

## Mammography



**Mammary Glands** The mammary glands, or breasts, are actually modified sebaceous glands (sweat) that are designed to secrete milk. On average, each breast weighs 200–300 g. They are composed of glandular tissue, fat, and supporting or stromal tissue. Each breast is organized into 12–25 triangular shaped lobes. Each lobe is composed of several smaller lobules. The breast lobules are linked by a collecting duct system which is responsible for the passage of milk. The spaces between the lobules are filled with fatty tissue. This intricate duct system terminates in the central portion of the breast, the areola or nipple area.

Pathologic (disease) changes may occur in any of the breast tissue. For example, the fat tissue in the breasts may actually necrose, or die, in response to trauma. Additionally, the stromal or support tissue of the breasts may give rise to fibrocystic changes, or benign solid tumors, called fibroadenomas. Breast cancer may also develop in any part of the breast.

Breast tissue responds to hormonal changes. Pain and swelling may occur prior to menstruation. Additionally, certain medications, particularly hormonal medications such as oral contraceptives, may also cause changes in the breasts. Early in pregnancy, the breasts prepare for lactation and may become tender and enlarged. After delivery, the breast tissue engorges to prepare for breast-feeding. When a woman chooses not to breastfeed or when she weans her infant, engorgement (swelling due to milk accumulation) may cause pain, and even a low-grade fever. The pain usually responds well to mild pain medications and cold compresses, and will usually resolve in approximately 2 weeks.

As women age, breast pain often diminishes. Hormone replacement therapy, however, may trigger pain in postmenopausal women.

**SEE ALSO:** Breast-feeding, Mammography, Mastectomy, Mastitis, Pregnancy

KAREN ASHBY

AQ: Are there is any references for "Suggested Reading"?

**Mammography** Breasts share the same basic structure. The mammary glands produce milk and are found in clusters throughout the breast. Ducts take the milk from the glands to the nipple during breast-feeding. Lymph nodes are present under the arm. The lymph nodes are small, normally bean-sized structures that help to fight infection and enlarge in the presence of infection or cancer in the breast tissue. There are reservoirs within the breast that store the milk. The areola is the part of the nipple that lubricates the nipple with oil. Fat in fibrous tissue surrounds the glands and ducts and gives the breast its smooth shape. Women who have more fat tissue in the breast have a softer breast, while having more fibrous tissue in the breast makes the breast feel firmer. Normally, a lump is easier to locate in a softer or more fatty breast, as compared to a firmer, dense breast.

At the time of each menstrual cycle, the drop in hormones results in a sloughing (breakdown) of the ductal lining. This lining re-grows again in a cyclic fashion. The blood vessels around the ducts in other cells

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also undergo changes during the menstrual cycle. This causes the breasts, in some women, to become swollen, tender, denser, or lumpier in the week before menstruation. During pregnancy, the milk glands, ducts, areolae, and nipples enlarge. The breasts feel heavy, lumpy, and tender when nursing stops. Breasts usually return to their former size; however, they may be less firm. In many parts of the breast, the glandular growth remains until it reduces at the time of menopause. At the onset of menopause, there is a loss of breast tissue, structural components, and an increase in the fat. The milk glands and ducts shrink and the breasts become smaller and softer. The supporting ligaments lose some of their strength. It is important to note that the changes associated with the hormonal changes during a menstrual cycle are not uniform throughout the breast. This can cause some asymmetric findings on physical examination of the normal breast.

## EPIDEMIOLOGY

As a result of widespread screening, breast cancer is the most commonly diagnosed cancer and the second leading cause of cancer deaths in women. The most common cause of death from cancer is lung cancer. Breast cancer in women under the age of 55 is an important cause of cancer death; however, half of all new cases and over half of the deaths occur in women over the age of 65 years. The estimated lifetime risk of developing breast cancer is now one out of every eight women.

## RISK FACTORS FOR BREAST CANCER

The National Cancer Institute has developed a computer program that uses information to calculate a woman's estimated risk of breast cancer. This program can be found on the institute's website (<http://cancertrials.mci.nih.gov>).

Factors in the development of breast cancer include increased risk with increased age. The risk of breast cancer is greater with earlier onset of menarche (first menstrual period), which is the age that menstrual cycles begin. The age of the first live birth is important as the risk increases with later age of first pregnancy. Risk increases with the number of first-degree relatives with breast cancer. Prior breast biopsies, especially those showing atypical hyperplasia (abnormal cells on

microscopic exam) help to predict an increased risk of breast cancer. Race is important as the risk is greater in White females. African American women have a lesser risk of breast cancer followed by Hispanic American women. Japanese American women have the lowest risk of breast cancer. It is important for all women to understand that all are at risk for breast cancer and that the majority of women with breast cancer have no identifiable risk factors. Other established risk factors include rare genetic problems that account for 5–10% of breast cancers. These are called BRCA-1 and BRCA-2 gene mutations. Risk factors for women with a personal history of breast cancer include a history of some specific breast cancers (ductal or lobular carcinoma in situ), or a history of receiving high dose radiation therapy at an age of younger than 40. Late age at menopause is another risk factor.

## WHAT IS A MAMMOGRAM?

A mammogram is an x-ray of the breast tissue. The mammogram is reviewed by a radiologist, and if he/she finds an abnormality, may recommend other examinations. The mammogram should be scheduled during the time that the breasts are less likely to be tender. This will help to ensure that it is a more comfortable experience. It is important not to use deodorant, powder, lotion, or perfumes on the breasts or under the arms. Mammography is a simple procedure. The woman undergoing the exam undresses from the waist up and the breast is positioned on the x-ray machine and placed between two flat pieces of plastic. The breast is pressed between the plates for a few seconds while the x-ray picture is taken. The pressure is slightly uncomfortable to many women, however, it does not harm the breasts. It is x-rayed from the side and from above. The complete examination takes about 15 min.

An ultrasound examination utilizes sound waves to produce an image of the breast tissue. It is used to evaluate whether a lump is a fluid-filled cyst or a solid lump. Fluid-filled cysts are not cancerous. Solid lumps may or may not be a cancer. The next step for a solid lump is usually a biopsy, where a small amount of the tissue or the entire lump is removed and analyzed. It is important to note that most lumps are not cancer.

The average mammogram delivers between 0.7 and 1 rad (x-ray units of measure), which is a minimal amount of radiation. This is about 10% of the exposure delivered 20 years ago. While there is a miniscule

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increased risk of cancer due to the radiation, the far greater risk is in missing a curable cancer at an early stage.

As in many fields of medicine, there is ongoing reassessment of the way that we look for early cancers, and breast cancer is no exception. The National Guideline Clearinghouse provides a guideline synthesis compiling all the major guidelines for breast cancer screening. The American Cancer Society, the American College of Radiology, and the U.S. Preventive Services Task Force recommend routine mammographic screening for women between the ages of 50 and 69 years. The U.S. Preventive Services Task Force recommends annual or biannual screening, while the American Cancer Society recommends annual screening. The screening should begin earlier in women with high risk for breast cancer (including those having relatives with breast cancer). The organizations that evaluate screening agree that there is no clear age at which mammography should be no longer offered to patients. However, this decision should be made on an individual basis, based on the person's preference and her potential risks and benefits of the procedure. The main area of controversy is the mammographic screening of women between the ages of 40 and 49, who are at average risk for breast cancer. The American Cancer Society, the American College of Radiology, and the U.S. Preventive Services Task Force recommend routine screening in this age group. All three guideline groups acknowledged that the benefit of screening in women younger than 50 is weaker than the evidence for older women; however, they do support the screening. The recommended frequency of mammography in a woman in her 40s is every 1–2 years. This should be decided with her health care provider.

### AT WHAT AGE SHOULD WE STOP GETTING MAMMOGRAMS?

Beyond the age of 70, the patient and her physician should make the decision. Frail elderly women with other life-limiting conditions may choose not to have this test performed.

Even though breast self-examination is not a proven way to screen for breast cancer, it is important to emphasize that women should be advised to report any breast changes that they may detect themselves to their physicians. It is important for the patient to look and feel for breast changes on her own.

### BRCA-1 TESTING

In recent years, a breast cancer gene called BRCA-1 has been identified and it carries an 85% lifetime risk of breast cancer and a 60% risk of ovarian cancer. These familial breast cancer syndromes account for less than 1 in 10 breast cancers. Even in women with several family members with breast cancer, routine screening for BRCA-1 is negative more than 90% of the time. BRCA-1 gene testing is not indicated in every day practice, as there is no long-term data to support its use.

**SEE ALSO:** Breast cancer, Breast examination, Breast-feeding, Breast lumps, Lactation, Mastectomy

### Suggested Resources

The American Cancer Society: [www.cancer.org](http://www.cancer.org) and National Comprehensive Cancer Network (NCCN): [www.nccn.org](http://www.nccn.org)  
The National Cancer Institute: <http://cancertrials.mci.nih.gov>

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### Manic Depressive Disorder *see* Bipolar Disorder

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**Marianismo** As projected, the most recent census data has confirmed that the Latino population has become the largest ethnic minority population in the United States. The increase in population reinforces the need for a greater understanding of cultural variables that impact the provision of culturally competent services. One of these variables is the concept of marianismo. The term *marianismo* originated in the anthropological literature and was used to describe the observed behavior of Latina women in Latino society. It implies that women are spiritually superior to men and subsequently able to withstand extreme sacrifices and suffering for the sake of the family. The self-sacrifice involved in this marianista identity, likened to martyrdom, enables the Latina woman in traditional Latino culture to gain respect and admiration from others. This is where she extracts her identity and power. In return for her suffering, she expects to be highly reinforced through other's esteem of her. The reinforcing

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components of marianismo send strong messages about what is expected of the Latina woman.

In the mental health literature, Latino professionals discuss marianismo as a framework to help clinicians understand what Latina women are experiencing in mainstream American society. Practitioners found Latinas in treatment often presented with struggles involving cultural conflicts or differing sex role expectations. In treatment, marianismo is a cultural component that can guide understanding and therapeutic intervention with Latinas faced with negotiating these struggles.

Marianismo encompasses traditional cultural dictates related to sexuality, gender roles, family, motherhood, relationships, and behavior. Marianismo defines the Latina "role model" as the Virgin Mary, emphasizing virginity and non-sexuality for the "good" woman. The sexual messages Latinas receive within their cultural contexts tend to be intermixed with issues of duty, honor, security, self-worth, and control, but never with satisfaction or pleasure. The high value placed on sexual morality has great implications for Latinas being raised in the United States. For example, Latina adolescents may face conflict over the dominant society's dating norms and family's restrictions. In addition, traditional sexual mores may put the Latina at risk of sexually transmitted diseases by not questioning her partner's sexual behavior or securing her own sexual protection. It may also place them at risk of becoming victims of domestic violence. The risks identified above are due to: (a) males having the sexual and decision-making rights; (b) acceptance of male infidelity; (c) the denial of bi-sexuality in the Latino community; and (d) the submissiveness of Latinas.

The Latina is expected to sacrifice her needs for that of her family, especially her children. In traditional Latino culture, the Latina's value is increased when she becomes a mother. The Latina also gains power through subscribing to marianismo and exerting indirect manipulation through her children. It is not surprising then that, when there is a conflict over roles, the Latina will more likely choose the role of mother. These findings have implications for the attainment of both educational and professional goals. Researchers have found that Latinas, who delayed marriage and family, pursued a college career more often and tended to persist in college longer than women following traditional sex roles. Thus, the conflict between traditional roles of wife and mother and having a career may be particularly significant for Latina women.

Cultural conflicts arising from marianista values versus American values can cause psychological

distress. Thus, Latina women must learn to reshape traditional role expectations in response to the majority's structural demands. The Latina must learn to negotiate conflicting values and begin identifying areas of change. The focus of this negotiation process is that of a person-environment fit. It does not place judgment or blame on the Latina. In practice, the clinician needs to be aware of this adjustment and role identification process, while continuing to recognize variability of marianismo values and conflicts within each Latina. The Latina must be able to envision herself as an agent of change in order to accept herself as a competent, successful, worthy Latina, capable of self-love. The Latina woman in the United States must learn to negotiate the components of her marianismo and decide on what she wants to retain, modify, or dismiss and in what environments she chooses to do any or all of the above.

The concept of marianismo is not without critics. Many believe that the term places a negative stereotype on Latina women and believe a more accurate description of marianismo, is the concept of a traditional cultural value set. Whether one uses the term marianismo or the concept of values, like any descriptor of a group, both individual and group differences must be accounted for. Thus, it is not assumed that every Latina will have internalized every or any aspect of marianismo nor is it assumed that an "acculturated" or "assimilated" Latina does not struggle with cultural conflicts related to marianismo and American culture. In sum, while marianismo can aid understanding and boost culturally competent services, it is not to be used as a definitive label of the Latina.

**SEE ALSO:** Acculturation, Gender role, Latinos

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MELISSA RIVERA MARANO

## Marijuana

**Marijuana** Marijuana or hemp (*Cannabis sativa*) is a plant that has been cultivated for thousands of years in various parts of the world for its fiber, seeds, medicinal, and psychoactive properties. The chemical compounds responsible for the intoxicating and therapeutic effects are found in the sticky resin released from the flowers of female plants. The marijuana plant contains more than 400 known compounds of which about 60 have a structure similar to cannabinoids. The main psychoactive substance is generally believed to be delta-9-tetrahydrocannabinol (THC). Cannabinoids act on a specific receptor that is widely distributed in the brain regions involved in cognition, memory, pain perception, and motor coordination.

Marijuana (“grass,” “weed,” “pot”) is prepared by drying the leaves and the flowering tops of the plant, and may be smoked in a rolled cigarette (“joint”), in a pipe or, more recently, in a cigar (“blunt”). Hashish consists of dried cannabis resin and generally contains higher levels of THC. Cannabis preparations may also be eaten or drunk as a tea, but smoking is the easiest way to achieve the desired psychoactive effects.

In the United States and most of the developed world, cannabis is an illegal substance and is primarily used for its psychoactive properties. However, for centuries marijuana has been used in various part of the world not only as an intoxicating agent but also as a medicinal substance.

From 1850 until 1937, cannabis was used in American medical practice for a wide range of conditions. The Marijuana Tax Act of 1937 introduced the first federal restrictions on marijuana and outlawed the non-medicinal, untaxed possession or sale of the drug. The Comprehensive Drug Abuse Prevention and Control Act of 1970 classified marijuana as a Schedule I controlled substance. Since then, there have been several attempts to legalize its medical use. In 1987, the Food and Drug Administration approved dronabinol, a compound containing synthetic THC, as a Schedule II controlled substance for treatment of chemotherapy-induced nausea and vomiting.

In the United States, cannabis became a major drug of abuse in the late 1960s, with peak usage occurring in the late 1970s and early 1980s. According to the Monitoring the Future Survey, in 1979, about 51% of high school seniors reported having used marijuana at least once in the past 12 months. The lowest levels of use occurred in 1992 with about 22% reporting annual use. The 1990s saw the resurgence of use, and annual

prevalence rates peaked in 1997 reaching almost 40% among twelfth grade students. Currently, marijuana is the most commonly used illicit drug in the United States according to the 2001 edition of National Household Survey on Drug Abuse.

Despite the fact that cannabis is one of the most widely used psychoactive substances in the world, its health and psychological effects are still not well understood and remain the subject of much debate. Due to its legal status, clinical studies of marijuana are difficult to conduct. As a result, data on the adverse effects of the drug are more extensive than data on its therapeutic effectiveness.

Cannabinoids produce a variety of acute psychological effects in humans. THC is rapidly absorbed into the bloodstream after smoking, and acute peak effects appear between 10 and 60 min, diminishing substantially over the next 2–4 hr. Oral administration is slower to take effect and lasts longer. Psychological effects (being “high” or “stoned”) are usually characterized by euphoria and relaxation coupled with the intensification of ordinary sensory experiences, including sexual activity. Short-term memory and attention, motor skills, and reaction time are also impaired while a person is intoxicated. High doses of the drug can facilitate anxiety, paranoia, and panic in both experienced and naïve users.

For a long time it was thought that marijuana dependence was not possible. Recent research suggests tolerance and withdrawal, and therefore dependence, may occur in long-term, high dose (daily) users; however, it is not seen in casual or moderate users. The symptoms of withdrawal may include irritability, insomnia, restlessness, loss of appetite, and more, but none are life threatening.

Physiological effects are many and varied but particularly noteworthy for individuals with cardiovascular problems, since the fluctuations in blood pressure and increases in heart rate exacerbate those problems. There are no reports of deaths that are directly linked to cannabis overdose from its acute effects in healthy adults. A number of in vitro and in vivo studies suggested that the immune system may be impaired after exposure to cannabis. However, the clinical significance of these changes is not well understood, and there is no conclusive evidence that consumption of cannabis impairs human immune function. Studies conducted with HIV-positive homosexual men have shown that cannabis use was not associated with an increased risk of development of AIDS among HIV-infected individuals.

Although there is a paucity of information on gender-specific marijuana effects, some evidence

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suggests that cannabis affects sex hormones. In animal studies, chronic administration of high doses of THC lowers testosterone secretion, impairs sperm production in males, and disrupts the ovulation cycle in females. However, evidence of the effects of cannabis on human fertility is inconclusive. Suffice it to say, individuals experiencing fertility problems would benefit from remaining abstinent from cannabis.

In some parts of the world, cannabis preparations were thought to have therapeutic value in childbirth and pregnancy. In modern medical practice, cannabis is considered to have damaging effects on the fetus. Numerous studies have explored cannabis as a perinatal risk factor, but the results of these studies have been contradictory, and it was difficult to isolate the effects of cannabis from many other variables that could influence the outcomes of pregnancy. Nevertheless, new clinical studies suggest that prenatal exposure to cannabinoids does result in adverse consequences for the offspring. However, these defects are subtle and are not apparent immediately after birth. Again, for pregnant or breast-feeding women, abstinence from cannabis should be the norm.

Advocates of the medical marijuana movement argue that cannabis has numerous therapeutic properties and is less toxic and more effective than some conventional therapies. Considerable debate exists in this area and will not be resolved soon, in large part because there is a lack of clinical studies to evaluate potential benefits and adverse effects in comparison to other existing therapies.

**SEE ALSO:** Addiction, Substance use

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RAMINTA DANIULAITYTE

**Marital Status** Sociologists refer to marital status as an achieved characteristic, in the sense that marital behavior is socially defined and influenced, rather than having any biological properties. Children are typically assumed to be single (never married), whereas adults are generally classified as being single, married, separated, divorced, or widowed, although of course people may change categories at various times in their lives. Virtually every human society assumes that most people will marry when they become adults, and social and biological reproduction tend to take place in the family unit formed by married people.

Data from the 2000 Census in the United States show that 24% of females aged 15 and older had never been married, a slight increase from 23% in the 1990 census. Almost half of women (49%) were currently married with a spouse present in 2000, while 16% were separated or divorced, and 10% were widowed. These figures vary by age, of course, with divorce and especially widowhood increasing with age. Globally, the average age at marriage for women is a key determinant of their social status, and even in the United States, the Current Population Survey in 2000 found that women were marrying 4 years later in life than they had in 1970. In 2000, the median age at first marriage was 25.1 years for women and 26.8 years for men, while in 1970, the corresponding figures were 20.8 and 23.2.

The postponement of marriage has led to a substantial increase in the proportion of young, never-married adults. For example, between 1970 and 2000, the proportion of those who had never married doubled for women ages 20–24, from 36% to 73% and more than tripled for women ages 30–34, from 6% to 22%. Among existing marriages, the divorce rate has stabilized since the 1980s, with about 40% of marriages likely to end in divorce in the United States.

Marital status is an important factor (along with education, race, and age) influencing labor force participation and differences in economic well-being of households. Single women without children spend a far larger proportion of time over their life cycle in labor market activity, increasing economic inequality among women. However, families headed by females, especially those with children, are among the poorest households in the United States. The obvious disadvantage is that a household with only one earner (e.g., a single mother) will have fewer resources than a household with two or more earners. However, the impact may go beyond that. Research has also demonstrated that family and other

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social networks can help people find employment and meet basic needs. Many types of resources flow to individuals who have strong network attachments, including childcare, help in emergencies, and resources that allow people to undertake new endeavors such as school enrolment or the purchase of a new home. Married people, who have greater material resources, also have larger support networks, both in the number and the variety of sources of support. Those who have never married and have lower human capital are most likely to reside with relatives or friends. Resources from family and others outside the household are an important income source for low-income single mothers.

The relationship between marital status and health has been a topic of interest for some time. It has been shown in the United States as well as in several other countries that married persons have lower rates of mortality, morbidity, and mental disorders than the unmarried. Among the unmarried, there are several patterns of health differentials. When self-reported health status and health conditions are used, the divorced and separated have the highest rates of poor health, followed by the widowed. Rates of mental illness are lowest for the married and never married, followed by the divorced, widowed, and finally, the separated.

There are two widely accepted explanations about the relationship between marital status and health: (a) marriage selection and (b) marriage protection. Marriage selection refers to the differential selection into and out of marriage. Generally, spouses may be selected into marriage based on the absence of physical and mental disability, as well as on a range of health-related characteristics such as emotional stability, risk-taking personality, income, and physical appearance. On the other hand, marriage may protect against poor health in several ways. Marriage may strengthen social integration; provide a source of instrumental support for tasks like household work; increase economic resources; contribute to the pool of knowledge and important information processing; and may provide practical assistance and care, especially when a member of the family gets sick. The presence of a spouse may also discourage risky behaviors such as heavy drinking and substance abuse and encourage healthy behaviors like adherence to medical regimens. It is often found that smoking and alcohol abuse are more common among the unmarried, and in particular, the divorced.

Married people may also benefit from emotional rewards from family relationships. However, changes in

marital status, such as the death of a spouse, may also be harmful. Such psychological factors may well influence various important lifestyle factors, and thus contribute to a weakening of the patient's physical health. Marital disruption, a particularly stressful life event, elevates the risk of psychological distress thereby contributing over the longer run to poor physical health outcomes. In that case, widowhood, divorce, and separation elevate the risk of poor health compared with marriage (and being never married).

Some researchers have found that marriage tends to be more beneficial to the health of men than of women, whereas others conclude that both sexes benefit equally from marriage, but perhaps for different reasons. Women's marital status is an important predictor of some categories of health problems; however, their influences vary for women of different age. It is observed that divorce and poor female health status are highly correlated in those societies where divorce is uncommon and discouraged, because the divorce decision is usually taken after many difficult years, which can be damaging to health. It has also been suggested by several studies that differences in economic well-being account for much of the difference in marital status and health for women, because with high economic status, women can afford to buy health insurance, housing, and nutrition.

Unmarried men engage in well-established risky health behaviors, including heavy drinking, drinking and driving, substance abuse, and marijuana use, and consequently are more likely to have physiological markers of cardiovascular disease, such as high blood pressure and worse cholesterol levels, than married men. However, the association between marital status and these risk factors is weaker and less consistent for women. The health advantages of marital status probably vary by race and ethnicity. Several researchers suggest, for example, that divorce impacts the mental health of Black women less than for White women because divorced Black women experience less stigmatization and more support from family and friends than divorced White women.

**SEE ALSO:** Ethnicity, Morbidity, Mortality, Socioeconomic status

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## Masculinity

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**Marriage Counseling** *see* Couples Therapy, Divorce Mediation, Psychotherapy

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**Masculinity** Masculinity defies a simple definition. It is typically represented as a set of stereotypical characteristics that constitutes an energy, an essence, or a state of being. But in this case, the whole would appear to be greater than the sum of its parts. We recognize masculinity when it is encountered, but it is difficult to distill the interacting components into a single, unifying definition that can be applied uniformly.

The most commonly encountered representation of masculinity is best described by sex-role theory, which proposes that humans unconsciously integrate archetypical ways of behaving that are appropriate to their assigned sex from society's institutions (see Femininity). Sex-role theory characterizes masculinity as aggressive, rational, dominant, and objective, and organizes it as the polar opposite of femininity. However, life is not so simple. Instead, a majority of men and women in a given society at a particular point in time will endorse a hegemonic masculinity. This means that social processes are organized in cultures to maintain masculine power by ensuring that subordinate groups view male dominance as fair, reasonable, and in the best interests of society.

Despite varying standards of masculinity throughout history, it has always tended to define itself as different from and superior to femininity. In contemporary U.S. culture, hegemonic masculinity is exemplified by

physical strength and bravado, suppression of vulnerability, economic independence, authority over women and other men, and exclusive heterosexuality with associated objectification of women. The fact that few men actually embody all of these qualities is of no consequence. U.S. society supports hegemonic masculinity in its institutions.

Societies tend to value masculinity over femininity. This is exemplified by the extraordinary efforts in which couples engage throughout the world to ensure that they produce at least one son. Furthermore, societies expend tremendous amounts of energy to guarantee that most males do not stray into the feminine realm and will idolize hegemonic masculinity. Additionally, the stereotypical traits embodied within hegemonic masculinity also are not valued equally. For example, gay men may exemplify all of the qualities of hegemonic masculinity, but because they fail on the most valued trait—exclusive heterosexuality—they are not considered *real men*.

Hegemonic masculinity reinforces the division of labor between males and females. Perhaps the most graphic example of this is that when men enter occupations dominated by women, such as nursing and elementary school teaching, they receive better salaries, are promoted faster, and are afforded more respect than their female colleagues. Therefore, despite all of the advances achieved through the hard work and dedication of feminists, power is still solidly within the realm of masculinity. How is this possible? Men have adjusted their relationship to women by accommodating superficial changes but they have not allowed genuine reform. Thus, within the paradoxical context of real progress, hegemonic masculinity has managed to hold and consolidate its privileges.

New movements have recently emerged that attempt to reject hegemonic masculinity in lieu of moving toward a more inclusive social framework. A notable example is the Mankind Project Network. This framework defines a mature masculinity as one that integrates archetypical representations of king, warrior, magician, and lover, and seeks to confront the destructive shadow side of each. For example, the warrior archetype consists of two opposite and equally destructive poles—the sadist and the masochist. A mature masculinity seeks to integrate the opposite poles for each of the four archetypes and find a center between them. The Mankind Project Network relies on the use of ritual and rites of passage as a means of connecting men to their growth process and the expression of moral and ethical behavior within society.



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It remains to be seen if these new masculine movements represent a true reform of hegemonic masculinity or if they merely are a new form of accommodation to women that will result in consolidating male dominance.

**SEE ALSO:** Femininity, Feminism, Gender, Gender role, Homosexuality

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ANGELA PATTATUCCI ARAGON

**Massage** Massage is derived from the Arabic word *mass* meaning *to press* and has been defined by Westland (1993) as *the aware and conscience manipulation of soft tissues of the body for therapeutic purposes*. Many ancient cultures developed various systems of massage to promote health and healing. Contemporary approaches of massage have included bodywork

techniques such as strain-counterstrain, myofascial release, craniosacral therapy, shiatsu, acupressure, Rolfing, and applied kinesiology.

