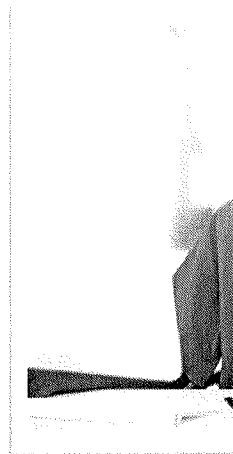




Theories from Biomedical Sciences

- Theories from the biomedical sciences (biology, medicine, public health, physiology, and pharmacology) have a tremendous impact on nursing practice



Theories from Biomedical Sciences

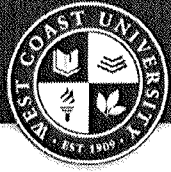
The number of biomedical theories and the use in nursing practice is staggering. Theories from the biomedical sciences such as biology, medicine, public health, physiology, and pharmacology have a tremendous impact on nursing practice. Many of these theories are so integral to nursing that they are overlooked and until recently were not significant areas of nursing research. Examples include theories of disease causation such as germ theory, the natural history of disease, and the web of causation; genetic principles and theories; and pain management.

①



◀ PREV





Germ Theory/Principles of Infection:

- 1858 – Proposed by Pasteur
- Mid-1860s – Confirmed by Lister
- Postulates that microscopic organisms (germs) cause diseases

Germ Theory/Principles of Infection: Application

Germ theory and principles of infection were proposed by Louis Pasteur in 1858 and confirmed by Lister in the mid-1860s. The theory postulates that microscopic organisms (germs) cause diseases. This simple theory was important for developing modern medical care. Germ theory describes the process that seeks to identify, understand, and manage infectious diseases. Today, theories of infection are widely applied to prevent infection (e.g., universal precautions; surgical asepsis).

Click on each button to learn more.

Education:

The first skill taught to nursing students is hand washing.

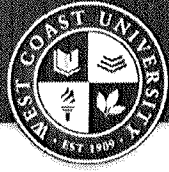
Practice:

Infection prevention and treatment is a primary component of nursing care in all settings.

Research:



2



Germ Theory/Principles of Infection:

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Germ Theory/Principles of Infection: Application

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Click on each button to learn more.

Education:

The first skill taught to nursing students is hand washing.

Practice:

Infection prevention and treatment is a primary component of nursing care in all settings.

Research:

Uses germ theory to identify causes of infection. Nursing researchers used the germ theory in their studies of prevention of infection studies. Examples include: strategies to prevent pneumonia related to ventilators, infections related to the use of urinary catheters, and others.



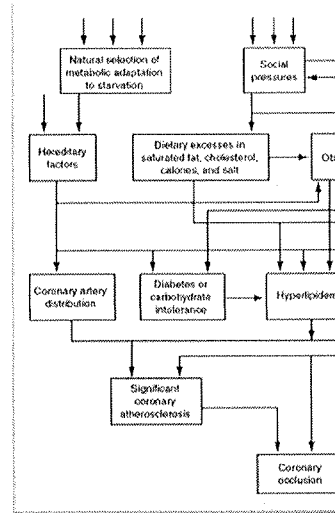


Web of Causation

- Developed by MacMahon and Pugh (1970) as the "chain of causation"
- Attempts to explain that disease and disability are caused by multiple factors
- It shows that chronic disease results from the interaction of multiple factors

Web of Causation

This flow chart was developed by MacMahon and Pugh (1970) as the "chain of causation". Here they provide the model which attempts to explain that disease and disability are caused by multiple factors. It shows that chronic disease results from the interaction of multiple factors. The implication of this is that many points for intervention may be needed.



Click on the figure to enlarge.

