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ABSTRACT

A frame of reference concerning health implications, based on the interaction of numerous factors in the physical, social, and biological environments, is provided in this prototype curriculum for grades 10-12. Development of sound techniques in problem solving is encouraged, resulting from the need to understand the nature and complexities of multiple effect and multiple causation. Specific curriculum content studies: (1) definitions of epidemiology and ecology, (2) epidemiological method, (3) factors which influence the occurrence, distribution, development, control, and prevention of disease, disability, defect, and death, and (4) modern public health problems with ecological implications. Appended material includes bibliographies of multimedia resources and a health behavior model. This publication is one in a series of health curriculum materials devoted to environmental and community health (Strand IV). Four other strands deal with physical and mental health, sociological health problems, and education for survival. The format consists of four columns intended to provide teachers with: (1) a basic content outline, (2) major understandings and fundamental concepts, (3) teaching aids and learning activities, and (4) information about resource materials, sources, and personnel. Because of the comprehensive nature of the total curriculum, teachers are advised to become familiar with all strands presently in print. Related documents in Strand IV are ED 037 738-9, ED 049 477-8, and SE 016 280-6. (BL)

ED 077723

PROTOTYPE
CURRICULUM MATERIALS
FOR THE ELEMENTARY
AND SECONDARY GRADES



HEALTH

STRAND IV ENVIRONMENTAL AND COMMUNITY HEALTH

Ecology and
Epidemiology of Health
Grades 10, 11, and 12

Special edition for
evaluation and discussion

THE UNIVERSITY OF THE STATE OF NEW YORK / THE STATE EDUCATION DEPARTMENT
BUREAU OF SECONDARY CURRICULUM DEVELOPMENT / ALBANY, NEW YORK 12224 / 1970

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SE 016 280

**PROTOTYPE
CURRICULUM MATERIALS
FOR THE ELEMENTARY
AND SECONDARY GRADES**

**U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION**

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HEALTH CURR. CULUM MATERIALS
Grades 10, 11, 12

STRAND IV - ENVIRONMENTAL AND COMMUNITY HEALTH
ECOLOGY AND EPIDEMIOLOGY OF HEALTH

The University of the State of New York/The State Education Department
Bureau of Secondary Curriculum Development/Albany 12224
1970

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Regents of the University (with years when terms expire)

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Director, Division of General Education

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Chief, Bureau of Health Education

John S. Sinacore

FOREWORD

This publication contains curriculum suggestions for teaching Strand IV - Environmental and Community Health - Ecology and Epidemiology of Health, for grades 10, 11, and 12.

The publication format of four columns is intended to provide teachers with a basic content outline, in the first column; a listing of the major understandings and fundamental concepts which children may achieve, in the second column; and information specifically designed for classroom teachers which should provide them with resource materials, teaching aids, and supplementary information, in the third and fourth columns.

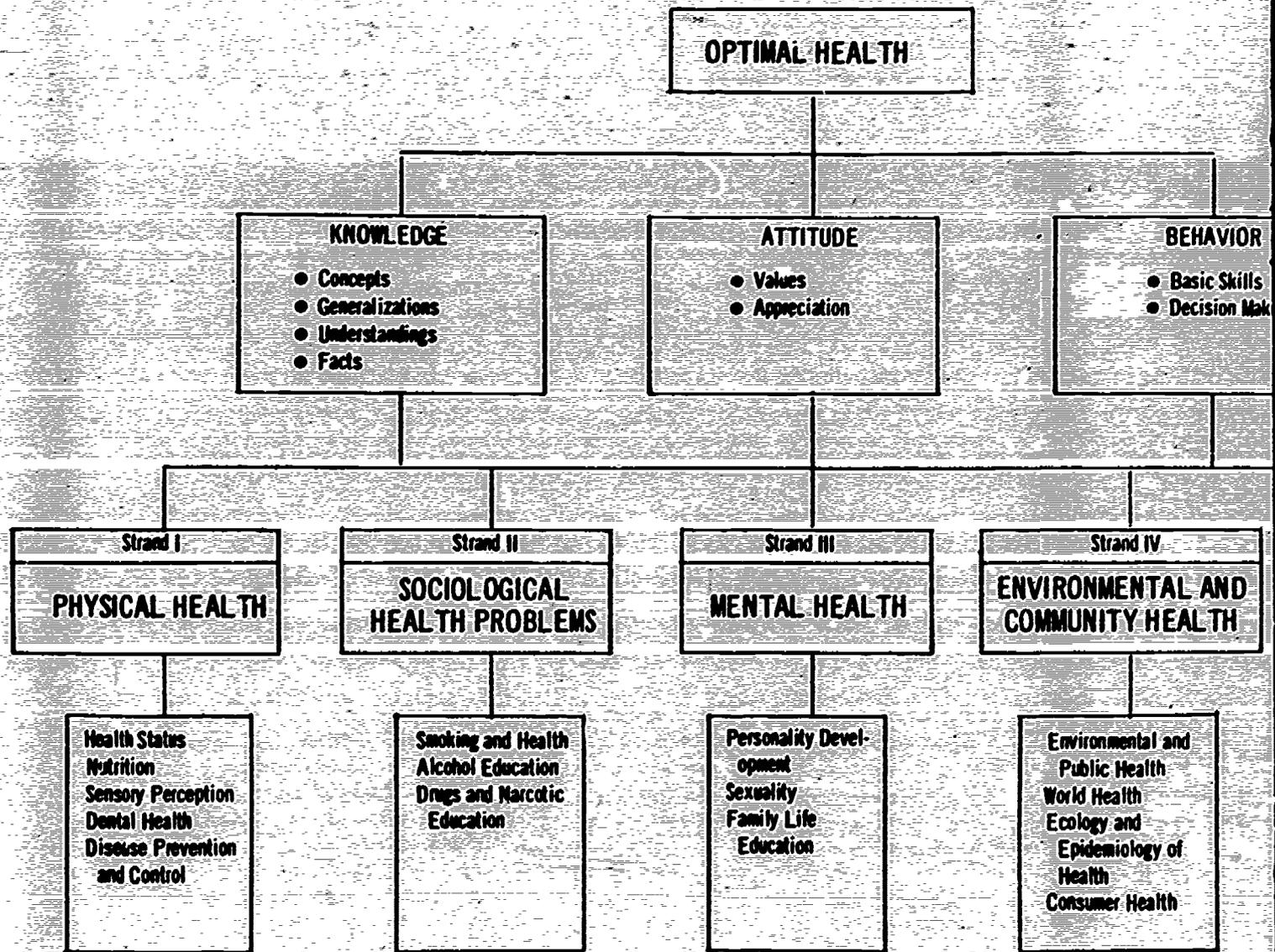
The comprehensive nature of the health program makes it imperative that teachers gain familiarity with all of the strands presently in print. In this way, important teaching-learning experiences may be developed by cross-referring from one strand to another.

It is recommended that the health coordinator in each school system review these materials carefully and consult with teachers, administrators, and leaders of interested parent groups in order to determine the most appropriate manner in which to utilize this strand as an integral part of a locally adapted, broad, and comprehensive program in health education.

The curriculum materials presented here are in tentative form and are subject to modification in content and sequence. Critiques of the format, content, and sequence are welcomed.

Gordon E. Van Hooft
*Chief, Bureau of Secondary
Curriculum Development*

William E. Young
*Director, Curriculum
Development Center*



OPTIMAL HEALTH

KNOWLEDGE
● Concepts
● Generalizations
● Understandings
● Facts

ATTITUDE
● Values
● Appreciation

BEHAVIOR
● Basic Skills
● Decision Making

Strand II
**SOCIOLOGICAL
HEALTH PROBLEMS**

Strand III
MENTAL HEALTH

Strand IV
**ENVIRONMENTAL AND
COMMUNITY HEALTH**

Strand V
**EDUCATION FOR
SURVIVAL**

Smoking and Health
Alcohol Education
Drugs and Narcotic
Education

Personality Devel-
opment
Sexuality
Family Life
Education

Environmental and
Public Health
World Health
Ecology and
Epidemiology of
Health
Consumer Health

Safety
First-Aid and
Survival
Education

ECOLOGY AND EPIDEMIOLOGY OF HEALTH

Grades 10, 11, 12

Overview

These materials are designed to provide a frame of reference for the student concerning the health implications of the interaction of numerous factors in his physical, social, and biological environments. Furthermore, each student should develop an appreciation and understanding of his personal role in this interrelationship, and the degree to which he controls and determines his health behavior.

The nature and complexities of multiple effect and multiple causation must be understood before the student can attempt to solve today's health problems, or to contribute to their solutions. The content of this strand attempts to help the student to develop sound techniques in solving health related problems. The processes of the epidemiologist are described extensively.

Pupil Objectives

Pupils in grades 10, 11, and 12 should:

- develop an approach to understanding and dealing with health problems.
- develop an understanding of the changing concepts of human ecology and epidemiology as they relate to public health, preventive medicine, and research.
- develop an understanding of modern concepts of health, disease, and longevity.
- become aware of the favorable and unfavorable ecological factors affecting man's health status.
- become familiar with current public health issues and problems that have ecological implications.

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OUTLINE OF CONTENT

**MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS**

**SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES**

**SUPPLEM
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**I. Definitions of
Epidemiology and
Ecology**

A. Human ecology

Human ecology is the science which studies the relationships of man as he interacts with his total environment, (physical, biological, and sociocultural).

View the film: *Population ecology.*

Ecology deals with the relationships between organisms and their environment. It considers the physical, biological, and social factors that influence the behavior of organisms. It also deals with the interactions between organisms and their environment, and the effects of these interactions on the environment.

B. Epidemiology

Present interpretation:
Epidemiology is the science and method of study concerned with the factors and conditions which determine the occurrence and distribution of health, disease, defect, disability, and death among groups of people.

The history of epidemiology from the past to the present has changed considerably. To truly appreciate the subject, it is suggested that the students read about and report on some of the outstanding epidemiologists (they may not have been referred to as such) and their contributions to epidemiology.

Infectious diseases are a major public health problem. They are caused by microorganisms and can be spread from one person to another. Some infectious diseases are highly contagious and can cause serious illness or death. It is important to understand the causes and transmission of these diseases in order to prevent and control them.

MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

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SUGGESTED TEACHING AIDS
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SUPPLEMENTARY INFORMATION
FOR TEACHERS

Ecology is the science that deals with the interrelationships of organisms and their environments. In human ecology the primary consideration is the interrelationship of man and his physical, emotional, and social environments. However, it should be noted that human ecology, at times, necessarily becomes involved with ecological relationships of other organisms. For example, intermediary hosts and vectors experience an ecological relationship in their own life cycle and may also be implicated in the transmission of disease to humans.

Infectious disease and communicable diseases, such as typhoid fever, TB, diphtheria, smallpox, whooping cough, etc., were at one time the primary concern of epidemiology. Since then, with the aid of the epidemiological approach, vaccines have either controlled or eradicated them. Consequently, epidemiology

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MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPP

1. Collection of
data

To determine normal and abnormal occurrence of disease, reporting and collection systems are necessary.

Refer to books and articles by Rouche, Dubos, DeKruif, Enders, Bankoff in the bibliography.

What diseases are "reportable"? How are vital statistics data collected? Write or visit a county health department to obtain a monthly vital statistics summary.

Obtain copies of *Vital Statistics of the U.S.* from the Superintendent of Documents, Washington, D.C.

Have some students refer to: *Principles of epidemiology* by Ian Taylor. Report to class the major principles of epidemiology.

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SUPPLEMENTARY INFORMATION FOR TEACHERS

has grown to encounter new problems, such as accidents (home, traffic, industry, etc.) heart disease, cancer, suicide, diabetes, to name a few, and even administrative problems not directly linked with disease.

An epidemic is defined as the occurrence, in a geographic area in a period of time, of an illness clearly in excess of normal expectation. Numerically, this may range from one case (smallpox) to thousands of cases (influenza). Non-epidemic disease frequency and distribution must be known to determine the occurrence of an epidemic. In chronic diseases, the prolonged epidemic waves are difficult to evaluate, hence epidemic and nonepidemic occurrence is confusing. Here the epidemiological approach is to study the correlation of factors thought to be associated in causing a disease (e.g. correlation of diet, cholesterol, obesity, and blood pressure with coronary heart disease.)

OUTLINE OF CONTENT

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

SUPP

2. Census reports

Census reports -- local, state, national, or international - provide information about people that is valuable in assessing their health status.

Learn about the history of the census. What data were collected in the 1970 census? Why?

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II. Epidemiological Method

A. Aims and purposes

It is necessary to describe and analyze disease distribution and occurrence according to such variables as age, sex, race, etc., so that preventive or control programs can be developed.

Contact your local health officer for information and material on preventive and control programs, for such diseases as rheumatic fever, phenylketonuria, polio, and diabetes.

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The study of the characteristics and interactions of agent, host, and environmental factors helps determine the cause of disease, disability, health problems, defect, and death.

The epidemiology of automobile accidents may be undertaken in conjunction with the driver education teacher.

Immunization programs (tetanus, measles, smallpox, etc.) may be researched and discussed in buzz

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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SUPPLEMENTARY INFORMATION FOR TEACHERS

Census data include such items as: population figures by race, age, sex, marital status, education, income, occupation, housing items, and many others. This information is extremely useful to health planning, projecting, and developing programs, and to statisticians in studying the various ecological factors involved in the distribution and occurrence of disease, defect, disability, debility, and death.

Primarily, epidemiological studies are undertaken to prevent further spread of the immediate hazardous situation. Once the diagnosis of the etiology (cause) of the outbreak has been determined, through clinical diagnosis and laboratory aids, the epidemiologist must find the source of infection. This requires comprehensive information about all possible modes of transmission of the type of infection under scrutiny.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

SUPPL

Epidemiology has aided in improving medical care and providing guidance for community health programs.

groups for comparison of differences and similarities. These are all results of epidemiological research.

Epidemiology provides the means for understanding local patterns of disease, so that individual therapy or community control measures may be more specifically and economically directed.

Make a list of the health resources in your community. What are their functions?

B. The epidemiological approach in scientific research

The epidemiological approach in scientific research is the application of the scientific method to the study of the conditions, situations, and diseases affecting man's health and welfare.

Suggested reading: *Epidemiologic approach to the study of primary hypertension* by E. Gurney Clark, M.D.

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1. Definition of the problems and clarification of objectives include:

- . nature, extent, and significance of the problem
- . framing of specific questions
- . statement of immediate and ultimate objectives
- . explanation of terms
- . statistical collaboration

For other case examples refer to the index volume of the *American Journal of Public Health*. Possible selections are:

- Smoking
- Accidents
- Poisonings
- Suicides
- Drug Abuse

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2. Appraisal of existing information on the subject:

- . search literature and other sources for data
- . classification and organization of data

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- Drug Abuse

SUPPLEMENTARY INFORMATION FOR TEACHERS

The application of the epidemiological approach to problems pertaining to groups of individuals also is used to gain solutions to nonepidemic problems. Hence, the focus of observation need not be directed solely at a population.

The nature (kind), extent (size), and significance (importance) of the problem at hand must be thoroughly understood from start to finish by all involved to insure uniformity of observations. That everyone understands the purposes, goals, and terminology is essential to free flowing communication without barriers. Recruiting technical assistance in statistical collaboration must be

OUTLINE OF CONTENT

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

SUPPLE

critical appraisal of existing data

Have students organize into several groups of 4 or 5 in each group. Using data already available, have each group study these data, organize them into meaningful categories, and interpret these data in view of the epidemiological approach herein described. Students should share their results with the rest of the class.

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3. Formulation of hypotheses: After gathering and analyzing the data, describe, within testable limits, what you think has caused or contributed to the cause of the problem and how you can solve the problem.

Data related to the venereal diseases, smoking and health, drug abuse, among others, may be used for this experience.

4. Testing of hypotheses: This may be conducted in the laboratory, the hospital, or the community:

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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SUPPLEMENTARY INFORMATION FOR TEACHERS

done in the initial stages of research.

The purposes of this step are to secure further data on the nature and significance of the problem, to evaluate critically the existing evidence, to separate fact and theory, and to reveal gaps in knowledge about the problem. This entails literature research, and reports, as well as their classification to permit an orderly arrangement of related aspects. Such arrangement allows critical evaluation of the collected data, as a whole, eliminating errors, revealing new knowledge, and providing a basis for making inferences and generalizations.

3. Formulation of hypotheses:
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Data related to the venereal diseases, smoking and health, drug abuse, among others, may be used for this experience.

4. Testing of hypotheses:
This may be conducted in the laboratory, the hospital, or the community.

A hypothesis must be formulated as thoroughly as possible and should be based upon needs, interests, and available resources. Testing the hypothesis includes the details of planning and executing the investigation. The object is to verify the hypothesis. It may take place in the hospital, laboratory, or

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5. Conclusions and practical application: This involves evaluation of the results.

What kinds of difficulties did the groups have? How are these overcome?

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Invite an epidemiologist to class to discuss his work in disease control and prevention in relation to epidemiology. What other methods does he use? Why?

III. Factors That Influence the Occurrence, Distribution, Development, Control, and Prevention of Disease, Disability, Defect, and Death.

A. Host factors

Host factors are those elements that influence health status which relate to the individual or group.

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community. Detailed plans for collection of information (sampling methods and size, controls, location and time factors, and training personnel who will collect the data) need to be written into the design. The classification, organization, tabulation, and analysis of data then can be done.

Once the hypothesis has been tested and a preventive or control program has been developed, evaluation of the outcome remains.

Most factors are those elements that influence health status which relate to the individual or group.

OUTLINE OF CONTENT

1. Heredity and health

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

The role of heredity in determining health status is extremely complex and dependent, in part, upon the interaction with environmental variables.

Many individuals generally confuse and interchange such terms as hereditary, congenital, and familial.

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

Make a list of diseases and defects which:

1. Are known to be solely hereditary
2. Are suspected to have a hereditary basis
3. Are thought to be congenital
4. "Run" in families

Distinguish between each of the above.

Why are the terms in the concept frequently confused?

Why do misconceptions persist?

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SUPPLEMENTARY INFORMATION FOR TEACHERS

Genes tend to produce their effects through metabolic pathways that are controlled by enzymes. Some scientists feel that all diseases have a genetic component and result from hereditary flaws in protein, fat, or carbohydrate metabolism.

Biochemical processes under genetic control help to determine individual metabolic variations related to the functioning of vital body organs and systems, reactions to stress, the onset and severity of communicable and chronic disease; and health, aging, and longevity.

A disease, defect, or abnormality is considered to be hereditary if such condition is caused by a defective gene. Congenital refers to the fact that the condition was present at birth. It may be acquired in the uterus by virtue of metabolic, hormonal, infectious toxin, environmental, or other factors.

OUTLINE OF CONTENT

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

The fact that a condition is congenital (present at birth) or familial (appears in the family) does not necessarily mean that it is hereditary (genetically transmitted).

Many aspects of genetic study have direct application for public health activities.

Radiation is but one of the forces capable of affecting genetic material through mutation.

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

Discuss how various behavioral traits and styles of living are related to health and disease.

- Why do some conditions tend to "run in families"?
- What part does heredity play? Habits of living? Combinations of factors?

Investigate what genetic counseling services, if any, are available in your community. What do these services do? How long have they been in existence? Whom do they serve?

Read books such as *Lucky Dragon #5* and *Hiroshima*, listed in the bibliography.

SUPPLEMENTS FOR

Behavior to certain deficiencies medical nutrition, the risk of contracting disease. Examples:
• Coronary and diet
• Lung
• Child and cancer
Mothers their incidence This may hormonal
• Present disease

The present material is of both short and long effects.

A host of identified effects found in

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUPPLEMENTARY INFORMATION FOR TEACHERS

Behavioral traits peculiar to certain families (dietary deficiencies, lack of medical care, habits, occupation, etc.) may increase the risk of the members contracting certain diseases.

Examples:

- . Coronary heart disease and dietary habits of consuming food rich in fat
- . Lung cancer and smoking
- . Child rearing practices and cancer of the breast. Mothers who breast feed their infants have a lower incidence of breast cancer. This may be related to a hormonal factor.
- . Presence of respiratory disease among coal miners

The presence of radioactive materials in the environment is of concern because of short term (medical) effects and long term (genetic) effects.

A host of chemical substances identified through their effects in animals also are found in man's environment.

OUTLINE OF CONTENT

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

SUPPL

2. Heredity and disease

Although the ranking order of our major causes of death has undergone a dramatic change since 1900, heredity has not been a primary factor in this change.

Have students develop a list of the 10 major causes of death in 1900 and compare these with the 10 major causes of death today, for all ages. What are the etiologies of these diseases? (See chart 1 in the appendix.)

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In some diseases, such as Huntington's chorea, the genetic component is quite explicit. In others, such as the communicable diseases, the environmental factors appear to predominate. Between these two extremes, the environmental and genetic factors operate with varying degrees of importance.

Are genetic diseases automatic? Explain. How has our environment changed in the past 50 years to help eliminate some diseases? How has it changed to contribute to an increase in some diseases? Have we actually been creating new diseases? Explain.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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Are genetic diseases automatic? Explain.

How has our environment changed in the past 50 years to help eliminate some diseases? How has it changed to contribute to an increase in some diseases? Have we actually been creating new diseases? Explain.

SUPPLEMENTARY INFORMATION FOR TEACHERS

In 1900, the major killers were pneumonia and influenza, tuberculosis, enteritis, heart disease, and cerebral hemorrhage. Today, in ranking order they are: diseases of the heart; cancers and other malignancies, cerebral hemorrhage, accidents, influenza, and pneumonia.

The ranking order over the past 68 years would not have undergone such a dramatic change if heredity were the major factor.

The hereditary makeup of our population has not changed significantly during the past 68 years, only the environment. However, the more we eliminate the worst hazards in our environment and the more we equalize conditions for all individuals, the more chance there is for the inherent differences in individuals to assert themselves. Thus, the role of heredity becomes increasingly more important in respect to disease and its possible effects on humans. Huntington's chorea is a mental disorder caused by a single dominant gene.

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Have students read and report about the role of heredity in specific diseases.

Read: *Your heredity and environment* by Amran Scheinfeld.

Some scientists feel that all diseases have a genetic component.

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The individual deteriorates physically and psychologically.

Have students read and report about the role of heredity in specific diseases.

Read: *Your heredity and environment* by Amran Scheinfeld.

A general classification suggested by Scheinfeld for discussing the role of heredity in disease is as follows:

1. Those diseases most directly inherited in which environment plays only a small part in causation, (the majority of cases of diabetes mellitus, some very rare forms of cancer such as cancer of the eye, and a host of rare conditions).
2. Those diseases which are conditionally inherited in which the individual will develop the disease only under certain adverse environmental circumstances, (some types of heart and arterial diseases including arteriosclerosis and possibly rheumatic heart disease, plus a number of metabolic disorders).
3. Those diseases which are influenced by heredity in some manner. This may be the case for most of our diseases. It is possible that for many of our infectious diseases some individuals may have inherited

Some scientists feel that all diseases have a genetic component.

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3. Sex and health

Sex is one of the genetic factors that governs life expectancy.

Have students compose a chart showing the sex differences, in terms of the causes of death during infancy. Discuss why these differences exist. Obtain data from "Sex differences in causes of death during infancy..." *Vital Statistics of the U.S.*

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Compare and contrast the differences in life expectancy between the sexes in 1900 and today. Discuss why the gap has widened.

The existing higher life expectancy of the female appears to stem from some inherent advantage possessed by the female in combating disease and stress that is able to assert itself with improvements in the environment.

Evidence that the extra margin of female longevity is conditioned by the environment is seen in underdeveloped countries. The worse the

Make a list of diseases and defects which appear to be sex-linked.

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MAJOR UNDERSTANDINGS AND
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SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

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Make a list of diseases and defects which appear to be sex-linked.

SUPPLEMENTARY INFORMATION
FOR TEACHERS

constitutional weakness, and given the proper environmental circumstances they may become easier prey than others to infection.

In 1965, the expectation of life at birth was 74.7 for white females and 67.6 for white males. Thus, expectation among white females exceeds that for white males by 7.1 years. In 1956, females outlived males by 6.4 years, and in 1900, by only 2.9 years.

In 1963, in Bolivia, the life expectancy of both sexes was 49.7 years. Hence, the innate advantage of the female could not assert

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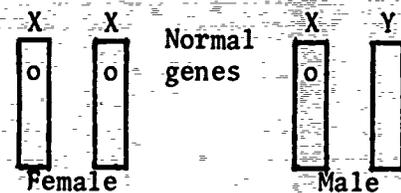
living and health conditions, as reflected in higher death rates and lower life expectancies, the smaller is the excess of female over male life expectancy.

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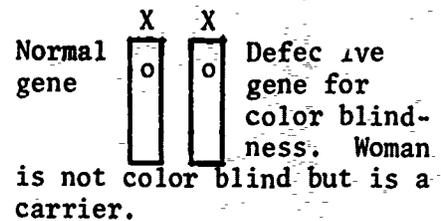
The male is more likely to inherit sex-linked diseases and defects.

Color blindness (sex-linked defect)

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Why is the male more apt to inherit sex-linked conditions?



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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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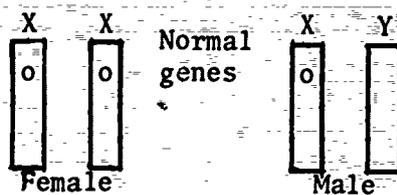
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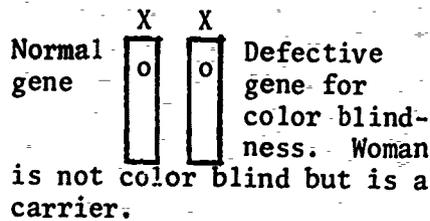
itself because of the poor environmental conditions affecting both sexes. Also, in India, the life expectancy for the male is 45.2 years and for the female, 46.6 years. The more we improve the environment, the better able the female is to assert her inherent advantage as evidenced by the 7.1-year advantage that the U.S. female possesses.

The male is more likely to inherit sex-linked diseases and defects.

Color blindness (sex-linked defect)



Why is the male more apt to inherit sex-linked conditions?



Sex-linked conditions result from defective genes carried on the X chromosome. At conception, the female received two X chromosomes (one from each parent). The male receives only one X chromosome from his mother and the Y from his father. Thus, the male is more vulnerable to defects since there is no corresponding gene on the opposite Y chromosome to neutralize the effects of the gene which causes the defect.

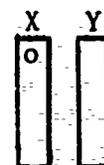
To produce a sex-linked defect in the male, only one defective gene is needed. The female needs two defective genes as the chances are that there will be a normal gene on the other X

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Male defective gene
 No corresponding site on Y chromosome to offset the defective gene. Man is color blind.

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Fathers can transmit color-blindness to daughters only, as it is carried on the X chromosome and not the Y.

Hemophilia is another disorder which can be analyzed and discussed with regard to its sexual and genetic implications.

Differences in chemical functioning appear to endow the female with certain advantages in resisting and fighting disease.

Present arguments show that, in reality, the male is the "weaker sex." (Genetically speaking). Why?

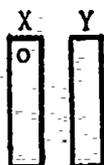
Refer to Amram Scheinfeld, op. cit.

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Refer to Amram Scheinfeld, op. cit.

chromosome to neutralize the effects. Other conditions that are sex-linked defects include hemophilia and some forms of near-sightedness, enlarged cornea, defective iris, optic atrophy, nystagma, and muscular dystrophy (duchenne type).

The clearest evidence for the greater longevity of the female appears in the role of the sex-hormones: the female produces proportionately more of the estrogens and the male more of the androgens. The female tends to be biochemically more variable due to changes in body chemistry that occur during menstruation and child-bearing. It is possible that this variability helps her to adjust to stress and disease better than her male counterpart.

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The death rate from heart disease among men treated with female hormones (estrogens) after a 5-year period was about half that of a control group who did not receive the female hormones.

How may this difference of diseases of the sexes be explained?

What part does biological make-up play? Differences in daily activity? Childhood activities?

The female has a lower mortality rate at all ages from most diseases than the male. When we classify causes of death into body systems, we find that the female has a higher overall death rate from disorders of the endocrine system. Diabetes mellitus is one of the few diseases that kills more women. (About one-third more women than men die from diabetes.)

However, even as we find the sociocultural differences between the sexes becoming more similar with respect to work, smoking, behavior, etc., we also find that the differences in life expectancy are increasing between the sexes, instead of narrowing. This suggests that the hereditary and biochemical differences must exert a powerful influence that tends to favor the female more than the male.

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**4. Race and
health**

Differences in life expectancy between whites and nonwhites still exist today.

As the nonwhite population makes continued economic and social advances the differences in life expectancy between the races should diminish.

Have students compare the life expectancy figures for the white and nonwhite population.

Discuss:

1. Why do these differences exist in life expectancy?
2. Why are the differences between the sexes in life expectancy not as great as in the white population?
3. What happens to these differences when one controls for income?

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**5. Occupation and
health**

Higher economic and social groups tend to have lower mortality rates and a longer life expectancy. Lower socioeconomic groups tend to have higher mortality rates and lower life expectancy.

Discuss how occupation and life expectancy are related.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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Discuss how occupation and life expectancy are related.

SUPPLEMENTARY INFORMATION FOR TEACHERS

In 1900, the life expectancy for the American Negro was 32.5 years for the male and 35 for the female (16 years less than for the white population).

In 1965, the life expectancy for the nonwhite male was 61.1 years and 67.4 years for the female (a difference of 6.5 years for the male and 7.3 years for the female as compared to the white population).

Racial differences in life expectancy are strongly influenced by income level. High-income blacks' and high-income whites' life expectancy show less discrepancy than that for high-income and low-income blacks.

Scientists, teachers, and social workers tend to have the highest longevity rates of all of the occupational groups. At the low end of the longevity slide we find miners, musicians, tailors, and taxi drivers.

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Environmental factors such as differences in occupation, habits, and behavior may predispose the male to greater risks with respect to disease and death.

Have students compare and contrast the mortality and morbidity rates from selected diseases and accidents in various occupations. Have students interpret and analyze why the differences exist.

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The morbidity and mortality rates of workers in some occupations are influenced directly by exposure to accidents and dust.

Insurance companies may have data relative to occupational diseases and injuries.

Compare and categorize various occupations according to their disease epidemiology. (Miners, general factory workers, chemical workers, teachers, truck drivers, dentists, lawyers, etc.).