Some women may consider massage to be a luxury; a form of self-indulgence to deal with tension and feel more relaxed. Others may think about massage as a way to manage more specific conditions such as pain, swelling, scar tissue adherence, and muscle or tendon tightness. Knowing and distinguishing between the different benefits that can be derived from various massage approaches can help women determine the best intervention for their given condition or goal. Women will also find it helpful to be familiar with the wide range of practitioners who are skillful in applying massage for a variety of purposes and conditions. Examples of such practitioners include physical therapists, nurses, chiropractors, osteopaths, athletic trainers, and massage therapists.

For the purposes of this entry, massage will be limited to classical Western massage, which includes techniques that have ancient roots, but have been used traditionally in Europe and the United States since the 19th century. The application of massage may produce multiple and/or simultaneous effects. The benefits of massage and the effects of massage have been well described in the scientific literature, and are summarized in Table 1.

Women should be aware that the effects depicted in Table 1 do not necessarily occur with every massage session and individual results may vary based on age,

**Table 1.** Benefits and effects of massage

Effect	Description	Benefits/outcomes
Mechanical	Movement of body fluids, such as blood and lymph	↓ Edema (fluid accumulation) ↓ Swelling
	Movement of soft tissue, such as muscle, scar, tendons	↓ Pain ↑ Flexibility of tissues ↑ Mobility
Physiological	At the cellular level, increase flow of nutrients and removal of waste products	↑ Mobility
		↓ Edema ↓ Swelling ↓ Pain ↓ Muscle spasm
Psychological/emotional	Promotion of relaxation, decreased anxiety, decreased depression	Relief of pain Relief of stress Release of tension Increased body awareness
Immunological	Enhance immune function and improved cell function	↑ Relaxation
		↓ Anxiety ↓ Pain ↓ Cortisol

## Massage

health status, and receptivity. Women, therefore, should be clear about the benefits they are hoping to achieve through massage. It is recommended that a woman choose a practitioner who not only can examine a client's status, and is skillful in applying massage techniques, but is also able to determine if massage will help the client achieve her goals.

Massage has been used as an intervention or approach to address a wide range of health issues prevalent in women. Some of these health concerns include stress, anxiety, depression, and headaches; gynecological issues such as fibroids and pregnancy/labor and delivery; and premature or low-birth weight infants.

The most compelling benefit of massage is in the area of stress reduction and health promotion. Stress can be defined as a general feeling of fatigue and tension. Psychological consequences of stress can include decreased coping behaviors and alteration of mood patterns. Physiological changes associated with stress include hypertension (high blood pressure); increased respiratory rate and heart rate; changes in levels of glucose, cortisol, adrenaline/norepinephrine; and alterations in blood flow rates to muscle.

In addition to cognitive and behavioral therapies, effective stress management often includes massage as a strategy that can promote relaxation by heightening body awareness and increasing sensory feedback. In several studies, massage has been demonstrated to be effective in reducing both hypertension and rapid respiration. Anxiety and depression are conditions that are distinct from stress, but frequently accompany stressful situations. Symptoms common to anxiety are muscle tension, heart palpitation, sweating, and insomnia. Symptoms common to depression include decreased concentration, irritability, and insomnia. Often a combination of symptoms is presented. As anxiety, depression, or stress become chronic, women are likely to respond to muscle tension, pain, and fatigue with abnormal sitting and standing postures as well as changes in movement patterns. Massage would then be used as a tool to produce the additional changes needed for proper body alignment as well as the necessary physiological and psychological changes.

Researchers have investigated massage as an intervention for depression in subjects with a history of sexual abuse, eating disorders, and postpartum depression. In these studies, massage appears to be helpful in reducing depression and anxiety associated with the given disorder. In some instances, positive changes in

body awareness and body image, and a reduction of stress hormone levels have been noted.

Many women suffer from recurring tension and migraine headaches, which may or may not be associated with stress. Several researchers have demonstrated that massage, when administered as part of a pain management regimen, is beneficial for reducing the severity and duration of headaches. Although the mechanism as to how massage can affect headaches requires additional investigation, researchers suggest that massage can directly affect the soft tissue impairments that lead to abnormal muscular tension and irregular blood flow patterns commonly found with headaches and migraines.

Pregnancy, along with labor and delivery can be responsible for trauma and disorders of the female musculoskeletal and urogenital systems. Back pain during pregnancy, which is often due to postural changes and joint laxity, can frequently be improved with a combination of massage, exercise, posture training, and proper positioning. Historically, massage during labor was used to assist in uterine contractions and movement of the baby's position. Today, the purpose of massage during labor and delivery is to promote relaxation and pain reduction. Researchers have demonstrated that women receiving 20-min massages every hour during labor report fewer depressed moods, less stress, and less pain compared to women not receiving massages.

Perineal massage is a specific type of massage performed directly to the perineum, the area between the vulva and the anus. Many obstetrician/gynecologists advocate the use of perineal massage to reduce the risk of tearing the perineum during delivery as well as to reduce the need for an episiotomy, a procedure in which the obstetrician surgically cuts the vulva to prevent it from tearing. During pregnancy, women are taught perineal massage and are encouraged to practice it on a regular basis. At the time of delivery, her obstetrician further performs the massage. At present, there are conflicting findings regarding the benefit of perineal massage, although women often report satisfaction with the technique in preparing both physically and psychologically for birth.

For new mothers of premature infants, massage has been demonstrated to facilitate the infant's growth and development. In several studies, premature infants that receive massage have shown improvement in motor function, greater weight gain, and better sleep cycles. The positive effects of massage frequently found in adults, such as a lower heart rate, decreased respirations,

## Mastectomy

and a reduction of stress hormones are also found in the infants who receive massage. Often the newborn's mother is trained to perform massage with her baby both in the hospital and at home.

There are additional gynecological disorders for which massage may be clinically applied. The effectiveness of massage application for scar management of fibroids, infertility due to scar adhesions, and cosmetic breast scars has yet to be expanded and explored. Further research is needed in these areas. It should be mentioned that massage does not produce changes in subcutaneous fat distribution, cellulite, or change in body contours.

The benefits of massage have been well documented in the scientific literature. To reduce stress and improve overall health, women should consider working with a practitioner who can administer therapeutic massage as part of a health and wellness program. Women who are pregnant should explore massage for its physiological and psychological benefits. Regardless of one's condition, however, it is important to find a practitioner who can examine your condition and assist you in determining if massage will help you reach your desired outcome or goal.

**SEE ALSO:** Anxiety disorders, Depression, Headache, Migraine, Pregnancy, Stress

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**Mastectomy** Mastectomy is a surgical procedure which involves the removal of either the entire breast or a segment of the breast. Usually performed for cancer of the breast, it can also be used for prophylactic removal of the breast for women who are at high risk of developing breast cancer.

Breast cancer begins as a local disease in the breast and if not treated spreads (metastasizes) to other parts of the body. The idea of removing the breast or a part of it goes as far back as Vesalius in the 16th century. Currently the type of surgery performed is determined by the extent or "stage" of the cancer.

### STAGES OF BREAST CANCER

*Stage 0 (in situ).* This includes ductal or lobular carcinoma in situ (CIS), which is noninvasive cancer and Paget's disease, which is a local cancer of the nipple. There are two types of in situ: (a) Intraductal (DCIS) which is noninvasive ductal carcinoma and (b) lobular CIS which is precancerous, more often multicentric (found throughout the breast), more often in both breasts.

*Stage I.* Early cancer, the tumor is 2 cm (3/4 of an inch) or smaller with no evidence of tumor in the axillary lymph nodes (under the arm) and no distant metastasis.

*Stage II.* Tumor size is 2–5 cm (3/4–2 in.), lymph nodes may be positive or not; but if the nodes are positive in a tumor less than 2 cm in size, this would qualify as Stage II.

*Stage III.* III A: The tumor is smaller than 5 cm (2 in.); axillary nodes are positive and it has spread to other lymph nodes; or the tumor is larger than 5 cm and has spread to the lymph nodes under the arm. III B: The cancer has spread outside the breast to the chest wall, muscles, and skin, or the cancer has spread to lymph nodes inside the chest wall near the breast.

*Stage IV.* There is evidence of distant metastasis to other organs usually the bones, lungs, liver, or brain regardless of size.

### TYPES OF SURGICAL PROCEDURES

The surgical technique that was used for the greater part of the 20th century was the radical mastectomy described by Dr. William Halstead in 1894 in the Johns Hopkins Hospital Report. This surgery involved removing the entire breast, skin and chest wall (pectoralis major) muscles, the contents of the axilla (under the arm), and skin, and required an extensive skin graft. Results with this form of surgery resulted in an immediate and drastic decrease in chest wall recurrences. Research in the 1970s and 1980s showed that there was

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## Mastectomy

no advantage to removing the chest wall muscles and a new surgical technique, the “modified radical mastectomy” virtually replaced the radical mastectomy. By 1990, only 0.4% of all surgeries for breast cancer were of the radical mastectomy type. Modified radical mastectomy involves a total mastectomy, removing the breast, nipple, and areola with removal of 10–20 lymph nodes under the arm, called an axillary lymph node dissection, without removing the major chest wall muscles. The surgery takes approximately 2–3 hr and breast reconstruction can be performed immediately. It became the most popular surgery for early stage cancers, if the tumor is 5 cm or greater, if the skin or muscle is involved, or four or more axillary lymph nodes are positive for cancer cells.

Total mastectomy without removing the axillary lymph nodes is used for extensive ductal CIS or in invasive cancer when the sentinel lymph node (see below) is negative.

## BREAST CONSERVATION THERAPY (BCT)

More recently, breast conservation therapy is being used. This involves combining two modalities: breast conserving surgery, also known as lumpectomy, with 5–7 weeks of postoperative irradiation.

The goal of breast conservation therapy is local control of the cancer and maintenance of a cosmetically normal appearance of the breast. It was demonstrated in the 1980s to have equal risks of recurrence compared to mastectomy. In 1990, a Consensus Development Statement by the National Institute of Health recommended lumpectomy for as many as 50–75% of women with early breast cancer.

Breast conserving surgery, the first phase of BCT, also called wide local excision or lumpectomy, leaves a safety margin of healthy breast tissue. It can be done under local or general anesthesia in a standard operating room or an outpatient surgery center and takes approximately 1 hr. The specimen is sent to pathology to access that the margins of the specimen are without tumor (“clear”).

Contraindications to lumpectomy are: (a) the presence of more than one tumor, or if there are suspicious areas of calcifications, small specks of calcium demonstrated on mammography, elsewhere in the breast, (b) if the tumor is so large or the breast so small that cosmetic results following surgery would not be satisfactory, (c) if the tumor is found to extend beyond the

margins of the tissue that was removed, (d) if the woman is not willing to have radiation therapy after surgery or has had prior irradiation to the breast or chest wall, or if there is no access to radiation treatment in the community. Collagen vascular disease such as scleroderma poses a risk to irradiation. It cannot be performed for women if they are pregnant. However, if a woman is pregnant in the 2nd or 3rd trimester, she may have surgery and chemotherapy and postpone irradiation until after delivery. Finally, if a woman would prefer to have a mastectomy rather than BCT, she should be given that choice.

## SENTINEL LYMPH NODE BIOPSY

This procedure, which has been added to the armamentarium of breast cancer treatment within the past decade, involves obtaining a tissue sample from the sentinel node, the “first lymph node,” which drains lymphatic fluid from the breast. It is performed only if there is a single tumor less than 5 cm, the woman has not had prior chemotherapy or hormone therapy, and the lymph nodes feel normal. The surgeon injects either a blue dye or a radioactive substance into the area around the tumor. The lymphatic vessels carry the dye to the first lymph node which is then examined microscopically for the presence of cancer cells. If the node is positive for malignant cells, the surgeon will then proceed with an axillary lymph node dissection.

Potential side effects of axillary lymph node dissection include lymphedema, which is a painful swelling of the involved arm caused by scarring around the lymph duct with resulting limitation of movement and function. The advantage of performing a sentinel node biopsy is that if it is free of cancer there is no need for further axillary lymph node removal.

## PSYCHOLOGICAL EFFECTS OF MASTECTOMY

All women diagnosed with breast cancer will experience some degree of emotional distress. It was previously thought that the emotional trauma from breast cancer was the result of the physical disfigurement of amputating the breast. However, with the advent of BCT, it has been shown that despite a better body image, the psychological trauma comes from having a potentially fatal disease.

## Mastitis

Women faced with the decision of whether to choose breast conserving surgery versus a mastectomy also carry the psychological burden of having to make the “right choice.” The fear of leaving behind cancer cells in a breast or the fear of undergoing irradiation therapy with its side effects of fatigue and vulnerability to depression may prompt a woman to choose a mastectomy. Availability of support groups and individual counseling can help a woman through this very difficult time.

Sexual difficulties may be anticipated in women regardless of whether they have had breast conserving surgery with irradiation or mastectomy with reconstruction. Pain or numbness in the breast or chest wall after surgery with reconstruction will decrease sexual interest. Some women who choose mastectomy without reconstruction may be embarrassed for their partners to see their scar and avoid intimacy. Woman should be encouraged to discuss these issues with their partner and health care providers so that referrals to specialty consultants can be made.

A woman’s style of coping, which includes attitudes of optimism or pessimism, the availability of social and family support, a woman’s ability to discuss emotional issues with her physician, and the way she felt about her body prior to the diagnosis of cancer, all determine her psychological response to breast cancer regardless of whether she has conservative surgery or mastectomy.

**SEE ALSO:** Body image, Breast-feeding, Breast lumps, Breast examination, Mammography

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**Mastitis** Mastitis, by definition, is inflammation of the mammary gland. It can occur in any woman, however, it is most common in first-time lactating mothers. This condition is a result of bacterial invasion of breast tissue. Mastitis rarely occurs in the antepartum period (before birth of the baby). Its incidence includes 1–2% of primiparas (first time mothers) who are postpartum and lactating. It usually occurs 2–4 weeks after delivery.

The presenting symptoms of mastitis include malaise (general sick feeling), fatigue, chills, muscle aches, or localized breast tenderness. The condition progresses to symptoms like fever of greater than 102°F, tachycardia (rapid heart beat), and a firm, reddened area of breast tenderness. Mastitis is usually preceded by marked engorgement of the affected breast, and is almost always unilateral (one-sided). The most common area of the breast that is affected is the outer quadrant.

Common causes of mastitis include bacteria from the baby’s mouth, bacteria entering via breast injuries (bruising, fissures, cracks in the nipple), milk stasis (milk pooling in the breast), and bacteria from the hands of the mother or health care provider. The most common organisms associated with mastitis are the bacterial organisms *Staphylococcus aureus* and beta-hemolytic streptococci. Concurrent infection with mumps is also found to be a cause of mastitis.

Some contributing factors associated with mastitis are: fatigue, stress, lack of sleep, plugged ducts, engorgement, a decrease in number of feedings, inadequate nutrition, breast trauma, and breast constriction by a tight brassiere. Thus, teaching about preventative measures is the most important treatment. Preventative measures include resting when the infant rests, as well as teaching the importance of maternal nutrition, increased fluid intake, and vitamin supplementation. Lactating women require large caloric requirements as a result of milk production and tissue healing from delivery. Proper hand washing, perhaps with an antibacterial soap, should be encouraged. One of the most important preventative measures to emphasize is good breast-feeding habits. For example, early and frequent feedings with complete emptying of breasts will decrease the likelihood of blocked ducts and milk stasis. Proper positioning of the baby on the breast, along with good latch on, could prevent nipple trauma. Lastly, breast care measures include: cleansing with water only and drying adequately, and wearing a nonconstricting, well-ventilated bra.

Treatment for mastitis includes Tylenol for reduction of fever, inflammation, and pain along with antibiotic

## Masturbation

therapy with penicillin or a cephalosporin. The mother should be instructed to complete the entire antibiotic prescription, even if symptoms subside quickly. She should be assured that breast-feeding can and should be continued in both breasts. Breast-feeding with an infection will not harm the newborn, nor will the antibiotics used for treatment. Both the use of warm compresses and massaging the affected area may help encourage milk drainage toward the nipple. Supportive care, rest, and decreasing stress will also help hasten recovery. The importance of prompt treatment should be stressed. If left untreated, a more serious complication, such as breast abscess, can occur.

**SEE ALSO:** Breast-feeding, Lactation

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**Masturbation** Masturbation is self-stimulation of the genitals, energized by fantasy that leads to sexual arousal and orgasm. In addition to generating sexual desire leading to masturbation, sexual fantasies are created, refined, lustily sanctioned and at a woman's caprice, discarded or retained for future use. Masturbation and fantasy influence one another and are inextricably linked. Historically, masturbation has been labeled as sexually deviant behavior and a social taboo despite its common practice. But as social and moral codes have modernized, masturbation's positive role and importance in sexual health has been endorsed. We now believe it is a normal behavior that most people have practiced at various frequencies throughout the life span.

The mental processes and fantasies determining masturbatory behavior illuminate intimate aspects of a woman's sexual desire. As an infant, localized genital sensations are noted to be pleasurable, help soothe

distressing mental states and are believed to foster development of positive self-regard and bodily image (Levine, 1992). As the young girl learns more control over bodily processes and experiences more complex life situations with sexual themes, she consciously and unconsciously links her mental (fantasy) life with bodily sensations and pleasure. During adolescence and early adulthood, continued exploration of her sexual interests, frequently with an increased role of masturbation, results in the assembly of sexual self-knowledge and facilitates the consolidation of her sexual identity. As an adult, masturbation becomes a conscious means of autonomous, self-regulation of bodily sensations and emotional states. Sensual pleasure becomes familiar.

The knowledge she has acquired about masturbation, and sex in general, allows her to make more choices about partner sex. She recognizes that she can be responsible for her own sexual pleasure but may choose to allow her partner to pleasure her. If the goal is orgasm, many women find that masturbatory clitoral stimulation heightens arousal, facilitates orgasm, and can easily be taught to their partners. For a large subset of women, it is the sole means of reaching an orgasm, with or without intercourse. Since masturbation and sexual fantasies are extremely private sexual information, sharing and teaching her partner what pleases her fosters greater mutuality and intimacy for the couple. As the adult woman matures, her sexual creativity evolves and the content of her masturbatory fantasy life changes, altering her behavioral patterns of pleasure. Communication of these changes to her partner helps ward off sexual boredom, fosters continued interest, and deepens intimacy. Men tend to have a more fixed sexual fantasy life over the life span, adding increased importance to the woman's sexual creativity for herself and the couple. Throughout the life span, masturbation can function as a substitute for partner sex.

There is no correct way to masturbate. What stimulates one woman may not work for another: it is individually determined. Physical stimuli such as fingers or vibrators guided to provide a particular type of touch seems to be the most effective and common practice. Most young men do not routinely think about different types of touch associated with masturbation and sexuality, they "just do it." With instruction and patience, they learn to enjoy and include it thoughtfully in their more mature sexual practices. Teaching a partner also helps refine the woman's self-knowledge to new heights.

## Maternal Mortality

Not all masturbation is healthy. In 2003, sexually explicit websites on the Internet have become primary sources for adult fantasy and masturbation. Although Internet sexual addiction is male dominated, women are not immune to its addictive qualities. Questions about sexual compulsivity, addiction, or other sexual aberrations should be raised when: (a) the number of times per week that someone has an orgasm by masturbation or any means is greater than seven, (b) sex preoccupies one's consciousness, and (c) interferes with daily life activities. As masturbation (or other sexual activity) becomes increasingly compulsive, relationships are negatively affected and quality of life deteriorates. Personal and professional disasters are common results.

The politics and morality of mainstream America surrounding masturbation has shifted from condemnation to acceptance for both women and men. Primarily negative lies and myths about masturbation are slowly dying and reality is prevailing. When used thoughtfully, it is not only sensually pleasurable, but a fascinating study of the mental and physical components of one's sexuality.

which almost all (98%) occur in developing nations, but even in the United States two or three women die each day of pregnancy-related causes. Regionally, the lifetime risk of maternal death is highest in Africa, where 1 in every 16 women is likely to be a victim. The risk of maternal death is 1 in 65 in Asia, 1 in 130 in Latin America, but is dramatically lower—1 in 1,800 women—in high-income nations. It is also estimated that for each woman who dies from complications of labor and delivery, at least 30 and possibly as many as 100 women survive childbirth but suffer from disease, disability, or other physical damage as a result of the complications of pregnancy.

An accurate assessment of maternal mortality rates is difficult to obtain, since the areas with the highest rates are often the same places that have the least accurate record-keeping systems. In developing nations, people often die outside the health care system, and the cause of death is often not recorded even if a death occurs in a hospital. Furthermore, the number of deaths from unsafe (typically illegal) abortion is often underestimated, because the procedure may have been performed in secrecy. In both developing and developed countries, the recorded cause of death may be misclassified if the link to a pregnancy is not recognized.

There are numerous causes of maternal mortality, but 80% of deaths in the world are due to five primary complications. These include hemorrhage (25% of maternal deaths), sepsis (15%), toxemia (12%), unsafe abortion (13%), and obstructed labor (8%). The remaining 20% are often due to associated conditions, such as malaria, anemia, and HIV/AIDS. One in four maternal deaths occurs during childbirth, half occur within the first 24 hr after birth, and the remaining 25% occur in the days and weeks immediately following delivery. Complications that do not result in death can create life-long conditions such as infertility, impaired mobility, severe anemia, chronic weakness, pelvic pain, uterine rupture, and fistula.

Worldwide, the availability of women's health services makes a significant impact on levels of maternal mortality and morbidity. According to data from the United Nations Population Fund (UNFPA), approximately 15% of pregnant women experience some kind of complication, and about 5% of pregnant women *require* surgery, usually a cesarean section. Note that in the United States nearly one in four deliveries is by cesarean section, but that is a far higher percentage than would be required if it were used solely to save the life of the mother or baby. The World Health

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**SEE ALSO:** Sexuality, Libido and desire, **Orgasm, Sexual compulsivity**

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**Maternal Mortality** Deaths to women that are associated with pregnancy and childbirth fall under the category of maternal mortality. There are more than 500,000 maternal deaths each year in the world, of

## Maternal Separation

Organization estimates that no population requires more than 15% of births to be by cesarean section. It is estimated that about two thirds of infant deaths each year in the world are a result of poor maternal health and inadequate care during delivery. The UNFPA has recognized three keys to reducing maternal death and disability: (a) family planning to help ensure that every pregnancy is wanted; (b) each birth assisted by a skilled attendant; and (c) access to essential obstetric care so that in the case of complications a woman can reach a functioning health care facility in a timely manner.

Although the proximate cause of maternal death is typically an identifiable medical condition or complication, maternal deaths often represent the culmination of other factors in a woman's situation. Maternal mortality and morbidity are a reflection, in particular, of the status of women in society. When women experience conditions of poverty, lack of education, early and too frequent childbearing, low status, and restricted choices, the likelihood of maternal mortality or morbidity is much higher. Social, cultural, and economic changes that improve the condition and status of women are a necessity to lower the risks of maternal mortality and morbidity throughout the world.

Although the risk of maternal death is considerably lower in industrialized nations than in other parts of the world, with an average of only 12 deaths out of every 100,000 live births, 2–3 women in the United States nonetheless die each day from pregnancy-related causes. Within the United States, the risk of maternal death varies greatly by race/ethnicity. In particular, Black women are four times as likely as non-Hispanic Whites to die of pregnancy-related complications, and Hispanic women are nearly twice as likely to die from these complications as are non-Hispanic Whites. The risk has declined for all racial/ethnic groups over the past 50 years, but most of the improvements were prior to the 1980s. Since then there has been relatively little change in maternal mortality rates. Even so, it is estimated that over half of all maternal deaths could still be avoided through improved health care access, higher quality of care, and altering health and lifestyle habits.

In the United States, the leading causes of pregnancy-related deaths are hemorrhage, embolism, pregnancy-induced hypertension, infection, complications with anesthesia, and heart muscle disease. Although the risk of death is low in the United States, approximately 30% of pregnancies involve some kind of complication before, during, or even after delivery. The most common complications include miscarriage,

ectopic pregnancy, excessive vomiting, diabetes, hemorrhage, infection, pregnancy-induced hypertension, premature labor, or the need for a cesarean delivery. Overall, childbirth is the most common reason for hospitalization of women in the United States, both for delivery and for treatment of complications.

In all cases, the repercussions of maternal mortality include children who must now survive without a mother, and the loss of an important member of a family and society.

**SEE ALSO:** Abortion, Access to health care, Morbidity, Mortality, Pregnancy

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**Maternal Separation** Close proximity of a mother to her infant or child is necessary for survival in humans and other mammals. The close contact promotes emotional attachment and helps to provide food, comfort, and safety. Maternal separation is just as important as close contact for the development of individuality and continued growth of the mother–child relationship. Separations that are relatively brief and consistent lead to healthy development of the mother–child relationship. A total lack of separation between the mother and child does not allow for growth and may lead to problems with separation in the future. Separations that are prolonged and/or inconsistent, without other means of comfort, may contribute to relationship problems, distress, illness, anxiety disorders, and/or attachment disorders.

Maternal separation from the neonate, infant, or child may produce stress and anxiety for both individuals. Timing, frequency, and duration of separation all



## Medicaid

contribute to the degree of stress experienced by the mother-child dyad. There is evidence that immediately after birth infants respond to and prefer the sound of their mothers' voice over that of others. This indicates that infants listen and respond to the sound of their mothers' voice before birth. Newborns also prefer the scent of their own mothers' breastmilk. This evidence suggests that newborns know their mothers at birth, therefore, separation from the familiarity of their mothers may be quite stressful. In fact, animal research examining behavioral and physiological reactivity to stress often involves separation of the mother and infant to induce a stressful situation.

It is ideal for a mother and infant to attain close physical contact immediately after birth to enhance and strengthen their relationship. However, it is not critical, as was once thought, that the "bonding" between mother and child happen within a given time frame. Emotional attachment is a process that occurs over time. Women who have complications after delivery, or have newborns that are too ill for interaction, have been able to develop an emotional attachment with their infants similar to mothers who held and interacted with their infants within the first hours after birth. In most circumstances, separation from the newborn can lead to maternal anxiety even if the mother has not yet seen her infant.

Maternal separation anxiety may occur in the natural process of physical separation. It can be evident during the first separation or during significant changes in the relationship that involve separation. The anxiety may be transient and an expected reaction to the separation or it can lead to significant distress, indicating that an anxiety disorder may be present.

Anxiety and stress for the infant increases with age during the first year of life. Between 9 and 12 months of age, infants become more aware that they are separate individuals from their mothers. This can lead to separation anxiety in varying degrees. Consistent return of mother after separation enhances the attachment relationship and contributes to further growth. A mother and her child are continually presented with challenges during separations at each developmental milestone: a toddler spending the first day in preschool, a 5-year-old going to kindergarten, an 8-year-old spending the first night away from home, or even an 18-year-old headed off to college. Separation at any developmental age contributes to feelings of anxiety initially; however, successful separation leads to a sense of accomplishment for both the child and the mother.

**SEE ALSO:** Anxiety disorders, Child care

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AMY SALISBURY

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**Medicaid** Medicaid was established in 1965 through the Title XIX of the Social Security Act. This federal-state program was developed to finance health care for low income persons, specifically *the categorically needy and the medically needy*. Categorically needy are those receiving Aid to Families with Dependent Children (AFDC) (now Temporary Assistance for Needy Families) and those who receive Supplemental Security Income (SSI) because they are aged, blind, or disabled. All states must cover the categorically needy. The medically needy are those who have enough money to live on, but not enough to pay for medical care. In 1972, an amendment to the Social Security Act added family planning services to the list of essential services. One purpose of the federal government was to ensure medical care for those on welfare, predominantly single, poor women, and their children. The link to cash assistance is a defining characteristic of the program and makes this an entitlement program.

