# REMIX: WOMEN'S HEALTH (MARKELL)

*Dawn Markell*
Mt. Hoood Community College

# Women’s Health (Markell)

This text is disseminated via the Open Education Resource (OER) LibreTexts Project (https://LibreTexts.org) and like the hundreds of other texts available within this powerful platform, it is freely available for reading, printing and "consuming." Most, but not all, pages in the library have licenses that may allow individuals to make changes, save, and print this book. Carefully consult the applicable license(s) before pursuing such effects.

Instructors can adopt existing LibreTexts texts or Remix them to quickly build course-specific resources to meet the needs of their students. Unlike traditional textbooks, LibreTexts' web based origins allow powerful integration of advanced features and new technologies to support learning.

The LibreTexts mission is to unite students, faculty and scholars in a cooperative effort to develop an easy-to-use online platform for the construction, customization, and dissemination of OER content to reduce the burdens of unreasonable textbook costs to our students and society. The LibreTexts project is a multi-institutional collaborative venture to develop the next generation of open-access texts to improve postsecondary education at all levels of higher learning by developing an Open Access Resource environment. The project currently consists of 14 independently operating and interconnected libraries that are constantly being optimized by students, faculty, and outside experts to supplant conventional paper-based books. These free textbook alternatives are organized within a central environment that is both vertically (from advance to basic level) and horizontally (across different fields) integrated.

The LibreTexts libraries are Powered by NICE CXOne and are supported by the Department of Education Open Textbook Pilot Project, the UC Davis Office of the Provost, the UC Davis Library, the California State University Affordable Learning Solutions Program, and Merlot. This material is based upon work supported by the National Science Foundation under Grant No. 1246120, 1525057, and 1413739.

Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation nor the US Department of Education.

Have questions or comments? For information about adoptions or adaptions contact info@LibreTexts.org. More information on our activities can be found via Facebook (https://facebook.com/Libretexts), Twitter (https://twitter.com/libretexts), or our blog (http://Blog.Libretexts.org).

This text was compiled on 02/05/2024

# TABLE OF CONTENTS

## Attribution and OER Revision Statement

"Women's Health" by Dawn Markell is licensed under CC BY 4.0 / A derivative from the three OER's mentioned below.

This open textbook is a combination of three open textbooks: "Introduction to Health" from College of the Canyons (Chapters 3, 4, 5and 9), "Health and Fitness for Life" from Mt Hood Community College (Chapters 3 and 9), and "Anatomy and Physiology" from Openstax/Rice University (Chapters 2, 6, 7 and 8) as well as original work (Chapters 1, 8 and 10). Material was reorganized or blended to better fit the Women's Health topic/course material timeline and create a cohesive reading experience. Material that moved too deeply into a specific subject for the needs of this material reference were omitted. The primary focus of this text compilation is to explore a variety of topics in women's health to 200-300 level college outcomes.

# Licensing

*A detailed breakdown of this resource's licensing can be found in **Back Matter/Detailed Licensing**.*

# CHAPTER OVERVIEW

## 1: Chapters

When thinking about health we often ponder exercise routines and low calories recipes to achieve outward physical signs of wellbeing. This book explores the multidimensional aspects of health and wellness as they overlap the female experience including female anatomical function, cancer risk, chemicals in beauty products, pregnancy, birth, body image and growing older.



---

1: Chapters is shared under a not declared license and was authored, remixed, and/or curated by LibreTexts.

# 1.1: History and Current Issues in Women's Health

## Chapter Objectives:

- Outline events that had, or continue to have, a significant impact on women's health
- Explore topics that impact your own personal health
- Discuss current issues regarding health care for women in the US
- Explore how health care options for women in the US compare to healthcare options in other countries
- Explore factors that impact a woman's access to quality and affordable health care
- Identify criteria for finding valid and reliable health information on the Internet

## Women's Health History

*I'm interested in women's health because I am a woman. I would be a darn fool to not be on my own side. ~Maya Angelou*

*Communities and countries and ultimately the world are only as strong at the health of their women. – Michelle Obama*

### Development of Women's Health Care in the US


If you had to pick just one, what event, discovery, development or invention do you feel has had the greatest impact on women's health? Ideas such as birth control or women's right to vote, Roe vs Wade or even Title IX may quickly come to mind. What about safe birthing practices or the women's health movement of the 1970's? Consider that women from minority groups are now better represented in the health care field? In reading the following articles about the history of health care in the US, reflect on how our choices today may be different if not for these developments.

Article: History of Women's Health Movement in the 20th Century

### Understanding Personal Health History

Considering how significant events in our collective health history impact resources and accessibility is the first step. Next, we need to explore how current health accessibility, education, and regulations impact our personal wellness and health choices today. As you begin to ask yourself about choices you make for your health now and information you will need for future health choices, it is important to explore criteria for defining health and wellness as well as understanding how to seek valid and reliable sources of health information.

### Broad Perspectives of Health

The most widely used of the broader definitions of health if from the World Health Organization (WHO), which defines **health** "a state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity". This classic definition is important, as it identifies the vital components of health. Well-being includes the presence of positive emotions and moods, the absence of negative emotions, satisfaction with life, fulfillment and positive functioning. In simple terms, well-being can be described as judging life positively and feeling good. Well-being is associated with numerous health, job, family, and economically related benefits. For example, higher levels of well-being are associated with decreased risk of disease, illness, and injury; better immune functioning; speedier recovery; and increased longevity. Individuals with high levels of well-being are more productive at work and are more likely to contribute to their communities. Many practitioners have expanded their focus to include wellness at the positive end of the health continuum. Wellness is being in good physical and mental health. Because mental health and physical health are linked, problems in one area can impact the other. At the same time, improving your physical health can

also benefit your mental health, and vice versa. It is important to make healthy choices for both your physical and mental well-being. Remember that **wellness** is not just the absence of illness or stress. One can still strive for wellness even while experiencing these challenges in life. To more fully understand the meaning of health, it is important to understand each of its individual components of wellness.

#### The Six Dimensions of Wellness

Think of each dimension as a continuum that can include more healthful or less healthful behaviors. Goals can be set to move each individual marker towards better balance rather then expecting perfection in all areas.

##### Physical

Body functioning; recognizing the need for physical activity, healthy foods, and adequate sleep. Avoiding unhealthy habits.

##### Social

Developing a sense of connection, belonging, and sustained support system. Having positive relationships

##### Intellectual

Recognizing creative abilities and finding ways to expand knowledge and skills. Being open-minded.

##### Emotional

Coping effectively with life and expressing emotions in an appropriate manner.

##### Spiritual

Having a sense of purpose and meaning in life; establishing peace, harmony, and balance in our lives.

##### Environmental

Occupying pleasant, healthy, and safe environments that support wellbeing. Positively impacting the quality of our surroundings (including protecting and preserving nature).

Learning about the Six Dimensions of Wellness can help a person choose how to make healthful choices a part of everyday life. Wellness strategies are practical ways to start developing healthy habits that can have a positive impact on physical and mental health.

### Determinants of Health

The range of personal, social, economic, and environmental factors that influence health status are known as **determinants of health**. What makes some people healthy and others unhealthy? We may know what actions promote health but for various reasons may not have access to the tools necessary to make long term, positive changes. How can we create a society in which everyone has a chance to live a long, healthy life?

Determinants of health are factors that contribute to a person's current state of health. These factors may be biological, socioeconomic, psychosocial, behavioral, or social in nature. Scientists generally recognize five determinants of health of a population:

## Policymaking

Policies at the local, state, and federal level affect individual and population health. Increasing taxes on tobacco sales, for example, can improve population health by reducing the number of people using tobacco products.

Some policies affect entire populations over extended periods of time while simultaneously helping to change individual behavior. For example, the 1966 Highway Safety Act and the National Traffic and Motor Vehicle Safety Act authorized the Federal Government to set and regulate standards for motor vehicles and highways. This led to an increase in safety standards for cars, including seat belts, which in turn reduced rates of injuries and deaths from motor vehicle accidents.

Does all policy contribute positively to health for all? We will be exploring this question more in future chapters.

## Social Factors

Social determinants of health reflect the social factors and physical conditions of the environment in which people are born, live, learn, play, work, and age. Also known as social and physical determinants of health, they impact a wide range of health,

functioning, and quality-of-life outcomes. Examples of social determinants include:

- Availability of resources to meet daily needs, such as educational and job opportunities, living wages, or healthful foods
- Social norms and attitudes, such as discrimination
- Exposure to crime, violence, and social disorder, such as the presence of trash
- Social support and social interactions
- Exposure to mass media and emerging technologies, such as the Internet or cell phones
- Socioeconomic conditions, such as concentrated poverty
- Quality schools
- Transportation options
- Public safety
- Residential segregation

Examples of physical determinants include:

- Natural environment, such as plants, weather, or climate change
- Built environment, such as buildings or transportation
- Worksites, schools, and recreational settings
- Housing, homes, and neighborhoods
- Exposure to toxic substances and other physical hazards
- Physical barriers, especially for people with disabilities
- Aesthetic elements, such as good lighting, trees, or benches

Poor health outcomes are often made worse by the interaction between individuals and their social and physical environment. For example, millions of people in the United States live in places that have unhealthy levels of ozone or other air pollutants. In counties where ozone pollution is high, there is often a higher prevalence of asthma in both adults and children compared with state and national averages. Poor air quality can worsen asthma symptoms, especially in children.

## Health Services

Both access to health services and the quality of health services can impact health. Healthy People 2020 directly addresses access to health services as a topic area and incorporates quality of health services throughout a number of topic areas.

Lack of access, or limited access, to health services greatly impacts an individual's health status. For example, when individuals do not have health insurance, they are less likely to participate in preventive care and are more likely to delay medical treatment.

Barriers to accessing health services include:

- Lack of availability
- High cost
- Lack of insurance coverage
- Limited language access

These barriers to accessing health services lead to:

- Unmet health needs
- Delays in receiving appropriate care
- Inability to get preventive services
- Hospitalizations that could have been prevented

## Individual Behavior

Individual behavior also plays a role in health outcomes. For example, if an individual quits smoking, his or her risk of developing heart disease is greatly reduced. Many public health and health care interventions focus on changing individual behaviors such as substance abuse, diet, and physical activity. Positive changes in individual behavior can reduce the rates of chronic disease in this country.

Examples of individual behavior determinants of health include:

- Diet
- Physical activity
- Alcohol, smoking, vaping, and other drug use
- Hand washing

## Biology and Genetics

Some biological and genetic factors affect specific populations more than others. For example, older adults are biologically prone to being in poorer health then adolescents due to the physical and cognitive effects of aging.

Sickle cell disease is a common example of a genetic determinant of health. Sickle cell is a condition that people inherit when both parents carry the gene for sickle cell. The gene is most common in people with ancestors from West African countries, Mediterranean countries, South or Central American countries, Caribbean islands, India, and Saudi Arabia.

Examples of biological and genetic social determinants of health include:

- Age
- Sex
- HIV status
- Inherited conditions, such as sickle-cell anemia, hemophilia, and cystic fibrosis
- Carrying the BRCA1 or BRCA2 gene, which increases risk for breast and ovarian cancer
- Family history of heart disease

### Health Disparities

Although the term disparities is often interpreted to mean racial or ethnic disparities, many dimensions of disparity exist in the United States, particularly in health. If a health outcome is seen to a greater or lesser extent between populations, there is disparity. Race or ethnicity, sex, sexual identity, age, disability, socioeconomic status, and geographic location all contribute to an individual's ability to achieve good health. It is important to recognize the impact that social determinants have on health outcomes of specific populations. Healthy People strives to improve the health of all groups.

To better understand the context of disparities, it is important to understand more about the U.S. population. In 2008, the U.S. population was estimated at 304 million people.

- In 2008, approximately 33%, or more than 100 million people, identified themselves as belonging to a racial or ethnic minority population.
- In 2008, 51%, or 154 million people, were women.
- In 2008, approximately 12%, or 36 million people not living in nursing homes or other residential care facilities, had a disability.
- In 2008, an estimated 70.5 million people lived in rural areas (23% of the population), while roughly 233.5 million people lived in urban areas (77%).
- In 2018, an estimated 4% of the U.S. population ages 18 to 44 identified themselves as lesbian, gay, bisexual, or transgender.

Healthy People 2020 defines health equity as the "attainment of the highest level of health for all people". Achieving health equity requires valuing everyone equally with focused and ongoing societal efforts to address avoidable inequalities, historical and contemporary injustices, and the elimination of health and health care disparities."

Health disparities adversely affect groups of people who have systematically experienced greater obstacles to health based on their racial or ethnic group; religion; socioeconomic status; gender; age; mental health; cognitive, sensory, or physical disability; sexual orientation or gender identity; geographic location; or other characteristics historically linked to discrimination or exclusion."

Over the years, efforts to eliminate disparities and achieve health equity have focused primarily on diseases or illnesses and on health care services. However, the absence of disease does not automatically equate to good health. Powerful, complex relationships exist between health and biology, genetics, and individual behavior, and between health and health services, socioeconomic status, the physical environment, discrimination, racism, literacy levels, and legislative policies. These factors, which influence an individual or population's health, are known as determinants of health.

For all Americans, other influences on health include the availability of and access to:

- High-quality education (including *quality* health education)
- Nutritious food
- Decent and safe housing
- Affordable, reliable public transportation
- Culturally sensitive health care providers
- Health insurance
- Clean water and non-polluted air

## Risk Factors and Levels of Disease Prevention

Part of learning how to take charge of one's health requires understanding risk factors for different diseases. **Risk factors** are things in life that increase your chances of getting a certain disease. Some risk factors are beyond your control. A person may be born with them or have exposure with no fault assigned.

### Some risk factors that you have little or no control over include:

- Family history of a disease
- Sex
- Ancestry

### Some controllable risk factors include:

- What you eat
- How much physical activity you get
- Whether you use tobacco or vape
- How much alcohol you drink
- Whether you misuse drugs

In fact, it has been estimated that almost 35 percent of all U.S. early deaths in 2000 could have been avoided by changing just three behaviors:

- Stopping smoking
- Eating a healthy diet (for example, eating more fruits and vegetables and less red meat)
- Getting more physical activity

A person can have one risk factor for a disease or many. The more risk factors a person has, the more likely they will get the disease. For example, if people eat healthy, exercise on a regular basis, and control blood pressure, their chances of getting heart disease are less than those of diabetics, smokers, and sedentary people. To lower your risks, take small steps toward engaging in a healthy lifestyle, and you'll see big rewards.

People with a family health history of chronic disease may have the most to gain from making lifestyle changes. You can't change your genes, but you can change behaviors that affect your health, such as smoking, inactivity, and poor eating habits. In many cases, making these changes can reduce your risk of disease even if the disease runs in your family. Another change you can make is to have screening tests, such as mammograms and colorectal cancer screening. These screening tests help detect disease early. People who have a family health history of a chronic disease may benefit the most from screening tests that look for risk factors or early signs of disease. Finding disease early, before symptoms appear, can mean better health in the long run.

## Levels of Disease Prevention

Prevention includes a wide range of activities — known as "interventions" — aimed at reducing risks or threats to health. You may have heard researchers and health experts talk about three categories of prevention: primary, secondary and tertiary. What do they

mean by these terms?

**Primary prevention** aims to prevent disease or injury before it ever occurs. This is done by preventing exposures to hazards that cause disease or injury, altering unhealthy or unsafe behaviors that can lead to disease or injury, and increasing resistance to disease or injury should exposure occur. Examples include:

- Legislation and enforcement to ban or control the use of hazardous products (e.g. asbestos) or to mandate safe and healthy practices (e.g. use of seatbelts and bike helmets)
- Education about healthy and safe habits (e.g. eating well, exercising regularly, not smoking)
- Immunization against infectious diseases.

**Secondary prevention** aims to reduce the impact of a disease or injury that has already occurred. This is done by detecting and treating disease or injury as soon as possible to halt or slow its progress, encouraging personal strategies to prevent re-injury or recurrence, and implementing programs to return people to their original health and function to prevent long-term problems.

Examples include:

- Regular exams and screening tests to detect disease in its earliest stages (e.g. mammograms to detect breast cancer)
- Daily, low-dose aspirins and/or diet and exercise programs to prevent further heart attacks or strokes
- Suitably modified work so injured or ill workers can return safely to their jobs.

**Tertiary prevention** aims to soften the impact of an ongoing illness or injury that has lasting effects. This is done by helping people manage long-term, often-complex health problems and injuries (e.g. chronic diseases, permanent impairments) in order to improve as much as possible their ability to function, their quality of life and their life expectancy. Examples include:

- Cardiac or stroke rehabilitation programs, chronic disease management programs (e.g. for diabetes, arthritis, depression, etc.)
- Support groups that allow members to share strategies for living well
- Vocational rehabilitation programs to retrain workers for new jobs when they have recovered as much as possible.

## Current Issues in Women's Health

Understanding health history, factors that influence wellness and behaviors that improve personal wellness all contribute to a persons current state of health. Now, lets look at current issues or policy in our society that impact a person's access to health care or influence health care choices.

Podcast: How the US Fails Women When it Comes to Health

### Valid and Reliable Health Resources

How can you learn more about your own personal health history, disparities, risk factors and possible impact on your life now? As you begin to seek information to improve your own wellness, it is important to understand where to find reliable health information. As you know, anyone can create a a web page and post any information they choose for public perusal. Some of this information, subtly or not so subtly, may have an ulterior motive in selling products, influencing your actions or even your vote. So, when looking for information to care for your own health, how do you discern useful and accurate information from the rest? In other words, who are you willing to trust with your health?

Article: How To Find Reliable Health Information on the Internet

Interactive Tool: Trust It or Trash It

## Check for Understanding

1. Reflecting on the reading, what event, development or discovery do you feel has had the greatest impact on women's health?
2. What current issues in women's health are of particular interest to you and why?
3. What are the dimensions of wellness and how might these factors influence each other?
4. What are the determinants of health and give examples of how these determinist may impact your personal health.
5. What is a risk factor an what is the difference between uncontrollable and controllable risk factors?
6. What are the three levels of disease prevention?
7. How does US health care compare to that of other developed countries? Name one area the US is doing well and one area we are failing.
8. What factors might impact a woman's access to quality, affordable health care?

9. When researching health information online, what are at least 4 things you should know about the article to judge validity and reliability?

---

1.1: History and Current Issues in Women's Health is shared under a CC BY license and was authored, remixed, and/or curated by LibreTexts.

# 1.2: Female Reproductive Anatomy and Physiology

## Chapter Objectives

- Explore common methods of sex education in the US and potential benefits/drawbacks
- Identify anatomical structures of the female reproductive system
- Describe hormonal and physiological changes that take place during ovulation and menstruation
- Describe the hormonal and physiological changes that take place during fertilization and implantation
- Explore dysfunction in female reproductive anatomy and potential symptoms/testing

## The Female Reproductive System

*"Menstrual blood is the only source of blood that is not traumatically induced. Yet, in modern society, this is the most hidden blood, the one so rarely spoken of and almost never seen, except privately by women. ~ Judy Grahn*

### Sex Education in the US

How did you first learn about your private body? When did you learn how it functioned and how to care for it? For many, these are discussions that take place at home when parents feel their child is old enough to *need* this information. It is often coined "the talk" and is dreaded by old and young alike.

Maybe your parents did not discuss such things but you received a "handy pamphlet" or a 45-minute video in 5th grade to explain your assigned gender along with some rules for future actions. Maybe books, the internet, friends or older siblings were your guide. Rarely are children taught about their own sexual anatomy in a open and comfortable way. Why do we maintain this stigma with certain parts of our bodies?

Consider your own thoughts and beliefs on when children should learn about sexual anatomy and physiology, sexuality, and safe sex. How will the experiences surrounding way a child learns about their sexual health impact future health choices?

### Female Reproductive Anatomy

The female reproductive system functions to produce a female egg (gamete), reproductive hormones, support a developing fetus and deliver it into the outside world. Unlike its male counterpart, the female reproductive system is located primarily inside the pelvic cavity (Figure 1). Let's look at some of the structures of the female reproductive system.

#### External Female Genitalia

The external female reproductive structures are referred to collectively as the **vulva** (Figure 2). The **mons pubis** is a pad of fat that is located over the pubic bone. After puberty, it becomes covered in pubic hair. The **labia majora** (labia = "lips"; majora = "larger") are folds of hair-covered skin that begin just posterior to the mons pubis. The thinner and more pigmented **labia minora** (labia = "lips"; minora = "smaller") lie inside the labia majora. Labia majora and minora serve to protect the female urethra and the entrance to the female reproductive tract.

The forward portions of the labia minora come together to encircle the **clitoris** (or glans clitoris), an organ that originates from the same cells as the glans penis and has abundant nerves that make it important in sexual sensation and orgasm. The **hymen** is a thin membrane that sometimes partially covers the entrance to the vagina. An intact hymen cannot be used as an indication of "virginity"; even at birth, this is only a partial membrane, as menstrual fluid and other secretions must be able to exit the body, regardless of penile–vaginal intercourse. The vaginal opening is located between the opening of the urethra and the anus. It is flanked by outlets to the **Bartholin's glands** (or greater vestibular glands).

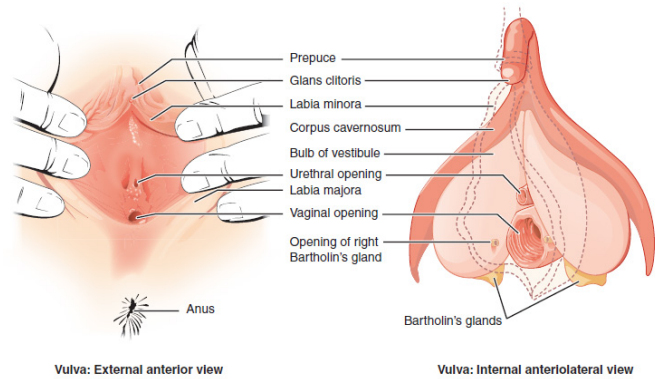



Figure 2. The Vulva. The external female genitalia are referred to collectively as the vulva.

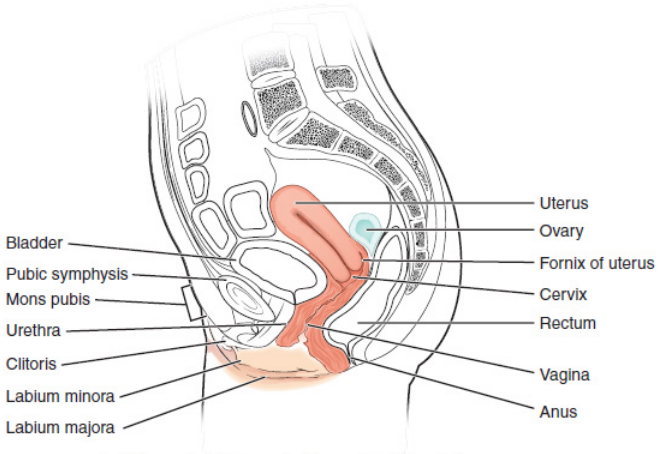
## Internal Female Anatomy

The **vagina**, Figure 1, is a muscular canal (approximately 10 cm long) that serves as the entrance to the reproductive tract. It also serves as the exit from the uterus during menses and childbirth. The thin, perforated hymen can partially surround the opening to the vaginal orifice. The hymen can be ruptured with strenuous physical exercise, penile–vaginal intercourse, and childbirth. The Bartholin's glands and the lesser vestibular glands (located near the clitoris) secrete mucus, which keeps the vestibular area moist.

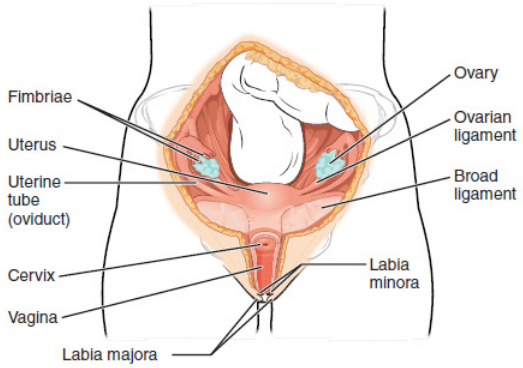
The vagina is home to a normal population of microorganisms that help to protect against infection by bacteria, yeast, or other organisms that can enter the vagina. In a healthy woman, the most predominant type of vaginal bacteria is from the genus *Lactobacillus*. This family of beneficial bacterial flora secretes lactic acid, and thus protects the vagina by maintaining an acidic pH (below 4.5). Potential pathogens are less likely to survive in these acidic conditions. Lactic acid, in combination with other vaginal secretions, makes the vagina a self-cleansing organ. Douching—or washing out the vagina with fluid—can disrupt the normal balance of healthy microorganisms, and actually increase a woman's risk for infections and irritation. Indeed, the American College of Obstetricians and Gynecologists recommend that women do not douche, and that they allow the vagina to maintain its normal healthy population of protective microbial flora.

The **ovaries** are the female gonads (organ that produces female sex cells/eggs) (see Figure 1) each about the size of an almond. The ovaries are located within the pelvic cavity and attached to the uterus via the ovarian ligament (not the fallopian tubes).

The **uterine tubes** (also called fallopian tubes or oviducts) serve as passage for the ovum from the ovary to the uterus. Each of the two uterine tubes is close to, but not directly connected to, the ovary. The middle region of the tube, called the **ampulla**, is where fertilization often occurs. Unlike sperm, oocytes lack flagella (tail), and therefore cannot move on their own. So how do they travel into the uterine tube and toward the uterus? High concentrations of estrogen that occur around the time of ovulation induce contractions of the smooth muscle along the length of the uterine tube. These contractions occur every 4 to 8 seconds, and the result is a coordinated movement that sweeps the surface of the ovary and the pelvic cavity.




(a) Human female reproductive system: lateral view




(b) Human female reproductive system: anterior view

Figure 1. Female Reproductive System. The major organs of the female reproductive system are located inside the pelvic cavity.

*Optional Link: Watch this video to observe ovulation and its initiation in response to the release of FSH and LH from the pituitary gland.*

If the oocyte is successfully fertilized, the resulting zygote will begin to divide into two cells, then four, and so on, as it makes its way through the uterine tube and into the uterus. There, it will implant and continue to grow. If the egg is not fertilized, it will simply degrade—either in the uterine tube or in the uterus, where it may be shed with the next menstrual period.

*Optional Link: Watch this series of videos to look at the movement of the oocyte through the ovary. The cilia in the uterine tube promote movement of the oocyte.*

The **uterus** is the muscular organ that nourishes and supports the growing embryo. Its average size is approximately approximately 2 in. by 3 in. when a female is not pregnant. It has three sections. The highest point is called the **fundus**. The middle section of the uterus is called the **body of uterus**. The **cervix** is the narrow bottom portion of the uterus that projects into the vagina. The cervix produces mucus secretions that become thin and stringy under the influence of estrogen which can facilitate sperm movement through the reproductive tract.

The wall of the uterus is made up of three layers. The **perimetrium** (outer layer), **myometrium** (muscle layer) **and endometrium** (part of this layer is shed during menses)**.** Most of the uterus is myometrial tissue, and the muscle fibers run horizontally, vertically, and diagonally, allowing the powerful contractions that occur during labor and the less powerful contractions (or cramps) that help to expel menstrual blood during a woman's period.

## Female Reproductive Physiology – The Menstrual Cycle

### Menstruation

The menstrual cycle is the process by which a woman's body gets ready for the chance of a pregnancy each month. The average menstrual cycle is 28 days from the start of one to the start of the next, but it can range from 21 days to 35 days. Most menstrual periods last from three to five days. In the United States, most girls start menstruating at age 12, but girls can start menstruating between the ages of 8 and 16. **Menarche** is a term referring to the first occurrence of mensuration.

When a woman menstruates, her body sheds the lining of the uterus (part of the endometrium). Menstrual blood flows from the uterus through the small opening in the cervix and passes out of the body through the vagina (see how the menstrual cycle works below).

The regular occurrence of menses is called the menstrual cycle. Having a regular menstrual cycle is a sign that reproductive organs are working properly. In addition to preparing the body for a pregnancy, this cycle provides important body chemicals (hormones) for a number of body functions related and not related to pregnancy.

In the first half of the cycle, levels of estrogen start to rise. Estrogen plays an important role bone health and supports growth and thickening in the lining of the uterus. This endometrial lining will nourish the embryo if a pregnancy occurs. At the same time the lining of the womb is growing, an ovum will mature in one of the ovaries. At about day 14 of an average 28-day cycle, the egg leaves the ovary. This is called **ovulation**.

After the egg has left the ovary, it travels through the fallopian tube to the uterus. Hormone levels rise and help prepare the uterine lining for pregnancy. A woman is most likely to get pregnant during the 3 days before or on the day of ovulation. Keep in mind, women with cycles that are shorter or longer than average may ovulate before or after day 14.

A woman becomes pregnant if the egg is fertilized by a man's sperm cell and attaches to the uterine wall. If the egg is not fertilized, hormone levels drop the thickened lining of the uterus is shed during the menstrual period.

### The Menstrual Cycle

- Day 1 starts with the first day of a period. This occurs after hormone levels drop at the end of the previous cycle, signaling blood and tissues lining the uterus to break down and shed from the body. Bleeding lasts about 5 days.
- Usually by Day 7, bleeding has stopped. Leading up to this time, hormones cause fluid filled pockets called follicles to develop on the ovaries. Each follicle contains an egg.
- Between Day 7 and 14, one follicle will continue to develop and reach maturity. The lining of the uterus starts to thicken, waiting for a fertilized egg to implant. The lining is rich in blood and nutrients.
- Around Day 14 (in a 28-day cycle), hormones cause the mature follicle to burst and release an egg from the ovary, a process called ovulation.
- Over the next few days, the egg travels down the fallopian tube towards the uterus. If a sperm unites with the egg, the fertilized egg will continue down the fallopian tube and attach to the lining of the uterus.
- If the egg is not fertilized, hormone levels will drop around Day 25. This signals the next menstrual cycle to begin. The egg will be shed with the next period.

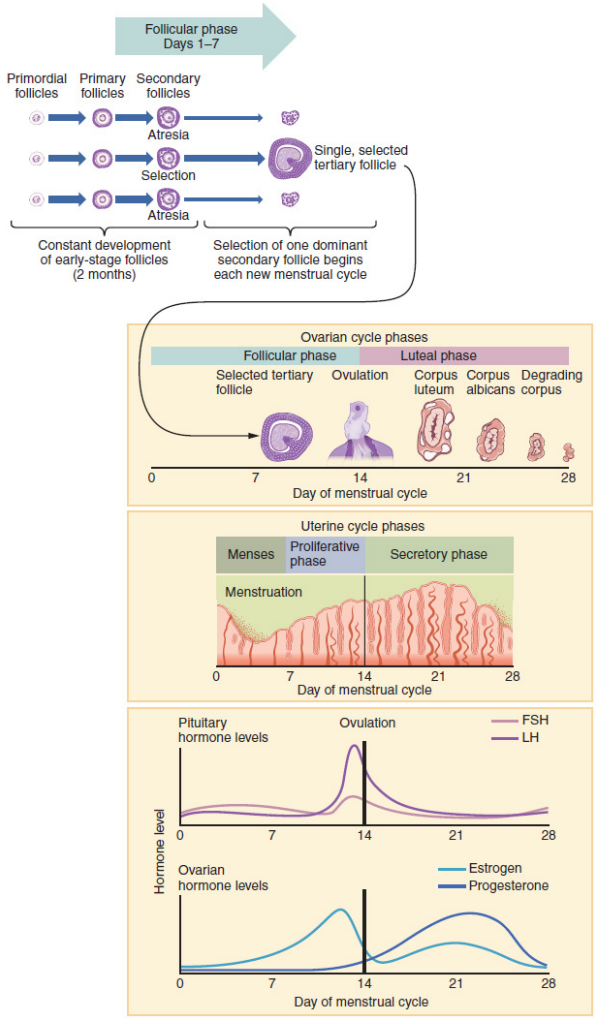



Figure 7. Hormone Levels in Ovarian and Menstrual Cycles. The correlation of the hormone levels and their effects on the female reproductive system is shown in this timeline of the ovarian and menstrual cycles. The menstrual cycle begins at day one with the start of menses. Ovulation occurs around day 14 of a 28-day cycle, triggered by the LH surge.