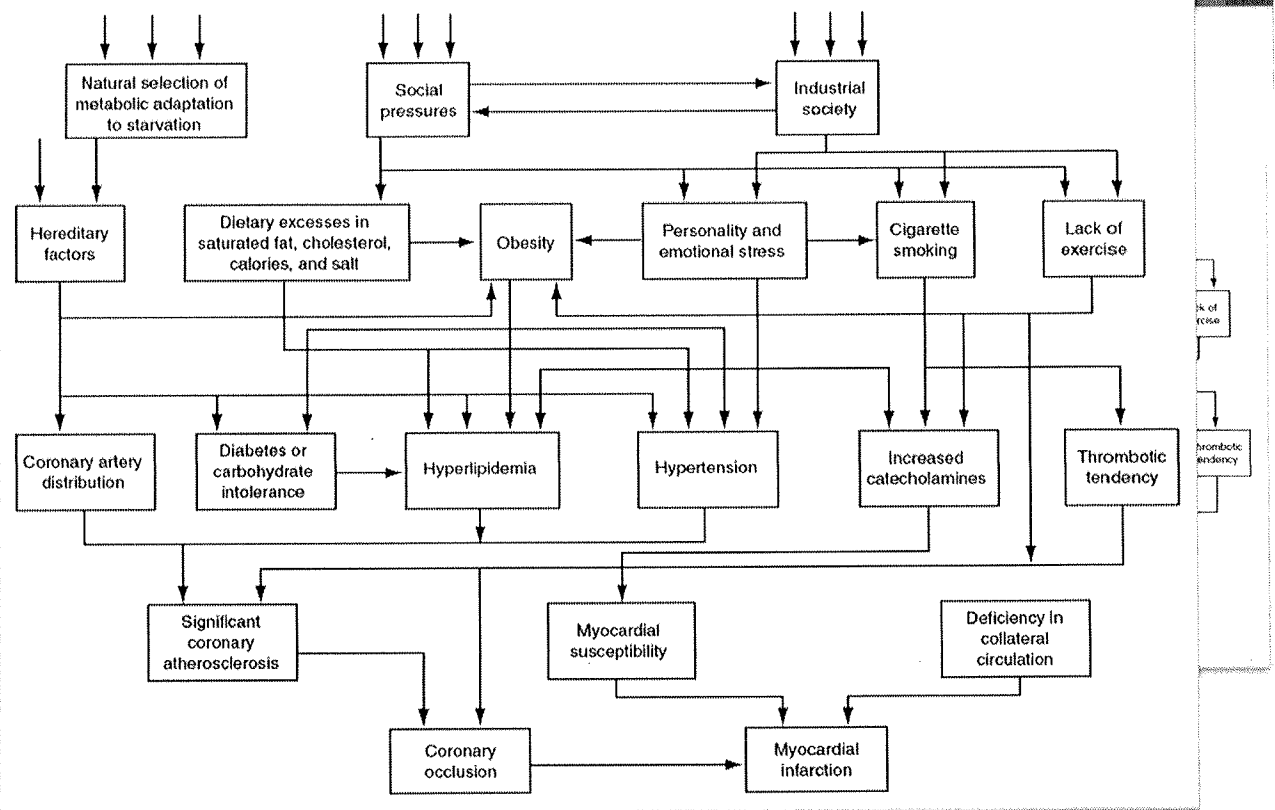
Theoretical Basis for Nursing, 4th Ed., by McEwen and Wills. ISBN 978-1-4511-9031-1. (2014). Wolters Kluwer Health | Lippincott, Williams, & Wilkins. Philadelphia, PA

(Adapted with permission from Friedman, G. D. [1994]. *Primer of epidemiology* [4th ed.]. New York: McGraw-Hill.)



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Natural History of Disease

- Natural history of diseases: Leavell and Clark in 1965
- Provides two central tenets:
 - Periods in the history of disease
 - Levels of prevention

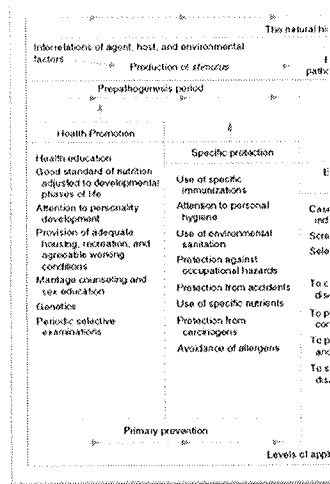
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{Adapted with permission from Leavell, H. R., & Clark, F. G. [1965]. *Preventive medicine for the doctor in his community: An epidemiologic approach* [p. 18]. New York: McGraw-Hill.}

Natural History of Disease

The natural history of diseases is discussed in this chart by Leavell and Clark in 1965. It provides two central tenets:

- Periods in the history of disease (prepathogenesis, pathogenesis), and levels of prevention (primary, secondary, tertiary)