The Medicaid program, financed by general tax revenues, is a cost sharing program between the states and the federal government. The federal government contributes roughly 57% of the cost and the states pay the balance. The eligibility and benefit structures are determined by each state. In particular, the state defines the scope, amount, and duration of services. Each state defines the eligibility for classification as medically needy, for example. A state Medicaid program must

## Medicaid

provide the minimum services: (a) inpatient and outpatient hospital services; (b) skilled nursing facilities; (c) physician services; (d) home health care; and (e) early and periodic screening, diagnosis, and treatment (EPSDT) of children under 21 who are eligible. Dental services, prescribed drugs, eye glasses, intermediate care facilities, and other services are optional services and states may offer any or all of these. Services must be provided to children and pregnant women at no cost. Deductibles (a set amount the patient must pay before Medicaid pays) are not permitted and co-pays (a percentage of charges paid by the patient) generally do not apply. Eligibility for cash assistance is also defined by the state and determines which parents in families can enrol in Medicaid. Many low-income families are not eligible for their state programs. All poor children under 19 years, all children under age 6 years, and pregnant women with incomes up to 133% of the federal poverty level are considered eligible for Medicaid under recent federal requirements.

Medicaid provides coverage to many of the sick and disadvantaged in the society. Children and their parents constitute the majority of the programs beneficiaries (73%) but account for only a quarter of the spending. Individuals with disabilities and older people who are poor (or the dually Medicare–Medicaid eligibles) also receive services through Medicaid. This group of beneficiaries incur the highest per capita expenditures, and consume disproportionate amounts of Medicaid dollars. In 1999, Medicaid covered 5% of nonelderly adults and 15% of those with incomes below 200% of poverty. Medicaid's role as a primary source of long-term care, gap coverage for Medicare, and major source of coverage for the disabled is likely to continue with the increasing growth of the elderly population.

Medicaid costs have risen through a combination of increased enrolment (from 4 million in 1966 to 47 million in 2002) and medical inflation. Total health care expenditures have had the fastest growth since 1991 and have created significant challenges for the federal and state governments in delivering Medicaid services. State funded Medicaid spending increased by 11% from fiscal year (FY) 2000 to 2001 and is expected to increase by another 13.4% in FY 2002. State Medicaid expenditure increases are most notably due to prescription drugs, enrolment increases, increased cost, and use of medical services and long-term care expenses. In most states, Medicaid costs outstrip state revenue. Selected actions by government intended to address these concerns have influenced the benefits

available to Medicaid beneficiaries. In the early 1990s, states concerned about the growing uninsured in their states, submitted applications for waivers under section 1115 of the Social Security Act. This allowed states flexibility in modifying eligibility, payment methods, and other program characteristics, including enrolment of beneficiaries in managed care plans, as an attempt to reduce costs and accommodate increasing enrolment. Another outcome was the extension of health coverage to the working poor and their families who were not previously eligible for Medicaid. Efforts to provide services for poor children prompted the development of State Child Health Insurance Programs, a program to provide coverage for children whose family income was too high for Medicaid. In addition, the 1996 Personal Responsibility and Work Opportunity Act redefined the eligibility, scope, and duration of welfare benefits and set the stage for the work requirements linked to these benefits.

The Medicaid program has achieved access to health care comparable to private insurance for low-income populations. Notable successes are in the provision of care for pregnant women and children and the development of enhanced or special services as part of the benefit package. Further, Medicaid has been a “gap” insurance, and a safety net program for the sickest and the frailest in the society. Medicaid provides coverage for mental health and substance abuse services, expensive drugs for treatment of AIDS, and rehabilitation services not covered by private insurance. In long-term care, Medicaid pays for 44% of nursing home expenditures. Despite this progress, Medicaid is reliant upon the state and federal economy. In more prosperous times, benefits across states may vary less and individual programs may begin to address the needs of beneficiaries. In times of economic distress, however, benefits may be restricted through eligibility, cash assistance, and scope of services or duration of benefits. Reform of Medicaid and the state to state variability of services have been a focus of public policy debate for the last decade and will be on the health care agenda for the foreseeable future.

The Medicaid program is of particular relevance to women. Women as single heads of household may rely on Medicaid for themselves and their children, especially during pregnancy. Women who are elderly, disabled, and draw low income count on Medicaid for access to specialized medical care. The overrepresentation of women in the poor and the elderly population, especially those residing in nursing homes, suggests

## Medical Malpractice

that women have a critical investment in the eligibility and benefits of the Medicaid program.

**SEE ALSO:** Access to health care, Health insurance, Health maintenance organizations

### Suggested Reading

AQ: Pls  
provide author  
name(s)

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BETH E. QUILL

**Medical Malpractice** There are many forms of legal regulation of medical practice and its practitioners. Among other legal mechanisms, there are state professional licensing and disciplinary statutes and regulations, mandatory oversight by peer review organizations, federal and state parameters on drug and device prescribing, and financial and quality of care audits by public and private third-party payers. Statutory and regulatory requirements for hospitals and other health care provider institutions and agencies also exert a direct impact on medical practice. One of the most significant mechanisms for regulating physician behavior in the United States is the private civil tort system that encompasses individual professional liability/medical malpractice lawsuits brought by, or on behalf of, patients against their professional caregivers.

A relatively small number of medical malpractice claims are predicated on a theory of violation of contract. In such litigation, the patient/plaintiff claims that an express promise made by the physician about the outcome (for instance, “After this plastic surgery, I guarantee that you will look twenty years younger than before”) has not been fulfilled.

The overwhelming majority of malpractice actions, though, are based instead on a theory of tort, which means a civil wrong (as contrasted with a crime) caused by the violation of a duty stemming from something other than a contract. Within the relationship between a patient and physician, a tort is committed by a

violation of the physician’s fiduciary or trust obligation to act always in the patient’s best interests.

A small percentage of the tort actions brought against physicians allege intentional wrongdoing, such as battery, for physically invading the patient’s bodily integrity by doing some procedure without appropriate permission. However, the majority of malpractice cases are founded on a theory of negligence, or unintentional (albeit blameworthy) deviation from accepted professional standards. Medical negligence may occur through the failure to supply the individual (or the proxy decision-maker for a decisionally incapable person) with the information necessary to give a truly informed, voluntary consent to a particular intervention. Negligence also may take place through poor quality, professionally unacceptable rendition of patient care. Many plaintiffs’ complaints in professional liability cases allege both lack of adequate informed consent and the substandard performance of medical services.

In any negligence action, the plaintiff who initiates the claim must prove the presence of four elements in order to establish a prima facie case and succeed. The plaintiff’s inability to meet the burden of proof—convincing the jury by a preponderance of the evidence—regarding any of these elements warrants dismissal of the case.

First, the plaintiff must show that the professional owed the plaintiff a duty of due care; this responsibility is established by virtue of the existence of a professional/patient relationship. The duty or standard of care owed is that degree of knowledge or skill that would be possessed and practiced by competent, prudent professional peers under similar circumstances. Second, because the present American malpractice system is based on the concept of fault, the plaintiff must show that the physician violated or breached the acceptable standard of care. The law does not require absolute perfection in medical diagnosis and treatment. By the same token, it is not enough for physicians to “do their best” if their conduct does not rise to the applicable level of care under the circumstances.

The third thing that a successful malpractice plaintiff must establish is that physical, financial, and/or emotional injury or damage was suffered. One main purpose of awarding monetary damages in a tort action is to attempt to make the injured victim “whole” again, or returned to the position or condition that existed prior to the negligence, even while recognizing that the ability of money to accomplish that objective very often is a legal fiction.

## Medicare

Finally, proving the element of causation is essential. Specifically, the plaintiff must convince the jury, to a reasonable degree of medical certainty, that the injury incurred was directly or proximately brought about by the defendant's violation of duty, that is, that "but for" (sine qua non) the defendant's negligence, the injury would not have happened and, furthermore, that there were no other intervening, superceding, unforeseeable factors that would explain the injury.

In many medical malpractice cases, the physician is not the only party named by the patient/plaintiff as a defendant. Depending on the specific facts, the health care institution or agency that employs the physician, or with whom the physician is affiliated, may be subject to lawsuit in addition to or in place of the physician. Health care institutions and agencies might be held liable, solely or jointly, for malpractice under theories of vicarious liability for employing (*respondeat superior*) the physician or negligently supervising her, or direct liability for the failure to adequately fulfill their own independent fiduciary responsibilities toward the patient.

**SEE ALSO:** Informed consent, Physicians

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MARSHALL B. KAPP

**Medicare** Medicare (Title XVIII) of the Social Security Act is a federal health insurance program inaugurated in July 1, 1966. The program is the major health insurance for those over the age of 65 years of age, who are covered by the Social Security system, regardless of income. Amendments to the Social Security Act in 1972

extended the benefits to those who do not meet the criteria for the regular Social Security program, but who are willing to pay a premium for coverage. Further amendments in 1973 extended benefits to those entitled to Social Security disability benefits or those who suffer from chronic renal disease requiring a kidney transplant or routine dialysis. Since 1966, the number of enrollees has expanded, and the medical expenditures increased, making Medicare a major budget item for the federal government. Currently, the Medicaid program spends more than \$200 billion a year.

Medicare is comprised of two parts: Part A and Part B. Part A of Medicare is the hospital insurance part, funded by Social Security taxes. Coverage includes hospitalization, care in a skilled nursing facility, home health care, or hospice care. The Medicare program has deductibles (set amount the patient must pay before Medicare begins to pay) and co-pays (a percentage of charges paid by the patient). Benefits may also have limitations on the amount of coverage. Hospital care expenses are not paid by Medicare beyond 150 days, for example, and a skilled nursing facility is limited to 100 days. Medicare pays for 14% of nursing home expenditures and Medicaid, which is another source of payment after Medicare expires, pays 44% of nursing home expenditures (1998).

Part B of Medicare is Supplemental Medical Insurance. While it is optional and must be paid for as a Social Security deduction, most elderly enrol in Part B. This part of Medicare pays for reasonable physician charges, inpatient and outpatient medical and surgical services, supplies, physical and speech therapy, ambulance and diagnostic tests, clinical laboratory tests, blood, home health care, and outpatient diagnosis and treatment. Similar to Part A, limitations on the amount of payments and deductibles apply. Physician services, for example, are covered 80% after the deductible (\$100) has been met. Although Medicare greatly expanded access to medical services for the elderly, the gaps in benefits and the particular burden of cost sharing requirements on low-income populations have limited the effectiveness of the program.

Managed care, a planned approach to control health care costs has been enrolling Medicare beneficiaries since the 1990s. A primary incentive is that the Medicare program allows beneficiaries to opt out of the traditional fee-for-service program and voluntarily enrol in a Medicare approved [HMO,] provided that the beneficiaries reside in an area that is served by one or more Medicare approved HMO. Medicare

AQ: Is there an expansion for HMO

## Meditation

HMOs typically offer a broader range of benefits (such as prescription coverage or preventive care). Approximately 18% of the nation's 38 million beneficiaries are enrolled in managed care plans. Recently, however, a number of HMOs have declined to participate in the Medicare program or narrowed their service areas. Access to Medicare providers and facilities continues to be a challenge for elderly citizens: About one in seven Medicare beneficiaries do not have a usual source of care or have not seen a physician when they needed medical care.

By the year 2030, it is estimated there will be 120% more elderly than today (65 million) and people over 65 will comprise 22% population. Individuals 85 years of age and older are the fastest growing segment of the population.

Persons over the age of 65 years use 23% of the ambulatory care visits, 48% of hospital days, and 69% of home health services. With increasing availability of community based services, nursing home utilization has decreased. A major problem for this growing group of elderly is the lack of coverage for prescription drugs. While most adults indicate they have a health problem that requires medication on a regular basis, only 55% of those 50–64 years of age and 49% of those 65–70 years of age noted that their insurance covered prescription costs. The elderly in particular, report high out-of-pocket costs that often compete with other expenses of daily living or prescription drugs.

Elderly women frequently live longer than men, have more chronic diseases and are more likely to live alone (except for those over age 85 years). Therefore, Medicare is the primary medical benefit available for health care. Women's contributed earnings are likely to be less than that of men, placing an increased burden for out-of-pocket medical expenses. For example, compared to a 65-year-old man retiring from work in 1990, the average man retiring at 65 in 2030 will require an additional 25 monthly payments of any promised benefit plan. In contrast, the average woman in the same example would require an additional 39 months. Women comprise the majority of nursing home residents, and will likely be the predominant users of Medicare. Thus, elderly women have vested interest in ensuring that specific measures are taken to close currently existing gender gaps in coverage.

The challenge for program officials is to keep Medicare program efficient, effective, and equitable in providing coverage for a broad scope of services, while containing costs. Therefore, it is expected that the

Medicare program continue to be at the heart of public policy debates.

**SEE ALSO:** Access to health care, Health insurance, Health maintenance organizations

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AQ: Ref is incomplete. pls provide complete details

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**Medicine** *see* entry for specific illness or disorder

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**Meditation** Traditionally meditation was used exclusively for spiritual growth. More recently, it has become a valuable tool for relaxation, stress relief, and as an adjunct to medical healing. Those who meditate on a regular basis report a sense of healing, deeper concentration and insight, a heightened sense of intuition, feeling more peaceful, positive, loving, and centered. Medical studies indicate that meditation confers not only strong psychological benefits, but also important physiological benefits. Long-term meditators experience significantly less heart disease and cancer than non-meditators. Meditation has a profoundly positive effect on blood pressure, chronic pain, and insomnia. Meditators secrete more DHEA than nonmeditators which helps to decrease stress, heighten memory, preserve sexual function, and control weight.

Meditation has been practiced for thousands of years in the Eastern cultures, but is relatively new to the West. Although spiritual more than religious, meditation is practiced in many religions, and also by those who claim no religious affiliation. There are many types of meditation. They include prayer, visualization, Sufi meditation, guided imagery, mindfulness meditation,

## Meditation

the relaxation response, biofeedback, Transcendental meditation, Zen Buddhist meditation, Native American meditation, movement meditation such as Yoga, T'ai Chi, Qigong, and medical meditation. One can meditate alone, with a master/teacher, or in a group of any size. Whatever the form and regardless of the level of practice, all meditations yield similar results. The three most common "methods" of meditation are the relaxation response, mindfulness meditation, and transcendental meditation.

### THE RELAXATION RESPONSE

This method begins with the belief that the "normal" state of mind is not a rested one, that the mind bounces from one thought to another followed by emotional and physical reactions, invoking the flight-or-fight response. This response activates the involuntary nervous system which instantly raises blood pressure and heart rate; stimulates the adrenal glands to release adrenaline, noradrenaline, and cortisol; and decreases or increases the production of important hormones. Prolonged periods of time in this mode can cause chronic high blood pressure, heart disease, stomach ulcers, autoimmune diseases, cancer, anxiety, insomnia, and depression. The opposite of the flight-or-fight response is the relaxation response. This response occurs during meditation and produces opposite physiological effects. To reach this response, the meditator sits quietly, clears her mind, and focuses on a calming phrase, image, or thought. Research has documented many health benefits from this type of meditation including decreased PMS symptoms, decreased migraine headaches, reduced anxiety and depression, fewer missed days of work due to illness, significant improvements in insomnia, reduction of chronic pain, and improved high blood pressure.

### MINDFULNESS MEDITATION

This type of meditation begins with the concept of mindfulness. Mindfulness has been described as "learning how to stop all your doing and shift over to a 'being' mode." To be mindful is to live in the present moment, to give up the habit of worry, to let all stress drain from mind and body, to let go of ego and the need to control. In this type of meditation, the meditator focuses on the breath and allows the mind to

wander striving for a heightened awareness of each passing thought and image. Studies have shown that mindfulness meditation decreases panic attacks and general anxiety, reduces chronic pain and the incidences of headaches, improves recovery to drug and alcohol addiction, and reduces obesity.

### TRANSCENDENTAL MEDITATION

This is the most popular and most studied form of meditation in the Western culture. It begins with the concept of restful alertness. As the body becomes deeply relaxed, the mind settles down to a state of inner calm and wakefulness. This form of meditation has been described as easy to learn, effortless to practice, involving neither concentration nor contemplation. It is recommended that one learns this technique from a Transcendental meditation teacher. In addition to the results reported with relaxation response and mindfulness meditation, transcendental meditation has been shown to slow the aging process, and significantly lower rates of hospitalization indicating higher levels of health than nonmeditators. Meditation does not require one to believe in a certain way or adopt a particular lifestyle. It will not conflict with one's religion. Whatever meditation technique is practiced, there are many common principles. These include not to worry about doing it exactly right and not to expect an earth-shattering experience. Most meditative results are quite subtle. Accept whatever occurs. Find a quiet comfortable place in which to meditate where disturbances are minimal. Sit in a comfortable chair, on a bed, or on the floor keeping the spine reasonably straight. If physical reasons dictate, lying on the back works fine. Eliminate as many potential distractions as possible, but not to worry about those things that cannot be controlled. No particular time of day is better than another; however, having a specific time in which to mediate will be helpful in making it a regular practice. Call on a spiritual source for assistance while meditating, if that comports with one's individual beliefs. When beginning a meditation practice, start with just 10–15 min once a day, increasing the time gradually, but keeping in mind that more is not always better. Meditation taps into very powerful inner energies which are very healing and uplifting, but it does take time to acclimate and is best done gradually.

AQ: Are there any "See also" entries

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JUDY HAHN

**Melanoma** Melanoma is a cancer of the skin that occurs when pigmented skin cells begin to grow out of control. Melanoma is often deadly, unlike basal cell and squamous cell skin cancers, which are usually curable. However, if found at an early stage, melanoma can usually be cured. Melanoma often appears as a brown or black spot on the skin, sometimes developing from a mole that has been present for a long time. Melanoma rarely causes obvious symptoms such as pain.

Melanoma begins in the cells that produce skin color. Dark-skinned people are naturally at much lower risk of melanoma compared to fair-skinned individuals. The frequency of malignant melanoma of the skin is increasing faster than any other cancer in the United States. Melanoma is a disease primarily in Whites that increases with age.

People with sun sensitive skin are at increased risk of melanoma. Sun sensitivity refers to the skin's response to sun exposure and is measured by a variety of markers. These markers include light skin color, light hair color, light eye color, tendency to sunburn, inability to tan, and presence of freckles. Studies have also shown melanoma to be related to an increased number of common moles and, especially, abnormal (dysplastic) moles. Studies of total body mole counts and mole counts on the arms have shown that an increased number of moles is related to a higher risk of developing melanoma. Early sun exposure may cause moles to develop, while other risk factors for melanoma, including adult sun exposure, may help change moles into melanoma.

## Melanoma

Ultraviolet (UV) light is the main environmental factor responsible for the development of skin melanoma as well as precursor lesions such as common moles (nevi). UV light is often divided into three regions with UV-A ranging from 320 to 400 nm, UV-B ranging from 290 to 320 nm, and with UV-C ranging from 200 to 290 nm, where visible light spans from 380 to 750 nm.

Sunlight is the major source of UV light. Various types of sun exposure are associated with melanoma, ranging from severe sunburns, occupational activities, vacation sun exposure, beach activities, other recreational activities, cumulative sun exposure, and early migration to sunny places. The most consistent risk factor for melanoma has been sunburns, particularly at young ages. The damage from sunburns can cause an increase in melanoma in the area that was burned, but sunburns also appear to suppress the skin's immune system. This allows melanomas to occur in non-sun-exposed skin. While dark-skinned people are naturally at lower risk for melanoma, recent studies suggest there is a higher risk of melanoma with prolonged sun exposure after developing a tan. Growing up in a sunny location or spending a large amount of time in the sun, particularly during childhood and adolescence, also appear to be important. Studies show that both intermittent sun exposure (sunburns and sunny vacations) and total sun exposure (over many years) are risk factors for melanoma.

A second source of UV light is from artificial exposures including tanning beds, sunlamps, and tanning booths. Tanning units are available for use at tanning salons where the patron pays for timed "tanning sessions." Alternatively, entire units may be purchased for home use. Sunlamps, prior to the 1980s, could irradiate only a localized area and emitted primarily UV-B and some UV-C. More recently, tanning beds or standing booths can irradiate nearly 100% of exposed skin, emitting more UV-A and some UV-B. Overall, there appears to be more than a 50% increase in melanoma risk among sunlamp or tanning bed users, with a greater risk associated with more use.

Sunscreens are thought to protect skin from sunburns and many other harmful effects of the sun. Consequently, some professionals suggest that limiting sun exposure through the use of sunscreen can reduce the risk of developing skin cancers by preventing sunburns. However, recent reports have suggested an increased risk of melanoma among sunscreen users. Some researchers think that the increased melanoma

## Menarche

risk with sunscreen use may actually be a result of prolonged sun exposure received by those who use sunscreen. However, skin sensitivity to the sun is likely to distort the association between sunscreen use and melanoma, since sun-sensitive individuals are more likely to use sunscreens. Many studies investigating the potential association between sunscreen and melanoma have not accounted for sun sensitivity. When accounting for sun sensitivity, current evidence suggests no association between sunscreen use and melanoma. The lack of a protective effect of sunscreen use may represent the failure of people who use sunscreen to apply enough sunscreen needed for protection, or may reflect a long period of time between protection from sun exposure and development of melanoma. It may be necessary to wait several decades to see if proper application of high sun protection factor (SPF) sunscreen (SPF >15) is truly protective against melanoma.

The use of sunless chemical tanners has increased dramatically in recent years. The tanning effects of sunless tanning products can last 5–7 days; however, the UV protection is shorter lived than the color change. Some dermatologists suggest that using sunless tanning products prior to sun exposure in conjunction with using sunscreens while outdoors may reduce UV damage to the skin, and thereby reduce incidence of skin melanoma. Many dermatologists recommend use of sunless tanning products over intentional sun exposure or tanning bed use for patients who insist on tanning.

The following are important tips to reduce your risk of melanoma: reduce your sun exposure, particularly between 10 AM and 2 PM; wear protective clothing while in the sun or use a sunscreen with an SPF of greater than 15; when applying sunscreen, use a palm-full of sunscreen and then re-apply it every 2 hr; wear protective clothing or use sunscreen even on hazy days or days with light cloud cover; do not use sunscreen to prolong your time in the sun. When there is a strong desire for a tan, use of sunless tanning products combined with sunscreen while in the sun may help prevent melanoma. Avoidance of sun exposure is the only sure way to reduce melanoma risk and aging of the skin. Seeking medical attention for any suspicious moles is important since melanoma can be a deadly disease with few or no symptoms or pain. However, melanoma is also easily curable if identified early and removed.

**SEE ALSO:** Cancer, Moles, Skin care, Skin disorders

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LESLIE K. DENNIS

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**Menarche** The average age of *Menarche*, or first menstruation, in the United States is 12.88 years for Caucasian girls and 12.16 years for African American girls. A popular misconception is that menarche marks the beginning of puberty; in reality, menarche occurs later in puberty. According to the widely used “five Tanner stages” of pubertal development, the onset of puberty is identified as Stage 2 at the first signs of pubic hair and breast bud development. The interval between these first signs of puberty and the completion of sexual maturation in girls (measured by the growth of pubic hair, reproductive organs, and breast development) can be as short as a year-and-a-half to as long as 6 years. Menarche generally occurs when girls are in Stage 3 or 4 of their development, which usually takes place somewhere between age 9 and 15 years old.

There has been some debate whether the age at menarche has changed over the last few decades. Examining the average age of menarche globally, the data indicate that the average age of menarche has decreased significantly in the last 100 years. Earlier menarche is attributed to improved nutrition, and the industrial revolution, which brought on a higher stress level due to the faster pace of life. According to a recent review, the age of menarche has remained stable over the last 50 years for Caucasian girls in the United States. Comparable longitudinal data are not available for African Americans or other minority groups, because few studies have included non-White girls until recently. Cross-sectional findings, however, suggest that African American girls reach menarche slightly earlier than Caucasian girls (12.16 years vs. 12.88 years), underscoring the important role of ethnicity in understanding menarche. It is notable that the age of menarche



## Menarche

has remained relatively stable, while the age of pubertal onset has decreased over the past 30 years in the United States.

### GENETIC AND ENVIRONMENTAL INFLUENCES ON TIMING OF MENARCHE

Genetic factors play an important role in the age of menarche. Early menarche tends to run in families, and studies show good correlation (statistically, an average correlation of 0.30) between mother's and daughter's age at menstruation. Environmental influences also affect the onset of menstruation. Delayed menarche is associated with excessive exercise, malnutrition, and significantly low weight. Sports or other activities that require intense physical activity, such as dancing and gymnastics, are associated with later ages at menarche. Such processes, however, can be reversed. One study indicated that stopping exercise for as little as 2 months initiated pubertal development and menarche. Body fat also predicts the onset of menstruation, with obesity linked to earlier onset and low weight related to later onset. Significant weight gain is seen in the years preceding menarche, with girls gaining approximately 40 lb across 4 years before their first menstruation.

Studies have also identified important psychosocial factors affecting menarche. For example, family structure and family relationships are strongly related to the timing of menstruation. Earlier age at menarche is related to the father absence before puberty and longer father absence. Moreover, approval and warmth in families, and absence of family conflict is related to later age of menarche. In fact, the quality of family relationships has been shown to influence age of menstruation over and above the effects of breast development and weight.

### TIMING OF MENARCHE AND MENSTRUAL EXPERIENCE

The timing of menarche may have considerable impact on how girls remember their initial menstrual experience. Conformity seeking is high during adolescence with girls striving to be like their friends. Girls who menstruate before their peers perceive the experience more negatively than girls who menstruate at the same time or later than their peers. Narratives of women between the ages of 18 and 61 recounting their first menstrual experience indicated that most women

held negative views of the sex education they received in school and at home. They reported that menstruation was either not discussed or the information provided and time spent talking about it was inadequate. Most women also complained that having to ask their questions in front of their classmates made it harder for them to voice their concerns. Particularly interesting, the narratives revealed similar experiences across the sample despite the wide age range among the women. Thus, in spite of our awareness that accurate and informative sex education fosters healthy adolescent development, schools and community resources do not appear to be meeting the needs of adolescents.

Another study offers a fascinating glimpse of how women's perceptions of menarche vary across cultures underscoring the role of environment. In one study, American and Malaysian women reported a greater range of emotional reactions to first menstruation than women from Lithuania and the Sudan, but the former two groups reported primarily negative emotions. The most common emotions reported by Americans and Malaysians were embarrassment followed by anxiety. American women expressed worrying about whether they could play sports, but they also indicated feeling "cooler" and eager to learn about their sexuality. Malaysian women reported feeling wiser, more respected, and mature. In contrast, the Lithuanians were philosophical and more positive in their explanations by placing this experience in a context larger than their selves; they reported feeling a part of nature, knowing the "secret" of life, and appreciating themselves more. Unfortunately, this study did not describe what cultural mechanisms might explain these differences in perceptions, but the data raise important questions about the impact of culture on perceptions of menstruation.