## Female Reproductive Physiology – Sexual Response Cycle and Fertility

*Let us consider a research-based paradigm developed by Masters and Johnson (1966) which they called the sexual response cycle. The sexual response cycle is a model that outlines the three phases most people experience when they engage in sexual intercourse: excitement, plateau, and then orgasm. Masters and Johnson were quick to point out that each individual has a unique and varied sexual response, so much so, that no two sexual encounters would be expected to be perfectly identical between the same people. Nevertheless, these three phases are very common among most people.*

*As sexual intercourse begins both males and females pass through three phases.* ***Excitement*** *phase is when blood flows to the pelvis bringing, more lymphatic fluid and plasma to the region. Because of hormonal and psychological stimuli there is generally swelling in sexual anatomy such as the penis, vaginal walls and clitoris. While this is happening, the* ***plateau*** *phase begins which is when more hormones are released, moisture increases, heart rate increases, intensity of sensory perception increases (touch, smell, sight, hearing, and taste). In the orgasm phase an electrical build up of energy is released that is associated with a rhythmic contraction of the pelvic floor muscles, the urinary and anal sphincters, and of various glands for males. This is called an* ***orgasm****. After the orgasm finishes, resolution eventually allows sexual anatomy to return to pre-excitement conditions.*

*Sexual response in a female would typically follow a pattern similar to this one:*

- ***Excitement phase:*** *Blood and lymphatic fluids increase swelling inside the vagina. Hormones are secreted which lead to a mild uterine contractions which raise the uterus away from the pubic bone. The labia swell and the clitoris becomes hard. The vaginal tissues secrete moisture and the vagina itself lengthens and expands slightly inward.*
- ***Plateau phase:*** *Begins as excitement continues, causing the labia and clitoris to become fully swollen, and the uterus to become elevated. The vagina is lengthened into the body, and, just before orgasm, lubrication ceases.*

- ***Orgasm**: The pelvis of the female experiences a series of contractions which occur every 8/10ths of second and can number anywhere from 1-20 or more in the sequence. The contractions include anal and urinary sphincter muscles, smooth muscles in the inward portion of the vagina, and the puboccocceygeus muscles. Further, an electrical sensation surges from the clitoris radiating throughout the body and stimulates the pleasure centers of the brain and a release of the hormone called Oxytocin (the "boding hormone"). When the orgasm ends, the body eventually returns to its pre-excitement state. In general, females have the capacity to experience more contractions over a longer period of time than do males.*

*Females have been found to have much more capacity for sexual intercourse than males. This means females can have more sexual intercourse, more often, and with more orgasms than can the average male.*

### The Sexual Experience

*Even though the physiological component of sexuality is common between sexes, the anatomical male and female sex drives may not be identical. Studies consistently show that sexual desire for women is more sensitive to the context (meaningful or intimate connection) and the social and cultural environment (quality of relationships, stresses of the day, etc.). This is not surprising given the potential long term "cost" of a sexual encounter for a female. While a male (biologically) always has the opportunity to walk away from a sexual encounter without consequence of pregnancy and/or child rearing, a female does not.*

## Female Anatomical and Physiological Dysfunction

### Pelvic Inflammatory Disease (PID)

The open-ended structure of the uterine tubes can have significant health consequences if bacteria or other contagions enter through the vagina and move through the uterus, into the tubes, and then into the pelvic cavity. If this is left unchecked, a bacterial infection (sepsis) could quickly become life-threatening. The spread of an infection in this manner is of special concern when unskilled practitioners perform abortions in non-sterile conditions. Sepsis is also associated with sexually transmitted bacterial infections, especially gonorrhea and chlamydia. These increase a woman's risk for pelvic inflammatory disease (PID), infection of the uterine tubes or other reproductive organs. Even when resolved, PID can leave scar tissue in the tubes, leading to infertility.

### Endometriosis

Endometriosis is a disorder in which endometrial cells implant and proliferate outside of the uterus—in the uterine tubes, on the ovaries, or even in the pelvic cavity.
UCLA Health: Endometriosis

### Yeast Infection (Vaginal Candidiasis)

A yeast infection is a fungal infection that may cause irritation of the vulva and discharge from the vagina. Yeast infections are fairly common in women affecting approximately 75% of women at some time in their life and easily treated.

UCLA Health: Yeast Infection

### PMS

Premenstrual syndrome is a group of symptoms that cause physical and emotional effects between ovulation and a period. The intensity of symptoms varies from mild in some women to debilitating in others.

UCLA Health: PMS

### PCOS/Ovarian cysts

Ovarian *cysts* are fluid-filled sacs in or on an ovary. Polycystic ovarian syndrome (PCOS) is a hormonal disorder that may cause numerous cyst to develop on the ovaries (potentially) impacting ovulation. Women with PCOS may have infrequent or prolonged menstrual periods or excess male hormone levels.

UCLA Health: PCOS

### Fibroid tumors

Fibroids are abnormal growths that develop in or on the muscle wall of a woman's uterus. These tumors can become quite large and cause abdominal pain and/or infertility.

UCLA Health: Fibroids

## Check for Understanding

1. Will the resources available to an individual when learning about sexual health affect the choices that person makes regarding their own sexual health?

2. What is one possible reason for the preponderance of evidence showing the importance of connection and context in the female sexual experience?
3. What types of dysfunction may impact female sex organs? What can be done to reduce risk, treat or manage these conditions?

1.2: Female Reproductive Anatomy and Physiology is shared under a CC BY license and was authored, remixed, and/or curated by LibreTexts.

# 1.3: Nutrition and Fitness

## Chapter Objectives

- List the macronutrients and micronutrients essential to body function and describe specific functions in the body
- Discuss nutrients deficiencies common in women and how these deficiency may impact future health
- List types of fitness training important to maintaining physical wellness
- Calculate personal caloric balance using BMR and AMR

*Exercise is a celebration for what your body can do, not a punishment for what you ate. ~ Sachin Pinate*

## Nutrition and Healthy Eating

After learning about anatomical structures in chapter 2 we continue with methods and behaviors that keep body systems healthy and lower risk of disease or dysfunction. The foods we eat affect all dimensions of health and wellness. Many of the health issues associated with poor eating habits are a result of an energy imbalance or lack of nutrients. Most Americans are obtaining more energy from food than they actually need to function in their daily lives and fewer vitamins and minerals.

### Nutrients

Ideally, when we consume and obtain energy from our food, we will primarily eat nutrient dense foods. A nutrient is a compound that provides a needed function in the body. The six **Essential Nutrients** are the nutrients that our bodies need in order to survive. They can be broken into two categories: macronutrients and micronutrients.

**Macronutrients** are nutrients needed in larger amounts. There are four macronutrients which include:

- Carbohydrates: 4 calories per gram
- Fats (lipids): 9 calories per gram
- Protein: 4 calories per gram
- Water: contains 0 calories

As can be seen, carbohydrates, protein, and fats provide energy. However, there is another energy source in the diet that is not a nutrient- alcohol. Alcohol has 7 calories per gram.

**Micronutrients** are nutrients needed in smaller amounts, but they are still considered essential. There are two groups of micronutrients which are:

- Vitamins
- Minerals

#### Carbohydrates

**Carbohydrates** provide energy for the body as well as fiber for digestive health and blood sugar regulation. Many natural carbohydrates such as fruits, vegetables and whole grains provide essential vitamins and minerals.

Although grains and starchy foods are most often associated with carbohydrates, almost all foods do contain some carbohydrates. Some dietary examples of carbohydrate rich foods are whole-wheat bread, oatmeal, rice, sugary snacks/drinks, and pasta. There are many different types of carbohydrates, but the three main types are: simple, complex, and alternative sugar sweeteners.

### Simple Carbohydrates

**Simple carbohydrates** provide quick energy for the body with a spike in blood sugar. If used before exercise or activity this energy can be beneficial and if taken in as fruit and veggies, also very nutritious. However, empty simple sugars, such as candy, cause a rise and then drop in blood sugar that may leave a person hungry a short time later without providing the body necessary vitamins and minerals for growth and maintenance.

Food manufacturers are always searching for cheaper ways to produce food. One method that has been popular is the use of high-fructose corn syrup as an alternative to sucrose (table sugar). High-fructose corn syrup contains 55% fructose which is similar to sucrose. Nevertheless, because an increase in high-fructose corn syrup consumption has coincided with the increase of obesity in the US, there is a lot of controversy surrounding its use. In reading labels, one will usually see high-fructose corn syrup plus other sugars listed which could be adding to the obesity epidemic.

## High-Fructose Corn Syrup

Food manufacturers are always searching for cheaper ways to produce their products. One extremely popular method for reducing costs is the use of high-fructose corn syrup as an alternative to sucrose. High-fructose corn syrup is approximately 50% glucose and 50% fructose, which is the same as sucrose. Nevertheless, because increased consumption of high-fructose corn syrup has coincided with increased obesity in the United States, a lot of controversy surrounds its use.

The New York Times article linked below discusses the growing popularity of sugar compared to high fructose corn syrup: "Sugar is Back on Food Labels, This Time as a Selling Point"

## Complex Carbohydrates

**Complex Carbohydrates** contain many sugar molecules while simple carbohydrates contain only one or two sugars. Complex Carbohydrates are called polysaccharides. Poly means "many," and thus polysaccharides are made of more than 10 sugar molecules. There are two classes of food based polysaccharides: starch and fiber. Starch is a main source of fuel for the cells. After cooking, starch becomes digestible for humans. Raw starch may resist digestion. Examples of starch foods are corn, potatoes, rice, beans, pasta, and grains. Fiber is indigestible matter that survives digestion in the small intestine and stays intact in the large intestine. It is divided into two categories: soluble and insoluble. Soluble means it can be dissolved in water, and insoluble means it does not dissolve in water.

- **Soluble fibers** are fermentable fibers. It is believed that these fibers decrease blood cholesterol and sugar levels thus lowering the risk of heart disease and diabetes II.
- **Insoluble fibers** are non-fermentable, and it is believed that this type of fiber decreases the risk of constipation and colon cancer because it increases stool bulk and reduces transit time. This reduced transit time means shorter exposure to consumed carcinogens in the intestine which may lower cancer risk.

The goal for a day's fiber intake is 25-40 grams depending on one's caloric intake. Suggestions would be to buy high fiber foods. Read the Nutrition Facts' label for how much fiber is in the product for one serving. Drink lots of fluids when eating fiber. Try to eat a minimum of five plant foods for fiber each day.

Carbohydrates have become, surprisingly, quite controversial. However, it is important to understand that carbohydrates are a diverse group of compounds that have a multitude of effects on bodily functions. Thus, trying to make blanket statements about carbohydrates is not a good idea.

### Fats (Lipids)

**Lipids**, commonly referred to as fats, have a poor reputation among most people. "Fat free" labeling on packaging is often perceived as healthy. We do need to consume certain fats, and we should try to incorporate these fats into our diets for their health benefits. However, consumption of certain fats is also associated with a greater risk of developing chronic disease(s). There are different categories of lipids:

- Triglycerides
- Oils
- Cholesterol

Fats (lipids) are the most concentrated source of energy at 9 calories per gram. Fats provide long term stored energy (in the from of triglycerides), insulation, cushion, and help the body absorb fat-soluble vitamins. Depending on the fatty acid structure a lipid may be monounsaturated, polyunsaturated, or saturated.

## Triglycerides

**Triglycerides** are molecules made of glycerol and fatty acids. They are the major form of energy storage in animals.

Triglycerides perform the following functions in our bodies:

- Provide energy
- Primary form of energy storage in the body
- Insulate and protect
- Aid in the absorption and transport of fat-soluble vitamins.

## Structures of Fatty Acids

Fatty acids are components of triglycerides. They are like the brick in a brick wall. Each individual brick is needed to make the overall wall. There are two basic types of fatty acids:

- **saturated fatty acid**
- **unsaturated fatty acid**

These molecules differ in structure and food sources. Saturated fats are typically found in animal products such as poultry, meat and dairy and are solid at room temperature. Unsaturated fats are typically found in plants and vegetable oils and are liquid at room temperature. There are also **monounsaturated fatty acids** (MUFAs) and **polyunsaturated fatty acids** (MUFAs), which have a healthy affect on cholesterol levels.

There are two essential fatty acids, which are:

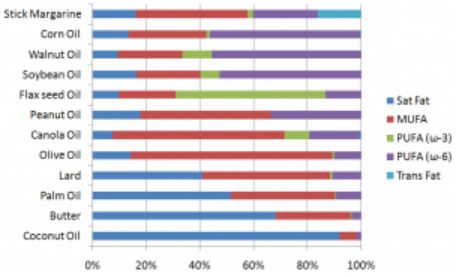
- **linoleic acid (omega-6)**
- **alpha-linolenic (omega-3)**

These fatty acids are essential because the body cannot synthesize them. The essential fatty acids are critical to human health as they play important roles in every system of the body. Good food sources of omega-6 include whole grains, fresh fruits and veggies, fish, olive oil, and garlic. Good food sources of omega-3 include flax seed, egg yolk, and chia seeds.

## Trans-fatty acids

**Trans-fatty acids** – like Crisco- are hydrogenated vegetable oils. In an artificial chemical process hydrogen is added to natural vegetable oils to make them more solid at room temperature, and more heat resistant for cooking, thus, hydrogenated oils are more resistant to heat degradation. The body doesn't have an efficient process for using trans-fats, so they get stored for the long term. The figure below shows the fatty acid composition of certain oils and oil-based foods. As can be seen, most foods contain a mixture of fatty acids.

Figure 1. Different Types of Fat




## Cholesterol

**Cholesterol** is a type of lipid found in the blood. It has many functions and is a structural part of all body cells, including brain and nerve tissue. Cholesterol is needed to form hormones, bile, and vitamin D. Many foods contain cholesterol, but primarily it is found in foods of animal origin. Some meats are higher in cholesterol than others.

The body needs cholesterol, but it produces all of the cholesterol that it needs. It is almost impossible to avoid consuming outside sources of cholesterol, but it is possible and advisable to limit cholesterol intake by avoiding foods high in cholesterol. Elevated levels of LDL ("bad cholesterol") in the blood can increase the risk of artery and heart disease.

The human body contains two types of cholesterol: low-density lipoprotein (LDL) and high-density lipoprotein (HDL).

LDL: The "Bad" Cholesterol

LDL is cholesterol that usually enters the human body through consuming food that contains cholesterol. LDL is considered the "bad cholesterol" because it bonds with triglycerides and stores it within the tissues. This is the leading cause of plaque in the arteries and can lead to restricted blood flow and possible cardiac arrest. This process takes place over several years with continuous eating of saturated fats, smoking, diabetes, and high blood pressure.

Figure 2. Blood flow restricted by the buildup of LDL cholesterol

Cholesterol plaque in the artery

HDL: The “Good” Cholesterol

HDL is produced when a person exercises, and it is considered the “good cholesterol.” HDL also bonds with triglycerides, but it is then processed by the body, added to feces, and expelled through the colon. In other words, HDL helps the body to process excess triglycerides thus managing the amount of excess fat in the overall system. The best way to increase HDL in the body is to exercise regularly.

A Lipid Panel is a series of tests that measures the amount of cholesterol in the blood. A small sample of blood is drawn from the patient for this test. One number is for “total cholesterol.” This number will show the total fats in the blood. The HDL will show the good fats; LDL will show the bad fats; Triglycerides will show good or bad fats depending on the number above or below 150.

Adult Blood Cholesterol and Triglyceride Target Numbers:

- Total Cholesterol < 200 mg/dl
- Total HDL > 35
- Total LDL < 100
- Total Triglycerides < 150

### Proteins

Proteins are another major macronutrient. They are similar to carbohydrates in that they are made up of small repeating units, but instead of sugars, proteins are made up of **amino acids**. Protein makes up approximately 20 percent of the human body and is present in every single cell. The word protein is a Greek word, meaning “of utmost importance.” Proteins are called the workhorses of life as they provide the body with structure and perform a vast array of functions. You can stand, walk, run, skate, swim, and more because of your protein-rich muscles. Protein is necessary for proper immune system function, digestion, and hair and nail growth, and is involved in numerous other body functions. In fact, it is estimated that more than one hundred thousand different proteins exist within the human body.

## What Is Protein?

**Proteins**, simply put, are macromolecules composed of amino acids. **Amino acids** are commonly called protein’s building blocks.

The functions of proteins are very diverse because there are 20 distinct amino acids that form long chains. For example, proteins can function as enzymes or hormones. Enzymes, one type of protein, are produced by living cells and are catalysts in biochemical reactions (like digestion). Enzymes can function to break molecular bonds, to rearrange bonds, or to form new bonds. An example of an enzyme is salivary amylase which breaks down amylose, a component of starch.

## Amino Acids Function

Amino acids are combined in order to form all of the protein the human body needs. In fact, the body makes proteins itself, but it needs amino acids from food to construct proteins that the body uses. Antibodies, enzymes, muscle proteins, as well as proteins in the skin are all made up of amino acids, some that the body produces and some that must be consumed. Amino acids that the body produces are called **non-essential amino acids**. There are eleven non-essential amino acids: alanine, arginine, asparagine, aspartate, cysteine, glutamic acid, glutamine, glycine, proline, serine and tyrosine. In Nutrition, the term essential is used to name

nutrients that the body doesn't produce itself; essential nutrients including **essential amino acids** must be consumed. There are nine essential amino acids: histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan and valine.

## Complete and Incomplete Proteins

As a way of simplifying protein, sources are described as either complete or incomplete. **Complete proteins** – such as eggs, tuna fish, peanut butter, almonds – contain most if not all of the essential amino acids. **Incomplete proteins** – such as spinach, beans, wheat germ – contain just a few of the essential amino acids.

Most plant-based proteins are categorized as incomplete proteins, but vegetarians should not be concerned about protein intake because a person can consume all of the essential amino acids by combining food sources. For example a person can eat beans and quinoa with a spinach salad and consume the essential amino acids.

### Water

Water is made up of hydrogen and oxygen (H2O) and doesn't provide energy for the body (calories). Humans are approximately 65% water! The body needs water to regulate temperature, moisten tissues in the mouth, eyes, and nose, lubricate joints, protect organs, prevent constipation, reduce the burden on kidneys and liver by helping to flush out waste, and to dissolve nutrients as part of the digestive process.

Although a person can survive for several weeks without food, the body cannot survive longer than a few days without fluids. A loss of water equivalent to:

- 1% of body weight is enough to cause thirst and to impact the ability to concentrate
- 4% loss of hydration results in dizziness and reduced muscle power
- 6% loss of fluids causes the heart to race and sweating ceases
- 7% loss of hydration results in collapse and subsequent death if fluids are not replaced

## Water Intake

In a normal diet, fluid is gained via food as well as in drinks. Water, along with some herbal teas and low sugar juices hydrate the body. However, alcoholic, high sugar, and caffeinated drinks may not contribute to body fluids as alcohol, sugar and caffeine are diuretics, substances that increases the output of urine by the body.

Fluid loss occurs in various ways throughout the body with urination being the primary method. Perspiration (sweating), and respiration (breathing) also removes fluid from the body. Water intake and water loss should be balanced in order to prevent dehydration and to maintain a healthy body. The recommended daily **intake** is 10-13 cups of fluid from food and drink for adult males and 7-9 cups of fluid for adult females or half your body weight in ounces.

### Vitamins

Vitamins are organic compounds that are essential for normal physiologic processes in the body. Before their detailed chemical structures were known, vitamins were named by being given a letter. They are generally still referred to by that letter as well as by their chemical name, for example, vitamin C or ascorbic acid.

Vitamins are categorized as either water-soluble or fat-soluble based on how they are dissolved in the body. **Water soluble vitamins** are dissolved in water and absorbed during digestion. Excess water-soluble vitamins are excreted through urine. **Fat-soluble vitamins** are absorbed through the digestive process with the help of fats (lipids). Excess fat-soluble vitamins can build up in the body and become toxic. Vitamin supplements can be dangerous particularly with fat-soluble vitamins because people can overdose.

A balanced diet includes all of the vitamins and minerals a person needs daily.

Water-Soluble Vitamins

There are nine water-soluble vitamins: Vitamin C, and eight Vitamin B's.

Fat-Soluble Vitamins

There are four fat-soluble vitamins: Vitamins A, D, E, and K.

### Minerals

Minerals are essential, non-caloric nutrients that are in all of our food and are essential for normal physiologic processes in the body. Minerals are micronutrients, which means humans only need to eat them in small quantities. Minerals assist body functions that range from bone strength to regulating your heartbeat.

When plants take up the water through their roots, dissolved minerals from within the soil are absorbed by the plant. When people eat plants, they are ingesting minerals found in the plant. Animals are able to concentrate minerals in their tissues, so meats and other foods derived from animals often contain a higher concentration of minerals.

There are two categories of minerals: major minerals and trace minerals. The classification of a mineral as major or trace depends on how much of the mineral the body needs.

Major minerals include:

- Calcium
- Phosphorus
- Sodium
- Potassium
- Magnesium

Trace minerals include:

- Iron
- Fluoride
- Zinc
- Copper
- Iodine
- Manganese
- Chloride
- Selenium

### Vitamin and Mineral Supplements

Vitamin and mineral supplements exist, but are not as effective as getting minerals from whole foods. There are two types of supplement: whole food supplements and synthetic supplements.

Whole food supplements are produced by taking vitamins and minerals straight from natural sources: soil, rocks, or plant/food sources; whereas, synthetic minerals are made in a lab. While synthetic mineral supplements mimic the chemical structure of vitamins and minerals, they are probably not exact copies. That means the body may not recognize the synthetic mineral structure and does not absorb the mineral efficiently. No supplements, including vitamins and minerals, are approved by the FDA. Only prescription drugs are approved by the FDA. A healthy balanced diet can provide all the vitamins and minerals needed.

## Food and Metabolism

The amount of energy that is needed or ingested per day is measured in calories. A **calorie** is the amount of heat it takes to raise 1 g of water by 1 °C. On average, a person needs 1500 to 2000 calories per day to sustain (or carry out) daily activities. The total number of calories needed by one person is dependent on his/her body mass, % lean mass, age, height, gender, activity level, and the amount of exercise per day. If exercise is a regular part of one's day, more calories are required. As a rule, people underestimate the number of calories ingested and overestimate the amount they burn through exercise. This can lead to ingestion of too many calories per day. The accumulation of an extra 3500 calories adds one pound of weight. If an excess of 200 calories per day is ingested, one extra pound of body weight will be gained every 18 days. At that rate, an extra 20 pounds can be gained over the course of a year. Of course, this increase in calories could be offset by increased exercise. Running or jogging one mile burns about 100 calories.

The type of food ingested also affects the body's metabolic rate. Processing of carbohydrates requires less energy than processing of proteins. In fact, the breakdown of carbohydrates requires the least amount of energy; whereas, the processing of proteins demands the most energy. In general, the amount of calories ingested and the amount of calories burned determines the overall weight. To lose weight, the number of calories burned per day must exceed the number ingested. Calories are in almost everything one ingests, so when considering calorie intake, beverages must also be considered.

## Planning a Diet

The definition of diet is anything that is consumed by a particular person or people on a regular basis. That means if someone routinely drinks coffee in the morning, that is part of his/her diet. If a person consistently eats a Big Mac from McDonald's, that is part of his/her diet.

It is clear that food choices influence short-term and long-term health. That is why it is so important to make wise choices in what one eats on a regular basis. If a person chooses to have a diet high in calories without balancing energy use, that person can expect to put on unhealthy weight. A diet that is high in fiber, with the appropriate amount of calories and proper amounts of the macronutrients, will contribute to a healthy body.

any times, the term diet is thought of as a method to lose weight or to change body shape. However, it is important to focus on the nutritional concepts listed below, so long-term health can be achieved.

Decisions about nutrition can be difficult. Knowing and using scientific research can lead to better health. Public health organizations have developed tools based on nutritional science to help people design healthy diets. These tools should be used as guidelines for each individual with the awareness that everyone is different and therefore has different needs. Everyone, regardless of age, size, shape, physique, can benefit from learning and utilizing the following tools:

### Acceptable Macronutrient Distribution Range

The Acceptable Macronutrient Distribution Range (AMDR) describes the proportions of daily caloric intake that should be carbohydrates, lipids, and proteins. Basically the AMDR provides guidelines on how many macronutrient calories one should consume a day.

According to the AMDR, the range of caloric intake in a daily diet should be:

- Carbohydrates: 45-65%
- Lipids: 20-35%
- Proteins: 10-35%

These ranges give enough variance to serve all genders and activity levels.

### Dietary Reference Intakes

The Dietary Reference Intakes (DRI's) are reference values of nutrient intake that help with nutrition planning and assessment of healthy individuals. There are four measures that together comprise the DRI:

- Recommended Dietary Allowance (RDA): the average daily dietary intake level that is sufficient to meet the nutrient requirement of nearly all (about 97%) healthy individuals in a group. This is the basic quantity of a nutrient recommended.
- Adequate Intake (AI): a value based on observed or experimentally determined approximations of nutrient intake by a group (or groups) of healthy people—used when an RDA cannot be determined. This is the minimum amount of a nutrient needed for maintaining health.
- Tolerable Upper Intake Level (UL): the highest level of daily nutrient intake that is likely to pose no risk of adverse health effects to almost all individuals in the general population. As intake increases above the UL, the risk of adverse effects increases. This is the maximum that would be consumed prior to developing negative effects of eating too much. This is not a level that is met, but rather one that is avoided to prevent a decrease in health.
- Estimated Average Requirement (EAR): a nutrient intake value that is estimated to meet the requirement of half the healthy individuals in a group. These nutrient values should be used as goals for dietary intake for health.

### 4 Key Concepts for Personalizing a Healthy Diet

Personalizing meal plans can be extremely beneficial psychologically as well as physically. Knowing that one is eating healthy reduces some of the subconscious doubts about doing what needs to be done to be well. However, as with every healthy practice, there can be pitfalls. To help avoid these, there are 4 approaches that can be taken:

1. Assessing and changing your current diet
2. Staying committed to a healthy diet
3. Try additions and substitutions to bring your current diet closer to your goals
4. Plan ahead for challenging situations

### Planning Healthy Meals

Individual requirements for nutrients vary considerably depending on factors such as age and gender. Other relevant factors are size, metabolic rate, and occupation. A farmer would have a different dietary need than someone in a sedentary occupation. The body also has stores of certain nutrients (fat-soluble vitamins, for example) so that variations in daily intake of such nutrients can be accommodated.

When considering dietary needs, various techniques have been established by health officials to assist people in choosing foods and food amounts wisely. **Choose My Plate** is a graphic representation of what a healthy plate of food might look like.

Other tools, such as **meal planning guides** can easily be found and utilized online or through apps.

### Nutrition Labels

Perhaps one of the most effective tools provided to consumers is the nutrition label that is, by law, on all food packaging. This information can be useful for evaluating the nutrient content of food and planning healthy meals.

In the United States, the Food and Drug Administration (FDA) requires packaged foods to have a label that helps consumers make educated decisions about the foods they purchase. The label provides caloric, macronutrient, and some micronutrient content of the food. Labels also indicate ingredients and manufacturer information.

FYI: Food labels do not provide all nutritional information; they just include the basics to help consumers make healthy food decisions.

## Information On Food Labels

- **Name of product:** Sometimes the name of the product includes important information. For example some brands are vegetarian, kosher, gluten-free, etc. It is also important to compare/contrast ingredients in generic and brand name foods
- **Serving Size:** It's important to pay attention to how many servings a package contains. Many packages contain multiple servings.

Figure 4. Using your hand to determine serving size


- **Calories**: Pay attention to whether the caloric content of the food is per serving or per package. Also, some food labels indicate calories before or after preparation.
- **Fats**: The food label includes all fats. Note that the label indicates different types of fats.
- **Cholesterol**: Dietary cholesterol is a major factor in cardiovascular health. Limiting the intake of cholesterol can prevent heart disease.
- **Sodium**: Another major factor in promoting good health is limiting the amount of sodium intake to less than 2000mg per day.
- **Carbohydrates**: The food label includes simple and complex carbohydrates. Note that the label indicates different types of carbohydrates. Carbohydrates should make up 45-65% of a persons diet while keeping grams of sugar below 25-30 grams per day.
- **Proteins**: Protein intake needs to be carefully monitored because over or under consumption of protein can cause severe issues.
- **Vitamins and Minerals**: There are four vitamins and minerals (Vitamin D, Calcium, Iron, and Potassium) that are required on food labels; however, the label might include more than these four.
- **Ingredients**: The ingredients are listed in order of their content per volume. If sugar is listed as the first ingredient, there is more sugar in the food than any other ingredient. The last ingredient has the least amount in the food.

- **Name of manufacturer**: In addition to the Nutrition Facts, the food label includes the name and contact information for the manufacturer as required by law.
- **Allergens**: Food manufacturers are required to draw specific attention to common allergens such as nuts, milk products, soy, etc. There is no specific location for allergen information, but it should be someplace on the packaging.

Figure 5. Nutrition Facts


To learn additional details about all of the information contained within the Nutrition Facts panel, see the following website: http://www.fda.gov/Food/ResourcesForYou/Consumers/NFLPM/ucm274593.htm

### Dietary Food Trends

Hundreds of years ago, when food was less accessible and daily life required much more physical activity, people worried less about obesity and more about simply getting enough to eat. In today's industrialized nations, conveniences have solved some problems and introduced new ones, including the hand-in-hand obesity and diabetes epidemics. Fad diets gained popularity as more North Americans struggled with excess pounds. However, new evidence-based approaches that emphasize more holistic measures are on the rise. These new dietary trends encourage those seeking to lose weight to eat healthy, whole foods first, while adopting a more active lifestyle. These sound practices put dietary choices in the context of wellness and a healthier approach to life.

