I. Introduction:

• Today we are looking at Chapters 19 & 20 of Dr. Harold Koenig, Michael McCullough and David Larson’s book,

  **Handbook of Religion and Health (2001)**

• Published by Oxford University Press, New York.
Since January 11 we have studied “Effects of Faith on Health & Medicine” -- Review of H. Koenig, et al, *Handbook of religion and Health (HRH)*

- Jan 13: Positive and Negative Effects of Religion on Health and healing (Chapters 3 & 4, HRH)

- Jan 20: Effects of Religious Coping (chapter 5, HRH)

- Jan 27: Effect of Religion on Well Being (chapter 6, HRH)

- March 3: Effect of Religion on Depression and Suicide, (chapters 7 - 8 HRH)

- March 10: Effect of Religion on Mental Health (chapter 15 HRH)
Thursdays Past, Present, and future

- March 17: Effect of Religion on Anxiety Disorders, Schizophrenia, and other Psychoses (chapters 9 - 10, HRH)
- March 24: Effect of Religion on Alcohol and Drug Use, Delinquency (chapters 11 - 12, HRH)
- March 31: Effect of Religion on Heart Disease & Hypertension (chapters 16-17, HRH)
- April 7: Effect of Religion on Immune System Dysfunction and Cancer (chapter 19-20, HRH)
- April 14: Effect of Religion on Longevity and Disability (Chap. 21-22, HRH)
Religion, the Immune System & Cancer

I. The Immune System

II. Cancer

III. The Effect of Religion
I. Religion, Effects on the Immune System and Cancer

• Harold Koenig, M.D. says in order to appreciate the effect of religion on immunity we must first understand the immune system and how it works.
I. The Immune System

• The Immune System is the body’s defense against outside invaders (viruses, bacteria, fungi, parasites) and internal invaders (i.e., cancer -- malignant transformation).

• In this chapter, Koenig, et al, explores the relationship between religious beliefs & practices and the function of the immune system by:

(1) examining the organs and cellular components that make up the immune system, the biological, psychological, and social factors that affect immune function.

(2) hypothesizes how religion may influence the immune system and review research that has examined the link between religious activity and immune function.
I. Components of the Immune System

- The immune system is made up of:
  - solid lymph organs (thymus, spleen, lymph nodes, liver, bone marrow)
  - lymphatic system (vessel-like channels carrying lymph fluid),
  - immune cells that circulate in lymph fluid, tissues and blood.

- The Thymus Gland:
  - In the newborn, the thymus is a large organ just beneath the sternum
  - The thymus gland stimulates the development of lymphocytes and other cellular components of the lymphatic system
  - If the thymus is removed early in life, no immune system will develop
  - In adulthood, the thymus shrinks to a small, almost undetectable size

- The Spleen:
  - A highly vascular organ that lies under the rib cage, left upper abdomen
  - The spleen filters and screens the blood that passes through it with abnormal blood cells, bacteria, parasites and other outside organisms.
  - With infections it may enlarge in size to filter the blood of bacteria
I. The Lymphatic System

- **Lymphatic system** consists of both the solid organs of the immune system and a system of porous channels (lymphatics) through which lymph fluid flows from the body’s intercellular spaces back into the blood stream.

- **Lymph nodes** – marble-sized solid collections of lymphocytes and other cells located along the lymphatic channels.

- **Lymph fluid (largely serum)** – passes through the lymph nodes where the fluid is cleansed by lymphocytes that engulf foreign material, bacteria in the fluid, preventing their dissemination throughout the body.
I. The Importance of the lymphatic system

• The function of the lymphatic system is vital. Without the system we would soon die.

• No foreign matter is directly absorbed through the venous capillaries into the blood stream. Instead, bacteria or other foreign organisms must first pass through the lymphatic filter system before entering into the blood.

• If foreign organisms do escape the lymphatic filter system and enter circulation, white blood cells in blood can engulf and destroy the invaders. There are also immune cells located in the liver and bone marrow (back up).
I. Cellular components

- The cells in the immune system derive from primordial cells:
  - White blood cells (monocytes, granulocytes, and lymphocytes)
  - Tissue Histiocytes
  - Plasma cells

- White blood cells circulate in the blood and lymph fluid and aggregate in areas of inflammation, destroying infectious agents they come in contact with.