### RECOMMENDATIONS

Menarche marks an important transition to adulthood, and being prepared for the experience plays a critical role in girls' perceptions of themselves and the significance of the event. Opportunities to talk about menarche before it occurs, have a venue for asking questions, and increasing communication about the process will diminish anxiety and enhance their understanding of the experience. Indeed, placing the onset of menarche in a positive light, such as marking it with a celebration, can significantly influence how girls

## Menopause

interpret and respond to the event. Families and schools can play a special role in providing support and information for young girls to assist them through the transition.

**SEE ALSO:** Puberty, Genital development, Sexuality, Adolescence, Reproduction

### Suggested Reading

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GERI DONENBERG

**Menopause** The age at which 50% of the population will cease menstruation (menopause) is 51.3 years with about 8% of women ceasing menstruation before the age of 40. While the menopause represents the last and final menstrual period, the diagnosis is made retrospectively after loss of menstruation for 12 consecutive months.

Menopause occurs as a result of a decline in the total levels of circulating estrogen and progesterone hormones, which in turn would have been produced by

the ovary. The female ovary is endowed with a finite number of eggs and the menopause represents the loss of any further eggs within the ovarian tissue.

The entire body may be affected by the altered and declining hormonal levels, particularly estrogen deficiency. Virtually all body tissues have estrogen receptors indicating that they are responsive to this hormone. Thus, the possible changes are listed in Table 1.

The immediate symptoms that may occur relate to the loss of menstruation, the onset of vasomotor symptoms (see entry Perimenopause), and the vaginal thinning which can increase susceptibility to infection, be associated with painful intercourse, or blood-stained vaginal discharge.

Of great importance are the hidden potential effects of loss of ovarian activity. Over time, multiple organ systems may be impacted increasing susceptibility to disease. Specifically, these include the cardiovascular system with an increased susceptibility to heart attack, loss of bone, which is accelerated with decline in estrogen and therefore increases susceptibility to bone fracture, and central nervous changes, with suggestion that there might be a relationship to the development of problems like Alzheimer's disease. It should be emphasized that premature menopause, before the age of 40 years, is associated with an earlier increase in incidence of heart attacks, osteoporotic fractures, and Alzheimer's disease.

With increasing life expectancy, menopause in a healthy 50-year-old woman would occur at less than two thirds into the life cycle. The menopause therefore serves as an ideal time to enter the health system for

**Table 1.** Potential problems in untreated perimenopause

Target organ	Possible symptom or problem
Vulva	Atrophy, dystrophy, pruritus vulvae (change in tissue structure, itching)
Vagina	Dyspareunia (painful intercourse), blood-stained discharge, vaginitis
Bladder and urethra	Cystourethritis (inflammation), ectropion (turning outward), frequency or urgency, stress incontinence
Uterus and pelvic floor	Uterovaginal prolapse (pelvic organ prolapse), abnormal bleeding
Skin and mucous membranes	Atrophy, dryness, or pruritus; loss of resilience
Vocal cords	Voice changes (reduction in upper register)
Cardiovascular system	Atherosclerosis, angina (pain), coronary heart disease
Skeleton	Osteoporosis with related fractures, backache
Breasts	Reduced size, softer consistency, drooping
Neuroendocrine system	Hot flashes, secondary psychological disturbances
Eyes	Dry eyes

## Menopause

a comprehensive examination, based on screening for presence of risk factors for future disease or early evidence of current disease. Logically, the menopause then is also the ideal opportunity for the introduction of a comprehensive preventive health program.

### CONFIRMING MENOPAUSE

Although menopause is defined as 12 months of amenorrhea, any woman with loss of menstruation of greater than 6 months and who is older than age 50 can be confidently diagnosed as being menopausal. It is extremely unusual for a breakthrough ovulation and potential pregnancy to occur in this instance. The diagnosis is more easily confirmed by the development of hot flashes, vaginal thinning, and night sweats.

Menopause can also be confirmed by administration of progestogenic medications (progesterone containing medications) in an attempt to induce a period. Failure to respond to progestogen indicates lack of the hormone estrogen. The blood level of follicle stimulating hormone, the brain produced hormone that stimulates the ovary, can also be measured, but beyond age 50 need not be undertaken on a routine basis. The greatest value for this test is in younger women.

### CLINICAL MANAGEMENT

There is a general consensus that the menopause is a normal physiological event occurring in the life cycle of all women. The concept of medicalization of the menopause has been debated. In view of the known effects of reduced ovarian sex steroids on body systems and potential health, there is a need to recognize the potential impact and possibilities for preventive health care.

It is generally recommended that the woman in peri- or postmenopause should have frequent, at least annual, medical check ups which include a comprehensive history and recommended laboratory testing such as routine blood screens, pap smear, mammogram, stool guaiac (check for presence of blood) for colon cancer screening, blood lipid levels for cardiovascular screening, thyroid testing for coincidental hypothyroidism (underactive thyroid), and when indicated, screens for sexually transmitted diseases.

There is a broad range of suggested modern therapies for preventive health beyond menopause. The

concept of healthy living is of paramount importance and should be focused on healthy diet, including appropriate supplements as necessary, exercise, smoking cessation, moderation in the use of alcohol, avoidance of habit-forming drugs, seat belts, and safe sexual practices. Beyond that, pharmacologic preparations may be indicated dependent upon specific indications.

Recently, there has been considerable debate about the role of hormonal therapies beyond menopause. The situation is becoming clearer and the following is a summary. The use of estrogen alone in women who have undergone hysterectomy, or estrogen plus progestogen in women with an intact uterus can be considered under the following circumstances. It should be emphasized that there is a difference between utilization of these products for the treatment of specific menopause-related effects as opposed to the utilization of these hormones for potential prevention of future disease such as osteoporosis.

The hormonal products remain an essential component in the management of true menopause-related symptoms, most specifically, the vasomotor symptoms (changes in blood pressure), vaginal atrophy (change in the tissue lining the vagina), and night sweats. An additional indication would also be increased urinary frequency (increased need to urinate frequently). Under these circumstances, current recommendations are for the lowest dose products administered for the shortest period of time, consistent with management of symptoms. If symptoms recur upon drug cessation, restarting may be considered based on the risk to benefit profile for each individual woman.

Currently, the only preventive indication for hormonal therapy is reduction of bone loss and resultant osteoporosis and bone fracture. Hormones are highly effective for this problem. Use should be balanced for risk and benefit for each individual, and also take into consideration the use of alternate nonhormonal bone sparing products such as the bisphosphonates and the selective estrogen receptor modulators (SERMs). In general, up to 5 years of hormonal use in the younger peri- and postmenopausal women is quite safe, and longer term use needs a careful risk/benefit evaluation. Risks of hormone usage include a slight increase in the incidence of heart attack, blood clot, and stroke in the first year to 18 months of therapy, with no increase beyond that. There is also a slight increase in the diagnosis of breast cancer, but fortunately, there is currently no evidence to suggest an increase in mortality from breast cancer. Indeed, some studies suggest that women

## Menstrual Cycle Disorders

on hormones at the time of diagnosis of breast cancer, have longer life expectancy than women who have never utilized these products.

When the only symptom relates to vaginal thinning or dryness, local use of estrogen is the preferred route of administration.

**SEE ALSO:** Menstrual cycle disorders, Menstruation

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WULF H. UTIAN

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## Menstrual Cycle Disorders

Because of the complex interplay of events, which are necessary to facilitate the occurrence of the normal menstrual cycle in the female, multiple factors can play roles in producing disorders of the menstrual cycle. Menstrual cycle disorders can be classified as disorders of the process in which eggs are released from the ovaries (ovulation), cycle length, and menstruation, including duration and volume of menstrual blood flow.

Ovulation depends on the occurrence of proper sequencing of events involving a part of the brain called the hypothalamus and the pituitary gland. Any disruption in hypothalamic function can alter hormonal secretion that affects the ovaries. Disruption in the rhythmic secretion of specific hormones important in ovarian function (FSH and LH) will result in anovulation or lack of ovulation. Common disruptions in the hypothalamic secretion include excess weight changes, athletic and psychologic stresses, as well as eating disorders. In addition, pituitary gland lesions such as adenomas (a type of tumor) can alter hormonal events necessary for ovulation to occur. Endocrine system disorders such as chronic anovulation or polycystic ovary syndrome and thyroid dysfunction may also impact the hormonal changes which affect ovulation. Thus, these conditions can contribute to menstrual cycle disorders.

The interval between menstruations varies from every 21 to 35 days. Even though menstrual cycles vary

within this normal range over the reproductive life cycle of a woman, any deviation from her individual pattern often represents a cause for anxiety, and will likely bring her to seek clinical attention. Common diagnoses in this group are oligomenorrhea (menstrual intervals of greater than 35 days), polymenorrhea (intervals of less than 21 days), and amenorrhea (absence of menstruation for more than three normal cycle periods). Causes of these types of abnormal bleeding include underactive thyroid (hypothyroidism), ovulatory dysfunction, pregnancy, premalignant or malignant conditions (some types of tumors), or structural lesions such as polyps. Treatments include correction of hypothyroidism, hormonal contraception, treatment of insulin resistance, progestin (hormone) therapy, and surgery.

The normal duration of the menstruation is 4–6 days. Any variation outside of this range represents an abnormality. Common diagnoses in this group are metrorrhagia (irregular periods) and menometrorrhagia (heavy and irregular periods). Usual causes include anatomic lesions such as fibroids and polyps and infections due to cervicitis and endometritis (inflammation of the cervix or lining of the uterus). Often patients will need to undergo an evaluation for bleeding disorders as these may affect the menstrual cycle duration and amount of flow.

Estimates of normal blood flow during menstruation are approximately 20–80 cc. Ninety percent of flow occurs within the first 48 h of the onset of menstrual flow. Common diagnoses in this category of disorders include menorrhagia and menometrorrhagia and causes include anatomic lesions such as fibroids, polyps, excessive tissue in the uterine wall (endometrial hyperplasia), neoplasia (tumor) or hypothyroidism, bleeding disorders such as Von Willebrand's disease, or deficiency of blood factors needed for clotting. In addition, any disease causing bone marrow dysfunction or liver disease can contribute to these manifestations. Correction of the underlying cause is usually the basis for treatment.

There are two conditions which merit attention here. One is the condition of midcycle bleeding associated with ovulation. This is due to the rise in the hormones estrogen and progesterone causing shedding of the endometrium (wall of the uterus). It usually lasts for 1–2 days and may be associated with mild cramping. Even though there is no cause for concern, it may cause anxiety in a patient. Although no treatment is usually needed, some patients may receive a hormonal contraceptive method to suppress ovulation. The second

## Menstruation

condition is called premenstrual tension, which is the cyclic occurrence of symptoms in a specific (luteal) phase of the menstrual cycle. They include somatic complaints (headaches, bloating, or breast tenderness), emotional complaints (anxiety, depression, or irritability), and behavioral complaints (poor concentration, food cravings, or sleep disturbances). Treatment includes suppression of ovulation with medications, exercise, dietary modification, nonsteroidal anti-inflammatory drugs (NSAIDs), hormonal contraception, and medical therapy with selective serotonin reuptake inhibitors (SSRIs).

**SEE ALSO:** Menstrual cycle disorders

### Suggested Reading

Speroff, L., Glass, R., & Kase, N. G. *Regulation of the menstrual cycle. Clinical gynecologic endocrinology and infertility* (5th ed., pp. 183–230). Williams & Wilkins.

AQ: Pls provide place of publication

MARGARET L. MCKENZIE

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**Menstruation** The menstrual cycle is a combination of a series of events occurring between a part of the brain called the hypothalamus, the pituitary gland in the brain, the ovaries, and the interior of the uterus (endometrium). Normal cycle lengths vary from 21 to 35 days even though considerable variation in the length occurs in individual women over their life span. The menstrual cycle is divided into four phases: the follicular, ovulatory, luteal, and menstrual phases.

### HORMONE PRODUCTION AND REGULATION

At puberty, a compound called gonadotropic releasing hormone (GnRH) is synthesized in a part of the brain called the hypothalamus and travels to the pituitary gland. Here GnRH stimulates the production of follicle stimulation hormone (FSH) and luteinizing hormone (LH), two hormones important for the functioning of the ovary. These hormones are all secreted in a pulsatile fashion and pulse frequency varies with the phase of the menstrual cycle. Within the ovary, FSH helps to synthesize the “female hormone” estrogen. As estrogen levels become higher (range of 200–300 pg/ml) and are maintained above this level for more than 24 hr,

positive feedback loops on the pituitary gland then trigger a surge of LH and FSH. This leads to release of the egg from the ovaries. The endocrine system then increases synthesis of another hormone, progesterone, which will act on the uterine wall (endometrium) to facilitate the changes necessary for successful egg implantation to occur. In the absence of fertilization, the portion of the uterus that has prepared for egg implantation and pregnancy disintegrates and menstruation occurs. This sloughing of the endometrium is known as menstruation.

The endometrium responds to these cyclical changes of ovarian hormones. Estrogen stimulates growth by increasing both the number and size of the endometrial cells. Progesterone receptors are induced on the membranes of these cells in response to increasing estrogen levels. Estrogen also increases the blood flow to the endometrium. This phase of the cycle is called the proliferative or follicular phase and occurs immediately following menstruation as FSH and thus estrogen levels start to rise.

As the estrogen levels rise and remain in the critical range for 24–48 hr, the positive feedback loop is activated in the pituitary gland resulting in the LH surge. This surge can be detected using ovulation kits.

The luteal phase of the cycle is characterized by progesterone dominance. This action on the endometrium is manifested by decrease in the cell growth (proliferative) effects of estrogen. Progesterone production causes a rise in basal body temperature and forms the basis of tests used to confirm that ovulation has occurred.

In the absence of fertilization, there is a decline in estrogen and progesterone levels. This decline leads to abrupt loss of hormonal support of the endometrium and subsequent decrease in blood flow, loss of the organized architecture, and resultant menstrual flow. This is called the menstrual phase. Normal blood volume during this menstrual phase varies from 20 to 80 cc over the entire menstrual period.

**SEE ALSO:** Menstrual cycle disorders, Pregnancy

### Suggested Reading

Speroff, L., Glass, R., & Kase, N. G. *Regulation of the menstrual cycle. Clinical gynecologic endocrinology and infertility* (5th ed., pp. 183–230). Williams & Wilkins.

AQ: Pls provide details of place of publication

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## Mental Illness

**Mental Illness** Mental illness can be defined as behavioral, psychological, or biological dysfunction that interferes with an individual's daily life and ability to cope with normal stressors. A "mental disorder" is differentiated from a "physical disorder" in order to categorize types of problematic symptoms and behaviors and to guide decisions regarding the boundary between normality and pathology. It is recognized, however, that the mind and body are inherently connected to and affected by one another, as psychological symptoms affect physical symptoms and vice versa.

Nearly 25% of women will experience mental illness in their lifetime. There are biological and psychosocial factors that affect women's mental health differently than men's mental health. Reproductive health events such as the premenstrual period, pregnancy or postpartum, and the perimenopausal period appear to affect psychological functioning. Gender differences in thyroid function, circadian rhythm patterns (sleep cycles), neurotransmitters (brain chemicals), and hormones may also contribute to higher prevalence rates of some mental disorders in women compared to men. Psychosocial factors such as role identity and conflict (family and work), sexual and physical abuse, discrimination, lack of social support, and poverty also affect women's mental health.

Some mental disorders occur equally commonly in men and women (schizophrenia and bipolar disorder), while other disorders, such as postpartum depression, occur exclusively in women. Depression is much more common in women than in men, likely a result of biological, psychological, and social factors. In the past, it was often believed that women were subject to emotional instability as a "side effect" of their reproductive functioning. "Hysteria" (based on the Greek word for uterus) was a term used in the past to describe overreactive emotional states occurring in women. In some cases, women were deprived of personal rights and freedoms as it was believed they were incapable of making rational decisions when in the grip of these "female," overreactive emotional states. While stigma is still a major factor in the lives of both men and women with mental illness, campaigns to improve public awareness of mental disorders and significant developments in understanding and treatments of mental illness have greatly improved conditions for women who experience emotional illness. "Hysteria" is not a term utilized in modern psychiatry.

While mental illness occurs all over the world and prevalence of disorder is remarkably consistent globally (e.g., approximately 1% of the population worldwide has schizophrenia), how illnesses manifest may differ across gender, age, and culture. For example, in cultures where depression is not an "acceptable" illness, individuals with depression are more likely to present with somatic complaints such as fatigue, headache, and pain.

Outcomes of mental illness may differ by gender and culture as well. For example, in most countries suicide attempts more commonly occur in women, while men are more likely to commit suicide. However, in some countries, such as India and China, the reverse is true, with women being more likely to commit suicide as compared to men. It has been speculated that this may be due to differing social roles between men and women, although much more study is needed to better understand how gender and culture affect the causes, presentation, and outcomes of mental illness.

Mental disorders describe, classify, and categorize symptoms rather than people. They are divided into the categories of mood, anxiety, psychotic, somatoform, factitious, dissociative, sexual and gender identity, eating, sleep, impulse control, adjustment, personality, first diagnosed in infancy, childhood or adolescence, delirium, dementia, amnesic, and other cognitive disorders, mental disorders due to a general medical condition, and substance-related disorders.

Mood disorders include variations of unipolar and bipolar depression. Major Depressive Disorder is the presence of a major depressive episode, which is sad mood or loss of interest, along with symptoms such as weight loss, sleep difficulty, fatigue, difficulty concentrating, and thoughts of death or suicide. Dysthymic Disorder is a chronic depressive symptom that lasts for at least two years. Women are 2–3 times more likely than men to develop unipolar depression and approximately one out of seven women will develop depression in their lifetime. Sixty to eighty percent of women in the postpartum period experience some combination of depressive and anxiety symptoms, 10–20% of new mothers experience more severe symptoms, resulting in a diagnosis of major depressive disorder with Postpartum Onset (Postpartum Depression), and in rare cases (0.1%) women who have just given birth will develop psychotic symptoms. It is estimated that approximately 75% of women experience depressive symptoms in the premenstrual period, and that 3% of women experience symptoms severe enough to be diagnosed with premenstrual dysphoric disorder.

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Bipolar disorder is characterized by alternating mood changes between severe lows (depressive episodes) and severe highs (manic episodes). A manic episode is elevated or irritable mood, inflated self-esteem, decreased need for sleep, pressured or rapid speech, racing thoughts, and excessive involvement in pleasurable activities such as spending sprees and sexual indiscretions. Women with bipolar disorder tend to experience a depressive episode first, which can be triggered during the postpartum period. Cyclothymic disorder involves 2 years of alternating periods of manic and depressive symptoms that are not as severe as bipolar disorder.

Anxiety disorders are characterized by irrational fear that is usually accompanied by physiological sensations such as palpitations, sweating, shaking, shortness of breath, chest pain, nausea, dizziness, fear of losing control or going crazy, fear of dying, numbness, and chills or hot flashes. Panic disorder is diagnosed when panic attacks (period of intense fear and physiological symptoms) occur along with fear of additional panic attacks and worry about the consequences of having attacks. Agoraphobia is anxiety about being in places or situations where escape might be difficult or help might not be available if a panic attack occurs. Specific Phobias are excessive fears of specific objects or situations and are classified by type: Animal, Natural Environment, Blood–Injection–Injury, or Situational. Social Phobia is overwhelming fear of social situations or performance. Obsessive–Compulsive disorder (OCD) is the presence of obsessions (persistent ideas, thoughts, impulses, or images that are inappropriate and intrusive) or compulsions (repetitive behaviors or mental acts that a person engages in to prevent or reduce anxiety). Post-traumatic stress disorder (PTSD) is an anxious response to witnessing or experiencing an extremely traumatic or life-threatening event that includes symptoms such as difficulty sleeping, irritability or anger outbursts, difficulty concentrating, hypervigilance, and exaggerated startle response. Acute stress disorder is exposure to a traumatic event combined with dissociative symptoms such as numbing, detachment, or absence of emotional response. Generalized anxiety disorder (GAD) is characterized by excessive worry and anxiety about numerous events or activities and is associated with symptoms such as restlessness, fatigue, difficulty concentrating, muscle tension, and sleep disturbance. Anxiety disorders such as GAD, social phobia, and panic disorder are diagnosed up to 2–3 times more often in women than men. PTSD is

often diagnosed in women who have been raped, physically or sexually abused, or are victims of domestic violence.

Psychotic disorders are characterized by the presence of psychotic features such as delusions (distorted thoughts or false beliefs) or hallucinations (distortions of perceptions). Schizophrenia includes symptoms such as delusions, hallucinations, disorganized speech, disorganized or catatonic behavior, and affective flattening. Schizophreniform disorder is similar to Schizophrenia but is less severe and lasts only 1–6 months. Schizoaffective disorder is characterized by the presence of Schizophrenia and either a major depressive or manic episode or both. Delusional disorder involves mistaken beliefs about situations that could occur in real life.

Somatoform disorders are characterized by the presence of physical complaints that cannot be explained by a general medical condition, substance use, or another psychological disorder. Somatization disorder is characterized by numerous physical ailments (pain, gastrointestinal, sexual or reproductive, or pseudoneurological symptoms) that result in medical treatment being sought or significant impairment in daily living. Undifferentiated Somatoform disorder is similar to Somatization disorder but not as severe. Conversion disorder is characterized by unexplained symptoms or problems with voluntary motor or sensory functioning that suggest a neurological or other general medical condition but is judged to be associated with psychological factors. Pain disorder involves pain as the main focus of clinical attention but psychological factors are judged to be significantly related to the pain. Hypochondriasis is characterized by the preoccupation with having a serious illness or disease based on the misinterpretation of bodily symptoms. Body dysmorphic disorder involves a preoccupation with an exaggerated or imagined defect in the individual's physical appearance. Somatization disorder, conversion disorder, and pain disorder are more common in women than men.

Factitious disorders involve pretending to have physical or psychological symptoms to assume the sick role, without the presence of external incentives for this behavior. Factitious disorder includes subjective complaints, self-inflicted conditions, or exacerbation or exaggeration of an existing general medical condition.

Dissociative disorders are characterized by a change in the usually integrated areas of consciousness, memory, identity, or perception of the environment. Dissociative Amnesia is an inability to recall important

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and traumatic information. Dissociative Fugue is sudden travel away from home with an inability to recall the past and confusion about personal identity or the assumption of a new identity. Dissociative Identity disorder (previously Multiple Personality Disorder) is two or more distinct identities or personality states that recurrently take control of the individual's behavior. Depersonalization disorder is characterized by a persistent feeling of being detached from one's body or mental processes.

Sexual and gender identity disorders include Sexual Dysfunctions such as sexual desire disorders, sexual arousal disorders, orgasmic disorders, and sexual pain disorders, Paraphilias such as Exhibitionism, Fetishism, Frotteurism, Pedophilia, Sexual Masochism, Sexual Sadism, Transvestic Fetishism, and Voyeurism, and gender identity disorders, which involve cross-gender identification and discomfort with one's assigned sex.

Eating disorders include severe disturbances in eating behaviors. Anorexia Nervosa is a refusal to maintain a minimally normal body weight, Bulimia Nervosa is repeated episodes of binge eating that are followed by inappropriate compensatory behaviors such as abuse of laxatives, self-induced vomiting, fasting, or excessive exercise, and Binge-Eating disorder is repeated episodes of eating an excessive amount of food without inappropriate compensatory behaviors. It is estimated that 0.5–5% of women suffer from eating disorders, and social factors such as the pressure for women to be attractive and the association of thinness with attractiveness are thought to contribute to these disorders.

Sleep disorders are organized into categories based on the cause of the sleep dysfunction. Primary sleep disorders include Dyssomnias (abnormalities in the amount, quality, or timing of sleep: Primary Insomnia, Primary Hypersomnia, Narcolepsy, Breathing-Related sleep disorder, and circadian rhythm sleep disorder) and Parasomnias (abnormal behavior in relation to sleep: nightmare disorder, sleep terror disorder, and sleepwalking disorder).

Impulse control disorders are characterized by the failure to resist an impulse or temptation to perform an act that is harmful. Intermittent explosive disorder is the failure to resist aggressive impulses that result in serious assaults or destruction of property. Kleptomania is the failure to resist impulses to steal objects that are not needed. Pyromania is a pattern of setting fires for relief of tension, pleasure, or gratification. Pathological

Gambling is maladaptive gambling behavior that is persistent and recurrent. Trichotillomania is recurrent pulling out of one's hair for relief of tension, pleasure, or gratification and results in noticeable hair loss. Kleptomania and Trichotillomania are more common in women than men.

Adjustment disorders are characterized by clinically significant emotional or behavioral symptoms in response to an identifiable stressor and are associated with symptoms such as depressed mood, anxiety, and/or behavior problems.

Personality disorders are patterns of experience and behavior that are inflexible and lead to impairment or distress. Paranoid Personality disorder is characterized by excessive suspiciousness and distrust. Schizoid Personality disorder is diagnosed in individuals who show a restricted range of emotions and have a history of detachment from social relationships. Schizotypal Personality disorder is characterized by acute discomfort in close relationships, eccentricities of behavior, and cognitive or perceptual distortions. Antisocial Personality disorder is diagnosed in individuals who show disregard for and violation of the rights of others. Borderline Personality disorder is characterized by impulsive behaviors and instability in interpersonal relationships, self-image, and mood. Histrionic Personality Disorder is characterized by excessive emotionality and attention-seeking behaviors. Avoidant Personality Disorder is diagnosed in individuals who are socially inhibited, feel inadequate, and are hypersensitive to negative evaluation by others. Dependent Personality Disorder is characterized by submissive and clinging behavior related to an excessive need to be taken care of. Obsessive–Compulsive Personality Disorder is diagnosed in individuals who are preoccupied with orderliness, perfectionism, and control. Borderline, Histrionic, and Dependent Personality disorders are more common in women than in men.

There are disorders that are usually first diagnosed in infancy, childhood, or adolescence, however there is no clear distinction between childhood and adult disorders. Disorders included in this category are Mental Retardation, Learning disorders, Motor Skills disorder, Communication disorders, Pervasive Developmental disorders (Autistic disorder, Rett's disorder, Childhood Disintegrative disorder, and Asperger's disorder), Attention-Deficit and Disruptive Behavior disorders (Attention-Deficit/Hyperactivity disorder, Conduct disorder, and Oppositional Defiant disorder), Feeding and Eating disorders of Infancy or Early Childhood



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(Pica, Rumination disorder, and Feeding disorder of Infancy or Early Childhood), Tic disorders (Tourette's disorder, Chronic Motor or Vocal Tic disorder, and Transient Tic disorder), Elimination disorders (Encopresis and Enuresis), and other disorders such as Separation Anxiety disorder, Selective Mutism, Reactive Attachment disorder of Infancy or Early Childhood, and Stereotypic Movement disorder.

Delirium, Dementia, Amnesic, and other cognitive disorders are characterized by a clinically significant deficit in cognition or memory. Delirium is a disturbance of consciousness that develops over a short period of time, Dementia is multiple cognitive deficits including memory, and an Amnesic disorder is memory impairment in the absence of other significant cognitive problems.