*Table 2: The Pros and Cons of Seven Popular Diets*

| Diet | Pros | Cons |
|---|---|---|
| DASH Diet | • Recommended by the National Heart, Lung, and Blood Institute, the American Heart Association, and many physicians<br>• Helps to lower blood pressure and cholesterol<br>• Reduces risk of heart disease and stroke<br>• Reduces risk of certain cancers<br>• Reduces diabetes risk | • There are very few negative factors associated with the DASH diet |
| Gluten-Free Diet | • Reduces the symptoms of gluten intolerance, such as chronic diarrhea, cramping, constipation, and bloating<br>• Promotes healing of the small intestines for people with celiac disease, preventing malnutrition<br>• May support weight loss<br>• May be beneficial for other autoimmune diseases, such as Parkinson's disease, rheumatoid arthritis, and multiple sclerosis<br>• May be helpful for Types 1 and 2 diabetes and anemia | • Risk of folate and iron deficiencies<br>• Special gluten-free products can be hard to find and expensive<br>• Requires constant vigilance and careful food label reading, since gluten is found in many products |

| | | |
|---|---|---|
| Low-Carb Diet | • Restricts refined carbohydrates, such as white flour and white sugar<br>• May temporarily improve blood sugar or blood cholesterol levels | • Not entirely evidence-based<br>• Results in higher fat and protein consumption |
| Mediterranean Diet | • A reduced risk of cardiovascular disease and mortality<br>• A lower risk of cancer<br>• De-emphasizes processed foods and emphasizes whole foods and healthy fats<br>• Lower sodium intake, due to fewer processed foods<br>• Emphasis on monosaturated fats leads to lower cholesterol<br>• Highlighting fruits and vegetables raises consumption of antioxidants | • Does not specify daily serving amounts<br>• Potential for high fat and high calorie intake as nuts and oils are calorie-dense foods<br>• Drinking one to two glasses of wine per day may not be healthy for those with certain conditions |
| Raw Food Diet | • Emphasizes whole foods<br>• Focuses on nutritionally-rich foods<br>• High in fiber | • Not entirely evidence-based<br>• Very restrictive and limits protein and healthy fat intake<br>• Could encourage the development of foodborne illness<br>• Extremely difficult to follow<br>• Can cause deficiencies in essential vitamins |
| Vegetarianism and Veganism | • May reduce cancer risk<br>• May reduce heart disease risk<br>• May reduce obesity risk<br>• May help prevent Type 2 diabetes<br>• Helps with weight reduction and weight maintenance | • Guidelines regarding fat and nutrient consumption must be followed<br>• Requires vigilance to watch out for hidden animal products<br>• Requires negotiating meals and holidays with meat-eating friends and family |

## Weight Management

Achieving and sustaining appropriate body weight across the lifespan is vital to maintaining good health and quality of life. Many behavioral, environmental, and genetic factors have been shown to affect a person's body weight. Calorie balance over time is the key to weight management. Calorie balance refers to the relationship between calories consumed from foods and beverages and calories expended in normal body functions (i.e., metabolic processes) and through physical activity. People cannot control the calories expended in metabolic processes, but they can control what they eat and drink, as well as how many calories they use in physical activity.

Calories consumed must equal calories expended for a person to maintain the same body weight. Consuming more calories than expended will result in weight gain. Conversely, consuming fewer calories than expended will result in weight loss. This can be achieved over time by eating fewer calories, being more physically active, or, best of all, a combination of the two.

Maintaining a healthy body weight and preventing excess weight gain throughout the lifespan are highly preferable to losing weight after weight gain. Once a person becomes obese, reducing body weight back to a healthy range requires significant effort over a span of time, even years. People who are most successful at losing weight and keeping it off do so through continued attention to calorie balance.

The current high rates of overweight and obesity among virtually all subgroups of the population in the United States demonstrate that many Americans are in calorie imbalance—that is, they consume more calories than they expend. To curb the obesity epidemic and improve their health, Americans need to make significant efforts to decrease the total number of calories they consume from foods and beverages and increase calorie expenditure through physical activity. Achieving these goals will require Americans to select a healthy eating pattern that includes nutrient-dense foods and beverages they enjoy, meets nutrient requirements, and stays within calorie needs. In addition, Americans can choose from a variety of strategies to increase physical activity.

**Key Recommendations**

- Prevent and/or reduce overweight and obesity through improved eating and physical activity behaviors.
- Control total calorie intake to manage body weight. For people who are overweight or obese, this will mean consuming fewer calories from foods and beverages.
- Increase physical activity and reduce time spent in sedentary behaviors.
- Maintain appropriate calorie balance during each stage of life—childhood, adolescence, adulthood, pregnancy and breastfeeding, and older age.

## Balancing Calories and Eating Healthfully

### Understanding Calories Needs

The total number of calories a person needs each day varies depending on a number of factors, including the person's age, gender, height, weight, and level of physical activity. This number is called **basal metabolic rate**, or the base number of calories to survive and carry out basic functions. In addition, a desire to lose, maintain, or gain weight affects how many calories should be consumed. Estimates range from 1,600 to 2,400 calories per day for adult women and 2,000 to 3,000 calories per day for adult men, depending on age and physical activity level. Within each age and gender category, the low end of the range is for sedentary individuals; the high end of the range is for active individuals. Due to reductions in basal metabolic rate that occurs with aging, calorie needs generally decrease for adults as they age. Estimated needs for young children range from 1,000 to 2,000 calories per day, and the range for older children and adolescents varies substantially from 1,400 to 3,200 calories per day, with boys generally having higher calorie needs than girls. These are only estimates, and more accurate calorie needs may be determined using the Harris Benedict Equation shown below:

- Step 1 – Calculating the Harris–Benedict BMR

The original Harris–Benedict equations published in 1918 and 1919.

| | |
|---|---|
| BMR calculation for men | BMR = 66 + ( 6.2 x weight in pounds ) + ( 12.7 x height in inches ) – ( 6.76 x age in years ) |
| BMR calculation for women | BMR = 655 + ( 4.35 x weight in pounds ) + ( 4.7 x height in inches ) – ( 4.7 x age in years ) |

- Step 2 – Determine Recommended Intake

The following table enables calculation of an individual's recommended daily kilocalorie intake to maintain current weight.[4]

| | |
|---|---|
| Little to no exercise | Daily kilocalories needed = BMR x 1.2 |
| Light exercise (1–3 days per week) | Daily kilocalories needed = BMR x 1.375 |
| Moderate exercise (3–5 days per week) | Daily kilocalories needed = BMR x 1.55 |
| Heavy exercise (6–7 days per week) | Daily kilocalories needed = BMR x 1.725 |
| Very heavy exercise (twice per day, extra heavy workouts) | Daily kilocalories needed = BMR x 1.9 |

Knowing one's daily calorie needs may be a useful reference point for determining whether the calories that a person eats and drinks are appropriate in relation to the number of calories needed each day. The best way for people to assess whether they are eating the appropriate number of calories is to monitor body weight and adjust calorie intake and participation in physical activity based on changes in weight over time. 3500 calories is equal to 1 pound of fat. A calorie deficit of 500 calories or more per day is a common initial goal for weight loss for adults. However, maintaining a smaller deficit can have a meaningful influence on body weight over time. The effect of a calorie deficit on weight does not depend on how the deficit is produced—by reducing calorie intake, increasing expenditure, or both. Yet, in research studies, a greater proportion of the calorie deficit is often due to decreasing calorie intake with a relatively smaller fraction due to increased physical activity.

*Table 2. Estimated Calorie Needs Per Day By Age, Gender, and Physical Activity Level**

*Estimated amounts of calories needed to maintain calorie balance for various gender and age groups at three different levels of physical activity. The estimates are rounded to the nearest 200 calories. An individual's calorie needs may be higher or lower than these average estimates.*

| gender | age (years) | sedentary | **Physical activity level*** moderately active | active |
|---|---|---|---|---|
| child (female and male) | 2–3 | 1,000–1,200c | 1,000–1,400c | 1,000–1,400c |
| female | 4–8 | 1,200–1,400 | 1,400–1,600 | 1,400–1,800 |
| | 9–13 | 1,400–1,600 | 1,600–2,000 | 1,800–2,200 |
| | 14–18 | 1,800 | 2,000 | 2,400 |
| | 19–30 | 1,800–2,000 | 2,000–2,200 | 2,400 |
| | 31–50 | 1,800 | 2,000 | 2,200 |
| | 51+ | 1,600 | 1,800 | 2,000–2,200 |
| male | 4–8 | 1,200–1,400 | 1,400–1,600 | 1,600–2,000 |
| | 9–13 | 1,600–2,000 | 1,800–2,200 | 2,000–2,600 |
| | 14–18 | 2,000–2,400 | 2,400–2,800 | 2,800–3,200 |
| | 19–30 | 2,400–2,600 | 2,600–2,800 | 3,000 |
| | 31–50 | 2,200–2,400 | 2,400–2,600 | 2,800–3,000 |
| | 51+ | 2,000–2,200 | 2,200–2,400 | 2,400–2,800 |

*a. Based on Estimated Energy Requirements (EER) equations, using reference heights (average) and reference weights (healthy) for each age/gender group. For children and adolescents, reference height and weight vary. For adults, the reference man is 5 feet 10 inches tall and weighs 154 pounds. The reference woman is 5 feet 4 inches tall and weighs 126 pounds. EER equations are from the Institute of Medicine. Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids. Washington (DC): The National Academies Press; 2002.*

*b. Sedentary means a lifestyle that includes only the light physical activity associated with typical day-to-day life. Moderately active means a lifestyle that includes physical activity equivalent to walking about 1.5 to 3 miles per day at 3 to 4 miles per hour, in addition to the light physical activity associated with typical day-to-day life. Active means a lifestyle that includes physical activity equivalent to walking more than 3 miles per day at 3 to 4 miles per hour, in addition to the light physical activity associated with typical day-to-day life.*

*c. The calorie ranges shown are to accommodate needs of different ages within the group. For children and adolescents, more calories are needed at older ages. For adults, fewer calories are needed at older ages.*

*d. Estimates for females do not include women who are pregnant or breastfeeding.*

### Individual Foods and Beverages and Body Weight

For calorie balance, the focus should be on total calorie intake. As individuals vary a great deal in their dietary intake, the best advice is to monitor diet and replace foods higher in calories with nutrient-dense foods and beverages relatively low in calories. The following guidance may help individuals control their total calorie intake and manage body weight:

- Increase intake of whole grains, vegetables, and fruits: adults who eat more whole grains, particularly those higher in dietary fiber, have a lower body weight compared to adults who eat fewer whole grains. Increased intake of vegetables and/or fruits may protect against weight gain.
- Reduce intake of sugar-sweetened beverages: This can be accomplished by drinking fewer and/or consuming smaller portions. Children and adolescents who consume more sugar-sweetened beverages have higher body weight compared to those who drink less. Sugar-sweetened beverages provide excess calories and few essential nutrients to the diet and should only be consumed occasionally.

### Developing Healthy Eating Patterns

Because people consume a variety of foods and beverages throughout the day as meals and snacks, a growing body of research has begun to describe overall eating patterns that help promote calorie balance and weight management. One aspect of these patterns that has been researched is the concept of **calorie density**, or the amount of calories provided per unit of food weight. Foods high in water and/or dietary fiber typically have fewer calories per gram and are lower in calorie density, while foods higher in fat are

generally higher in calorie density. A dietary pattern low in calorie density is characterized by a relatively high intake of vegetables, fruit, and dietary fiber and a relatively low intake of total fat, saturated fat, and added sugars. Eating patterns that are low in calorie density improve weight loss and weight maintenance, and also may be associated with a lower risk of type 2 diabetes in adults.

Although total calories consumed is important for calorie balance and weight management, it is important to consider the nutrients and other healthful properties of food and beverages, as well as their calories, when selecting an eating pattern for optimal health.

- When choosing carbohydrates, Americans should emphasize naturally occurring carbohydrates, such as those found in whole grains, beans and peas, vegetables, and fruits, especially those high in dietary fiber, while limiting refined grains and intake of foods with added sugars.
- For protein, plant-based sources and/or animal-based sources can be incorporated into a healthy eating pattern. However, some protein products, particularly some animal-based sources, are high in saturated fat, so non-fat, low-fat, or lean choices should be selected.
- Fat intake should emphasize monounsaturated and polyunsaturated fats, such as those found in seafood, nuts, seeds, and oils.

Americans should move toward more healthful eating patterns. Overall, as long as foods and beverages consumed meet nutrient needs and calorie intake is appropriate, individuals can select an eating pattern that they enjoy and can maintain over time. Individuals should consider the calories from all foods and beverages they consume, regardless of when and where they eat or drink.

### Calorie Balance: Physical Activity

Physical activity is the other side of the calorie balance equation and should be considered when addressing weight management. Regular participation in physical activity not only reduces risk of disease, it also helps people maintain a healthy weight and prevent excess weight gain. Further, physical activity, particularly when combined with reduced calorie intake, may aid weight loss and maintenance of weight loss.

## Physical Fitness

Being physically active is one of the most important steps that Americans of all ages can take to improve their health. Physical activity is beneficial for healthy people, people at risk of developing chronic diseases, and people with current chronic conditions or disabilities. Studies by the US Department of Health and Human Services have examined the role of physical activity in many groups—men and women, children, teens, adults, older adults, people with disabilities, and women during pregnancy and the postpartum period. These studies have focused on the role that physical activity plays in many health outcomes, such as coronary artery disease, diabetes, stroke, osteoporosis, high blood sugar, high cholesterol and depression.

### Health Benefits Associated with Regular Physical Activity

Table 1

| **Health Benefits Associated with Regular Physical Activity in Adults and Older Adults** | | |
|---|---|---|
| **Strong Evidence** | **Moderate to Strong Evidence** | **Moderate Evidence** |

| | | |
|---|---|---|
| • Lower risk of early death<br>• Lower risk of coronary heart disease<br>• Lower risk of stroke<br>• Lower risk of high blood pressure<br>• Lower risk of adverse blood lipid profile<br>• Lower risk of type 2 diabetes<br>• Lower risk of metabolic syndrome<br>• Lower risk of colon cancer<br>• Lower risk of breast cancer<br>• Prevention of weight gain<br>• Weight loss, particularly when combined with reduced calorie intake<br>• Improved cardiorespiratory and muscular fitness<br>• Prevention of falls<br>• Reduced depression<br>• Better cognitive function (for older adults) | • Better functional health (for older adults)<br>• Reduced abdominal obesity | • Lower risk of hip fracture<br>• Lower risk of lung cancer<br>• Lower risk of endometrial cancer<br>• Weight maintenance after weight loss<br>• Increased bone density<br>• Improved sleep quality |

These studies have also prompted questions as to what type and how much physical activity is needed for various health benefits. That led to the development of The Physical Activity Guidelines for Americans, which gives guidance on the amount of physical activity that will provide health benefits for all Americans. Although some health benefits seem to begin with as little as 60 minutes (1 hour) a week, research shows that a total amount of 150 minutes (2 hours and 30 minutes) a week of moderate-intensity aerobic activity, such as brisk walking, consistently reduces the risk of many chronic diseases and other adverse health outcomes. For more details on the Physical Activity Guidelines for Americans please see the table below:

Table 3

| **For Important Health Benefits Adults Need at Least:** | | |
|---|---|---|
| 2 hours and 30 minutes (150 minutes) of moderate aerobic activity every week (i.e., brisk walking) every week; | AND | Muscle-strengthening activities on 2 or more days a week that work all major muscle groups (legs hips, back, abdomen, chest, shoulders, and arms) |
| OR | | |
| 1 hour and 15 minutes (75 minutes) of vigorous intensity aerobic activity (i.e., jogging or running) every week; | | |
| OR | | |
| An equivalent mix of moderate-and-vigorous-intensity aerobic activity | | |

Although the Guidelines focus on the health benefits of physical activity, these benefits are not the only reason why people are active. Physical activity gives people a chance to have fun, be with friends and family, enjoy the outdoors, improve their personal appearance, and improve their fitness so that they can participate in more intensive physical activity or sporting events. Some people are active because it gives them certain health benefits (such as feeling more energetic). The Guidelines encourage people to be physically active for any and all reasons that are meaningful for them. Nothing in the Guidelines is intended to mean that health benefits are the only reason to do physical activity.

### Health Related Components of Physical Fitness

In many studies related to physical fitness and health, researchers have focused on **exercise**, as well as on the more broadly defined concept of **physical activity**. Physical activity is defined by the World Health Organization as any bodily movement produced by skeletal muscles that requires energy expenditure, while exercise is a form of physical activity that is planned, structured, repetitive, and performed with the goal of improving health or fitness. So, although all exercise is physical activity, not all physical activity is exercise. Although physical activity and exercise are defined concepts, the ultimate focus of the health related components of

physical fitness is to provide a framework for components that are necessary for good health. They are cardiorespiratory (CR) endurance (also called aerobic endurance), flexibility, muscular strength, muscular endurance, and body composition.

### Cardiorespiratory Endurance

- ***Aerobic endurance:*** The ability of the heart, blood vessels, and lungs to work together to accomplish three goals: 1) deliver oxygen to body tissues; 2) deliver nutrients; 3) remove waste products. CR endurance exercises involve large muscle groups in prolonged, dynamic movement (ex. running, swimming, etc)

Table 4

| **Examples of Different Aerobic Physical Activities and Intensities** | |
|---|---|
| **Moderate Intensity** | **Vigorous Intensity** |
| · Walking briskly (3 miles per hour or faster, but not race-walking)<br>· Water aerobics<br>· Bicycling slower than 10 miles per hour<br>· Tennis (doubles)<br>· Ballroom dancing<br>· General gardening | · Racewalking, jogging, or running<br>· Swimming laps<br>· Tennis (singles)<br>· Aerobic dancing<br>· Bicycling 10 miles per hour or faster<br>· Jumping rope<br>· Heavy gardening (continuous digging or hoeing, with heart rate increases)<br>· Hiking uphill or with a heavy backpack |

### Muscular Strength and Endurance

- ***Muscular strength***: The ability of muscles to exert maximal effort.
- ***Muscular endurance***: The ability of muscles to exert submaximal effort repetitively (contract over and over again or hold a contraction for a long time).

### Activities for Muscular Strength and Endurance

These kind of activities, which includes **resistance training** and lifting weights, causes the body's muscles to work or hold against an applied force or weight. These activities often involve relatively heavy objects, such as weights, which are lifted multiple times to train various muscle groups. Muscle-strengthening activity can also be done by using elastic bands or body weight for resistance (climbing a tree or doing push-ups, for example). Activities for Muscular Strength and Endurance also has three components:

Muscle-strengthening activities provide additional benefits not found with aerobic activity. The benefits of muscle-strengthening activity include increased bone strength and muscular fitness. Muscle-strengthening activities can also help maintain muscle mass during a program of weight loss.

### Flexibility

Flexibility is the ability of moving a joint through the range of motion. Flexibility is an important part of physical fitness. Stretching exercises are effective in increasing flexibility, and thereby can allow people to more easily do activities that require greater flexibility. Flexibility activities also reduce risk of joint pain as well as muscle and joint injury. Time spent doing flexibility activities by themselves does not count toward meeting the aerobic or muscle-strengthening Guidelines. Although there are not specific national guidelines for flexibility, adults should do flexibility exercises at least two or three days each week to improve range of motion. This can be done by holding a stretch for 10-30 seconds to the point of tightness or slight discomfort. Repeat each stretch two to four times, accumulating 60 seconds per stretch.

### Body Composition

The percentage of the body composed of lean tissue (muscle, bone, fluids, etc.) and fat tissue. Changes in body composition usually occur as a result of improvements in the other components of health related physical fitness, as well as changes in eating habits.

## Adding Physical Activity to Your Life

### Overcoming Barrier to Being Physical Active

Given the health benefits of regular physical activity, we might have to ask why two out of three (60%) Americans are not active at recommended levels.

Many technological advances and conveniences that have made our lives easier and less active, as well as many personal variables, including physiological, behavioral, and psychological factors, may affect our plans to become more physically active. In fact, the

10 most common reasons adults cite for not adopting more physically active lifestyles are (Sallis and Hovell, 1990; Sallis et al., 1992):

- Do not have enough time to exercise
- Find it inconvenient to exercise
- Lack self-motivation
- Do not find exercise enjoyable
- Find exercise boring
- Lack confidence in their ability to be physically active (low self-efficacy)
- Fear being injured or have been injured recently
- Lack self-management skills, such as the ability to set personal goals, monitor progress, or reward progress toward such goals
- Lack encouragement, support, or companionship from family and friends, and
- Do not have parks, sidewalks, bicycle trails, or safe and pleasant walking paths convenient to their homes or offices.

Understanding common barriers to physical activity and creating strategies to overcome them may help you make physical activity part of your daily life.

#### Creating Your Own Fitness Program

The first step to implementing a fitness program is to identify your goals. Goals should be Specific, Measurable, Attainable, Realistic and Time-bound (SMART). Progress can be difficult to track if goals are vague and open-ended, such as *"I will exercise more."* Here is an example of a SMART goal for fitness:

- Specific: *"I will walk for 30 minutes a day 3-5 days per week"*
- Measurable: *"I will improve my resting heart rate over the next month"*
- Attainable: *"I have the ability to se aside 30 minutes on 3-5 days per week to walk"*
- Realistic: *"I will increase my walking to 45 minutes per day in one month"*
- Time Bound: *"I will try this walking program for one month and then reassess my goals"*

You can also make a SMART Goal in one statement, such as *"I will walk for 30 minutes 3-5 days per week for the next month in order to improve my resting heart rate."*

#### Achieving Your Physical Activities: The Possibilities are endless

These examples show how it's possible to meet the Guidelines by doing moderate-intensity or vigorous-intensity activity or a combination of both. Physical activity at this level provides substantial health benefits.

Ways to get the equivalent of 150 minutes (2 hours and 30 minutes) of moderate-intensity aerobic physical activity a week plus muscle-strengthening activities:

- Thirty minutes of brisk walking (moderate intensity) on 5 days, exercising with resistance bands (muscle strengthening) on 2 days;
- Twenty-five minutes of running (vigorous intensity) on 3 days, lifting weights on 2 days (muscle strengthening);
- Thirty minutes of brisk walking on 2 days, 60 minutes (1 hour) of social dancing (moderate intensity) on 1 evening, 30 minutes of mowing the lawn (moderate intensity) on 1 afternoon, heavy gardening (muscle strengthening) on 2 days;
- Thirty minutes of an aerobic dance class on 1 morning (vigorous intensity), 30 minutes of running on 1 day (vigorous intensity), 30 minutes of brisk walking on 1 day (moderate intensity), calisthenics (such as sit-ups, push-ups) on 3 days (muscle strengthening);
- Thirty minutes of biking to and from work on 3 days (moderate intensity), playing softball for 60 minutes on 1 day (moderate intensity), using weight machines on 2 days (muscle-strengthening on 2 days); and
- Forty-five minutes of doubles tennis on 2 days (moderate intensity), lifting weights after work on 1 day (muscle strengthening), hiking vigorously for 30 minutes and rock climbing (muscle strengthening) on 1 day.

## Increase Physical Activity Gradually Over Time

Scientific studies indicate that the risk of injury to bones, muscles, and joints is directly related to the gap between a person's usual level of activity and a new level of activity. The size of this gap is called the amount of overload. Creating a small overload and waiting for the body to adapt and recover reduces the risk of injury. When amounts of physical activity need to be increased to meet the Guidelines or personal goals, physical activity should be increased gradually over time, no matter what the person's current

level of physical activity. The following recommendations give general guidance for inactive people and those with low levels of physical activity on how to increase physical activity:

- Start with relatively moderate-intensity aerobic activity. Avoid vigorous-intensity activity, such as shoveling snow or running until you feel comfortable at this intensity. Adults with a low level of fitness may need to start with light activity, or a mix of light- to moderate-intensity activity.
- First, increase the number of minutes per session (duration), and the number of days per week (frequency) of moderate-intensity activity. Later, if desired, increase the intensity.
- Pay attention to the relative size of the increase in physical activity each week, as this is related to injury risk. For example, a 20-minute increase each week is safer for a person who does 200 minutes a week of walking (a 10 percent increase), than for a person who does 40 minutes a week (a 50 percent increase).

Support your activity by eating whole, nutritious foods and drinking plenty of water. Healthy eating and physical activity reduces risk of disease, improves self-perception and adds to an overall sense of wellbeing. How can you add some of these behaviors into your everyday life?

## Check for Understanding

1. What are the macronutrients and what function do they serve in the body?
2. What modifications can a person make to improve the micronutrient content in their diet?
3. What is a safe caloric deficit for weight loss that still allows for adequate nutrient intake and successful weight loss?
4. What components of fitness are important to include in a fitness plan?
5. What are some simple ways a person could increase the amount of physical activity in their daily routine?

---

1.3: Nutrition and Fitness is shared under a CC BY license and was authored, remixed, and/or curated by LibreTexts.

# 1.4: Body Image and Self Care

## Chapter Objectives

- Discuss variations and modifications to female body types
- Explore how the “ideal body” changes based on societal factors
- Discuss internal and external factors that may shape body image
- Explore unhealthy mean used to achieve the “ideal” body
- Discuss ways an individual can foster the growth of health body image

## Body Image and Self Care

“Hating our bodies is something we learn, and it sure as hell is something we can unlearn.” ~Megan Jayne Crabbe

### Body Image

Have you ever listened to a little kid talk about their body? They are amazed by everything it does and would never think about listing all the things that are “wrong” with it or hate it. The human body is an wondrous machine that can do amazing things. It houses the brain, allows us to run, jump, climb, compete, explore, build or play. In addition, the female body has the unique ability to grow and nourish new life.

Yet, eighty-five percent of college females report that they believe they are either slightly or seriously overweight (when the actual number of those with higher than healthy body composition is somewhere around twenty percent . Body dissatisfaction is associated with excessive dieting, disordered eating, increased depression, and low self-esteem.

One of the greatest difficulties we have as a society is achieving and maintaining a healthy body image. Body image is how you see yourself when you look in the mirror or when you picture yourself in your mind. It encompasses:

- What you believe about your own appearance (including your memories, assumptions, and generalizations).
- How you feel about your body, including your height, shape, and weight.
- How you sense and control your body as you move. How you feel *in* your body, not just about your body.

Below are examples of negative and positive body image:

Negative Body Image

- A distorted perception of your shape–you perceive parts of your body unlike they really are.
- You are convinced that only other people are attractive and that your body size or shape is a sign of personal failure.
- You feel ashamed, self-conscious, and anxious about your body.
- You feel uncomfortable and awkward in your body.

Positive Body Image

- A clear, true perception of your shape–you see the various parts of your body as they really are.
- You celebrate and appreciate your natural body shape and you understand that a person’s physical appearance says very little about their character and value as a person.
- You feel proud and accepting of your unique body and refuse to spend an unreasonable amount of time worrying about food, weight, and calories.
- You feel comfortable and confident in your body.

Video: Body Image: Not Just About Your Body

### The “Ideal” Body

What sets the criteria for the ideal body? Femininity or masculinity? Ability to perform manual labor or likelihood of easily birthing babies? We will explore the chemistry of sexual attraction in later chapters but it is interesting to note that body ideals vary significantly depending on gender, area of the world and time in history.

Video: Women’s Ideal Body Types Throughout History

Video: Men’s Standards of Beauty Around the World

## Body Types and Variations

High body image satisfaction is strongly influenced by anthropometric measurements (1). However, not all bodies have to potential to meet measurements that society deems “ideal. Human bodies can be classified into three different body types. Endomorph, Ectomorph and Mesomorph. These three types are genetically predetermined and provide a framework for overall body size, ease of body fat storage and muscle build.

Quiz: Are you an Endomorph, Ectomorph or Mesomorph?

## Aspects of Body Image and Factors Influencing Body Image

So, if we understand that children usually have a positive body image, we need to look at what causes or influences might be at work to affect this initial positive state. Think back to your own childhood. Do you remember your parents talking about the strength and health of their own bodies, or rather the need to lose some weight and the attributes they disliked? Did you receive pressure from family members to cut your hair a certain way, dress in certain clothes, or lose a few pounds, maybe even under the guise of concern for your health/well being? Peers, parents, family and media certainly influence our view of ourselves and what we *should* be as well.

PDF: What is Body Image

Body Image, Social Media and Eating Disorders

## Body Image and Gender Dysphoria

We have examined body size, shape, body fat percentage and other physical characteristics but body image can also be heavily impacted by societal gender influences or categorization.

Dysphoria vs Dysmorphia and impacts on the LBGTQ+ community

## Eating Disorders

People with negative body image have a greater likelihood of developing an eating disorder and are more likely to suffer from feelings of depression, isolation, low self-esteem, and obsessions with weight loss.

Anorexia Nervosa

**Anorexia nervosa**, or anorexia, is a type of eating disorder that mainly affects adolescent girls and young women, but can also affect men. A person with this disease has an intense fear of gaining weight and severely limits food intake. Individual may:

- Have a low body weight
- Refuse to keep a normal body weight
- Be extremely afraid of becoming fat
- Believe they are fat even if they are very thin
- Women may miss three (menstrual) periods in a row

Anorexia affects your health because it can damage many parts of your body. A person with anorexia will have many of these signs:

- Loses a lot of weight
- Talks about weight and food all the time
- Moves food around the plate; doesn’t eat it
- Weighs food and counts calories
- Follows a strict diet
- Won’t eat in front of others
- Ignores/denies hunger
- Uses extreme measures to lose weight (self-induced vomiting, laxative abuse, diuretic abuse, diet pills, fasting, excessive exercise)
- Thinks they are fat when they are too thin
- Gets sick a lot
- Weighs self several times a day
- Feels depressed or irritable
- Doesn’t socialize

- Wears baggy clothes to hide appearance

A health care team of doctors, nutritionists, and therapists will help the patient get better. They will:

- Help bring the person back to a normal weight
- Treat any psychological issues related to anorexia
- Help the person get rid of any actions or thoughts that cause the eating disorder

Bulimia Nervosa

Bulimia nervosa, or bulimia, is a type of eating disorder. Someone with bulimia eats a lot of food in a short amount of time (bingeing) and then tries to get rid of the calories by purging. Purging might be done in these ways:

- Making oneself throw up
- Taking laxatives (pills or liquids that increase how fast food moves through your body and leads to a bowel movement)

A person with bulimia may also use these ways to prevent weight gain:

- Exercising a lot (more than normal)
- Restricting her eating or not eating at all (like going without food for a day)
- Taking diuretics (pills that make you urinate)

Bulimia is more than just a problem with food. It's a way of using food to feel in control of other feelings that may seem overwhelming. Purging and other behaviors to prevent weight gain are ways for people with bulimia to feel more in control of their lives and to ease stress and anxiety.

Unlike anorexia, when people are severely underweight, people with bulimia may be underweight, overweight, or have a normal weight. This makes it harder to know if someone has this disease. However, someone with bulimia may have these signs:

- Thinks about food a lot
- Binges (normally in secret)
- Throws up after bingeing
- Uses laxatives, diet pills, or diuretics to control weight
- Is depressed
- Is unhappy and/or thinks a lot about her body shape and weight
- Eats large amounts of food quickly
- Goes to the bathroom all the time after she eats (to throw up)
- Exercises a lot, even during bad weather, fatigue, illness, or injury
- Unusual swelling of the cheeks or jaw area
- Cuts and calluses on the back of the hands and knuckles from making herself throw up
- White enamel of teeth wears away making teeth look clear
- Doesn't see friends or participate in activities as much. Has rules about food — has "good" foods and "bad" foods

**Treatments**

Some research suggests that the use of medicines — such as antidepressants, antipsychotics, or mood stabilizers — may work for those living with anorexia or bulimia. It is thought that these medicines help the mood and anxiety symptoms that often co-exist with disordered eating. Psychotherapy, sometimes known as "talk therapy", can also help in the treatment of eating disorders. It uses different ways of communicating to change a patient's thoughts or behavior.