- White blood cells formed in the bone marrow are known as granulocytes (neutrophils, eosinophils, and basophils). Each granulocyte has a life-span of only 2-12 hours and can ingest 5 to 25 bacteria before it dies. Monocytes have a longer lifespan and can ingest 100 invaders.
T helper cell

CD4⁺

B cells

Antibodies

MHC2

APC

Antigen

T helper cell

CD4⁺

macrophages

Killer T cells
Macrophage and engulfing Anthrax
I. Lymphocytes

- Lymphocytes are formed in the Lymph Nodes, live between 100 – 300 days, and consist of B cells and T cells.

- When a B cell encounters a foreign invader or antigen it begins replicating and turns into a plasma cell. Plasma cells are responsible for making antibodies (immunoglobulins) that circulate and attach to antigens.

- The most common types of immunoglobulins are IgG, IgA, and IgM.

- The antibodies neutralize toxins, deactivate foreign proteins and viruses, and cause bacteria to stick together, making it easier for immune cells to destroy them.
Illustration of how the introduction of bacteria through a cut initiates an immediate process called Extravasation. Phagocytic white blood cells and exudate with Complement, antibody and C-reactive protein leaves the vascular system to engage bacteria. <http://uhaweb.hartford.edu/BUGL/immune.htm>
I. Lymphocytes, cont...

- **T Cells** make up about 75% of lymphocytes in the blood and are the main effectors of **cell-mediated immunity** or what is termed, “delayed hypersensitivity.”

- When exposed to a foreign antigen, **T cells** begin to proliferate and become sensitized to the antigen. **T Cells** are subdivided into:
  - **T-helper cells** – act to stimulate B cell activity in forming antibodies
  - **T-killer cells** – attack antibodies on the surface of tumor cells or bacteria, destroying them by secretion of cytotoxic agents.
  - **T-suppressor cells** – suppress B cells and cell-mediated immune responses, resulting in reduced antibody production & T-killer activity.

- **Cytokines** are proteins produced by immune cells that are critical for normal immune system function and the coordination of immune activities.
I. Cytokines

- Over 30 different kinds of Cytokines have been identified. They are divided into three groups:

1. **Immunoregulatory cytokines** – Interlukin-2 (IL-2) and IL-4.

2. **Proinflammatory cytokines** (IL-1, Tumor necrosis factor, IL-6, IL-8).

3. **Cytokines that regulate immune cell growth and maturation** – IL-3, IL-7.

- Cytokines have multiple effects as they circulate in the blood: fever, lethargy, decreased appetite, and stimulation of Cortisol production through activation of the hypothalamic-pituitary-adrenal axis. Psychological stress induces cytokine production...
I. The Immune Response...

- There are two kinds of immune responses:
  - Immediate
  - Delayed

- The immediate response system begins within minutes after exposure to an antigen, resulting in acute inflammation (swelling, redness, increased warmth or fever)

- The delayed response usually takes several days to develop. It is characterized by development of “memory” for the foreign invader or antigen, so that subsequent exposure to the foreign antigen will result in a more rapid and vigorous response.
I. When a foreign substance is detected:

– B cells transform into plasma cells and begin producing antibodies.

– Antibodies attach to other immune cells, activating them and to the foreign antigens themselves, making them easier to destroy.

– T Cells proliferate and initiate the cell-mediated immune response that includes the production of killer T cells capable of directly destroying bacteria, tumor cells and other organisms.

– T Cells also release lymphkines that stimulate other immune cells to actively disable these antigens.

– Immune cells produce many other products including cytokines, tumor necrosis factor, and other mediators of the inflammatory response.

– The end result is that the foreign substance is destroyed or deactivated and the breakdown products are removed from the body.
I. Interferon

- **Interferons (IFNs)** are proteins released by lymphocytes in response to the presence of pathogens—viruses, bacteria, parasites, or tumor cells. They allow communication between cells to trigger the protective defenses of the immune system that eradicate pathogens or tumors.

- IFNs belong to the large class of glycoproteins known as cytokins. Interferons are named after their ability to "interfere" with viral replication within host cells.