Mental disorders Due to a General Medical Condition are psychological symptoms (delirium, dementia, amnesic, psychotic, mood, anxiety, sexual dysfunction, or sleep) that are judged to be the result of a general medical condition.

Substance-Related disorders are associated with the taking of a drug of abuse, side effects of medication, and toxin exposure. The two groups of substance-related disorders are Substance Use disorders (Substance Dependence and Substance Abuse) and Substance-Induced disorders (Substance Intoxication, Substance Withdrawal, and Substance-Induced delirium, dementia, amnesic, psychotic, mood, anxiety, sexual dysfunction, or sleep disorders). The 11 classes of substances include alcohol, amphetamines, caffeine, cannabis, cocaine, hallucinogens, inhalants, nicotine, opioids, phencyclidine (PCP), and sedatives, hypnotics, and anxiolytics.

Most mental disorders can be successfully treated in a variety of ways. Psychoactive medications are used to modify emotions and behavior in the treatment of mental disorders and include antidepressant, anti-anxiety, antipsychotic, and antimanic medications. Antidepressants are commonly used to treat unipolar depression and anxiety disorders and include tricyclic antidepressants, monoamine oxidase inhibitors (MAOIs), and selective serotonin reuptake inhibitors (SSRIs). Anti-anxiety medications include benzodiazepines, which relieve anxiety symptoms for a short period of time. Antipsychotic medications cannot cure psychosis, but are very effective in treating psychotic symptoms, and antimanic medications stabilize the mood swings in Bipolar disorder. Women who are of childbearing age should discuss and carefully weigh the pros and cons of psychotropic medication treatment

with their doctors because of the potential risks while taking birth control pills, possible birth defects in the developing fetus, and the passing of medication through breast milk. Psychosocial therapy includes individual psychotherapy (cognitive behavioral or interpersonal therapy is commonly used), family therapy, psychoeducation, group therapy (supportive or self-help), inpatient hospitalization, rehabilitation services, and electro-convulsive treatment (ECT).

The changes in laws and public policy in the United States reflects the ever-evolving feminist movement, and the history of women and mental illness is representative of cultural issues reflected in laws and public policy. One historical example is the story of Elizabeth Packard who, in the mid-1800s, was committed to a state mental hospital simply because her husband asserted that she was insane. When she was released, she won a jury trial, and advocated for laws to be changed. She was responsible for changes to commitment laws in many states and was crucial to raising awareness about the treatment of patients in mental asylums. She also fought for the "Bill for the Protection of Personal Liberty," which granted the right to a jury trial to individuals committed to an asylum. In the United States during the years of Packard's story, public policy regarding mental illness also reflected the views regarding women at that time. Women were not yet allowed to vote and husbands were permitted to send their wives to a mental hospital without evidence of insanity.

The "Anti-Psychiatry Movement" that began in the 1960s is another example of the impact of culture on women and mental illness (although criticisms of psychiatry began decades before the 1960s). Much of this movement derived from criticism regarding inhumane treatment of psychiatric patients including lobotomies, ECT, isolation, and restraint. Some also believed that many individuals are misdiagnosed, over-diagnosed, or mistreated. Many people argue against involuntary commitment, coming from a legal or civil liberties perspective. As with Elizabeth Packard, social reform and public policy changes resulted from this movement. Sylvia Plath's *The Bell Jar* and Ken Kesey's *One Flew Over the Cuckoo's Nest* are examples of literary efforts at social reform regarding psychiatric treatment. Plath's work also addressed social and cultural issues related to women and mental illness, including social class and a patriarchal society. More recently, Susanna Kaysen's *Girl, Interrupted* also questioned the symptoms for diagnosing Borderline Personality Disorder, implying

## Midwifery

that social class and a male-dominated society had a significant influence in her diagnosis and experiences in inpatient psychiatric treatment.

It is evident that culture plays a significant role in various aspects of mental illness, including prevalence rates of diagnoses, as well as treatment implications and access to treatment. Research has shown that racial and ethnic minorities are less likely than the general public to receive quality mental health care. Culture also affects how patients communicate and manifest their symptoms, coping styles and skills, willingness to seek treatment, and family and community supports. A history of racism and discrimination in this country often causes mistrust and fear that deters minorities from utilizing services and obtaining mental health care.

Research has shown that there is a disproportionate number of African Americans who are homeless, incarcerated, in the child welfare system, and victims of trauma; these populations have an increased risk for mental illness. Approximately, 40% of Hispanic Americans report difficulty speaking English, therefore, many Hispanic Americans have limited access to Spanish-speaking mental health providers. The American Indians/Alaska Natives population has a suicide rate that is 50% higher than the national average. It appears that co-occurring mental illness and substance abuse are also higher in this population. Asian Americans/Pacific Islanders often present with more severe mental illnesses than other ethnic groups, possibly due to stigma and shame preventing individuals from seeking treatment.

**SEE ALSO:** Anxiety disorders, Depression, Bipolar disorder, Dementia, Discrimination, Eating disorders, Hysteria, Obsessive-compulsive disorder, Panic attack, Psychiatry, Psychology, Schizophrenia, Sleep disorders, Substance use

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Not  
in list

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TIRA B. STEBBINS

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**Midwifery** Midwifery is the second oldest profession for women in the world. The practice of midwifery is documented in the Old Testament. The derivation of the word *midwife* means, “with woman,” giving credence to the most enduring hallmark of midwifery which connotes a human presence during birth.

Exclusive of the North American continent, midwifery care for women has maintained a congruent path throughout history. Organized schools of midwifery have flourished across Europe through the centuries as far back as the 5th century BC when Hippocrates founded the first formal midwifery program. Countries across the world continue to recognize midwives as the caregivers of women, especially during parturition. Today’s midwife is very different from the one who counseled Moses’ mother to set him adrift in a basket upon the Nile, but her/his role in counseling women remains undaunted.

Midwifery came to America with the first colonists, although birth attendants existed among the Native Americans long before the continent was “discovered.” This *new* midwife initially had been trained in Europe or was indigenously apprenticed in America. It was Mary Breckinridge who, having been educated in England, brought the nurse midwife to the United States in the early 1920s to care for Appalachian women and their families in the state of Kentucky. In 1925, she opened the Frontier Nursing Service with nurse midwives who had also been educated in England. These British-trained nurse midwives were the first to practice in the United States.

In 1931, the first nurse midwifery educational program in the United States opened in New York City. It was called the Lobenstine Midwifery School and continues today as the State University of New York (SUNY) Downstate educational program. Currently there are over 40 nurse midwifery educational programs, and nurse midwives practice in all the 50 states. The number of

## Midwifery

graduates fluctuates each year, but usually over 400 graduate yearly. Currently, there are over 10,000 Certified Nurse Midwives in the United States, and over 7,000 belong to the American College of Nurse Midwives (ACNM). Ninety-five percent are women, and the majority practice in urban and suburban communities.

The American College of Nurse Midwifery was formed in 1955 and changed its name to ACNM when it merged with the Kentucky Association of Nurse Midwives in 1969. The ACNM sets the Standards for nurse midwifery/midwifery practice in the United States. Through the Division of Accreditation, the ACNM accredits its educational programs to ensure a single standard of education; the Certification Council provides the venue for national certification. Within the last decade, the ACNM has expanded its educational horizon and accredited a non-nurse midwifery educational route to practice. Individuals who select the non-nurse route to midwifery must possess a Bachelor of Science degree to be considered for admission. After acceptance they must successfully complete a bridge option which includes basic fundamentals of health care and the trends and ethics of today's health care delivery system. These students then attend and complete the same accredited midwifery education program as their fellow registered nurse students.

There are different routes to midwifery education and care in the United States today. As a future practitioner, it is important for an individual to choose the educational route consistent with his/her philosophy of practice. As a consumer, it is important for a woman to make an informed decision about the practice of midwifery, before entrusting herself and her baby to the birth attendant.

The Certified Nurse Midwife (CNM) and Certified Midwife (CM) are licensed providers who have been educated in programs accredited by the ACNM Division of Accreditation and nationally certified by the ACNM Certification Council. State regulations and/or legislation are promulgated to set the perimeters of the scope of practice.

Direct entry into midwifery education and practice are prospering in its own venue. Midwives' Alliance of North America (MANA) is the official professional organization. Accreditation standards for educational programs and certification of its graduates have been established through the Midwifery Education Accreditation Council (MEAC) and the North American Registry of Midwives (NARM).

Certified Nurse Midwives/certified Midwives, referred to hereafter as "midwives," provide primary

care to women throughout the life cycle. Today, midwives are not just provider of care during pregnancy and childbirth; they provide care that emphasizes well woman care incorporating health promotion and education through the woman's lifetime. Pregnancy and childbirth, however, remain a focal point of midwifery care, since pregnancy is often a healthy woman's first entry into the health care system. Midwives attend about 9% of births nationally each year.

Midwives focus on pregnancy as a normal event, and they inspire women to have confidence and to trust their bodies. Their basic approach is to empower the woman and her family to take an active role in her health care. Midwives respect technology and use it appropriately; they educate women to make informed decisions about childbirth, and they provide the know-how and environment necessary to achieve a safe and satisfying birthing experience.

Increasingly, today's families are choosing midwives, as evidenced by a 118% increase in births attended by midwives in the last decade. However, many legislative, political, economic, and social challenges confront the profession and women's health care. Among them are:

1. High liability premiums
2. Barriers to home birth and trial of labor after cesarean
3. Increasing use of epidurals and induction of labor
4. Emergence of elective cesarean sections
5. Inequitable reimbursement for nurse midwifery services
6. Decrease in scholarship funds for students.

In order to sustain and promote the growth in the practice of midwifery observed in the last decade, midwives must educate the public that they are skilled and knowledgeable practitioners who care for women over their lifetimes, rather than only during pregnancy and childbirth.

**SEE ALSO:** The history of women's health, Women in the health professions, Labor and delivery, Nurse, Nurse practitioner, Pregnancy, Prenatal care

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in list

### Suggested Reading

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## Migraine

### Suggested Resources

American College of Nurse Midwives: [www.midwife.org](http://www.midwife.org)

ELAINE K. DIEGMANN

**Migraine** Migraine is the second most common headache disorder, after tension-type headache. The prevalence of migraine is related to age and sex. Before puberty, boys are more susceptible than girls. After puberty, the prevalence in women increases until age 40–50 and then decreases. At age 40, 26% of women will have at least one migraine over the course of a year, compared with 8% of men.

Migraine is a hereditary illness. First-degree relatives of an affected person are 2–4 times as likely to have migraines. The mode of inheritance for most types of migraine is not known, but one form, familial hemiplegic migraine (a type of migraine that runs in families and causes bodily weakness), is known to be transmitted as an autosomal dominant trait (specific method of genetic transmission). The gene has been mapped to chromosome 19.

Migraine consists of two parts, a transient neurological symptom, called the *aura*, and a headache. They can occur together (*migraine with aura*) or separately (*migraine without aura*, *migraine aura without headache*). The aura usually precedes the headache but may occur during it or afterwards.

The most common auras are abnormalities of vision, sensation, and language ability. An aura may occur alone, or two or three may appear one after another. Visual auras are usually small and unobtrusive at first but enlarge and spread across the field of vision during a period of 10–15 min. Likewise, sensory auras start in one part of the body, usually the fingers or lips, and spread slowly to other parts. Auras usually last 15–30 min and then disappear. Visual auras often consist of an area of visual loss surrounded by a shimmer or a flickering light (scintillating scotoma), or zigzag lines in the form of a horse shoe (fortification spectrum). Sensory auras may consist of numbness or tingling and “pins and needles.” A language aura (aphasia) impairs the subject’s ability to express herself in words or to understand spoken or written language. Other less common auras include limb weakness, vertigo (dizziness), double vision, lack of coordination, and a reduced level of consciousness.

The pain of migraine may be on one or both sides of the head. It generally has a pulsating or throbbing quality, is moderate to severe in intensity, and is made worse by routine physical activity, such as climbing stairs. The headache is often associated with nausea, vomiting, and sensitivity to light (photophobia) and sound (phonophobia). Untreated, the pain lasts for 4 hr to 3 days.

Migraine headaches respond better to *abortive treatment* the earlier it is given after the pain starts. The choice of medication depends on the severity of the pain. Mild headaches may respond to over-the-counter pain relievers, such as aspirin and acetaminophen (with or without caffeine), and to nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen and naproxen. Moderate and severe headaches require a prescription drug. The most effective drugs belong to a family of agents called “triptans.” Sumatriptan (Imitrex) was the first one marketed. It is available as a tablet, a nasal spray, and a subcutaneous injection. More intense headaches require the nasal spray or injection. Dihydroergotamine, another antimigraine agent, is available as a nasal spray (Migranal) and is at least as effective as sumatriptan nasal spray, although not as effective as the injection. The nausea and vomiting of a migraine will respond to anti-nausea drugs, such as metoclopramide, domperidone, and prochlorperazine, taken as a tablet or suppository.

Using abortive medications for migraine more than 2 days a week can lead to *medication-overuse headache*, a chronic daily headache that improves with each dose of medicine but recurs in a few hours, creating a vicious cycle of withdrawal headache. In order to avoid this, many patients use *preventive therapy* of migraine. Preventive therapy involves taking a drug regularly, everyday, in order to reduce the frequency, severity, and duration of migraine attacks. Once the migraines have been under good control for 3–6 months, the drugs can be withdrawn. Several classes of drugs may be used: beta-blockers such as propranolol, antidepressants such as amitriptyline and phenelzine, calcium-channel blockers such as verapamil, and antiepileptic drugs such as valproate, topiramate, and gabapentin. Although beta-blockers and calcium-channel blockers are also blood pressure medicines, they are usually tolerated well when taken for migraines.

During the first trimester of pregnancy, the risk of exposing the fetus restricts the use of preventive drugs. Among abortive agents, acetaminophen, caffeine,

## Military Service

NSAIDs, narcotic analgesics, and probably sumatriptan are safe, as are the anti-emetic agents (prevent vomiting) prochlorperazine and metoclopramide. Amitriptyline, as a preventive drug, is probably safe in the second and third trimesters. Late in pregnancy, NSAIDs should be avoided because they inhibit closure of the fetal ductus arteriosus, causing circulatory problems in the newborn. Breast-feeding mothers should discuss medication choices with their health care provider, to avoid possible ill-effects on the infant.

Many women have migraine headaches only or mainly with their menstrual periods (*menstrual migraine*). These migraines are often intense, long-lasting, and resist abortive treatment. Use of NSAIDs or standard preventive drugs before and during the period, a short course of oral corticosteroids, or therapy with estrogen can prevent or reduce the headaches.

Hormonal contraceptives, including oral and injectable contraceptives, may cause or worsen migraine. This usually occurs within the first few cycles of their use but may not appear for years. Stopping the drug may not bring immediate relief: there may be a delay of several months or no improvement at all.

Migraine with aura and, to a lesser extent, migraine without aura, as well as the use of estrogen-containing contraceptives are all minor risk factors for ischemic stroke. Controversy continues on whether it really is too risky to use estrogen-containing contraceptives in patients with migraine. It seems reasonable, however, not to use them in migraine patients who have other stroke risk factors, such as smoking, high blood pressure, or age over 40 years. If migraine auras appear or worsen during treatment, then these contraceptives should be discontinued.

People with migraines can also develop other types of headache. Some causes of headache, such as bleeding within the skull or meningitis, are quite dangerous. Talk with your health care provider if your headaches change significantly. Warning signs of a possibly serious condition include headache that comes on suddenly without warning, pain that is different from or much worse than your usual migraine pain, headaches occurring more often or lasting longer, pain that gets worse with each new headache, headache that develops after a head injury, headache with fever or stiff neck, or headache with new neurological symptoms such as trouble walking, talking, or weakness.

**SEE ALSO:** [Contraception](#), Pain

### Suggested Reading

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MARC WINKELMAN

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### Military Service

In 2001, there were 1,385,116 active duty members of the United States military, down from 1,610,490 in 1994. In 2001 there were 207,188 women service members, roughly 15% of the total force, up from the 199,688, in 1994. Compared to 1994, the total number of active duty military members fell, while the number of women service members rose by about 2.5%.

Until 1948, women could serve as voluntary members of the military. The Army had the Women's Army Auxiliary Corps (WAACs), the Navy had the Women Accepted for Voluntary Emergency Service (WAVES), and the Marines had "Semper Paratus, Always Ready" (SPAR). Usually these volunteers served as nurses, clerks, and sometimes even performed communications jobs, but were not considered full members of the armed services.

The Women's Armed Services Act of 1948 opened the military forces for women to become full members, however limiting their service to non-combat role. Roughly 50% of all military jobs are now open to women. This number varies by branch of service.

In the recent Gulf War, some 540,000 soldiers participated in Operation Desert Storm, of these soldiers, approximately 35,000 were women. The Persian Gulf War was the first major conflict where women saw front-line action. Women were very much in the media spotlight during this war. Media attention and the exceptional performance of female service members during the Gulf War were largely responsible for the changing attitudes and subsequent opening of many previously prohibited jobs to women. Combat exclusion laws have been repealed, however, there are still a number of military occupations closed to women. Among those closed to women are: infantry, armor, field artillery, and special forces in the Army; submarine, SEAL (special forces units), and mining/anti-mining

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## Miscarriage

positions in the Navy; infantry, artillery, armored units, reconnaissance, and combat engineer units in the marine Corps; and finally, paragraph-rescue and combat controllers in the Air Force.

A few of the reasons that opponents of women in combat roles offer for exclusion are: physical differences, reproductive issues, that men would be unable to fight because they would be too concerned with protecting female members, and the potential rape by enemy forces if captured. As military equipment and jobs become more technical and hand-to-hand combat in war decreases, many of these arguments fall by the wayside.

The year 1994 saw an enormous surge of female firsts for the military. In 1994, 1st Lt. Jeanne Flynn became the first Air Force combat jet pilot; Lt. Shannon Workman became the first female Navy pilot to qualify on an aircraft carrier, and 1st Lt. Sarah Deal became the first Marine Corps combat pilot. Also in 1994, the Navy allowed two female pilots to fly combat missions for the first time.

Another area of military service to be opened to women, during the 1990s, came after the United States Supreme Court ruled, in a seven to one decision, that the prestigious Virginia Military Institute (VMI) would have to either accept women or go private. VMI's answer was to create the Virginia Women's Military Institute (VWMI). Shortly thereafter, another military academy, the Citadel, admitted their first woman student, Shannon Faulkner.

The United States Military has progressed far in the area of women's equality; while not quite there yet, the military continues to progress toward equality.

**SEE ALSO:** Women in the workforce, Sexual harassment

## Suggested Reading

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TAMBRA CAIN

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**Miscarriage** A miscarriage is a pregnancy that ends before the fetus reaches a point where it would be able to survive outside the uterus. The medical term for a miscarriage is a "spontaneous abortion." About 80% of miscarriages occur in the first trimester, meaning the first 12 weeks of pregnancy. Approximately 20% of pregnancies end in miscarriage. There are probably another 10% of pregnancies lost before women actually realize they are even pregnant.

When a miscarriage occurs, couples are very anxious to understand why this event, which can be devastating, has happened. Approximately 50% of miscarriages are due to genetic abnormalities of the fetus. Most babies are born perfect, and this is "nature's way" of controlling this wonderful phenomenon. Most abnormal fetuses will not continue to grow and will result in miscarriage. The earlier in a pregnancy a miscarriage occurs, the more likely that it was a result of a genetic abnormality. Miscarriages may also be the result of uterine abnormalities such as fibroids or cervical abnormalities. Women with repeated pregnancy losses may require complex evaluations looking for possible autoimmune or endocrine diseases. Miscarriages are not caused by maternal activity (exercise, heavy lifting, etc.) or intercourse. Often patients are concerned about how they may have contributed to this event. It is important to discuss these concerns with your physician. It is unusual to know why a miscarriage occurred.

There are multiple factors that increase the risk of a miscarriage. The most important of these is maternal age. Between the ages of 20 and 30, the risk of miscarriage is 9–17%. At age 35, the risk is 20%, at age 40, the risk is 40%, and at age 45, the risk is 80%. The risk of miscarriage also increases with the more children a woman has had, this is independent of her age. Having had a previous miscarriage is a risk as well. But this is very much dependent on how many miscarriages have occurred. After a single miscarriage, the risk of a second is about 20%, after two miscarriages, the risk is about 28%, and after three miscarriages, the risk is 43%. Most physicians begin an investigation as to why a miscarriage occurs after two or three miscarriages; this will depend upon the patient's specific situation. Smoking and alcohol consumption also increase the risk. Caffeine increases the risk at a significant level when 4–5 cups of coffee are consumed a day. There are also, less commonly, risks from maternal exposure to chemicals, medications, or infections.

## Mitral Valve Prolapse

There are many ways in which a woman may learn that she has had a miscarriage. The most common way is by vaginal bleeding and/or abdominal cramping. These symptoms may also occur however in a normal pregnancy or an ectopic pregnancy (pregnancy outside of the uterus). Because of this, ultrasound is key to the evaluation of a possible miscarriage. If a heart beat is not seen by approximately 6 weeks gestation (6 weeks from the last menstrual period) on a transvaginal ultrasound (specialized procedure using sound waves to visualize the structure around and in the uterus), concern of miscarriage increases. When the diagnosis is not entirely clear, blood levels of the pregnancy hormone, beta-HCG, may be followed over the course of several days. If vaginal bleeding is heavy and the cervix has already begun to dilate, the miscarriage is considered "inevitable." If bleeding is occurring in the face of a heart beat on ultrasound and a closed cervix, the miscarriage is considered "threatened," this can be an extremely stressful time for a patient. Continued surveillance with ultrasound is then indicated. There are times when bleeding has occurred to the point that the fetus is passed as well. In these cases an ultrasound reveals an empty uterus. This is called a "complete abortion" and usually no further medical or surgical treatment is necessary. If a significant amount of tissue remains in the uterus, despite loss of a fetal heart beat, this is called an "incomplete abortion" and often the patient is offered medical or more commonly surgical therapy to complete the miscarriage and clear the uterine cavity. Because of the frequent use of early ultrasound, often a miscarriage is diagnosed even before the patient has experienced any vaginal bleeding. In this case, a routine ultrasound would reveal that the fetus is either not developing normally or no longer has a heart beat.

Treatment of a miscarriage is varied. If a pregnancy is before approximately 7–8 weeks, often a patient is encouraged to "let nature take its course." In other words, no intervention would be made by the physician and the patient would simply wait to see whether the pregnancy passes on its own. Usually this occurs within 2 weeks, but may take longer. This can result in heavy bleeding and painful cramping, but can be handled well by most women. If at any time the woman felt the bleeding was too heavy or pain too severe, she would simply contact her physician. In order to expedite passing the pregnancy, or to attempt this later in the first trimester, medication may be considered. More commonly, however, a patient is offered

a dilation and curettage (D&C) to complete the miscarriage. This is a surgical procedure done either in the operating room or in the physician's office. This is a decision made by the patient and her physician. The risks of D&C are small, but include bleeding, infection, and uterine perforation.

After a miscarriage, it is usually advised not to have intercourse until after the next normal menses. If intercourse occurs before then, a condom should be used. It is medically safe to attempt pregnancy again after the first normal menses. Many couples are encouraged to wait 2–3 cycles, however, to give themselves some time to heal psychologically from this emotionally difficult event. If a woman feels she is more depressed than she would expect, or is concerned about her mood in any way, it is very important for her to discuss this with her physician.

**SEE ALSO:** Autoimmune disorders, Ectopic pregnancy, Genetic counseling, Pelvic organ prolapse, Pregnancy, Uterine fibroids

### Suggested Resources

American College of Gynecology: [www.acog.org](http://www.acog.org)

MERRILL SUE LEWEN

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**Mitral Valve Prolapse** Mitral valve prolapse (MVP) is the most common congenital valvular heart disease in adults and has become the most frequent valvular cause of chronic mitral regurgitation (leakiness) in the United States.

The prevalence of this disease in our country varies according to the sources in the literature due to a lack of strict criteria for diagnosis and differences in study design. This condition has been reported to occur in 5–10% of the general population, with the prevalence being highest in young women. However, this data was based on studies using old diagnostic criteria for this condition. Dr. Levine and colleagues at the Massachusetts General Hospital showed that the supposed epidemic of MVP was created by misinterpretation of echocardiographic findings. The Framingham Study examined 1,845 women and 1,646 men using the current two-dimensional echocardiographic criteria for the diagnosis of MVP. The findings were: disease prevalence of 2.4%, no gender difference and no age group predominance.

## Mitral Valve Prolapse

The mitral valve is a bileaflet structure that separates the left atrium and the left ventricle (the upper and lower left-sided chambers of the heart). It is composed of the anterior and posterior leaflets, the chordae tendineae that are attached to the papillary muscles, and the mitral valve annulus. In MVP disease, there is thickening and redundancy of the leaflets, elongation, thinning and occasional rupture of the chordae tendinae, and dilatation of the annulus. Histologically, there is substitution of the normal fibrous tissue of the valve structure by a myxomatous process that is responsible for the above changes. Both leaflets can be involved, but the posterior leaflet is the most commonly affected one.

MVP, floppy mitral valve, click/murmur syndrome, Barlow's syndrome, and myxomatous mitral valve disease are all different names for this disease. The name prolapse comes from the fact that one or both leaflets are displaced above the mitral valve ring into the left atrium during systole, the contraction phase of the heart. MVP can be inherited as an autosomal dominant condition with incomplete penetrance or, less commonly, as an X-chromosome-linked disorder in which males are affected and females are carriers. It can be associated with connective tissue disorders such as Marfan syndrome, Ehlers-Danlos syndrome, adult polycystic kidney disease, anterior chest deformity, scoliosis, and kyphosis. It can be associated with tricuspid valve prolapse as well.

The diagnosis of MVP is based on physical examination of the heart with confirmatory echocardiographic findings. On auscultation of the heart, the typical finding is the mid-systolic click, which may or may not be associated with a late systolic murmur of mitral regurgitation because of lack of complete coaptation of the anterior and posterior leaflets. Echocardiography is the most useful tool that can show in real time the prolapsing mitral leaflets, the thickened leaflets, redundant chordae tendinae, and dilated annulus. It can also reveal the severity of mitral regurgitation, if there is any, as well as determine whether there is dilatation of the heart chambers and deterioration of heart function.

Mitral regurgitation is one of the most common complications of MVP disease. Fortunately, the majority of patients have only mild regurgitation or none at all. However, 2–7% of patients progress to severe regurgitation, requiring surgical treatment. Furthermore, the presence of severe regurgitation is a risk factor for heart failure, sudden death, arrhythmias, and congestive heart failure. Symptoms suggestive of hemodynamically significant mitral regurgitation are shortness of breath,

decreased exercise tolerance with easy fatigability, and dizziness. Once the patient develops the above symptoms, it is usually indicative that left ventricular contractility is beginning to decrease and surgical treatment with either valve repair or replacement is indicated. Chordae rupture can complicate MVP and can occur spontaneously or during exercise. Mitral valve repair is the treatment of choice over valve replacement when the anatomy is favorable. This is because the former is related to a better outcome with regard to preservation of ventricular function. Isolated posterior leaflet prolapse has better operative success results with lower reoperation rate than anterior or bileaflet prolapse. Indications for surgery in MVP are: (a) development of symptoms of heart failure; (b) asymptomatic patients with severe regurgitation and evidence of left ventricular systolic dysfunction or left ventricular dilatation; (c) chordae rupture with severe regurgitation. Sudden death in patients with MVP is rare (1–2.5%) in the absence of significant mitral valve degeneration and regurgitation. The risks factors for sudden death are: (a) prolapse involving leaflets, (b) significant mitral regurgitation, (c) history of syncope or near syncope, (d) presence of flail mitral leaflet, (e) reduced left ventricular systolic function, and (f) atrial fibrillation.