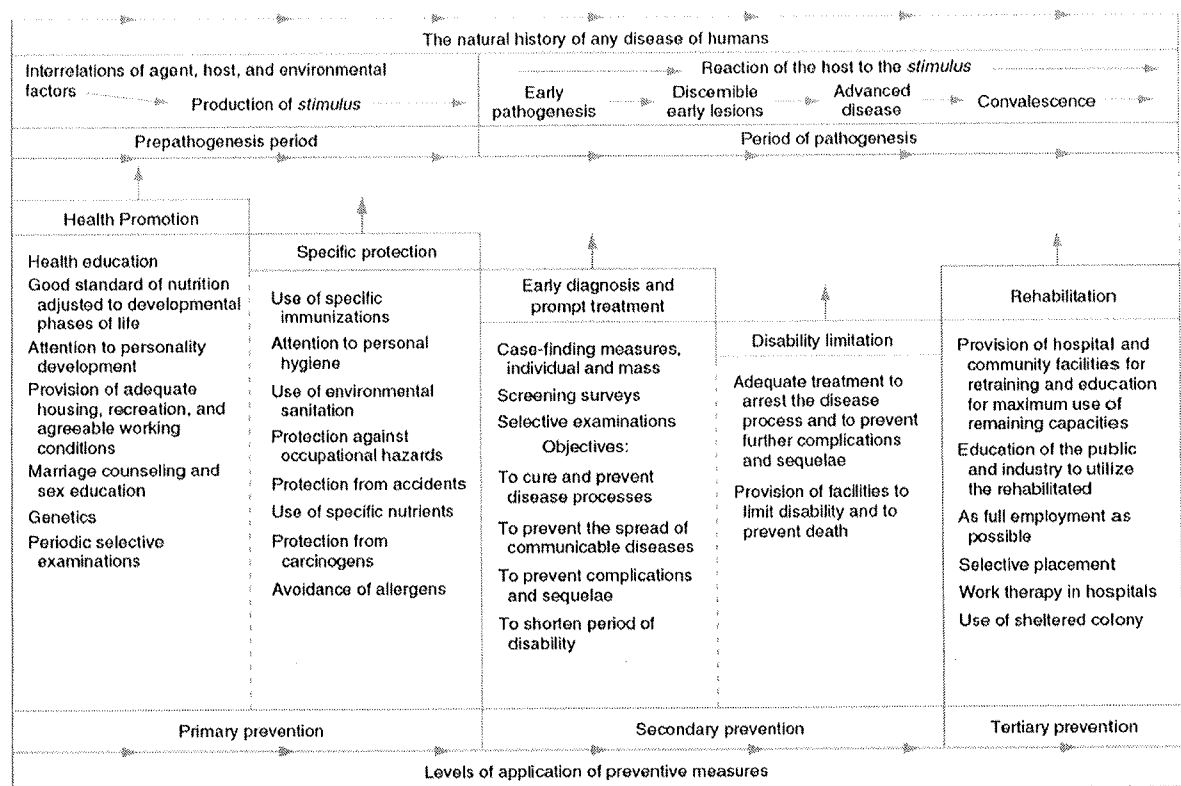


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Natural History of Disease - Application

Natural History of Disease - Application

The application of Leavell and Clark's work is seen in:

- Practice-much of nursing practice focuses on preventing the progression of disease from one stage to the next
- Primary prevention examples-prevention of obesity, osteoporosis, neural tube defects, accidents, immunizations
- Secondary prevention examples-mammography programs, prostate screening efforts
- Tertiary prevention examples-prevention of subsequent heart attacks through cardiac rehabilitation, prevention of complications of diabetes

Practice

- Focuses on preventing the progression of disease

Primary Prevention Examples

- Prevention of obesity, osteoporosis, neural tube defects, accidents, immunization

Secondary Prevention Examples

- Mammography programs, prostate screening efforts

Tertiary Prevention Examples

- Prevention of subsequent heart attacks through cardiac rehabilitation, prevention



Genetics

Genetics

- Although principles of genetics date back to Mendel's work in the 1860s, only in advances been made
- The field of genetics has exploded in the last five years and its importance to nu

Although principles of genetics date back to Mendel's work in the 1860s, only in the last decade have significant advances been made. The field of genetics has exploded in the last five years and its importance to nursing will continue to grow. Almost on a daily basis, there is a new test, disease component, or new research findings related to genetics.

In the space below, drag the term on the left to its matching definition on the right.

DNA:

DNA is composed of four chemicals (A, T, C, G). The order determines the traits of the organism. DNA is arranged into 24 distinct chromosomes-molecules that range from about 50 million to 250 million pairs.

Genome:

A genome is the complete set of DNA in an organism. The human genome has 3 billion pairs of bases

Genes:



Genetics

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Genetics

Genes:

Genes are the basic physical and functional units of heredity. They carry information for the specific sequences of bases that encode functions to make proteins. There are about 20,000 to 25,000 genes in humans. Genes comprise only about 2% of the genome. Functions are unknown for more than 50% of discovered genes.

Proteins:

Proteins are large, complex molecules composed of amino acids; the chemical process of amino acids determines:

- How the protein chains function in the cell
- How the organism looks
- The organism's metabolism and behavior

Humans share most of the same protein families as worms, flies, and plants, but the number of genes is expanded in humans. Gene mutation is the alteration in the coding of the DNA and results in a change in the protein product. Mutations in some genes cause clinical disease due to absence of the normal protein.



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