- IFNs have other functions: they activate immune cells, such as natural killer cells and macrophages; they increase recognition of infection or tumor cells by up-regulating antigen presentation to T lymphocytes; and they increase the ability of uninfected host cells to resist new infection by virus.
This movie depicted a boy born with Primary Immunodeficiency (SCID – Severe Combined Immunodeficiency).
I. Genetic Immunodeficiency Syndromes

- Absent or undeveloped Thymus and parathyroid glands
  - X-linked, lack B Cells, prone to infections
  - ADA = Adenosine deaminase deficiency
    - Autosomal recessive

SCID = Severe Combined Immunodeficiency

Pro-B cell → Pre-B cell

- Bruton’s agammaglobulinemia
  - IgM-producing B cell
  - Hyper-IgM syndrome
  - Selective IgA deficiency

Pro-T cell → Immature T cell

- SCID (MHC II deficiency)
  - CD8 T cell
  - CD4 T cell

Pluripotent stem cell → Lymphoid stem cell
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I. Complement – part of “innate” immune system

• The **complement system** helps or “complements” the ability of antibodies and phagocytic cells to clear pathogens from an organism. It consists of a number of small proteins found in the blood, generally synthesized by the liver, and normally circulating as inactive “innate” precursors (pro-proteins).

• When stimulated, they release cytokines and initiate a cascade of changes resulting in a **massive amplification** of the immune response and activation of the cell-killing membrane attack complex.

• Over 25 proteins and protein fragments make up the complement system. They account for about 5% of the globulin fraction of blood serum.
COMPLEMENT SYSTEM

In order to avoid excessive spontaneous amplification of the complement system, the body has some regulatory mechanisms in place (black diamonds).

Alternative pathway (red)
- C-reactive protein (CRP)
- Lectin pathway (green)
- Classical pathway (yellow)

Acute Phase Response leading to increased production of acute phase proteins by liver.

Lectin pathway:
- Mannose-binding lectin (MBL)
- Binding of MBL to mannose on surface of pathogens
- Activation of C1

Classical pathway:
- C-reactive protein (CRP) binds
- Complement component in cell wall of pathogens
- C1 activated
- Antibody binding to target antigens on pathogen surface

Common pathway for classical and lectin systems (blue):
- C1 activated
- C1r/C1s
- C3a
- Action of C3 (purple)
- Decay Accelerating Factor (DAF)
- Spontaneous decay
- Activation of C3

Membrane Attack Complex:
- C5b-9
- Induces Membrane Attack Complex (MAC) formation by binding with C7, C8 and C9
- Hydrolyses regions of Clq and it becomes exposed and binds to cell membrane of target cell
- C5b-9 complex to form a large pore in the cell
- Leakage of cytoplasm leading to death of target cell

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Alternative pathway acts first. Classical and Lectin pathways rely on the activation of Acute Phase Response and hence take longer.
I. Functions of Activated Complement

The following are the basic functions of the complement:

- **Opsonization** - enhancing phagocytosis of antigens
- **Chemotaxis** - attracting macrophages and neutrophils
- **Lysis** - rupturing membranes of foreign cells
- **Clumping** of antigen-bearing agents
- **Altering** the molecular structure of viruses
I. Tests of Immune System Function:

- Complete Blood Count with differential (lymphocytes, monocytes, etc)

- Serum levels of Immunoglobulins (IgM, IgG, IgA, IgD, IgE, etc)

- Quantification of T cells, B cells, NK cells (Natural Killer)

- T cell function (skin tests for TB, Candida)

- B-cell function (antibodies to common viruses, bacterial toxins)

- B cell function – IgG subclass quantification

- Complement assays – CH50, C3 C4, etc.

- Phagocyte function – bacteriocidal activity, chemotaxis assays
I. Biological Factors Influencing the Immune System:

- **Hereditary influence** – immunodeficiency, autoimmune diseases

- **Exposure to Toxins** – Benzenes, paint removers, kerosene

- **Infection** – human immunodeficiency virus (HIV), infects T cells

- **Prescription drugs** – corticosteroids, steroids, methotrexate

- **Alcohol** – causes defect in cell-mediated immunity

- **Smoking** – cigarette smoking alters the immune system and improves when individual quits.

- **Recreational drugs** – Marijuana (T-lymphocytes affected)
I. Psychological Influences on Immunity

• Effects of Stress (Annals of Internal Medicine, McEwen & Steller (1993)):
  – Asthma
  – Diabetes
  – Gastro-intestinal disorders
  – Myocardial Infarction
  – Hypertension
  – Cancer
  – Viral Infections
  – Auto-immune diseases

• Pathways psychological factors affect the immune system:
  – Depression/stress & anxiety cause hypothalmus to release corticotropic releasing factor (CRF), stimulating pituitary gland to release adrenocorticotropic hormone ACTH activates adrenal cortex to release cortisol
  – Stress can also cause adrenal glands the release of catecholamines
  – Short term = fight or flight; but, long term = diseases listed above.
I. Psychological Stress effect . . .