Infective endocarditis (infection involving the mitral valve caused by bacteria or fungus) is a possible complication of MVP, mainly when it is associated with mitral regurgitation and significant leaflet thickening. Therefore, patients with these two conditions should be advised to take antibiotics prior to any invasive procedures such as dental cleaning and endoscopy with biopsy.

Based on observational studies, the risk of strokes and transient ischemic cerebral attacks in MVP is very low: estimated to be 1 in 11,000 per year. Many people with MVP present with a constellation of nonspecific symptoms that cannot be attributed to advanced valve dysfunction, such as panic attacks, anxiety, atypical chest pain, and palpitations without arrhythmias. This constellation of symptoms has been called MVP syndrome. Many physicians believe that these symptoms are coincidental and that the link between them and the disease are accidental because of the inaccuracy of original studies suggesting an association. It is possible, however, that the autonomic nervous system and neuroendocrine dysfunction found in some patients with MVP may be responsible for some of these symptoms. Further investigation is warranted to confirm this possibility. Patients with these symptoms benefit from reassurance about the



## Moles

benign nature of this disorder, changes in lifestyle, including aerobic exercise, avoidance of stimulants such as caffeine and alcohol, and reduction of stress.

Asymptomatic patients with MVP may engage in exercise and competitive activities. However, patients with mitral regurgitation should avoid weight lifting. Patients with MVP should be followed with a physical examination every 2–3 years. A new murmur or development of symptoms should prompt further evaluation with an echocardiogram.

AQ: This entry is not provided. Pls check

**SEE ALSO:** Chest pain, Anxiety disorders, [Dental Procedure](#), Exercise

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ELINA YAMADA  
CLAIRE DUVERNOY

**Moles** Nevi, commonly referred to as moles, beauty marks, or birthmarks, are one of the many types of benign tumors of the skin. Moles can be present at birth or develop during childhood or adulthood. A normal mole can be flat or raised and is generally an evenly colored brown, tan, or black spot on the skin. It can be round or oval. Moles are generally less than 1/4 in. or 6 mm in diameter. Once a mole has developed, it will usually stay the same size, shape, and color for many years.

Congenital moles or birthmarks are a less common kind of moles. Congenital moles are present at birth and are usually larger (>1.5 cm) than moles that develop after birth. They may be brown or black and sometimes pink. Smaller birthmarks are usually pigmented and often slightly raised. Giant congenital moles may be found anywhere on the skin and can cover large areas of the body. The risk of developing melanoma in these giant moles is high.

The number of moles increases with age, especially during childhood and adolescence. Boys tend to have more moles than girls do. Individuals with a family history of skin cancer tend to have more moles. Both children and adults who are sun sensitive are at increased risk of having or developing moles. Sun sensitivity can be measured as red or blond hair, light or fair skin color, a tendency to burn, a tendency to freckle, and a lack of tanning ability. Both benign moles and melanoma (cancer) occur more often in people with a lighter complexion.

Moles that are irregular in shape, size, or color may be referred to as atypical or dysplastic moles. These moles tend to be large. They form a continuum between the common mole and superficial spreading melanoma. Dysplastic moles may occur as multiple moles distributed over the body, a condition known as dysplastic nevus syndrome. People with multiple moles often have a family history of multiple moles and melanoma, and are at higher risk for developing melanoma themselves. Such people need to be closely monitored by a dermatologist. The association of increasing numbers of moles with melanoma suggests that moles are either markers of some exposure that leads to melanoma, or potential precursors of melanoma or both.

Sun exposure is the major risk factor leading to the development of skin melanoma and precursor lesions such as moles. Childhood sun exposure may promote the development of melanoma by increasing the number of moles that develop. Several studies have found more moles on sun-exposed areas of the body compared to sun-protected areas. After early sun exposure causes moles to develop, other risk factors for melanoma may cause the moles to progress to melanoma. Sunburns are related to both sun exposure and the skin's sensitivity to the sun. Various studies have found an increased risk of moles with increasing number of sunburns, similar to the association seen between sunburns and melanoma.

The contribution of tanning bed use or sunless tanning products to the development of moles has not been well-studied at this time. Similar to sun exposure, ultraviolet light from tanning bed use during adolescence is likely to increase the number of moles. Any changes in a mole seen after tanning bed use should be shown to a dermatologist immediately.

Few moles develop into melanoma. Individuals with many moles have a greater chance that progression will occur. It is important to recognize changes in a mole in both children and adults. Photographs or full

## Mononucleosis

body charts of your moles can be used to monitor changes in shape, color, and size over time. The most important warning sign for melanoma is a spot on your skin that is changing in size, shape, or color over a period of 1 month to 1 or 2 years. The ABCD rule may help you remember the four signs of melanoma. If you find one of the following, consult a dermatologist: *A*—not *asymmetric*—if half of the mole does not match the other half; *B*—irregular *border*—a mole forms irregular borders or becomes ragged, notched, or blurred; *C*—change in *color*—a mole changes in color or is not the same color all over; *D*—large diameter—a mole is larger than the width of a pencil eraser (more than 1/4 in. or 6 mm in diameter).

Seeking medical attention for suspicious moles is very important because melanoma can be a deadly disease with few or no symptoms or pain. However, melanoma is also easily curable if identified early and removed. Distinguishing between a mole and a melanoma may be difficult, even for dermatologists. The most dependable method to distinguish a normal mole from melanoma is to remove the mole and have it examined under a microscope to determine whether the lesion is cancerous.

**SEE ALSO:** Cancer, Skin care

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LESLIE K. DENNIS

**Mononucleosis** The term *mononucleosis* refers to both a specific infection and a syndrome, with considerable overlap between the two. Acute Epstein-Barr

virus (EBV) infection produces an illness characterized by sore throat, swollen lymph glands, fatigue, and fever. The clinical illness produced by acute EBV infection is called mononucleosis; the term is also used when other infectious agents produce a similar illness. EBV is a member of the Herpes virus family, which also includes Herpes simplex I and II, cytomegalovirus (CMV), discussed below, and varicella-zoster virus, the cause of chicken pox and shingles. Infection due to this family of viruses is characterized by an acute illness followed by lifelong infection, which is usually clinically silent (although chronic infection, relapses and relapse, due to immunosuppression can occur).

Infection with EBV usually occurs during adolescence or early adulthood. The virus is found in saliva, and is spread by kissing, shared beverages, or other close contact. Fever, sore throat, swollen lymph nodes, particularly in the neck area are the most typical signs and symptoms. Enlargement of the spleen (splenomegaly) is also common. The clinical presentation can be quite varied and is somewhat dependant on age. Signs and symptoms of acute EBV infection occurring in older individuals (in this case, over 30) are often atypical, and individuals may not have the classic symptoms of sore throat and adenopathy. In children younger than 5, acute EBV infection often produces a mild, non-specific illness. EBV infects lymphocytes and infection results in the presence of significant numbers of abnormal appearing white blood cells (referred to as atypical lymphocytes). The absence of atypical lymphocytes makes acute EBV infection highly unlikely, and the presence of significant numbers of atypical lymphocytes strongly suggests the diagnosis. Individuals often have mild elevations in liver function tests (LFTs), but LFTs that are increased by more than five times the normal level are unusual, and should prompt investigation for alternative diagnoses.

Individuals can be quite symptomatic from acute EBV infection, and the symptoms often last 2–3 weeks. Swelling in the lymph nodes and tonsils can be significant, and in rare cases may produce obstruction of the upper airway. The most common complication of acute EBV infection is significant fatigue following the acute illness; it is not unusual for patients to have fatigue for several months following the initial symptoms. Another complication is splenic rupture; spontaneous splenic rupture is rare but patients with splenomegaly should refrain from activity that produces trauma to the abdomen such as contact sports. Other complications are rare and include encephalitis (brain swelling),

hemolytic anemia (low red blood cells), and myocarditis (swelling of the heart muscle).

Therapy of acute EBV infection is largely supportive and there is no role for antivirals in routine cases. Corticosteroids have been used when marked lymphadenopathy (lymph node swelling) and tonsil swelling threaten the upper airway. The role of EBV in chronic fatigue syndrome (CFS) remains unproven, and most evidence suggests that there is no direct relationship between EBV and CFS. Patients with CFS often have elevated levels of antibodies to EBV, but similar levels occur in many asymptomatic individuals. The existence of "Chronic Epstein-Barr," defined by symptoms of fatigue that last more than a year following acute infection, or persistent fatigue without acute infection, remains doubtful. In highly immunosuppressed patients EBV infection is associated with the development of lymphoma, particularly in patients with organ transplants and advanced HIV infection.

About 5% of cases of the mononucleosis syndrome (fever, sore throat, adenopathy, and atypical lymphocytes) are due to causes other than EBV. The most common alternative agent is CMV, which can produce a similar illness, although marked adenopathy (lymph node swelling) is unusual and the percentage of atypical lymphocytes (white blood cells) is much smaller (<5% vs. >20%). Acute infection with CMV can be minimally symptomatic, and can also produce an illness characterized by persistent low-grade fever and fatigue. CMV can produce significant illness in immunosuppressed patients, and is a major cause of morbidity and mortality in AIDS patients and organ transplant patients. Acute infection with the parasite *Toxoplasma gondii* can also produce mononucleosis-like illness.

**SEE ALSO:** Chronic fatigue syndrome, Shingles

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### Suggested Resources

<http://www.cdc.gov/ncidod/diseases/ebv.htm>

KEITH ARMITAGE

## Mood Disorders

**Mood Disorders** Mood disorders, previously called affective disorders, include a number of psychiatric diagnoses where the major symptom is a disturbance of mood. Most individuals experience a wide range of emotional states from sadness and grief to elation. Even the most extreme mood states do not usually interfere with daily functioning for a prolonged period of time. In contrast, a mood disorder occurs when a persistent state of sad, depressed mood, or elevated, irritable mood interferes with daily life. Depressive disorders and Bipolar disorders are the two main categories of mood disorders.

### DEPRESSIVE DISORDERS

Major Depressive Disorder (also known as Major Depression) and Dysthymic disorder (or Dysthymia) make up the core depressive disorders. Major Depressive disorder is the most common of the depressive mood disorders with a lifetime prevalence of 5–12% in men and 10–25% in women. The prevalence of Major Depression is twice as high in women as it is in men in nearly every country in which epidemiological studies have been conducted. The exception to this finding is among the Orthodox Jewish community across several countries. Cultural differences and a lack of substance use, particularly alcohol, may account for these findings. One theory about the high rate of depressive illness in women compared to men is that there are significant hormonal changes throughout the life span, particularly just after menarche, childbirth, and menopause. Gender roles may also play a part in the incidence of depression in women, especially for women with very young children trying to balance work and home.

The diagnosis of Major Depression depends upon the presence of a major depressive episode, which is characterized by an overwhelming low mood and/or a loss of interest or pleasure in most activities. An episode is a distinct period of time, lasting at least 2 weeks, that is marked by a significant decline in one's ability to function in a usual manner. The persistent low mood is accompanied by one or more of the following symptoms: loss of appetite (or increased appetite) usually accompanied by weight loss or gain, difficulty sleeping or excessive sleeping, feelings of restlessness or being slowed down, fatigue, loss of energy, and inappropriate feelings of guilt, poor memory or difficulty concentrating, and thoughts of suicide or death. The presence of

## Mood Disorders

a manic or hypomanic episode precludes the diagnosis of a depressive disorder.

The first onset of major depression occurs between the ages of 20 and 50 for 50% of those diagnosed with the disorder; however, the mean age of onset is 40 years of age. Depression also occurs in approximately 2% of children and 4–8% of adolescents. Children may present with primary irritability as well as depressed mood. The distress is commonly identified due to school failure, truancy, drug and alcohol use, persistent irritability, violence, or withdrawal from peers and activities. Major depression occurs in 15% of the elderly (>65 years) population, which is more than 60% female. Onset of major depression at this age is not related to the aging process; rather, it is associated with bereavement due to the loss of a spouse or the stress of a chronic medical condition. Depressive symptoms in the elderly commonly include low mood, low self-esteem, worthlessness, and guilt. Cognitive impairment is not uncommon and must be distinguished from dementia related to aging.

The average duration of an untreated major depressive episode is 6–13 months. When treated, the course may be as short as 3 months, typically resolving by 6 months. Often patients discontinue treatment once they are feeling better. This leads to a return of the symptoms if discontinuation occurs in the first 3 months of treatment. Medication should be tapered gradually to avoid side effects and relapse. Over time, the duration and number of episodes can increase.

Depressive episodes are experienced in several ways. Symptom severity in a depressive episode varies from mild to severe. The number of symptoms experienced in a depressive episode varies from as low as 5 to as many as 10 or more. The depressive episodes may also be recurrent, seasonal (Seasonal Affective Disorder), or occurring within 1–6 months after childbirth (postpartum onset or Postpartum Depression). The depressive episode may be further defined by specific coinciding symptoms, namely psychotic symptoms (delusions, hallucinations), catatonic (extreme disturbance of mobility), melancholic (mood worse in the morning, low reactivity to pleasurable stimuli, significant slowing or agitation, and inappropriate guilt), or atypical features (mood brightens to positive events, excessive sleeping, increased appetite or weight gain).

Unlike major depressive disorder, which is characterized by one or more depressive episodes in a distinct period of time, Dysthymia is a chronic, persistent depressed mood for at least 2 years. Individuals with

dysthymia often report that they have always been depressed or that they have never been as happy as others in their lives. Feelings of inadequacy and persistent irritability, pessimism, withdrawal from social events, and low activity level are common in Dysthymic Disorder. Symptoms of poor appetite or overeating, fatigue, sleep disturbance, low self-esteem, and poor concentration are common but are not severe enough to impair daily functioning. Children and adolescents with dysthymic disorder are usually irritable and pessimistic, have a low self-esteem, poor social skills, and declining school performance. After the initial 2-year period of depressed mood, major depressive episodes may occur in addition to the chronic low mood and has been called “Double Depression.” Dysthymia has a lifetime prevalence of 6%. The disorder typically develops early, with most experiencing the onset by 21 years of age. In children, the number of girls affected is equal to that of boys. However, in adulthood, the incidence in women is 2–3 times that of men.

Other depressive mood disorders have been described in the research and clinical literature. Minor depressive disorder has similar episodic symptoms to major depression but with lower symptom severity. Recurrent Brief Depressive Disorder is characterized by recurring depressive episodes meeting criteria for major depression but for durations of less than 2 weeks at one time. Premenstrual Dysphoric Disorder is a diagnosis currently under research investigation to determine its validity as a distinct disorder. The disorder is distinguished by abnormal mood and behavior in addition to physical symptoms, such as headache, breast tenderness, and swelling during the week between ovulation and the onset of menstruation. The symptoms are severe enough to interfere with daily functioning and remit once menses occurs.

## BIPOLAR DISORDERS

Bipolar Disorders are chronic, often devastating disorders that are characterized by manic or hypomanic episodes. A manic episode is a distinct period of at least 1 week marked by an abnormal elevation of mood that causes a significant loss of daily functioning. A manic episode may initially be a state of euphoria or a period of persistent irritability and low frustration tolerance, which often leads to loss of control. Other concurrent symptoms generally include: exaggerated self-esteem, talkativeness or pressured speech, racing thoughts,

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a decreased need for sleep, poor attention, and an overindulgence in pleasurable activities (drinking, spending money, sex). An individual in a manic episode may present with delusions, perceptual disturbances, and gross psychotic symptoms. A hypomanic episode is similar symptomatically to a manic episode except that it does not cause significant impairment in social or occupational functioning. There are no psychotic symptoms during a hypomanic episode. A bipolar mood episode may also be mixed in that both depressive and manic symptoms are present simultaneously.

There are three main classifications of bipolar disorders: Bipolar I disorder, Bipolar II disorder, and Cyclothymic disorder. Bipolar I disorder is characterized by at least one manic episode with or without a current or past major depressive episode. Bipolar II disorder is present when there is a current or past major depressive episode and a current or past history of at least one hypomanic episode with no history of a manic episode. The current functioning of the individual is significantly impaired. Psychotic features may be present in bipolar II disorder. The depressive episodes of both bipolar I and II disorders may occur seasonally. The mood episodes of the disorders may be rapid cycling if at least four episodes are identified in a 12-month period. Similar to the depressive disorders, bipolar disorders are also described in terms of specific features of catatonia, melancholia, atypical, or with postpartum onset.

Bipolar disorders have a lifetime prevalence of 1.3–1.6%. Although the onset is usually between 15 and 24 years of age, there is typically a 5–10 year delay in seeking treatment. The onset of bipolar disorder may also occur in childhood with symptoms more consistently presenting as irritability and hyperactivity. Early onset of bipolar illness typically follows an initial depressive episode and is frequently a more severe illness than when onset occurs in adulthood. Women and men are affected equally in most bipolar disorders. However, women have a higher incidence than men of rapid cycling and mixed episodes.

Cyclothymic disorder (Cyclothymia) is a mild form of bipolar II disorder. It is a chronic disorder with at least 2 years of recurring episodes of hypomania and mild depression with remissions lasting less than 2 months at one time. Cyclothymic disorder is often comorbid with Borderline Personality disorder. The onset is usually between the ages of 15 and 25 with a lifetime prevalence of 1%. Cyclothymia affects women more than men.

### OTHER MOOD DISORDERS

Schizoaffective disorder is classified as a psychotic disorder rather than a mood disorder. However, a depressive, manic, or mixed episode occurring with two or more of the characteristic symptoms of schizophrenia would be considered schizoaffective disorder. These characteristic symptoms are delusions, hallucinations, disorganized speech, grossly disorganized or catatonic behavior, flat affect, and lack of motivation. These symptoms are not usually as severe as when experienced in schizophrenia.

### CAUSES OF MOOD DISORDERS

The causes of mood disorders are not fully understood. However, there are strong indications that mood disorders are influenced by the combination of biological, genetic, and psychosocial factors. The biological factors include altered levels of neurotransmitters in the brain, particularly serotonin, norepinephrine, and dopamine. Other significant biological factors include alterations in neuroendocrine systems (stress system), thyroid hormones, circadian rhythm disturbances, and neuroanatomical changes. Family and twin studies have shown that genetics plays a large role in mood disorders, particularly in bipolar I disorder. The particular alterations in these systems may vary depending on the type or subtype of the mood disorder. Psychosocial factors, such as high life stress, multiple losses, poor social support, and trauma can influence the development of a mood disorder, particularly the depressive disorders.

### COMORBIDITY AND MORTALITY

Mood disorders coexist with a variety of other disorders. Depressive disorders are highly comorbid with anxiety disorders. Alcohol and substance abuse/dependence are common in those afflicted with either a depressive or bipolar mood disorder. Individuals with a medical condition (especially one that is chronic) are more likely to have depressive mood disorders. In some cases, the mood disorder may be caused by substance abuse, prescription and nonprescription medications, or a medical condition. A careful, thorough medical and psychiatric evaluation is needed to rule out the causative agent to ensure proper treatment. Mood

## Mood Disorders

disorders brought on by medication or a general medical condition are secondary mood disorders that usually resolve once the causative agent is removed or the condition treated.

The greatest risk with mood disorders is the occurrence of suicide with a depressive episode, especially at the onset or end of an episode. It is estimated that 400 of every 100,000 male patients and 180 of every 100,000 female patients commit suicide. Substance abuse and social isolation increases the risk of suicide in mood disorder patients.

### TREATMENT

Treatment of mood disorders depends upon the specific symptoms and severity of the illness. Those with severe symptoms, psychosis, or suicidal thoughts or attempts may require hospitalization to prevent self-harm. For most individuals with mood disorders, outpatient therapy in conjunction with medication is the treatment of choice. Psychotherapies are often very helpful for the psychosocial and cognitive aspects of mood disorders. The type of therapy that is best suited for the disorder depends upon the type of disorder, symptom severity and presentation, and individual preference. The therapies include interpersonal therapy, cognitive-behavioral therapy, psychoanalysis, and family therapy.

Medication treatment is generally indicated for major depressive and manic episodes and can have a therapeutic effect in about 2–6 weeks. The choices for medication treatment for depressive episodes include: tricyclic antidepressants, such as amitriptyline (Elavil and others) and clomipramine (Anafranil and others), selective serotonin reuptake inhibitors (SSRIs), such as fluoxetine (Prozac) and sertraline (Zoloft), particularly for first depressive episodes and dysthymic disorder. Monoamine oxidase inhibitors (MAOIs) such as phenelzine (Nardil) and tranylcypromine (Parnate) are generally used to treat atypical depression and manic episodes. There is a reluctance to use the MAOIs due to the potential for a hypertensive crisis if the patient does not eliminate tyrosine from their diet. High tyrosine levels are found in many sharp cheeses, cured meats, and fish. The treatment of major depression or bipolar disorder with psychotic features requires additional treatment with antipsychotic medication. The main treatment for bipolar I disorder is mood stabilization with lithium (Lithobid and others) or valproic acid (Depakote and others). The anticonvulsant medications carbamazepine

(Tegretol) and gabapentin (Neurontin) are also effective medications for bipolar I disorder. Atypical antipsychotic medications such as olanzapine (Zyprexa) are also gaining popularity in the treatment of bipolar illness. Obtaining long-term mood stability with medication is reportedly related to a reduction in suicide rates in individuals with bipolar and schizoaffective disorder. Treatment of bipolar II disorder is more complicated due to the frequent depressive episodes which may require medications that induce a hypomanic episode.

Alternative therapies include light therapy, sleep deprivation, and electroconvulsive therapy (ECT). In circumstances of a depressive episode or manic episode with medication failure, intolerance to medications, or severe psychotic or suicidal symptoms, ECT is the treatment of choice. ECT is a generally safe, fast, and effective method of treatment. ECT involves the induction of a bilateral generalized seizure by sending pulses of electrical current through the scalp into the brain. ECT is not contraindicated in pregnancy, and has been used for the same indications without apparent harm to the fetus.

Drug treatment in women requires special attention to the possibility of pregnancy and lactation while being treated with the medication. Physicians are sometimes reluctant to prescribe psychotropic medications during pregnancy due to the potential adverse effects on the fetus. However, recent data supports the use of some medications during pregnancy, especially when the risk of suicide or self-harm is high. There is also sufficient evidence to suggest that fetal exposure to maternal mood disorders may also impact fetal behavior and development. Antidepressant medications, particularly the SSRIs and tricyclic medications have been found to be relatively safe during pregnancy between 9 and 36 weeks gestational age. It is recommended that the dosage be tapered in the last month of pregnancy to decrease the risk of neonatal withdrawal. SSRIs are the current first-line choice of clinicians for treatment during pregnancy due to relatively fewer side effects and low risk to the fetus. The use of mood stabilizers during pregnancy is associated with greater risk to the fetus; however, the benefits of the medication may outweigh the risks.

**SEE ALSO:** Anxiety disorders, Bipolar disorder, Depression, Mental illness

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## Morbidity

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AMY SALISBURY

**Morbidity** In general terms, morbidity represents illness—any departure from normal well being. There is a close relationship between mortality and morbidity, because high levels of morbidity (i.e., an unhealthy population) are associated with high death rates, and vice versa. For example, the life expectancy of women in the United States increased from 49 years at the beginning of the 20th century to 79 years at the beginning of the 21st century. These improvements in longevity are a result of significant changes in the patterns of illness and disease among both women and men, although women have seen a bigger improvement than have men. In fact, in 1900, American women had a life expectancy that was 2 years longer than that of men, and the advantage grew to nearly 8 years by the mid-1970s, before dropping to about 6 years in 2000.

Infectious diseases combined especially with complications of pregnancy have historically been the

major sources of morbidity (and, at the extreme, of mortality) among women all over the world. Infectious diseases have been brought under reasonable control by better nutrition that helps people resist disease; clean water and adequate sewage systems that help to prevent the spread of disease; better housing, vaccinations, medical care, and a host of other technological innovations that have spread around the world over the last century. These same changes have also reduced pregnancy-related illness, especially in combination with the dramatic decline in the number of pregnancies and births among women. The rising standard of living and improved status of women have been important motivations for limiting family size, but, of course, the success of this has been heavily dependent upon the availability of a wide range of fertility control measures.

Lower morbidity means that people are healthier into the older ages, at which point degenerative (chronic) diseases tend to become sources of illness, disability, and of course death. Patterns of morbidity vary not only by age and sex, but also regionally across the globe. A useful way of making such comparisons is through the calculation of Disability Adjusted Life Years (DALYs). This concept was introduced by the World Bank in 1990 and has been implemented as the global “burden of disease” studies undertaken by Murray and Lopez at the Harvard School of Public Health, and is now accepted and used widely by the World Health Organization of the United Nations. A DALY is equal to the sum of YLL and YLD, where YLL is equal to the years of life lost due to death at an age earlier than expected, and YLD is the number of years lost to disability as a consequence of injury or illness. If a person could expect to live to age 100 in a perfect world, but dies of a stroke (a type of cardiovascular disease) at age 50, then that person “lost” 50 years of life and the sum of all years of life lost in a society to people dying of stroke would be the YLL for that population in that year. Another person might have had a stroke at age 50, but survived. The severity of the disability with which such a person would have to live would then be given a weight and the number of years of normal functioning lost to the disease would be calculated as the YLD. The total burden of a disease is then the number of years of life that a society loses to a disease through its combined impact on mortality and morbidity.

Among women in the world at the beginning of the 21st century, the greatest number of DALYs lost (i.e., the

## Morning Sickness

greatest disease burden) is caused by HIV/AIDS, followed by lower respiratory disease, and unipolar depressive disorders. However, World Bank data show that different diseases are important at different ages among women. At ages 15–44, maternal causes are most important, whereas at ages 45 and older, cerebrovascular diseases cause the greatest morbidity burden.

Regional variations in morbidity are now especially related to HIV/AIDS. In sub-Saharan Africa, there is evidence that migrant labor is a powerful source of the spread of the disease because of the sexual networking that is involved in a subcontinent where the use of the condom has not been as widespread as in other parts of the world. Because HIV/AIDS tends to affect young adults more than other age groups, it places a tremendous burden on a society through the loss of not only family members, but also through dramatically reduced economic productivity. Indeed, in the middle of the 20th century, increases in health care access for workers were pushed by labor unions in Europe and North America on the (correct) grounds that improved health levels of workers would make companies more profitable.

**SEE ALSO:** Disability, Maternal mortality, Mortality

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JOHN R. WEEKS

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**Morning Sickness** The existence of morning sickness early in pregnancy seems difficult to explain. Maybe it is just a mistake, an accident of nature. We all know that the first few months of fetal development are critical for the baby's health. Why then are so many women so sick early in pregnancy, and what can be done to help them? Finally, is it possible that morning sickness is actually a good thing to have?