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SUPPLEMENTARY INFORMATION
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Differences in longevity between the various occupational groups may be due not only to the nature of the work involved but also to the attitudes, habits, and living conditions of the personnel engaged in their occupations. Various studies indicate that lower socioeconomic groups tend to perceive health differently than higher socioeconomic groups. Lower socioeconomic groups tend to be delayers in seeking medical care and are less oriented towards preventive medicine than higher socioeconomic groups.

Environmental social conditions may by themselves directly cause disease in man. Epidemiological studies showed that among workers exposed to large quantities of silica dust, the tuberculosis death rate is much higher than the average for people employed in other occupations. Also, silicosis, a disease of the lungs caused by breathing air containing large amounts of silica dust, is more common in occupations concerned with mining, quarrying, or drilling. High

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**6. Psychological
and social
factors and
health**

**a. Psychological
factors**

Psychological factors are components related to the will or mind.

Refer to Chart 2 in the appendix.

**b. Social
factors**

Social factors relate to the interaction of the individual and the group.

Form small groups to discuss the psychological and social factors involved in selected current psychosocial problems, for example, drug abuse, crime, teen-age out-of-wedlock pregnancies.

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accidental death rates are observed in the mining, quarrying, and oil and gas industries. Construction and agricultural workers also have higher-than-average accidental death rates.

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Psychological factors are components related to the will or mind.

Social factors relate to the interaction of the individual and the group.

Refer to Chart 2 in the appendix.

Form small groups to discuss the psychological and social factors involved in selected current psychosocial problems, for example, drug abuse, crime, teen-age out-of-wedlock pregnancies.

Psychological and social factors involve the individual and the group. There are specific needs, values, codes, norms, etc., that concern each; yet, they are quite apt to be different for the individual when they relate to him alone versus his interactions with others in a group situation. Behavior by the individual and by the group is affected by social and psychological factors. These complex factors are only two of many influences on behavior, as can be seen in the behavior model in Chart 2, p. 48.

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7. Cultural effects
on health

Culture is a way of thinking, feeling, and believing. It is the group's knowledge stored up for future use and applies to any number of health issues.

Culture varies in its patterns and meanings for different social units, depending upon the history of the social unit in perceiving and dealing with life's issues in different settings.

Differences in health, attitudes, beliefs, values, and behavior are found to exist in low-income groups.

Assign groups to research and report on the cultural influences of the following topics:

- . psychiatric treatment
- . pain reaction
- . patient care (seeking and utilizing medical care)
- . public health programs
- . dental care

Have students report on the health problems of minority groups in the United States.

Read: *Low-income life styles* by L. H. Irelan.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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- public health programs
- dental care

Have students report on the health problems of minority groups in the United States.

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SUPPLEMENTARY INFORMATION FOR TEACHERS

An example of how culture affects health can be seen most clearly by an example such as alcoholism. Various cultural groups (ethnic groups) react differently to alcohol, i.e., they regard and use it differently. This difference is shown in their alcoholism rates. The Irish, for example, experience higher alcoholism rates than the Jews. This is due in part to their differing attitudes and experiences with alcohol. Religion and familial values and uses have a definite influence on the meaning and perception of alcohol in their respective cultures. This same reasoning can be applied to the way various cultures regard fear, sickness, etc.

Low-income groups in the United States are generally characterized by possessing certain factors in comparison to the middle and upper income groups.

Lower income groups tend to:
1. Possess higher morbidity and mortality rates for many diseases.

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Attitudes of fatalism and helplessness, a preference for personalized relationships with the subprofessional, and the materialistic values of the lower economic groups tend to exert a forceful impact on influencing their health behavior.

Individuals who have a limited income and generally little hope of improving their economic conditions perceive health and health services in a different perspective.

Invite an OEO, Welfare, or a social worker to your class to discuss the health problems and needs of the lower economic groups.

Discuss the effects of medicaid on the health practices of the poor.

Have students read *Mirage of health* by Rene Dubos.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUPPLEMENTARY INFORMATION FOR TEACHERS

The incidence of rheumatic fever, cancer, heart disease, and diabetes mellitus tends to rise with decreasing social class.

2. Have less accurate health information. Loss of teeth and dental decay are perceived of as being incurable and unavoidable.

3. Define health as the "ability to continue working." Only when the poor cannot fulfill their job responsibilities do they consider themselves sick.

4. Be less likely to utilize preventive health measures. Immunization studies indicate that they are less likely to have their children immunized against specific diseases.

5. Delay longer in seeking health services. Treatment is usually begun at a late stage in the disease process.

6. Participate little or be nonparticipants in community health programs. Poverty groups are characterized by a lack of utilization of health services.

7. Seek advice of subprofessionals on health matters. They are more likely to seek the advice of some person other than a medical

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Differences still exist today with respect to infant and maternal mortality rates between the races.

Discuss what basic factors play a role in determining the differences in death rates that exist between white and nonwhite groups.

Health programs are frequently impeded by the failure of health personnel to understand the cultural system of the community they are working in. Health programs need to be related to the cultural system in which they operate. They must relate to what is familiar to the people.

Discuss why poor communication is one of the major barriers to public health programs.

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Discuss why poor communication is one of the major barriers to public health programs.

doctor. Awareness of social distance is probably linked with lack of utilization of health services. Subjective appraisal of the practitioner's competencies often determines who he will select for medical care.
8. Be exposed to more health hazards by virtue of their environment and occupation.
9. Place health low on their value system. Priority is given to the material necessities of life.

In 1965, the infant mortality rate per 1000 Negro live births was 40.3 as compared to 21.5 for the white population. The maternal mortality rate per 100,000 Negro live births was 83.7 as compared to 21.0 for white population.

Problems in communications are one of the major barriers to successful public health programs and services.

Language difficulties, as well as differences in values, complicate attempts to communicate and to comprehend the efforts of health workers.

OUTLINE OF CONTENT

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

SUPP

The culture acts as a filter through which the communication message must pass if it is to be received and understood.

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B. Agent factors

Agent factors are those elements and substances, both living and nonliving, which can cause or continue a disease process in a susceptible host under certain environmental conditions.

Have students read, list, and report those diseases falling in this category. Reference: *Control of communicable diseases in man*, edited by John E. Gordon, M.D.

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1. Classes of agent factors

Biologic agents are living disease agents such as Arthropods (insects), Helminths (worms), Protozoa (microscopic parasites), Fungi (yeasts and molds), Bacteria (single celled organisms), Rickettsiae (smaller than bacteria - intracellular parasites,) Viruses (smallest known living agents of disease).

Read: *Microbe hunters* by Paul DeKruif.

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a. Physical agents

Show and discuss the film: *Anatomy of a disease*.

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MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

The culture acts as a filter through which the communication message must pass if it is to be received and understood.

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SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

Have students read, list, and report those diseases falling in this category. Reference: *Control of communicable diseases in man*, edited by John E. Gordon, M.D.

Read: *Microbe hunters* by Paul DeKruif.

Show and discuss the film: *Anatomy of a disease*.

SUPPLEMENTARY INFORMATION
FOR TEACHERS

For a message to have an effect, it must be received, understood, and perceived as cogent and reasonable.

Biologic agents, parasites of man, are classified in decreasing order of size as follows:

- . Arthropods are important primarily as vectors of other disease agents, i.e., mosquitoes carry the agent for malaria and yellow fever.
- . Helminths include: hookworms, tapeworms, round worms (*Trichinella spiralis* causes trichinosis), and schistosomes, etc. (causes schistosomiasis).
- . Protozoa as microparasitic animals cause such diseases as amebiasis, malaria, etc.
- . Fungi may produce conditions as actinomycosis, coccidiomycosis, hystoplasmosis, etc.
- . Bacteria, generally visible under a microscope, cause diphtheria, gonorrhoea, syphilis (spirochete), pneumonia, etc.
- . Rickettsiae, smaller than most bacteria, are parasites of arthropods and man and are responsible

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MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
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SUPPLEMENTS
FOR

b. Nutrient
agents

Nutrient agents are nonliving chemical substances necessary to sustain life, such as carbohydrates, proteins, fats, vitamins, minerals, water.

Have students read and report on the various problems associated with causation by nutrient agents.

- (1) *Nutrition science and you* by Olaf Mickelsen.
- (2) *Obesity and health*, U.S. Dept. of H.E.W., P.H.S.

Question for research and discussion: What are the effects of insufficient or excessive intake of vitamins, fats, proteins?

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MAJOR UNDERSTANDINGS AND
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SUPPLEMENTARY INFORMATION
FOR TEACHERS

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Question for research and discussion: What are the effects of insufficient or excessive intake of vitamins, fats, proteins?

for endemic typhus fever, Rocky Mountain spotted fever, etc. All are transmitted by means of an arthropod vector.

. Viruses, the smallest known agents of disease, require living cells for propagation. They cause such diseases as: smallpox, polio, influenza, measles, yellow fever, etc.

Nutrient agents include:

. Carbohydrates - Disease may arise from excess (obesity), deficiency (starvation), or improper utilization (diabetes).

. Proteins - Lack of essential amino acids may lead to a nitrogen imbalance in the body.

. Fats - When excesses are stored, it leads to overweight and obesity.

. Vitamins - A diet deficient in a given vitamin results in a specific metabolic abnormality or deficiency disease, for example rickets (lack of vitamin D), hypervitaminosis (too much vitamin A or D).

. Minerals - Lack of iron, for example, can cause anemia.

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c. Chemical
agents

Chemical agents are those nonliving substances found outside of the host (gas, alcohol, drugs, etc.) and those produced inside the body (toxic substances).

Read and report on diseases and problems caused by chemical agents. Subject references: carbon monoxide poisoning, drug abuse and narcotics addiction, lead poisoning, poison ivy, etc.

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d. Physical
agents

Physical agents are the non-living forms of matter or energy that disorganize cell, tissue, and body function (radiation, heat, cold, pressure, humidity, sound, etc.).

Read and report on diseases and conditions caused by physical agents. Subject areas: radiation sickness, frostbite, caisson disease, etc.

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etc.

2. Absence of
known factors

The causes of many diseases are yet unknown.

Divide the class into several groups and have them list as many diseases of unknown cause as possible. Then compare the lists of the groups.

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MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

Chemical agents are those nonliving substances found outside of the host (gas, alcohol, drugs, etc.) and those produced inside the body (toxic substances).

Physical agents are the non-living forms of matter or energy that disorganize cell, tissue, and body function (radiation, heat, cold, pressure, humidity, sound, etc.).

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SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

Read and report on diseases and problems caused by chemical agents. Subject references: carbon monoxide poisoning, drug abuse and narcotics addiction, lead poisoning, poison ivy, etc.

Read and report on diseases and conditions caused by physical agents. Subject areas: radiation sickness, frostbite, caisson disease, etc.

Divide the class into several groups and have them list as many diseases of unknown cause as possible. Then compare the lists of the groups.

SUPPLEMENTARY INFORMATION
FOR TEACHERS

. Water - composing about $\frac{2}{3}$ of the total body mass - is required for many physiologic functions.

Chemical agents are of two types: exogenous (arise outside of the host) and endogenous (are produced inside the host). Exogenous agents include gas (carbon monoxide), vapor (lead), mineral dusts (silica), air-borne particles, beverages (alcohol), drugs, acids, cosmetics, poison ivy, snake venom, etc. Endogenous agents include such things as diabetic acidosis and uremic poisoning.

Physical agents include radiation (radiation sickness), heat (burns), cold (frostbite), atmospheric pressure (caisson disease), sound (loss of hearing), etc.

Many major and minor, common and rare diseases exist that are of unknown etiology, for example: the common cold, essential hypertension, diabetes, tumors, many forms of mental disorders, and cancer, to mention a few. Although

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C. Environmental
factors

1. Necessities of
a healthful
environment

The essential factors of a
healthful environment are:
. clean air to breathe
. clean water for drinking
and recreational purposes
. clean land to enjoy and
live on
. healthful housing
. clean food to eat

The most likely sources for
obtaining speakers on the
physical environment are
the county health depart-
ment and the conservation
department. A sociologist,
if available, from your
school or a nearby college
could explain social
theory and health.

2. Housing and
health

Incidence of disease, death,
disability, crime, and acci-
dents are higher for people
living in substandard
housing than those who live
in adequate housing.

Read *Sociological studies
of health and sickness* by
Dorian Apple.

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The essential factors of a healthful environment are:

- . clean air to breathe
- . clean water for drinking and recreational purposes
- . clean land to enjoy and live on
- . healthful housing
- . clean food to eat

Incidence of disease, death, disability, crime, and accidents are higher for people living in substandard housing than those who live in adequate housing.

The most likely sources for obtaining speakers on the physical environment are the county health department and the conservation department. A sociologist, if available, from your school or a nearby college could explain social theory and health.

Read *Sociological studies of health and sickness* by Dorian Apple.

research is coming close to isolating specific causative and contributory factors of some diseases, many diseases still remain a mystery.

Every family has a right to a decent home and a suitable living environment. When this right is not fulfilled, health problems arise. In 1960, 15.4 percent of the dwellings in upstate New York were considered as substandard housing, while 19.1 percent of the dwellings in New York City were so labelled. This is not subject to statistical analysis, since poverty, malnutrition, and lack of medical care and education also have an effect on

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a. Slum

A slum is a neighborhood in which dwellings lack: private inside toilet and bathing facilities, hot and cold running water, adequate heat, light, ventilation, quiet, clean air, and space for the number of persons housed.

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A slum is a neighborhood in which dwellings lack: private inside toilet and bathing facilities, hot and cold running water, adequate heat, light, ventilation, quiet, clean air, and space for the number of persons housed.

health status, and it is difficult to isolate any one factor as having a cause-and-effect relationship to ill health. However, substandard housing is associated with increased rates of ill health. For example, juvenile delinquency is twice as high as the national average; mental illness is more prevalent (40 percent of patients in state mental institutions were from substandard housing areas according to one study); broken homes, prostitution, TB, infectious disease, crimes, fires, accidents, VD, pneumonia, and infant mortality and infant morbidity all have higher incidence in substandard housing areas. Life expectancy is even lower for these people.

Slums are said to be the result of: poverty, lack of education, social inequities and cultural patterns, substandard housing and neighborhoods, migration, indifference, obsolescence, lack of housing codes and enforcement, poor health services,

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b. Blight

An area of no growth in which buildings are allowed to deteriorate is said to be in a condition of blight, ex., urban blight.

3. Population growth and environmental planning

Planning for new housing needs necessitates concern for additional water supplies, solid waste collection and disposal, recreational facilities, schools, books, land, public services, streets, sewage treatment facilities, etc.

Assign a study project on "housing - conditions, needs, and plans for present and future development." Suggest that the following offices be visited: health department, housing and urban development, and other offices or commissions concerned with zoning and building codes.

Show the film: *Population ecology*.

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**MAJOR UNDERSTANDINGS AND
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An area of no growth in which buildings are allowed to deteriorate is said to be in a condition of blight, ex., urban blight.

Planning for new housing needs necessitates concern for additional water supplies, solid waste collection and disposal, recreational facilities, schools, books, land, public services, streets, sewage treatment facilities, etc.

**SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES**

Assign a study project on "housing - conditions, needs, and plans for present and future development." Suggest that the following offices be visited: health department, housing and urban development, and other offices or commissions concerned with zoning and building codes.

Show the film: *Population ecology*.

**SUPPLEMENTARY INFORMATION
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and relatively excessive costs.

Population growth is primarily toward the suburbs. Projected indications are for 70,000 dwelling units per year in addition to replacement housing to satisfy growth needs. Every 1000 new people will require:

- . additional water supply, 100,000 to 200,000 gallons per day
- . solid waste collection and disposal, 4,000 to 6,000 lbs. per day
- . recreation facilities, for more people with more leisure time
- . schools, 4.8 new elementary classrooms and 3.6 new high school classrooms
- . land, 10 or more acres for schools, parks, play areas
- . services, 1.8 policemen and 1.5 firemen

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4. Interrelation-
ship of
factors in the
physical en-
vironment

The interrelationship of en-
vironmental factors means that
any single factor can affect
one or more other factors,
thus changing the total en-
vironment to the benefit or
detriment of one's health.

Assign small groups to
discuss the interrelation-
ships of various physical
environmental factors
(refer to column four) in
relation to one given
factor. Each group could
be given a different
factor. Have each group
report its results to the
rest of the class after-
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The interrelationship of environmental factors means that any single factor can affect one or more other factors, thus changing the total environment to the benefit or detriment of one's health.

Assign small groups to discuss the interrelationships of various physical environmental factors (refer to column four) in relation to one given factor. Each group could be given a different factor. Have each group report its results to the rest of the class afterwards.

- . streets and roads, more than 1 mile, which have to be cleared of ice and snow and drained
- . 1000 new library books
- . air pollution, \$20,000 to control sources and \$65,000 to offset physical damage caused by air pollution
- . sewage treatment, facilities to handle 100,000 to 150,000 gallons per day
- . more autos, retail stores, service commercial and industrial areas, county and state parks, and private enterprises

Consider the following factors in the physical environment:

- . water supply
- . sewage and other waste water disposal
- . housing
- . recreation
- . geology and soil
- . air pollution
- . zoning
- . highway construction

All of these factors are affected by each other. For example, the water supply affects and is affected by sewage, solid waste disposal, and geology

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5. Social environ-
ment

Social environment relates to societies, their cultures and subcultures, their groups and orders, persons and their relationships, objects, ideas, and all the meanings assigned to them that together comprise the social setting in which man transacts his affairs.

Pick a current health issue and assign a research project on the various viewpoints about the issue held by individuals, social groups, service organizations, racial groups, religious groups, political organizations, governmental organizations, etc. When the reports are summarized, bring out ways in which the individual is affected by, and affects, social opinion and action.

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**MAJOR UNDERSTANDINGS AND
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on- Social environment relates to societies, their cultures and subcultures, their groups and orders, persons and their relationships, objects, ideas, and all the meanings assigned to them that together comprise the social setting in which man transacts his affairs.

**SUGGESTED TEACHING AIDS
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**SUPPLEMENTARY INFORMATION
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and soil conditions. Housing is affected by zoning, geology, air pollution, water supply, sewage and solid waste disposal, etc. The lack of optimal conditions regarding the total environment negatively affects the physical, emotional, and social well-being of people.

Social environment may be said to include:

- . the density and composition of various populations, conceived as communities, ethnic and racial groups, and social classes
- . the organized human groups of which individuals are members, ranging from families, schools, and factories to nation-states
- . the socially defined roles embedded in such groups, including age and sex roles, and occupational and family roles
- . the shared symbols, values, laws, and norms which guide the behavior of individuals in groups
- . the technologies and material apparatus available to different groups

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a. Effects of social factors on health	Health is affected by social factors on an individual, as well as group, basis.		in pl Soci heal . Ac in t many a ph geog . Pl the dise . De tion publ the carr prob . De soci to m
D. Interaction of agent, host, and environment	The interaction of agent, host, and environment concerns itself with conditions under which the agent, host, and environment affect each other to initiate a disease process.	Recommended film: <i>The epidemiology of staphylococcal infections.</i>	See, Dise Cont
1. Mode of transmission	The mode of transmission is the mechanism by which disease agents are transported from the "source" to the host. This might be by:		
a. Contact transmission	Contact transmission involves direct or indirect contact with the infectious agent.	Students may list and discuss several diseases spread via contact	Cont by d touc

MAJOR UNDERSTANDINGS AND
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Health is affected by social factors on an individual, as well as group, basis.

The interaction of agent, host, and environment concerns itself with conditions under which the agent, host, and environment affect each other to initiate a disease process.

The mode of transmission is the mechanism by which disease agents are transported from the "source" to the host. This might be by:

Contact transmission involves direct or indirect contact with the infectious agent.

SUGGESTED TEACHING AIDS
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Recommended film: *The epidemiology of staphylococcal infections.*

Students may list and discuss several diseases spread via contact

SUPPLEMENTARY INFORMATION
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in various times and places.

Social factors influence health in four ways:
. Act as basic determinants in the distribution of many diseases. Disease is a phenomenon that varies geographically.
. Play an important part in the etiology of many diseases
. Define which health conditions shall be considered public health problems and the activities that may be carried out to meet these problems
. Determine the response of society and the individual to many health problems

See, also, Strand IV, Disease Prevention and Control.

Contact transmission may be by direct contact (by touching the source), by

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b. Air-borne
transmission

Air-borne transmission refers to the infectious agent being transported through the air.

transmission (venereal disease, rabies, hookworm, etc.), and the means of controlling them.

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c. Vector
transmission

Vector transmission refers to the infectious agents being transported via an intermediary host - fly, flea, mosquito, tick, mite, etc.

Students may list and discuss several diseases spread via air-borne transmission (sillicosis, tuberculosis, brucellosis, etc.), and the means of controlling them.

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Have students report on methods and instances of controlling the cycle of infection:

- . Avoidance, e.g., mosquito netting
- . Repellants, e.g., N, N-diethyl-m-tolumide
- . Insecticides, e.g., DDT, chlordane
- . Reducing breeding vectors, e.g., poison, mosquito spraying, baiting of rats

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

Air-borne transmission refers to the infectious agent being transported through the air.

Vector transmission refers to the infectious agents being transported via an intermediary host - fly, flea, mosquito, tick, mite, etc.

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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Students may list and discuss several diseases spread via air-borne transmission (sillicosis, tuberculosis, brucellosis, etc.), and the means of controlling them.

Have students report on methods and instances of controlling the cycle of infection:

- . Avoidance, e.g., mosquito netting
- . Repellants, e.g., N, N-diethyl-m-tolamide
- . Insecticides, e.g., DDT, chlordane
- . Reducing breeding vectors, e.g., poison, mosquito spraying, baiting of rats

SUPPLEMENTARY INFORMATION FOR TEACHERS

indirect contact (touching contaminated objects), or by droplet spread (coughing, sneezing, smoke, fumes).

*Some diseases transmitted by contact: venereal disease, whooping cough, plague, rabies, polio, ringworm, hookworm, etc.

Air-borne transmission may include droplet nuclei (residue suspended in air), dust (from floors, soil), and radiation (alpha, beta, and gamma rays, ultraviolet, X-rays). Some diseases transmitted by the air-borne route: tuberculosis, psittacosis, brucellosis, sillicosis, anthrax, etc.

Vector transmission - Arthropods may transmit infection by biting through or depositing infective materials on the skin. The vector itself may be infected, or may only be a carrier of the agent. The vector might be a fly, mosquito, tick, flea, etc. The agent might be a bacterium, virus, rickettsia, snake venom, etc.

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Show 16-mm, sound, color
film: *Epidemiology of
murine typhus.*

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Show and discuss the film:
*Epidemiology of salmonel-
lucis in man and animals.*

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Show 16-mm, sound, color
film: *Epidemiology of
murine typhus.*

Show and discuss the film:
*Epidemiology of salmonel-
losis in man and animals.*

Some diseases transmitted
by vectors include:
mosquito - malaria, yellow
fever, equine encephalitis
flies - typhoid, bacillary
dysentery
lice - trench fever, epi-
demic typhus, pediculosis
fleas - murine typhus,
plague
ticks - Colorado tick fever,
Rocky Mountain spotted
fever, Q fever, relapsing
fever

Vector control - Vector
control consists of break-
ing the cycle of infection.
There are two ecological
schemes. One is man-to-man
transmission by a vector.
An example is that of
malaria in which the Anoph-
eles mosquito bites one
man, obtaining the causa-
tive agent from his blood.
Then, it bites another man,
passing the infection to
him. In this type of vector
transmission combinations
of isolation and medication
of the man and environ-
mental attacks on the vector
break the cycle. A second
form of vector transmission
involves animal-to-man
passage of the etiological
agent, as in Rocky Mountain

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d. Vehicle
transmission
and control

Vehicle transmission is an
inanimate means of carrying
an infectious agent.

Arrange for field trips to
municipal water treatment
plants and pasteurization
plants. Have students re-
port on various types of
treatment of water and
pasteurization. When you
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**MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS**

Vehicle transmission is an inanimate means of carrying an infectious agent.

**SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES**

Arrange for field trips to municipal water treatment plants and pasteurization plants. Have students report on various types of treatment of water and pasteurization. When you visit a milk pasteurization plant, note methods of pasteurization, cleanliness, storage.

**SUPPLEMENTARY INFORMATION
FOR TEACHERS**

spotted fever. In this instance a tick from a wild rodent bites the man. It is sometimes possible to control the alternate host, which serves as the reservoir of infection dangerous to man. Control action consists of avoiding, repelling, killing, and reducing the numbers of breeding vectors.

Vehicle transmission includes conveyance by water, food, milk, and biological products (serum hepatitis) of a disease agent from a source (reservoir) to the host.

Vehicle Control

Milk-borne diseases include typhoid fever, paratyphoid fever, streptococcal infections, gastro-enteritis, diphtheria, bacillary dysentery, etc. There is only one method that has been demonstrated to successfully control milk-borne infection; that is pasteurization. Pasteurization consists of heating milk to a certain temperature for a certain length of time to destroy pathogenic bacteria.

OUTLINE OF CONTENT

MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPPLE

Take field trips to local water treatment and sewage treatment plants. Have students prepare reports on various types of treatments.

How is water purified? What is the status of the water supply? What kinds of treatment does sewage get?

Have a county health department sanitarian talk on food poisoning and food preparation, storage, and handling.

You may wish to show film: *Epidemiology of salmonellosis in man and animal.*

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MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPPLEMENTARY INFORMATION
FOR TEACHERS

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How is water purified?
What is the status of the water supply? What kinds of treatment does sewage get?

Have a county health department sanitarian talk on food poisoning and food preparation, storage, and handling.

You may wish to show film:
Epidemiology of salmonellosis in man and animal.

. Water-borne diseases include: infectious hepatitis, typhoid fever, cholera, and other bacterial, viral and parasitic diseases. A primary use of water is for drinking and food preparation. There are several means of providing potable and bacteriologically safe water. Disinfection, to remove pathogens, is usually done by chlorination and/or filtration.

. Food-borne food poisoning, a general term, includes many illnesses such as salmonellosis, staphylococcal food poisoning, botulism, mushroom poisoning, chemical food poisoning, etc. Prevention of food-borne disease primarily involves the prevention of bacterial and chemical contamination of food and utensils, adequate refrigeration of raw and processed foods, and use of adequate temperatures for food preparation and cleansing of utensils.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

SUPPLE

e. Genetic transmission

Genetic transmission is that mode which relates to transfer of disorders, as well as other characteristics, via genes through reproduction. This is often referred to as hereditary transmission.

Invite a guest speaker (a physician or consultant from a genetic counselling service) to discuss hereditary disorders and the implications for marriage, rehabilitation, etc.

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2. Multiple causation theory

Etiology (causation) is viewed as the interaction of the agent, host, and environment.

Invite a guest lecturer, (physician, public health officer, epidemiologist) to your school to discuss some of the multiple factors involved in such disorders as heart disease, mental illness, cancer, arthritis, accidents, etc.

Have the students report on the risk factors associated with certain diseases such as heart disease, cancer, tuberculosis, etc.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

Genetic transmission is that mode which relates to transfer of disorders, as well as other characteristics, via genes through reproduction. This is often referred to as hereditary transmission.

Etiology (causation) is viewed as the interaction of the agent, host, and environment.

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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Invite a guest lecturer, (physician, public health officer, epidemiologist) to your school to discuss some of the multiple factors involved in such disorders as heart disease, mental illness, cancer, arthritis, accidents, etc.

Have the students report on the risk factors associated with certain diseases such as heart disease, cancer, tuberculosis, etc.

SUPPLEMENTARY INFORMATION FOR TEACHERS

Although the exact nature of genetic transmission is not thoroughly understood, there are a number of diseases that are transmitted genetically, for example, Tay Sach's disease, hemophilia, phenylketonuria, diabetes, Huntington's chorea, and some forms of epilepsy, to name a few. Genetic counselling is recommended for those people who have personal or family histories of genetic disorders.

Agent, host, and environment are regarded as the basic determinants of disease. According to this theory, the problem of ascertaining the cause of a disease is not solved by identifying the disease agent alone. Public health and medicine must also examine the qualities of the host and the environmental influence that interact with the agent and host.

The inadequacy of the singular cause theory can be illustrated by examining the four basic factors that are necessary to produce breast cancer in mice. The

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MAJOR UNDERSTANDINGS AND
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SUGGESTED TEACHING AIDS
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Refer students to the following:
*Epidemiology and communi-
cable disease control*,
by F. B. Rogers.
Uses of epidemiology, by
J. N. Morris.
Accident prevention, by
M. N. Halsey.

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Numerous factors can cause a particular disease, and what may be causal under certain conditions may not be causative under others.

Refer students to: *Health and disease*, and *Man, medicine and environment*, by Rene Dubos.

MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

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FOR TEACHERS

presence of all four factors must be present for breast cancer to occur.

Example of multiple causation theory

1. Genetic transmission - Scientists by selective breeding can produce mice in which 80 percent of the offspring develop breast cancer.
2. Viral cause - If these genetically susceptible mice are taken from their mother's breast at birth and allowed to suckle from a mother who is from a nonsusceptible strain, the offspring will not develop breast cancer. Susceptible mothers secrete a virus in their milk which must be present for breast cancer to develop in their offspring.
3. Hormonal cause - Only female susceptible mice develop cancer of the breast. However, when scientists inject estrogen (female sex hormone) into males, they also will develop breast cancer.
4. Nutritional cause - Mice in which all factors are present (female mice bred and suckled by genetically

Refer students to the following:

Epidemiology and communicable disease control, by F. B. Rogers.
Uses of epidemiology, by J. N. Morris.
Accident prevention, by M. N. Halsey.

Refer students to: *Health and disease*, and *Man, medicine and environment*, by Rene Dubos.

Numerous factors can cause a particular disease, and what may be causal under certain conditions may not be causative under others.

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MAJOR UNDERSTANDINGS AND
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SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

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Show film: *Mission
measles: the story of
a vaccine.*

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Few diseases have only one cause. Many people carry the organisms for tuberculosis, staphylococcus infections, influenza, etc., but this single factor does not necessarily lead to disease.

Have the class list reasons why one may have disease-producing organisms in the body, yet not be infected.

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ences:

The majority of people "infected" with tuberculosis do not develop the disease. The singular cause theory of disease would imply that people who develop tuberculosis are sick because of the presence of the tubercle bacillus in their body.

Discuss reasons why some people in the same socio-cultural setting from the same family contract a disease quite readily, while others do not.