- **Psychological stress** stimulates the sympathetic nerves that terminate in the lymphoid organs. With chronic stress, nerve stimulation may down-regulate immune function and reduce its responsiveness.

- **Depression** – chronic depression results in higher levels of serum cortisol. The dexamethasone suppression test (DST) is a common biological test for depression and for monitoring response to treatment. Patients with depression will **not** suppress cortisol production and serum cortisol will remain high.

- Persons with depressive disorder have impaired lymphocyte function including reduced NK cell cytotoxicity. We find impaired lymphocyte function after bereavement (mortality?)
I. Stress . . .

“Lack of Control” can produce alterations in mood:

- Depression
- Tension, anxiety
- Anger, Unhappiness
- Sense of Helplessness and Hopelessness

Kiecolt-Glaser, Malarkey, Chee, et al. (1993) analyzed 90 newlywed couples to determine effect of conflict on immunology. Spouses with negative or hostile behavior after a 30-minute discussion of marital problems had:

- Decrease in NK cell activity
- Weaker blastogenic and proliferation responses
- Higher antibody titers, consistent with down-regulated immune system
- Larger and longer-lasting increases in blood pressure.
I. Social Influences on Immune Function . . .

- **Social Support** has been shown to buffer the negative impact of stressful life events, prevent the onset of depression, and speed recovery from depression (George et al, 1989, 1992).

- Social support may alter neuro-endocrine changes that impair immunity by preventing the negative endocrine and immunological changes associated with stress.

- Sapolsky et al (1997) examined 70 yellow baboons in Africa to determine the relationship between hypercholesterolemia and social status and isolation. They found those lower on the social scale had three times higher cortisol levels than that of dominant baboons. Concluded that social status and degree of social affiliation influence adrenocortical function.

- These findings have been repeated for human subjects as well.
II. Cancer and the Immune System
II. Cancer and the Immune System

- The *theory of immune surveillance* proposes that the cellular immune system is the body’s first line of defense against cancer.

- This theory maintains that spontaneously arising malignant cells are kept in check by a healthy immune system *(Burnet, 1970)*.

- Malignant tumors develop in an otherwise healthy human only if there is a breakdown in the body surveillance mechanism.
II. Cancer and immunity . . .

- Harrison's, *Principles of Internal Medicine*, 1998, p 535 says:
  
  “Animal studies have conclusively shown that the immune system can recognize and eliminate malignant tumors in vivo. Rejection of tumor cells . . . appears to be mediated primarily by cytotoxic lymphocytes, including cytotoxic T lymphocytes and natural killer cells. . . There is increasing evidence that NK cells play an important role in immune surveillance because of their ability to mediate natural resistance against tumors, certain viruses, and other microbial substances.” (p 295 HRH)

- Patients with HIV (human immunodeficiency virus) infections or AIDS (acquired immune deficiency syndrome) have seriously weakened immune system and are unusually susceptible to the cancer known as Kaposi’s sarcoma.
II. Cancer and Psychological stress

- Psychological stress in healthy persons may affect immune system function in a way that increases susceptibility to malignancy.


- At the end of the study, 82 men had died of cancer. After controlling for variables such as age, smoking, alcohol use, family history, and occupational status, the likelihood of dying from cancer was twice as high among men with depression.
II. Cancer

- Prigerson et al (1997) studied 150 future widows and widowers at the time of their spouses hospital admission and followed them for 2 years after their spouses death.

- **Traumatic grief** was assessed and those with traumatic grief had a significantly higher incidence of cancer within 2 years.

- The mere **diagnosis of cancer** may create psychological stress that impairs the body’s ability to contain the disease. Stress is known to diminish natural killer cell (NK) activity. Fatigue and lack of family support also lead to decrease in NK activity.

- Psychological stress also affects the speed of wound healing. Caregivers of cancer patients showed slower healing of wounds and had less responsive interleuken-1 beta mRNA.
III. The Effect of Religion on the Immune System & Cancer
III. Religion and the immune system

• Koenig says, “from our discussion, it should be clear that there are several pathways by which religious beliefs and practices can influence immunity.”