## ALL-DAY SICKNESS

It would be more accurate to refer to morning sickness as “all-day” sickness because for many pregnant women it is, although it is frequently worse in the mornings. The preferred medical term is *nausea and vomiting of pregnancy* (NVP). Morning sickness can range in severity from none (20% of all pregnant women do not get it at all) to persistent vomiting so severe that hospitalization and treatment with intravenous fluids are necessary. Typically, morning sickness is a near-constant feeling of nausea, intermittent vomiting, and an increased sensitivity/aversion to odors. It usually begins about weeks 5 or 6 of pregnancy and usually is fully resolved by about week 14.

## WHY DOES MORNING SICKNESS EXIST AT ALL? TRADITIONAL EXPLANATION

Many articles link morning sickness to the pregnancy hormone human chorionic gonadotropin (hCG), which is unique to pregnancy. For example, morning sickness tends to be worse with multiple gestation (a high-hormone state) and it tends to be minimal in pregnancies that end in miscarriage (a low-hormone state). Many patients understand that the sicker they are, the “better” the pregnancy. This theory does not explain everything however. Why does morning sickness exist at all? Is there some reason, perhaps something related to human evolution, that explains the existence of morning sickness?

AQ: Is this HCG

## AN EVOLUTIONARY EXPLANATION

A promising theory comes from Margie Profet, an evolutionary biologist (and a recipient of a 1993 MacArthur “genius” prize). In her book, *Protecting Your Baby-to-Be* she states that morning sickness is the result of thousands of generations of evolution, and that its purpose is to improve the survival of the human species!

Her theory is that morning sickness is Mother Nature's way of providing humans with an instinctive toxin (or poison) avoidance mechanism. It is a biological radar, warning us when something potentially hazardous is coming our way. For thousands of years, humans were hunter-gatherers, eating whatever and whenever they could.



## Morning Sickness

Many plants produce toxins designed to enhance their survival by damaging the reproductive potential of the animals that ingest them. Today, we extract many of these “toxins” and use them to our advantage, only we now call them herbs, spices, drugs, and medications!

The evidence supporting this theory is extensive. For example, fetal organ development is usually completed by week 14 of pregnancy. During those first 14 weeks, the fetus is exquisitely sensitive to the damaging effects of toxins. The first trimester is also when nearly all miscarriages occur.

### SEVERE MORNING SICKNESS

About 1–3% of pregnant women experience severe morning sickness. It can lead to profound dehydration, mineral and electrolyte abnormalities, and acid–base changes in blood chemistry. Treatment requires intravenous fluids and possibly hospitalization. Contact your doctor right away if you have any of the following symptoms:

1. Throwing up everything, food and liquids, for more than a couple of days.
2. Losing more than 5% of your body weight (e.g., a 120 lb woman loses 6 lb) compared to your pre-pregnant weight.
3. Feeling constantly dizzy, lightheaded, very weak and having a dry, pasty mouth.

### MANAGEMENT OF MILD MORNING SICKNESS

From the evolutionary theory comes some helpful advice for dealing with morning sickness. First, trust your instinctive food aversions. If it does not smell good, look good, or “sound” good to you to eat it, then do not. Below are two lists: The “avoid” list is far more important than the “try this” list. Avoidance serves two purposes. One is to help avoid something that can aggravate the morning sickness. The other, and even more important reason, is to avoid substances potentially toxic to the first trimester fetus.

### THINGS TO AVOID

1. Avoid odors as much as possible. Have your partner use breath mints. No smoking in the house. Use

air filters. Use odorless hygiene and laundry products. Avoid odor-filled places (crowded public places, public restrooms, smelly gyms, etc.). Have your home cleaned to try and eliminate any musty or moldy household odors. Get rid of smelly stuff in the fridge and place opened boxes of baking soda inside.

2. Avoid unripe fruits and most vegetables (especially mushrooms), canned fruits and vegetables, greasy and high-fat foods (dairy products are usually okay).

3. Avoid burnt foods, barbecued food, raw fish (sushi), nuts, spices, spicy foods and herbs, food flavorings, and condiments (e.g., ketchup, mustard, steak sauce, etc.) Small amounts of salt are okay.

4. If vomiting more than once a day, stop all vitamins (yes, even prenatal vitamins) except folic acid (0.4 mg daily) and B6 (25–50 mg daily).

5. Avoid coffee, tea, chocolate, and any substance that is bitter in its native form (before sugar and fat have been added to it).

### THINGS TO TRY

1. Keep saltine crackers on your nightstand. Eat one as soon as you awake, while still lying down if possible. Then wait a few minutes before getting up. The crackers will absorb stomach acid that may have accumulated during the night.

2. Eat things a baby would like (boring, bland stuff), like plain white breads, cereal, noodles, rice, plain yogurt. Eat ripe soft fruits. Drink fresh-squeezed fruit juices ice cold and watered down a bit.

3. Eat white cheese. It digests slowly and lessens stomach acid production. Dry, white meats like turkey breast are usually well tolerated.

4. Drink flat, sweetened, clear soda or ginger ale (pour into a cup, then stir). If vomiting, drink Gatorade-type drinks rather than water to replace minerals. Drink liquids with crushed ice, using a straw.

5. Eat small meals all day long, up to 10 times a day. If you have to cook, try to microwave, steam, or boil foods. This lowers the “burned food” odors.

6. To help nausea, try the following (any medications, including vitamins and herbs should only be taken after consulting with your doctor): Vitamin B6, 50 mg once or twice a day. Try ginger, either tea or candied (helps nausea). Try lemon drops (candy). Wear wristbands, also known as acupressure or “sea” bands.

## Mortality

### USING MEDICATION

There are times when the morning sickness is so bad that without medication the patient may have to be hospitalized, or alternatively, medication may be necessary for someone to be able to leave the hospital, or for someone to function well enough not to miss work. In those cases, the benefits of using medication may outweigh the risks to the fetus. However, only a qualified obstetrician/gynecologist practitioner should make these types of decisions.

### CONCLUSION

Normal (not severe) morning sickness is not a mistake at all. It is an evolutionary miracle, designed to benefit the survival of the species by reducing the risk of miscarriage and birth defects. Hopefully, the information in this article, and understanding what it means, will make dealing with morning sickness just a little bit easier.

**SEE ALSO:** Pregnancy, Prenatal care, Vitamins

### Suggested Resources

[www.acog.org](http://www.acog.org)

BRYAN JICK

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**Mortality** For most of human history, mortality was very high, with life expectancy between 20 and 40 in most societies. At that life expectancy, nearly half of all children born die before reaching age 5, and fewer than 1 in 10 people survive to age 65, with infectious diseases being the biggest killers of humans over the centuries. Over the past 200 years, and especially since the beginning of the 20th century, humans have made great progress in controlling mortality. A combination of factors, including improved nutrition; advances in science that led to vaccinations to prevent severe illness; antiseptics to prevent the spread of bacterial contamination; drug therapies to cure disease; and environmental controls such as clean water supplies, sewerage, draining of swamps, improved housing, improved clothing; and the promotion of personal

hygiene, all helped to push life expectancy to higher levels all over the world. This happened first in the now developed countries, but spread quickly to the rest of the world after the end of World War II.

During the Roman Empire, life expectancy was estimated to be 22 years. In the Middle Ages, with some improvement of nutrition, life expectancy increased in Europe to more than 30 years. In the beginning of the 19th century, as a result of improved nutrition, housing, and sanitation due to increasing income, life expectancy in the United States and Europe reached approximately 40 years. Currently in the United States, the odds that a female baby will survive to age 65 are equal to 86%, based on a life expectancy of nearly 80 years. This means that nearly half of all women born will still be alive at age 85.

The process of declining mortality follows a generally predictable path that has come to be known as the epidemiological transition. The main features of the transition are the change from most deaths occurring early in life largely from infectious diseases, to most deaths occurring later in life largely from chronic diseases. As life expectancy increases, a greater fraction of babies born survive to older ages, and human *longevity* gets closer to the human *lifespan*.

Lifespan refers to the oldest age to which human beings can survive, which is approximately 120 years, based on the oldest authenticated age to which any human has ever lived. Longevity refers to the actual experience that people have in terms of survival. While lifespan is thought to be largely determined by biological factors, longevity has both biological and social components. Longevity is usually measured by life expectancy, which is the statistically average length of life (or average age at death), and is greatly influenced by the society in which we live, the genetic characteristics with which we are born, and by the lifestyle that we maintain.

Human beings still have little control over biological factors such as the strength of vital organs, predisposition to particular diseases, and metabolism rate. Regarding the social factors impacting longevity, there are three major categories: (a) the overall social and economic infrastructure, (b) a person's place within a given society, and (c) a person's lifestyle, regardless of his or her place in society. In general, the wealthier a country is, the better able it is to provide the kind of infrastructure that helps to maintain a lower risk of death for everyone living there. Within any particular society, those at the top of the socioeconomic scale are more likely to have

## Mortality

access especially to health care resources, which increase the probability of survival from year to year. Nonetheless, no matter what your status in society might be, certain kinds of behaviors (such as smoking and abusing alcohol and drugs) increase the risk of death, while other kinds of behaviors (such as regular exercise and a moderate, healthy diet) will lower the risk of death.

The major causes of death are (a) diseases that can be transmitted from one person to another, such as malaria, measles, plague, smallpox, and recently HIV/AIDS; (b) degeneration of a body, including chronic diseases such as heart disease, cancer, cerebrovascular disease, chronic lung disease, diabetes mellitus, and chronic liver disease and cirrhosis; and (c) products of the social and economic environment, such as accidental deaths, murders, and suicides.

The “real” causes of death may not necessarily appear on a person’s death certificate. In 1993, two physicians, McGinnis and Foege, estimated the “real” or “actual” causes of death in the United States in 1990. Of the 2,148,000 people who died in the United States that year, they found that 400,000 died as a result of tobacco use, 300,000 deaths were caused by dietary and physical activity patterns of the United States population. Alcohol misuse was the third real cause of death in the United States, followed by infectious diseases, and then toxic agents such as environmental pollutants, contaminants of food and water supplies, and components of commercial products. Finally, they found that firearms were responsible for 36,000 deaths.

There is, of course, still a considerable amount of variability in mortality in the world, despite the world average life expectancy early in the 21st century of 67 years (65 for males and 69 for women). For example, sub-Saharan African countries have life expectancy between 46 and 50 years. The next lowest life expectancy region is South Asia where it is between 58 and 64. The highest life expectancy is found in Japan, where a female baby can expect to live to age 85. Several European countries, including France and Switzerland, have a female life expectancy of 83.

We can also compare urban and rural differentials in mortality. For example, life expectancy in 1841 was 40 years for native English males and 42 for females, but in London it was 5 years less than that. The early differences regarding urban and rural mortality were due less to favorable conditions in the countryside, than to unfavorable conditions in the cities. Over time, medical advances and environmental improvements have benefited the urban populations more than the rural

ones, leading to the current situation of better mortality conditions in urban areas. Differences in mortality by social status are among the most pervasive inequalities in modern society, and they are most noticeable in cities. So, if one is part of a family of low socioeconomic status, this may put him or her at greater risk of death. Data clearly suggest that the higher one’s position in society, the longer he or she is likely to live.

As with income, there is a marked decline in the risk of death as education increases. Race and ethnicity are also sources of differentials in mortality in the United States. Data from National Center for Health Statistics showed that in the United States in 1998, at every age up to 70, African American mortality rates are nearly double the rates for the White population. African Americans have higher risks of death from almost every major cause of death than do Whites. Marital status also counts for differentials in mortality. Married people tend to live longer than unmarried people do, not only in the United States, but also in other countries.

Gender is also responsible for differentials in mortality. Women live longer than men do, and the gap has been widening until recently. In 1900, women in the United States could expect to live an average of 2 years longer than men in the United States. By 1975, the difference had peaked at 7.8 years, although since then the difference has dropped to 5.7 years. In general, the difference between male and female life expectancy can be an important clue to the status of women in society. Since the evidence points overwhelmingly to an inherent biological superiority of women over men with respect to mortality, any society in which women die at a higher rate, or close to the same rate, as men, is a society in which social customs and inequalities have trumped the biological tendencies. In many Asian societies, women have historically been the last to eat (even though they do most of the cooking), and are less likely to be cared for if sick. These symptoms of lower status are then reflected in higher than expected death rates.

Throughout history, and still today in many developing countries, high rates of pregnancy in a society not well covered by health care systems can lead to high levels of maternal mortality and infant mortality, as well. The infant mortality rate (IMR) is the number of deaths of infants under 1 year of age per 1,000 live births in a given year. Included in the IMR are the neonatal mortality rate (calculated from deaths occurring in the first 4 weeks of life) and postneonatal mortality rate (from deaths in the remainder of the first year). Neonatal deaths are further subdivided into early (first week) and

## Multiple Sclerosis

late (second, third, and fourth weeks). In prosperous countries, neonatal deaths account for about two thirds of infant mortalities, the majority being in the first week. The IMR is usually regarded more as a measure of social affluence than a measure of the quality of antenatal and/or obstetric care; the latter is more truly reflected in the perinatal mortality rate (the number of deaths after 24 weeks of gestation, including stillbirths, and during the first week of life per 1,000 total births).

As deaths increasingly are pushed to the later ages, the issue has arisen as to whether lifespan may increase or whether societies will experience a “rectangularization” of mortality. An increase in lifespan would mean that humans had discovered ways to keep alive beyond the age that any human has thus far lived. While this seems theoretically possible, science has a long way to go before this is likely to be accomplished. Instead, it seems more likely that deaths will become increasingly compressed into a few years late in life. This will lead to a rectangularization of the age curve, in which almost everybody stays alive until age 100 or beyond and then quickly begin to die.

**SEE ALSO:** Ethnicity, Life expectancy, Marital status, Maternal mortality, Morbidity, Socioeconomic status

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JOHN R. WEEKS  
MANUEL MIRANDA

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**Multiple Chemical Sensitivity** *see*  
Idiopathic Environmental Intolerance

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**Multiple Personality Disorder** *see*  
Dissociative Identity Disorder

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**Multiple Sclerosis** Multiple sclerosis is the most common inflammatory disease of the central nervous system. The cause stems from faulty regulation of the immune system. Myelin, the insulator of nerves, is attacked by the immune system because of improper recognition. Inflammation surrounding the nerves strips the myelin from the nerve fibers and damages some of the fibers (axons) preventing the normal transmission of nerve impulses.

The prevalence of multiple sclerosis is 70/100,000 in the United States with regional variation. Young women are unfortunately disproportionately affected, outnumbering men nearly 2:1. The disease typically begins from age 20 to 50 although onset at both younger and older ages exists. Familial tendencies are apparent. The children of patients with multiple sclerosis have a six-fold greater risk of developing multiple sclerosis than those children of parents without disease. Crucial genetic markers have not yet been identified.

Various subtypes of multiple sclerosis exist. Each subtype depicts the clinical course of the illness. Onset may be either relapsing–remitting (improving, then relapsing) or continuously progressive (worsens over time). The most common subtype, relapsing–remitting, begins before the progressive subtypes by nearly a decade. The peak incidence of relapsing–remitting multiple sclerosis occurs between the ages of 25 and 29, whereas progressive is most commonly diagnosed between ages 35 and 39. Distinguishing a person's subtype is important because therapy depends upon disease classifications.

The clinical symptoms and physical findings in multiple sclerosis are varied. No region within the central nervous system is spared. Cognitive impairment (loss in memory and concentration) occurs to variable degrees in more than one half of individuals with

## Multiple Sclerosis

multiple sclerosis. Cognitive speed, recent memory, attention and abstraction are commonly impaired. Mood disorders ranging from euphoria through depression are not uncommon.

The optic nerve (primary nerve supply to the eye) is often involved. Optic nerve inflammation causes eye pain worsened with movement and visual blurring. Progression over several days with decrease in color vision is classical for the diagnosis. Central visual loss reflecting swelling within the optic nerve is frequently noted during ophthalmologic testing.

Additional cranial nerves (nerves to the head and neck) also may be involved. Eye movement difficulties caused by disturbances in brainstem pathways result in double vision or feelings of imbalance. Facial pain may occur associated with numbness and tingling. Unexplained facial pain in a young adult may be the first symptom of multiple sclerosis. Slurring of speech (dysarthria) and difficulty swallowing (dysphagia) are frequent.

Disturbances of sensation and strength often occur. Regional inflammation within the brain results in loss of sensation or strength usually on the opposite side of the body. Problems with strength or sensation occurring simultaneously on both sides of the body imply inflammation within the brainstem or spinal cord.

Coordination difficulties often are seen. Clumsiness of the body or legs frequently impairs walking. Speech may be affected resulting in an awkward speaking pattern. Poorly coordinated eye movements may cause imbalance or a sense of movement when none is apparent.

Autonomic nervous system involvement commonly causes urinary incontinence. Persons may lose the ability to inhibit their bladder from emptying when the urge arises. Less frequently, the bladder loses its tone and distends until pressure builds and leakage occurs. Problems with defecation are less common. Erectile dysfunction (difficulty having an erection) in men and absence of orgasms in both men and women are not infrequent.

External factors influence the course of multiple sclerosis. Infectious agents such as viruses and some bacteria often precede worsening of the illness. Trauma has not been shown to convincingly worsen the illness. It has been suggested that vaccination has been implicated to exacerbate disease, although most experts no longer hold this to be true, and recommend vaccination when indicated. Pregnancy seems to inhibit disease activity. However, attacks seem to increase in frequency in the first 3–6 months after delivery.

Diagnosis is based on historical information requiring multiple episodes affecting various regions of the central nervous system at different times. Laboratory tests and radiographic imaging are used for confirmation. Blood and cerebrospinal fluid samples along with magnetic resonance imaging are frequently obtained. Alternative diagnoses including infections, a variety of immune disorders, metabolic and inherited disorders should be excluded.

Pharmacologic therapy (medication management) for multiple sclerosis has evolved during the last decade. Acute treatment with intravenous or oral anti-inflammatory steroids speeds functional recovery following acute worsening. Individuals who do not respond to standard treatment of a severe initial attack may benefit from plasma exchange. Subcutaneous and intramuscular medications (medications injected beneath the skin) decrease the frequency of relapses in patients with either relapsing–remitting or relapsing–progressive subtypes. Various other intravenous and oral immune system inhibitors have met with mixed success.

Scant information exists regarding the social impact of multiple sclerosis and a woman's ability to fulfill the demands of an active lifestyle. Chronic illness often strains relationships resulting in marital or familial discord. Employment may be jeopardized from either physical or cognitive disability. Rehabilitative experts with interest in multiple sclerosis and its associated conditions may be available. Social support thankfully exists through local MS Society chapters. Counseling and pharmacologic management of depression should be sought early to prevent social isolation.

**SEE ALSO:** Autoimmune disorders, Pregnancy

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JOSEPH P. HANNA

## Myasthenia Gravis

**Myasthenia Gravis** Myasthenia gravis (MG) is an autoimmune disorder of the neuromuscular junction (NMJ) that results in muscle weakness and fatigability. Muscle contractions occur when electrical impulses travel along motor nerve fibers and end at the NMJ. When an electrical impulse reaches the nerve fiber terminal, it causes the release of a molecule called acetylcholine (ACh). ACh diffuses across the gap (NMJ) and activates specialized ACh receptors (AChR) on the muscle fiber. AChR activation causes electrical activation of muscle fibers and contraction. Excess ACh in the NMJ is eliminated by an enzyme called choline esterase (ChE). In MG, there are circulating antibodies directed against AChR. These attach and cause elimination of AChR. With a paucity of AChR, there is failure of nerve-to-muscle transmission, especially high levels of activity. This presents as fatigability or muscle weakness with repeated contraction. Muscles around the eye and muscles of the face and throat are particularly vulnerable in MG.

The prevalence of MG is about 150 per million. Onset is early in women (late teens and 20s) and late in men (60s and 70s). Prevalence used to be higher in women, but with the aging of the population, may be higher in men now. Ten percent of patients with MG have a tumor of the thymus gland (thymoma) in the chest. In others, there may be enlargement of the thymus (hyperplasia).

MG manifests as waxing and waning drooping of eyelids; double vision or squint; facial weakness and loss of expression; weakness/fatigability of chewing, swallowing, and speech; neck weakness; weakness/fatigability of arm and leg muscles; and weakness of breathing muscles in varying combinations. Prolonged activity worsens symptoms. Examples are double vision while reading or watching television, voice slurring during a long conversation, chewing or swallowing difficulty as the meal progresses, or hands getting weak with repeated activity. Symptoms are commonly worse in the evenings than in the mornings. If weakness is restricted to the muscles around the eyes, the disorder is termed ocular MG. More commonly, it is diffuse and is called generalized MG. Generalized MG can be mild or can be severe. Acute severe worsening of MG (myasthenic crisis) may be precipitated by infection, surgery, or some medications. Weakness of breathing muscles during a myasthenic crisis may necessitate ventilatory support.

Often, MG starts around the eyes and becomes generalized in ensuing months. Infrequently, MG

sparing the eye and face muscles. MG is usually a life-long problem. Most of the worsening and fluctuation in severity is seen in the first few years of the disease. After several years, the disease tends to stabilize, but there may be some residual fatigability and weakness. Most myasthenics receiving appropriate medical care can remain independent and lead productive lives.

The diagnosis of MG is challenging, clinical suspicion needs to be high. If MG is suspected, a bedside test (Tensilon® test) which assesses transient improvement after injection of edrophonium may be preformed. Often, the physiological change in NMJ transmission can be demonstrated by a decrement in muscle response on repetitive electrical stimulation of nerve. The most sensitive test for MG is an electrical test called single fiber EMG. A blood test for the detection of AChR antibodies is quite sensitive and specific.

Treatment options include ChE inhibitors (such as pyridostigmine and neostigmine, which increase availability of ACh by blocking its destruction), corticosteroids (which reduce the autoimmune response), and azathioprine and other immunosuppressants. Most experts believe that removal of the thymus gland (thymectomy) early in the course of generalized MG improves the long-term course. In periods of acute worsening, removal of antibodies from the blood (plasma exchange) can rapidly improve symptoms. Intravenous immunoglobulin is also an option for acute worsening. Several classes of medications, especially anesthetic agents, some cardiac medications, and some antibiotics can cause worsening of MG and need to be avoided.

Pregnancy has special implications for myasthenics. About one third get worse during pregnancy or after delivery. Weakness of muscles may make vaginal delivery difficult. About 10–20% of infants born to myasthenic mothers may have transient weakness and trouble feeding for the first few weeks after birth (neonatal myasthenia) because of antibodies crossing the placenta.

MG is not a genetic disease. Rarely, disorders closely resembling MG are seen running in families. Such congenital myasthenic syndromes are not autoimmune; rather, they are genetic defects in proteins of the NMJ. Some other disorders of the NMJ of note that have only a passing similarity to MG are Lambert–Eaton myasthenic syndrome and botulism.

**SEE ALSO:** Autoimmune disorders, Pregnancy

## Myasthenia Gravis

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NIMISH THAKORE

## Nail Care



**Nail Care** One of the most common problems in caring for nails is picking and biting. The habit is common across all age groups. Picking and biting nails and cuticles increases the risk of infection by introducing bacteria. In general, the behavior often occurs as the result of anxiety or nervousness.

Filing, even of the cuticles, is often recommended in place of cutting or clipping. This allows the removal of dead skin and reduces the likelihood of injury. Lotions and exfoliants can be used to moisturize the area around the nails; cuticles should be kept moist and pushed back. Nails should be cared for in this manner at least once a month. Individuals with dry skin may wish to do it more frequently. Products containing aloe vera are often recommended, especially for individuals with eczema or other conditions involving dry skin.

Pain, swelling, and redness are signs that may indicate an infection or other problem, such as an ingrown nail. It is important to keep the area clean and to avoid “digging” into it in an attempt to cure the problem. In such situations, the individual may wish to consult a podiatrist (doctor who specializes in the care of feet).

A wide selection of “false” nails is available. If applied properly, acrylic nails are often the best because they adhere to the nail directly, so that the risk of infection is reduced. Other products, such as silk and fiberglass nails, are glue-based and are more likely to lift, increasing the time required to maintain and care for them properly as well as the risk of infection.

A manicurist should be selected based on the cleanliness of the facility and his or her practice, rather than on the basis of price. Consider the following.

1. If the state requires a license to provide manicures to the public, the license should be appropriately displayed and should be current.
2. All instruments used should be sterilized after each use or thrown away. Barbicide can be used to clean the equipment.
3. Cuts on the manicurist’s hand(s) should be covered to avoid possible transmission of infection to others.
4. The manicurist should ask, or be informed if she does not, if the client has a particular medical condition that may predispose the client to a greater risk of injury or infection. For instance, individuals on blood thinners (such as Coumadin) may be at greater risk of seriously bleeding if they are cut by accident. Diabetic clients may be more prone to infection.

The provision of nail care provides an important service to many women. A manicure enhances a woman’s appearance and the experience is often relaxing.

Women interested in becoming manicurists will find that the profession offers flexibility and independence. The practice can be easily moved and the hours can be tailored to fit any schedule. Manicurists can rent a booth at someone else’s salon or can enter an arrangement whereby they are paid minimum wage and a commission for working at a particular salon.

MARA MEZA



## Natural Family Planning

**Natural Childbirth** What is natural childbirth today and what does the word “natural” mean to today’s woman in this world of technologic intensive labor? The dictionary definition of the word “natural” means legitimate; a state of nature untouched by influences of civilization and society; freedom from artificiality or constraint. Could not this be a definition of the birth process? But what one lives and breathes, becomes normal and natural to you. We are losing the normalcy of birth: women doing women’s work with women’s bodies and resources birthing a healthy mother and baby. As professionals, we can never forget that the woman must be at the center of the experience.

It is such a dichotomy in our society that we revere and admire the athlete who pushes to the limit of endurance; handling pain pumped up by the powerful pull of winning and success; pushing the human body to new limits to set new records. Labor is the true contact sport. Women must want to participate to win. Yet professionals attempt to evaluate the forces of labor to levels of distress that equate the natural forces of a normal process to the pain of death and disease.

Women and practitioners must be re-educated that pain is a valuable tool during labor. As the woman handles pain, she can use it as a guide to find the positions and practices that give her comfort and actually facilitate the birth process. Pain is like a catalyst that helps contractions intensify and assists the baby progress through the birth canal. Nature’s medication, endorphins, are released in response to pain and may decrease the woman’s perception of pain. With support from the practitioner, the family, and a secure environment, the woman can surrender to the experience and give birth. So in the hospital, flat on her back with tubes coming from every orifice, completely devoid of stimulation, is it surprising that the contractions decrease; labor arrests; and almost 30% of women need operative intervention.