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The highest rate for tuberculosis among nonwhites was found in the areas where they were a distinct minority and thus had little opportunity for meaningful social relationships with others. Conversely, for whites the rates

List diseases that appear to have a single cause. What other factors must be present for the disease to actually occur?

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

Few diseases have only one cause. Many people carry the organisms for tuberculosis, staphylococcus infections, influenza, etc., but this single factor does not necessarily lead to disease.

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SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

Show film: *Mission measles: the story of a vaccine.*

Have the class list reasons why one may have disease-producing organisms in the body, yet not be infected.

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List diseases that appear to have a single cause. What other factors must be present for the disease to actually occur?

SUPPLEMENTARY INFORMATION FOR TEACHERS

susceptible mothers) and placed on a restricted caloric intake rarely develop breast cancer.

Obviously, no single factor is the cause of breast cancer in mice. All four factors have to be present to produce breast cancer in mice.

How do people who develop tuberculosis differ from those who do not? The following study was designed to discover such differences:

An epidemiological study reported by Cassel which was conducted in Seattle, Washington, found that individuals who had tuberculosis were characterized by the possession of certain traits.

1. Race. Whites living in the poorest area of the city, with the worst housing and overcrowded conditions, had the highest tuberculosis rates. For nonwhites the pattern was reversed. The highest rates for nonwhites occurred in the wealthier area of the city.

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SUGGESTED TEACHING AIDS
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were highest in those areas
in which there were high
proportions of nonwhites and
where the whites had little
opportunity for social inter-
action.

Do the same with diseases
which appear to have a
multiple causation. How
are the two lists alike?
How do they differ? Why
do these occur?

Show and discuss the film
Anatomy of a disease.

If not already done, the
class may want to review
portions of the film
again or obtain another
film which contains more
depth. See film list at
the end of this strand.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

were highest in those areas in which there were high proportions of nonwhites and where the whites had little opportunity for social interaction.

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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Show and discuss the film *Anatomy of a disease*.

If not already done, the class may want to review portions of the film again or obtain another film which contains more depth. See film list at the end of this strand.

SUPPLEMENTARY INFORMATION FOR TEACHERS

2. Residential and job mobility. Those who developed tuberculosis were highly mobile. They moved from home to home about five times more than the average person and changed their place of employment frequently.

3. Marital status. Few of those who developed tuberculosis were married, and many more were divorced or widowed than is true for the general population.

4. Living arrangements. A relatively large proportion of those with tuberculosis lived alone in one room.

Populations with these four characteristics have been referred to by sociologists as "marginal men." Generally they do not belong, they have few friends, few neighbors that they know well, and little contact with their fellow man.

What are the differences between the people who are "isolated" and develop tuberculosis and "isolated" people who do not?

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MAJOR UNDERSTANDINGS AND
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SUGGESTED TEACHING AIDS
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SUPPL

Further epidemiological analysis is necessary since not all people who are isolated develop tuberculosis even when they are exposed to the tubercle bacillus.

People who are exposed to mounting stress, deprived of societal help and support, and have no friends to aid them, are placed in a position to handle these threats to their security unaided. One of the dire consequences is tuberculosis.

How does stress aid the tuberculosis bacillus to gain infectious proportions within an individual?

You may wish to show the film *Stress* at this time. Although it deals with general stress reaction, rather than tuberculosis, students may want to discuss the general implications of stress to such conditions as: arthritis, heart disease, and infectious diseases, such as, tuberculosis.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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SUPPLEMENTARY INFORMATION FOR TEACHERS

An epidemiological study comparing tuberculosis hospital employees who had developed tuberculosis as a result of working in the hospital with employees who had not developed the disease was undertaken to answer this basic question. The major finding was that stress appeared to be a significant factor in developing tuberculosis. In the nontuberculosis group, the stressful situations were distributed randomly, that is, in some years the group was relatively free of stress and other years there appeared to be multiple stresses. However, in the tuberculosis group, the stresses tended to accumulate so that each year was worse than the preceding one. The stress situations reached a peak about one year before tuberculosis was diagnosed.

A group of tuberculosis patients were studied to determine the relationship between hormone balance and recovery from the disease. The hormone studied was the 17 ketosteroids produced by the

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A person's emotional state may lead to an alteration in his hormone balance which increases his susceptibility to the tubercle bacillus.

Have some students read appropriate portions of *The individual, society and behavior*, by A. L. Knutson, and summarize the key principles for class discussion.

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Infectious diseases are not the only area in which we can apply epidemiological methods. Noncommunicable diseases - cancer, heart disease, diabetes, accidents, also may be studied via the epidemiological approach.

Have some students report on selected epidemiological studies such as those found in the American Journal of Public Health.

Some examples are: accidents, suicides, poisoning, smoking, alcoholism, etc.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUPPLEMENTARY INFORMATION FOR TEACHERS

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Have some students report on selected epidemiological studies such as those found in the American Journal of Public Health.

Some examples are: accidents, suicides, drinking, smoking, alcoholism, etc.

adrenal gland. It was found that:

- . High levels of this hormone were related to anxiety and aggressiveness in the patient.
- . Low levels were related to apathy, depression, and feelings of hopelessness.
- . Normal levels tended to be related to calmness and adjustment to the illness.

If the emotional state of the patient was changed, the hormone level also changed, and the chances of recovery from tuberculosis also improved.

Under therapy, those with normal levels recovered the fastest, while those with high levels became chronic patients and those with low levels tended to die.

Epidemiological studies have been conducted on chronic diseases, accidents, mental illness, alcoholism, drug addiction, juvenile delinquency, industrial absenteeism, and many other causes.

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SUGGESTED TEACHING AIDS
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3. Role of health attitudes, beliefs, values, knowledge, and practices

Attitudes have long been recognized as potent forces that play a complex role in determining health values, knowledge, and behavior.

Discuss the role of attitudes, beliefs, and knowledge in determining man's behavior by use of Chart 2 on page 48.

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An attitude may be defined as a tendency to respond either positively or negatively toward a given type of person, object, situation or ideal; it is a predisposition to action.

Have the class discuss attitudes in relation to the prevention and control of disease.

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Attitudes provide some uniformity to behavior.

How do attitudes impede program development? Do cultural attitudes affect disease control? How?

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Knowledge by itself does not necessarily insure that the desired behavior will occur.

Refer to Strand III, Mental Health, for basic principles controlling attitudes. How are attitudes formed? Changed?

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Knowledge can aid individuals and groups to make intelligent decisions which can result in desired behavior change.

Discuss how too little or the wrong kinds of knowledge may lead us to incorrect conclusions. What kind and how much knowledge does the epidemiologist seek? Why? How does this help him in solving disease-related health problems? Give some specific illustrations. Perhaps

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A desired health practice such as immunization against regular measles may not occur unless the individual knows that there is a vaccine available for this disease.

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

Attitudes have long been recognized as potent forces that play a complex role in determining health values, knowledge, and behavior.

An attitude may be defined as a tendency to respond either positively or negatively toward a given type of person, object, situation or ideal; it is a predisposition to action.

Attitudes provide some uniformity to behavior.

Knowledge by itself does not necessarily insure that the desired behavior will occur.

Knowledge can aid individuals and groups to make intelligent decisions which can result in desired behavior change.

A desired health practice such as immunization against regular measles may not occur unless the individual knows that there is a vaccine available for this disease.

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

Discuss the role of attitudes, beliefs, and knowledge in determining man's behavior by use of Chart 2 on page 48.

Have the class discuss attitudes in relation to the prevention and control of disease.

How do attitudes impede program development? Do cultural attitudes affect disease control? How?

Refer to Strand III, Mental Health, for basic principles controlling attitudes. How are attitudes formed? Changed?

Discuss how too little or the wrong kinds of knowledge may lead us to incorrect conclusions. What kind and how much knowledge does the epidemiologist seek? Why? How does this help him in solving disease-related health problems? Give some specific illustrations. Perhaps

SUPPLEMENTARY INFORMATION FOR TEACHERS

What people feel or value will be an important factor in determining their health behavior.

People who feel they are not susceptible to a given disease may not accept the practice of immunization. Negative attitudes with respect to safety may contribute to unsafe acts that cause accidents. Understanding the attitudes of an individual or group may make it possible to predict their health behavior.

The knowledge that immunization may protect an individual from disease does not insure that preventive measures will be utilized.

The knowledge that cigarette smoking is related to lung cancer does not necessarily cause a smoker to refrain from this practice.

Evidence indicates that attitudes and practices can be modified and changed through education.

Three basic factors appear to intervene between knowledge and the application of such knowledge to obtain the desired behavior.

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All aspects of an individual's
personality, including his
temperament, interests, atti-
tudes, and values, play a sig-
nificant role in determining
health status.

Discuss the role of emo-
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and his reactions to
these perceptions.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUPPLEMENTARY INFORMATION FOR TEACHERS

a public health worker can come to class to discuss some of his current studies.

The basic principles of perception, interpretation, and salience have been found to operate in controlling the health behavior of individuals and groups in a number of research investigations. For example, among low-income families it was observed that:

. Perception of health.

Health is not perceived as being of primary importance to them. Other matters in their everyday lives appeared to have greater significance for them.

. Interpretation. The manner by which health could be maintained was not interpreted by low-income groups to include certain measures.

. Salience. Knowledge regarding a specific health procedure or verbal acceptance of its importance does not necessarily insure the desired action.

All aspects of an individual's personality, including his temperament, interests, attitudes, and values, play a significant role in determining health status.

Discuss the role of emotions in one's perceptions and his reactions to these perceptions.

Psychosomatic investigations (physical or bodily symptoms that arise in part from psychological factors) have indicated that personality factors may be important variables in

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SUPPL

IV. Epidemiology and
Ecology in the
Modern Era

A. Public health
problems with
ecological im-
plications

Significant economic, demo-
graphic, social, cultural,
scientific, and technological
changes have occurred during
the 20th century that have not
only improved man's health
but have also created addi-
tional health needs and prob-
lems.

The two extremes of life re-
presented by the age groups,
6 and under and 65 and over,
represent the periods of man's
life cycle that generally
demand the greatest need for
health services.

Discuss and analyze some
of the significant eco-
nomic, demographic, cul-
tural, and technological
advances that have been
made in the U.S. since
1900. What new problems
have emerged?

Discuss why the very young
and the very old are par-
ticularly susceptible to
disease, death, disability.

Discuss how the health
problems of the aged differ
from those encountered by
the younger-age groups.
What are the implications
of this for social and
health services planning?

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

Significant economic, demographic, social, cultural, scientific, and technological changes have occurred during the 20th century that have not only improved man's health but have also created additional health needs and problems.

The two extremes of life represented by the age groups, 6 and under and 65 and over, represent the periods of man's life cycle that generally demand the greatest need for health services.

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

Discuss and analyze some of the significant economic, demographic, cultural, and technological advances that have been made in the U.S. since 1900. What new problems have emerged?

Discuss why the very young and the very old are particularly susceptible to disease, death, disability.

Discuss how the health problems of the aged differ from those encountered by the younger-age groups. What are the implications of this for social and health services planning?

SUPPLEMENTARY INFORMATION FOR TEACHERS

numerous diseases, (i.e., arthritis, ulcers, diabetes, asthma, colitis, migraine headaches, heart disease, etc.)

As our physical, social, and biological environment changes, the scope of our health problems also change with the arising of new, and the compounding of past, health problems.

Examples of demographic changes include:

. Changes in the age structure of our population have occurred as a result of our increased life expectancy.

In 1900, 18 percent of our population was in the age group 45 and over. In 1965, the corresponding figure was approximately 30 percent. 10 percent of our population is in the age group 65 and over.

. Our population is presently increasing at the rate of 1.7 percent per year.

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Low-income groups tend to have higher morbidity and mortality rates. Utilization of health services is becoming a major problem in some areas.

Invite the county Commissioner of Social Services to class to discuss this concept from his agency's viewpoint.

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Major scientific and technological advances have aided in improving man's health. However, they have also created new problems of pollution, disposal of radioactive and industrial wastes, side effects of drugs, increasing costs of medical and dental care, etc.

List and discuss contemporary health problems, e.g., alcohol abuse, alcoholism, drinking and driving, drug abuse and addiction, cigarette smoking; pollution - air, water, solid waste, noise (jets, industrial); population explosion; malnutrition - obesity, starvation; accidents - vehicular, pedestrian, industrial; suicide - depression, mental illness - psychoses, neuroses, character disorders; health economics - financing for hospitalization, medical and dental care, others. What are the individual and community implications and responsibilities in these problems?

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

Low-income groups tend to have higher morbidity and mortality rates. Utilization of health services is becoming a major problem in some areas.

Major scientific and technological advances have aided in improving man's health. However, they have also created new problems of pollution, disposal of radioactive and industrial wastes, side effects of drugs, increasing costs of medical and dental care, etc.

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

Invite the county Commissioner of Social Services to class to discuss this concept from his agency's viewpoint.

List and discuss contemporary health problems, e.g., alcohol abuse, alcoholism, drinking and driving, drug abuse and addiction, cigarette smoking; pollution - air, water, solid waste, noise (jets, industrial); population explosion; malnutrition - obesity, starvation; accidents - vehicular, pedestrian, industrial; suicide - depression, mental illness - psychoses, neuroses, character disorders; health economics - financing for hospitalization, medical and dental care, others. What are the individual and community implications and responsibilities in these problems?

SUPPLEMENTARY INFORMATION FOR TEACHERS

Examples of economic changes include:

The standard of living among groups and social classes has been rising at the rate of about 1 percent a year.

Some poverty and subpoverty groups have not shown a significant increase in their standard of living.

Examples of scientific and technological changes include:

. The rate of major medical developments has increased since 1900 from about one per decade to several per year since 1940.

. 90 percent of prescriptions written today are for products that did not exist 10 years ago.

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IDENTIFIERS Epidemiology

ABSTRACT

A frame of reference concerning health implications, based on the interaction of numerous factors in the physical, social, and biological environments, is provided in this prototype curriculum for grades 10-12. Development of sound techniques in problem solving is encouraged, resulting from the need to understand the nature and complexities of multiple effect and multiple causation. Specific curriculum content studies: (1) definitions of epidemiology and ecology, (2) epidemiological method, (3) factors which influence the occurrence, distribution, development, control, and prevention of disease, disability, defect, and death, and (4) modern public health problems with ecological implications. Appended material includes bibliographies of multimedia resources and a health behavior model. This publication is one in a series of health curriculum materials devoted to environmental and community health (Strand IV). Four other strands deal with physical and mental health, sociological health problems, and education for survival. The format consists of four columns intended to provide teachers with: (1) a basic content outline, (2) major understandings and fundamental concepts, (3) teaching aids and learning activities, and (4) information about resource materials, sources, and personnel. Because of the comprehensive nature of the total curriculum, teachers are advised to become familiar with all strands presently in print. Related documents in Strand IV are ED 037 738-9, ED 049 477-8, and SE 016 280-6. (BL)

ED 077725

PROTOTYPE
CURRICULUM MATERIALS
FOR THE ELEMENTARY
AND SECONDARY GRADES



HEALTH

STRAND IV ENVIRONMENTAL AND COMMUNITY HEALTH

Ecology and
Epidemiology of Health
Grades 10, 11, and 12

Special edition for
evaluation and discussion

THE UNIVERSITY OF THE STATE OF NEW YORK/THE STATE EDUCATION DEPARTMENT
BUREAU OF SECONDARY CURRICULUM DEVELOPMENT/ALBANY, NEW YORK 12224/1970

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SE 016 280

**PROTOTYPE
CURRICULUM MATERIALS
FOR THE ELEMENTARY
AND SECONDARY GRADES**

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HEALTH CURR. CULUM MATERIALS
Grades 10, 11, 12

STRAND IV - ENVIRONMENTAL AND COMMUNITY HEALTH
ECOLOGY AND EPIDEMIOLOGY OF HEALTH

The University of the State of New York/The State Education Department
Bureau of Secondary Curriculum Development/Albany 12224
1970

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Regents of the University (with years when terms expire)

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Director, Division of General Education

Ted T. Grenda

Chief, Bureau of Health Education

John S. Sinacore

FOREWORD

This publication contains curriculum suggestions for teaching Strand IV - Environmental and Community Health - Ecology and Epidemiology of Health, for grades 10, 11, and 12.

The publication format of four columns is intended to provide teachers with a basic content outline, in the first column; a listing of the major understandings and fundamental concepts which children may achieve, in the second column; and information specifically designed for classroom teachers which should provide them with resource materials, teaching aids, and supplementary information, in the third and fourth columns.

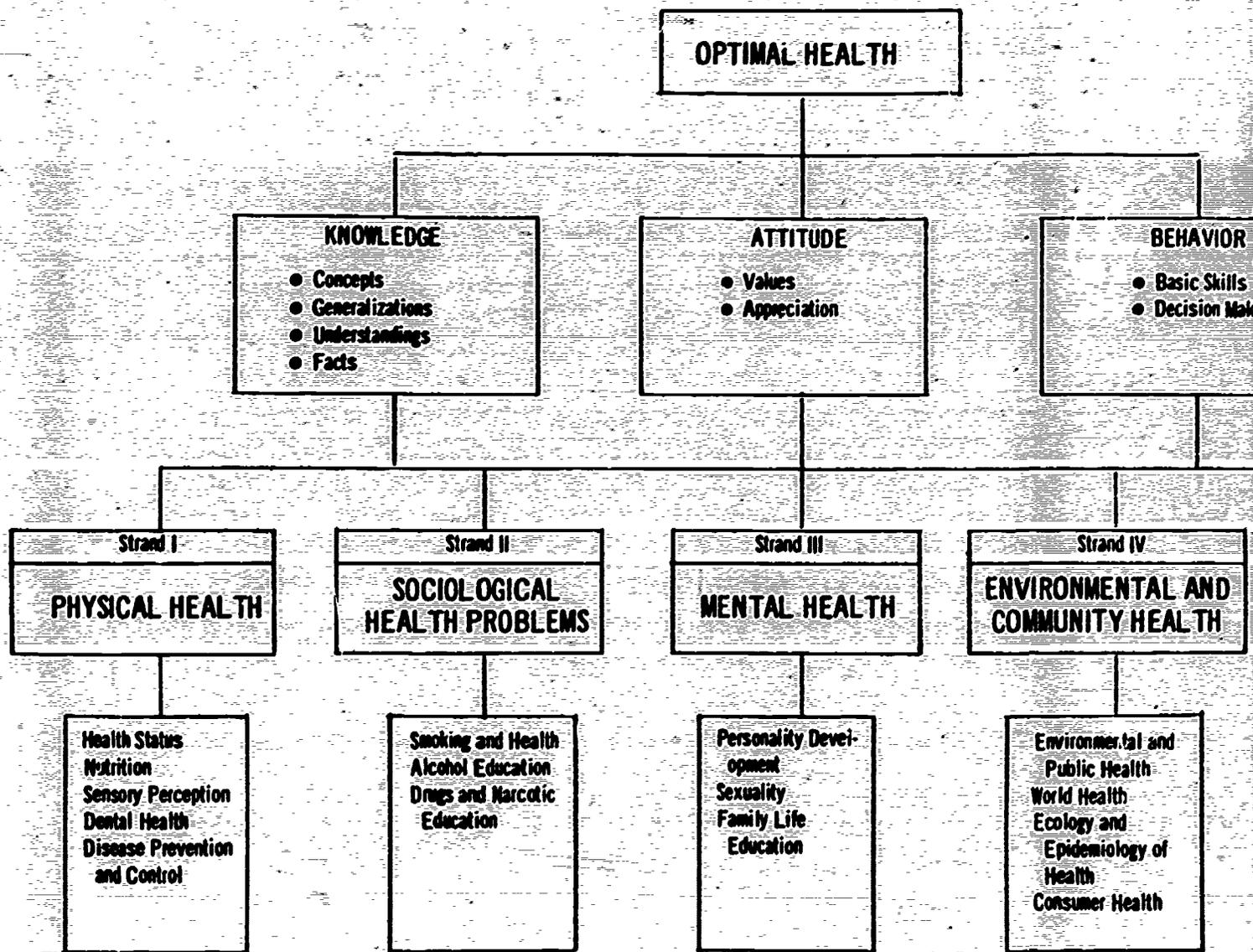
The comprehensive nature of the health program makes it imperative that teachers gain familiarity with all of the strands presently in print. In this way, important teaching-learning experiences may be developed by cross-referring from one strand to another.

It is recommended that the health coordinator in each school system review these materials carefully and consult with teachers, administrators, and leaders of interested parent groups in order to determine the most appropriate manner in which to utilize this strand as an integral part of a locally adapted, broad, and comprehensive program in health education.

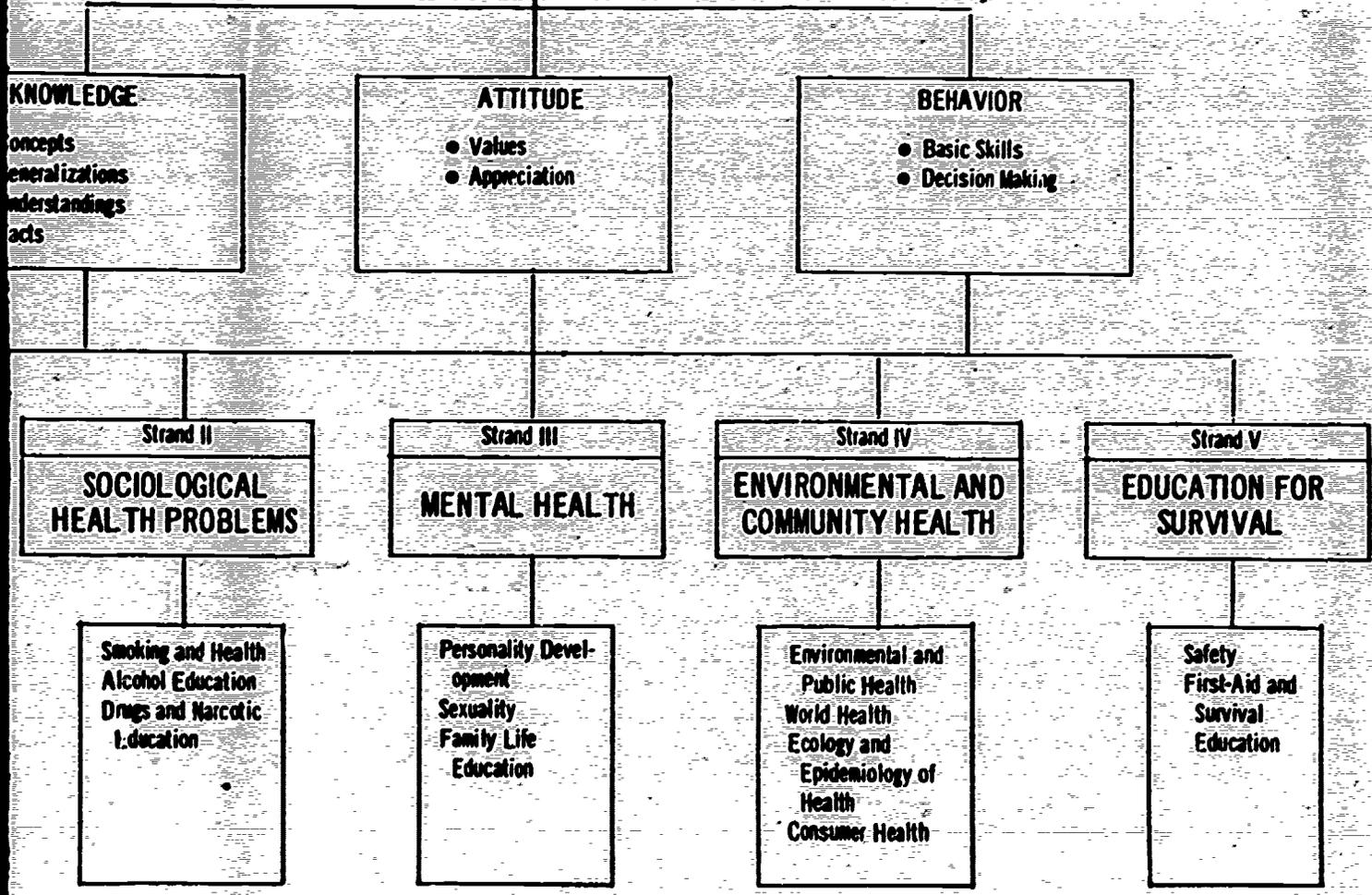
The curriculum materials presented here are in tentative form and are subject to modification in content and sequence. Critiques of the format, content, and sequence are welcomed.

Gordon E. Van Hooft
*Chief, Bureau of Secondary
Curriculum Development*

William E. Young
*Director, Curriculum
Development Center*



OPTIMAL HEALTH



ECOLOGY AND EPIDEMIOLOGY OF HEALTH

Grades 10, 11, 12

Overview

These materials are designed to provide a frame of reference for the student concerning the health implications of the interaction of numerous factors in his physical, social, and biological environments. Furthermore, each student should develop an appreciation and understanding of his personal role in this interrelationship, and the degree to which he controls and determines his health behavior.

The nature and complexities of multiple effect and multiple causation must be understood before the student can attempt to solve today's health problems, or to contribute to their solutions. The content of this strand attempts to help the student to develop sound techniques in solving health related problems. The processes of the epidemiologist are described extensively.

Pupil Objectives

Pupils in grades 10, 11, and 12 should:

- develop an approach to understanding and dealing with health problems.
- develop an understanding of the changing concepts of human ecology and epidemiology as they relate to public health, preventive medicine, and research.
- develop an understanding of modern concepts of health, disease, and longevity.
- become aware of the favorable and unfavorable ecological factors affecting man's health status.
- become familiar with current public health issues and problems that have ecological implications.

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OUTLINE OF CONTENT

**MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS**

**SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES**

**SUPPLEM
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**I. Definitions of
Epidemiology and
Ecology**

A. Human ecology

Human ecology is the science which studies the relationships of man as he interacts with his total environment, (physical, biological, and sociocultural).

View the film: *Population ecology.*

Ecology deals with the relationships between organisms and their environment. It considers the physical and social environment. However, that has changed in some times, involving relationships between organisms and their environment. It is a vector of biological and their relationships to human.

B. Epidemiology

Present interpretation: Epidemiology is the science and method of study concerned with the factors and conditions which determine the occurrence and distribution of health, disease, defect, disability, and death among groups of people.

The history of epidemiology from the past to the present has changed considerably. To truly appreciate the subject, it is suggested that the students read about and report on some of the outstanding epidemiologists (they may not have been referred to as such) and their contributions to epidemiology.

Infectious diseases in communities as typified by diphtheria, whooping cough, and other communicable diseases. Since the development of vaccines and their control. Consequences.

**MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS**

**SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES**

**SUPPLEMENTARY INFORMATION
FOR TEACHERS**

Human ecology is the science which studies the relationships of man as he interacts with his total environment, (physical, biological, and sociocultural).

View the film: *Population ecology*.

Ecology is the science that deals with the interrelationships of organisms and their environments. In human ecology the primary consideration is the interrelationship of man and his physical, emotional, and social environments. However, it should be noted that human ecology, at times, necessarily becomes involved with ecological relationships of other organisms. For example, intermediary hosts and vectors experience an ecological relationship in their own life cycle and may also be implicated in the transmission of disease to humans.

Present interpretation:
Epidemiology is the science and method of study concerned with the factors and conditions which determine the occurrence and distribution of health, disease, defect, disability, and death among groups of people.

The history of epidemiology from the past to the present has changed considerably. To truly appreciate the subject, it is suggested that the students read about and report on some of the outstanding epidemiologists (they may not have been referred to as such) and their contributions to epidemiology.

Infectious disease and communicable diseases, such as typhoid fever, TB, diphtheria, smallpox, whooping cough, etc., were at one time the primary concern of epidemiology. Since then, with the aid of the epidemiological approach, vaccines have either controlled or eradicated them. Consequently, epidemiology

OUTLINE OF CONTENT

MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPP

1. Collection of
data

To determine normal and abnormal occurrence of disease, reporting and collection systems are necessary.

Refer to books and articles by Rouche, Dubos, DeKruif, Enders, Bankoff in the bibliography.

What diseases are "reportable"? How are vital statistics data collected? Write or visit a county health department to obtain a monthly vital statistics summary.

Obtain copies of *Vital Statistics of the U.S.* from the Superintendent of Documents, Washington, D.C.

Have some students refer to: *Principles of epidemiology* by Ian Taylor. Report to class the major principles of epidemiology.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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SUPPLEMENTARY INFORMATION FOR TEACHERS

has grown to encounter new problems, such as accidents (home, traffic, industry, etc.) heart disease, cancer, suicide, diabetes, to name a few, and even administrative problems not directly linked with disease.

An epidemic is defined as the occurrence, in a geographic area in a period of time, of an illness clearly in excess of normal expectation. Numerically, this may range from one case (smallpox) to thousands of cases (influenza). Non-epidemic disease frequency and distribution must be known to determine the occurrence of an epidemic. In chronic diseases, the prolonged epidemic waves are difficult to evaluate, hence epidemic and nonepidemic occurrence is confusing. Here the epidemiological approach is to study the correlation of factors thought to be associated in causing a disease (e.g. correlation of diet, cholesterol, obesity, and blood pressure with coronary heart disease.)

OUTLINE OF CONTENT

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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2. Census reports

Census reports -- local, state, national, or international - provide information about people that is valuable in assessing their health status.

Learn about the history of the census. What data were collected in the 1970 census? Why?

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II. Epidemiological Method

A. Aims and purposes

It is necessary to describe and analyze disease distribution and occurrence according to such variables as age, sex, race, etc., so that preventive or control programs can be developed.

The study of the characteristics and interactions of agent, host, and environmental factors helps determine the cause of disease, disability, health problems, defect, and death.

Contact your local health officer for information and material on preventive and control programs, for such diseases as rheumatic fever, phenylketonuria, polio, and diabetes.

The epidemiology of automobile accidents may be undertaken in conjunction with the driver education teacher.

Immunization programs (tetanus, measles, smallpox, etc.) may be researched and discussed in buzz

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUPPLEMENTARY INFORMATION FOR TEACHERS

Census data include such items as: population figures by race, age, sex, marital status, education, income, occupation, housing items, and many others. This information is extremely useful to health planning, projecting, and developing programs, and to statisticians in studying the various ecological factors involved in the distribution and occurrence of disease, defect, disability, debility, and death.