## Fostering Healthy Body Image

When pressure to look, act and be a certain way is all around us, and in us as well, the ability to maintain emotional and physical wellness and balance is tough. The key: Remembering that you and your body are on the same team.

### 10 Steps to Positive Body Image

We all may have our days when we feel awkward or uncomfortable in our bodies, but the key to developing positive body image is to recognize and respect our natural shape and learn to overpower negative thoughts and feelings with positive, affirming, and accepting ones. In addition, seek guidance in living with disordered eating dysphoria or dysmorphia. For more information you can visit the website for the National Eating Disorder Association. Their message is simple: **Accept yourself. Accept your body.**

## Check for Understanding

1. What factors may impact body image as we grow?
2. What does the difference between body dysmorphia and dysphoria mean to the LGBTQ+ community?
3. What are the impacts of disordered eating and how can a person seek help for living with an eating disorder?
4. What behaviors foster healthy body image?

---

1.4: Body Image and Self Care is shared under a CC BY license and was authored, remixed, and/or curated by LibreTexts.

# 1.5: Healthy Relationships and Sexuality

## Chapter Objectives

- Explore attributes of a healthy romantic and/or sexual relationship
- Discuss potentially unhealthy relationship situations
- Evaluate possible courses of action to address or leave an unhealthy relationship

*"The world is not to be divided into sheep and goats, and not all things are black nor all things white. It is a fundamental of taxonomy that nature rarely deals with discrete categories. Only the human mind invents categories and tries to force facts into separated pigeon-holes. The living world is a continuum in each and every one of its aspects. The sooner we learn this concerning human sexual behavior, the sooner we shall reach a sound understanding of the realities of sex."* ~ Alfred Kinsey

## Gender and Sexuality

Sex and gender have potentially been two of the most socially significant factors in the history of the world. Sex is one's biological classification as male or female, which is biologically determined at the moment the sperm fertilizes the egg. **Sex** can be precisely defined at the genetic level with females having two X chromosomes (XX), while males posses an XY pairing. The female's eggs contain only an X chromosome, while the male's sperm contains half X and half Y chromosomes. Therefore, the sperm that fertilizes the egg determines whether a person has XX (female) or XY (male) pairing of chromosomes. The main difference between sexes is the reproductive body parts assigned to each (including their functions and corresponding hormones).

**Gender** is culturally-based and varies in a thousand subtle ways across the many diverse cultures of the world. Gender has been shaped by social norms, politics, religion, philosophy, language, tradition and other cultural forces for many years. Gender identity is our personal internal sense of our own place on the gender continuum. Every society has a slightly different view of what it means to be of a certain gender.

### Sexual Scripts

A script is what actors read or study and what guides their behavior in a certain role. A script is a blueprint for what we "should do" in our roles. Sexual scripts are blueprints and guidelines for what we define as our role in sexual expression, sexual orientation, sexual behaviors, sexual desires, and the sexual component of our self-definition. All of us are sexual beings, yet none of us is exactly identical to another in our sexual definitions and script expectations. Having said that, keep in mind that we are not just born with sexual scripts in place; they are learned. Sexual socialization is the process by which we learn how, when, where, with whom, why, and with which motivations we are sexual beings.

We are all born with drives, which are biological needs that demand our attention and behavioral responses to them. The most powerful drives are circulation, breathing, voiding waste, eating, drinking, sleeping, and sexual involvement. Sexual drives are biological urges to participate in sexual activity and in certain sexual roles. Sexual scripts, once learned, will shape how that drive is answered. Sexuality is learned via culture and socialization. There are as many unique sexual scripts as there are people, yet some of these scripts have common themes and can be viewed as a collective pattern or trend in the larger social level.

Many of us learn our sexual scripts in a passive way. In other words, we don't learn from experience, but from a synthesis of concepts, images, ideals, and sometimes misconceptions. For example, the commonly held belief that men and women are two different creatures, perhaps even from different planets, was a very successful fad in recent years that led an entire generation to believe that men might be from "Mars" while women might be from "Venus."

Some traditional sexual scripts that have been studied include a number of problematic assumptions. Some of these assumptions include but are not limited to: the man must be in charge, the woman must not enjoy (or let on that she enjoys) the sexual experience, the man is a performer whose skills are proven effective upon arrival of his partner's orgasm, and men are sexual while women are not. Numerous studies have shown that most of these traditional scripts are not realistic, healthy, conducive to open communication, nor negotiation of sexual needs and desires for couples. In sum, rather, these traditional notions can be an undermining influence in a couple's intimacy. Scripts that are more contemporary include these simple ideas:

1) A person needs to ownership of their own sexual experiences.

2) Both partners need to learn to communicate openly and honestly about their feelings.

3) Both partners need to learn to meet one another's desires, needs, and wishes while making sure that their own needs are being met.

## Sex and Gender

When filling out official documents, you are often asked to provide your name, birth date, and sex or gender. But have you ever been asked to provide your sex *and* your gender? Sociologists and most other social scientists view sex and gender as conceptually distinct. *Sex* denotes biological characteristics and exists along a spectrum from male to female. *Gender*, on the other hand, denotes social and cultural characteristics that are assigned to different sexes. Sex and gender are not always synchronous, meaning they do not always line up in an easy-to-categorize way.

"Sex" refers to physiological differences found among male, female, and various intersex bodies. Sex includes both *primary sex characteristics* (those related to the reproductive system) and *secondary sex characteristics* (those that are not directly related to the reproductive system, such as breasts and facial hair). In humans, the biological sex of a child is determined at birth based on several factors, including chromosomes, gonads, hormones, internal reproductive anatomy, and genitalia. Biological sex has traditionally been conceptualized as a binary in Western medicine, typically divided into male and female. However, anywhere from 1.0 to 1.7% of children are born intersex, having a variation in sex characteristics (including chromosomes, gonads, or genitals) that do not allow them to be distinctly identified as male or female. Due to the existence of multiple forms of intersex conditions (which are more prevalent than researchers once thought), many view sex as existing along a spectrum, rather than simply two mutually exclusive categories.

Figure 3. Female and Male Sex Symbols

## Gender

A person's sex, as determined by his or her biology, does not always correspond with their gender; therefore, the terms "sex" and "gender" are not interchangeable. "Gender" is a term that refers to social or cultural distinctions associated with being male, female, or intersex. Typically, babies born with male sex characteristics (*sex)* are assigned as boys (*gender);* babies born with female sex characteristics (*sex)* are assigned as girls (*gender).* Because our society operates in a binary system when it comes to gender (in other words, seeing gender as only having two options), many children who are born intersex are forcibly assigned as either a boy or a girl and even surgically "corrected" to fit a particular gender.

Gender identity is a person's sense of self as a member of a particular gender. Individuals who identify with a role that corresponds to the sex assigned to them at birth (for example, they were born with male sex characteristics, were assigned as a boy, and identify today as a boy or man) are **cisgender**. Those who identify with a role that is *different* from their biological sex (for example, they were born with male sex characteristics, were assigned as a boy, but identify today as a girl, woman, or some other gender altogether) are often referred to as **transgender**. The term "transgender" encompasses a wide range of possible identities, including agender, genderfluid, genderqueer, two-spirit, androgynous, and many others.

Figure 4. The Transgender Sex Symbol

## Cultural Variations of Gender

Since the term "sex" refers to biological or physical distinctions, characteristics of sex will not vary significantly between different human societies. For example, persons of the female sex, in general, regardless of culture, will eventually menstruate and develop breasts that can lactate. Characteristics of gender, on the other hand, may vary greatly between different societies. For example, in American culture, it is considered feminine (or a trait of the female gender) to wear a dress or skirt. However, in many Middle

Eastern, Asian, and African cultures, dresses or skirts (often referred to as sarongs, robes, or gowns) can be considered masculine. Similarly, the kilt worn by a Scottish male does not make him appear feminine in his culture.

### Sexual Identity and Orientation

Human beings are socialized into their adult roles and learn their sexual identities along with their gender roles, work roles, and family roles. Sexual orientation is the sexual preference one has for their partner: male, female, both, or neither. There are a few common sexual orientations that can be seen at the societal and personal level. **Heterosexuality** is the sexual attraction between a male and a female. **Homosexuality** is a sexual attraction between a male to another male or a female to another female. **Bisexuality** is a sexual attraction to both male and female sexual partners. **Pansexuality** is sexual, romantic, or emotional attraction towards people regardless of their sex or gender identity.

Sexual desire is the attractions we have for sexual partners and experience that exist independent of our behaviors. Sexual behaviors are our actual sexual actions and interactions. It is important to note that orientations, desires, and behaviors are not always the same thing. They do overlap at times. For example, a heterosexual male may have had a homosexual experience in the past, or not. He may at times desire males and females regardless of his actual sexual activities. A lesbian female may have had a short-term heterosexual relationship, yet define herself as a lesbian.

The Janus Report reported their findings on sexual behaviors and sexual orientation. Their sample reported 22% of men and 17% of women said yes to the question, “Have you had a homosexual experience?” Janus also reported that 91% of men and 95% of women claimed to be heterosexual; four percent of men and two percent of women claimed to be homosexual; and five percent of men and three percent of women claimed to be bisexual. Generally speaking Janus and Laumann found that the U.S. is a very sexual nation. They reported that very few men and women reported never having had vaginal sexual intercourse (less than five percent). They reported that men typically have sex sooner than women and that most had sex by age 20. Janus specifically reported that only nine percent of men and 17% of women had NO sexual experience before marriage.

## Relationships and Communication

Attachments are crucial to human existence and are essentially the emotional context of those relationships we form in life. As an infant you learned to trust those who cared for you; you learned that they returned once they were out of view and were dependable. Eventually, as your cognitive development matures, your brain allows you to love the person you are attached to and to care for them—whether or not they are caring for you. You learn then that your attachments begin to facilitate your needs and wants being met. How you attached as an infant and young child shape (at least in theory) how you will likely attach as an adult. For example, if you had strong attachments in childhood, then forming adult relationships should be easier for you; if you had weak or interrupted attachments in childhood, then forming adult relationships would be more difficult.

Abraham Maslow, addressed love in terms of how our needs are met by the other person. His basic premise is that we pair-off with those whose love styles fill an unmet childhood need. In other words, Maslow said that if our childhood needs were not met in the basics of survival, safety, food, shelter, love, belonging, and even self-esteem, then we look for an adult companion that can fill those needs for us. It’s like an empty cup from our childhood that our adult partner fills for us. Maslow also said that when all those basic needs are met in childhood, we are attracted to an adult partner who compliments our full development into our psychological potential.

### Sternberg’s Triangular Theory of Love

Robert Sternberg was the “Geometry of Love” psychologist who triangulated love using intimacy, passion, and commitment by measuring the intensity of each and how intense the triangulation was for the couple. To Sternberg it was important to consider how each partner’s triangle matched the other partner’s. He said that a couple with all three types of love balanced, and in sufficient magnitude, would have a rare yet rewarding type of love that encompassed much of what couples seek in a loving relationship.3 Sternberg’s consummate love is a love type that had equal measures of passion, intimacy, and commitment that is satisfactory to both lovers.

In modern day applications of love, various components have been found as the ingredients of love: commitment, passion, friendship, trust, loyalty, affections, intimacy, acceptance, caring, concern, care, selflessness, infatuation, and romance. There is a love type identified that many people are aware of called unconditional love. Unconditional love is the sincere love that does not vary regardless of the actions of the person who is loved.

## Theories of Mate Selection

The Social Exchange Theory and its rational choice formula clarify the selection process even further. We strive to maximize rewards and minimize costs in our choices of a mate.

Rewards – Costs = Choice

When we interact with potential dates and mates, we run a mental balance sheet in our heads. She might think, “He’s tall, confident, funny, and friends with my friends.” As she talks a bit more she might say, “But, he chews tobacco, only wants to party, and just flirted with another woman while we were talking.” The entire time we interact with potential dates and mates we evaluate them on their appearance, disposition, goals and aspirations, and other traits. This while simultaneously remembering how we rate and evaluate ourselves. Rarely do we seek out the best looking person at the party unless we define ourselves as an even match for him or her. More often we rank and rate ourselves compared to others and as we size up and evaluate potentials we define the overall exchange rationally or in an economic context where we try to maximize our rewards while minimizing our losses.

The overall evaluation of the deal also depends to a great extent on how well we feel matched on racial and ethnic traits, religious background, social economic class, and age similarities. The complexity of the date and mate selection process includes many obvious and some more subtle processes.

How do strangers transition from not even knowing one another to eventually cohabiting or marrying? From the very first encounter, two strangers begin a process that either excludes one another as potential dates or mates or includes them and begins the process of establishing intimacy. Intimacy is the mutual feeling of acceptance, trust, and connection to another person, even with the understanding of personal faults of the individual. In other words, intimacy is the ability to become close to one another, to accept one another as is, and eventually to feel accepted by the other. Intimacy is not sexual intercourse, although sexual intercourse may be one of many expressions of intimacy. When two strangers meet they have a stimulus that alerts one or both to take notice of the other.

### Effective Communication

Effective communication is critical to successful relationships. Researchers and therapists have found at least nine skills that can help couples learn to talk effectively about important issues (Gottman 1994; Markman, Stanley, and Blumberg 2010; Schramm and Harris 2011). How we interact about issues such as time spent together/apart, money, health, gender differences, children, family, friends, commitment, trust, and intimacy affects our ability to develop and maintain lasting friendships. If learned well, these nine skills can help put our relationships on a positive trajectory for success.

#### What Do Couples Talk About?

- Time Together/Apart. Both the quantity and quality of time spent together influence the wellbeing of relationships. Spending time apart participating in other activities also influences the well-being of a relationships.
- Money. Thoughts and talk about money, spending habits, and ability to budget, invest, and plan for the future impact couple financial management processes and practices.
- Health. Couples must talk about many health-related issues, including nutrition, exercise, illness, disease, accidents, health care, mortality, and death.
- Personality. Because some individuals tend to be more task-oriented in their communication styles and others tend to be more process-oriented, task-oriented people tend to want to solve issues immediately, while process-oriented people tend to want to talk about them more and come to a consensus about what should be done.
- Children. How children develop physically, socially, emotionally, intellectually, and spiritually are often topics of discussion. Focusing on the best ways to consistently meet children’s needs is considered being child-centered.
- Family/In-Laws/Friends. Couples often talk about situations and circumstances surrounding the interactions they have with their closest relationships.

#### What do couples argue about?

Because the items listed above are some of the major topics couples talk about, it follows that they are also the same topics that can spur disagreements. For instance, it is a familiar joke that people can have difficulties in their relationships with in-laws. Take for example, “What is the difference between in-laws and outlaws? Answer: One is ‘Wanted!’” Sayings such as these underscore the importance of knowing how your relationships with others can affect your marriage and could potentially become the topic of a marital conflict.

#### Learning and Practicing New Habits

Effective communication isn't easy. Teaching and learning new communication skills take patience as well as practice. Taking the time to talk is important. Your relationship provides a safe place to share feelings, thoughts, fears, dreams, and hopes. Make a special effort to find time to talk to your partner more frequently. In tough times, people feel overwhelmed with worries and responsibilities. Time together as a couple is often the last thing on our minds as we deal with the hassles of daily life. Although you may be busy, stressed, and worried, take the time to focus on your partners' needs and spend quality time together without interruption. Even a few minutes a day talking about what has occurred can be a relief from stress. Be thoughtful by considering whether those difficult or problem-solving discussions could be reserved for other times when you and your partner are not tired or distracted.

### Finding Time to Talk

- Spend time talking with limited interruptions.
- Make a date to talk to your partner.
- Plan at least one routine family time each week.
- Talk instead of watching TV.
- Talk when you take a walk together.
- Talk while you work together on household chores.
- Talk in the car while traveling to activities.

### Negative Patterns of Interaction

In good times and bad, couples need each other. Good communication does not mean your partner will always like what you have to say. However, chances of solving problems are much higher if you and your partner can express yourselves openly and freely with each other.

For couples today, there is an abundance of information on how to sustain healthy, happy relationships. Most information available to couples falls short on giving examples of "what not to do" in a relationship. Communication is the key, but it is difficult to apply effective strategies to harmful interactions.

Four negative patterns of interaction have been demonstrated as major destroyers of relationships:

- Criticism
- Contempt
- Defensiveness
- Stonewalling

## Criticism

Criticism is using hurtful or judgmental comments aimed at your partner's character or personality. With criticism, the blame is placed on the person and not the problematic behavior. Criticism tends to be a repetitive cycle—a single critical moment can end up in a continued exchange. Most critical statements can be recognized by the phrases, "you always" or "you never." The following are some examples of criticism:

- You never finish any project that you start. You're so lazy.
- When we go out to eat, you always embarrass me with your table manners.

## Contempt

Contempt is a more complex negative interaction. It is an effort to psychologically abuse your partner through disrespectful statements and actions. Contempt has both verbal and non-verbal deliveries. Verbal examples of contempt include sarcasm, hostile humor, and mockery. For example, nonverbal displays of contempt include rolling of the eyes and sucking of the teeth during conflict. Contempt sends your partner a message of scorn—that they are inferior and worthless.

## Defensiveness

Defensiveness is often a natural response to receiving criticism and contempt. When faced with criticism and contempt, most people find a need to defend themselves. However, couples can be defensive even when criticism is constructive. Defensiveness

may be a response to previous, current, and/or future attacks. If one or both persons are acting defensively, it is most likely the case they are not listening. Defensiveness may take many forms including:

- Making excuses for behavior
- Repeating a statement for effect
- Denying responsibility for actions
- Answering a complaint with another complaint

## Stonewalling

The final negative pattern of interaction is stonewalling. As the name implies, this occurs when partners "put a wall" around themselves, either physically or psychologically. Stonewalling is often used to decrease conflict, and when delivered in moderation, can be healthy. On the other hand, continual failure to respond and/or engage in conversation escalates rather than reduces conflict. Examples of stonewalling include:

- Leaving the room
- Putting a physical barrier between you and your partner (newspaper, book, child)
- Focusing intently on something other than your partner during a discussion
- Failure to actively listen
- Responding with a blank stare

## What can be done?

All of the above can become patterns of interaction within a relationship. One negative interaction leads to another, often in a repetitive cycle. The following suggestions can be used to break the cycle and promote a healthy relationship:

1. Eliminate criticism. Discussing your feelings about the behavior is okay as long as there are no personal attacks. Use the word I instead of you and describe how the behavior makes you feel. Talk about the behavior and not the person.

- Example: "When we go out to eat, you always embarrass me," becomes "I feel hurt and ashamed when you make fun of me in public.

2. Build on your friendship base. Validate your partner and his/her feelings, thoughts, needs, and desires, etc.

- Example: "I recognize that you need to talk more about our relationship. What is on your mind?"

3. Take accountability and responsibility for your own actions. Do not make excuses. Apologize and correct the behavior (if possible).

- Example: "I'm sorry that I yelled at you earlier. I've been under a lot of pressure at work, but it is unfair to take it out on you."

4. Use reflective listening. Repeat what your partner has stated and then respond. Show them that you are listening and hearing them.

- Example: Partner 1: I would appreciate it if you would talk to me before you discipline the kids. That way we can be a united front."
- Partner 2: What I'm hearing is that you would like for us to talk about disciplining the kids before I make any decisions. I think that is a good idea.

5. Continue dating. Make a point to rekindle the dating aspect of your relationship.

- Example: Go for walks, hold hands, act silly, etc. Find ways to show appreciation to your partner throughout the day (i.e., e-mails, notes, phone calls, etc.)

6. Seek help if needed. If you can identify these negative interactions in your relationship or you think you may need help, see a licensed marriage and family therapist or other professional. Do not try and fix everything on your own.

- Example: Talk to a trusted family member, friend, or your local extension agent in order to find resources in your area.

Before a couple can learn and/or practice new routines in their relationship, they must rid themselves of the old ways that aren't working. It is important to first identify negative patterns and destructive behaviors and target them for change. At that point, the

couple can begin rebuilding their relationship.

## Violence in Relationships

Violence is a serious public health problem in the United States. From infants to the elderly, it affects people in all stages of life. In the United States, violence accounts for approximately 51,000 deaths annually. In 2007, more than 18,000 people were victims of homicide and more than 34,000 took their own life.
The number of violent deaths tells only part of the story. Many more survive violence and are left with permanent physical and emotional scars. Violence also erodes communities by reducing productivity, decreasing property values, and disrupting social services.

### Understanding Violence

Interpersonal violence is defined as the actual or threatened intentional use of force—physical, sexual, or emotional—against another person, group, or community. It may result in physical injury, psychological harm, or even death. Violence also includes suicide and nonfatal acts of self-harm.

Unfortunately, violence is a part of our daily life. It exists in all corners of our nation. It affects us all regardless of our age, gender, race, ethnicity, or socio-economic status.
Violence also erodes the fabric of our communities. It can threaten productivity in the workplace, decrease the value of our homes and businesses, and disrupt essential public and social services. The economic cost of violence is staggering. In 2000, the medical costs and productivity losses associated with nonfatal violence-related injuries and deaths were estimated at more than $70 billion each year. The total burden to society is far greater.

The good news is that violence is a problem with a solution. It can be prevented by using a thoughtful and systematic approach. While the field of violence prevention is still developing, our knowledge of “what works” increases every day.

### Types of Violence

- Child Maltreatment (e.g., child abuse and neglect)
- Intimate Partner Violence (e.g., violence by a current or former spouse, boy/girlfriend)
- Sexual Violence (e.g., rape, sexual assault, sexual harassment)
- Suicide (e.g., fatal and nonfatal suicide behavior)
- Youth Violence (e.g., bullying, gang violence, peer violence)

### Intimate Partner Violence

Figure 1. Couple

Intimate partner violence (IPV) is a serious, preventable public health problem that affects millions of Americans. The term “intimate partner violence” describes physical, sexual, or psychological harm by a current or former partner or spouse. This type of violence can occur among heterosexual or same-sex couples and does not require sexual intimacy.

There are four main types of IPV:

**Physical violence** is the intentional use of physical force with the potential for causing death, disability, injury, or harm. Physical violence includes, but is not limited to, scratching; pushing; shoving; throwing; grabbing; biting; choking; shaking; aggressive hair pulling; slapping; punching; hitting; burning; use of a weapon; and use of restraints or one’s body, size, or strength against another person. Physical violence also includes coercing other people to commit any of the above acts.

- **Sexual violence** is divided into five categories. Any of these acts constitute sexual violence, whether attempted or completed. Additionally all of these acts occur without the victim’s freely given consent, including cases in which the victim is unable to consent due to being too intoxicated or otherwise unable to consent.

- **Rape or penetration of victim –** This includes completed or attempted, forced unwanted vaginal, oral, or anal insertion. Forced penetration occurs through the perpetrator's use of physical force against the victim or threats to physically harm the victim. (This includes incidents in which the victim was pressured verbally or through intimidation or misuse of authority to consent or acquiesce to being penetrated.)
- **Victim was made to penetrate someone else –** This includes completed or attempted, forced incidents when the victim was made to sexually penetrate a perpetrator or someone else without the victim's consent.
- **Unwanted sexual contact –** This includes intentional touching of the victim or making the victim touch the perpetrator, either directly or through the clothing, on the genitalia, anus, groin, breast, inner thigh, or buttocks without the victim's consent
- **Non-contact unwanted sexual experiences –** This includes unwanted sexual events that are not of a physical nature that occur without the victim's consent. Examples include unwanted exposure to sexual situations (e.g., pornography); verbal or behavioral sexual harassment; and /or unwanted filming, taking or disseminating photographs of a sexual nature of another person.

- **Stalking** is a pattern of repeated, unwanted, attention and contact that causes fear or concern for one's own safety or the safety of someone else (e.g., family member or friend). Some examples include repeated, unwanted phone calls, emails, or texts; leaving cards, letters, flowers, or other items when the victim does not want them; watching or following from a distance; spying; approaching or showing up in places when the victim does not want to see them.

**Psychological Aggression** is the use of verbal and non-verbal communication with the intent to harm another person mentally or emotionally, and/or to exert control over another person. Psychological aggression can include expressive aggression (e.g., name-calling, humiliating); coercive control (e.g., limiting access to transportation, money, friends, and family; excessive monitoring of whereabouts); threats of physical or sexual violence; control of reproductive or sexual health (e.g., refusal to use birth control; coerced pregnancy termination); exploitation of victim's vulnerability (e.g., immigration status, disability); exploitation of perpetrator's vulnerability; and presenting false information to the victim with the intent of making them doubt their own memory or perception (e.g., mind games).

Risk Factors for Intimate Partner Violence

Persons with certain risk factors are more likely to become perpetrators or victims of intimate partner violence (IPV). Those risk factors contribute to IPV but might not be direct causes. Not everyone who is identified as "at risk" becomes involved in violence.

A combination of individual, relational, community, and societal factors contribute to the risk of becoming an IPV perpetrator or victim. Understanding these multilevel factors can help identify various opportunities for prevention.

## Individual Risk Factors

- Low self-esteem
- Low income
- Low academic achievement
- Young age
- Aggressive or delinquent behavior as a youth
- Heavy alcohol and drug use
- Depression
- Anger and hostility
- Antisocial personality traits
- Borderline personality traits
- Prior history of being physically abusive
- Having few friends and being isolated from other people
- Unemployment
- Emotional dependence and insecurity
- Belief in strict gender roles (e.g., male dominance and aggression in relationships)
- Desire for power and control in relationships
- Perpetrating psychological aggression
- Seeing or being a victim of physical or psychological abuse (consistently one of the strongest predictors of perpetration)
- History of experiencing poor parenting as a child

- History of experiencing physical discipline as a child

## Relationship Factors

- Relationship conflict-fights, tension, and other struggles
- Relationship instability-divorces or separations
- Dominance and control of the relationship by one partner over the other
- Economic stress
- Unhealthy family relationships and interactions

## Community Factors

- Poverty and associated factors (e.g., overcrowding)
- Low social capital-lack of institutions, relationships, and norms that shape a community's social interactions
- Weak community sanctions against IPV (e.g., unwillingness of neighbors to intervene in situations where they witness violence)

## Societal Factors

- Traditional gender norms (e.g., women should stay at home, not enter workforce, and be submissive; men support the family and make the decisions)

### Protecting Yourself from Relationship Violence

It can be hard to know if your relationship is headed down the wrong path. While it's not always possible to prevent relationship violence, there are steps you can take to protect yourself.

If you think your partner might be controlling or abusive, it's important to:

- Trust your feelings. If something doesn't seem right, take it seriously.
- Learn the warning signs of someone who might become controlling or violent.
- Get help. Talk to experts in relationship violence.

If your partner is controlling or abusive, it's better to get help now than to wait. Controlling or violent relationships usually get worse over time.

Remember: if your partner hurts you, it's not your fault.

### How Do I Know if My Relationship Might Become Violent?

Relationship violence can start slowly and be hard to recognize at first. For example, when people first start dating, it's common to want to spend a lot of time together. But spending less time with other people can also be a sign that your partner is trying to control your time.

Try asking yourself these questions:

- Does my partner respect me?
- Does my partner blame me for everything that goes wrong?
- Does my partner make most of the decisions in our relationship?
- Am I ever afraid to tell my partner something?
- Do I ever feel forced to do things that I don't want to do?
- Have I ever done anything sexual with my partner when I didn't want to?
- Does my partner promise to change and then keep doing the same things?

It's okay if you aren't sure – you can still get help. Domestic violence agencies have counselors who are experts at helping people with questions about their relationships. You don't even have to give your name.

- **Take Action!** If you think your partner is controlling or abusive, take steps to protect yourself.
- **Trust your instincts.** You are the expert on your life and relationships. If you think your relationship is unhealthy or you are worried about your safety, trust your gut.

- **Plan for your safety.** If you are in a relationship with someone who is violent or might become violent, make a plan to keep yourself safe. This is important whether you are planning to leave your partner or not.
- **Start with a phone call.** If you need help or have questions about your relationship, call the National Domestic Violence Hotline at 1-800-799-SAFE (1-800-799-7233). You'll be able to find a domestic violence agency near you or talk to a counselor over the phone. Services are free. **If you are in danger right now, call 911.**

#### Healthy vs. Unhealthy Relationships

Sometimes a relationship might not be abusive, but it might have some serious problems that make it unhealthy. If you think you might be in an unhealthy relationship, you should be able to talk to your partner about your concerns. If you feel like you can't talk to your partner, try talking to a trusted friend, family member, or counselor. Consider calling a confidential hotline to get the support you need and to explore next steps. If you're afraid to end the relationship, call a hotline for help (1-800-799-SAFE).

Signs of an unhealthy relationship include:

- Focusing all your energy on your partner
- Dropping friends and family or activities you enjoy
- Feeling pressured or controlled a lot
- Having more bad times in the relationship than good
- Feeling sad or scared when with your partner

Signs of a healthy relationship include:

- Having more good times in the relationship than bad
- Having a life outside the relationship, with your own friends and activities
- Making decisions together, with each partner compromising at times
- Dealing with conflicts by talking honestly
- Feeling comfortable and able to be yourself
- Feeling able to take care of yourself
- Feeling like your partner supports you

If you feel confused about your relationship, a mental health professional can help. Remember, you deserve to be treated with respect.

## Sexual Health

Sexuality is a major part of being human. Love, affection and sexual intimacy all play a role in healthy relationships. They also contribute to a sense of well-being. A number of disorders can affect the ability to have or enjoy sex. Concerns about infertility or fear of unplanned pregnancy can also come into play. In addition, a number of diseases and disorders affect sexual health. These include sexually transmitted diseases and cancer. In men, treatment of prostate cancer can cause erectile dysfunction. In women, cervical, uterine, vaginal, vulvar or ovarian cancer may have sexual effects.

### Sexual Dysfunction

Sexual dysfunction can pose public health problems, as it is related to public health issues and affects people's happiness and general well-being.

According to the National Health and Social Life Survey,

- The prevalence of sexual dysfunction was found to be higher among women than men.
- Lack of sexual desire is the most common problem among women
- For men, the most common sexual problem is premature ejaculation, not erectile dysfunction.
- Sexual problems increase with age, but sex-related personal distress decreases.

### Reproductive Health

Both the male and female reproductive systems play a role in pregnancy. Problems with these systems can affect fertility and the ability to have children. There are many such problems in men and women. Reproductive health problems can also be harmful to overall health and impair a person's ability to enjoy a sexual relationship.

Your reproductive health is influenced by many factors. These include your age, lifestyle, habits, genetics, use of medicines and exposure to chemicals in the environment. Many problems of the reproductive system can be corrected.

Reproductive health includes a variety of topics, such as:

- Menstruation and menopause
- Pregnancy and preconception care
- Fertility/Infertility
- Contraception

## Contraception

An unintended pregnancy is a pregnancy that is either mistimed or unwanted at the time of conception. It is a core concept in understanding the fertility of populations and the unmet need for contraception. Unintended pregnancy is associated with an increased risk of morbidity for women, and with health behaviors during pregnancy that are associated with adverse effects. For example, women with an unintended pregnancy may delay prenatal care, which may affect the health of the infant. Women of all ages may have unintended pregnancies, but some groups, such as teens, are at a higher risk.