• (1) Koenig points out that in our study of previous chapters that religious involvement is inversely related to behaviors that adversely affect immune function (Chapter 24). Those being:
  – alcohol abuse
  – cigarette smoking
  – illicit drug use
  – high-risk practices that can lead to HIV infection.
Relationship between religious activities and average diastolic BP
III. Religion and immunity . . .

- (2) religious beliefs and practices are associated with better adaptation to:
  - stress (chapter 5, HRH)
  - Greater well-being (chapter 6, HRH)
  - Lower levels of anxiety (chapter 9, HRH)
  - Less depression and quicker recovery from depression (chapter 7, HRH)

- Given the relationship between psychological distress and impaired immunity, any factor that improves coping and prevents emotional disorder is likely to benefit immune function.

- And, Religion is also associated with a larger and more vital social support network and to greater satisfaction with that support (chapter 15, HRH).
Despite these plausible reasons for a relationship between religion and immunity, few studies have investigated the idea.

Sudsuang et al (1991) conducted a study of the effects of Buddhist meditation on serum cortisol and other measures. 52 men aged 20-25 who practice Buddhist meditation were compared to a control group that did not meditate.

At the end of the study, cortisol levels were significantly lower in those who meditated when compared to controls.

Schaal et al (1998) studied 112 women with metastatic breast cancer. Cortisol levels were lower among women whose religious expression had “greater importance.”
III. Religion and IL-6 levels

• Koenig, et al (1997) conducted a large, 6-year study to evaluate the effect of religious attendance on interleukin-6 (IL-6) as an indicator of immune function.

• They hypothesized that frequent religious attendance would predict lower plasma IL-6 levels in the last year tested.

• Interestingly, the likelihood that persons who attended religious services to any degree would have high IL-6 levels (>5 pg/ml) was 50% lower than that for non-attenders.
Attendance at Religious Services and effect on IL-6 levels (Koenig, Cohen & George (1997) Intl Journal of Psychiatry in Medicine 27, p 242.  (HRH, p 289)
III. IL-6 and Immunity

- IL-6 plays a prominent role in the induction of the acute inflammatory response, B cell proliferation and differentiation, and regulation of protein inhibitors.

- While IL-6 levels are usually undetected until advanced age, this cytokine is a particularly important indicator of disease in the elderly and may play a key role in mediating the aging process (Ersher, 1993).

- High levels of IL-6 (5 pg/ml) have been reported in diseases such as cancer (B cell lymphoma, multiple myeloma, head and neck cancer, Hodgkin’s disease) and other illnesses such as: (Myocardial infarction, hypertension, Alzheimer’s disease, osteoporosis, rheumatoid arthritis, and chronic fatigue syndrome).
Woods et al (1999) surveyed 106 HIV-seropositive gay men to determine whether religiosity is associated with less depression or better immune function in this population.

Religious activities, such as prayer, religious attendance, spiritual discussions, and reading religious/spiritual literature were associated with significantly higher CD4+ counts and percentages (T-helper-inducer cells).

Religious coping (putting trust in God, seeking God’s help, increasing praying) was related to lower scores in the Beck Depression Inventory scale and on the Spielberger Trait Anxiety Inventory but not to specific immune markers.

Koenig said subjects with more severe disease may have turned to prayer, obscuring any differences with control group.
“The relationship between IL-6 and religious attendance may suggest persons who actively involve themselves in religious community may have more stable immune systems.”
III. Cancer Incidence in various religious groups

- The incidence of penile cancer in Jews and Muslims (who circumcise) is greatly diminished. Virtually unheard of in these groups but accounts of 2-3% of all cancers in men.

- **Jewish women** are less likely to have cervical cancer and cancer of the uterus (often ascribed to spousal circumcision). Yet, cancer of the large intestine, lymphomas and leukemia were significantly more prevalent in Jews than in non-Jews.

- Enstrom (1975) studied cancer rates among Mormons and found California Mormons experienced only about one-half the cancer death rates of other Californians. This was especially true for cancers of the lung, the GI and GU systems.
III. Cancer incidence in various religious groups

- Certain cancers are less common among conservative Christians because of healthy behaviors (less smoking, alcohol & drug use, and less risky sexual behaviors).

- Naguib, et al (1996), studied the incidence of positive Pap smears in women. Among 3,962 women designated as “Christian” there was an inverse relationship between the frequency of religious service attendance and rates of abnormal smears or confirmed cases of cervical cancer.