Primarily, epidemiological studies are undertaken to prevent further spread of the immediate hazardous situation. Once the diagnosis of the etiology (cause) of the outbreak has been determined, through clinical diagnosis and laboratory aids, the epidemiologist must find the source of infection. This requires comprehensive information about all possible modes of transmission of the type of infection under scrutiny.

OUTLINE OF CONTENT

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

SUPPL

Epidemiology has aided in improving medical care and providing guidance for community health programs.

groups for comparison of differences and similarities. These are all results of epidemiological research.

Epidemiology provides the means for understanding local patterns of disease, so that individual therapy or community control measures may be more specifically and economically directed.

Make a list of the health resources in your community. What are their functions?

B. The epidemiological approach in scientific research

The epidemiological approach in scientific research is the application of the scientific method to the study of the conditions, situations, and diseases affecting man's health and welfare.

Suggested reading: *Epidemiologic approach to the study of primary hypertension* by E. Gurney Clark, M.D.

For other case examples refer to the index volume of the *American Journal of Public Health*. Possible selections are:

- Smoking
- Accidents
- Poisonings
- Suicides
- Drug Abuse

1. Definition of the problems and clarification of objectives include:
 - . nature, extent, and significance of the problem
 - . framing of specific questions
 - . statement of immediate and ultimate objectives
 - . explanation of terms
 - . statistical collaboration

2. Appraisal of existing information on the subject:
 - . search literature and other sources for data
 - . classification and organization of data

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SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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- Smoking
- Accidents
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SUPPLEMENTARY INFORMATION FOR TEACHERS

The application of the epidemiological approach to problems pertaining to groups of individuals also is used to gain solutions to nonepidemic problems. Hence, the focus of observation need not be directed solely at a population.

The nature (kind), extent (size), and significance (importance) of the problem at hand must be thoroughly understood from start to finish by all involved to insure uniformity of observations. That everyone understands the purposes, goals, and terminology is essential to free flowing communication without barriers. Recruiting technical assistance in statistical collaboration must be

OUTLINE OF CONTENT

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

SUPPLE

critical appraisal of existing data

Have students organize into several groups of 4 or 5 in each group. Using data already available, have each group study these data, organize them into meaningful categories, and interpret these data in view of the epidemiological approach herein described. Students should share their results with the rest of the class.

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3. Formulation of hypotheses: After gathering and analyzing the data, describe, within testable limits, what you think has caused or contributed to the cause of the problem and how you can solve the problem.

Data related to the venereal diseases, smoking and health, drug abuse, among others, may be used for this experience.

4. Testing of hypotheses: This may be conducted in the laboratory, the hospital, or the community:

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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SUPPLEMENTARY INFORMATION FOR TEACHERS

done in the initial stages of research.

The purposes of this step are to secure further data on the nature and significance of the problem, to evaluate critically the existing evidence, to separate fact and theory, and to reveal gaps in knowledge about the problem. This entails literature research, and reports, as well as their classification to permit an orderly arrangement of related aspects. Such arrangement allows critical evaluation of the collected data, as a whole, eliminating errors, revealing new knowledge, and providing a basis for making inferences and generalizations.

A hypothesis must be formulated as thoroughly as possible and should be based upon needs, interests, and available resources. Testing the hypothesis includes the details of planning and executing the investigation. The object is to verify the hypothesis. It may take place in the hospital, laboratory, or

3. Formulation of hypotheses: After gathering and analyzing the data, describe, within testable limits, what you think has caused or contributed to the cause of the problem and how you can solve the problem.

4. Testing of hypotheses: This may be conducted in the laboratory, the hospital, or the community.

OUTLINE OF CONTENT

MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
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SUPP

5. Conclusions and practical application: This involves evaluation of the results.

What kinds of difficulties did the groups have? How are these overcome?

Invite an epidemiologist to class to discuss his work in disease control and prevention in relation to epidemiology. What other methods does he use? Why?

III. Factors That Influence the Occurrence, Distribution, Development, Control, and Prevention of Disease, Disability, Defect, and Death.

A. Host factors

Host factors are those elements that influence health status which relate to the individual or group.

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MAJOR UNDERSTANDINGS AND
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SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPPLEMENTARY INFORMATION
FOR TEACHERS

community. Detailed plans for collection of information (sampling methods and size, controls, location and time factors, and training personnel who will collect the data) need to be written into the design. The classification, organization, tabulation, and analysis of data then can be done.

5. Conclusions and practical application: This involves evaluation of the results.

What kinds of difficulties did the groups have? How are these overcome?

Once the hypothesis has been tested and a preventive or control program has been developed, evaluation of the outcome remains.

Invite an epidemiologist to class to discuss his work in disease control and prevention in relation to epidemiology. What other methods does he use? Why?

Host factors are those elements that influence health status which relate to the individual or group.

OUTLINE OF CONTENT

1. Heredity and health

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

The role of heredity in determining health status is extremely complex and dependent, in part, upon the interaction with environmental variables.

Many individuals generally confuse and interchange such terms as hereditary, congenital, and familial.

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

Make a list of diseases and defects which:

1. Are known to be solely hereditary
2. Are suspected to have a hereditary basis
3. Are thought to be congenital
4. "Run" in families

Distinguish between each of the above.

Why are the terms in the concept frequently confused?

Why do misconceptions persist?

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SUPPLEMENTARY INFORMATION FOR TEACHERS

Genes tend to produce their effects through metabolic pathways that are controlled by enzymes. Some scientists feel that all diseases have a genetic component and result from hereditary flaws in protein, fat, or carbohydrate metabolism.

Biochemical processes under genetic control help to determine individual metabolic variations related to the functioning of vital body organs and systems, reactions to stress, the onset and severity of communicable and chronic disease; and health, aging, and longevity.

A disease, defect, or abnormality is considered to be hereditary if such condition is caused by a defective gene. Congenital refers to the fact that the condition was present at birth. It may be acquired in the uterus by virtue of metabolic, hormonal, infectious toxin, environmental, or other factors.

OUTLINE OF CONTENT

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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The fact that a condition is congenital (present at birth) or familial (appears in the family) does not necessarily mean that it is hereditary (genetically transmitted).

Discuss how various behavioral traits and styles of living are related to health and disease.

- Why do some conditions tend to "run in families"?
- What part does heredity play? Habits of living? Combinations of factors?

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Many aspects of genetic study have direct application for public health activities.

Investigate what genetic counseling services, if any, are available in your community. What do these services do? How long have they been in existence? Whom do they serve?

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Radiation is but one of the forces capable of affecting genetic material through mutation.

Read books such as *Lucky Dragon #5* and *Hiroshima*, listed in the bibliography.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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- Why do some conditions tend to "run in families"?
- What part does heredity play? Habits of living? Combinations of factors?

Investigate what genetic counseling services, if any, are available in your community. What do these services do? How long have they been in existence? Whom do they serve?

Read books such as *Lucky Dragon #5* and *Hiroshima*, listed in the bibliography.

SUPPLEMENTARY INFORMATION FOR TEACHERS

Behavioral traits peculiar to certain families (dietary deficiencies, lack of medical care, habits, occupation, etc.) may increase the risk of the members contracting certain diseases.

Examples:

- . Coronary heart disease and dietary habits of consuming food rich in fat
- . Lung cancer and smoking
- . Child rearing practices and cancer of the breast. Mothers who breast feed their infants have a lower incidence of breast cancer. This may be related to a hormonal factor.
- . Presence of respiratory disease among coal miners

The presence of radioactive materials in the environment is of concern because of short term (medical) effects and long term (genetic) effects.

A host of chemical substances identified through their effects in animals also are found in man's environment.

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SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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2. Heredity and disease

Although the ranking order of our major causes of death has undergone a dramatic change since 1900, heredity has not been a primary factor in this change.

Have students develop a list of the 10 major causes of death in 1900 and compare these with the 10 major causes of death today, for all ages. What are the etiologies of these diseases? (See chart 1 in the appendix.)

In 1900, the leading causes of death were pneumonia, tuberculosis, heart disease, cancer, and accidents. In 1950, the leading causes of death were heart disease, cancer, pneumonia, tuberculosis, and accidents.

In some diseases, such as Huntington's chorea, the genetic component is quite explicit. In others, such as the communicable diseases, the environmental factors appear to predominate. Between these two extremes, the environmental and genetic factors operate with varying degrees of importance.

Are genetic diseases automatic? Explain. How has our environment changed in the past 50 years to help eliminate some diseases? How has it changed to contribute to an increase in some diseases? Have we actually been creating new diseases? Explain.

The population of the world has increased from about 1 billion in 1900 to about 3 billion in 1950. This increase has led to a greater incidence of genetic diseases.

MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

Although the ranking order of our major causes of death has undergone a dramatic change since 1900, heredity has not been a primary factor in this change.

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

Have students develop a list of the 10 major causes of death in 1900 and compare these with the 10 major causes of death today, for all ages. What are the etiologies of these diseases? (See chart 1 in the appendix.)

SUPPLEMENTARY INFORMATION
FOR TEACHERS

In 1900, the major killers were pneumonia and influenza, tuberculosis, enteritis, heart disease, and cerebral hemorrhage. Today, in ranking order they are: diseases of the heart; cancers and other malignancies, cerebral hemorrhage, accidents, influenza, and pneumonia.

The ranking order over the past 68 years would not have undergone such a dramatic change if heredity were the major factor.

In some diseases, such as Huntington's chorea, the genetic component is quite explicit. In others, such as the communicable diseases, the environmental factors appear to predominate. Between these two extremes, the environmental and genetic factors operate with varying degrees of importance.

Are genetic diseases automatic? Explain.

How has our environment changed in the past 50 years to help eliminate some diseases? How has it changed to contribute to an increase in some diseases? Have we actually been creating new diseases? Explain.

The hereditary makeup of our population has not changed significantly during the past 68 years, only the environment. However, the more we eliminate the worst hazards in our environment and the more we equalize conditions for all individuals, the more chance there is for the inherent differences in individuals to assert themselves. Thus, the role of heredity becomes increasingly more important in respect to disease and its possible effects on humans. Huntington's chorea is a mental disorder caused by a single dominant gene.

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Have students read and report about the role of heredity in specific diseases.

Read: *Your heredity and environment* by Amran Scheinfeld.

Some scientists feel that all diseases have a genetic component.

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MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPPLEMENTARY INFORMATION
FOR TEACHERS

Have students read and report about the role of heredity in specific diseases.

Read: *Your heredity and environment* by Amran Scheinfeld.

Some scientists feel that all diseases have a genetic component.

The individual deteriorates physically and psychologically.

A general classification suggested by Scheinfeld for discussing the role of heredity in disease is as follows:

1. Those diseases most directly inherited in which environment plays only a small part in causation, (the majority of cases of diabetes mellitus, some very rare forms of cancer such as cancer of the eye, and a host of rare conditions).
2. Those diseases which are conditionally inherited in which the individual will develop the disease only under certain adverse environmental circumstances, (some types of heart and arterial diseases including arteriosclerosis and possibly rheumatic heart disease, plus a number of metabolic disorders).
3. Those diseases which are influenced by heredity in some manner. This may be the case for most of our diseases. It is possible that for many of our infectious diseases some individuals may have inherited

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3. Sex and health

Sex is one of the genetic factors that governs life expectancy.

Have students compose a chart showing the sex differences, in terms of the causes of death during infancy. Discuss why these differences exist. Obtain data from "Sex differences in causes of death during infancy..." *Vital Statistics of the U.S.*

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Compare and contrast the differences in life expectancy between the sexes in 1900 and today. Discuss why the gap has widened.

The existing higher life expectancy of the female appears to stem from some inherent advantage possessed by the female in combating disease and stress that is able to assert itself with improvements in the environment.

Evidence that the extra margin of female longevity is conditioned by the environment is seen in underdeveloped countries. The worse the

Make a list of diseases and defects which appear to be sex-linked.

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**MAJOR UNDERSTANDINGS AND
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**SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES**

**SUPPLEMENTARY INFORMATION
FOR TEACHERS**

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Have students compose a chart showing the sex differences, in terms of the causes of death during infancy. Discuss why these differences exist. Obtain data from "Sex differences in causes of death during infancy..." *Vital Statistics of the U.S.*

constitutional weakness, and given the proper environmental circumstances they may become easier prey than others to infection.

In 1965, the expectation of life at birth was 74.7 for white females and 67.6 for white males. Thus, expectation among white females exceeds that for white males by 7.1 years. In 1956, females outlived males by 6.4 years, and in 1900, by only 2.9 years.

Compare and contrast the differences in life expectancy between the sexes in 1900 and today. Discuss why the gap has widened.

The existing higher life expectancy of the female appears to stem from some inherent advantage possessed by the female in combating disease and stress that is able to assert itself with improvements in the environment.

Evidence that the extra margin of female longevity is conditioned by the environment is seen in underdeveloped countries. The worse the

Make a list of diseases and defects which appear to be sex-linked.

In 1963, in Bolivia, the life expectancy of both sexes was 49.7 years. Hence, the innate advantage of the female could not assert

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SUGGESTED TEACHING AIDS
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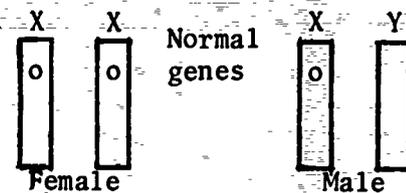
living and health conditions, as reflected in higher death rates and lower life expectancies, the smaller is the excess of female over male life expectancy.

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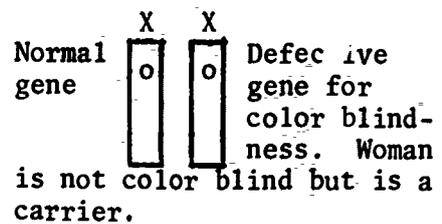
The male is more likely to inherit sex-linked diseases and defects.

Color blindness (sex-linked defect)

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Why is the male more apt to inherit sex-linked conditions?



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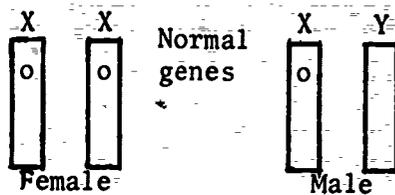
MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

living and health conditions, as reflected in higher death rates and lower life expectancies, the smaller is the excess of female over male life expectancy.

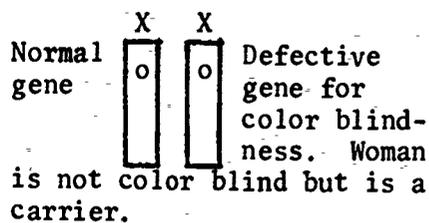
The male is more likely to inherit sex-linked diseases and defects.

SUGGESTED TEACHING-AIDS AND LEARNING ACTIVITIES

Color blindness (sex-linked defect)



Why is the male more apt to inherit sex-linked conditions?



SUPPLEMENTARY INFORMATION FOR TEACHERS

itself because of the poor environmental conditions affecting both sexes. Also, in India, the life expectancy for the male is 45.2 years and for the female, 46.6 years. The more we improve the environment, the better able the female is to assert her inherent advantage as evidenced by the 7.1-year advantage that the U.S. female possesses.

Sex-linked conditions result from defective genes carried on the X chromosome. At conception, the female received two X chromosomes (one from each parent). The male receives only one X chromosome from his mother and the Y from his father. Thus, the male is more vulnerable to defects since there is no corresponding gene on the opposite Y chromosome to neutralize the effects of the gene which causes the defect.

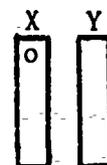
To produce a sex-linked defect in the male, only one defective gene is needed. The female needs two defective genes as the chances are that there will be a normal gene on the other X

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Male defective gene
 No corresponding site on Y chromosome to offset the defective gene. Man is color blind.

Fathers can transmit color-blindness to daughters only, as it is carried on the X chromosome and not the Y.

Hemophilia is another disorder which can be analyzed and discussed with regard to its sexual and genetic implications.

Differences in chemical functioning appear to endow the female with certain advantages in resisting and fighting disease.

Present arguments show that, in reality, the male is the "weaker sex." (Genetically speaking). Why?

Refer to Amram Scheinfeld, op. cit.

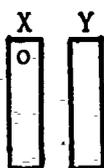
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Male defective gene
No corresponding site on Y chromosome to offset the defective gene. Man is color blind.

chromosome to neutralize the effects. Other conditions that are sex-linked defects include hemophilia and some forms of near-sightedness, enlarged cornea, defective iris, optic atrophy, nystagmus, and muscular dystrophy (duchenne type).

Fathers can transmit color-blindness to daughters only, as it is carried on the X chromosome and not the Y.

Hemophilia is another disorder which can be analyzed and discussed with regard to its sexual and genetic implications.

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Present arguments show that, in reality, the male is the "weaker sex." (Genetically speaking). Why?

Refer to Amram Scheinfeld, op. cit.

The clearest evidence for the greater longevity of the female appears in the role of the sex-hormones: the female produces proportionately more of the estrogens and the male more of the androgens. The female tends to be biochemically more variable due to changes in body chemistry that occur during menstruation and child-bearing. It is possible that this variability helps her to adjust to stress and disease better than her male counterpart.

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How may this difference of diseases of the sexes be explained?

What part does biological make-up play? Differences in daily activity? Childhood activities?

The death rate from heart disease among men treated with female hormones (estrogens) after a 5-year period was about half that of a control group who did not receive the female hormones.

The female has a lower mortality rate at all ages from most diseases than the male. When we classify causes of death into body systems, we find that the female has a higher overall death rate from disorders of the endocrine system. Diabetes mellitus is one of the few diseases that kills more women. (About one-third more women than men die from diabetes.)

However, even as we find the sociocultural differences between the sexes becoming more similar with respect to work, smoking, behavior, etc., we also find that the differences in life expectancy are increasing between the sexes, instead of narrowing. This suggests that the hereditary and biochemical differences must exert a powerful influence that tends to favor the female more than the male.

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**4. Race and
health**

Differences in life expectancy between whites and nonwhites still exist today.

As the nonwhite population makes continued economic and social advances the differences in life expectancy between the races should diminish.

Have students compare the life expectancy figures for the white and nonwhite population.

Discuss:

1. Why do these differences exist in life expectancy?
2. Why are the differences between the sexes in life expectancy not as great as in the white population?
3. What happens to these differences when one controls for income?

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**5. Occupation and
health**

Higher economic and social groups tend to have lower mortality rates and a longer life expectancy. Lower socioeconomic groups tend to have higher mortality rates and lower life expectancy.

Discuss how occupation and life expectancy are related.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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3. What happens to these differences when one controls for income?

Discuss how occupation and life expectancy are related.

SUPPLEMENTARY INFORMATION FOR TEACHERS

In 1900, the life expectancy for the American Negro was 32.5 years for the male and 35 for the female (16 years less than for the white population).

In 1965, the life expectancy for the nonwhite male was 61.1 years and 67.4 years for the female (a difference of 6.5 years for the male and 7.3 years for the female as compared to the white population).

Racial differences in life expectancy are strongly influenced by income level. High-income blacks' and high-income whites' life expectancy show less discrepancy than that for high-income and low-income blacks.

Scientists, teachers, and social workers tend to have the highest longevity rates of all of the occupational groups. At the low end of the longevity slide we find miners, musicians, tailors, and taxi drivers.

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Environmental factors such as differences in occupation, habits, and behavior may predispose the male to greater risks with respect to disease and death.

Have students compare and contrast the mortality and morbidity rates from selected diseases and accidents in various occupations. Have students interpret and analyze why the differences exist.

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The morbidity and mortality rates of workers in some occupations are influenced directly by exposure to accidents and dust.

Insurance companies may have data relative to occupational diseases and injuries.

Compare and categorize various occupations according to their disease epidemiology. (Miners, general factory workers, chemical workers, teachers, truck drivers, dentists, lawyers, etc.).

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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SUPPLEMENTARY INFORMATION FOR TEACHERS

Differences in longevity between the various occupational groups may be due not only to the nature of the work involved but also to the attitudes, habits, and living conditions of the personnel engaged in their occupations. Various studies indicate that lower socioeconomic groups tend to perceive health differently than higher socioeconomic groups. Lower socioeconomic groups tend to be delayers in seeking medical care and are less oriented towards preventive medicine than higher socioeconomic groups.

Environmental social conditions may by themselves directly cause disease in man. Epidemiological studies showed that among workers exposed to large quantities of silica dust, the tuberculosis death rate is much higher than the average for people employed in other occupations. Also, silicosis, a disease of the lungs caused by breathing air containing large amounts of silica dust, is more common in occupations concerned with mining, quarrying, or drilling. High

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6. Psychological
and social
factors and
health

a. Psychological
factors

Psychological factors are
components related to the
will or mind.

Refer to Chart 2 in the
appendix.

b. Social
factors

Social factors relate to
the interaction of the indi-
vidual and the group.

Form small groups to dis-
cuss the psychological and
social factors involved in
selected current psycho-
social problems, for ex-
ample, drug abuse, crime,
teen-age out-of-wedlock
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FOR TEACHERS**

al Psychological factors are components related to the will or mind.

Social factors relate to the interaction of the individual and the group.

Refer to Chart 2 in the appendix.

Form small groups to discuss the psychological and social factors involved in selected current psychosocial problems, for example, drug abuse, crime, teen-age out-of-wedlock pregnancies.

accidental death rates are observed in the mining, quarrying, and oil and gas industries. Construction and agricultural workers also have higher-than-average accidental death rates.

Psychological and social factors involve the individual and the group. There are specific needs, values, codes, norms, etc., that concern each; yet, they are quite apt to be different for the individual when they relate to him alone versus his interactions with others in a group situation. Behavior by the individual and by the group is affected by social and psychological factors. These complex factors are only two of many influences on behavior, as can be seen in the behavior model in Chart 2, p. 48.

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7. Cultural effects on health

Culture is a way of thinking, feeling, and believing. It is the group's knowledge stored up for future use and applies to any number of health issues.

Culture varies in its patterns and meanings for different social units, depending upon the history of the social unit in perceiving and dealing with life's issues in different settings.

Differences in health, attitudes, beliefs, values, and behavior are found to exist in low-income groups.

Assign groups to research and report on the cultural influences of the following topics:

- . psychiatric treatment
- . pain reaction
- . patient care (seeking and utilizing medical care)
- . public health programs
- . dental care

Have students report on the health problems of minority groups in the United States.

Read: *Low-income life styles* by L. H. Irelan.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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SUPPLEMENTARY INFORMATION FOR TEACHERS

An example of how culture affects health can be seen most clearly by an example such as alcoholism. Various cultural groups (ethnic groups) react differently to alcohol, i.e., they regard and use it differently. This difference is shown in their alcoholism rates. The Irish, for example, experience higher alcoholism rates than the Jews. This is due in part to their differing attitudes and experiences with alcohol. Religion and familial values and uses have a definite influence on the meaning and perception of alcohol in their respective cultures. This same reasoning can be applied to the way various cultures regard fear, sickness, etc.

Low-income groups in the United States are generally characterized by possessing certain factors in comparison to the middle and upper income groups.

Lower income groups tend to:
1. Possess higher morbidity and mortality rates for many diseases.

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Attitudes of fatalism and helplessness, a preference for personalized relationships with the subprofessional, and the materialistic values of the lower economic groups tend to exert a forceful impact on influencing their health behavior.

Individuals who have a limited income and generally little hope of improving their economic conditions perceive health and health services in a different perspective.

Invite an OEO, Welfare, or a social worker to your class to discuss the health problems and needs of the lower economic groups.

Discuss the effects of medicaid on the health practices of the poor.

Have students read *Mirage of health* by Rene Dubos.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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SUPPLEMENTARY INFORMATION FOR TEACHERS

The incidence of rheumatic fever, cancer, heart disease, and diabetes mellitus tends to rise with decreasing social class.

2. Have less accurate health information. Loss of teeth and dental decay are perceived of as being incurable and unavoidable.

3. Define health as the "ability to continue working." Only when the poor cannot fulfill their job responsibilities do they consider themselves sick.

4. Be less likely to utilize preventive health measures. Immunization studies indicate that they are less likely to have their children immunized against specific diseases.

5. Delay longer in seeking health services. Treatment is usually begun at a late stage in the disease process.

6. Participate little or be nonparticipants in community health programs. Poverty groups are characterized by a lack of utilization of health services.

7. Seek advice of subprofessionals on health matters. They are more likely to seek the advice of some person other than a medical

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Differences still exist today with respect to infant and maternal mortality rates between the races.

Discuss what basic factors play a role in determining the differences in death rates that exist between white and nonwhite groups.

Health programs are frequently impeded by the failure of health personnel to understand the cultural system of the community they are working in. Health programs need to be related to the cultural system in which they operate. They must relate to what is familiar to the people.

Discuss why poor communication is one of the major barriers to public health programs.

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MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPPLEMENTARY INFORMATION
FOR TEACHERS

Differences still exist today with respect to infant and maternal mortality rates between the races.

Health programs are frequently impeded by the failure of health personnel to understand the cultural system of the community they are working in. Health programs need to be related to the cultural system in which they operate. They must relate to what is familiar to the people.

Discuss what basic factors play a role in determining the differences in death rates that exist between white and nonwhite groups.

Discuss why poor communication is one of the major barriers to public health programs.

doctor. Awareness of social distance is probably linked with lack of utilization of health services. Subjective appraisal of the practitioner's competencies often determines who he will select for medical care.

8. Be exposed to more health hazards by virtue of their environment and occupation.

9. Place health low on their value system. Priority is given to the material necessities of life.

In 1965, the infant mortality rate per 1000 Negro live births was 40.3 as compared to 21.5 for the white population. The maternal mortality rate per 100,000 Negro live births was 83.7 as compared to 21.0 for white population.

Problems in communications are one of the major barriers to successful public health programs and services.

Language difficulties, as well as differences in values, complicate attempts to communicate and to comprehend the efforts of health workers.

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MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
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SUPP

The culture acts as a filter through which the communication message must pass if it is to be received and understood.

B. Agent factors

Agent factors are those elements and substances, both living and nonliving, which can cause or continue a disease process in a susceptible host under certain environmental conditions.

Have students read, list, and report those diseases falling in this category. Reference: *Control of communicable diseases in man*, edited by John E. Gordon, M.D.

1. Classes of agent factors

Biologic agents are living disease agents such as Arthropods (insects), Helminths (worms), Protozoa (microscopic parasites), Fungi (yeasts and molds), Bacteria (single celled organisms), Rickettsiae (smaller than bacteria - intracellular parasites,) Viruses (smallest known living agents of disease).

Read: *Microbe hunters* by Paul DeKruif.

a. Biologic agents

Show and discuss the film: *Anatomy of a disease*.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

Have students read, list, and report those diseases falling in this category. Reference: *Control of communicable diseases in man*, edited by John E. Gordon, M.D.

Read: *Microbe hunters* by Paul DeKruif.

Show and discuss the film: *Anatomy of a disease*.

SUPPLEMENTARY INFORMATION FOR TEACHERS

For a message to have an effect, it must be received, understood, and perceived as cogent and reasonable.

Biologic agents, parasites of man, are classified in decreasing order of size as follows:

. Arthropods are important primarily as vectors of other disease agents, i.e., mosquitoes carry the agent for malaria and yellow fever.

. Helminths include: hookworms, tapeworms, round worms (*Trichinella spiralis* causes trichinosis), and schistosomes, etc. (causes schistosomiasis).

. Protozoa as microparasitic animals cause such diseases as amebiasis, malaria, etc.

. Fungi may produce conditions as actinomycosis, coccidiomycosis, histoplasmosis, etc.

. Bacteria, generally visible under a microscope, cause diphtheria, gonorrhoea, syphilis (spirochete), pneumonia, etc.

. Rickettsiae, smaller than most bacteria, are parasites of arthropods and man and are responsible

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SUPPLEMENTS
FOR

b. Nutrient
agents

Nutrient agents are nonliving chemical substances necessary to sustain life, such as carbohydrates, proteins, fats, vitamins, minerals, water.

Have students read and report on the various problems associated with causation by nutrient agents.

- (1) *Nutrition science and you* by Olaf Mickelsen.
- (2) *Obesity and health*, U.S. Dept. of H.E.W., P.H.S.

Question for research and discussion: What are the effects of insufficient or excessive intake of vitamins, fats, proteins?

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MAJOR UNDERSTANDINGS AND
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SUPPLEMENTARY INFORMATION
FOR TEACHERS

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Question for research and discussion: What are the effects of insufficient or excessive intake of vitamins, fats, proteins?

for endemic typhus fever, Rocky Mountain spotted fever, etc. All are transmitted by means of an arthropod vector.

. Viruses, the smallest known agents of disease, require living cells for propagation. They cause such diseases as: smallpox, polio, influenza, measles, yellow fever, etc.

Nutrient agents include:

- . Carbohydrates - Disease may arise from excess (obesity), deficiency (starvation), or improper utilization (diabetes).
- . Proteins - Lack of essential amino acids may lead to a nitrogen imbalance in the body.
- . Fats - When excesses are stored, it leads to overweight and obesity.
- . Vitamins - A diet deficient in a given vitamin results in a specific metabolic abnormality or deficiency disease, for example rickets (lack of vitamin D), hypervitaminosis (too much vitamin A or D).
- . Minerals - Lack of iron, for example, can cause anemia.

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SUPPLEMENTS

c. Chemical agents

Chemical agents are those nonliving substances found outside of the host (gas, alcohol, drugs, etc.) and those produced inside the body (toxic substances).

Read and report on diseases and problems caused by chemical agents. Subject references: carbon monoxide poisoning, drug abuse and narcotics addiction, lead poisoning, poison ivy, etc.

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Chemical types: outside endogenous (carbon (lead) (silicosis) drugs, poison etc. include diabetes uremic

d. Physical agents

Physical agents are the non-living forms of matter or energy that disorganize cell, tissue, and body function (radiation, heat, cold, pressure, humidity, sound, etc.).

Read and report on diseases and conditions caused by physical agents. Subject areas: radiation sickness, frostbite, caisson disease, etc.

Physical (radiation sickness), (frostbite, pressure, sound etc.

2. Absence of known factors

The causes of many diseases are yet unknown.

Divide the class into several groups and have them list as many diseases of unknown cause as possible. Then compare the lists of the groups.

Many common exist etiologic common perturbation tumors disordered mental

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SUPPLEMENTARY INFORMATION
FOR TEACHERS

Chemical agents are those nonliving substances found outside of the host (gas, alcohol, drugs, etc.) and those produced inside the body (toxic substances).