Efforts to decrease unintended pregnancy include finding better forms of contraception, and increasing contraceptive use and adherence.

Contraception, (also known as “birth control”, is designed to prevent pregnancy. Some types of birth control include (but are not limited to):

- **Barrier methods**, such as condoms, the diaphragm, and the cervical cap, are designed to prevent the sperm from reaching the egg for fertilization. Intrauterine device, or IUD, is a small device that is inserted into the uterus by a health care provider. The IUD prevents a fertilized egg from implanting in the uterus. An IUD can stay in the uterus for up to 10 years until a health care provider removes it.
- **Hormonal birth control**, such as birth control pills, injections, skin patches, and vaginal rings, release hormones into a woman’s body that interfere with fertility by preventing ovulation, fertilization, or implantation.
- **Sterilization** is a method that permanently prevents a woman from getting pregnant or a man from being able to get a woman pregnant. Sterilization involves surgical procedures that must be done by a health care provider and usually cannot be reversed.

The choice of birth control depends on factors such as a person’s overall health, age, frequency of sexual activity, number of sexual partners, desire to have children in the future, and family history of certain diseases. A woman should talk to her health care provider about her choice of birth control method.

It is important to remember that even though birth control methods can prevent pregnancy, they do not all protect against sexually transmitted diseases or HIV.

### Barrier Methods

Barrier method contraception work by placing a block or barrier to prevent sperm from reaching the egg.

#### Contraceptive Sponge

Before having sex, wet the sponge and place it, loop side down, inside the vagina to cover the cervix. The sponge is effective for more than one act of intercourse for up to 24 hours. It needs to be left in for at least 6 hours after having sex to prevent pregnancy. It must then be taken out within 30 hours after it is inserted.

Women who are sensitive to the spermicide nonoxynol-9 should not use the sponge. The sponge does not protect against sexually transmitted infections (STIs)

#### Diaphragm, cervical cap, and cervical shield

These barrier methods block the sperm from entering the cervix and reaching the egg.

- The diaphragm is a shallow latex cup.
- The cervical cap is a thimble-shaped latex cup. It often is called by its brand name, FemCap.
- The cervical shield is a silicone cup that has a one-way valve that creates suction and helps it fit against the cervix. It often is called by its brand name, Lea’s Shield.

The diaphragm and cervical cap come in different sizes, and you need a doctor to “fit” you for one. The cervical shield comes in one size, and you will not need a fitting. Before having sex, add spermicide (to block or kill sperm) to the devices. Then place them inside your vagina to cover your cervix. You can buy spermicide gel or foam at a drug store.

All three of these barrier methods must be left in place for 6 to 8 hours after having sex to prevent pregnancy. The diaphragm should be taken out within 24 hours. The cap and shield should be taken out within 48 hours.

### Female condom

This condom is worn by the woman inside the vagina as a barrier to sperm. It is made of thin, flexible, rubber and is packaged with a lubricant. It can be inserted up to 8 hours before having sex. A new condom should be used each time and should not be used at the same time as a male condom.

### Male condom

Male condoms are a thin sheath placed over an erect penis to contain sperm. Condoms can be made of latex, polyurethane, or "natural/lambskin". Natural condoms do not protect against STIs. A new condom needs to be used with each sex act.

Condoms are either:

- Lubricated, which can make sexual intercourse more comfortable
- Non-lubricated, which can also be used for oral sex. It is best to add lubrication to nonlubricated condoms if you use them for vaginal or anal sex. Use of a water-based lubricant, such as K-Y jelly is recommended. (Oil-based lubricants like massage oils, baby oil, lotions, or petroleum jelly will weaken the condom, causing it to tear or break.)

Keep condoms in a cool, dry place. Condoms kept in a warm place (like a wallet or glove compartment) may break down increasing risk of condom failure.

## Hormonal methods

Hormonal methods prevent pregnancy by interfering with ovulation, fertilization and/or implantation.

### Oral contraceptives – ("The pill")

The pill contains the hormones estrogen and progestin. It is taken daily to keep the ovaries from releasing an egg. The pill also causes changes in the lining of the uterus and the cervical mucus to keep the sperm from joining the egg.

Some women prefer the "extended cycle" pills. These have 12 weeks of pills that contain hormones (active) and 1 week of pills that don't contain hormones (inactive). While taking extended cycle pills, women only have their period three to four times a year.

Your doctor may advise a person against taking the pill if:

- Older than 35 and smoke
- Have a history of blood clots
- Have a history of breast, liver, or endometrial cancer

### The patch

Also called by its brand name, Ortho Evra, this skin patch is worn on the lower abdomen, buttocks, outer arm, or upper body. It releases the hormones progestin and estrogen into the bloodstream to stop the ovaries from releasing eggs. It also thickens the cervical mucus, which keeps the sperm from joining with the egg. A new patch is applied once a week for 3 weeks. You don't use a patch the fourth week in order to have a period.

### Shot/injection

The birth control shot is often called by its brand name Depo-Provera. With this method you get injections, or shots, of the hormone progestin in the buttocks or arm every 3 months. A new version of the shot can now be injected under the skin as well. The birth control shot stops the ovaries from releasing an egg in most women. It also causes changes in the cervix that keep the sperm from joining with the egg.

### Vaginal ring

This is a thin, flexible ring that releases the hormones progestin and estrogen. It works by stopping the ovaries from releasing eggs. It also thickens the cervical mucus, which keeps the sperm from joining the egg. It is commonly called *NuvaRing*, its brand name. You squeeze the ring between your thumb and index finger and insert it into your vagina. You wear the ring for 3 weeks, take it out for the week that you have your period, and then put in a new ring.

## Implantable devices

Implantable devices provide a slow release of hormones that impact ovulation or implantation.

### Implantable rod

This is a matchstick-size, flexible rod that is put under the skin of the upper arm. It is often called by its brand name, Implanon. The rod releases a progestin, which causes changes in the lining of the uterus and the cervical mucus to keep the sperm from joining an egg. Less often, it stops the ovaries from releasing eggs. It is effective for up to 3 years.

### Intrauterine devices or IUDs

An IUD is a small device shaped like a "T" that goes in the uterus. There are two types:

- Copper IUD – The copper IUD goes by the brand name ParaGard. It releases a small amount of copper into the uterus, which prevents the sperm from reaching and fertilizing the egg. If fertilization does occur, the IUD keeps the fertilized egg from implanting in the lining of the uterus. A doctor needs to insert the copper IUD and can stay in your uterus for 5 to 10 years.
- Hormonal IUD – The hormonal IUD goes by the brand name Mirena. It is sometimes called an intrauterine system, or IUS. It releases progestin into the uterus, which keeps the ovaries from releasing an egg and causes the cervical mucus to thicken so sperm can't reach the egg. It also affects the ability of a fertilized egg to successfully implant in the uterus. A doctor needs to insert the hormonal IUD and it can stay in your uterus for up to 5 years.

### Sterilization implant

Essure is the first non-surgical method of sterilizing women. A thin tube is used to thread a tiny spring-like device through the vagina and uterus into each fallopian tube. The device works by causing scar tissue to form around the coil. This blocks the fallopian tubes and stops the egg and sperm from joining.

It can take about 3 months for the scar tissue to grow, so it's important to use another form of birth control during this time. Then you will have to return to your doctor for a test to see if scar tissue has fully blocked your tubes.

### Surgical sterilization

For women, surgical sterilization closes the fallopian tubes by cutting and tying this pathway. This stops the eggs from going down to the uterus where they can be fertilized. The surgery can be done a number of ways. Sometimes, a woman having cesarean birth has the procedure done at the same time, so as to avoid having additional surgery later.

For men, having a vasectomy keeps sperm from leaving the penis (ejaculate lacks sperm). Sperm stays in the system after surgery for about 3 months. During that time, use a backup form of birth control to prevent pregnancy. A simple test (called semen analysis) can be done to check if all the sperm is absent from ejaculate.

### Emergency contraception

Emergency contraception may go by the names Plan B, One-Step or Next Step. It is also called the "morning after pill." Emergency contraception prevents pregnancy after unprotected sex or after contraceptive failure (such as a condom breaking).

### Abortion

Abortion is the ending of pregnancy by removing a fetus or embryo before it can survive outside the uterus. An abortion that occurs spontaneously is also known as a miscarriage. The word ***abortion*** is often used to mean only induced abortions though can include removal of fetal tissue that is no longer living if the woman's body does not expel naturally.

When allowed by law, abortion in the developed world is one of the safest procedures in medicine. Modern methods use medication or surgery for abortions. The drug mifepristone in combination with prostaglandin appears to be as safe and effective as surgery during the first and second trimester of pregnancy. Birth control, such as the pill or intrauterine devices, can be used immediately following abortion. When performed legally and safely, induced abortions do not increase the risk of long-term mental or physical problems. In contrast, unsafe abortions (those performed by unskilled individuals, with hazardous equipment, or in unsanitary facilities) cause 47,000 deaths and 5 million hospital admissions each year. The World Health Organization recommends safe and legal abortions be available to all women.

Around 56 million abortions are performed each year in the world, with about 45% done unsafely. Abortion rates have shown steady decrease as access to family planning and birth control increases. As of 2008, 40% of the world's women had access to legal abortions without limits as to reason.

Historically, abortions have been attempted using herbal medicines, sharp tools, with force, or through other traditional methods. Abortion laws and cultural or religious views of abortions are different around the world. In some areas abortion is legal only in specific cases such as rape, problems with the fetus, poverty, risk to a woman's health, or incest. In many places there is much debate over the moral, ethical, and legal issues of abortion. Those who oppose abortion often maintain that an embryo or fetus is a human with a right to life and may compare abortion to murder. Those who favor the legality of abortion often hold that a woman has a right to make decisions about her own body.

### Contraception Use

All birth control methods work the best if used correctly and every time there is sexual contact. The misuse of contraceptives is known as human error and is the main reason why effectiveness is determined by typical use and perfect use. Common errors with condom use include putting it on “inside-out” or not leaving enough room at the tip for ejaculate.

## Infectious Diseases and Sexually Transmitted Infections (STI's)

STDs are a substantial health challenge facing the United States. CDC estimates that nearly 20 million new sexually transmitted infections occur every year in this country, half among young people aged 15–24, and account for almost $16 billion in health care costs. Each of these infections is a potential threat to an individual’s immediate and long-term health and well-being. In addition to increasing a person’s risk for acquiring and transmitting HIV infection, STDs can lead to chronic pain and severe reproductive health complications, such as infertility and ectopic pregnancy. Approximately 20 different infections are known to be transmitted through sexual contact. Here are descriptions of some of the most common and well known:

- Chlamydia
- Gonorrhea
- Genital Herpes
- HIV/AIDS
- Human Papillomavirus (HPV)
- Syphilis
- Bacterial Vaginosis
- Trichomoniasis
- Viral Hepatitis

### Bacterial STIs

Bacterial STIs are caused by transmission of bacteria and usually affect one are of the body (but can be spread to others). Bacterial infections can be treated with antibiotics.

#### Chlamydia

Chlamydia is a common STD/STI caused by the bacterium *Chlamydia trachomatis*. Chlamydia can be transmitted during vaginal, oral, or anal sexual contact with an infected partner. While many individuals will not experience symptoms, chlamydia can cause fever, abdominal pain, and unusual discharge of the penis or vagina.

In women, whether or not they are having symptoms and know about their infection, chlamydia can cause pelvic inflammatory disease (PID). PID can lead to permanent damage to the woman’s reproductive organs resulting ectopic pregnancy (in which the fetus develops in abnormal places outside of the womb, a condition that can be life-threatening) and infertility.

Additionally, if the woman is pregnant, she can pass chlamydia can be passed to her fetus during pregnancy and delivery. If chlamydia is detected early, it can be treated easily with an oral antibiotic.

#### Gonorrhea

Gonorrhea is caused by the bacterium Neisseria gonorrhoeae, which can grow rapidly and multiply easily in the warm, moist areas of the reproductive tract. The most common symptoms of gonorrheal infection are a discharge from the vagina or penis and painful or difficult urination.

As with chlamydial infection, the most common and serious complications of gonorrhea occur in women and include pelvic inflammatory disease (PID), ectopic pregnancy, infertility, and the potential spread to the developing fetus if acquired during pregnancy. Gonorrhea can also infect the mouth, throat, eyes, rectum and can spread to the blood, where it can become a life-threatening illness.

In addition, people with gonorrhea can more easily contract HIV, the virus that causes AIDS. People infected with HIV and gonorrhea are also more likely to transmit the HIV virus to someone else.

Gonorrhea is a bacterial STIs that can be treated with antibiotics given either orally or by injection. Current sexual partners should be treated at the same time.

### Syphilis

Syphilis infections, caused by the bacterium Treponema pallidum, are passed from person to person during vaginal, anal, or oral sex through direct contact with sores, called chancres. The first sign of syphilis is a chancre, a painless genital sore that most often appears on the penis or in and around the vagina. Beyond being the first sign of a syphilis infection, chancres make a person two to five times more likely to contract an HIV infection. If the person is already infected with HIV, chancres also increase the likelihood that the virus will be passed on to a sexual partner. These sores typically resolve on their own, even without treatment. However, the body does not clear the infection on its own, and, over time, syphilis may involve other organs, including the skin, heart, blood vessels, liver, bones, and joints in secondary syphilis. If the illness is still not treated, tertiary syphilis can develop over a period of years and involve the nerves, eyes, and brain and can potentially cause death.

Expectant mothers harboring the bacterium are at an increased risk of miscarriage and stillbirth, and they can pass the infection on to their fetuses during pregnancy and delivery. Infants that acquire congenital syphilis during pregnancy may suffer from skeletal deformity, difficulty with speech and motor development, seizure, anemia, liver disease, and neurologic problems.

If recognized during the early stages, usually within the first year of infection, syphilis can be treated with a single intramuscular injection of antibiotic. A person being treated for syphilis must avoid sexual contact until the chancre sores caused by the bacteria are completely healed to avoid infecting other people.

If a person does not recognize the infection early, or does not seek treatment immediately, longer treatment with antibiotics may be required. If left untreated, the infection can progress even further and potentially cause death. Although antibiotics can prevent the infection from getting worse, they cannot reverse damage that has already occurred.

### Bacterial Vaginosis

Bacterial vaginosis is a common, possibly sexually transmitted, vaginal infection in women of reproductive age. While it is healthy and normal for a vagina to have bacteria, just like the skin, mouth, or gastrointestinal (GI) tract, sometimes changes in the balance of different types of bacteria can cause problems.

Bacterial vaginosis occurs when problematic bacteria that are normally present only in small amounts increase in number, replace normal vaginal lactobacilli bacteria, and upset the usual balance. This situation becomes more likely if a woman douches frequently or has new or multiple sexual partners. The most common sign of a bacterial vaginosis infection is a thin, milky discharge that is often described as having a “fishy” odor. However, some women will have no symptoms at all.

Regardless of symptoms, having bacterial vaginosis increases the risk of getting other STDs/STIs and is also associated with pelvic inflammatory disease (PID), an infection of the female reproductive organs, including the uterus and the fallopian tubes (which carry eggs to the uterus), and postoperative infections. Preterm labor and birth are also possibly more common in women with bacterial vaginosis.

Bacterial vaginosis can be treated with antibiotics, typically metronidazole or clindamycin. Generally, male sexual partners of women with bacterial vaginosis do not need to be treated because treatment of partners has not been shown to reduce the risk of recurrence. Treatment during pregnancy is recommended primarily for women at risk for preterm labor or having a low birthweight infant.

## Viral STIs

Viral STIs are cause by transmission of a virus. Viruses infect cells throughout the body and cannot be treated or “cured” with antibiotics. Vaccines have been developed to prevent transmission of some viruses.

### Genital Herpes

Genital herpes is a contagious infection caused by the herpes simplex virus (HSV). There are two different strains, or types, of HSV: herpes simplex virus type 1 (HSV-1) and type 2 (HSV-2). Both can cause genital herpes, although most cases of genital herpes are caused by HSV-2. When symptomatic, HSV-1 usually appears as fever blisters or cold sores on the lips, but it can also infect the genital region through oral-genital or genital-genital contact. Symptomatic HSV-2 typically causes painful, watery skin blisters on or around the genitals or anus. However, substantial numbers of people who carry these viruses have no or only minimal signs or symptoms.

Neither HSV-1 nor HSV-2 can be cured, and even during times when an infected person has no symptoms, the virus can be found in the body’s nerve cells. Periodically, (usually in response to stress) a person will experience outbreaks in which new blisters form on the skin in the genital area; at those times, the virus is more likely to be passed on to other people.

Pregnant women, especially those who acquire genital herpes for the first time during pregnancy, may pass the infection to their newborns, causing life-threatening neonatal HSV, an infection affecting the infant's skin, brain, and other organs.

Genital herpes outbreaks can be treated with antiviral drugs. Although this medication can limit the length and severity of outbreaks, it does not cure the infection. In addition, daily suppressive therapy (daily use of antiviral medication) for herpes can reduce the likelihood of transmission to partners. A pregnant woman known to have the infection must take additional care because she can pass the infection to her infant during delivery. Women who first acquire genital HSV during pregnancy are at highest risk of transmission to their infants. If a pregnant woman has an outbreak when she goes into labor, she may need to have a cesarean section (C-section) to prevent the infant from getting the virus during birth.

### HIV/AIDS

HIV, or the human immunodeficiency virus, is the virus that causes AIDS (acquired immunodeficiency syndrome). HIV destroys the body's immune system by killing the blood cells that fight infection. Once HIV destroys a substantial proportion of these cells (CD4 cells), the body's ability to fight off and recover from infections is compromised. This advanced stage of HIV infection is known as AIDS.

The CD4 count is like a snapshot of how well your immune system is functioning. CD4 cells (also known as CD4+ T cells) are white blood cells that fight infection. The more you have, the better. These are the cells that the HIV virus kills. As HIV infection progresses, the number of these cells declines. When the CD4 count drops below 200 due to advanced HIV disease, a person is diagnosed with AIDS. A normal range for CD4 cells is about 500-1,500. Usually, when a person with low CD4 cells starts HIV medicines, the CD4 cell count increases as the HIV virus is controlled. Most, but not all, people will experience an increase in CD4 cells with effective HIV treatment.

People whose HIV has progressed to AIDS are very susceptible to opportunistic infections and certain forms of cancer.

AIDS can be prevented by early initiation of antiretroviral therapy in those with HIV infection. Transmission of the virus primarily occurs during unprotected sexual activity and by sharing needles used to inject intravenous drugs, although the virus also can spread from mother to infant during pregnancy, delivery, and breastfeeding.

In 2013, NIH-supported researchers reported that a 2-year-old child who was born with HIV and was treated starting in the first few days of life has had her HIV infection go into remission. This appears to be the first case of functional cure of HIV.

There is no cure for HIV/AIDS. However, research into new treatments has improved outcomes for people living with the disease. A combination of antiretroviral drugs can be given in highly active antiretroviral therapy to control the virus, promote a healthy immune system, help people with the virus live longer lives, and reduce the risk of transmission.

### Human Papillomavirus (HPV)

HPV is the most common STD/STI. More than 40 HPV types strains, and all of them can infect both men and women. The types of HPVs vary in their ability to cause genital warts; infect other regions of the body, including the mouth and throat; and cause cancers of the cervix, vulva, penis, and mouth.

Although no cure exists for HPV infection once it occurs, regular screening with a Pap smear test can detect at an early stage most cases cervical cancer that may have been caused by HPV. (A Pap smear test involves a health care provider taking samples of cells from the cervix during a standard gynecologic exam; these cells are examined under a microscope for signs of developing cancer).

A person who has an HPV infection cannot be cured. However, a health care provider can treat genital warts caused by the virus as well as monitor and control a woman's risk of cervical cancer through frequent screening with Pap smear tests.

An available vaccine protects against most (but not all) HPV types that cause cervical cancer. The American Academy of Pediatrics recommends this vaccine for school-aged boys and girls.

### Viral Hepatitis

Viral hepatitis is a serious liver disease that can be caused by several different viruses, which can be transmitted through sexual contact.

- Hepatitis A virus (HAV) causes a short-term or self-limited liver infection that can be quite serious, although it does not result in chronic infection. While there are other ways the virus can be transmitted, HAV can be spread from person to person during sexual activity through oral-rectal contact. Vaccination can prevent HAV infection.

- Usually the infection gets better on its own without requiring treatment. In some cases, however, individuals may have lasting damage to their livers or may have such severe nausea and vomiting that they must be admitted to the hospital.

- Hepatitis B virus (HBV) causes a serious liver disease that can result in both immediate illness and lifelong infection leading to permanent liver scarring (cirrhosis), cancer, liver failure, and death. HBV spreads through both heterosexual and homosexual contact as well as through contact with other bodily fluids, such as blood, through shared contaminated needles used for injecting intravenous (IV) drugs, tattooing, and piercing. Pregnant women with HBV can transmit the virus to their infants during delivery. HBV infection is preventable through vaccination.
  - People with HBV infection will need to see a liver specialist with experience treating individuals with chronic liver disease. These individuals need to take special care not to pass on the virus to their sexual partners, and sexual partners should receive hepatitis B vaccine if not already immune.
- Hepatitis C virus (HCV) can cause an immediate illness affecting the liver, but it more commonly becomes a silent, chronic infection that leads to liver scarring (cirrhosis), cancer, liver failure, and death. HCV is most commonly transmitted through sharing needles or exposure to infected blood. However, it can spread through sexual contact or from mother to fetus during pregnancy and delivery. There is no vaccine for HCV, and treatments are not always effective.
  - As with hepatitis B, individuals with HCV may have a lifelong infection and will always be at risk of passing the virus on to their sexual partners. New treatments are available that can clear the infection in some individuals.

## Parasitic STIs

Parasitic infestation result from parasitic transfer from one body to another, and the parasite using the body as a host. Parasitic infestations are treatable but some types require cleaning/sterilization of clothing, bedding and other linens to prevent reinfestation.

### Trichomoniasis

Trichomoniasis infection is caused by the single-celled protozoan parasite Trichomonas vaginalis and is common in young, sexually active women. The parasite also infects men, though less frequently. The parasite can be transmitted between men and women as well as between women whenever physical contact occurs between the genital areas. Although *Trichomonas* infections do not always cause symptoms, they can cause frequent, painful, or burning urination in men and women as well as vaginal discharge, genital soreness, redness, or itching in women. Because the infection can occur without symptoms, a person may be unaware that he or she is infected and continue to re-infect a sexual partner who is having recurrent signs of infection. As with bacterial STDs/STIs, all sexual partners should be treated at the same time to avoid re-infection.

Trichomoniasis can be treated with a single dose of an antibiotic, usually either metronidazole or tinidazole, taken by mouth.

### Pubic Lice (“crabs”)

Pubic lice — also known as crabs — are small parasites that live on the skin and coarse hairs that are around genitals, and they feed blood. (Pubic lice are different than head lice and infest different areas of the body.)

Pubic lice are spread through personal contact. Sexual intercourse is not necessary for the transmission of pubic lice because lice stay outside the body and infest areas with course hair such as eyelashes, eyebrows, chest hair, armpits, beards, and mustaches. Sometimes pubic lice are spread by using an infected person’s clothes, towels, or bed.

You can treat pubic lice with topical lice treatments.

### STD/STI Prevention:

Every year, there are an estimated 20 million new sexually transmitted infections in the United States. Anyone who is sexually active can get an STI.

The Good News: STI’s ARE preventable. Steps can be taken to keep yourself and your partner(s) healthy. Here’s How You Can Avoid (or reduce the risk of) giving or getting an STI:

### Practice Abstinence

The surest way to avoid STI’s is to not have sex. This means not having vaginal, oral, or anal sex as well as other activities that involve close personal contact or coming in contact with another person’s body fluids.

### Use Condoms

Using a condom correctly every time a person participates is sexual activity can reduce risk of STI transmission. Certain STI’s, like herpes or HPV, can still be transmitted by contact with a partner’s skin (even when using a condom).

### Have Fewer Partners

Agree to only have sex with one person who agrees to only have sex with you. Make sure you both get tested to know for sure that neither of you has an STI. This is one of the most reliable ways to avoid STI's.

### Get Vaccinated

Some common STI can be prevented by a vaccine. The HPV vaccine is safe, effective, and can help you avoid HPV-related health problems like genital warts and some cancers.

### Talk With Your Partner

Talk with your sex partner(s) about STI's and staying safe before having sex. It might be uncomfortable to **start the conversation**, but protecting your health is your responsibility.

### Get Tested

Many STI's don't have symptoms, but they can still cause health problems.

3. **Talk with your health care provider**
4. **Search for CDC recommended tests**
5. **Find a location to get tested for STDs**

The only way to know for sure if you have an STI is to get tested.

## Check for Understanding

1. What is the difference between sex and gender? How are these influence by social constructs?
2. What factors are important for forming healthy relationships? What are some signs of an unhealthy relationship?
3. What methods of contraception can be use to reduce risk of unwanted pregnancy?
4. What methods of protection can be use to reduce risk of STI transmission?
5. What are the three main categories of STIs and how do these differ in transmission and treatment?

---

1.5: Healthy Relationships and Sexuality is shared under a CC BY license and was authored, remixed, and/or curated by LibreTexts.

# 1.6: Pregnancy and Fetal Development

## Chapter Objectives

- Identify maternal and fetal changes that occur during each prenatal trimester
- Discuss possible dysfunction or complications that can occur during each trimester of pregnancy
- Describe a typical birth process along with at least four variations that could occur
- Describe the pros and cons associated with homebirth and hospital birth
- Discuss possible causes and symptoms of miscarriage and stillbirth

## Pregnancy and Birthing Options

*"Making the decision to have a baby (or adopt a child) is momentous. It is to decide forever to have your heart go walking around outside your body." ~ Elizabeth Stone*

*"That she bear children is not a woman's significance. But that she bear herself, that is her supreme and risky fate." ~ D.H. Lawrence*

### To Have or Not to Have Children

One of the bigger choices we make as humans is the choice to have and raise children or to not have children. Sometimes it is not a choice at all but the result of circumstances given to us. Why might a person choose to have kids and what would the arguments be for choosing to remain childless? What circumstances might cause someone who so badly wants a child to be without? How might someone deal with an unexpected pregnancy when having a child was not part of the plan?

Video: I Don't Want to Have Children, Stop Telling Me I Will Change My Mind.

Video: The Case for Having Kids.

### Pregnancy

A missed period is often the first clue that a woman might be pregnant though she might suspect pregnancy even sooner. Symptoms such as headache, fatigue, and breast tenderness, can occur even before a missed period. The wait to know can be emotional. These days, many women first use home pregnancy tests (HPT) to learn they are pregnant.

All pregnancy tests work by detecting Human Chorionic Gonadotropic (hCG) in the urine or blood only present a woman is pregnant. hCG is made when a fertilized egg implants in the uterus and rapidly builds up in your body during early pregnancy.

#### Unplanned Pregnancy

In the event of an unplanned pregnancy many thoughts may come to mind. Will your partner welcome the news? Can you afford to care for the baby? Will choices such as past drug use addiction affect the health of the unborn baby? Will having a baby keep me from finishing school or pursuing a career?

First steps to take when a person fins out they are pregnant:

- Start taking care of yourself right away. Take 400 to 800 micrograms (400 to 800 mcg or 0.4 to 0.8 mg) folic acid every. Stop alcohol, tobacco, and drug use.
- Make a doctor's visit to confirm your pregnancy. Discuss your health and issues that could affect your pregnancy. Ask for help quitting smoking. Find out what you can do to take care of yourself and your unborn baby.
- Ask your doctor to recommend a counselor who you can talk to about your situation.
- Seek support in someone you trust and respect.

#### Trying to Get Pregnant

Some women want children but either cannot conceive or miscarry multiple times. Many couples face **infertility** when trying to start or grow a family. About one-third of the time, it is a female problem. In another one-third of cases, it is the man with the fertility problem. For the remaining one-third, both partners have fertility challenges or no cause is found.

##### Causes of infertility

**Age** – Women generally have some decrease in fertility starting in their early 30s. As a woman ages, normal changes that occur in her ovaries and eggs make it harder to become pregnant. Even though menstrual cycles continue to be regular in a woman's 30s

and 40s, the eggs that ovulate each month are of poorer quality than those from her 20s. As a woman nears menopause, the ovaries may not release an egg each month, which also can make it harder to get pregnant.

**Health problems** – Some women have diseases or conditions that affect their hormone levels, which can cause infertility. Women with polycystic ovary syndrome (PCOS) rarely or never ovulate. Failure to ovulate is the most common cause of infertility in women.

Common problems with a woman's reproductive organs, like uterine fibroids, endometriosis, and pelvic inflammatory disease can worsen with age and also affect fertility. These conditions might cause a blockage in the fallopian tubes to be blocked preventing the egg from getting to the uterus.

**Lifestyle factors** – Certain lifestyle factors also can have a negative effect on a woman's fertility. Examples include smoking, alcohol use, weighing much more or much less than an ideal body weight, a lot of strenuous exercise, and having an eating disorder. Stress also can affect fertility.

### When to see your doctor

You should talk to your doctor about your fertility if:

* You are younger than 35 and have not been able to conceive after one year of frequent sex without birth control.

- You are age 35 or older and have not been able to conceive after six months of frequent sex without birth control.
- You believe you or your partner might have fertility problems in the future (even before you begin trying to get pregnant).
- You or your partner has a problem with sexual function or libido.

If you are having fertility issues, your doctor can refer you to a fertility specialist. About 9 in 10 cases of infertility are treated with drugs or surgery. Don't delay seeing your doctor as age also affects the success rates of these treatments. For some couples, adoption or foster care offers a way to share their love with a child and build a family.

### Increasing Likelihood of Pregnancy

Being aware of the menstrual cycle and the changes in the body that happen during mensuration can help a woman know when she is likely to get pregnant.

There are ways you can keep track of your fertile times in the menstrual cycle. They are:

- **Basal body temperature method** – Basal body temperature is your temperature at rest as soon as you awake in the morning. A woman's basal body temperature rises slightly with ovulation. So by recording this temperature daily for several months, a woman will be able to predict the most fertile days.
- **Calendar method** – This involves recording your menstrual cycle on a calendar for eight to 12 months. The first day of a period is Day 1. Circle Day 1 on the calendar and record down the total number of days a cycle it lasts each time. Days 12-14 of the cycle will be a woman's most fertile days.
- **Cervical mucus method** (also known as the ovulation method) – This involves being aware of the changes in your cervical mucus throughout the month. The hormones that control the menstrual cycle also change the kind and amount of mucus before and during ovulation. The greatest amount of mucus appears just before ovulation.

## Preconception Care: Why Preconception Health Matters

Preconception health is a woman's health before she becomes pregnant. It means knowing how health conditions and risk factors could affect a woman or her unborn baby if she becomes pregnant. For example, some foods, habits, and medicines can harm a baby — even before conception. Some health problems, such as diabetes, also can affect pregnancy.