- The authors concluded the lower rates of cancer of the cervix was because Christian women have more conservative sexual practices. Kinsey et al (1948) found the incidence of extramarital coitus was inversely related to church activity (cervical cancer is associated with Human Papilloma Virus).
III. Cancer incidence among Hutterites

• To examine the effects of inbreeding on cancer risk, Martin et al (1980) examined cancer deaths over a ten-year period among the Hutterites, a religious group with 13,000 members living in Alberta, Manitoba, S. D. and Washington State.

• Members of this group are concerned about their health – do not smoke and seek modern medical care promptly.

• Although subject to inbreeding, there were few cancer deaths among the Hutterites. Largely this was the result of having lower mortality from lung cancer (1 death) and lower rates of cervical cancer among the women (only 1, patient still alive).

• They did have higher expected rate of leukemia which is consistent with a genetic hypothesis.
III. Cancer incidence among Amish

• The Amish are another relatively isolated group with a high degree of inbreeding.

• Diet is relatively high in fats and carbs and prepared without preservatives or additives. Cigarettes are discouraged but pipe, cigar and tobacco chewing are common. Alcohol drinking is minimal, at home.

• Hamman et al (1981) conducted a case-control study of causes of death in 25,822 Amish in Indiana, Ohio & Penn.

• The Amish men have higher mortality rates as infants and children, but lower mortality rates after age 40, largely due to lower rates of cancer and cardiovascular disease. Female death rates did not differ from the general population.
III. Why Cancer is less in certain religious groups

- Clearly, health practices play a major role in lower rates of cancer in certain religious groups. Among those factors:
  - Less smoking and drinking of alcohol
  - Better diet
  - Safer sexual practices
  - Hygienic practices – circumcision
  - Psychosocial factors – greater coping and social support

- Religiousness and cancer risk:
  - Religious attendance
  - “Intrinsic” Religiosity
  - Religious Commitment
  - Greater sense of Hopefulness
  - Cancer incidence among clergy of all faiths -- was less, largely due to less smoking and better diet, safer environment (i.e., for monastics).
III. Why Cancer is less in certain religious groups

• **Improved Immune Surveillance:** The majority of studies indicate that religiousness is related to increased social support, greater sense of well-being, lower rates of depression, reduced anxiety, and improved coping.

• These benefits, in turn, may reduce neuroendocrine responses to stress that impair immune system functioning and break down immune surveillance.

• Consequently, one might expect those with greater religiousness to be at a lower risk for developing at least some forms of cancer.

• Conversely, religion may increase the likelihood of cancer in groups that inbreed which allow genetic mutations to be expressed more easily.
The use of religion by Cancer patients is significant. Johnson and Spilka (1991) studied 103 women with breast cancer and 85% reported that religion helped them cope with their cancer.

The investigators examined the relationship between intrinsic and extrinsic religiousness to religious coping and found that extrinsic religiosity was unrelated to religious coping.

Conversely, intrinsic religiousness was associated with greater involvement with clergy, belief that God was involved in the cancer, and greater satisfaction from the use of religion as a coping behavior.

They concluded, “It is evident that religion is an extremely important resource for the majority of patients with breast cancer.”
III. Religion and the family of a child with cancer

- Dealing with the fact that one’s child has cancer is one of the most difficult experiences a person can face. Spilka, et al (1991) conducted interviews of 265 members of 118 families who had children with cancer.

- They concluded that religion acted as a protective-defense system that motivated efforts by family members to cope constructively.

- Barbarin and Chesler (1986) interviewed 74 parents of children surviving cancer. Religious coping in their study was unrelated to medically related stress, quality of relationship with the staff, number of hospitalizations or coping effectiveness.
III. Coping Behaviors of Cancer survivors

- Halstead and Fernsler (1994) surveyed 59 persons with cancer (51% had breast cancer) who had survived five years or more, were no longer receiving therapy, and were not terminal.

- “Praying or putting trust in God” was ranked first as the “most often used and very helpful” coping strategy out of 12 coping behaviors.

- Kurtz et al (1995) surveyed 191 women with cancer (58% had breast cancer) who had lived at least 5 years since diagnosis.

- The authors reported that the best health habits and the most supportive behaviors were found among women with a positive spiritual outlook, as measured by a 12-item Philosophical/Spiritual View scale.
Next Thursday’s Class

• April 14: Effect of Religion on Longevity and Religion and Disability (Chap. 21-22, HRH)