Read and report on diseases and problems caused by chemical agents. Subject references: carbon monoxide poisoning, drug abuse and narcotics addiction, lead poisoning, poison ivy, etc.

. Water - composing about $\frac{2}{3}$ of the total body mass - is required for many physiologic functions.

Chemical agents are of two types: exogenous (arise outside of the host) and endogenous (are produced inside the host). Exogenous agents include gas (carbon monoxide), vapor (lead), mineral dusts (silica), air-borne particles, beverages (alcohol), drugs, acids, cosmetics, poison ivy, snake venom, etc. Endogenous agents include such things as diabetic acidosis and uremic poisoning.

Physical agents are the non-living forms of matter or energy that disorganize cell, tissue, and body function (radiation, heat, cold, pressure, humidity, sound, etc.).

Read and report on diseases and conditions caused by physical agents. Subject areas: radiation sickness, frostbite, caisson disease, etc.

Physical agents include radiation (radiation sickness), heat (burns), cold (frostbite), atmospheric pressure (caisson disease), sound (loss of hearing), etc.

The causes of many diseases are yet unknown.

Divide the class into several groups and have them list as many diseases of unknown cause as possible. Then compare the lists of the groups.

Many major and minor, common and rare diseases exist that are of unknown etiology, for example: the common cold, essential hypertension, diabetes, tumors, many forms of mental disorders, and cancer, to mention a few. Although

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SUPPLEM
F

C. Environmental
factors

1. Necessities of
a healthful
environment

The essential factors of a healthful environment are:

- . clean air to breathe
- . clean water for drinking and recreational purposes
- . clean land to enjoy and live on
- . healthful housing
- . clean food to eat

The most likely sources for obtaining speakers on the physical environment are the county health department and the conservation department. A sociologist, if available, from your school or a nearby college could explain social theory and health.

2. Housing and
health

Incidence of disease, death, disability, crime, and accidents are higher for people living in substandard housing than those who live in adequate housing.

Read *Sociological studies of health and sickness* by Dorian Apple.

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FOR TEACHERS

The essential factors of a healthful environment are:

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Incidence of disease, death, disability, crime, and accidents are higher for people living in substandard housing than those who live in adequate housing.

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Read *Sociological studies of health and sickness* by Dorian Apple.

research is coming close to isolating specific causative and contributory factors of some diseases, many diseases still remain a mystery.

Every family has a right to a decent home and a suitable living environment. When this right is not fulfilled, health problems arise. In 1960, 15.4 percent of the dwellings in upstate New York were considered as substandard housing, while 19.1 percent of the dwellings in New York City were so labelled. This is not subject to statistical analysis, since poverty, malnutrition, and lack of medical care and education also have an effect on

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a. Slum

A slum is a neighborhood in which dwellings lack: private inside toilet and bathing facilities, hot and cold running water, adequate heat, light, ventilation, quiet, clean air, and space for the number of persons housed.

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**SUPPLEMENTARY INFORMATION
FOR TEACHERS**

A slum is a neighborhood in which dwellings lack: private inside toilet and bathing facilities, hot and cold running water, adequate heat, light, ventilation, quiet, clean air, and space for the number of persons housed.

health status, and it is difficult to isolate any one factor as having a cause-and-effect relationship to ill health. However, substandard housing is associated with increased rates of ill health. For example, juvenile delinquency is twice as high as the national average; mental illness is more prevalent (40 percent of patients in state mental institutions were from substandard housing areas according to one study); broken homes, prostitution, TB, infectious disease, crimes, fires, accidents, VD, pneumonia, and infant mortality and infant morbidity all have higher incidence in substandard housing areas. Life expectancy is even lower for these people.

Slums are said to be the result of: poverty, lack of education, social inequities and cultural patterns, substandard housing and neighborhoods, migration, indifference, obsolescence, lack of housing codes and enforcement, poor health services,

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An area of no growth in which buildings are allowed to deteriorate is said to be in a condition of blight, ex., urban blight.

Planning for new housing needs necessitates concern for additional water supplies, solid waste collection and disposal, recreational facilities, schools, books, land, public services, streets, sewage treatment facilities, etc.

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

Assign a study project on "housing - conditions, needs, and plans for present and future development." Suggest that the following offices be visited: health department, housing and urban development, and other offices or commissions concerned with zoning and building codes.

Show the film: *Population ecology*.

SUPPLEMENTARY INFORMATION FOR TEACHERS

and relatively excessive costs.

Population growth is primarily toward the suburbs. Projected indications are for 70,000 dwelling units per year in addition to replacement housing to satisfy growth needs. Every 1000 new people will require:

- . additional water supply, 100,000 to 200,000 gallons per day
- . solid waste collection and disposal, 4,000 to 6,000 lbs. per day
- . recreation facilities, for more people with more leisure time
- . schools, 4.8 new elementary classrooms and 3.6 new high school classrooms
- . land, 10 or more acres for schools, parks, play areas
- . services, 1.8 policemen and 1.5 firemen

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4. Interrelation-
ship of
factors in the
physical en-
vironment

The interrelationship of en-
vironmental factors means that
any single factor can affect
one or more other factors,
thus changing the total en-
vironment to the benefit or
detriment of one's health.

Assign small groups to
discuss the interrelation-
ships of various physical
environmental factors
(refer to column four) in
relation to one given
factor. Each group could
be given a different
factor. Have each group
report its results to the
rest of the class after-
wards.

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The interrelationship of environmental factors means that any single factor can affect one or more other factors, thus changing the total environment to the benefit or detriment of one's health.

Assign small groups to discuss the interrelationships of various physical environmental factors (refer to column four) in relation to one given factor. Each group could be given a different factor. Have each group report its results to the rest of the class afterwards.

- . streets and roads, more than 1 mile, which have to be cleared of ice and snow and drained
- . 1000 new library books
- . air pollution, \$20,000 to control sources and \$65,000 to offset physical damage caused by air pollution
- . sewage treatment, facilities to handle 100,000 to 150,000 gallons per day
- . more autos, retail stores, service commercial and industrial areas, county and state parks, and private enterprises

Consider the following factors in the physical environment:

- . water supply
- . sewage and other waste water disposal
- . housing
- . recreation
- . geology and soil
- . air pollution
- . zoning
- . highway construction

All of these factors are affected by each other. For example, the water supply affects and is affected by sewage, solid waste disposal, and geology

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5. Social environ-
ment

Social environment relates to societies, their cultures and subcultures, their groups and orders, persons and their relationships, objects, ideas, and all the meanings assigned to them that together comprise the social setting in which man transacts his affairs.

Pick a current health issue and assign a research project on the various viewpoints about the issue held by individuals, social groups, service organizations, racial groups, religious groups, political organizations, governmental organizations, etc. When the reports are summarized, bring out ways in which the individual is affected by, and affects, social opinion and action.

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on- Social environment relates to societies, their cultures and subcultures, their groups and orders, persons and their relationships, objects, ideas, and all the meanings assigned to them that together comprise the social setting in which man transacts his affairs.

Pick a current health issue and assign a research project on the various viewpoints about the issue held by individuals, social groups, service organizations, racial groups, religious groups, political organizations, governmental organizations, etc. When the reports are summarized, bring out ways in which the individual is affected by, and affects, social opinion and action.

and soil conditions. Housing is affected by zoning, geology, air pollution, water supply, sewage and solid waste disposal, etc. The lack of optimal conditions regarding the total environment negatively affects the physical, emotional, and social well-being of people.

Social environment may be said to include:

- the density and composition of various populations, conceived as communities, ethnic and racial groups, and social classes
- the organized human groups of which individuals are members, ranging from families, schools, and factories to nation-states
- the socially defined roles embedded in such groups, including age and sex roles, and occupational and family roles
- the shared symbols, values, laws, and norms which guide the behavior of individuals in groups
- the technologies and material apparatus available to different groups

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MAJOR UNDERSTANDINGS AND
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a. Effects of
social
factors on
health

Health is affected by social factors on an individual, as well as group, basis.

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D. Interaction of
agent, host, and
environment

The interaction of agent, host, and environment concerns itself with conditions under which the agent, host, and environment affect each other to initiate a disease process.

Recommended film: *The epidemiology of staphylococcal infections.*

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Cont

1. Mode of
transmission

The mode of transmission is the mechanism by which disease agents are transported from the "source" to the host. This might be by:

a. Contact
transmission

Contact transmission involves direct or indirect contact with the infectious agent.

Students may list and discuss several diseases spread via contact

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MAJOR UNDERSTANDINGS AND
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Health is affected by social factors on an individual, as well as group, basis.

The interaction of agent, host, and environment concerns itself with conditions under which the agent, host, and environment affect each other to initiate a disease process.

The mode of transmission is the mechanism by which disease agents are transported from the "source" to the host. This might be by:

Contact transmission involves direct or indirect contact with the infectious agent.

SUGGESTED TEACHING AIDS
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Recommended film: *The epidemiology of staphylococcal infections.*

Students may list and discuss several diseases spread via contact

SUPPLEMENTARY INFORMATION
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in various times and places.

Social factors influence health in four ways:

- . Act as basic determinants in the distribution of many diseases. Disease is a phenomenon that varies geographically.
- . Play an important part in the etiology of many diseases
- . Define which health conditions shall be considered public health problems and the activities that may be carried out to meet these problems
- . Determine the response of society and the individual to many health problems

See, also, Strand IV, Disease Prevention and Control.

Contact transmission may be by direct contact (by touching the source), by

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b. Air-borne
transmission

Air-borne transmission refers
to the infectious agent being
transported through the air.

transmission (venereal
disease, rabies, hook-
worm, etc.), and the means
of controlling them.

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c. Vector
transmission

Vector transmission refers
to the infectious agents being
transported via an inter-
mediary host - fly, flea,
mosquito, tick, mite, etc.

Students may list and
discuss several diseases
spread via air-borne trans-
mission (sillicosis, tu-
berculosis, brucellosis,
etc.), and the means of
controlling them.

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Have students report on
methods and instances of
controlling the cycle of
infection:

- . Avoidance, e.g., mosqui-
to netting
- . Repellants, e.g., N, N-
diethyl-m-tolumide
- . Insecticides, e.g., DDT,
chlordane
- . Reducing breeding
vectors, e.g., poison,
mosquito spraying,
baiting of rats

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

Air-borne transmission refers to the infectious agent being transported through the air.

Vector transmission refers to the infectious agents being transported via an intermediary host - fly, flea, mosquito, tick, mite, etc.

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

transmission (venereal disease, rabies, hookworm, etc.), and the means of controlling them.

Students may list and discuss several diseases spread via air-borne transmission (sillicosis, tuberculosis, brucellosis, etc.), and the means of controlling them.

Have students report on methods and instances of controlling the cycle of infection:

- . Avoidance, e.g., mosquito netting
- . Repellants, e.g., N, N-diethyl-m-tolamide
- . Insecticides, e.g., DDT, chlordane
- . Reducing breeding vectors, e.g., poison, mosquito spraying, baiting of rats

SUPPLEMENTARY INFORMATION FOR TEACHERS

indirect contact (touching contaminated objects), or by droplet spread (coughing, sneezing, smoke, fumes).

*Some diseases transmitted by contact: venereal disease, whooping cough, plague, rabies, polio, ringworm, hookworm, etc.

Air-borne transmission may include droplet nuclei (residue suspended in air), dust (from floors, soil), and radiation (alpha, beta, and gamma rays, ultraviolet, X-rays). Some diseases transmitted by the air-borne route: tuberculosis, psittacosis, brucellosis, sillicosis, anthrax, etc.

Vector transmission - Arthropods may transmit infection by biting through or depositing infective materials on the skin. The vector itself may be infected, or may only be a carrier of the agent. The vector might be a fly, mosquito, tick, flea, etc. The agent might be a bacterium, virus, rickettsia, snake venom, etc.

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Show 16-mm, sound, color
film: *Epidemiology of
murine typhus.*

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Show and discuss the film:
*Epidemiology of salmonel-
losis in man and animals.*

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Show 16-mm, sound, color
film: *Epidemiology of
murine typhus.*

Show and discuss the film:
*Epidemiology of salmonel-
losis in man and animals.*

Some diseases transmitted
by vectors include:
mosquito - malaria, yellow
fever, equine encephalitis
flies - typhoid, bacillary
dysentery
lice - trench fever, epi-
demic typhus, pediculosis
fleas - murine typhus,
plague
ticks - Colorado tick fever,
Rocky Mountain spotted
fever, Q fever, relapsing
fever

Vector control - Vector
control consists of break-
ing the cycle of infection.
There are two ecological
schemes. One is man-to-man
transmission by a vector.
An example is that of
malaria in which the Anoph-
eles mosquito bites one
man, obtaining the causa-
tive agent from his blood.
Then, it bites another man,
passing the infection to
him. In this type of vector
transmission combinations
of isolation and medication
of the man and environ-
mental attacks on the vector
break the cycle. A second
form of vector transmission
involves animal-to-man
passage of the etiologi-
cal agent, as in Rocky Mountain

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d. Vehicle transmission and control

Vehicle transmission is an inanimate means of carrying an infectious agent.

Arrange for field trips to municipal water treatment plants and pasteurization plants. Have students report on various types of treatment of water and pasteurization. When you visit a milk pasteurization plant, note methods of pasteurization; cleanliness, storage.

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**MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS**

**SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES**

**SUPPLEMENTARY INFORMATION
FOR TEACHERS**

Vehicle transmission is an inanimate means of carrying an infectious agent.

Arrange for field trips to municipal water treatment plants and pasteurization plants. Have students report on various types of treatment of water and pasteurization. When you visit a milk pasteurization plant, note methods of pasteurization, cleanliness, storage.

spotted fever. In this instance a tick from a wild rodent bites the man. It is sometimes possible to control the alternate host, which serves as the reservoir of infection dangerous to man. Control action consists of avoiding, repelling, killing, and reducing the numbers of breeding vectors.

Vehicle transmission includes conveyance by water, food, milk, and biological products (serum hepatitis) of a disease agent from a source (reservoir) to the host.

Vehicle Control

Milk-borne diseases include typhoid fever, paratyphoid fever, streptococcal infections, gastro-enteritis, diphtheria, bacillary dysentery, etc. There is only one method that has been demonstrated to successfully control milk-borne infection; that is pasteurization. Pasteurization consists of heating milk to a certain temperature for a certain length of time to destroy pathogenic bacteria.

OUTLINE OF CONTENT

MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPPLEM

Take field trips to local water treatment and sewage treatment plants. Have students prepare reports on various types of treatments.

How is water purified?
What is the status of the water supply? What kinds of treatment does sewage get?

Have a county health department sanitarian talk on food poisoning and food preparation, storage, and handling.

You may wish to show film:
Epidemiology of salmonellosis in man and animal.

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MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPPLEMENTARY INFORMATION
FOR TEACHERS

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What is the status of the water supply? What kinds of treatment does sewage get?

Have a county health department sanitarian talk on food poisoning and food preparation, storage, and handling.

You may wish to show film:
Epidemiology of salmonellosis in man and animal.

. Water-borne diseases include: infectious hepatitis, typhoid fever, cholera, and other bacterial, viral and parasitic diseases. A primary use of water is for drinking and food preparation. There are several means of providing potable and bacteriologically safe water. Disinfection, to remove pathogens, is usually done by chlorination and/or filtration.

. Food-borne food poisoning, a general term, includes many illnesses such as salmonellosis, staphylococcal food poisoning, botulism, mushroom poisoning, chemical food poisoning, etc. Prevention of food-borne disease primarily involves the prevention of bacterial and chemical contamination of food and utensils, adequate refrigeration of raw and processed foods, and use of adequate temperatures for food preparation and cleansing of utensils.

OUTLINE OF CONTENT

MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPPLE

e. Genetic
transmission

Genetic transmission is that mode which relates to transfer of disorders, as well as other characteristics, via genes through reproduction. This is often referred to as hereditary transmission.

Invite a guest speaker (a physician or consultant from a genetic counselling service) to discuss hereditary disorders and the implications for marriage, rehabilitation, etc.

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2. Multiple-
causation
theory

Etiology (causation) is viewed as the interaction of the agent, host, and environment.

Invite a guest lecturer, (physician, public health officer, epidemiologist) to your school to discuss some of the multiple factors involved in such disorders as heart disease, mental illness, cancer, arthritis, accidents, etc.

Have the students report on the risk factors associated with certain diseases such as heart disease, cancer, tuberculosis, etc.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

Genetic transmission is that mode which relates to transfer of disorders, as well as other characteristics, via genes through reproduction. This is often referred to as hereditary transmission.

Etiology (causation) is viewed as the interaction of the agent, host, and environment.

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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Have the students report on the risk factors associated with certain diseases such as heart disease, cancer, tuberculosis, etc.

SUPPLEMENTARY INFORMATION FOR TEACHERS

Although the exact nature of genetic transmission is not thoroughly understood, there are a number of diseases that are transmitted genetically, for example, Tay Sach's disease, hemophilia, phenylketonuria, diabetes, Huntington's chorea, and some forms of epilepsy, to name a few. Genetic counselling is recommended for those people who have personal or family histories of genetic disorders.

Agent, host, and environment are regarded as the basic determinants of disease. According to this theory, the problem of ascertaining the cause of a disease is not solved by identifying the disease agent alone. Public health and medicine must also examine the qualities of the host and the environmental influence that interact with the agent and host.

The inadequacy of the singular cause theory can be illustrated by examining the four basic factors that are necessary to produce breast cancer in mice. The

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Refer students to the following:
*Epidemiology and communi-
cable disease control*,
by F. B. Rogers.
Uses of epidemiology, by
J. N. Morris.
Accident prevention, by
M. N. Halsey.

Numerous factors can cause a particular disease, and what may be causal under certain conditions may not be causative under others.

Refer students to: *Health and disease*, and *Man, medicine and environment*, by Rene Dubos.

MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPPLEMENTARY INFORMATION
FOR TEACHERS

Numerous factors can cause a particular disease, and what may be causal under certain conditions may not be causative under others.

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Refer students to: *Health and disease*, and *Man, medicine and environment*, by Rene Dubos.

presence of all four factors must be present for breast cancer to occur.

Example of multiple causation theory

1. Genetic transmission - Scientists by selective breeding can produce mice in which 80 percent of the offspring develop breast cancer.
2. Viral cause - If these genetically susceptible mice are taken from their mother's breast at birth and allowed to suckle from a mother who is from a nonsusceptible strain, the offspring will not develop breast cancer. Susceptible mothers secrete a virus in their milk which must be present for breast cancer to develop in their offspring.
3. Hormonal cause - Only female susceptible mice develop cancer of the breast. However, when scientists inject estrogen (female sex hormone) into males, they also will develop breast cancer.
4. Nutritional cause - Mice in which all factors are present (female mice bred and suckled by genetically

OUTLINE OF CONTENT

MAJOR UNDERSTANDINGS AND
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SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

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Show film: *Mission
measles: the story of
a vaccine.*

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Few diseases have only one cause. Many people carry the organisms for tuberculosis, staphylococcus infections, influenza, etc., but this single factor does not necessarily lead to disease.

Have the class list reasons why one may have disease-producing organisms in the body, yet not be infected.

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The majority of people "infected" with tuberculosis do not develop the disease. The singular cause theory of disease would imply that people who develop tuberculosis are sick because of the presence of the tubercle bacillus in their body.

Discuss reasons why some people in the same socio-cultural setting from the same family contract a disease quite readily, while others do not.

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The highest rate for tuberculosis among nonwhites was found in the areas where they were a distinct minority and thus had little opportunity for meaningful social relationships with others. Conversely, for whites the rates

List diseases that appear to have a single cause. What other factors must be present for the disease to actually occur?

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

SUPPLEMENTARY INFORMATION FOR TEACHERS

Show film: *Mission measles: the story of a vaccine.*

susceptible mothers) and placed on a restricted caloric intake rarely develop breast cancer.

Obviously, no single factor is the cause of breast cancer in mice. All four factors have to be present to produce breast cancer in mice.

Few diseases have only one cause. Many people carry the organisms for tuberculosis, staphylococcus infections, influenza, etc., but this single factor does not necessarily lead to disease.

Have the class list reasons why one may have disease-producing organisms in the body, yet not be infected.

How do people who develop tuberculosis differ from those who do not? The following study was designed to discover such differences:

Discuss reasons why some people in the same socio-cultural setting from the same family contract a disease quite readily, while others do not.

An epidemiological study reported by Cassel which was conducted in Seattle, Washington, found that individuals who had tuberculosis were characterized by the possession of certain traits.

List diseases that appear to have a single cause. What other factors must be present for the disease to actually occur?

1. Race. Whites living in the poorest area of the city, with the worst housing and overcrowded conditions, had the highest tuberculosis rates. For nonwhites the pattern was reversed. The highest rates for nonwhites occurred in the wealthier area of the city.

The majority of people "infected" with tuberculosis do not develop the disease. The singular cause theory of disease would imply that people who develop tuberculosis are sick because of the presence of the tubercle bacillus in their body.

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SUGGESTED TEACHING AIDS
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were highest in those areas
in which there were high
proportions of nonwhites and
where the whites had little
opportunity for social inter-
action.

Do the same with diseases
which appear to have a
multiple causation. How
are the two lists alike?
How do they differ? Why
do these occur?

Show and discuss the film
Anatomy of a disease.

If not already done, the
class may want to review
portions of the film
again or obtain another
film which contains more
depth. See film list at
the end of this strand.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

were highest in those areas in which there were high proportions of nonwhites and where the whites had little opportunity for social interaction

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

Do the same with diseases which appear to have a multiple causation. How are the two lists alike? How do they differ? Why do these occur?

Show and discuss the film *Anatomy of a disease*.

If not already done, the class may want to review portions of the film again or obtain another film which contains more depth. See film list at the end of this strand.

SUPPLEMENTARY INFORMATION FOR TEACHERS

2. Residential and job mobility. Those who developed tuberculosis were highly mobile. They moved from home to home about five times more than the average person and changed their place of employment frequently.

3. Marital status. Few of those who developed tuberculosis were married, and many more were divorced or widowed than is true for the general population.

4. Living arrangements. A relatively large proportion of those with tuberculosis lived alone in one room.

Populations with these four characteristics have been referred to by sociologists as "marginal men." Generally they do not belong, they have few friends, few neighbors that they know well, and little contact with their fellow man.

What are the differences between the people who are "isolated" and develop tuberculosis and "isolated" people who do not?

OUTLINE OF CONTENT

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

Further epidemiological analysis is necessary since not all people who are isolated develop tuberculosis even when they are exposed to the tubercle bacillus.

People who are exposed to mounting stress, deprived of societal help and support, and have no friends to aid them, are placed in a position to handle these threats to their security unaided. One of the dire consequences is tuberculosis.

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

How does stress aid the tuberculosis bacillus to gain infectious proportions within an individual?

You may wish to show the film *Stress* at this time. Although it deals with general stress reaction, rather than tuberculosis, students may want to discuss the general implications of stress to such conditions as: arthritis, heart disease, and infectious diseases, such as, tuberculosis.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUPPLEMENTARY INFORMATION FOR TEACHERS

An epidemiological study comparing tuberculosis hospital employees who had developed tuberculosis as a result of working in the hospital with employees who had not developed the disease was undertaken to answer this basic question. The major finding was that stress appeared to be a significant factor in developing tuberculosis. In the nontuberculosis group, the stressful situations were distributed randomly, that is, in some years the group was relatively free of stress and other years there appeared to be multiple stresses. However, in the tuberculosis group, the stresses tended to accumulate so that each year was worse than the preceding one. The stress situations reached a peak about one year before tuberculosis was diagnosed.

A group of tuberculosis patients were studied to determine the relationship between hormone balance and recovery from the disease. The hormone studied was the 17 ketosteroids produced by the

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SUGGESTED TEACHING AIDS
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A person's emotional state may lead to an alteration in his hormone balance which increases his susceptibility to the tubercle bacillus.

Have some students read appropriate portions of *The individual, society and behavior*, by A. L. Knutson, and summarize the key principles for class discussion.

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Infectious diseases are not the only area in which we can apply epidemiological methods. Noncommunicable diseases - cancer, heart disease, diabetes, accidents, also may be studied via the epidemiological approach.

Have some students report on selected epidemiological studies such as those found in the American Journal of Public Health.

Some examples are: accidents, suicides, poisoning, smoking, alcoholism, etc.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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Infectious diseases are not the only area in which we can apply epidemiological methods. Noncommunicable diseases - cancer, heart disease, diabetes, accidents, also may be studied via the epidemiological approach.

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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Have some students report on selected epidemiological studies such as those found in the American Journal of Public Health.

Some examples are: accidents, suicides, poisoning, smoking, alcoholism, etc.

SUPPLEMENTARY INFORMATION FOR TEACHERS

adrenal gland. It was found that:

- . High levels of this hormone were related to anxiety and aggressiveness in the patient.
- . Low levels were related to apathy, depression, and feelings of hopelessness.
- . Normal levels tended to be related to calmness and adjustment to the illness.

If the emotional state of the patient was changed, the hormone level also changed, and the chances of recovery from tuberculosis also improved.

Under therapy, those with normal levels recovered the fastest, while those with high levels became chronic patients and those with low levels tended to die.

Epidemiological studies have been conducted on chronic diseases, accidents, mental illness, alcoholism, drug addiction, juvenile delinquency, industrial absenteeism, and many other causes.

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SUGGESTED TEACHING AIDS
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SUPPL

3. Role of health attitudes, beliefs, values, knowledge, and practices

Attitudes have long been recognized as potent forces that play a complex role in determining health values, knowledge, and behavior.

Discuss the role of attitudes, beliefs, and knowledge in determining man's behavior by use of Chart 2 on page 48.

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An attitude may be defined as a tendency to respond either positively or negatively toward a given type of person, object, situation or ideal; it is a predisposition to action.

Have the class discuss attitudes in relation to the prevention and control of disease.

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Attitudes provide some uniformity to behavior.

How do attitudes impede program development? Do cultural attitudes affect disease control? How?

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Knowledge by itself does not necessarily insure that the desired behavior will occur.

Refer to Strand III, Mental Health, for basic principles controlling attitudes. How are attitudes formed? Changed?

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Knowledge can aid individuals and groups to make intelligent decisions which can result in desired behavior change.

Discuss how too little or the wrong kinds of knowledge may lead us to incorrect conclusions. What kind and how much knowledge does the epidemiologist seek? Why? How does this help him in solving disease-related health problems? Give some specific illustrations. Perhaps

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A desired health practice such as immunization against regular measles may not occur unless the individual knows that there is a vaccine available for this disease.

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

Attitudes have long been recognized as potent forces that play a complex role in determining health values, knowledge, and behavior.

An attitude may be defined as a tendency to respond either positively or negatively toward a given type of person, object, situation or ideal; it is a predisposition to action.

Attitudes provide some uniformity to behavior.

Knowledge by itself does not necessarily insure that the desired behavior will occur.

Knowledge can aid individuals and groups to make intelligent decisions which can result in desired behavior change.

A desired health practice such as immunization against regular measles may not occur unless the individual knows that there is a vaccine available for this disease.

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

Discuss the role of attitudes, beliefs, and knowledge in determining man's behavior by use of Chart 2 on page 48.

Have the class discuss attitudes in relation to the prevention and control of disease.

How do attitudes impede program development? Do cultural attitudes affect disease control? How?

Refer to Strand III, Mental Health, for basic principles controlling attitudes. How are attitudes formed? Changed?

Discuss how too little or the wrong kinds of knowledge may lead us to incorrect conclusions. What kind and how much knowledge does the epidemiologist seek? Why? How does this help him in solving disease-related health problems? Give some specific illustrations. Perhaps

SUPPLEMENTARY INFORMATION FOR TEACHERS

What people feel or value will be an important factor in determining their health behavior.

People who feel they are not susceptible to a given disease may not accept the practice of immunization. Negative attitudes with respect to safety may contribute to unsafe acts that cause accidents. Understanding the attitudes of an individual or group may make it possible to predict their health behavior.

The knowledge that immunization may protect an individual from disease does not insure that preventive measures will be utilized.

The knowledge that cigarette smoking is related to lung cancer does not necessarily cause a smoker to refrain from this practice.

Evidence indicates that attitudes and practices can be modified and changed through education.

Three basic factors appear to intervene between knowledge and the application of such knowledge to obtain the desired behavior.

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SUGGESTED TEACHING AIDS
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All aspects of an individual's
personality, including his
temperament, interests, atti-
tudes, and values, play a sig-
nificant role in determining
health status.

Discuss the role of emo-
tions in one's perceptions
and his reactions to
these perceptions.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

SUPPLEMENTARY INFORMATION FOR TEACHERS

a public health worker can come to class to discuss some of his current studies.

The basic principles of perception, interpretation, and salience have been found to operate in controlling the health behavior of individuals and groups in a number of research investigations. For example, among low-income families it was observed that:

. Perception of health. Health is not perceived as being of primary importance to them. Other matters in their everyday lives appeared to have greater significance for them.

. Interpretation. The manner by which health could be maintained was not interpreted by low-income groups to include certain measures.

. Salience. Knowledge regarding a specific health procedure or verbal acceptance of its importance does not necessarily insure the desired action.

All aspects of an individual's personality, including his temperament, interests, attitudes, and values, play a significant role in determining health status.

Discuss the role of emotions in one's perceptions and his reactions to these perceptions.

Psychosomatic investigations (physical or bodily symptoms that arise in part from psychological factors) have indicated that personality factors may be important variables in

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MAJOR UNDERSTANDINGS AND
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SUGGESTED TEACHING AIDS
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SUPPL

IV. Epidemiology and
Ecology in the
Modern Era

A. Public health
problems with
ecological im-
plications

Significant economic, demo-
graphic, social, cultural,
scientific, and technological
changes have occurred during
the 20th century that have not
only improved man's health
but have also created addi-
tional health needs and prob-
lems.

The two extremes of life re-
presented by the age groups,
6 and under and 65 and over,
represent the periods of man's
life cycle that generally
demand the greatest need for
health services.

Discuss and analyze some
of the significant eco-
nomic, demographic, cul-
tural, and technological
advances that have been
made in the U.S. since
1900. What new problems
have emerged?

Discuss why the very young
and the very old are par-
ticularly susceptible to
disease, death, disability.

Discuss how the health
problems of the aged differ
from those encountered by
the younger-age groups.
What are the implications
of this for social and
health services planning?