It is important for any person thinking about their health, but with half of all pregnancies unplanned it is especially important to consider behaviors that may affect the health of a baby. Unplanned pregnancies are at greater risk of preterm birth and low birth weight babies. Despite important advances in medicine and prenatal care, about 1 in 8 babies is born too early. Researchers are trying to find out why and how to prevent preterm birth. But experts agree that women need to be healthy before becoming pregnant. By taking action on health issues and risks before pregnancy, a person can prevent problems that might affect mom or baby later.

### Improving Preconception Health

Ideally, couple should prepare for pregnancy at least three months before getting pregnant. Some actions, such as quitting smoking, reaching a healthy weight, or adjusting medicines may need to start even earlier.

The five most important things a woman can do for preconception health are:

- Take 400 to 800 micrograms (400 to 800 mcg or 0.4 to 0.8 mg) of folic acid every day if you are planning or capable of pregnancy to lower your risk of some birth defects of the brain and spine, including spina bifida.
- Stop smoking and drinking alcohol.
- If you have a medical condition, be sure it is under control. Some conditions that can affect pregnancy or be affected by it include asthma,diabetes, oral health, obesity, or
- Talk to your doctor about any over-the-counter and prescription medicines you are using. These include dietary or herbal supplements. Be sure your vaccinations are up to date.
- Avoid contact with toxic substances or materials that could cause infection at work and at home. Stay away from chemicals and cat or rodent feces.

### Anatomical and Physiological Changes that Occur During Pregnancy

A full-term pregnancy lasts approximately 270 days (approximately 38.5 weeks) from conception to birth. Because it is easier to remember the first day of the last menstrual period (LMP) than to estimate the date of conception, obstetricians set the due date as 284 days (approximately 40.5 weeks) from the LMP. This assumes that conception occurred on day 14 of the woman's cycle, which is usually a good approximation. The 40 weeks of an average pregnancy are usually discussed in terms of three **trimesters**, each approximately 13 weeks. We will express embryonic and fetal ages in terms of weeks from conception. The period of time required for full development of a fetus in utero is referred to as **gestation** (gestare = "to carry" or "to bear").

A developing human is referred to as a **zygote** for the first 2 weeks after conception, an **embryo** during weeks 3–8, and a **fetus** from the ninth week of gestation until birth.

## Implantation

Following fertilization, the zygote and its associated membranes, continue their travel through the fallopian tube toward the uterus. During its journey to the uterus, the zygote undergoes five or six rapid mitotic cell divisions. At the end of the first week, the blastocyst comes in contact with the uterine wall and adheres to it, embedding itself in the uterine lining (referred to as **implantation).** (Figure 2). Implantation can be accompanied by minor bleeding. The zygote typically implants in the fundus of the uterus or on the posterior wall. However, if the endometrium is not fully developed and ready to receive the zygote, the zygote and associated cells will detach and find a better spot. A significant percentage (50–75 percent) of zygotes fail to implant; when this occurs, the cell bundle is shed with the endometrium during menses. The high rate of implantation failure is one reason why successful pregnancy typically requires several ovulation cycles.

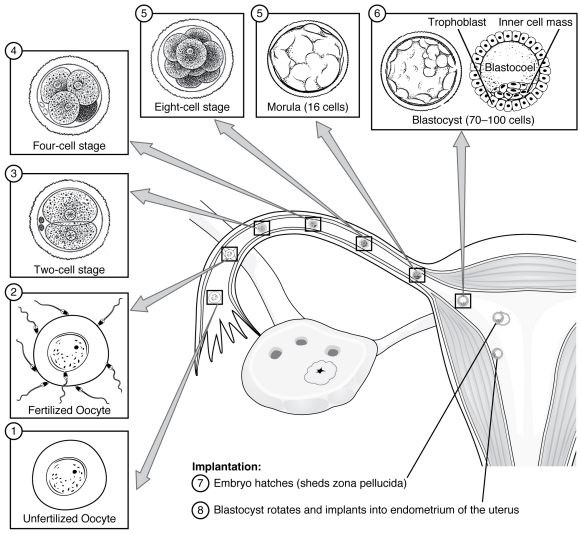



Figure 2. Pre-Embryonic Development. Ovulation, fertilization, pre-embryonic development, and implantation occur at specific locations within the female reproductive system in a time span of approximately 1 week.

Just a few days after implantation, the mass of cells has secreted enough hCG (human growth hormone) for an at-home urine pregnancy test to give a positive result. However, in one to two percent of cases, the embryo implants either outside the uterus or in a region of uterus that can create complications for the pregnancy.

***DysfunctionDuring Implantation***

*In the vast majority of **ectopic pregnancies**, the embryo does not complete its journey to the uterus and implants in the uterine tube, referred to as*

*a tubal pregnancy. However, there are also ovarian ectopic pregnancies (in which the egg never left the ovary) and abdominal ectopic pregnancies (in which an egg was "lost" to the abdominal cavity during the transfer from ovary to uterine tube, or in which an embryo from a tubal pregnancy re-implanted in the abdomen).*

*Tubal pregnancies can be caused by scar tissue within the tube following a sexually transmitted bacterial infection. The scar tissue impedes the progress of the embryo into the uterus—in some cases "snagging" the embryo and, in other cases, blocking the tube completely. Approximately one half of tubal pregnancies resolve spontaneously. Implantation in a uterine tube causes bleeding, which appears to stimulate smooth muscle contractions and expulsion of the embryo. In the remaining cases, medical or surgical intervention is necessary.*

*Even if the embryo has successfully found its way to the uterus, it does not always implant in an optimal location (the fundus or the posterior wall of the uterus). Placenta previa can result if an embryo implants close to the internal opening of the cervix. As the fetus grows, the placenta can partially or completely cover the opening of the cervix (Figure 4). Although it occurs in only 0.5 percent of pregnancies,* ***placenta previa*** *is the leading cause of antepartum hemorrhage (profuse vaginal bleeding after week 24 of pregnancy but prior to childbirth).*

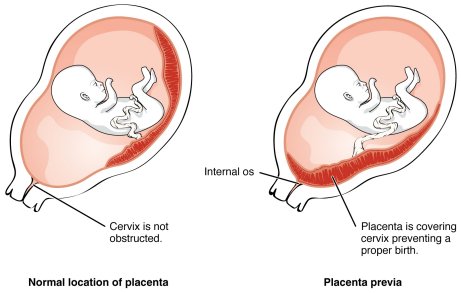



*Figure 4. Placenta Previa. An embryo that implants too close to the opening of the cervix can lead to placenta previa, a condition in which the placenta partially or completely covers the cervix.*

## Development of the Placenta

During the first several weeks of development, the cells of the endometrium (uterus) nourish the embryo. During prenatal weeks 4–12, the developing placenta gradually takes over the role of feeding the embryo, and the endometrial cells are no longer needed. The mature placenta is composed of tissues derived from the embryo, as well as maternal tissues of the endometrium. The placenta connects to the embryo via the **umbilical cord**, which carries deoxygenated blood and wastes from the fetus through two umbilical arteries; nutrients and oxygen are carried from the mother to the fetus through the single umbilical vein.

## Embryotic Development

Within the first 8 weeks of gestation, a developing embryo establishes the rudimentary structures of all of its organs and tissues. The heart begins its development in the embryo as a tube-like structure, connected via capillaries. Cells of the primitive tube-shaped heart are capable of electrical conduction and contraction. The heart begins beating in the beginning of the fourth week, although it does not actually pump embryonic blood until a week later, when the oversized liver has begun producing red blood cells. (This is a temporary responsibility of the embryonic liver that the bone marrow will assume during fetal development.) During weeks 4–5, the eye pits form, limb buds become apparent, and the rudiments of the pulmonary system are formed.

During the sixth week, uncontrolled fetal limb movements begin to occur. The gastrointestinal system develops too rapidly for the embryonic abdomen to accommodate it, and the intestines temporarily loop into the umbilical cord. Paddle-shaped hands and feet develop fingers and toes. By week 7, the facial structure is more complex and includes nostrils, outer ears, and lenses (Figure 12). By the eighth week, the head is nearly as large as the rest of the embryo's body, and all major brain structures are in place. The external genitalia are apparent, but at this point, male and female embryos are indistinguishable. Bone begins to replace cartilage in the embryonic skeleton through the process of ossification. By the end of the embryonic period, the embryo is approximately 3 cm (1.2 in) from crown to rump and weighs approximately 8 g (0.25 oz).

Figure 12. Embryo at 7 Weeks. An embryo at the end of 7 weeks of development is only 10 mm in length, but its developing eyes, limb buds, and tail are already visible. (This embryo was derived from an ectopic pregnancy.) (credit: Ed Uthman)

### Sexual Differentiation

*Sexual differentiation does not begin until the fetal period, during weeks 9–12. Embryonic males and females, though genetically distinguishable, are morphologically identical. Gonads that can develop into male or female sexual organs, are connected to a central cavity called the cloaca via Müllerian ducts (female)and Wolffian ducts (male).*

*During male fetal development, the gonads become the testes and associated epididymis. The Müllerian ducts degenerate. The Wolffian ducts become the vas deferens.*

*During female fetal development, the gonads develop into ovaries. The Wolffian ducts degenerate. The Müllerian ducts become the uterine tubes and uterus.*

## *Fetal Development*

*During weeks 9–12 of fetal development, the brain continues to expand, the body elongates, and ossification of bones continues. Fetal movements are frequent during this period, but are jerky and not well-controlled. The bone marrow begins to take over the process of red blood cell production. The eyes are well-developed by this stage, but the eyelids are fused shut. The fingers and toes begin to develop nails. By the end of week 12, the fetus measures approximately 9 cm (3.5 in) from crown to rump.*

*Weeks 13–16 are marked by sensory organ development. The eyes move closer together; blinking motions begin, although the eyes remain sealed shut. The lips exhibit sucking motions. The scalp begins to grow hair.*

*During approximately weeks 16–20, as the fetus grows and limb movements become more powerful, the mother may begin to feel **quickening**, or fetal movements. However, space restrictions limit these movements and typically force the growing fetus into the "fetal position," with the arms crossed and the legs bent at the knees. Oil glands coat the skin with a waxy, protective substance called **vernix** that protects and moisturizes the skin and may provide lubrication during childbirth. A silky hair called **lanugo** also covers the skin during weeks 17–20, but it is shed as the fetus continues to grow. Extremely premature infants sometimes exhibit residual lanugo.*

*Developmental weeks 21–30 are characterized by rapid weight gain, which is important for maintaining a stable body temperature after birth. During this period, the fetus grows eyelashes. The eyelids are no longer fused and can be opened and closed. The lungs begin producing surfactant, a substance that reduces surface tension in the lungs and assists proper lung expansion after birth. In male fetuses, the testes descend into the scrotum near the end of this period. The fetus at 30 weeks measures 28 cm (11 in) from crown to rump and exhibits the approximate body proportions of a full-term newborn, but still is much leaner.*

*The fetus continues to lay down fat under the skin from week 31 until birth which causes and the skin transitions from red and wrinkled to soft and pink. Lanugo is shed, and the nails grow to the tips of the fingers and toes. Immediately before birth, the average crown-to-rump length is 35.5–40.5 cm (14–16 in), and the fetus weighs approximately 2.5–4 kg (5.5–8.8 lbs). Once born, the newborn is no longer confined to the fetal position, so subsequent measurements are made from head-to-toe instead of from crown-to-rump. At birth, the average length is approximately 51 cm (20 in).*

### Maternal Changes

The 40 weeks of an average pregnancy are usually discussed in terms of three trimesters, each approximately 13 weeks. During the second and third trimesters, the pre-pregnancy uterus—about the size of a fist—grows dramatically to contain the fetus, causing a number of anatomical changes in the mother.

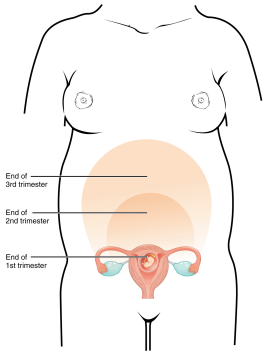



Figure 1. Size of Uterus throughout Pregnancy. The uterus grows throughout pregnancy to accommodate the fetus.

## Effects of Hormones

Virtually all of the effects of pregnancy can be attributed in some way to the influence of hormones—particularly estrogens, progesterone, and hCG. Relaxin, another hormone secreted by the placenta, helps prepare the mother's body for childbirth. It increases the elasticity of the pubic joint and pelvic ligaments, making room for the growing fetus and allowing expansion of the pelvic outlet for childbirth. Relaxin also helps dilate the cervix during labor.

## Weight Gain

The second and third trimesters of pregnancy are associated with dramatic changes in maternal anatomy and physiology. The most obvious anatomical sign of pregnancy is the dramatic enlargement of the abdominal region, coupled with maternal weight gain. This weight results from the growing fetus as well as the enlarged uterus, amniotic fluid, and placenta. Additional breast tissue and dramatically increased blood volume also contribute to weight gain (Table 2). Surprisingly, fat storage accounts for only approximately 2.3 kg (5 lbs) in a normal pregnancy and serves as a reserve for the increased metabolic demand of breastfeeding.

During the first trimester, the mother does not need to consume additional calories to maintain a healthy pregnancy. However, a weight gain of approximately 0.45 kg (1 lb) per month is common. During the second and third trimesters, the mother's appetite increases, but it is only necessary for her to consume an additional 300 calories per day to support the growing fetus. Most women gain approximately 0.45 kg (1 lb) per week.

Contributors to Weight Gain During Pregnancy (Table 2)

| Component | Weight (kg) | Weight (lb) |
|---|---|---|
| Fetus | 3.2–3.6 | 7–8 |
| Placenta and fetal membranes | 0.9–1.8 | 2–4 |
| Amniotic fluid | 0.9–1.4 | 2–3 |
| Breast tissue | 0.9–1.4 | 2–3 |
| Blood | 1.4 | 4 |
| Fat | 0.9–4.1 | 3–9 |
| Uterus | 0.9–2.3 | 2–5 |
| Total | 10–16.3 | 22–36 |

## Changes in Organ Systems During Pregnancy

As the woman's body adapts to pregnancy, characteristic physiologic changes occur. These changes can sometimes prompt symptoms often referred to collectively as the common discomforts of pregnancy.

### Digestive and Urinary System Changes

Nausea and vomiting, sometimes triggered by an increased sensitivity to odors, are common during the first few weeks to months of pregnancy. This phenomenon is often referred to as "**morning sickness**," although the nausea may persist all day. The source of

pregnancy nausea is thought to be the increased circulation of pregnancy-related hormones. By about week 12 of pregnancy, nausea typically subsides.

A common gastrointestinal complaint during the later stages of pregnancy is gastric reflux, or heartburn, which results from the upward, constrictive pressure of the growing uterus on the stomach.

The downward pressure of the uterus also compresses the urinary bladder, leading to frequent urination. In addition, the maternal urinary system processes both maternal and fetal wastes, further increasing the total volume of urine.

### Circulatory System Changes

Blood volume increases substantially during pregnancy, so that by childbirth, it exceeds its preconception volume by 30 percent, or approximately 1–2 liters. The greater blood volume helps to manage the demands of fetal nourishment and fetal waste removal. In conjunction with increased blood volume, the pulse and blood pressure also rise moderately during pregnancy. As the fetus grows, the uterus compresses underlying pelvic blood vessels, hampering venous return from the legs and pelvic region. As a result, many pregnant women develop varicose veins or hemorrhoids.

### Respiratory System Changes

During the second half of pregnancy, the volume of gas inhaled or exhaled by the lungs per minute increases by 50 percent to compensate for the oxygen demands of the fetus and the increased maternal metabolic rate. The growing uterus exerts upward pressure on the diaphragm, decreasing the volume of each inspiration and potentially causing shortness of breath. During the last several weeks of pregnancy, the pelvis becomes more elastic, and the fetus descends lower in a process called lightening. This typically alleviates shortness of breath.

### Skin Changes

The skin stretches extensively to accommodate the growing uterus, breast tissue, and fat deposits on the thighs and hips. Torn connective tissue cause stretch marks on the abdomen, which appear as red or purple marks during pregnancy that fade to a silvery white color in the months after childbirth.

An increase in melanin-stimulating hormone, in conjunction with estrogens, darkens the areolae and creates a line of pigment from the umbilicus to the pubis called the linea nigra (Figure 2). Melanin production during pregnancy may also darken or discolor skin on the face to create a chloasma, or “mask of pregnancy.”

Figure 2. Linea Nigra. The linea nigra, a dark medial line running from the umbilicus to the pubis, forms during pregnancy and persists for a few weeks following childbirth. The linea nigra shown here corresponds to a pregnancy that is 22 weeks along.

## Check for Understanding

1. *What are some reasons a person may decide to have or not have children?*
2. *How can a person increase the likelihood of becoming pregnant or contributing to a pregnancy?*
3. *What are some common causes of infertility?*
4. *What are some important factors to consider in preconception health?*
5. *What are the various stages of development by trimester for embryo/fetus?*
6. *What are some maternal changes during pregnancy?*

1.6: Pregnancy and Fetal Development is shared under a CC BY license and was authored, remixed, and/or curated by LibreTexts.

# 1.7: Labor and Childbirth

## Chapter Objectives

- identify various stages of labor
- describe components of APGAR score and use in newborn evaluation
- describe various options available in maternal and infant care during and after delivery
- discuss pros and cons of home birth
- discuss pros and cons of hospital birth
- identify

### Physiology of Labor

Childbirth typically occurs within a week of a woman's due date, unless the woman is pregnant with more than one fetus, which usually causes her to go into labor early. As a pregnancy progresses into its final weeks, several physiological changes occur in response to hormones that trigger labor.

Progesterone inhibits uterine contractions throughout the first several months of pregnancy. As the pregnancy enters its seventh month, progesterone levels plateau and then drop. Estrogen levels, however, continue to rise (Figure 3). The increasing ratio of estrogen to progesterone makes the the uterine muscle (myometrium) more sensitive to stimuli that promote contractions (because progesterone no longer inhibits them). Some women may feel the result of the decreasing levels of progesterone in late pregnancy as weak and irregular **Braxton-Hicks contractions**, also called false labor. These contractions can often be relieved with rest or hydration.

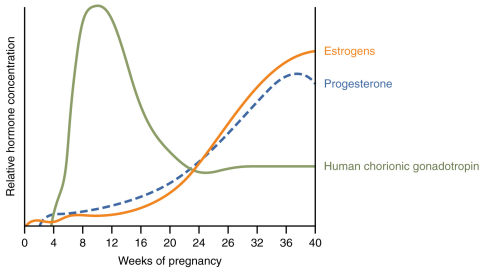



Figure 3. Hormones Initiating Labor. A positive feedback loop of hormones works to initiate labor.

A common sign that labor will be soon is the so-called "bloody show." During pregnancy, a plug of mucus accumulates in the cervical canal, blocking the entrance to the uterus. Approximately 1–2 days prior to the onset of true labor, this plug loosens and is expelled, along with a small amount of blood.

Meanwhile, the pituitary gland has been boosting its secretion of **oxytocin**, a hormone that stimulates the contractions of labor. At the same time, the muscles of the uterus increase sensitivity to oxytocin. Like oxytocin, prostaglandins (chemicals that induce labor) also enhance uterine contractile strength. Given the importance of oxytocin and prostaglandins to the initiation and maintenance of labor, it is not surprising that, when a pregnancy is not progressing to labor and needs to be induced, a pharmaceutical version of these compounds (called **pitocin**) is administered by intravenous drip.

Finally, stretching of the myometrium and cervix by a full-term fetus in the vertex (head-down) position is regarded as a stimulant to uterine contractions. The sum of these changes initiates the regular contractions known as true labor, which become more powerful and more frequent with time. The pain of labor is attributed to myometrial hypoxia during uterine contractions.

### Stages of Childbirth

The process of childbirth can be divided into three stages: cervical dilation, expulsion of the newborn, and afterbirth (Figure 4).

#### Cervical Dilation

For vaginal birth to occur, the cervix must dilate fully to 10 cm in diameter—wide enough to deliver the newborn's head. The dilation stage is the longest stage of labor and typically takes 6–12 hours. However, it varies widely and may take minutes, hours, or days, depending in part on whether the mother has given birth before; in each subsequent labor, this stage tends to be shorter.

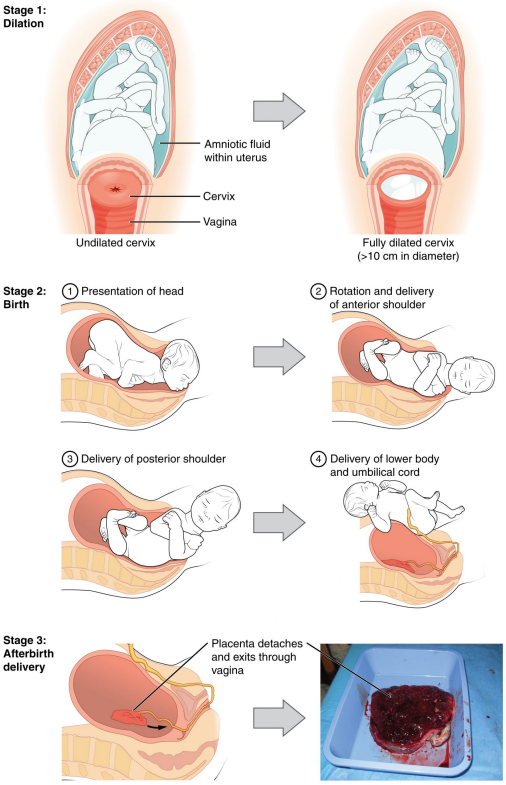



Figure 4. Stages of Childbirth. The stages of childbirth include Stage 1, early cervical dilation; Stage 2, full dilation and expulsion of the newborn; and Stage 3, delivery of the placenta and associated fetal membranes. (The position of the newborn's shoulder is described relative to the mother.)

True labor progresses in a positive feedback loop in which uterine contractions stretch the cervix, causing it to dilate and efface, or become thinner. Cervical stretching induces reflexive uterine contractions that dilate and efface the cervix further. In addition, cervical dilation boosts oxytocin secretion from the pituitary, which in turn triggers more powerful uterine contractions. When labor begins, uterine contractions may occur only every 3–30 minutes and last only 20–40 seconds; however, by the end of this stage, contractions may occur as frequently as every 1.5–2 minutes and last for a full minute.

Each contraction sharply reduces oxygenated blood flow to the fetus. For this reason, it is critical that a period of relaxation occur after each contraction. **Fetal distress**, measured as a sustained decrease or increase in the fetal heart rate, can result from severe contractions that are too powerful or lengthy for oxygenated blood to be restored to the fetus. Such a situation can be cause for an emergency birth with vacuum, forceps, or surgically by **Caesarian section**.

The amniotic membranes rupture before the onset of labor in about 12 percent of women; they typically rupture at the end of the dilation stage in response to excessive pressure from the fetal head entering the birth canal.

## Expulsion Stage

The expulsion stage begins when the fetal head enters the birth canal and ends with birth of the newborn. It typically takes up to 2 hours, but it can last longer or be completed in minutes, depending in part on the orientation of the fetus. The vertex presentation is the most common presentation and is associated with the greatest ease of vaginal birth. The fetus faces the maternal spine and the smallest part of the head (the back of top-back of the head) exits the birth canal first.

In fewer than 5 percent of births, the infant is oriented in the **breech** presentation, or buttocks down. In a **complete breech**, both legs are crossed and oriented downward. In a **frank breech** presentation, the legs are oriented upward. Before the 1960s, it was common for breech presentations to be delivered vaginally. Today, most breech births are accomplished by Caesarian section.

Vaginal birth is associated with significant stretching of the vaginal canal, the cervix, and the perineum. Until recent decades, it was routine procedure for an obstetrician to numb the perineum and perform an **episiotomy**, an incision in the posterior vaginal wall and perineum. The perineum is now more commonly allowed to tear on its own during birth. Both an episiotomy and a perineal tear need to be sutured shortly after birth to ensure optimal healing. Although suturing the jagged edges of a perineal tear may be

more difficult than suturing an episiotomy, tears heal more quickly, are less painful, and are associated with less damage to the muscles around the vagina and rectum.

Upon birth of the newborn's head, an obstetrician will aspirate mucus from the mouth and nose before the newborn's first breath. Once the head is birthed, the rest of the body usually follows quickly. The umbilical cord is then double-clamped, and a cut is made between the clamps. This completes the second stage of childbirth.

### Afterbirth

The delivery of the placenta and associated membranes, commonly referred to as the **afterbirth**, marks the final stage of childbirth. After expulsion of the newborn, the myometrium continues to contract. This movement shears the placenta from the back of the uterine wall. It is then easily delivered through the vagina. Continued uterine contractions then reduce blood loss from the site of the placenta. Delivery of the placenta marks the beginning of the postpartum period—the period of approximately 6 weeks immediately following childbirth during which the mother's body gradually returns to a non-pregnant state. If the placenta does not birth spontaneously within approximately 30 minutes, it is considered retained, and the obstetrician may attempt manual removal. If this is not successful, surgery may be required.

It is important that the obstetrician examines the expelled placenta and fetal membranes to ensure that they are intact. If fragments of the placenta remain in the uterus, they can cause postpartum hemorrhage. Uterine contractions continue for several hours after birth to return the uterus to its pre-pregnancy size in a process called involution, which also allows the mother's abdominal organs to return to their pre-pregnancy locations. Breastfeeding facilitates this process.

### Caesarian Section

Cesarean delivery (C-section) is a surgical procedure used to deliver a baby through an incision in the abdomen (and uterus). A C-section might be scheduled ahead of a woman develops complications during pregnancy that may require this procedure for the health and safety of mom and/or baby.

Your health care provider might recommend a C-section if:

- Labor is not progressing – one of the most common reasons for a C-section. Stalled labor might occur if the cervix is not dilating enough to allow for passage of the baby.
- Baby is distress – concerned about changes in baby's heartbeat or other vital signs.
- Baby is in an abnormal position – safest way to deliver the baby if his or her feet or buttocks enter the birth canal first (breech) or the baby is positioned side or shoulder first (transverse).
- Carrying multiples – carrying twins and the leading baby is in an abnormal position (or triplets).
- Placenta previa – placenta covers the opening of the cervix
- Umbilical cord prolapse – a loop of umbilical cord slips through the cervix ahead of the baby.
- Health concern – mom has a severe health problem, such as a heart or brain condition or active genital herpes infection at the time of labor.
- Mechanical obstruction – large fibroid obstructing the birth canal, a severely displaced pelvic fracture or your baby has a condition that can cause the head to be unusually large.
- Previous C-section – depending on the type of incision and other factors, it's often possible to attempt a VBAC (vaginal birth after caesarian). However, your health care provider might recommend a repeat C-section.

Some women request C-sections with their first baby to avoid labor or other possible complications of vaginal birth, or the convenience of a planned delivery. However, this is discouraged because women who have multiple C-sections are at increased risk of placental problems as well as heavy bleeding, which might require surgical removal of the uterus (hysterectomy). Babies born vie C-section usually require more intervention to begin breathing on their own after birth.

### Homeostasis in the Newborn: Apgar Score

In the minutes following birth, a newborn must undergo dramatic systemic changes to be able to survive outside the womb. An obstetrician, midwife, or nurse can estimate how well a newborn is doing by obtaining an Apgar score. The Apgar score was introduced in 1952 by the anesthesiologist Dr. Virginia Apgar as a method to assess the effects on the newborn of anesthesia given to the laboring mother. Healthcare providers now use it to assess the general wellbeing of the newborn, whether or not analgesics or anesthetics were used.

Five criteria—skin color, heart rate, reflex, muscle tone, and respiration—are assessed, and each criterion is assigned a score of 0, 1, or 2. Scores are taken at 1 minute after birth and again at 5 minutes after birth. Each time that scores are taken, the five scores are added together. High scores (out of a possible 10) indicate the baby has made the transition from the womb well, whereas lower scores indicate that the baby may be in distress.

The technique for determining an Apgar score is quick and easy, painless for the newborn, and does not require any instruments except for a stethoscope. A convenient way to remember the five scoring criteria is to apply the mnemonic APGAR, for "appearance" (skin color), "pulse" (heart rate), "grimace" (reflex), "activity" (muscle tone), and "respiration."

Of the five Apgar criteria, heart rate and respiration are the most critical. Poor scores for either of these measurements may indicate the need for immediate medical attention to resuscitate or stabilize the newborn. In general, any score lower than 7 at the 5-minute mark indicates that medical assistance may be needed. A total score below 5 indicates an emergency situation. Normally, a newborn will get an intermediate score of 1 for some of the Apgar criteria and will progress to a 2 by the 5-minute assessment. Scores of 8 or above are normal.

## Home Birth

When preparing for pregnancy one of the many choices to be made is who will be attending the birth. Doctors or midwives can attend hospital births and a mother may choose to also have a **Doula** present specifically to support the mother during the birthing process. If the mother and partner would prefer the advantages of a home birth these can be attended by certified midwifes and Doulas. The following article give more information about the pros and cons of choosing a home birth.

Pros and Cons of Home Birth (read article or listen to 4 minute audio)

## Pregnancy Loss

Unfortunately, not all pregnancies go as planned. complications may arise that result in miscarriage (loss of a baby before the age of viability) or stillbirth (loss of a baby after the age of viability). There are many different potential causes of miscarriages or stillbirth and as many different emotional reactions and grieving processes for a family involved.

Pregnancy Loss

The M-Word – Shattering the Silence on Miscarriage

## Check for Understanding

1. What are the stages of labor and what happens to mom and baby in each stage?
2. What birthing options are available to a mother and partner? Why might a person choose one of these options over another?
3. What are the components of and APGAR score and how is is used?
4. What are the potential physical causes and emotional impacts of pregnancy or infant loss?
5. Why is miscarriage or infant loss not talked about the way other forms of loss are?

---

1.7: Labor and Childbirth is shared under a CC BY license and was authored, remixed, and/or curated by LibreTexts.

# 1.8: Breast Health and Female Cancers

## Chapter Objectives

- Identify anatomical structures of the female breast
- Describe the physiological processes of the female breast
- List at least 3 factors that increase risk of female cancers
- Describe symptoms and treatment options for female cancers (breast, ovarian and uterine)
- Discuss screening options and recommended frequency for breast, uterine and ovarian cancer

## Breast Anatomy

*For my mom Kären, A breast cancer warrior and my best example of a strong woman.*

“Never be ashamed of a scar. It simply means you were stronger that whatever tried to hurt you” ~Unknown

### Anatomical Structure of the Female Breast

The breasts are located far from the other female reproductive organs so they are considered “accessory organs” of the female reproductive system. The function of the breasts is to supply milk to an infant in a process called **lactation**. The external features of the breast include a nipple surrounded by a pigmented **areola** (Figure 9), whose coloration may deepen during pregnancy. The areola is typically circular and can vary in size from 25 to 100 mm in diameter. The areolar region is characterized by small, raised areolar glands that secrete lubricating fluid during lactation to protect the nipple from chafing. When a baby nurses, or draws milk from the breast, the entire areolar region is taken into the mouth.

Breast milk is produced by the **mammary glands**, which are modified sweat glands. The milk itself exits the breast through the nipple via 15 to 20 **lactiferous ducts** that open on the surface of the nipple. These lactiferous ducts each extend to a lobe within the breast itself that contains groups of milk-secreting cells in clusters called **alveoli** (see Figure 9). The clusters can change in size depending on the amount of milk in the alveoli. The alveolar lobes themselves are surrounded by fat tissue, which determines the size of the breast; breast size differs between individuals and does not affect the amount of milk produced. Supporting the breasts are multiple bands of connective tissue called **suspensory ligaments** that connect the breast tissue to the dermis of the overlying skin.

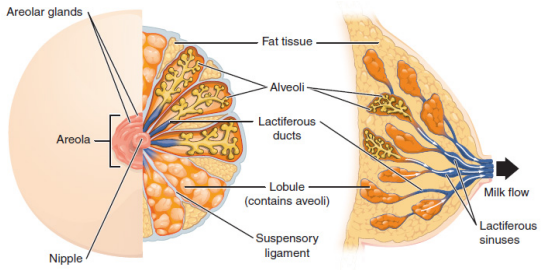



Figure 9. Anatomy of the Breast. During lactation, milk moves from the alveoli through the lactiferous ducts to the nipple.

### Physiological Function of the Female Breast

During the normal hormonal fluctuations in the menstrual cycle, breast tissue responds to changing levels of estrogen and progesterone, which can lead to swelling and breast tenderness in some individuals. If pregnancy occurs, the increase in hormones leads to further development of the mammary tissue and enlargement of the breasts.

**Lactation** is the process by which milk is synthesized and secreted from the mammary glands of the postpartum female breast in response to an infant sucking at the nipple. Breast milk provides ideal nutrition and passive immunity for the infant, encourages mild uterine contractions to return the uterus to its pre-pregnancy size (i.e., involution), and induces a substantial metabolic increase in the mother, consuming the fat reserves stored during pregnancy.

### Structure of the Lactating Breast

The non-pregnant and non-lactating female breast is composed primarily of adipose and collagenous tissue, with mammary glands making up a very minor proportion of breast volume. The mammary gland is composed of milk-transporting ducts, which expand and branch extensively during pregnancy in response to estrogen, growth hormone, cortisol, and prolactin. Moreover, in response to progesterone, clusters of breast alveoli bud from the ducts and expand outward toward the chest wall. Breast alveoli are balloon-

like structures lined with milk-secreting cells, or lactocytes. Milk is secreted from the lactocytes, fills the alveoli, and is squeezed into the ducts. Clusters of alveoli that drain to a common duct are called lobules; the lactating female has 12–20 lobules organized radially around the nipple. Milk drains from lactiferous ducts into lactiferous sinuses that meet at 4 to 18 perforations in the nipple, called nipple pores. The small bumps of the areola (the darkened skin around the nipple) are called Montgomery glands. They secrete oil to cleanse the nipple opening and prevent chapping and cracking of the nipple during breastfeeding.

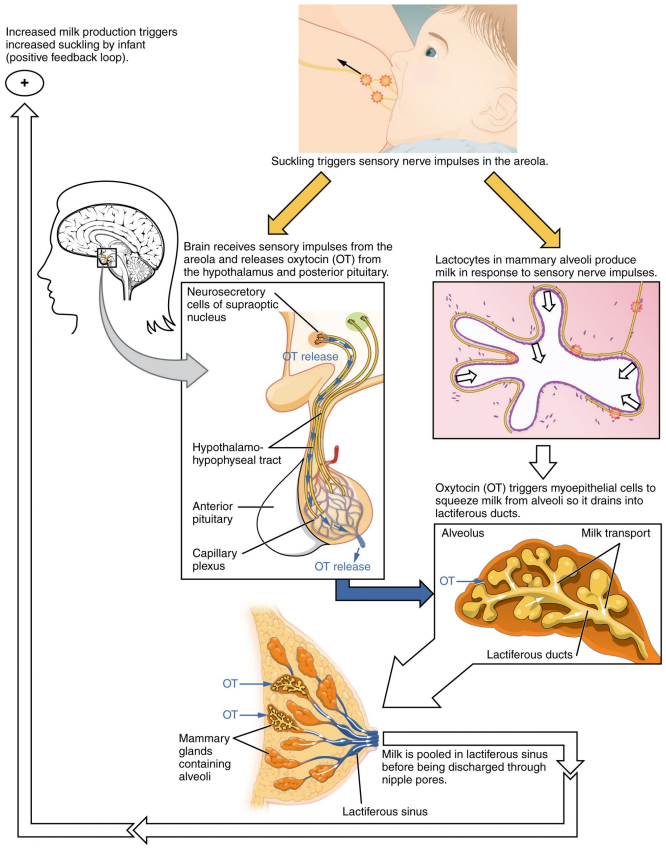



Figure 1. Let-Down Reflex. A positive feedback loop ensures continued milk production as long as the infant continues to breastfeed.

Breastfeeding

Benefits of Breastfeeding

## Cancer

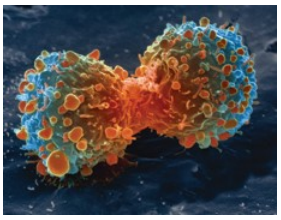


Figure 8. Cancerous Cells

Cancer is the name given to a collection of related diseases. In all types of cancer, some of the body's cells begin to divide without stopping and spread into surrounding tissues. Cancer can start almost anywhere in the human body. Normally, human cells grow and divide to form new cells as the body needs them. When cells grow old or become damaged, they die, and new cells take their place. When cancer develops, however, this orderly process breaks down. As cells become more and more abnormal, old or damaged cells survive when they should die, and new cells form when they are not needed. These extra cells can divide without stopping and may form growths called tumors.

Cancerous tumors are **malignant**, which means they can spread into, or invade, nearby tissues. In addition, as these tumors grow, some cancer cells can break off and travel to distant places in the body through the blood or the lymph system and form new tumors far from the original tumor.

Unlike malignant tumors, **benign** tumors do not spread into, or invade, nearby tissues. Benign tumors can sometimes be quite large, however. When removed, they usually don't grow back, whereas malignant tumors sometimes do.

### Cancer Terms

- **Neoplasms**: clusters of abnormal cells; aka "tumors." When the neoplasms or tumors grow out and replace normal cells they are said to be "*infiltrating*" or "*metastasizing*" which means traveling to other parts of the body via the blood or lymph.
- **Carcinoma**: most common form; starts in the epithelium.
- **Sarcoma**: forms in connective tissue: bones, muscles, blood vessels.
- **Leukemias**: form in blood-forming tissues: bone marrow, lymph nodes, and the spleen.
- **Lymphomas**: form in the cells of the lymph system (the system that filters out impurities and/or infection).
- Conceptually, cancer is thought to develop via the turning on of genes called "**oncogenes**" or genes that have gone awry. The DNA in these cells replicates at an accelerated rate. "Tumor suppressor genes", which are present in all of us, fail to stop these cells from dividing thereby allowing a tumor to form.
- A "**malignant**" tumor is a cancerous tumor, whereas a "**benign**" tumor is not cancerous and of no imminent danger to the body.

### How Cancer Arises

Cancer is caused by changes to genes that control the way our cells function, especially how they grow and divide.

Genetic changes that cause cancer can be inherited from our parents. They can also arise during a person's lifetime as a result of errors that occur as cells divide or because of damage to DNA caused by certain environmental exposures. Cancer-causing environmental exposures include substances, such as the chemicals in tobacco smoke or beauty products, and radiation, such as ultraviolet rays from the sun.

### Cancer Stages

Cancers are staged 1-3/4, depending on the cancer and the severity. When detected at stage 1, a person suffering from most types of cancer has about a 95% of surviving. The odds go down as you get to stage 3 or 4 (some cancers only have 3 stages, others 4). Doctors will often add an 'A' or 'B' to the staging as well, and this can relate to whether or not the cancer has invaded other tissues.

### Types of Cancer

This list of common cancer types includes cancers that are diagnosed with the greatest frequency in the United States, excluding non-melanoma skin cancers:

- **Bladder Cancer**: The most common type of bladder cancer is transitional cell carcinoma, also called urothelial carcinoma. Smoking is a major risk factor for bladder cancer. Bladder cancer is often diagnosed at an early stage.
- **Breast Cancer:** Breast cancer is the second most common cancer in women after skin cancer. Mammograms can detect breast cancer early, possibly before it has spread.
- **Colon and Rectal Cancer:** Colorectal cancer often begins as a growth called a polyp inside the colon or rectum. Finding and removing polyps can prevent colorectal cancer.
- **Endometrial Cancer:** Uterine cancers can be of two types: endometrial cancer (common) and uterine sarcoma (rare). Endometrial cancer can often be cured. Uterine sarcoma is often more aggressive and harder to treat.
- **Kidney Cancer:** Kidney cancer can develop in adults and children. The main types of kidney cancer are renal cell cancer, transitional cell cancer, and Wilms tumor. Certain inherited conditions increase the risk of kidney cancer.
- **Leukemia**: Leukemia is a broad term for cancers of the blood cells. The type of leukemia depends on the type of blood cell that becomes cancer and whether it grows quickly or slowly. Leukemia occurs most often in adults older than 55, but it is also the most common cancer in children younger than 15.
- **Lung Cancer:** Lung cancer includes two main types: non-small cell lung cancer and small cell lung cancer. Smoking causes most lung cancers, but nonsmokers can also develop lung cancer.
- **Melanoma:** Skin cancer is the most common type of cancer. The main types of skin cancer are squamous cell carcinoma, basal cell carcinoma, and melanoma. Melanoma is much less common than the other types but much more likely to invade nearby tissue and spread to other parts of the body. Most deaths from skin cancer are caused by melanoma.
- **Non-Hodgkin Lymphoma:** Lymphoma is a broad term for cancer that begins in cells of the lymph system. The two main types are Hodgkin lymphoma and non-Hodgkin lymphoma (NHL). Hodgkin lymphoma can often be cured. The prognosis of NHL

depends on the specific type.

- **Pancreatic Cancer:** Pancreatic cancer can develop from two kinds of cells in the pancreas: exocrine cells and neuroendocrine cells, such as islet cells. The exocrine type is more common and is usually found at an advanced stage. Pancreatic neuroendocrine tumors (islet cell tumors) are less common but have a better prognosis.
- **Prostate Cancer:** Prostate cancer is the most common cancer and the second leading cause of cancer death among men in the United States. Prostate cancer usually grows very slowly, and finding and treating it before symptoms occur may not improve men's health or help them live longer.
- **Thyroid Cancer:** Thyroid cancer can be of four main types, which vary in their aggressiveness. Anaplastic thyroid cancer is hard to cure with current treatments, whereas papillary (the most common), follicular, and medullary thyroid cancer can usually be cured.

Cancer incidence and mortality statistics reported by the American Cancer Society and other resources were used to create the list. To qualify as a common cancer for the list, the estimated annual incidence for 2016 had to be 40,000 cases or more.

The most common type of cancer on the list is breast cancer, with more than 249,000 new cases expected in the United States in 2016. The next most common cancers are lung cancer and prostate cancer.

The following table gives the estimated numbers of new cases and deaths for each common cancer type:

*Table 2. Cancer Types*

| Cancer Type | Estimated New Cases | Estimated Deaths |
|---|---|---|
| Bladder | 76,960 | 16,390 |
| Breast (Female – Male) | 246,660 – 2,600 | 40,450 – 440 |
| Colon and Rectal (Combined) | 134,490 | 49,190 |
| Endometrial | 60,050 | 10,470 |
| Kidney (Renal Cell and Renal Pelvis) Cancer | 62,700 | 14,240 |
| Leukemia (All Types) | 60,140 | 24,400 |
| Lung (Including Bronchus) | 224,390 | 158,080 |
| Melanoma | 76,380 | 10,130 |
| Non-Hodgkin Lymphoma | 72,580 | 20,150 |
| Pancreatic | 53,070 | 41,780 |
| Prostate | 180,890 | 26,120 |
| Thyroid | 64,300 | 1,980 |

### Risk Factors for Cancer

It is not possible to know exactly why one person develops cancer and another doesn't. But research has shown that certain risk factors may increase a person's chances of developing cancer. (There are also factors that are linked to a lower risk of cancer. These are called protective factors.)

Cancer risk factors include exposure to chemicals or other substances, as well as certain behaviors. They also include things people cannot control, like age and family history. A family history of certain cancers can be a sign of a possible inherited cancer syndrome.

The list below includes the most studied known or suspected risk factors for cancer:

- Age
- Alcohol
- Cancer-Causing Substances
- Chronic Inflammation
- Diet
- Hormones
- Immunosuppression

- Infectious Agents
- Obesity
- Radiation
- Sunlight
- Tobacco


Figure 9. CDC Advertisement

## Beauty Products and Cancer, Are You at Risk?

Although some of these risk factors can be avoided, others—such as growing older—cannot. Limiting your exposure to avoidable risk factors may lower your risk of developing certain cancers.

### Cancer Prevention

The number of new cancer cases can be reduced and many cancer deaths can be prevented. Research shows that screening for cervical and colorectal cancers as recommended helps prevent these diseases by finding precancerous lesions so they can be treated before they become cancerous. Screening for cervical, colorectal, and breast cancers also helps find these diseases at an early stage, when treatment works best.

Vaccines (shots) also help lower cancer risk. The human papillomavirus (HPV) vaccine helps prevent most cervical cancers and several other kinds of cancer, and the hepatitis B vaccine can help lower liver cancer risk.

A person's cancer risk can be reduced with healthy choices like avoiding tobacco, limiting alcohol use, protecting your skin from the sun and avoiding indoor tanning, eating a diet rich in fruits and vegetables, keeping a healthy weight, and being physically active.

### Types of Cancer Treatment

Figure 10. Source: National Cancer Institute – https://www.cancer.gov/about-cancer/treatment/types

There are many types of cancer treatment. The types of treatment will depend on the type of cancer and how advanced it is. Some people with cancer will have only one treatment. But most people have a combination of treatments, such as surgery with chemotherapy and/or radiation therapy.

- Surgery – a procedure in which a surgeon removes cancer from the body.
- Radiation Therapy – uses high doses of radiation to kill cancer cells and shrink tumors.
- Chemotherapy – uses drugs to kill cancer cells.
- Immunotherapy – helps your immune system fight cancer.
- Targeted Therapy – targets the changes in cancer cells that help them grow, divide, and spread.
- Hormone Therapy – slows or stops the growth of breast and prostate cancers that use hormones to grow.
- Stem Cell Transplant – procedures that restore blood-forming stem cells in cancer patients who have had theirs destroyed by very high doses of chemotherapy or radiation therapy.

## Female Cancers

### Breast Cancer

Breast cancer is a disease in which cells in the breast grow out of control. There are different kinds of breast cancer. The kind of cancer depends on the cells in the breast affected by cancer.

Breast Cancer

### Cervical Cancer

Research over many years has confirmed that cervical cancer is most often caused by a sexually transmitted infection with human papillomavirus (HPV). There are over 100 related viruses in the HPV family, and the characteristics of each strain determine the outcome of the infection. In all cases, the virus enters body cells and uses its own genetic material to take over the host cell's metabolic machinery and produce more virus particles.

Risk factors for cervical cancer include having unprotected sex; having multiple sexual partners; a first sexual experience at a younger age, when the cells of the cervix are not fully mature; failure to receive the HPV vaccine; a compromised immune system; and smoking. The risk of developing cervical cancer is doubled with cigarette smoking.

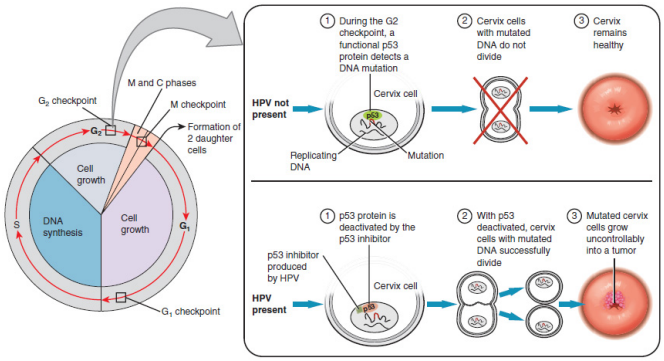



Figure 8. Development of Cervical Cancer. In most cases, cells infected with the HPV virus heal on their own. In some cases, however, the virus continues to spread and becomes an invasive cancer.

#### Screening and Prevention

The prevalence of cervical cancer in the United States is very low because of regular screening exams called **pap smears**. Pap smears sample cells of the cervix, allowing the detection of abnormal cells. If pre-cancerous cells are detected, there are several highly effective techniques that are currently in use to remove them before they pose a danger. However, women in developing countries often do not have access to regular pap smears. As a result, these women account for as many as 80 percent of the cases of cervical cancer worldwide.

In 2006, the first vaccine against the high-risk types of HPV was approved. There are now two HPV vaccines available: Gardasil® and Cervarix®. Whereas these vaccines were initially only targeted for women, because HPV is sexually transmitted, both men and women require vaccination for this approach to achieve its maximum efficacy. A recent study suggests that the HPV vaccine has cut the rates of HPV infection by the four targeted strains at least in half. Unfortunately, the high cost of manufacturing the vaccine is currently limiting access to many women worldwide.

### Ovarian Cancer

Ovarian cancer affect the female ovaries. Unfortunately, this type of cancer often goes undetected until it has spread within the abdomen. Ovarian cancer often has no symptoms in the early stages and later stages may have non-specific symptoms such as weight loss or loss of apatite.

Ovarian Cancer

## Check for Understanding

1. Identify the anatomical structures of the female breast.
2. What is the physiological function of the female breast and benefits of breastfeeding?
3. What is cancer and how does it impact the body?
4. What are the risk factors, symptoms, screening tests, and treatments for breast, ovarian and cervical cancers?

1.8: Breast Health and Female Cancers is shared under a CC BY license and was authored, remixed, and/or curated by LibreTexts.

# 1.9: Stress and Health

## Chapter Objectives

- Describe the difference between a stressor and a stress response
- Describe the fight or flight reaction and the function of this in stress management
- Discuss the long and short term health impacts associated with a stress response
- Describe and/or demonstrate stress management techniques

*"A ship in harbor is safe, but that is not what ships are built for?" ~ John Shedd*
*"There are some things you learn best in calm, an some in storm." ~ Willa Cather*

## Stress

In today's fast-paced society, most people complain about being stressed. However, when they use the term *stress*, they rarely know it's true meaning. The word carries many negative connotations and is associated with an unpleasant or traumatic event. As such, people mistakenly believe that stress is simply the nervousness and tension experienced prior to, during, or after a negative event. In fact, the effects of stress are physiological, emotional, *and* psychological.

Additionally, not all levels of stress are detrimental. The stress athletes experience right before a big game or college students feel right before an exam can enhance focus and increase their ability to concentrate. Stress is either good or bad depending on how long it persists and how it is perceived by the individual.

This chapter will provide a deeper understanding of what stress is and provide effective strategies for managing stress.

Stress is defined as the body's physical, mental, and emotional response to a particular stimulus, called a **stressor**. This adaption/coping-response helps the body prepare for challenging situations. It is the level of a person's response to a stressor that determines whether the experience is positive or negative. As a hardworking college student, you may feel as if you know the meaning of stress all too well. You may dream of a future where the demands on your time are diminished, so you can escape the high levels of stress you are feeling now. Unfortunately, regardless of their situation, everyone experiences stress on a regular basis. The good news is, not all stress is bad! Small levels of stress can enhance cognitive brain function. Stress may provide the motivation and concentration you need to write an essay, practice a speech, or prepare for a job interview. For most people, these types of stressors are manageable and not harmful. Stressors that have the potential for harm include the sudden loss of a loved one, the unexpected ending of a romantic relationship, or the unfair demands of an unreasonable boss.

### Defining Stress

Stress, then, is more than simply the tension and apprehension generated by problems, obstacles, or traumatic events. Stress is the body's automatic response (physical, mental, and emotional) to any stressor. It is a natural and unavoidable part of life, and it can be empowering and motivating, or harmful and potentially dangerous.

For more information on stress click on the links below:

What is stress and what causes it?

### The Effects of Stress on The Body

Not all stress is bad. All animals have a stress response, which can be lifesaving in some situations. The nerve chemicals and hormones released during such stressful times prepares the animal to face a threat or flee to safety (Fight or Flight Response). When you face a dangerous situation, your pulse quickens, you breathe faster, your muscles tense, your brain uses more oxygen and increases activity—all functions aimed at survival. In the short term, it can even boost the immune system.

However, long-term stress can increase the risk of diseases like depression, heart disease and a variety of other problems. With chronic stress, those same nerve chemicals that are normal, or even beneficial, in short bursts can suppress functions that aren't needed for immediate survival. Your immunity is lowered and your digestive, excretory, and reproductive systems stop working normally.

Problems occur if the stress response goes on too long, such as when the source of stress is constant, or if the response continues after the danger has subsided. A stress-related illness called post-traumatic stress disorder (PTSD) develops after an event like war, physical or sexual assault, or a natural disaster. If you have chronic stress, the best way to deal with it is to take care of the underlying problem. Counseling can help you find ways to relax and calm down. Doctor prescribed medications may also help.

## Your Bodies Response to Stress

When we experience excessive stress, either from internal worry or external circumstance, a bodily reaction called the **"fight-or-flight"response** will be triggered. The response system represents the genetic impulse to protect ourselves from bodily harm. During stress-response processes, the sympathetic nervous system increases heart rate and releases chemicals to prepare the body to either fight or flee. When the fight-or-flight response system get activated, it tends to perceive everything in the environment as a potential threat to survival.

In modern life, we do not get the option of "flight" very often. We have to deal with those stressors all the time and find a solution. When you need to take a final exam, there is no easy way for you to avoid it; sitting in the test room for hours feels like the only choice. Lacking the "flight" option in stress-response process leads to higher stress levels in modern society.

The body responds to stress by releasing stress hormones. These hormones make blood pressure, heart rate, and blood sugar levels go up. Long-term stress can help cause a variety of health problems, including:

- Mental health disorders, like depression and anxiety
- Obesity
- Heart disease
- High blood pressure
- Abnormal heart beats
- Menstrual problems
- Acne and other skin problems

## General Adaptation Syndrome

Hans Selye (1907-1982) started the modern era of research into something called stress. He proposed a three-stage pattern of response to stress that he called the **General Adaptation Syndrome (GAS)**. The model represents that when the organism first encounters stress, in the form of novelty or threat, it responds with an **alarm reaction**. This is followed by a **recovery or resistance stage** during which the organism repairs itself and stores energy. If the stress-causing events continue, **exhaustion** sets in. This third stage is what has become known as "burn-out". Classic symptoms of burn-out include loss of drive, emotional flatness, and (in humans) dulling of responsiveness to the needs of others.

### Three Stages of GAS

#### 1. Alarm reaction stage

In this stage, your body experiences the "fight or flight" response. This natural reaction prepares you to either flee or protect yourself in dangerous situations. The **sympathetic branch** of the autonomic nervous system is activated and the adrenal glands secrete two hormones to stimulate your reactions to stress: epinephrine (also known as adrenalin) and norepinephrine (also known as noradrenalin).

Adrenalin mobilizes glucose and fatty acid release from fatty cells. The body is able to use both as energy to respond to stress. Adrenalin and noradrenalin also have powerful effects on the heart. Both the heart rate and stroke volume are increased, thereby increasing the body's cardiac output. They also help to shunt blood away from the other parts of the body and thereby push more blood to the heart, brain, and muscles as the body prepares to attack or flee. At the same time, the adrenal glands also release cortisol, to help meet the body's energy needs in times of stress.

#### 2. Resistance stage

After the initial reaction to the stressor during the alarm reaction stage, the **parasympathetic branch** of the autonomic nervous system counteracts the changes that the stressful stimulus has produced, and attempts to restore a state of **homeostasis**, the default state in which the body functions normally.

During the resistance stage, the results of the hormonal changes which occurred in the previous stage are still apparent, including increased glucose levels in the blood and higher blood pressure, but stress hormone levels begin to return to normal, enabling the body's focus to shift from alertness to repair.

If the resistance stage continues for too long the body will stay in a state of alertness and continue to produce the stress hormones. Signs of the resistance stage include:

- Irritability
- Frustration

- Poor concentration

#### 3. Exhaustion stage

After an extended period of stress, the body enters this final stage of GAS. At this stage, the body has depleted its physical, emotional, and mental resources and is unable to maintain normal function. Once the body is no longer equipped to fight stress and may experience these symptoms:

- Fatigue
- Depression
- Anxiety
- Feeling unable to cope

### Eustress vs Distress

Negative stress, or **distress**, is often part of activities that we perceive we cannot escape. Our bodies and minds seem to have evolved to cope well with sudden and brief stressors, such as escaping attack by a predator. We do not seem to be designed to handle chronic stress even if it is mild, like driving in heavy traffic. Our society has created many conditions that produce chronic stress and are associated with stress related illnesses. We have time pressures, work pressures, relationship pressures, crowding, noise, crime, to many things to do in too little time, achievement pressures, and even education-related pressures in this course.

However, stress is not always bad. Sometimes a challenge is a good thing. Indeed, one could argue that nothing useful in life can be accomplished without some degree of stress. “Good stress,” Selye pointed out, is “the spice of life.” To combat the notion that all stress was bad, Selye developed the idea of **eustress**, which is a person’s ideal stress level. Selye proposed that different people needed different levels of challenge or stimulation (stress) in their lives. Some people (“turtles”) need low levels of stress. Others (“racehorses”) thrive on challenges. Challenges are not harmful in themselves. A person could be a busy executive or engage in strenuous exercise without experiencing negative stress-related symptoms, as long as the person enjoyed the challenge.

### Common Causes of Stress

Stress happens when people feel like they don’t have the tools to manage all of the demands in their lives. Stress can be short-term or long-term. Missing the bus or arguing with your spouse or partner can cause short-term stress. Money problems or trouble at work can cause long-term stress. Even happy events, like having a baby or getting married can cause stress. Some of the most common stressful life events include:

- Death of a spouse
- Death of a close family member divorce
- Losing your job
- Major personal illness or injury
- Marital separation
- Marriage
- Pregnancy
- Retirement

### Common Signs and Symptoms of Stress

Everyone responds to stress a little differently. Symptoms may vary person to person. Here are some of the signs to look for:

- Not eating or eating too much
- Feeling like you have no control
- Needing to have too much control
- Forgetfulness
- Headaches
- Lack of energy
- Lack of focus
- Trouble getting things done
- Poor self-esteem
- Short temper
- Upset stomach
- Back pain

- General aches and pains

These symptoms may also be signs of depression or anxiety, which can be caused by long-term stress.

### Women React to Stress Differently Than Men?

One recent survey found that women were more likely to experience physical symptoms of stress than men. However, it cannot be said that this applies to all women. We do know that women often cope with stress in different ways than men. Women "**tend and befriend,**" taking care of those closest to them, but also drawing support from friends and family. Men are more likely to have the "**fight or flight**" response. They cope by "escaping" into a relaxing activity or other distraction.

### Stress is in the Eye of the Beholder

#### How to Make Stress Your Friend

The process by which we experience a situation is described by Lazarus's Theory of Cognitive Appraisal. This theory may be beneficial to our understanding of the differences between individual's stress levels. The theory's main points are:

1. When we experience a situation or event we first determine if it is a threat, a challenge, or is neutral.
2. We then assess our inventory of resources to cope with the event. If we do not perceive we are adequate to the task, we must be able to withdraw or we will feel trapped in a situation with aversive consequences coming. That induces distress and all the physiological processes that harm our health. If we perceive that we have the resources to successfully cope with the situation, we feel challenged and optimistic. Note that challenge and optimism are related to enhanced health and sense of well-being.

This second stage of appraisal impacts the first stage in a loop process. If we at first perceive a threat but then realize we can handle it, it reduces the distress and may even create a perception of challenge. If at first we perceive a challenge but then realize that we don't have what it takes to be successful, we may begin to experience distress as we see the aversive outcome of failure looming ahead. Depending on the meaning of the outcome to us, the distress may be mild or severe. If the situation is always hanging over us and we always feeling inadequate to it and anxious about negative outcomes, we are always under distress. Our health and well-being take a beating in that scenario.

Next, we must select from our repertoire of coping resources. There are two types of coping resources:

- Instrumental
- Palliative (emotion-focused)

**Instrumental coping** solves the problem and removes the stressor from our experience as in working out a conflict with someone to reduce the distress or by getting a better job to reduce financial pressures.

**Palliative coping** alters our physiological reactions to stress that will not go away and cannot be escaped. These include relaxation skills, reinterpretation of the meaning or effects of the stressor, acceptance of the situation, or optimism about future improvements in the situation. Palliative skills would include relaxing in the traffic jam even though you have an important appointment that is being missed. You realize you cannot do anything about it, so you may as well relax because anger and tension will not make the cars move any faster, but it will hurt you, so you choose to relax instead.

As we go to our repertoire of coping skills to select one or more, we may become more optimistic of success and reappraise the situation in the first step. It may become less threatening and hence less distressful. We could find that our coping resources will be less adequate than we initially thought and we would become more threatened now. Even a challenge might be converted into a threat as in traveling to a another country for the first time and finding your credit cards are missing and you have no money for anything and no way to get any.

This interactive appraisal and coping process is at the heart of the impact of stress on us. If we interpret a situation as stressful, it has the stress-related effects on us. If we have few coping sources, more situations will be perceived as distressing. If we have many coping resources, more situations will be perceived as challenging or at least neutral.

As I am driving down the road and have a flat tire, I could be annoyed at the trouble it causes or feel threatened by past negative experience associated with changing a tire. If I don't know how to change a tire and it is dark out, I may feel very threatened as I perceive helplessness and vulnerability to someone's attacking me. If I assure myself that this is unlikely, and I do know how to change a tire, I may decide that I will get this done in ten minutes and be on the road safely. Or may not have the skills to change a tire but have a cell phone and a close friend who will quickly lend a hand (social support) which decreases distress.

These factual situations are part of the appraisal and coping process. Perception is also critically important. If I have little confidence in myself to handle a flat tire even though I have been taught how to do it and have the tire, I may feel more threatened. If I have the cell phone but don't believe I should bother anybody to come here, or don't believe they would want to help me, the facts do not determine my reaction as much as my perception of the facts determines it.

A second example of the role of coping skills and perception could involve getting started in an online course. If you are a computer whiz and have taken several college courses including online courses before, you were able to start with little problem. Learning to use online resources did not cause much distress. But if you were new to using the Internet, had never taken an online course, and had low self-confidence, you may have been quite distressed. Same situation, different coping resources.

Now add perception. If you perceive college as a supportive environment, and instructors as willing to be flexible when circumstances are beyond all of our control, you may be hassled but not threatened about failing the course because of these factors. But if you see colleges and instructors as money-hungry and deliberately placing obstacles in your path to cause you to fail and drop out, you have may been very distressed when you had difficulties as you would see no support or flexibility to allow you to adapt to the new situation. The reality of the college and instructor's intent make no difference in your initial perception and resultant choices. It is your perception of reality that determines what you will do.