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

Significant economic, demographic, social, cultural, scientific, and technological changes have occurred during the 20th century that have not only improved man's health but have also created additional health needs and problems.

The two extremes of life represented by the age groups, 6 and under and 65 and over, represent the periods of man's life cycle that generally demand the greatest need for health services.

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

Discuss and analyze some of the significant economic, demographic, cultural, and technological advances that have been made in the U.S. since 1900. What new problems have emerged?

Discuss why the very young and the very old are particularly susceptible to disease, death, disability.

Discuss how the health problems of the aged differ from those encountered by the younger-age groups. What are the implications of this for social and health services planning?

SUPPLEMENTARY INFORMATION FOR TEACHERS

numerous diseases, (i.e., arthritis, ulcers, diabetes, asthma, colitis, migraine headaches, heart disease, etc.)

As our physical, social, and biological environment changes, the scope of our health problems also change with the arising of new, and the compounding of past, health problems.

Examples of demographic changes include:

. Changes in the age structure of our population have occurred as a result of our increased life expectancy. In 1900, 18 percent of our population was in the age group 45 and over. In 1965, the corresponding figure was approximately 30 percent. 10 percent of our population is in the age group 65 and over.
. Our population is presently increasing at the rate of 1.7 percent per year.

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Low-income groups tend to have higher morbidity and mortality rates. Utilization of health services is becoming a major problem in some areas.

Invite the county Commissioner of Social Services to class to discuss this concept from his agency's viewpoint.

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Major scientific and technological advances have aided in improving man's health. However, they have also created new problems of pollution, disposal of radioactive and industrial wastes, side effects of drugs, increasing costs of medical and dental care, etc.

List and discuss contemporary health problems, e.g., alcohol abuse, alcoholism, drinking and driving, drug abuse and addiction, cigarette smoking; pollution - air, water, solid waste, noise (jets, industrial); population explosion; malnutrition - obesity, starvation; accidents - vehicular, pedestrian, industrial; suicide - depression, mental illness - psychoses, neuroses, character disorders; health economics - financing for hospitalization, medical and dental care, others. What are the individual and community implications and responsibilities in these problems?

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

Low-income groups tend to have higher morbidity and mortality rates. Utilization of health services is becoming a major problem in some areas.

Major scientific and technological advances have aided in improving man's health. However, they have also created new problems of pollution, disposal of radioactive and industrial wastes, side effects of drugs, increasing costs of medical and dental care, etc.

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

Invite the county Commissioner of Social Services to class to discuss this concept from his agency's viewpoint.

List and discuss contemporary health problems, e.g., alcohol abuse, alcoholism, drinking and driving, drug abuse and addiction, cigarette smoking; pollution - air, water, solid waste, noise (jets, industrial); population explosion; malnutrition - obesity, starvation; accidents - vehicular, pedestrian, industrial; suicide - depression, mental illness - psychoses, neuroses, character disorders; health economics - financing for hospitalization, medical and dental care, others. What are the individual and community implications and responsibilities in these problems?

SUPPLEMENTARY INFORMATION FOR TEACHERS

Examples of economic changes include:

The standard of living among groups and social classes has been rising at the rate of about 1 percent a year.

Some poverty and subpoverty groups have not shown a significant increase in their standard of living.

Examples of scientific and technological changes include:

. The rate of major medical developments has increased since 1900 from about one per decade to several per year since 1940.

. 90 percent of prescriptions written today are for products that did not exist 10 years ago.

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ABSTRACT

A frame of reference concerning health implications, based on the interaction of numerous factors in the physical, social, and biological environments, is provided in this prototype curriculum for grades 10-12. Development of sound techniques in problem solving is encouraged, resulting from the need to understand the nature and complexities of multiple effect and multiple causation. Specific curriculum content studies: (1) definitions of epidemiology and ecology, (2) epidemiological method, (3) factors which influence the occurrence, distribution, development, control, and prevention of disease, disability, defect, and death, and (4) modern public health problems with ecological implications. Appended material includes bibliographies of multimedia resources and a health behavior model. This publication is one in a series of health curriculum materials devoted to environmental and community health (Strand IV). Four other strands deal with physical and mental health, sociological health problems, and education for survival. The format consists of four columns intended to provide teachers with: (1) a basic content outline, (2) major understandings and fundamental concepts, (3) teaching aids and learning activities, and (4) information about resource materials, sources, and personnel. Because of the comprehensive nature of the total curriculum, teachers are advised to become familiar with all strands presently in print. Related documents in Strand IV are ED 037 738-9, ED 049 477-8, and SE 016 280-6. (BL)

ED 077723

PROTOTYPE
CURRICULUM MATERIALS
FOR THE ELEMENTARY
AND SECONDARY GRADES



HEALTH

STRAND IV ENVIRONMENTAL AND COMMUNITY HEALTH

Ecology and
Epidemiology of Health
Grades 10, 11, and 12

Special edition for
evaluation and discussion

THE UNIVERSITY OF THE STATE OF NEW YORK/THE STATE EDUCATION DEPARTMENT
BUREAU OF SECONDARY CURRICULUM DEVELOPMENT/ALBANY, NEW YORK 12224/1970

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SE 016 280

**PROTOTYPE
CURRICULUM MATERIALS
FOR THE ELEMENTARY
AND SECONDARY GRADES**

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HEALTH

GRADE IV ENVIRONMENTAL COMMUNITY HEALTH

**Ecology and
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HEALTH CURRICULUM MATERIALS
Grades 10, 11, 12

STRAND IV - ENVIRONMENTAL AND COMMUNITY HEALTH
ECOLOGY AND EPIDEMIOLOGY OF HEALTH

The University of the State of New York/The State Education Department
Bureau of Secondary Curriculum Development/Albany 12224
1970

THE UNIVERSITY OF THE STATE OF NEW YORK
Regents of the University (with years when terms expire)

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1985	Everett J. Penny, P.C.S., D.C.S., Vice Chancellor -----	White Plains
1978	Alexander J. Allan, Jr., LL.D., Litt.D. -----	Troy
1973	Charles W. Millard, Jr., A.B., LL.D., L.H.D. -----	Buffalo
1972	Carl H. Pforzheimer, Jr., A.B., M.B.A., D.C.S., H.H.D. -----	Purchase
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1982	Stephen K. Bailey, A.B., B.A., M.A., Ph.D., LL.D. -----	Syracuse
1983	Harold E. Newcomb, B.A. -----	Owego
1981	Theodore M. Black, A.B. -----	Sands Point

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Bernard F. Haake

Director, Curriculum Development Center

William E. Young

Chief, Bureau of Secondary Curriculum Development

Gordon E. Van Hooft

Director, Division of General Education

Ted T. Grenda

Chief, Bureau of Health Education

John S. Sinacore

FOREWORD

This publication contains curriculum suggestions for teaching Strand IV - Environmental and Community Health - Ecology and Epidemiology of Health, for grades 10, 11, and 12.

The publication format of four columns is intended to provide teachers with a basic content outline, in the first column; a listing of the major understandings and fundamental concepts which children may achieve, in the second column; and information specifically designed for classroom teachers which should provide them with resource materials, teaching aids, and supplementary information, in the third and fourth columns.

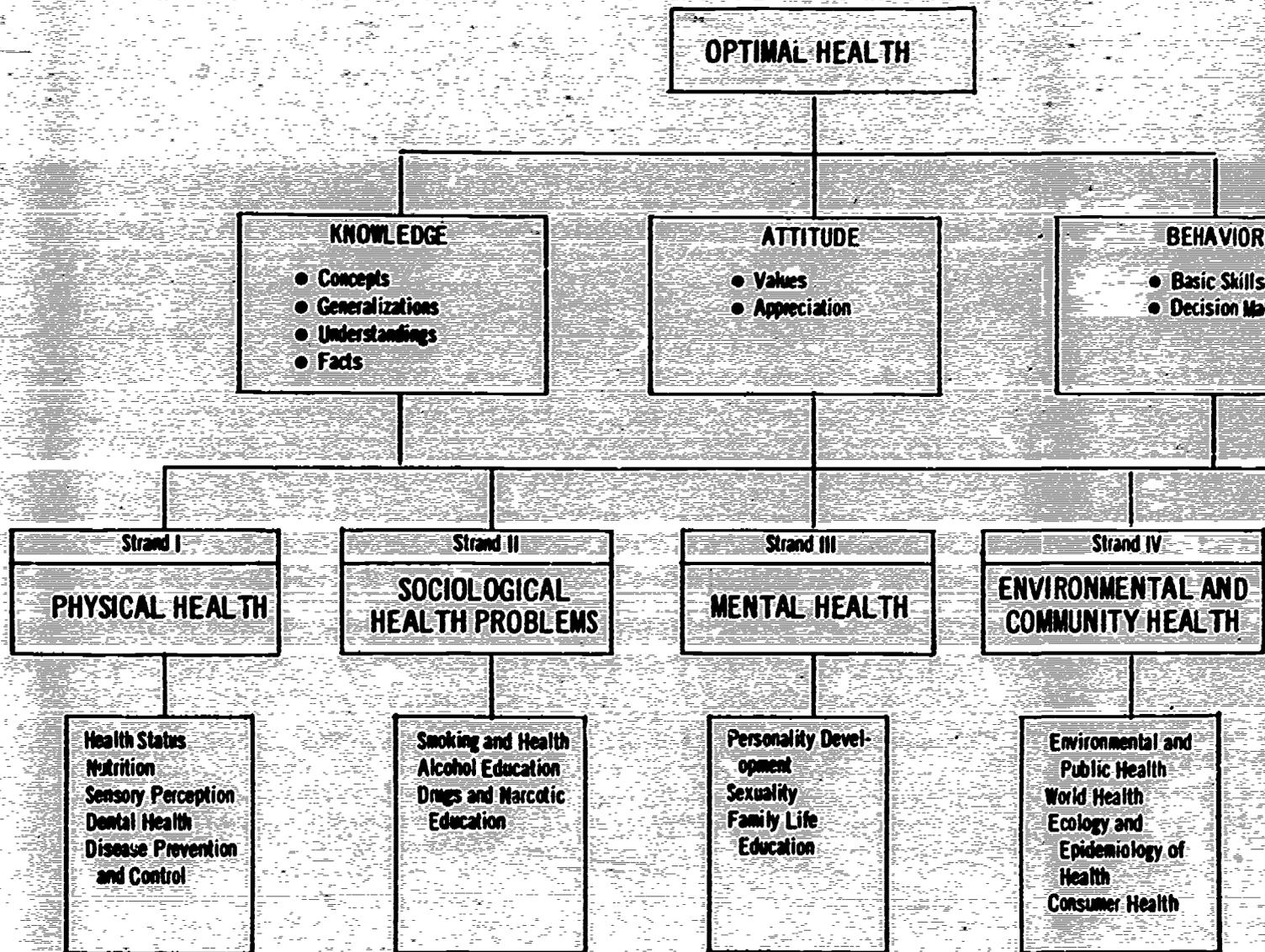
The comprehensive nature of the health program makes it imperative that teachers gain familiarity with all of the strands presently in print. In this way, important teaching-learning experiences may be developed by cross-referring from one strand to another.

It is recommended that the health coordinator in each school system review these materials carefully and consult with teachers, administrators, and leaders of interested parent groups in order to determine the most appropriate manner in which to utilize this strand as an integral part of a locally adapted, broad, and comprehensive program in health education.

The curriculum materials presented here are in tentative form and are subject to modification in content and sequence. Critiques of the format, content, and sequence are welcomed.

Gordon E. Van Hooft
*Chief, Bureau of Secondary
Curriculum Development*

William E. Young
*Director, Curriculum
Development Center*



OPTIMAL HEALTH

KNOWLEDGE
● Concepts
● Generalizations
● Understandings
● Facts

ATTITUDE
● Values
● Appreciation

BEHAVIOR
● Basic Skills
● Decision Making

Strand II
**SOCIOLOGICAL
HEALTH PROBLEMS**

Strand III
MENTAL HEALTH

Strand IV
**ENVIRONMENTAL AND
COMMUNITY HEALTH**

Strand V
**EDUCATION FOR
SURVIVAL**

Smoking and Health
Alcohol Education
Drugs and Narcotic
Education

Personality Development
Sexuality
Family Life
Education

Environmental and
Public Health
World Health
Ecology and
Epidemiology of
Health
Consumer Health

Safety
First-Aid and
Survival
Education

ECOLOGY AND EPIDEMIOLOGY OF HEALTH

Grades 10, 11, 12

Overview

These materials are designed to provide a frame of reference for the student concerning the health implications of the interaction of numerous factors in his physical, social, and biological environments. Furthermore, each student should develop an appreciation and understanding of his personal role in this interrelationship, and the degree to which he controls and determines his health behavior.

The nature and complexities of multiple effect and multiple causation must be understood before the student can attempt to solve today's health problems, or to contribute to their solutions. The content of this strand attempts to help the student to develop sound techniques in solving health related problems. The processes of the epidemiologist are described extensively.

Pupil Objectives

Pupils in grades 10, 11, and 12 should:

- develop an approach to understanding and dealing with health problems.
- develop an understanding of the changing concepts of human ecology and epidemiology as they relate to public health, preventive medicine, and research.
- develop an understanding of modern concepts of health, disease, and longevity.
- become aware of the favorable and unfavorable ecological factors affecting man's health status.
- become familiar with current public health issues and problems that have ecological implications.

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OUTLINE OF CONTENT

**MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS**

**SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES**

SUPPLEMENTS

**I. Definitions of
Epidemiology and
Ecology**

A. Human ecology

Human ecology is the science which studies the relationships of man as he interacts with his total environment, (physical, biological, and sociocultural).

View the film: *Population ecology.*

Ecology deals with the relationships between their human and consider the relationship between physical and social environment, that is, at times, involve the relationship between organisms and their environment. vector-borne diseases, their transmission may also be the result of human

B. Epidemiology

Present interpretation: Epidemiology is the science and method of study concerned with the factors and conditions which determine the occurrence and distribution of health, disease, defect, disability, and death among groups of people.

The history of epidemiology from the past to the present has changed considerably. To truly appreciate the subject, it is suggested that the students read about and report on some of the outstanding epidemiologists (they may not have been referred to as such) and their contributions to epidemiology.

Infectious diseases, as typified by diphtheria, whooping cough, etc., concern the epidemiologist. Since the development of vaccines and their control, the consequences

MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

Human ecology is the science which studies the relationships of man as he interacts with his total environment, (physical, biological, and sociocultural).

Present interpretation:
Epidemiology is the science and method of study concerned with the factors and conditions which determine the occurrence and distribution of health, disease, defect, disability, and death among groups of people.

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

View the film: *Population ecology*.

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SUPPLEMENTARY INFORMATION
FOR TEACHERS

Ecology is the science that deals with the interrelationships of organisms and their environments. In human ecology the primary consideration is the interrelationship of man and his physical, emotional, and social environments. However, it should be noted that human ecology, at times, necessarily becomes involved with ecological relationships of other organisms. For example, intermediary hosts and vectors experience an ecological relationship in their own life cycle and may also be implicated in the transmission of disease to humans.

Infectious disease and communicable diseases, such as typhoid fever, TB, diphtheria, smallpox, whooping cough, etc., were at one time the primary concern of epidemiology. Since then, with the aid of the epidemiological approach, vaccines have either controlled or eradicated them. Consequently, epidemiology

OUTLINE OF CONTENT

MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPP

1. Collection of
data

To determine normal and abnormal occurrence of disease, reporting and collection systems are necessary.

Refer to books and articles by Rouche, Dubos, DeKruif, Enders, Bankoff in the bibliography.

What diseases are "reportable"? How are vital statistics data collected? Write or visit the county health department to obtain a monthly vital statistics summary.

Obtain copies of *Vital Statistics of the U.S.* from the Superintendent of Documents, Washington, D.C.

Have some students refer to: *Principles of epidemiology* by Ian Taylor. Report to class the major principles of epidemiology.

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MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPPLEMENTARY INFORMATION
FOR TEACHERS

Refer to books and articles by Rouche, Dubos, DeKruif, Enders, Bankoff in the bibliography.

has grown to encounter new problems, such as accidents (home, traffic, industry, etc.) heart disease, cancer, suicide, diabetes, to name a few, and even administrative problems not directly linked with disease.

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To determine normal and abnormal occurrence of disease, reporting and collection systems are necessary.

What diseases are "reportable"? How are vital statistics data collected? Write or visit a county health department to obtain a monthly vital statistics summary.

An epidemic is defined as the occurrence, in a geographic area in a period of time, of an illness clearly in excess of normal expectation. Numerically, this may range from one case (smallpox) to thousands of cases (influenza). Non-epidemic disease frequency and distribution must be known to determine the occurrence of an epidemic. In chronic diseases, the prolonged epidemic waves are difficult to evaluate, hence epidemic and nonepidemic occurrence is confusing. Here the epidemiological approach is to study the correlation of factors thought to be associated in causing a disease (e.g. correlation of diet, cholesterol, obesity, and blood pressure with coronary heart disease.)

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OUTLINE OF CONTENT

MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPP

2. Census reports

Census reports -- local, state, national, or international - provide information about people that is valuable in assessing their health status.

Learn about the history of the census. What data were collected in the 1970 census? Why?

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II. Epidemiological
Method

A. Aims and purposes

It is necessary to describe and analyze disease distribution and occurrence according to such variables as age, sex, race, etc., so that preventive or control programs can be developed.

The study of the characteristics and interactions of agent, host, and environmental factors helps determine the cause of disease, disability, health problems, defect, and death.

Contact your local health officer for information and material on preventive and control programs, for such diseases as rheumatic fever, phenylketonuria, polio, and diabetes.

The epidemiology of automobile accidents may be undertaken in conjunction with the driver education teacher.

Immunization programs (tetanus, measles, smallpox, etc.) may be researched and discussed in buzz

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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SUPPLEMENTARY INFORMATION FOR TEACHERS

Census data include such items as: population figures by race, age, sex, marital status, education, income, occupation, housing items, and many others. This information is extremely useful to health planning, projecting, and developing programs, and to statisticians in studying the various ecological factors involved in the distribution and occurrence of disease, defect, disability, debility, and death.

Primarily, epidemiological studies are undertaken to prevent further spread of the immediate hazardous situation. Once the diagnosis of the etiology (cause) of the outbreak has been determined, through clinical diagnosis and laboratory aids, the epidemiologist must find the source of infection. This requires comprehensive information about all possible modes of transmission of the type of infection under scrutiny.

OUTLINE OF CONTENT

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

SUPPL

Epidemiology has aided in improving medical care and providing guidance for community health programs.

groups for comparison of differences and similarities. These are all results of epidemiological research.

Epidemiology provides the means for understanding local patterns of disease, so that individual therapy or community control measures may be more specifically and economically directed.

Make a list of the health resources in your community. What are their functions?

B. The epidemiological approach in scientific research

The epidemiological approach in scientific research is the application of the scientific method to the study of the conditions, situations, and diseases affecting man's health and welfare.

Suggested reading: *Epidemiologic approach to the study of primary hypertension* by E. Gurney Clark, M.D.

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For other case examples refer to the index volume of the *American Journal of Public Health*. Possible selections are:

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1. Definition of the problems and clarification of objectives include:
 - . nature, extent, and significance of the problem
 - . framing of specific questions
 - . statement of immediate and ultimate objectives
 - . explanation of terms
 - . statistical collaboration

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2. Appraisal of existing information on the subject:
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 - . classification and organization of data

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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- search literature and other sources for data
- classification and organization of data

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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For other case examples refer to the index volume of the *American Journal of Public Health*. Possible selections are:

- Smoking
- Accidents
- Poisonings
- Suicides
- Drug Abuse

SUPPLEMENTARY INFORMATION FOR TEACHERS

The application of the epidemiological approach to problems pertaining to groups of individuals also is used to gain solutions to nonepidemic problems. Hence, the focus of observation need not be directed solely at a population.

The nature (kind), extent (size), and significance (importance) of the problem at hand must be thoroughly understood from start to finish by all involved to insure uniformity of observations. That everyone understands the purposes, goals, and terminology is essential to free flowing communication without barriers. Recruiting technical assistance in statistical collaboration must be

OUTLINE OF CONTENT

MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPPLE

critical appraisal of
existing data

Have students organize into several groups of 4 or 5 in each group. Using data already available, have each group study these data, organize them into meaningful categories, and interpret these data in view of the epidemiological approach herein described. Students should share their results with the rest of the class.

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3. Formulation of hypotheses:
After gathering and analyzing the data, describe, within testable limits, what you think has caused or contributed to the cause of the problem and how you can solve the problem.

Data related to the venereal diseases, smoking and health, drug abuse, among others, may be used for this experience.

4. Testing of hypotheses:
This may be conducted in the laboratory, the hospital, or the community:

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

critical appraisal of existing data

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

Have students organize into several groups of 4 or 5 in each group. Using data already available, have each group study these data, organize them into meaningful categories, and interpret these data in view of the epidemiological approach herein described. Students should share their results with the rest of the class.

SUPPLEMENTARY INFORMATION FOR TEACHERS

done in the initial stages of research.

The purposes of this step are to secure further data on the nature and significance of the problem, to evaluate critically the existing evidence, to separate fact and theory, and to reveal gaps in knowledge about the problem. This entails literature research, and reports, as well as their classification to permit an orderly arrangement of related aspects. Such arrangement allows critical evaluation of the collected data, as a whole, eliminating errors, revealing new knowledge, and providing a basis for making inferences and generalizations.

3. Formulation of hypotheses: After gathering and analyzing the data, describe, within testable limits, what you think has caused or contributed to the cause of the problem and how you can solve the problem.

Data related to the venereal diseases, smoking and health, drug abuse, among others, may be used for this experience.

4. Testing of hypotheses: This may be conducted in the laboratory, the hospital, or the community.

A hypothesis must be formulated as thoroughly as possible and should be based upon needs, interests, and available resources. Testing the hypothesis includes the details of planning and executing the investigation. The object is to verify the hypothesis. It may take place in the hospital, laboratory, or

OUTLINE OF CONTENT

MAJOR UNDERSTANDINGS AND
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SUGGESTED TEACHING AIDS
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5. Conclusions and practical application: This involves evaluation of the results.

What kinds of difficulties did the groups have? How are these overcome?

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Invite an epidemiologist to class to discuss his work in disease control and prevention in relation to epidemiology. What other methods does he use? Why?

III. Factors That Influence the Occurrence, Distribution, Development, Control, and Prevention of Disease, Disability, Defect, and Death.

A. Host factors

Host factors are those elements that influence health status which relate to the individual or group.

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MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPPLEMENTARY INFORMATION
FOR TEACHERS

community. Detailed plans for collection of information (sampling methods and size, controls, location and time factors, and training personnel who will collect the data) need to be written into the design. The classification, organization, tabulation, and analysis of data then can be done.

Once the hypothesis has been tested and a preventive or control program has been developed, evaluation of the outcome remains.

5. Conclusions and practical application: This involves evaluation of the results.

What kinds of difficulties did the groups have? How are these overcome?

Invite an epidemiologist to class to discuss his work in disease control and prevention in relation to epidemiology. What other methods does he use? Why?

Most factors are those elements that influence health status which relate to the individual or group.

OUTLINE OF CONTENT

1. Heredity and health

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

The role of heredity in determining health status is extremely complex and dependent, in part, upon the interaction with environmental variables.

Many individuals generally confuse and interchange such terms as hereditary, congenital, and familial.

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

Make a list of diseases and defects which:
1. Are known to be solely hereditary
2. Are suspected to have a hereditary basis
3. Are thought to be congenital
4. "Run" in families
Distinguish between each of the above.

Why are the terms in the concept frequently confused?

Why do misconceptions persist?

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Distinguish between each of the above.

Why are the terms in the concept frequently confused?

Why do misconceptions persist?

SUPPLEMENTARY INFORMATION FOR TEACHERS

Genes tend to produce their effects through metabolic pathways that are controlled by enzymes. Some scientists feel that all diseases have a genetic component and result from hereditary flaws in protein, fat, or carbohydrate metabolism.

Biochemical processes under genetic control help to determine individual metabolic variations related to the functioning of vital body organs and systems, reactions to stress, the onset and severity of communicable and chronic disease; and health, aging, and longevity.

A disease, defect, or abnormality is considered to be hereditary if such condition is caused by a defective gene. Congenital refers to the fact that the condition was present at birth. It may be acquired in the uterus by virtue of metabolic, hormonal, infectious toxin, environmental, or other factors.

OUTLINE OF CONTENT

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

The fact that a condition is congenital (present at birth) or familial (appears in the family) does not necessarily mean that it is hereditary (genetically transmitted).

Many aspects of genetic study have direct application for public health activities.

Radiation is but one of the forces capable of affecting genetic material through mutation.

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

Discuss how various behavioral traits and styles of living are related to health and disease.

- Why do some conditions tend to "run in families"?
- What part does heredity play? Habits of living? Combinations of factors?

Investigate what genetic counseling services, if any, are available in your community. What do these services do? How long have they been in existence? Whom do they serve?

Read books such as *Lucky Dragon #5* and *Hiroshima*, listed in the bibliography.

SUPPLEMENTS FOR

Behavior to certain deficiencies, medical malnutrition, the risk of contracting disease. Examples: . Coronary and diet summing . Lung . Child and cancer Mothers their incidence This may hormonal . Present disease

The present material is of course short term and long effects.

A host of identifiable effects found in

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

The fact that a condition is congenital (present at birth) or familial (appears in the family) does not necessarily mean that it is hereditary (genetically transmitted).

Many aspects of genetic study have direct application for public health activities.

Radiation is but one of the forces capable of affecting genetic material through mutation.

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

Discuss how various behavioral traits and styles of living are related to health and disease.

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SUPPLEMENTARY INFORMATION FOR TEACHERS

Behavioral traits peculiar to certain families (dietary deficiencies, lack of medical care, habits, occupation, etc.) may increase the risk of the members contracting certain diseases.

Examples:

- . Coronary heart disease and dietary habits of consuming food rich in fat
- . Lung cancer and smoking
- . Child rearing practices and cancer of the breast. Mothers who breast feed their infants have a lower incidence of breast cancer. This may be related to a hormonal factor.
- . Presence of respiratory disease among coal miners

The presence of radioactive materials in the environment is of concern because of short term (medical) effects and long term (genetic) effects.

A host of chemical substances identified through their effects in animals also are found in man's environment.

OUTLINE OF CONTENT

MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPPL

2. Heredity and
disease

Although the ranking order of our major causes of death has undergone a dramatic change since 1900, heredity has not been a primary factor in this change.

Have students develop a list of the 10 major causes of death in 1900 and compare these with the 10 major causes of death today, for all ages. What are the etiologies of these diseases? (See chart 1 in the appendix.)

In 1900, the leading causes of death were pneumonia, tuberculosis, heart disease, cancer, and influenza.

The past decade has seen a change in the ranking of major causes of death.

In some diseases, such as Huntington's chorea, the genetic component is quite explicit. In others, such as the communicable diseases, the environmental factors appear to predominate. Between these two extremes, the environmental and genetic factors operate with varying degrees of importance.

Are genetic diseases automatic? Explain.

How has our environment changed in the past 50 years to help eliminate some diseases? How has it changed to contribute to an increase in some diseases? Have we actually been creating new diseases? Explain.

The population has increased significantly in the past 50 years. In many areas, the environment has become more hazardous. This has led to an increase in certain diseases. Have we actually been creating new diseases? Explain.

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

Although the ranking order of our major causes of death has undergone a dramatic change since 1900, heredity has not been a primary factor in this change.

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SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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Are genetic diseases automatic? Explain.
How has our environment changed in the past 50 years to help eliminate some diseases? How has it changed to contribute to an increase in some diseases? Have we actually been creating new diseases? Explain.

SUPPLEMENTARY INFORMATION FOR TEACHERS

In 1900, the major killers were pneumonia and influenza, tuberculosis, enteritis, heart disease, and cerebral hemorrhage. Today, in ranking order they are: diseases of the heart, cancers and other malignancies, cerebral hemorrhage, accidents, influenza, and pneumonia.

The ranking order over the past 68 years would not have undergone such a dramatic change if heredity were the major factor.

The hereditary makeup of our population has not changed significantly during the past 68 years, only the environment. However, the more we eliminate the worst hazards in our environment and the more we equalize conditions for all individuals, the more chance there is for the inherent differences in individuals to assert themselves. Thus, the role of heredity becomes increasingly more important in respect to disease and its possible effects on humans. Huntington's chorea is a mental disorder caused by a single dominant gene.

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FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPPL

Have students read and report about the role of heredity in specific diseases.

Read: *Your heredity and environment* by Amran Scheinfeld.

Some scientists feel that all diseases have a genetic component.

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MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPPLEMENTARY INFORMATION
FOR TEACHERS

The individual deteriorates physically and psychologically.

Have students read and report about the role of heredity in specific diseases.

Read: *Your heredity and environment* by Amran Scheinfeld.

A general classification suggested by Scheinfeld for discussing the role of heredity in disease is as follows:

1. Those diseases most directly inherited in which environment plays only a small part in causation, (the majority of cases of diabetes mellitus, some very rare forms of cancer such as cancer of the eye, and a host of rare conditions).
2. Those diseases which are conditionally inherited in which the individual will develop the disease only under certain adverse environmental circumstances, (some types of heart and arterial diseases including arteriosclerosis and possibly rheumatic heart disease, plus a number of metabolic disorders).
3. Those diseases which are influenced by heredity in some manner. This may be the case for most of our diseases. It is possible that for many of our infectious diseases some individuals may have inherited

Some scientists feel that all diseases have a genetic component.

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MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPPL

3. Sex and health

Sex is one of the genetic factors that governs life expectancy.

Have students compose a chart showing the sex differences, in terms of the causes of death during infancy. Discuss why these differences exist. Obtain data from "Sex differences in causes of death during infancy..." *Vital Statistics of the U.S.*

Compare and contrast the differences in life expectancy between the sexes in 1900 and today. Discuss why the gap has widened.

The existing higher life expectancy of the female appears to stem from some inherent advantage possessed by the female in combating disease and stress that is able to assert itself with improvements in the environment.

Evidence that the extra margin of female longevity is conditioned by the environment is seen in underdeveloped countries. The worse the

Make a list of diseases and defects which appear to be sex-linked.

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**MAJOR UNDERSTANDINGS AND
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Make a list of diseases and defects which appear to be sex-linked.