The appraisal and coping process underlies the statement that "stress is in the eye of the beholder." Any event or situation may be perceived differently by different individuals due to past experience with it, learned skills, personality traits like Type A and optimism, and the amount of distress being experienced already. Social support may be instrumental in helping cope with problem as in coming to help with the flat tire, or being eager to listen and be supportive with your sharing your experiences. Both reduce the distress levels.

## Managing Stress

Everyone must deal with stress. There are steps that can be taken help manage stress in a positive way and keep it from increasing risk of illness. Try these tips to keep stress in check:

### Develop a new attitude

- Become a problem solver. Make a list of the things that cause stress. From your list, figure out which problems you can solve now and which are beyond your control for the moment. From your list of problems that you can solve now, start with the little ones. Learn how to calmly look at a problem, think of possible solutions, and take action to solve the problem. Being able to solve small problems will give you confidence to tackle the big ones. And feeling confident that you can solve problems will go a long way to helping you feel less stressed.
- Be flexible. Sometimes, it's not worth the stress to argue. Give in once in a while or meet people halfway.
- Get organized. Think ahead about how you're going to spend your time. Write a to-do list. Figure out what's most important to do and do those things first.
- Set limits. When it comes to things like work and family, figure out what you can really do. There are only so many hours in the day. Set limits for yourself and others. Don't be afraid to say NO to requests for your time and energy.

### Relax

- Take deep breaths. If you're feeling stressed, taking a few deep breaths makes you breathe slower and helps your muscles relax.
- Stretch. Stretching can also help relax your muscles and make you feel less tense.
  Massage tense muscles. Having someone massage the muscles in the back of your neck and upper back can help you feel less tense.
- Take time for yourself. We all have lots of things that we have to do. But often we don't take the time to do the things that we really want to do. It could be listening to music, reading a good book, or going to a movie. Think of this as an order from your doctor, so you won't feel guilty!

### Take care of your body

- Get enough sleep. Getting enough sleep helps you recover from the stresses of the day. Also, being well-rested helps you think better so that you are prepared to handle problems as they come up. Most adults need 7 to 9 hours of sleep a night to feel rested.
- Eat right. Try to fuel up with fruits, vegetables, beans, and whole grains. Don't be fooled by the jolt you get from caffeine or high-sugar snack foods. Your energy will wear off, and you could wind up feeling more tired than you did before.
- Get moving. Getting physical activity can not only help relax your tense muscles but improve your mood. Research shows that physical activity can help relieve symptoms of depression and anxiety.
- Don't deal with stress in unhealthy ways. This includes drinking too much alcohol, using drugs, smoking, or overeating.

### Connect with others

- Share your stress. Talking about your problems with friends or family members can sometimes help you feel better. They might also help you see your problems in a new way and suggest solutions that you hadn't thought of.
- Get help from a professional if you need it. If you feel that you can no longer cope, talk to your doctor. She or he may suggest counseling to help you learn better ways to deal with stress. Your doctor may also prescribe medicines, such as antidepressants or sleep aids.
- Help others. Volunteering in your community can help you make new friends and feel better about yourself.

## Coping with Stress

The effects of stress tend to build up over time. Taking practical steps to maintain your health and outlook can reduce or prevent these effects. The following are some tips that may help you to cope with stress:

- Seek help from a qualified mental health care provider if you are overwhelmed, feel you cannot cope, have suicidal thoughts, or are using drugs or alcohol to cope.
- Get proper health care for existing or new health problems.
- Stay in touch with people who can provide emotional and other support. Ask for help from friends, family, and community or religious organizations to reduce stress due to work burdens or family issues, such as caring for a loved one.
- Recognize signs of your body's response to stress, such as difficulty sleeping, increased alcohol and other substance use, being easily angered, feeling depressed, and having low energy.
- Set priorities-decide what must get done and what can wait, and learn to say no to new tasks if they are putting you into overload.
- Note what you have accomplished at the end of the day, not what you have been unable to do.
- Avoid dwelling on problems. If you can't do this on your own, seek help from a qualified mental health professional who can guide you.
- Schedule regular times for healthy and relaxing activities.
- Explore stress coping programs, which may incorporate meditation, yoga, tai chi, or other gentle exercises.
- Exercise regularly – just 30 minutes per day of gentle walking can help boost mood and reduce stress.

### Exercise and Stress

Exercise builds stronger bodies only if we push ourselves beyond our regular level of strength and endurance. Progressing in your intellectual skills occurs only by going beyond your adaptation level for the complexity and amount of knowledge you must acquire. Stress as "challenge" enhances physical and emotional well-being. Mountain climbers want risk and challenge, but they want the type that they feel they can master and mostly control. They don't want to be perfectly in control because then the challenge would not be so great. They want to be on the edge between in-control and having to use every degree of skill, concentration, and problem solving to succeed. The same is true of race car drivers, downhill skiers, chess players, musicians, and artists.

These activities have been described by Csikszentmihalyi as inducing the experience of "flow" that totally captures the attention, makes it very easy to continue, and very hard to stop. There are many other activities and professions that produce "flow", but the essence of the experience is to be on the edge of challenge and failure with the perception that your own efforts will make the difference between good and bad outcomes. In these conditions stress builds healthier bodies and higher well-being. People who experience "flow" frequently report high degrees of satisfaction in life.

### Physiological Toughness Model

There is also a psychophysiological framework for explaining how exercise cannot only reduce the immediate effects of stress but also can enhance the recovery from stressors. This framework is called the Physiological Toughness Model and it theorizes that intermittent but regular exposure to stressors, like exercise, can lead to psychological coping, emotional stability, and physiological changes. These physiological changes include increases in endorphins and reductions in stress hormones and lead to improvements in performance during challenging/threatening situations, strengthening of immune system functioning, and improvements in stress tolerance.

### Meditation and Health

Many people practice meditation for a number of health-related purposes. A 2007 national government survey found that 9.4% of respondents had used meditation in the past 12 months.

### What is meditation?

The term meditation refers to a group of techniques which may be practiced for many reasons, such as to increase calmness and physical relaxation, to improve psychological balance, to cope with illness, or to enhance overall wellness. Most types of meditation have four elements in common:

- A quiet location. Meditation is usually practiced in a quiet place with as few distractions as possible. This can be particularly helpful for beginners.
- A specific, comfortable posture. Depending on the type being practiced, meditation can be done while sitting, lying down, standing, walking, or in other positions.
- A focus of attention. Focusing one's attention is usually a part of meditation. For example, the meditator may focus on a mantra (a specially chosen word or set of words), an object, or the sensations of the breath.
- Having an open attitude. During meditation this means letting distractions come and go naturally without judging them.

### How can meditation affect my health?

It is not fully known what changes occur in the body during meditation; whether they influence health; and, if so, how. Research is under way to find out more about meditation's effects, how it works, and diseases and conditions for which it may be most helpful. The National Center for Complementary and Alternative Medicine (NCCAM) is the federal government's lead agency for scientific research on complementary and alternative medicine (CAM). Some recent NCCAM-supported studies have been investigating meditation for relieving stress in caregivers for elderly patients with dementia and for relieving asthma symptoms.

### Is meditation right for me?

Meditation is considered to be safe for healthy people, but if you are thinking about using meditation practices to prevent asthma attacks, to control high blood pressure, to reduce arthritis pain, or for any other medical reason, be smart.

## Relaxation Techniques

Relaxation techniques include a number of practices such as progressive relaxation, guided imagery, biofeedback, self-hypnosis, and deep breathing exercises. The goal is similar in all: to consciously produce the body's natural relaxation response, characterized by slower breathing, lower blood pressure, and a feeling of calm and well-being.
Relaxation techniques (also called relaxation response techniques) may be used by some to release tension and to counteract the ill effects of stress. Relaxation techniques are also used to induce sleep, reduce pain, and calm emotions. This fact sheet provides a general overview of relaxation techniques and suggests sources for additional information.

### Key Points

- Relaxation techniques are used for a variety of health-related purposes, such as counteracting the effects of stress on the body.
- Most relaxation techniques can be self-taught and self-administered.
- Relaxation techniques are generally safe, but there is limited evidence of usefulness for specific health conditions. Research is under way to find out more about relaxation and health outcomes.
- Do not use relaxation techniques as a replacement for conventional care or to postpone seeing a doctor about a medical problem.
- Tell your health care providers about any complementary and alternative practices you use. Give them a full picture of what you do to manage your health. This will help ensure coordinated and safe care.

### About Relaxation Techniques

Relaxation is more than a state of mind; it physically changes the way your body functions. When your body is relaxed breathing slows, blood pressure and oxygen consumption decrease, and some people report an increased sense of well-being. This is called the "relaxation response." Being able to produce the relaxation response using relaxation techniques may counteract the effects of long-term stress, which may contribute to or worsen a range of health problems including depression, digestive disorders, headaches, high blood pressure, and insomnia.

Relaxation techniques often combine breathing and focused attention on pleasing thoughts and images to calm the mind and the body. Most methods require only brief instruction from a book or experienced practitioner before they can be done without assistance. These techniques may be most effective when practiced regularly and combined with good nutrition, regular exercise, and a strong social support system.

Some relaxation response techniques include:

- **Autogenic training:** When using this method, you focus on the physical sensation of your own breathing or heartbeat and picture your body as warm, heavy, and/or relaxed.

- **Biofeedback:** Biofeedback-assisted relaxation uses electronic devices to teach you how to consciously produce the relaxation response. Biofeedback is sometimes used to relieve conditions that are caused or worsened by stress.
- **Deep breathing or breathing exercises:** To relax using this method, you consciously slow your breathing and focus on taking regular and deep breaths.
- **Guided imagery:** For this technique, you focus on pleasant images to replace negative or stressful feelings and relax. Guided imagery may be directed by you or a practitioner through storytelling or descriptions designed to suggest mental images (also called visualization).
- **Progressive relaxation:** (also called Jacobson's progressive relaxation or progressive muscle relaxation). For this relaxation method, you focus on tightening and relaxing each muscle group. Progressive relaxation is often combined with guided imagery and breathing exercises.
- **Self-Hypnosis:** In self-hypnosis you produce the relaxation response with a phrase or nonverbal cue (called a "suggestion"). Self-hypnosis may be used to relieve pain (tension headaches, labor, or minor surgery) as well as to treat anxiety and irritable bowel syndrome.

### If You Are Thinking About Using Relaxation Techniques for Health

- Do not use relaxation techniques as a replacement for conventional care or to postpone seeing a doctor about a medical problem.
- Ask about the training and experience of the practitioner or instructor you are considering for any complementary alternative medicine practice.
- Look for published research studies on relaxation for the health condition in which you are interested. Remember that some claims for using relaxation therapies may exceed the available scientific evidence.
- Tell all your health care providers about any complementary and alternative practices you use. Give them a full picture of what you do to manage your health. This will help ensure coordinated and safe care.

## Resilience

### Resilience is the ability to:

- Bounce back
- Take on difficult challenges and still find meaning in life
- Respond positively to difficult situations
- Rise above adversity
- Cope when things look bleak
- Tap into hope
- Transform unfavorable situations into wisdom, insight, and compassion
- Endure

Resilience refers to the ability of an individual, family, organization, or community to cope with adversity and adapt to challenges or change. It is an ongoing process that requires time and effort and engages people in taking a number of steps to enhance their response to adverse circumstances. Resilience implies that after an event, a person or community may not only be able to cope and recover, but also change to reflect different priorities arising from the experience and prepare for the next stressful situation.

Resilience is the most important defense people have against stress.
It is important to build and foster resilience to be ready for future challenges.
Resilience will enable the development of a reservoir of internal resources to draw upon during stressful situations.

Research (Aguirre, 2007; American Psychological Association, 2006; Bonanno, 2004) has shown that resilience is ordinary, not extraordinary, and that people regularly demonstrate being resilient.

Resilience is not a trait that people either have or do not have.
Resilience involves behaviors, thoughts, and actions that can be learned and developed in anyone. Resilience is tremendously influenced by a person's environment.

Resilience changes over time. It fluctuates depending on how much a person nurtures internal resources or coping strategies. Some people are more resilient in work life, while others exhibit more resilience in their personal relationships. People can build resilience and promote the foundations of resilience in any aspect of life they choose.

### Building Resilience

Developing resilience is a personal journey. People do not react the same way to traumatic events. Some ways to build resilience include the following actions:

- Making connections with others
- Looking for opportunities for self-discovery
- Nurturing a positive view of self
- Accepting that change is a part of living
- Taking decisive actions
- Learning from the past

The ability to be flexible is a great skill to obtain and facilitates resilience growth. Getting help when it is needed is crucial to building resilience. An approach to building resilience that works for one person might not work for another. People use varying strategies. Resilience involves maintaining flexibility and balance in life during stressful circumstances and traumatic events. Being resilient does not mean that a person does not experience difficulty or distress. Emotional pain and sadness are common in people who have suffered major adversity or trauma in their lives. Stress can be dealt with proactively by building resilience to prepare for stressful circumstances, while learning how to recognize symptoms of stress. Fostering resilience or the ability to bounce back from a stressful situation is a proactive mechanism to managing stress.

## Check for Understanding

1. What is the difference between a stressor and a stress response?
2. What is the fight or flight reaction and how is it used by the body?
3. What is the GAS syndrome and what does this mean for long term stress?
4. How does long term and short term stress affect health or wellness?
5. How does perception impact the stress response?
6. What are some stress management techniques that you feel would be useful to you in managing short and long term stress?

---

1.9: Stress and Health is shared under a CC BY license and was authored, remixed, and/or curated by LibreTexts.

# 1.10: Growing Older

## Chapter Objectives

- Describe the physical, emotional and social changes associated with ageing
- Discuss the positive and negative outcomes of the ageing process
- Develop a personalized goal for healthy aging

## Growing Older

*"Beautiful young people are accidents of nature, but beautiful old people are works of art." ~Eleanor Roosevelt.*

*"We don't stop playing because we grow old; we grow old because we stop playing." ~George Bernard Shaw.*

### Signs and Symptoms of Ageing

We can all describe physical attributes that may signal to us that someone is "old". Maybe these include gray hair, wrinkled skin or a strange obsession with music from the 1970's. These ageing individuals may also seem to have more time to devote to hobbies and better financial security. Changes associated with ageing can be broken into 3 categories: Physical, Emotional, and Social.

### Physical Changes Associated with Ageing

Menopause is commonly associated with the female ageing process. This is the point that the female body is depleted of viable eggs to the point that follicular changes to the ovaries affect the hormonal regulation of the mensural cycle.

#### Perimenopause

The earliest changes occur during the menopausal transition, referred to as **perimenopause**, when a women's cycle becomes irregular but does not stop entirely. Although the levels of estrogen are still nearly the same as before the transition, the level of progesterone is reduced. This decline in progesterone can lead to abnormal growth, or hyperplasia, of the endometrium. This condition is a concern because it increases the risk of developing endometrial cancer. Two harmless conditions that can develop during the transition are uterine fibroids, which are benign masses of cells, and irregular bleeding. As estrogen levels change, other symptoms that occur are hot flashes and night sweats, trouble sleeping, vaginal dryness, mood swings, difficulty focusing, and thinning of hair on the head along with the growth of more hair on the face. Depending on the individual, these symptoms can be entirely absent, moderate, or severe.

#### Menopause

Female fertility (the ability to conceive) peaks when women are in their twenties, and is slowly reduced until a women reaches 35 years of age. After that time, fertility declines more rapidly, until it ends completely at menopause. Menopause is the cessation of the menstrual cycle that occurs as a result of the loss of ovarian follicles and the hormones that they produce. A woman is considered to have completed menopause if she has not menstruated in a full year. After that point, she is considered postmenopausal. The average age for this change is consistent worldwide at between 50 and 52 years of age, but it can normally occur in a woman's forties, or later in her fifties. Poor health, including smoking, can lead to earlier loss of fertility and earlier menopause.

#### Post Menopause

After menopause, lower amounts of estrogens can lead to other changes. Cardiovascular disease becomes as prevalent in women as in men, possibly because estrogens reduce the amount of cholesterol in the blood vessels. When estrogen is lacking, many women find that they suddenly have problems with high cholesterol and the cardiovascular issues that accompany it. Osteoporosis is another problem because bone density decreases rapidly in the first years after menopause. The reduction in bone density leads to a higher incidence of fractures.

Hormone therapy (HT), which employs medication (synthetic estrogens and progestins) to increase estrogen and progestin levels, can alleviate some of the symptoms of menopause. In 2002, the Women's Health Initiative began a study to observe women for the long-term outcomes of hormone replacement therapy over 8.5 years. However, the study was prematurely terminated after 5.2 years because of evidence of a higher than normal risk of breast cancer in patients taking estrogen-only HT. The potential positive effects on cardiovascular disease were also not realized in the estrogen-only patients. The results of other hormone replacement studies over the last 50 years, including a 2012 study that followed over 1,000 menopausal women for 10 years, have shown cardiovascular benefits from estrogen and no increased risk for cancer. Some researchers believe that the age group tested in the

2002 trial may have been too old to benefit from the therapy, thus skewing the results. In the meantime, intense debate and study of the benefits and risks of replacement therapy is ongoing. Current guidelines approve HT for the reduction of hot flashes or flushes, but this treatment is generally only considered when women first start showing signs of menopausal changes, is used in the lowest dose possible for the shortest time possible (5 years or less), and it is suggested that women on HT have regular pelvic and breast exams.

### Cognitive Changes Associated with Ageing

Cognitive changes can also be seen in the aging process and often begin around the age of 60 (though can be seen earlier.) Cognitive change as part of the natural ageing process has been well researched and documented. Some cognitive abilities, such as vocabulary, are resilient to aging and may even improve with age. Other abilities, such as conceptual reasoning, memory, and processing speed, decline gradually over time.

Age-Related Cognitive Decline: Women are More Resilient than Men

### Emotional Changes Associated with Ageing

In addition to the hormonal and cognitive effects of perimenopause on a women's emotional balance, other factors associates with ageing may impact wellbeing in this area:

- fewer responsibilities associated with child rearing
- becoming a grandmother
- more time to dedicate to personal causes or hobbies
- changes in physical appearance

### Social Changes Associated with Ageing

One could argue that social changes to the aging progress for women have had the most drematic changes in later generations. Women now (more than in generations past) have has long term careers which bring friendships and financial assests seperat from a partner. The following factors may bring about social changes as women age:

- financial security
- time to travel with or spend time with friends
- romantic relationship stability or stagnation
- friends passing on
- changes to independent living

### Planning for Healthy Ageing

Lifestyle choices can have a significant impact on an individuals physical, mental and emotional health as they age. Actions can start well before middle age to improve quality of life in the "golden years" such as:

- Eating a balanced diet
- Maintain a healthy body weight
- Daily physical activity
- Exercise aimed to strengthen the heart and other muscles of the body
- Properly manage health conditions
- Stay mentally active
- Family history of age related illnesses
- Make and maintain healthy social connections
- Financial planning

An an individual approaches retirement age they may want to also consider the following:

- Health benefits and Medicare
- Senior assistance programs
- Retirement and financial resources
- Staying connected to the community
- Managing medications and treatments for chronic illness
- Driving challenges for older adults
- Age related hearing and vision changes

- Emotional and social support

## Check for Understanding

1. What are some of the physical, cognitive, social and emotional changes associated with ageing?
2. What are some positive outcomes of the ageing process?
3. What are some challenges associated with ageing?
4. What behaviors can a person manage early in life to improve likelihood of a positive aging experience?
5. What is one goal you could se not to improve your health in 20-40 years?

---

1.10: Growing Older is shared under a CC BY license and was authored, remixed, and/or curated by LibreTexts.

# Works Cited

## Works Cited


### Chapter 1 – History and Current Issues in Women's Health

Nichols, Francine H. "History of the Women's Health Movement in the 20th Century." *Journal of Obstetric, Gynecologic & Neonatal Nursing*, vol. 29, no. 1, 2000, pp. 56–64. *Crossref*, doi:10.1111/j.1552-6909.2000.tb02756.x.
Rieck, Garrett. "Introduction to Health." *Health 100 V3*, 1st ed., vol. 3, Santa Clarita, CA, College of the Canyons, 2019, pp. 6–14. *Merlot*, drive.google.com/file/d/1hOf6wPNjeUvWflVIRwjbB7h-qMTMMp-G/view.
"Women at Risk: Why Many Women Are Forgoing Needed Health Care | Commonwealth Fund." *Commonwealthfund*, 2019, www.commonwealthfund.org/publications/issue-briefs/2009/may/women-risk-why-many-women-are-forgoing-needed-health-care. "How the U.S. Fails Women When It Comes to Health | Commonwealth Fund." *Commonwealthfund*, 2019, www.commonwealthfund.org/publications/podcast/2019/jan/how-us-fails-women-when-it-comes-health. "How to Find Reliable Health Information on the Internet." *Allina Health*, 2019, www.allinahealth.org/customer-service/be-prepared/for-your-clinic-visit/how-to-find-reliable-health-information-on-the-internet. "Trust It or Trash It?" *Trust It or Trash It*, www.trustortrash.org. Accessed 13 Aug. 2020.

### Chapter 2 – Female Reproductive Anatomy and Physiology

Betts, Gordon. "Anatomy and Physiology – Open Textbook." *Pressbooks*, 6 Mar. 2013, opentextbc.ca/anatomyandphysiologyopenstax.

"Models of Sexual Response." *Our Bodies Ourselves*, 11 Feb. 2017, www.ourbodiesourselves.org/book-excerpts/health-article/models-sexual-response.

UCLA Health. "Endometriosis: What Is Endometriosis? Endometriosis Symptoms, Treatment, Diagnosis – UCLA." *UCLA Health*, www.uclahealth.org/obgyn/endometriosis. Accessed 19 Dec. 2020.

"Yeast Infection | UCLA Health Library, Los Angeles, CA." *UCLA Health*, healthinfo.uclahealth.org/Search/85,P00265. Accessed 19 Dec. 2020.

http://"Premenstrual Syndrome (PMS) | UCLA Health Library, Los Angeles, CA." UCLA Health, healthinfo.uclahealth.org/Search/85,P00581. Accessed 19 Dec. 2020.

"Polycystic Ovary Syndrome (PCOS): What Is PCOS? PCOS Symptoms, Treatment, Diagnosis | UCLA." *UCLA Health*, www.uclahealth.org/obgyn/pcos. Accessed 19 Dec. 2020.

"Fibroids: What Are Fibroids? Fibroids Symptoms, Treatment, Diagnosis – UCLA." *UCLA Health*, www.uclahealth.org/fibroids/what-are-fibroids. Accessed 19 Dec. 2020.

### Chapter 3 – Nutrition and Fitness

Reick, Garrett. "Chapter 9:Basic Nutrition and Healthy Eating, Chapter 10: Weight Management, Chapter 11: Physical Fitness." *Health Science 100*, edited by Justin Lundin, Version 3, California, Merlot, 2019, pp. 196–270, drive.google.com/file/d/1hOf6wPNjeUvWflVIRwjbB7h-qMTMMp-G/view.

Dawn Markell &, Diane Peterson. "Nutrition." *Health and Fitness for Life*, Mt Hood Community College, MHCC Library Press, 2018, pp. 50–55. *OER Commons*, mhcc.pressbooks.pub/hpe295/part/part-7.

### Chapter 4 – Body Image and Self Care

Moldenhaur, Callicut, AND Leddick, Krista Moldenhaur, Ashley Calicutt, and George Leddick. "Body Image Among Female College Students." *American Counseling Association*, 2004, www.counseling.org/knowledge-center/vistas/by-subject2/vistas-college-students/docs/default-source/vistas/vistas_2004_16. "Body Image: Not Just About Your Body | Jessi Kneeland | TEDxOnondagaCommunityCollege." *YouTube*, uploaded by TedTalk, 18 Jan. 2017, www.youtube.com/watch?v=cWESkMNPams&t=136s. Colino, Phil Catudal And Stacey. "Do You Know Your Body Type?" *EverydayHealth.Com*, 18 Nov. 2019, assessment.everydayhealth.com/body-type-quiz. "Women's Ideal Body Types Throughout History." *YouTube*, uploaded by BuzzFeedVideo, 27 Jan. 2015, www.youtube.com/watch?v=Xrp0zJZu0a4. "Men's Standards Of Beauty Around The World." *YouTube*, uploaded by BuzzFeedVideo, 18 Mar. 2015, www.youtube.com/watch?v=tneKwarw1Yk&t=56s "Body Image." *National Eating Disorders Collaboration*, www.nedc.com.au/eating-disorders/eating-disorders-explained/body-image. Accessed 14 Aug. 2020. Barcellos, Anna. "Body Image and Social Media: The College Perspective." *The Public Health Advocate*, 24 Jan. 2020, pha.berkeley.edu/2017/04/04/body-image-and-social-media-the-college-perspective. "Dysphoria vs. Dysmorphia: Mental Health Discussions in Transgender Anorexia Nervosa Treatment." *Monte Nido*, 19 June 2020, www.montenido.com/transgender-anorexia-

dysphoria-vs-dysmorphia. “10 Steps to Positive Body Image.” *National Eating Disorders Association*, 22 Feb. 2018, www.nationaleatingdisorders.org/learn/general-information/ten-steps

## Chapter 5 – Healthy Relationships and Sexuality

Reick, Garrett. “Chapter 4: Relationships and Communication, Chapter 5: Gender and Sexuality, Chapter 6: Sexual Health, Chapter 7: Infectious disease and Sexually Transmitted Infections.” *Health Science 100*, edited by Justin Lundin, Version 3, California, Merlot, 2019, pp. 196–270, drive.google.com/file/d/1hOf6wPNjeUvWflVIRwjbB7h-qMTMMp-G/view.

Rodgers, Crystal. “Women, Power, and Reproductive Healthcare | OHSU.” *OHSU Historical Collections and Archives*, 2014, www.ohsu.edu/historical-collections-archives/women-power-and-reproductive-healthcare.

Vanderbilt University. “LBGTQ Heath Concerns.” *Vanderbilt University Medical Center*, Vanderbilt University, www.vumc.org/lgbtq/key-transgender-health-concerns. Accessed 0.

Nichols, Hannah. “Surprising Ways Your Partner Can Affect Your Health.” *Medical News Today*, 7 Aug. 2017, www.medicalnewstoday.com/articles/318837.

## Chapter 6 – Pregnancy and Fetal Development

Reighter, Christen. “I Don’t Want Children — Stop Telling Me I’ll Change My Mind.” *TED Talks*, uploaded by TedxTalks, 16 Nov. 2017, www.ted.com/talks/christen_reighter_i_don_t_want_children_stop_telling_me_i_ll_change_my_mind?language=en.

Ali, Wajahat. “The Case for Having Kids.” *TED Talks*, uploaded by TedxTalks, 1 Jan. 2019, www.ted.com/talks/wajahat_ali_the_case_for_having_kids/transcript?language=en#t-195692.

Betts, Gordon. “Anatomy and Physiology – Open Textbook.” *Pressbooks*, 6 Mar. 2013, opentextbc.ca/anatomyandphysiologyopenstax.

## Chapter 7 – Labor and Childbirth

Betts, Gordon. “Anatomy and Physiology – Open Textbook.” *Pressbooks*, 6 Mar. 2013, opentextbc.ca/anatomyandphysiologyopenstax.

McClurg, Lesley. “Home Birth Can Be Appealing, but How Safe Is It?” *NPR*, OPB, 11 Mar. 2019, choice.npr.org/index.html?origin=https://www.npr.org/sections/health-...how-safe-is-it.

“Default – Stanford Children’s Health.” *Stanford Children’s Health*, 2020, www.stanfordchildrens.org/en/topic/default?id=overview-of-pregnancy-loss-90-P02466

Hanasono, Lisa. “The M-Word: Shattering the Silence on Miscarriage.” *TED Talks*, uploaded by TedxTalks, 11 May 2018, www.ted.com/talks/lisa_hanasono_the_m_word_shattering_the_silence_on_miscarriage.

## Chapter 8 – Breast Health and Female Cancers

Betts, Gordon. “Anatomy and Physiology – Open Textbook.” *Pressbooks*, 6 Mar. 2013, opentextbc.ca/anatomyandphysiologyopenstax.

Reick, Garrett. “Chapter: Cancer.” *Health Science 100*, edited by Justin Lundin, Version 3, California, Merlot, 2019, pp. 196–270, drive.google.com/file/d/1hOf6wPNjeUvWflVIRwjbB7h-qMTMMp-G/view.

“What Is Breast Cancer Screening?” *Centers for Disease Control and Prevention*, 28 Sept. 2020, www.cdc.gov/cancer/breast/basic_info/screening.htm.

“What Is Breast Cancer?” *Centers for Disease Control and Prevention*, 17 June 2020, www.cdc.gov/cancer/breast/basic_info/what-is-breast-cancer.htm.

“What Are the Risk Factors for Breast Cancer?” *Centers for Disease Control and Prevention*, 14 Sept. 2020, www.cdc.gov/cancer/breast/basic_info/risk_factors.htm.

“Basic Information About Ovarian Cancer | CDC.” *Center for Disease Control*, www.cdc.gov/cancer/ovarian/basic_info/index.htm. Accessed 11 Nov. 2020

### Chapter 9 – Stress

Whats Up Dude. “Stress – What Is Stress – Why Is Stress Bad – What Causes Stress – How Stress Works.” *YouTube*, uploaded by YouTube, 17 May 2016, www.youtube.com/watch?v=dERu8051t4w&ab_channel=WhatsUpDude.

Dawn Markell &, Diane Peterson. “Stress.” *Health and Fitness for Life*, MHCC Library Press, 2018, pp. 75–85. *OER Commons*, mhcc.pressbooks.pub/hpe295/chapter/what-is-stress-and-how-does-it-affect-wellness.

Reick, Garrett. “Chapter 3: Stress Mangaement.” *Health Science 100*, edited by Justin Lundin, Version 3, California, Merlot, 2019, pp. 196–270, drive.google.com/file/d/1hOf6wPNjeUvWflVIRwjbB7h-qMTMMp-G/view.

TED. “How to Make Stress Your Friend | Kelly McGonigal.” *YouTube*, uploaded by YouTube, 4 Sept. 2013, www.youtube.com/watch?v=RcGyVTAoXEU&t=35s&ab_channel=TED.

### Chapter 10 – Growing Older

*Center for Disease Control*, CDC, www.cdc.gov/chronicdisease/about/index.htm#:%7E:text=Chronic%20diseases%20such%20as%20heart,in%20annual%20health%20care%20costs. Accessed 1 Sept. 2020.

Digital Communications Division (DCD). “Healthy Aging.” *HHS.Gov*, 20 Oct. 2020, www.hhs.gov/aging/healthy-aging/index.html.

## Purdue OWL MLA

### Works Cited page:

https://owl.purdue.edu/owl/research_and_citation/mla_style/mla_formatting_and_style_guide/mla_endnotes_and_footnotes.html

#### Endotes & Footnotes:

https://owl.purdue.edu/owl/research_and_citation/mla_style/mla_formatting_and_style_guide/mla_endnotes_and_footnotes.html

# Index

## D

# Glossary

**Sample Word 1** | Sample Definition 1

# Detailed Licensing

## Overview

**Title:** Remix: Women's Health (Markell)

**Webpages:** 23

**All licenses found:**

- CC BY 4.0: 56.5% (13 pages)
- Undeclared: 43.5% (10 pages)

## By Page