**SUPPLEMENTARY INFORMATION
FOR TEACHERS**

constitutional weakness, and given the proper environmental circumstances they may become easier prey than others to infection.

In 1965, the expectation of life at birth was 74.7 for white females and 67.6 for white males. Thus, expectation among white females exceeds that for white males by 7.1 years. In 1956, females outlived males by 6.4 years, and in 1900, by only 2.9 years.

In 1963, in Bolivia, the life expectancy of both sexes was 49.7 years. Hence, the innate advantage of the female could not assert

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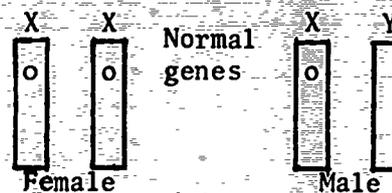
SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

SUPPLEMENTS

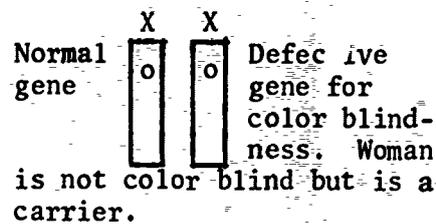
living and health conditions, as reflected in higher death rates and lower life expectancies, the smaller is the excess of female over male life expectancy.

The male is more likely to inherit sex-linked diseases and defects.

Color blindness (sex-linked defect)



Why is the male more apt to inherit sex-linked conditions?



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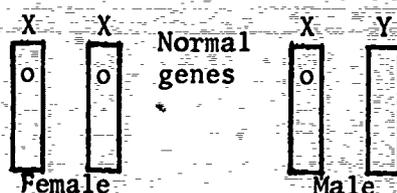
MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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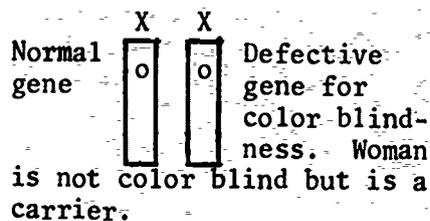
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SUGGESTED TEACHING-AIDS AND LEARNING ACTIVITIES

Color blindness (sex-linked defect)



Why is the male more apt to inherit sex-linked conditions?



SUPPLEMENTARY INFORMATION FOR TEACHERS

itself because of the poor environmental conditions affecting both sexes. Also, in India, the life expectancy for the male is 45.2 years and for the female, 46.6 years. The more we improve the environment, the better able the female is to assert her inherent advantage as evidenced by the 7.1-year advantage that the U.S. female possesses.

Sex-linked conditions result from defective genes carried on the X chromosome. At conception, the female received two X chromosomes (one from each parent). The male receives only one X chromosome from his mother and the Y from his father. Thus, the male is more vulnerable to defects since there is no corresponding gene on the opposite Y chromosome to neutralize the effects of the gene which causes the defect.

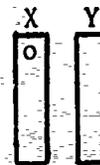
To produce a sex-linked defect in the male, only one defective gene is needed. The female needs two defective genes as the chances are that there will be a normal gene on the other X

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SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

SUPPLE



Male defective gene
No corresponding site on Y chromosome to offset the defective gene. Man is color blind.

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Fathers can transmit color-blindness to daughters only, as it is carried on the X chromosome and not the Y.

Hemophilia is another disorder which can be analyzed and discussed with regard to its sexual and genetic implications.

Differences in chemical functioning appear to endow the female with certain advantages in resisting and fighting disease.

Present arguments show that, in reality, the male is the "weaker sex." (Genetically speaking). Why?

Refer to Amram Scheinfeld, op. cit.

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MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

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FOR TEACHERS

X Y Male defective
gene
No corresponding
site on Y chro-
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Why?

Refer to Amram Scheinfeld,
op. cit.

chromosome to neutralize
the effects. Other condi-
tions that are sex-linked
defects include hemophilia
and some forms of near-
sightedness, enlarged
cornea, defective iris,
optic atrophy, nystagma,
and muscular dystrophy
(duchenne type).

The clearest evidence for
the greater longevity of
the female appears in the
role of the sex-hormones:
the female produces pro-
portionately more of the
estrogens and the male more
of the androgens. The
female tends to be bio-
chemically more variable
due to changes in body
chemistry that occur during
menstruation and child-
bearing. It is possible
that this variability helps
her to adjust to stress and
disease better than her
male counterpart.

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What part does biological
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SUGGESTED TEACHING AIDS
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FOR TEACHERS

The death rate from heart disease among men treated with female hormones (estrogens) after a 5-year period was about half that of a control group who did not receive the female hormones.

How may this difference of diseases of the sexes be explained?

The female has a lower mortality rate at all ages from most diseases than the male. When we classify causes of death into body systems, we find that the female has a higher overall death rate from disorders of the endocrine system. Diabetes mellitus is one of the few diseases that kills more women. (About one-third more women than men die from diabetes.)

What part does biological make-up play? Differences in daily activity? Childhood activities?

However, even as we find the sociocultural differences between the sexes becoming more similar with respect to work, smoking, behavior, etc., we also find that the differences in life expectancy are increasing between the sexes, instead of narrowing. This suggests that the hereditary and biochemical differences must exert a powerful influence that tends to favor the female more than the male.

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4. Race and health

Differences in life expectancy between whites and nonwhites still exist today.

As the nonwhite population makes continued economic and social advances the differences in life expectancy between the races should diminish.

Have students compare the life expectancy figures for the white and nonwhite population.

Discuss:

1. Why do these differences exist in life expectancy?
2. Why are the differences between the sexes in life expectancy not as great as in the white population?
3. What happens to these differences when one controls for income?

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5. Occupation and health

Higher economic and social groups tend to have lower mortality rates and a longer life expectancy. Lower socioeconomic groups tend to have higher mortality rates and lower life expectancy.

Discuss how occupation and life expectancy are related.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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Discuss how occupation and life expectancy are related.

SUPPLEMENTARY INFORMATION FOR TEACHERS

In 1900, the life expectancy for the American Negro was 32.5 years for the male and 35 for the female (16 years less than for the white population).

In 1965, the life expectancy for the nonwhite male was 61.1 years and 67.4 years for the female (a difference of 6.5 years for the male and 7.3 years for the female as compared to the white population).

Racial differences in life expectancy are strongly influenced by income level. High-income blacks' and high-income whites' life expectancy show less discrepancy than that for high-income and low-income blacks.

Scientists, teachers, and social workers tend to have the highest longevity rates of all of the occupational groups. At the low end of the longevity slide we find miners, musicians, tailors, and taxi drivers.

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SUPPL

Environmental factors such as differences in occupation, habits, and behavior may predispose the male to greater risks with respect to disease and death.

Have students compare and contrast the mortality and morbidity rates from selected diseases and accidents in various occupations. Have students interpret and analyze why the differences exist.

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The morbidity and mortality rates of workers in some occupations are influenced directly by exposure to accidents and dust.

Insurance companies may have data relative to occupational diseases and injuries.

Compare and categorize various occupations according to their disease epidemiology. (Miners, general factory workers, chemical workers, teachers, truck drivers, dentists, lawyers, etc.).

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MAJOR UNDERSTANDINGS AND
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SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

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SUPPLEMENTARY INFORMATION
FOR TEACHERS

Differences in longevity between the various occupational groups may be due not only to the nature of the work involved but also to the attitudes, habits, and living conditions of the personnel engaged in their occupations. Various studies indicate that lower socioeconomic groups tend to perceive health differently than higher socioeconomic groups. Lower socioeconomic groups tend to be delayers in seeking medical care and are less oriented towards preventive medicine than higher socioeconomic groups.

Environmental social conditions may by themselves directly cause disease in man. Epidemiological studies showed that among workers exposed to large quantities of silica dust, the tuberculosis death rate is much higher than the average for people employed in other occupations. Also, silicosis, a disease of the lungs caused by breathing air containing large amounts of silica dust, is more common in occupations concerned with mining, quarrying, or drilling. High

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AND LEARNING ACTIVITIES

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6. Psychological
and social
factors and
health

a. Psychological
factors

Psychological factors are
components related to the
will or mind.

Refer to Chart 2 in the
appendix.

b. Social
factors

Social factors relate to
the interaction of the indi-
vidual and the group.

Form small groups to dis-
cuss the psychological and
social factors involved in
selected current psycho-
social problems, for ex-
ample, drug abuse, crime,
teen-age out-of-wedlock
pregnancies.

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MAJOR UNDERSTANDINGS AND
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AND LEARNING ACTIVITIES

SUPPLEMENTARY INFORMATION
FOR TEACHERS

accidental death rates are observed in the mining, quarrying, and oil and gas industries. Construction and agricultural workers also have higher-than-average accidental death rates.

Psychological factors are components related to the will or mind.

Social factors relate to the interaction of the individual and the group.

Refer to Chart 2 in the appendix.

Form small groups to discuss the psychological and social factors involved in selected current psychosocial problems, for example, drug abuse, crime, teen-age out-of-wedlock pregnancies.

Psychological and social factors involve the individual and the group. There are specific needs, values, codes, norms, etc., that concern each; yet, they are quite apt to be different for the individual when they relate to him alone versus his interactions with others in a group situation. Behavior by the individual and by the group is affected by social and psychological factors. These complex factors are only two of many influences on behavior, as can be seen in the behavior model in Chart 2, p. 48.

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7. Cultural effects on health

Culture is a way of thinking, feeling, and believing. It is the group's knowledge stored up for future use and applies to any number of health issues.

Culture varies in its patterns and meanings for different social units, depending upon the history of the social unit in perceiving and dealing with life's issues in different settings.

Differences in health, attitudes, beliefs, values, and behavior are found to exist in low-income groups.

Assign groups to research and report on the cultural influences of the following topics:

- . psychiatric treatment
- . pain reaction
- . patient care (seeking and utilizing medical care)
- . public health programs
- . dental care

Have students report on the health problems of minority groups in the United States.

Read: *Low-income life styles* by L. H. Irelan.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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- . dental care

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SUPPLEMENTARY INFORMATION FOR TEACHERS

An example of how culture affects health can be seen most clearly by an example such as alcoholism. Various cultural groups (ethnic groups) react differently to alcohol, i.e., they regard and use it differently. This difference is shown in their alcoholism rates. The Irish, for example, experience higher alcoholism rates than the Jews. This is due in part to their differing attitudes and experiences with alcohol. Religion and familial values and uses have a definite influence on the meaning and perception of alcohol in their respective cultures. This same reasoning can be applied to the way various cultures regard fear, sickness, etc.

Low-income groups in the United States are generally characterized by possessing certain factors in comparison to the middle and upper income groups.

Lower income groups tend to:

1. Possess higher morbidity and mortality rates for many diseases.

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SUPPL

Attitudes of fatalism and helplessness, a preference for personalized relationships with the subprofessional, and the materialistic values of the lower economic groups tend to exert a forceful impact on influencing their health behavior.

Individuals who have a limited income and generally little hope of improving their economic conditions perceive health and health services in a different perspective.

Invite an OEO, Welfare, or a social worker to your class to discuss the health problems and needs of the lower economic groups.

Discuss the effects of medicaid on the health practices of the poor.

Have students read *Mirage of health* by Rene Dubos.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUPPLEMENTARY INFORMATION FOR TEACHERS

The incidence of rheumatic fever, cancer, heart disease, and diabetes mellitus tends to rise with decreasing social class.

2. Have less accurate health information. Loss of teeth and dental decay are perceived of as being incurable and unavoidable.

3. Define health as the "ability to continue working." Only when the poor cannot fulfill their job responsibilities do they consider themselves sick.

4. Be less likely to utilize preventive health measures. Immunization studies indicate that they are less likely to have their children immunized against specific diseases.

5. Delay longer in seeking health services. Treatment is usually begun at a late stage in the disease process.

6. Participate little or be nonparticipants in community health programs. Poverty groups are characterized by a lack of utilization of health services.

7. Seek advice of subprofessionals on health matters. They are more likely to seek the advice of some person other than a medical

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MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
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SUPPLEM
F

Differences still exist today with respect to infant and maternal mortality rates between the races.

Discuss what basic factors play a role in determining the differences in death rates that exist between white and nonwhite groups.

Health programs are frequently impeded by the failure of health personnel to understand the cultural system of the community they are working in. Health programs need to be related to the cultural system in which they operate. They must relate to what is familiar to the people.

Discuss why poor communication is one of the major barriers to public health programs.

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MAJOR UNDERSTANDINGS AND
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SUPPLEMENTARY INFORMATION
FOR TEACHERS

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Discuss what basic factors play a role in determining the differences in death rates that exist between white and nonwhite groups.

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Discuss why poor communication is one of the major barriers to public health programs.

doctor. Awareness of social distance is probably linked with lack of utilization of health services. Subjective appraisal of the practitioner's competencies often determines who he will select for medical care.

8. Be exposed to more health hazards by virtue of their environment and occupation.

9. Place health low on their value system. Priority is given to the material necessities of life.

In 1965, the infant mortality rate per 1000 Negro live births was 40.3 as compared to 21.5 for the white population. The maternal mortality rate per 100,000 Negro live births was 83.7 as compared to 21.0 for white population.

Problems in communications are one of the major barriers to successful public health programs and services.

Language difficulties, as well as differences in values, complicate attempts to communicate and to comprehend the efforts of health workers.

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SUPP

The culture acts as a filter through which the communication message must pass if it is to be received and understood.

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B. Agent factors

Agent factors are those elements and substances, both living and nonliving, which can cause or continue a disease process in a susceptible host under certain environmental conditions.

Have students read, list, and report those diseases falling in this category. Reference: *Control of communicable diseases in man*, edited by John E. Gordon, M.D.

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1. Classes of
agent factors

Biologic agents are living disease agents such as Arthropods (insects), Helminths (worms), Protozoa (microscopic parasites), Fungi (yeasts and molds), Bacteria (single celled organisms), Rickettsiae (smaller than bacteria - intracellular parasites,) Viruses (smallest known living agents of disease).

Read: *Microbe hunters* by Paul DeKruif.

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a. Biologic
agents

Show and discuss the film: *Anatomy of a disease*.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

Have students read, list, and report those diseases falling in this category. Reference: *Control of communicable diseases in man*, edited by John E. Gordon, M.D.

Read: *Microbe hunters* by Paul DeKruif.

Show and discuss the film: *Anatomy of a disease*.

SUPPLEMENTARY INFORMATION FOR TEACHERS

For a message to have an effect, it must be received, understood, and perceived as cogent and reasonable.

Biologic agents, parasites of man, are classified in decreasing order of size as follows:

. Arthropods are important primarily as vectors of other disease agents, i.e., mosquitoes carry the agent for malaria and yellow fever.

. Helminths include: hookworms, tapeworms, round worms (*Trichinella spiralis* causes trichinosis), and schistosomes, etc. (causes schistosomiasis).

. Protozoa as microparasitic animals cause such diseases as amebiasis, malaria, etc.

. Fungi may produce conditions as actinomycosis, coccidiomycosis, histoplasmosis, etc.

. Bacteria, generally visible under a microscope, cause diphtheria, gonorrhea, syphilis (spirochete), pneumonia, etc.

. Rickettsiae, smaller than most bacteria, are parasites of arthropods and man and are responsible

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b. Nutrient
agents

Nutrient agents are nonliving chemical substances necessary to sustain life, such as carbohydrates, proteins, fats, vitamins, minerals, water.

Have students read and report on the various problems associated with causation by nutrient agents.

- (1) *Nutrition science and you* by Olaf Mickelsen.
- (2) *Obesity and health*, U.S. Dept. of H.E.W., P.H.S.

Question for research and discussion: What are the effects of insufficient or excessive intake of vitamins, fats, proteins?

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FOR TEACHERS

for endemic typhus fever, Rocky Mountain spotted fever, etc. All are transmitted by means of an arthropod vector.

. Viruses, the smallest known agents of disease, require living cells for propagation. They cause such diseases as: smallpox, polio, influenza, measles, yellow fever, etc.

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Have students read and report on the various problems associated with causation by nutrient agents.

- (1) *Nutrition science and you* by Olaf Mickelsen.
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Question for research and discussion: What are the effects of insufficient or excessive intake of vitamins, fats, proteins?

Nutrient agents include:

. Carbohydrates - Disease may arise from excess (obesity), deficiency (starvation), or improper utilization (diabetes).

. Proteins - Lack of essential amino acids may lead to a nitrogen imbalance in the body.

. Fats - When excesses are stored, it leads to overweight and obesity.

. Vitamins - A diet deficient in a given vitamin results in a specific metabolic abnormality or deficiency disease, for example rickets (lack of vitamin D), hypervitaminosis (too much vitamin A or D).

. Minerals - Lack of iron, for example, can cause anemia.

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c. Chemical
agents

Chemical agents are those nonliving substances found outside of the host (gas, alcohol, drugs, etc.) and those produced inside the body (toxic substances).

Read and report on diseases and problems caused by chemical agents. Subject references: carbon monoxide poisoning, drug abuse and narcotics addiction, lead poisoning, poison ivy, etc.

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d. Physical
agents

Physical agents are the non-living forms of matter or energy that disorganize cell, tissue, and body function (radiation, heat, cold, pressure, humidity, sound, etc.).

Read and report on diseases and conditions caused by physical agents. Subject areas: radiation sickness, frostbite, caisson disease, etc.

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etc.

2. Absence of
known factors

The causes of many diseases are yet unknown.

Divide the class into several groups and have them list as many diseases of unknown cause as possible. Then compare the lists of the groups.

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MAJOR UNDERSTANDINGS AND
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Chemical agents are those nonliving substances found outside of the host (gas, alcohol, drugs, etc.) and those produced inside the body (toxic substances).

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SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

Read and report on diseases and problems caused by chemical agents. Subject references: carbon monoxide poisoning, drug abuse and narcotics addiction, lead poisoning, poison ivy, etc.

Read and report on diseases and conditions caused by physical agents. Subject areas: radiation sickness, frostbite, caisson disease, etc.

Divide the class into several groups and have them list as many diseases of unknown cause as possible. Then compare the lists of the groups.

SUPPLEMENTARY INFORMATION
FOR TEACHERS

. Water - composing about $\frac{2}{3}$ of the total body mass - is required for many physiologic functions.

Chemical agents are of two types: exogenous (arise outside of the host) and endogenous (are produced inside the host). Exogenous agents include gas (carbon monoxide), vapor (lead), mineral dusts (silica), air-borne particles, beverages (alcohol), drugs, acids, cosmetics, poison ivy, snake venom, etc. Endogenous agents include such things as diabetic acidosis and uremic poisoning.

Physical agents include radiation (radiation sickness), heat (burns), cold (frostbite), atmospheric pressure (caisson disease), sound (loss of hearing), etc.

Many major and minor, common and rare diseases exist that are of unknown etiology, for example: the common cold, essential hypertension, diabetes, tumors, many forms of mental disorders, and cancer, to mention a few. Although

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C. Environmental
factors

1. Necessities of
a healthful
environment

The essential factors of a healthful environment are:

- . clean air to breathe
- . clean water for drinking and recreational purposes
- . clean land to enjoy and live on
- . healthful housing
- . clean food to eat

The most likely sources for obtaining speakers on the physical environment are the county health department and the conservation department. A sociologist, if available, from your school or a nearby college could explain social theory and health.

2. Housing and
health

Incidence of disease, death, disability, crime, and accidents are higher for people living in substandard housing than those who live in adequate housing.

Read *Sociological studies of health and sickness* by Dorian Apple.

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MAJOR UNDERSTANDINGS AND
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SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

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SUPPLEMENTARY INFORMATION
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research is coming close to isolating specific causative and contributory factors of some diseases, many diseases still remain a mystery.

Every family has a right to a decent home and a suitable living environment. When this right is not fulfilled, health problems arise. In 1960, 15.4 percent of the dwellings in upstate New York were considered as substandard housing, while 19.1 percent of the dwellings in New York City were so labelled. This is not subject to statistical analysis, since poverty, malnutrition, and lack of medical care and education also have an effect on

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a. Slum

A slum is a neighborhood in which dwellings lack: private inside toilet and bathing facilities, hot and cold running water, adequate heat, light, ventilation, quiet, clean air, and space for the number of persons housed.

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A slum is a neighborhood in which dwellings lack: private inside toilet and bathing facilities, hot and cold running water, adequate heat, light, ventilation, quiet, clean air, and space for the number of persons housed.

health status, and it is difficult to isolate any one factor as having a cause-and-effect relationship to ill health. However, substandard housing is associated with increased rates of ill health. For example, juvenile delinquency is twice as high as the national average; mental illness is more prevalent (40 percent of patients in state mental institutions were from substandard housing areas according to one study); broken homes, prostitution, TB, infectious disease, crimes, fires, accidents, VD, pneumonia, and infant mortality and infant morbidity all have higher incidence in substandard housing areas. Life expectancy is even lower for these people.

Slums are said to be the result of: poverty, lack of education, social inequities and cultural patterns, substandard housing and neighborhoods, migration, indifference, obsolescence, lack of housing codes and enforcement, poor health services,

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b. Blight

An area of no growth in which buildings are allowed to deteriorate is said to be in a condition of blight, ex., urban blight.

3. Population
growth and
environmental
planning

Planning for new housing needs necessitates concern for additional water supplies, solid waste collection and disposal, recreational facilities, schools, books, land, public services, streets, sewage treatment facilities, etc.

Assign a study project on "housing - conditions, needs, and plans for present and future development." Suggest that the following offices be visited: health department, housing and urban development, and other offices or commissions concerned with zoning and building codes.

Show the film: *Population ecology*.

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**MAJOR UNDERSTANDINGS AND
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An area of no growth in which buildings are allowed to deteriorate is said to be in a condition of blight, ex., urban blight.

Planning for new housing needs necessitates concern for additional water supplies, solid waste collection and disposal, recreational facilities, schools, books, land, public services, streets, sewage treatment facilities, etc.

**SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES**

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Show the film: *Population ecology*.

**SUPPLEMENTARY INFORMATION
FOR TEACHERS**

and relatively excessive costs.

Population growth is primarily toward the suburbs. Projected indications are for 70,000 dwelling units per year in addition to replacement housing to satisfy growth needs. Every 1000 new people will require:

- . additional water supply, 100,000 to 200,000 gallons per day
- . solid waste collection and disposal, 4,000 to 6,000 lbs. per day
- . recreation facilities, for more people with more leisure time
- . schools, 4.8 new elementary classrooms and 3.6 new high school classrooms
- . land, 10 or more acres for schools, parks, play areas
- . services, 1.8 policemen and 1.5 firemen

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4. Interrelation-
ship of
factors in the
physical en-
vironment

The interrelationship of en-
vironmental factors means that
any single factor can affect
one or more other factors,
thus changing the total en-
vironment to the benefit or
detriment of one's health.

Assign small groups to
discuss the interrelation-
ships of various physical
environmental factors
(refer to column four) in
relation to one given
factor. Each group could
be given a different
factor. Have each group
report its results to the
rest of the class after-
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The interrelationship of environmental factors means that any single factor can affect one or more other factors, thus changing the total environment to the benefit or detriment of one's health.

Assign small groups to discuss the interrelationships of various physical environmental factors (refer to column four) in relation to one given factor. Each group could be given a different factor. Have each group report its results to the rest of the class afterwards.

- . streets and roads, more than 1 mile, which have to be cleared of ice and snow and drained.
- . 1000 new library books
- . air pollution, \$20,000 to control sources and \$65,000 to offset physical damage caused by air pollution
- . sewage treatment, facilities to handle 100,000 to 150,000 gallons per day
- . more autos, retail stores, service commercial and industrial areas, county and state parks, and private enterprises

Consider the following factors in the physical environment:

- . water supply
- . sewage and other waste water disposal
- . housing
- . recreation
- . geology and soil
- . air pollution
- . zoning
- . highway construction

All of these factors are affected by each other. For example, the water supply affects and is affected by sewage, solid waste disposal, and geology

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5. Social environ-
ment

Social environment relates to societies, their cultures and subcultures, their groups and orders, persons and their relationships, objects, ideas, and all the meanings assigned to them that together comprise the social setting in which man transacts his affairs.

Pick a current health issue and assign a research project on the various viewpoints about the issue held by individuals, social groups, service organizations, racial groups, religious groups, political organizations, governmental organizations, etc. When the reports are summarized, bring out ways in which the individual is affected by, and affects, social opinion and action.

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on- Social environment relates to societies, their cultures and subcultures, their groups and orders, persons and their relationships, objects, ideas, and all the meanings assigned to them that together comprise the social setting in which man transacts his affairs.

Pick a current health issue and assign a research project on the various viewpoints about the issue held by individuals, social groups, service organizations, racial groups, religious groups, political organizations, governmental organizations, etc. When the reports are summarized, bring out ways in which the individual is affected by, and affects, social opinion and action.

and soil conditions. Housing is affected by zoning, geology, air pollution, water supply, sewage and solid waste disposal, etc. The lack of optimal conditions regarding the total environment negatively affects the physical, emotional, and social well-being of people.

Social environment may be said to include:

- the density and composition of various populations, conceived as communities, ethnic and racial groups, and social classes
- the organized human groups of which individuals are members, ranging from families, schools, and factories to nation-states
- the socially defined roles embedded in such groups, including age and sex roles, and occupational and family roles
- the shared symbols, values, laws, and norms which guide the behavior of individuals in groups
- the technologies and material apparatus available to different groups

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a. Effects of
social
factors on
health

Health is affected by social
factors on an individual, as
well as group, basis.

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D. Interaction of
agent, host, and
environment

The interaction of agent, host,
and environment concerns itself
with conditions under which
the agent, host, and environ-
ment affect each other to ini-
tiate a disease process.

Recommended film: *The epi-
demiology of staphylococcal
infections.*

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1. Mode of
transmission

The mode of transmission is
the mechanism by which disease
agents are transported from
the "source" to the host.
This might be by:

a. Contact
transmission

Contact transmission involves
direct or indirect contact with
the infectious agent.

Students may list and dis-
cuss several diseases
spread via contact

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MAJOR UNDERSTANDINGS AND
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Health is affected by social factors on an individual, as well as group, basis.

The interaction of agent, host, and environment concerns itself with conditions under which the agent, host, and environment affect each other to initiate a disease process.

The mode of transmission is the mechanism by which disease agents are transported from the "source" to the host. This might be by:

Contact transmission involves direct or indirect contact with the infectious agent.

SUGGESTED TEACHING AIDS
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Recommended film: *The epidemiology of staphylococcal infections.*

Students may list and discuss several diseases spread via contact

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in various times and places.

- Social factors influence health in four ways:
- . Act as basic determinants in the distribution of many diseases. Disease is a phenomenon that varies geographically.
 - . Play an important part in the etiology of many diseases
 - . Define which health conditions shall be considered public health problems and the activities that may be carried out to meet these problems
 - . Determine the response of society and the individual to many health problems

See, also, Strand IV, Disease Prevention and Control.

Contact transmission may be by direct contact (by touching the source), by

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b. Air-borne
transmission

Air-borne transmission refers to the infectious agent being transported through the air.

transmission (venereal disease, rabies, hook-worm, etc.), and the means of controlling them.

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Students may list and discuss several diseases spread via air-borne transmission (sillicosis, tuberculosis, brucellosis, etc.), and the means of controlling them.

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c. Vector
transmission

Vector transmission refers to the infectious agents being transported via an intermediary host - fly, flea, mosquito, tick, mite, etc.

Have students report on methods and instances of controlling the cycle of infection:

- . Avoidance, e.g., mosquito netting
- . Repellants, e.g., N, N-diethyl-m-tolamide
- . Insecticides, e.g., DDT, chlordane
- . Reducing breeding vectors, e.g., poison, mosquito spraying, baiting of rats

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transmission (venereal disease, rabies, hookworm, etc.), and the means of controlling them.

indirect contact (touching contaminated objects), or by droplet spread (coughing, sneezing, smoke, fumes).

*Some diseases transmitted by contact: venereal disease, whooping cough, plague, rabies, polio, ringworm, hookworm, etc.

Air-borne transmission refers to the infectious agent being transported through the air.

Students may list and discuss several diseases spread via air-borne transmission (sillicosis, tuberculosis, brucellosis, etc.), and the means of controlling them.

Air-borne transmission may include droplet nuclei (residue suspended in air), dust (from floors, soil), and radiation (alpha, beta, and gamma rays, ultraviolet, X-rays). Some diseases transmitted by the air-borne route: tuberculosis, psittacosis, brucellosis, sillicosis, anthrax, etc.

Vector transmission refers to the infectious agents being transported via an intermediary host - fly, flea, mosquito, tick, mite, etc.

Have students report on methods and instances of controlling the cycle of infection:

- . Avoidance, e.g., mosquito netting
- . Repellants, e.g., N, N-diethyl-m-tolamide
- . Insecticides, e.g., DDT, chlordane
- . Reducing breeding vectors, e.g., poison, mosquito spraying, baiting of rats

Vector transmission - Arthropods may transmit infection by biting through or depositing infective materials on the skin. The vector itself may be infected, or may only be a carrier of the agent. The vector might be a fly, mosquito, tick, flea, etc. The agent might be a bacterium, virus, rickettsia, snake venom, etc.

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Show 16-mm, sound, color
film: *Epidemiology of
murine typhus.*

Show and discuss the film:
*Epidemiology of salmonel-
losis in man and animals.*

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MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPPLEMENTARY INFORMATION
FOR TEACHERS

Show 16-mm, sound, color
film: *Epidemiology of
murine typhus.*

Show and discuss the film:
*Epidemiology of salmonel-
losis in man and animals.*

Some diseases transmitted
by vectors include:
mosquito - malaria, yellow
fever, equine encephalitis
flies - typhoid, bacillary
dysentery
lice - trench fever, epi-
demic typhus, pediculosis
fleas - murine typhus,
plague
ticks - Colorado tick fever,
Rocky Mountain spotted
fever, Q fever, relapsing
fever

Vector control - Vector
control consists of break-
ing the cycle of infection.
There are two ecological
schemes. One is man-to-man
transmission by a vector.
An example is that of
malaria in which the Anoph-
eles mosquito bites one
man, obtaining the causa-
tive agent from his blood.
Then, it bites another man,
passing the infection to
him. In this type of vector
transmission combinations
of isolation and medication
of the man and environ-
mental attacks on the vector
break the cycle. A second
form of vector transmission
involves animal-to-man
passage of the etiological
agent, as in Rocky Mountain

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MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPPL

d. Vehicle
transmission
and control

Vehicle transmission is an
inanimate means of carrying
an infectious agent.

Arrange for field trips to
municipal water treatment
plants and pasteurization
plants. Have students re-
port on various types of
treatment of water and
pasteurization. When you
visit a milk pasteuriza-
tion plant, note methods
of pasteurization, clean-
liness, storage.

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**MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS**

Vehicle transmission is an inanimate means of carrying an infectious agent.

**SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES**

Arrange for field trips to municipal water treatment plants and pasteurization plants. Have students report on various types of treatment of water and pasteurization. When you visit a milk pasteurization plant, note methods of pasteurization, cleanliness, storage.

**SUPPLEMENTARY INFORMATION
FOR TEACHERS**

spotted fever. In this instance a tick from a wild rodent bites the man. It is sometimes possible to control the alternate host, which serves as the reservoir of infection dangerous to man. Control action consists of avoiding, repelling, killing, and reducing the numbers of breeding vectors.

Vehicle transmission includes conveyance by water, food, milk, and biological products (serum hepatitis) of a disease agent from a source (reservoir) to the host.

Vehicle Control

Milk-borne diseases include typhoid fever, paratyphoid fever, streptococcal infections, gastro-enteritis, diphtheria, bacillary dysentery, etc. There is only one method that has been demonstrated to successfully control milk-borne infection; that is pasteurization. Pasteurization consists of heating milk to a certain temperature for a certain length of time to destroy pathogenic bacteria.

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SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPPLE

Take field trips to local water treatment and sewage treatment plants. Have students prepare reports on various types of treatments.

How is water purified? What is the status of the water supply? What kinds of treatment does sewage get?

Have a county health department sanitarian talk on food poisoning and food preparation, storage, and handling.

You may wish to show film: *Epidemiology of salmonellosis in man and animal.*

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MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
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SUPPLEMENTARY INFORMATION
FOR TEACHERS

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What is the status of the water supply? What kinds of treatment does sewage get?

Have a county health department sanitarian talk on food poisoning and food preparation, storage, and handling.

You may wish to show film:
Epidemiology of salmonellosis in man and animal.

. Water-borne diseases include: infectious hepatitis, typhoid fever, cholera, and other bacterial, viral and parasitic diseases. A primary use of water is for drinking and food preparation. There are several means of providing potable and bacteriologically safe water. Disinfection, to remove pathogens, is usually done by chlorination and/or filtration.

. Food-borne food poisoning, a general term, includes many illnesses such as salmonellosis, staphylococcal food poisoning, botulism, mushroom poisoning, chemical food poisoning, etc. Prevention of food-borne disease primarily involves the prevention of bacterial and chemical contamination of food and utensils, adequate refrigeration of raw and processed foods, and use of adequate temperatures for food preparation and cleansing of utensils.

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MAJOR UNDERSTANDINGS AND
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SUGGESTED TEACHING AIDS
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SUPPLEMENTS

e. Genetic transmission

Genetic transmission is that mode which relates to transfer of disorders, as well as other characteristics, via genes through reproduction. This is often referred to as hereditary transmission.

Invite a guest speaker (a physician or consultant from a genetic counselling service) to discuss hereditary disorders and the implications for marriage, rehabilitation, etc.

Although of genetic origin, not all these diseases are transmitted. Examples include hemophilia, diabetes, chorea, epilepsy, and genetic recombinations in people or families with genetic disorders.

2. Multiple causation theory

Etiology (causation) is viewed as the interaction of the agent, host, and environment.

Invite a guest lecturer, (physician, public health officer, epidemiologist) to your school to discuss some of the multiple factors involved in such disorders as heart disease, mental illness, cancer, arthritis, accidents, etc.

Have the students report on the risk factors associated with certain diseases such as heart disease, cancer, tuberculosis, etc.

Agents are determined according to the probability that the cause is not so. Public health must assure a quality of life that is agent-free. The incidence of singular diseases can be ill. The factors are not breast

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

Genetic transmission is that mode which relates to transfer of disorders, as well as other characteristics, via genes through reproduction. This is often referred to as hereditary transmission.

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SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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Have the students report on the risk factors associated with certain diseases such as heart disease, cancer, tuberculosis, etc.

SUPPLEMENTARY INFORMATION FOR TEACHERS

Although the exact nature of genetic transmission is not thoroughly understood, there are a number of diseases that are transmitted genetically, for example, Tay Sach's disease, hemophilia, phenylketonuria, diabetes, Huntington's chorea, and some forms of epilepsy, to name a few. Genetic counselling is recommended for those people who have personal or family histories of genetic disorders.

Agent, host, and environment are regarded as the basic determinants of disease. According to this theory, the problem of ascertaining the cause of a disease is not solved by identifying the disease agent alone. Public health and medicine must also examine the qualities of the host and the environmental influence that interact with the agent and host.

The inadequacy of the singular cause theory can be illustrated by examining the four basic factors that are necessary to produce breast cancer in mice. The

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MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
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Refer students to the following:

- Epidemiology and communicable disease control*, by F. B. Rogers.
- Uses of epidemiology*, by J. N. Morris.
- Accident prevention*, by M. N. Halsey.

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Numerous factors can cause a particular disease, and what may be causal under certain conditions may not be causative under others.

Refer students to: *Health and disease*, and *Man, medicine and environment*, by Rene Dubos.

MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPPLEMENTARY INFORMATION
FOR TEACHERS

presence of all four factors must be present for breast cancer to occur.

Example of multiple causation theory

1. Genetic transmission - Scientists by selective breeding can produce mice in which 80 percent of the offspring develop breast cancer.

2. Viral cause - If these genetically susceptible mice are taken from their mother's breast at birth and allowed to suckle from a mother who is from a nonsusceptible strain, the offspring will not develop breast cancer. Susceptible mothers secrete a virus in their milk which must be present for breast cancer to develop in their offspring.

3. Hormonal cause - Only female susceptible mice develop cancer of the breast. However, when scientists inject estrogen (female sex hormone) into males, they also will develop breast cancer.

4. Nutritional cause - Mice in which all factors are present (female mice bred and suckled by genetically

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MAJOR UNDERSTANDINGS AND
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AND LEARNING ACTIVITIES

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Show film: *Mission
measles: the story of
a vaccine.*

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Few diseases have only one cause. Many people carry the organisms for tuberculosis, staphylococcus infections, influenza, etc., but this single factor does not necessarily lead to disease.

Have the class list reasons why one may have disease-producing organisms in the body, yet not be infected.

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The majority of people "infected" with tuberculosis do not develop the disease. The singular cause theory of disease would imply that people who develop tuberculosis are sick because of the presence of the tubercle bacillus in their body.

Discuss reasons why some people in the same socio-cultural setting from the same family contract a disease quite readily, while others do not.

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The highest rate for tuberculosis among nonwhites was found in the areas where they were a distinct minority and thus had little opportunity for meaningful social relationships with others. Conversely, for whites the rates

List diseases that appear to have a single cause. What other factors must be present for the disease to actually occur?

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

Show film: *Mission measles: the story of a vaccine.*

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SUPPLEMENTARY INFORMATION FOR TEACHERS

susceptible mothers) and placed on a restricted caloric intake rarely develop breast cancer.

Obviously, no single factor is the cause of breast cancer in mice. All four factors have to be present to produce breast cancer in mice.

How do people who develop tuberculosis differ from those who do not? The following study was designed to discover such differences:

An epidemiological study reported by Cassel which was conducted in Seattle, Washington, found that individuals who had tuberculosis were characterized by the possession of certain traits.

1. Race. Whites living in the poorest area of the city, with the worst housing and overcrowded conditions, had the highest tuberculosis rates. For nonwhites the pattern was reversed. The highest rates for nonwhites occurred in the wealthier area of the city.

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FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPPLEMENTS
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were highest in those areas in which there were high proportions of nonwhites and where the whites had little opportunity for social interaction.

Do the same with diseases which appear to have a multiple causation. How are the two lists alike? How do they differ? Why do these occur?

Show and discuss the film *Anatomy of a disease*.

If not already done, the class may want to review portions of the film again or obtain another film which contains more depth. See film list at the end of this strand.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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SUPPLEMENTARY INFORMATION FOR TEACHERS

2. Residential and job mobility. Those who developed tuberculosis were highly mobile. They moved from home to home about five times more than the average person and changed their place of employment frequently.

3. Marital status. Few of those who developed tuberculosis were married, and many more were divorced or widowed than is true for the general population.

4. Living arrangements. A relatively large proportion of those with tuberculosis lived alone in one room.

Populations with these four characteristics have been referred to by sociologists as "marginal men." Generally they do not belong, they have few friends, few neighbors that they know well, and little contact with their fellow man.

What are the differences between the people who are "isolated" and develop tuberculosis and "isolated" people who do not?

OUTLINE OF CONTENT

MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

Further epidemiological analysis is necessary since not all people who are isolated develop tuberculosis even when they are exposed to the tubercle bacillus.

People who are exposed to mounting stress, deprived of societal help and support, and have no friends to aid them, are placed in a position to handle these threats to their security unaided. One of the dire consequences is tuberculosis.

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

How does stress aid the tuberculosis bacillus to gain infectious proportions within an individual?

You may wish to show the film *Stress* at this time. Although it deals with general stress reaction, rather than tuberculosis, students may want to discuss the general implications of stress to such conditions as: arthritis, heart disease, and infectious diseases, such as, tuberculosis.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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SUPPLEMENTARY INFORMATION FOR TEACHERS

An epidemiological study comparing tuberculosis hospital employees who had developed tuberculosis as a result of working in the hospital with employees who had not developed the disease was undertaken to answer this basic question. The major finding was that stress appeared to be a significant factor in developing tuberculosis. In the nontuberculosis group, the stressful situations were distributed randomly, that is, in some years the group was relatively free of stress and other years there appeared to be multiple stresses. However, in the tuberculosis group, the stresses tended to accumulate so that each year was worse than the preceding one. The stress situations reached a peak about one year before tuberculosis was diagnosed.

A group of tuberculosis patients were studied to determine the relationship between hormone balance and recovery from the disease. The hormone studied was the 17 ketosteroids produced by the

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SUGGESTED TEACHING AIDS
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A person's emotional state may lead to an alteration in his hormone balance which increases his susceptibility to the tubercle bacillus.

Have some students read appropriate portions of *The individual, society and behavior*, by A. L. Knutson, and summarize the key principles for class discussion.

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Infectious diseases are not the only area in which we can apply epidemiological methods. Noncommunicable diseases - cancer, heart disease, diabetes, accidents, also may be studied via the epidemiological approach.

Have some students report on selected epidemiological studies such as those found in the American Journal of Public Health.

Some examples are: accidents, suicides, poisoning, smoking, alcoholism, etc.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

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Some examples are: accidents, suicides, poisoning, smoking, alcoholism, etc.

SUPPLEMENTARY INFORMATION FOR TEACHERS

adrenal gland. It was found that:

- . High levels of this hormone were related to anxiety and aggressiveness in the patient.
- . Low levels were related to apathy, depression, and feelings of hopelessness.
- . Normal levels tended to be related to calmness and adjustment to the illness.

If the emotional state of the patient was changed, the hormone level also changed, and the chances of recovery from tuberculosis also improved.

Under therapy, those with normal levels recovered the fastest, while those with high levels became chronic patients and those with low levels tended to die.

Epidemiological studies have been conducted on chronic diseases, accidents, mental illness, alcoholism, drug addiction, juvenile delinquency, industrial absenteeism, and many other causes.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUPPL

3. Role of health attitudes, beliefs, values, knowledge, and practices

Attitudes have long been recognized as potent forces that play a complex role in determining health values, knowledge, and behavior.

Discuss the role of attitudes, beliefs, and knowledge in determining man's behavior by use of Chart 2 on page 48.

What will in d es, beha d

An attitude may be defined as a tendency to respond either positively or negatively toward a given type of person, object, situation or ideal; it is a predisposition to action.

Have the class discuss attitudes in relation to the prevention and control of disease.

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Attitudes provide some uniformity to behavior.

How do attitudes impede program development? Do cultural attitudes affect disease control? How?

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Knowledge by itself does not necessarily insure that the desired behavior will occur.

Refer to Strand III, Mental Health, for basic principles controlling attitudes. How are attitudes formed? Changed?

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Knowledge can aid individuals and groups to make intelligent decisions which can result in desired behavior change.

Discuss how too little or the wrong kinds of knowledge may lead us to incorrect conclusions. What kind and how much knowledge does the epidemiologist seek? Why? How does this help him in solving disease-related health problems? Give some specific illustrations. Perhaps

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A desired health practice such as immunization against regular measles may not occur unless the individual knows that there is a vaccine available for this disease.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

Attitudes have long been recognized as potent forces that play a complex role in determining health values, knowledge, and behavior.

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Knowledge can aid individuals and groups to make intelligent decisions which can result in desired behavior change.

A desired health practice such as immunization against regular measles may not occur unless the individual knows that there is a vaccine available for this disease.

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

Discuss the role of attitudes, beliefs, and knowledge in determining man's behavior by use of Chart 2 on page 48.

Have the class discuss attitudes in relation to the prevention and control of disease.

How do attitudes impede program development? Do cultural attitudes affect disease control? How?

Refer to Strand III, Mental Health, for basic principles controlling attitudes. How are attitudes formed? Changed?

Discuss how too little or the wrong kinds of knowledge may lead us to incorrect conclusions. What kind and how much knowledge does the epidemiologist seek? Why? How does this help him in solving disease-related health problems? Give some specific illustrations. Perhaps

SUPPLEMENTARY INFORMATION FOR TEACHERS

What people feel or value will be an important factor in determining their health behavior.

People who feel they are not susceptible to a given disease may not accept the practice of immunization. Negative attitudes with respect to safety may contribute to unsafe acts that cause accidents. Understanding the attitudes of an individual or group may make it possible to predict their health behavior.

The knowledge that immunization may protect an individual from disease does not insure that preventive measures will be utilized.

The knowledge that cigarette smoking is related to lung cancer does not necessarily cause a smoker to refrain from this practice.

Evidence indicates that attitudes and practices can be modified and changed through education.

Three basic factors appear to intervene between knowledge and the application of such knowledge to obtain the desired behavior.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

SUPPLEMENTARY MATERIALS

a public health worker can come to class to discuss some of his current studies.

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All aspects of an individual's personality, including his temperament, interests, attitudes, and values, play a significant role in determining health status.

Discuss the role of emotions in one's perceptions and his reactions to these perceptions.

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MAJOR UNDERSTANDINGS AND
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SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPPLEMENTARY INFORMATION
FOR TEACHERS

a public health worker can come to class to discuss some of his current studies.

The basic principles of perception, interpretation, and salience have been found to operate in controlling the health behavior of individuals and groups in a number of research investigations. For example, among low-income families it was observed that:

. Perception of health. Health is not perceived as being of primary importance to them. Other matters in their everyday lives appeared to have greater significance for them.

. Interpretation. The manner by which health could be maintained was not interpreted by low-income groups to include certain measures.

. Salience. Knowledge regarding a specific health procedure or verbal acceptance of its importance does not necessarily insure the desired action.

All aspects of an individual's personality, including his temperament, interests, attitudes, and values, play a significant role in determining health status.

Discuss the role of emotions in one's perceptions and his reactions to these perceptions.

Psychosomatic investigations (physical or bodily symptoms that arise in part from psychological factors) have indicated that personality factors may be important variables in

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SUGGESTED TEACHING AIDS
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SUPPL

IV. Epidemiology and
Ecology in the
Modern Era

A. Public health
problems with
ecological im-
plications

Significant economic, demo-
graphic, social, cultural,
scientific, and technological
changes have occurred during
the 20th century that have not
only improved man's health
but have also created addi-
tional health needs and prob-
lems.

The two extremes of life re-
presented by the age groups,
6 and under and 65 and over,
represent the periods of man's
life cycle that generally
demand the greatest need for
health services.

Discuss and analyze some
of the significant eco-
nomic, demographic, cul-
tural, and technological
advances that have been
made in the U.S. since
1900. What new problems
have emerged?

Discuss why the very young
and the very old are par-
ticularly susceptible to
disease, death, disability.

Discuss how the health
problems of the aged differ
from those encountered by
the younger-age groups.
What are the implications
of this for social and
health services planning?

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

Significant economic, demographic, social, cultural, scientific, and technological changes have occurred during the 20th century that have not only improved man's health but have also created additional health needs and problems.

The two extremes of life represented by the age groups, 6 and under and 65 and over, represent the periods of man's life cycle that generally demand the greatest need for health services.

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

Discuss and analyze some of the significant economic, demographic, cultural, and technological advances that have been made in the U.S. since 1900. What new problems have emerged?

Discuss why the very young and the very old are particularly susceptible to disease, death, disability.

Discuss how the health problems of the aged differ from those encountered by the younger-age groups. What are the implications of this for social and health services planning?

SUPPLEMENTARY INFORMATION FOR TEACHERS

numerous diseases, (i.e., arthritis, ulcers, diabetes, asthma, colitis, migraine headaches, heart disease, etc.)

As our physical, social, and biological environment changes, the scope of our health problems also change with the arising of new, and the compounding of past, health problems.

Examples of demographic changes include:

. Changes in the age structure of our population have occurred as a result of our increased life expectancy. In 1900, 18 percent of our population was in the age group 45 and over. In 1965, the corresponding figure was approximately 30 percent. 10 percent of our population is in the age group 65 and over.

. Our population is presently increasing at the rate of 1.7 percent per year.

OUTLINE OF CONTENT

MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPPLEM
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Low-income groups tend to have higher morbidity and mortality rates. Utilization of health services is becoming a major problem in some areas.

Invite the county Commissioner of Social Services to class to discuss this concept from his agency's viewpoint.

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Major scientific and technological advances have aided in improving man's health. However, they have also created new problems of pollution, disposal of radioactive and industrial wastes, side effects of drugs, increasing costs of medical and dental care, etc.

List and discuss contemporary health problems, e.g., alcohol abuse, alcoholism, drinking and driving, drug abuse and addiction, cigarette smoking; pollution - air, water, solid waste, noise (jets, industrial); population explosion; malnutrition - obesity, starvation; accidents - vehicular, pedestrian, industrial; suicide - depression, mental illness - psychoses, neuroses, character disorders; health economics - financing for hospitalization, medical and dental care, others. What are the individual and community implications and responsibilities in these problems?

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

Low-income groups tend to have higher morbidity and mortality rates. Utilization of health services is becoming a major problem in some areas.

Major scientific and technological advances have aided in improving man's health. However, they have also created new problems of pollution, disposal of radioactive and industrial wastes, side effects of drugs, increasing costs of medical and dental care, etc.

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

Invite the county Commissioner of Social Services to class to discuss this concept from his agency's viewpoint.

List and discuss contemporary health problems, e.g., alcohol abuse, alcoholism, drinking and driving, drug abuse and addiction, cigarette smoking; pollution - air, water, solid waste, noise (jets, industrial); population explosion; malnutrition - obesity, starvation; accidents - vehicular, pedestrian, industrial; suicide - depression, mental illness - psychoses, neuroses, character disorders; health economics - financing for hospitalization, medical and dental care, others. What are the individual and community implications and responsibilities in these problems?

SUPPLEMENTARY INFORMATION FOR TEACHERS

Examples of economic changes include:

The standard of living among groups and social classes has been rising at the rate of about 1 percent a year.

Some poverty and subpoverty groups have not shown a significant increase in their standard of living.

Examples of scientific and technological changes include:

. The rate of major medical developments has increased since 1900 from about one per decade to several per year since 1940.

. 90 percent of prescriptions written today are for products that did not exist 10 years ago.

OUTLINE OF CONTENT

MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS

SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES

SUPP

Social and cultural changes that have occurred have also brought concomittant problems of segregation, urban development, air and water pollution, mental illness, alcoholism, drug addiction, accidents, etc.

Show and relate the film: *Air pollution - everyone's problem.*

Discuss the health problems related to suburbanization. How do planners take into account the health problems related to air, water, mental health, recreation, and safety. Refer to *Preventive medicine* by H. E. Hilleboe, *Crisis in our cities* by L. Herber, and *The unseen world* by Rene Dubos.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

Social and cultural changes that have occurred have also brought concomittant problems of segregation, urban development, air and water pollution, mental illness, alcoholism, drug addiction, accidents, etc.

SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

Show and relate the film: *Air pollution - everyone's problem.*

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SUPPLEMENTARY INFORMATION FOR TEACHERS

Examples of social and cultural changes include:

- . The trend toward urbanization in which two-thirds of our population now lives in urban areas.
- . The trend toward lower social class migration to central city areas and a corresponding migration by higher socioeconomic groups to the suburbs.
- . About 1 out of 5 Americans changes his place of residence each year. Americans have become highly mobile in terms of geographic location as well as job mobility.
- . Automation has increased man's leisure time.
- . Women now account for about 30 percent of the total labor force.
- . The median age for first marriage has declined to 20.1 years for brides and 23.1 years for grooms.
- . The birth rate has also declined since 1957 and approximates the birth rate found in 1930. In 1966, the birth rate was 18.5 per 1,000 population.

OUTLINE OF CONTENT

**MAJOR UNDERSTANDINGS AND
FUNDAMENTAL CONCEPTS**

Many of our health problems can best be attacked and combated through the cooperative efforts of:

- . Public health and medicine
- . Research
- . Health education (including both public and school health education)
- . Comprehensive health planning

**SUGGESTED TEACHING AIDS
AND LEARNING ACTIVITIES**

Have students report on some of our public health problems and discuss the ecological implications.

Show and discuss the film: *Beargrass creek* or *Clean waters*.

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MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS

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SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES

Have students report on some of our public health problems and discuss the ecological implications.

Show and discuss the film: *Beargrass creek* or *Clean waters*.

SUPPLEMENTARY INFORMATION FOR TEACHERS

Examples of public health problems with ecological implications include:

- . Problems of the aged
- . Accidents
- . Mental health and illness
- . Smoking and health
- . Alcoholism
- . Chronic and acute diseases
- . Pollution and environmental sanitation
- . Quackery and consumer health
- . Maternal and child health
- . Drug use and abuse
- . Utilization of public health services
- . Health and poverty

APPENDIX

CHART I

THE TEN LEADING CAUSES OF DEATH IN THE UNITED STATES, 1900 and 1967*

1900		Death Rate per 100,000 Population	1967	
Rank	Cause of Death		Rank	Cause of Death
	All causes	1,719		All causes
1	Pneumonia and influenza	202	1	Diseases of heart
2	Tuberculosis	194	2	Cancer and other malignant neo
3	Diarrhea and enteritis	143	3	Cerebral hemorrhage (stroke)
4	Diseases of heart	137	4	Accidents
5	Cerebral hemorrhage (stroke)	107	5	Pneumonia and influenza
6	Nephritis	81	6	Certain diseases of early infan
7	Accidents	72	7	General arteriosclerosis
8	Cancer and other malignant neoplasms	64	8	Diabetes mellitus
9	Certain diseases of early infancy	63	9	Other diseases of circulatory
10	Diphtheria	40	10	Other bronchopulmonic diseases

*Vital Statistics - U.S. Department of Health, Education and Welfare, Public Health Service, Health, Education and Welfare Administration, National Center for Health Statistics

APPENDIX

CHART I

THE TEN LEADING CAUSES OF DEATH IN THE UNITED STATES, 1900 and 1967*

	Death Rate per 100,000 Population	1967 Rank	Cause of Death	Death Rate per 100,000 Population
	1,719		All causes	935.7
Influenza	202	1	Diseases of heart	436.5
	194	2	Cancer and other malignant neoplasms	157.2
Arthritis	143	3	Cerebral hemorrhage (stroke)	102.2
	137	4	Accidents	57.2
Stroke (stroke)	107	5	Pneumonia and influenza	28.8
	81	6	Certain diseases of early infancy	24.4
	72	7	General arteriosclerosis	17.7
Malignant neoplasms	64	8	Diabetes mellitus	17.7
Diseases of early infancy	63	9	Other diseases of circulatory system	15.1
	40	10	Other bronchopulmonic diseases	14.8

* U.S. Department of Health, Education and Welfare, Public Health Service, Health Services and Statistics Administration, National Center for Health Statistics

CHART 2

HEALTH BEHAVIOR MODEL

KNOWLEDGE	+	INFLUENTIAL FORCES	=	B
<u>Sources of knowledge</u>		<u>Internal and external forces</u>		<u>Interaction of influential fo</u>
<p><u>Real experiences:</u> Actual performance may be a source of knowledge through trial and error, or through the application of knowledge gained elsewhere. That which is learned by experience may have positive or negative effects on one's health.</p>		<p><u>Internal forces:</u> These include those forces within the individual, both acquired and inherited. Biological Forces Psychological Forces</p>		<p>Behavior is the end-product of the interaction of internal and external forces. It may be positive or constructive or destructive or unacceptable.</p>
<p><u>Vicarious experiences:</u> These "second-hand" experiences implore one, through imagination, to project himself into an actual situation. Such means are tv, radio, newspapers, books, plays, films, records, dialogue, etc.</p>		<p><u>External forces:</u> These forces come to affect the individual from without. Social forces Environmental forces The above components or forces are combined and interpreted to meet the needs of the individual in his environment with his family, peers, and others.</p>		<p>When confronted with a problem or situation, behavior is usually a result of the interaction of real and vicarious associations with the person, according to his past experiences.</p>

CHART 2

HEALTH BEHAVIOR MODEL

+	INFLUENTIAL FORCES	=	BEHAVIOR
	<u>Internal and external forces</u>		<u>Interaction of knowledge and influential forces</u>
	<p>Internal forces: These include those forces within the individual, both acquired and inherited.</p> <p>Biological Forces Psychological Forces</p>		<p>Behavior is the reaction, response, or end-product of the synthesis of internal and external forces. It may be positive or negative, constructive or destructive, acceptable or unacceptable.</p>
	<p>External forces: These forces come to affect the individual from without.</p> <p>Social forces Environmental forces</p> <p>The above components or forces are combined and interpreted to meet the needs of the individual in his environment with his family, peers, and others.</p>		<p>When confronted with a new situation or problem, an individual's behavior usually reflects a reaction to similar past experiences -- both real and vicarious. This system of associations varies from person to person, according to the kinds of experiences he has been exposed to.</p>

MULTIMEDIA RESOURCES

Ecology and Epidemiology of Health
Grades 10-11-12

TEACHER REFERENCES

These supplementary materials have been evaluated. The list is for teacher convenience only. Teachers in the field are requested to evaluate the materials and send their comments to the Resource Center.

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MULTIMEDIA RESOURCES

Ecology and Epidemiology of Health
Grades 10-11-12

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These supplementary aids have not been evaluated. The list is appended for teacher convenience only, and teachers in the field are requested to critically evaluate the materials and to forward their comments to the Curriculum Development Center.

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Dr. J.F. Enders," October 29, 1954.

Films - The following suggested list of films may be ordered from the Film Library, New York State Department of Health, 84 Holland Avenue, Albany, New York 12208, unless otherwise noted.

Air pollution - everyone's problem. 20 minutes, color. Emphasizes the causes, effects, and methods of combating the air pollution problem.

Anatomy of a disease. 14 1/2 minutes, color. Presents basic facts concerning the epidemiology of tuberculosis. Utilizes several brief interviews with tuberculosis patients as background material.

Beargrass creek. 20 minutes, color. Describes the general problem of water pollution and the municipal responsibility of treating sewage instead of discharging raw sewage into the creek.

Clean waters. 27 minutes, color. Demonstrates the ecologic aspects of water pollution and its effects on populations, recreational facilities, and disease in man.

Epidemiology of murine typhus. 18 minutes, color. Free from the National Medical Audio-Visual Center, Chamblee, Ga. 30005.

Epidemiology of salmonellosis in man and animals. 15 minutes, color. Explains the complex patterns of salmonellosis and the significance of human carriers.

Epidemiology of staphylococcal infection. 14 minutes, color. Illustrates the interaction of host, pathogen, and environment in the transmission of disease. Also available free from the National Medical Audio-Visual Center, (annex), Chamblee, Ga. 30005.

The first mile up. 28 minutes, black and white. Discusses the various factors involved in air pollution. Utilizes a series of interviews and comments from health and engineering authorities concerning the air pollution problem.

Mission measles: the story of a vaccine. 20 minutes, black and white. Discusses the history and development of measles including the development, testing, and perfection of the Enders vaccine.

The mosquito and its control. 10 minutes, black and white. Presents the life cycle of the mosquito and the implication of the cycle for combating mosquito-borne diseases.

Population ecology. 19 minutes, color. Examines factors which limit growth of plant and animal populations.

Stress. 11 minutes, black and white. Describes the general concept of the stress theory and its application by Dr. Hans Selye. Utilizes third dimensional diagrams to illustrate various relationships.

Suggested list of films may be ordered from the Film Library, New York State Department of
Land and Avenue, Albany, New York 12208, unless otherwise noted.

one's problem. 20 minutes, color. Emphasizes the causes, effects, and approaches to
pollution problem.

14 1/2 minutes, color. Presents basic facts concerning the epidemiology of tuberculosis.
Brief interviews with tuberculosis patients as background material.

minutes, color. Describes the general problem of water pollution. Particular emphasis is
placed on the responsibility of treating sewage instead of discharging raw sewage into streams.

minutes, color. Demonstrates the ecologic aspects of water pollution in respect to animal
sanitation facilities, and disease in man.

typhus. 18 minutes, color. Free from the National Medical Audio-visual Center (annex),
Washington, D. C.

typhoid fever in man and animals. 15 minutes, color. Explains the complex transmission
of typhoid fever and the significance of human carriers.

Staphylococcal infection. 14 minutes, color. Illustrates the interaction of the agent, host,
and environment in the transmission of disease. Also available free from the National Medical Audio-visual
Center, Atlanta, Ga. 3005.

8 minutes, black and white. Discusses the various factors involved in air pollution.
Includes interviews and comments from health and engineering authorities concerning the air
pollution problem.

Story of a vaccine. 20 minutes, black and white. Discusses the nature and seriousness
of the disease and the development, testing, and perfection of the Enders vaccine.

Malaria control. 10 minutes, black and white. Presents the life cycle of the mosquito and the
methods for combating mosquito-borne diseases.

19 minutes, color. Examines factors which limit growth of plant and animal populations.

black and white. Describes the general concept of the stress theory of disease developed
by Selye. Utilizes third dimensional diagrams to illustrate various relationships.