Unless something has happened to change her anatomy, today’s woman is just as capable if not more so, with her state of health and nutritional stores to give birth. Unfortunately, today’s woman has bought the advertising hype that technology guarantees a normal healthy child; that operative birth saves the vagina from trauma; that women have no responsibility for the birth outcome. This not to say that technology is not an effective tool when the pregnancy is at risk and interventions are necessary to effect a safe outcome. Women and practitioners must never forget that these interventions

are simply tools to be utilized as appropriate to give nature a helping hand. Many women are simply not interested in pursuing natural childbirth. This technology seems to be too readily available to them and is championed by care providers and the mass media as the “intelligent” choice.

Natural childbirth simply stated means a spontaneous birth through the vaginal canal utilizing the forces of the uterine contractions under the control of the woman. This author feels that it should be taken a step further to mean that the woman should be educated to understand the forces of labor and how to use these forces in conjunction with her own natural resources to give birth. She should be allowed to ambulate, eat and drink, choose the position of birth, feel the forces of birth, and choose who will support her and who will assist her to birth within a safe environment.

Women, this author intreats you to listen and take control of your birth again. It is a fulfilling natural process not a disease. It should be celebrated with family with tears of joy not fear. Only when women truly take control and make informed decisions about their birth, will normal birth become the standard again.

**SEE ALSO:** Cesarean section, Pregnancy, Labor and delivery

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**Natural Family Planning** Natural family planning is a method of understanding signs and patterns of fertility during the menstrual cycle to achieve or avoid pregnancy. Other terms for this method are fertility awareness method (FAM), the rhythm method, or periodic abstinence. The use of the term natural does not imply that other methods are “unnatural.” The expression actually means that the natural signs and symptoms of the menstrual cycle are observed, recorded, and interpreted to ascertain when a woman is fertile. The couple then abstains or uses a barrier method or withdrawal during these times.

## Nausea

There are several methods that are considered to be natural family planning. All of these methods overestimate the time of fertility in order to compensate for the life span of the sperm and ova (egg). The sperm can live for 5 days within the female reproductive tract. The lifespan of the ova is 24 hr. The calendar method is the recording of the intermenstrual period (the number of days from the onset of one period to the onset of the next) for 6 months in order to ascertain the shortest and longest cycle length. The fertile time can then be determined by subtracting 18 from the shortest cycle length and 11 from the longest cycle. The couple then abstains from intercourse on the days corresponding to the fertile time. This would require periodic abstinence for an average of 16 days a cycle. The effectiveness rate of this method for perfect use is 3.1% for the first year. For imperfect use the failure rate is as high as 86.4% however.

A second type of natural family planning is the basal body temperature (BBT) method. Fertility is determined by taking the temperature first thing in the morning before getting out of bed with a special thermometer for this purpose. The temperature is recorded. An increase of 0.2–0.4°F that continues for 3 days indicates that ovulation has occurred. The couple abstains or uses another method until after the ovulation temperature spike. Perfect use of this method has a failure of 2% and a typical use failure rate of 20%.

Another method of detecting fertility is observing the cervical mucous beginning the first day after menstruation stops. Just after menses, the vagina may feel moist for a few days. The mucous then becomes thicker and cloudy. As ovulation approaches, the mucous becomes more clear, slippery, stretchy, and abundant. The mucous may be stretched for 2–3 in. between the thumb and index finger during peak times. Ovulation occurs at the peak of this wetter, clearer mucous. The fertile time is the first day of peak mucous until 4 days after the peak day. Some issues that can make this method more difficult to interpret are the use of douching, having unprotected intercourse the day before since semen and arousal fluids can be confused with mucous, vaginal infections, and menstruation. Couples may either have intercourse only during the pre and post peak days or use another method during the peak times. Some choose to avoid having intercourse until after the peak each month. This method typically requires the help of a professional to correctly interpret the mucous findings.

The symptothermal method combines more than one indicator of fertility. Many use the temperature and mucous observations to determine fertile times. Other signs can also be used such as checking the position and consistency of the cervix and noting midcycle pain called mittelschmerz or ovulation pain.

The advantages for using these methods are that the cost is free, the Catholic Church sanctions the methods, and there are no hormones introduced into the body. Often these methods are used to determine the most fertile time of the month when couples are attempting pregnancy. Women become more aware of their bodies as well. The disadvantages are that these methods are very complex and require highly motivated couples willing to abstain from intercourse during fertile times. Conditions that cause the menstrual cycle to be irregular or alter cervical mucous such as breastfeeding or recent childbirth may make these methods more difficult to use.

It is recommended that couples seek professional education and monitoring when learning to use these methods as they often require several cycles of observation to become familiar with the fertility signs and symptoms.

**SEE ALSO:** Birth control, Menstruation

NANCY MYERS-BRADLEY

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**Nausea** Nausea is a common symptom that is associated with a wide variety of conditions. Nausea is an unpleasant sensation in the upper abdomen often referred to as “queasiness,” which is usually accompanied by an urge to vomit. Vomiting, usually preceded by nausea, is defined as the forceful ejection of stomach contents up to and out of the mouth. It is important to recognize that nausea and vomiting are not diseases in and of themselves but rather symptoms of an underlying process. Usually nausea and vomiting are due to an illness that improves on its own or is easily treated.

### CAUSES

The list of conditions that can cause nausea and vomiting is long and includes disorders affecting the digestive tract, abdominal organs, central nervous system, metabolism, and endocrine system. Examples of digestive

## Nausea

tract disorders that may be associated with nausea include gastroparesis (poor stomach emptying in the absence of an anatomical obstruction), gastroesophageal reflux disease, irritable bowel syndrome, peptic ulcer disease, and gastrointestinal obstruction. Nausea may be due to infections involving the digestive tract like viral gastroenteritis and food poisoning. Inflammatory abdominal conditions like gallbladder disease, hepatitis, and pancreatitis frequently cause nausea. Nausea is a common symptom reported by patients with balance and equilibrium problems (such as motion sickness), other intracerebral disorders (such as migraine headaches, tumor, hemorrhage, meningitis), and psychiatric disorders (such as anxiety, depression, anorexia nervosa, bulimia). Endocrine and metabolic causes of nausea and vomiting include pregnancy (nausea occurs in 70% of women during the first trimester), diabetes, kidney failure, and thyroid disorders. Medications are among the most common causes of nausea and vomiting, usually during the first few weeks the medication is used. Examples of medications that frequently cause nausea and vomiting are aspirin, nonsteroidal anti-inflammatory drugs (such as ibuprofen), digoxin, theophylline, oral contraceptives, narcotics, and many cancer chemotherapy agents. Nausea and vomiting may also occur in patients with heart attacks, congestive heart failure, or during the first few days following surgery.

### DIAGNOSIS

Although the causes of nausea and vomiting are numerous, careful consideration of each patient's individual circumstances gives clues to the likely cause. This, along with a thorough history and physical examination, can narrow down the diagnosis. Important factors to consider are duration, severity, and frequency of symptoms as well as recent ingestions (e.g., spoiled foods, toxins), new medications, similar illness in family or friends, description of vomit (if any), and any other associated symptoms. Acute nausea and vomiting, lasting in the order of hours to a few days, is typically due to infection (e.g., gastroenteritis, meningitis), medications, acute inflammatory conditions (e.g., gallbladder disease), or toxins (e.g., alcohol). Nausea and vomiting symptoms lasting more than 1 month may be due to a number of chronic medical conditions (e.g., gastroparesis, irritable bowel syndrome, cancer, and diabetes), pregnancy, medications, or psychiatric disorders. Vomiting early in the morning may suggest causes including pregnancy,

kidney failure, alcohol, narcotic withdrawal, and increased intracranial pressure (increased pressure on the brain due to causes like cerebral hemorrhage, tumor, or meningitis). Vomiting occurring 1–3 hr after meals is seen in gastric outlet obstruction and gastroparesis whereas symptoms during or immediately after meals are often associated with psychiatric disorders (e.g., anorexia nervosa and bulimia). Associated symptoms that may aid in the evaluation and diagnosis include fever, abdominal pain, diarrhea, red blood or black “coffee grounds” in the vomit, weight loss, chest pain, headache, stiff neck, ringing in the ears, and vertigo.

A complete physical examination is performed not only to provide diagnostic information but to determine whether any complications of nausea and vomiting have occurred. The patient is specifically assessed for signs of weight loss, dehydration, fever, jaundice, abdominal tenderness and location, abdominal masses, enlarged lymph nodes, neurologic abnormalities, and blood in the stool.

A number of diagnostic tests may be used to evaluate nausea and vomiting, and the choice is dictated by the clinical situation. Laboratory studies may include blood, urine, and stool tests. A pregnancy test should be considered in women of reproductive age. A variety of radiologic studies may also be useful, including abdominal x-rays, abdominal ultrasound, abdominal or head CT scan, and contrast imaging studies (where the patient drinks barium and then x-rays are taken of the stomach and small intestine). At times, endoscopy (insertion of a flexible tube containing a camera into the mouth or rectum) may be required to diagnose the underlying cause of nausea and vomiting.

### TREATMENT

Treatment of nausea and vomiting will depend on the severity and cause. Important issues to be addressed are: correction of fluid and electrolyte losses; identification and treatment, or removal, of underlying cause; and symptom treatment. Minor self-limited symptoms can often be managed with rest and a bland diet consisting of cold or room temperature clear liquids (e.g., ginger ale, broth) and small frequent meals of nonfatty foods (e.g., crackers, toast). Oral rehydration fluids (e.g., sports drinks) provide important sugar and salt in addition to water when vomiting has persisted for more than 24 hr. However, young children and infants should not be given sports drinks, and should be rehydrated

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under medical supervision. Medical attention should be sought if nausea lasts more than a week or if pregnancy is suspected. Immediate attention should be sought if there is persistent vomiting, vomiting and diarrhea, severe abdominal pain, severe headache, stiff neck, high fever, red blood or “coffee grounds” in the vomit, lightheadedness, confusion, decreased consciousness, chest pain, rapid heart rate, or shortness of breath.

At times, hospital admission may be necessary for intravenous fluids, testing, and/or treatment. Specific treatments are directed at the underlying cause and can range from simple measures such as over-the-counter medications for motion sickness to invasive treatments such as dialysis for kidney failure or surgery for gallbladder disease. Sometimes the cause of symptoms cannot be identified or treatment is unsuccessful or incomplete. In these cases, antiemetic (“antivomiting”) medications may be given. There is a wide variety of antiemetic agents available and the clinician must decide which is most appropriate given the situation and severity of symptoms. Acupuncture and acupressure have been effective in reducing nausea and vomiting in chemotherapy patients and in people with symptoms following surgery. Acupressure may reduce nausea in pregnancy. In cases of chronic nausea and vomiting in which a physical explanation has been ruled out, a psychiatric evaluation may be helpful.

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AQ: Pls provide related topics

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**Neonatal Care Ethics** During the year 2000, there were over 4.5 million births in the United States. Nearly 12% of these births were defined as premature, that is, occurring at less than 37 weeks gestation, and 1% of these births were infants weighing less than 1,500 g. We have developed specialized expertise and technologies in order to take care of the smallest of these very low birth weight (VLBW) infants, referred to as “micropremies.”

Mortality and morbidity, in general, inversely correlate with gestational age and birth weight of infants born prematurely. The neonatal mortality rate drops significantly at 1,000 g, which typically correlates with a gestational age of 27 weeks. Currently the limit of our ability to resuscitate an extremely premature newborn is 22 weeks of gestation or just over half of a normal gestation of 40 weeks. More than half of these infants do not survive despite intensive efforts and the survivors most commonly experience enduring deficits and morbidity. Morbidity associated with extreme prematurity includes: cerebral palsy, which is a nonprogressive neuromuscular disorder involving primarily the extremities often with associated cognitive defects; bleeding in the brain (intraventricular hemorrhage or IVH), bleeding-related swelling of the brain (posthemorrhagic hydrocephalus) and conditions affecting the white matter of the brain periventricular leukomalacia (PVL), chronic lung disease sometimes necessitating a home ventilator; disorders of the eye (retinopathy) of prematurity, which in some cases can lead to vision difficulties or retinal detachment and blindness; hearing loss; and long-term growth and development delays.

Along with the ability to save some of the smallest babies come many ethical considerations. Four central ethical concerns in the clinical care of premature infants relate to: (1) the process of obtaining informed consent for these interventions; (2) the quality of life we are creating for a population of former extremely low birth weight infants and their families; (3) optimal approaches to palliative care for these critically ill infants; and (4) the distribution of scarce societal resources and technology for the entire neonatal population.

### INFORMED CONSENT

In theory, informed consent occurs in a context of trust and understanding and is predicated on three elements: A substantive process for information sharing; the ability of the appropriate decision-maker to make

## Neonatal Care Ethics

knowledgeable, reasoned, and meaningful choices; and the ability to make decisions freely and in the absence of coercive pressures. In reality, the existence of true informed consent in the neonatal intensive care unit (NICU) is often under debate. Neonatologists (doctors who care for premature infants) are asked to explain the risks of delivering a premature infant to mothers and families at moments of extreme vulnerability in the mother's life: she is in preterm labor, or ill herself and hearing for the first time that she is having a premature infant; these are also conversations that may be rushed due to clinical circumstances. The detail and significance of these discussions must increase with the decreasing gestational age of the infant. There are a variety of issues that need to be reviewed. These encompass the risks of cardiopulmonary resuscitation in the delivery room, the possible clinical course while in the NICU, including the types of respiratory support available to these infants such as specialized mechanical ventilation (high frequency ventilation), the possibility of surgery to correct a heart defect (patent ductus arteriosus), the occurrence of IVH and PVL, and the inherent risks of long-term neurodevelopmental disabilities associated with an extremely low birth weight infant.

Inherent in the *ability* to resuscitate an extremely premature infant is the decision of *whether* to do so. This decision comes to intimately involve both parents and physician. Consent discussions are shaped by evidence and standards of care, but personal values, cultural influences, and religious beliefs affect the family's understanding of what is good and right and possible. The values of clinicians and counselors may enter into these discussions, as it is often difficult to be completely "objective" in the face of such uncertainty and risk. In present day medicine, parents hold ultimate responsibility for the choices made in the care of a premature infant, even if it is the clinician who must present and, at times, guide these choices. It is apparent that this represents an extraordinary and often painful burden for the family to shoulder. Sensitive, supportive efforts on the part of the clinical team can make the process less difficult. Ongoing discussions after the infant is born are also important; it may not be until birth of the infant that the family truly develops an understanding of the type of support that children born prematurely will require.

### QUALITY OF LIFE

The eventual quality of life for a premature baby is greatly influenced by gestational age at the time of birth.

Infants born at the limits of viability, that is, 22–25 weeks, tend to be the most profoundly affected in their neurodevelopmental outcomes. Unfortunately we have no way of foretelling which infants may eventually have deficits; the prognostic ability of head ultrasounds demonstrating bleeding in the brain (IVH) is called into question in the extremely low birth weight population. We do know that when surveyed, parents of VLBW infants with developmental delay feel no worse impact than those families with normal term infants. In addition to the ability to "save" extremely premature infants we have also advanced technology with regard to the surgical correction of many previously lethal deformities. We have seen advances in the repair of severe bowel diseases. The diagnosis of abnormal placement of the tissue beneath the lungs (congenital diaphragmatic hernia or CDH) is no longer a death sentence and congenital heart disease including underdevelopment of the heart (hypoplastic left heart syndrome) is readily correctable at large institutions via staged surgery or cardiac transplant. Fetal therapy is available for some surgical interventions including correction for CDH and fetal gene therapy is on the horizon for inheritable diseases such as some types of disorders of immune system functioning (severe combined immune deficiency).

Optimism about the health outcomes of premature infants is often well founded. Moreover, even when deficits persist, the physical difficulties accompanying prematurity are not determinant of one's eventual strengths and capacities, nor are they predictive of one's sense of personal satisfaction, life meaning, individualism, and societal contributions. This said, there are very real concerns about the very devastating health outcomes experienced by many of the littlest or sickest of premature infants. These issues merit our continued attention as technological abilities push back the defining line for infant viability.

### PALLIATIVE CARE APPROACHES

It is increasingly acknowledged that integrated palliative care and pain programs are central to optimal care for infants. Dismissed are the thoughts that infants do not experience pain as older children and adults do, and modern training in neonatology includes skills in evaluating and treating the pain of infants just as in the care of patients by other subspecialties. Palliative care consultation services are slowly making their way into the NICU. When the time comes for palliative care in

## Neural Tube Defects

the infant's life we must apply what we have learned from other populations. Easing the passage to death is a gift the physician can give the family and their baby. Palliative care studies in infants demonstrate that fewer medical procedures are performed and more supportive services are provided to families that are involved with palliative care consultation. As the availability of palliative care programs increases we will see a greater number of clinicians skilled in providing pain relief, emotional support, and access to services for these families to ease their burden.

## RESOURCE ALLOCATION

One consideration that permeates all of medicine, and especially intensive care medicine, is the challenge of appropriate resource allocation. Costs associated with successful resuscitation of the very littlest of newborns are substantial, and they are overshadowed by the costs of caring for children and adults with the sequelae of prematurity. Creating a health care system where pregnant women have access to the prenatal care that they need may have the biggest impact on the rate of premature birth over the next decade. It is encouraging that the rate of premature birth declined in 2000 for the first time in over a decade from 11.8% to 11.6%. However, lack of access to prenatal care remains a huge contributor to the rate of premature births, especially in rural and poor areas of the country. Without serious attention to this issue, this will become a worsening problem in coming years.

Until premature birth can be prevented there will be challenges surrounding the care of the VLBW infant. There are difficult decisions to be made regarding consent of the family in danger of delivering a very premature infant, resuscitation of that infant, long-term quality of life for the infant and family, and when treatment fails providing a pain-free death with dignity, which also provides emotional support for the family. The best care will be provided by physicians and support staff working closely with families to alleviate some of the inherent emotional distress associated with NICU care.

**SEE ALSO:** Informed consent, Prenatal care

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LAURA WEISS ROBERTS

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## Neural Tube Defects

Defects of neural tube development are congenital anomalies with an estimated incidence of 1 in 2,000 live births. Formation of the neural tube is completed by 28 days of gestation, before most women are even aware that they are pregnant. Neural tube defects (NTDs) result from the failure of closure of the neural folds at one or more of sites.

The most severe form of NTDs occurs when there is a total failure of neural tube formation. Failure of closure of the anterior portion of the neural tube results in anencephaly, a total or partial absence of the brain and skull. An encephalocele occurs when there is a limited closure defect of the skull with brain and membrane tissue protruding through the opening. Spina bifida results from failed closure of a portion of the posterior neural tube. Myelomeningocele is a form of spina bifida in which a protruding sac contains nerves, covering membrane tissue, and cerebrospinal fluid. A meningocele is a less frequent type of spina bifida in which the sac protruding through the vertebral defect contains meninges, the membrane tissue enclosing the spinal cord. In another form of spina bifida, intact skin covers the vertebral defect, often concealing the lesion and leading to the term spina bifida occulta. Skin lesions such as hair tufts, sinus tracts, or birthmarks may raise suspicion of an underlying spina bifida occulta, which occurs in

## Neural Tube Defects

approximately 10% of otherwise healthy people. Thus mild forms are considered normal variants. However, some forms of spina bifida occulta are associated with fibrous bands that limit mobility of the lower spinal cord. The tension transmitted to the spinal cord during movement can cause injury and progressive neurological symptoms such as lower back pain, muscle atrophy, and urinary incontinence.

Screening the pregnant population for NTDs is accomplished by measuring maternal serum levels of the major fetal tissue protein, alpha fetoprotein (AFP). If the fetal skin layer is not intact, greater amounts of AFP leak into the amniotic fluid and then diffuse into the maternal blood stream. AFP values that are 2–2.5 times above the average identify the pregnancy as high risk and lead to the detection of over 80% of fetuses with NTDs. High resolution ultrasound is recommended if screening detects an elevated AFP level as it is able to identify nearly 100% of open NTDs. Although AFP screening is noninvasive and does not physically harm the mother or fetus, receiving abnormal results can cause great emotional stress. Awareness of congenital anomalies in the fetus leads to ethically complex decisions about whether to terminate the pregnancy.

Neural tube closure is a complex process, and defects have genetic and environmental etiologies. The incidence of NTDs varies greatly among populations and ethnic groups. In the United States, African and Asian Americans have a lower rate of NTDs than those of Hispanic or European heritage. Risk factors for neural tube defects include diabetes, hyperthermia, and use of the anticonvulsant valproic acid. In addition, alterations in genes involved in the processing of folate, a form of B vitamin, are found in some mothers of affected infants.

Randomized investigations have shown a 60% reduction in the occurrence of NTDs when women received folic acid vitamins. As a result the public health service recommends that women capable of becoming pregnant consume 0.4 mg of folic acid daily and high risk women take 4 mg of folic acid per day around conception. Estimates of folic acid intake from natural food sources show that only 8% of women consume 0.4 mg daily. Folic acid intake can be increased by consuming foods such as leafy greens, legumes, citrus fruits, liver, and whole wheat. Alternatively, folate fortified processed foods or vitamin supplements can be taken. Since the implementation of grain fortification in 1998, the average woman receives about one quarter of her daily folate requirement from cereal products.

Vitamin supplements were the only form of folate tested in the clinical trials demonstrating decreased incidence of NTDs.

Elective cesarian section and in utero surgery for infants with spina bifida have been advocated to decrease trauma to the spinal cord. Cesarean delivery prior to onset of labor remains controversial because of a lack of planned research studies demonstrating a benefit. Surgery to cover the exposed spinal cord in fetuses with spina bifida during the second trimester of pregnancy is still investigational. Early results show improved neurological outcomes, but the benefit should be weighed against the increased risk of preterm labor and maternal complications.

Anencephalic infants are either stillborn or do not survive beyond a few weeks. In the United States over 90% of infants with spina bifida survive beyond a year, although most experience serious lifelong disability. All have varying degrees of paralysis and decreased sensation, and the majority also has an obstruction to the flow of cerebrospinal fluid. Complications of progressive brainstem dysfunction are the leading early cause of death in infants with spina bifida.

As children with spina bifida mature, the neurological, genitourinary, and musculoskeletal systems require ongoing surveillance. Lack of bladder control may lead to recurrent urinary tract infections and renal damage. Since spina bifida involves the spinal cord, it also inevitably affects sexual functioning. Orthopedic abnormalities include curvature of the spine and imbalanced muscle groups producing joint dislocation. Individuals with spina bifida are also at risk for severe latex allergy from repeated exposures during hospitalizations.

Spinal nerve damage may result in urinary retention, reduced rectal sensation, or an inability to retain stools. Control of urinary and fecal incontinence is essential for achieving personal and social independence. Bladder emptying at routine intervals by insertion of a clean urine catheter is an important management technique, and a range of dietary, pharmacologic, and surgical interventions also exist.

The effects of spina bifida lesions on sexual functioning vary widely between individuals. Puberty may occur earlier in those with spina bifida when compared to their siblings. Altered genital sensation is frequent in both males and females. While women usually have normal fertility, functional problems with erection and ejaculation can lead to decreased fertility in males. The course of pregnancy in women with spina bifida is

## Neuropathy

similar to unaffected women except for an increased risk of urinary tract infections, pressure sores, and lower pelvic pain. Pregnant women with spina bifida are encouraged to deliver vaginally, as caesarian section is associated with higher risk of complication rates. The risk of NTDs in the offspring of individuals with spina bifida is estimated at 1 in 25, which is higher than the risk in the general population. The majority of individuals with spina bifida have never discussed spina bifida-related sexual issues with their physician and providing a supportive environment can greatly improve their quality of life. Assisted reproductive technologies are available to improve male fertility and periconceptual counseling can help in pregnancy planning.

The long-term prognosis for individuals with spina bifida is difficult to estimate as improvements in medical care continue to increase life expectancy. Recent studies show survival to the third decade of life in over 50% of affected persons. Early mortality places NTDs as the fifth leading cause of years of potential life lost. Despite daunting medical problems, most children with spina bifida have normal intelligence and lead a nearly independent life.

**SEE ALSO:** Activities of daily living, Alpha-fetoprotein screening, Disability, Nutrition, Prenatal care, Quality of life

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**Neuropathy** Nerves extend out from the central nervous system (spinal cord or brain) to supply muscle, skin, and other tissues. Nerves are comprised of a large number of microscopic nerve fibers. The core of each nerve fiber is the axon, which is a long, thin extension

of a nerve cell located within or near the spinal cord or brain. The axon carries electrical impulses. Nerve fibers can be motor (making muscles contract), sensory, or autonomic (controlling blood vessels, sweat glands, and viscera). Large nerve fibers (which serve motor or fine sensory function) have an insulation of a fatty substance called myelin surrounding the axon. Small nerve fibers (which may be myelinated or unmyelinated) carry the sensation of pain or temperature, or are autonomic.

Neuropathy means a disorder of nerves. More specifically, it is used synonymously with polyneuropathy, implying a disorder affecting the nerves of the body diffusely. Polyneuropathy needs to be distinguished from mononeuropathy (disorder of a single nerve). The most common mononeuropathy is carpal tunnel syndrome, or median nerve entrapment in the hand, which causes fingers to go numb in sleep. Mononeuropathies of nerves arising from the brain are called cranial neuropathies. The most common cranial neuropathy is unexplained facial neuropathy, or Bell's palsy.

Polyneuropathies are usually symmetrical. In general, the longest nerve fibers (which supply the feet) are affected first. As the disease advances, progressively shorter nerve fibers are involved and symptoms ascend up the legs. When the knees get affected, the fingers get affected too. Symptoms of polyneuropathy include numbness, tingling, burning, shooting pains, loss of sensation (leading to unnoticed injuries to feet), loss of muscle bulk in the feet, hammer toes, weakness advancing to foot drop, hand weakness and even thigh weakness, loss of balance, loss of sweating in the feet, and skin changes.

The most common cause of polyneuropathy in the developed world is diabetes. Prevalence of neuropathy in longstanding diabetics may be as high as 50%. Diabetic polyneuropathy can be mild or can be severe and disabling. Good control of diabetes decreases the risk of polyneuropathy. The list of other causes of polyneuropathy is long. A short list includes (a) hereditary: Charcot–Marie–Tooth disease, others, (b) infectious: HIV, leprosy, diphtheria, (c) toxic: drugs (some drugs used for cancer and HIV, INH amiodarone, others), metals (lead, gold, arsenic, thallium), industrial toxins, and possibly alcohol, (d) nutritional: deficiencies of thiamine, niacin, vitamin B12, vitamin E, (e) metabolic: renal failure, thyroid deficiency, (f) paraproteinemia (abnormal immunoglobulin-like protein in the blood) and paraneoplastic (distant effect of cancer), and (g) vasculitic: from autoimmune inflammation of blood vessels, either in isolation or in association with disorders like rheumatoid arthritis. Vasculitic neuropathy is often severe and could

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be diffuse (spread out), asymmetrical, or affect multiple individual nerves (mononeuritis multiplex).

A specific neuropathy called Guillain–Barré syndrome (also called acute inflammatory demyelinating polyradiculoneuropathy) is caused by an autoimmune attack on myelin. It develops over days to weeks and can affect short as well as long nerves. Unlike other neuropathies, weakness of muscles predominates and can be so profound that the patient's breathing has to be supported on a ventilator. The vast majority make an excellent recovery over weeks to months. Recovery is hastened by plasma exchange (removal of antibodies and other offending molecules from blood) or by injecting high doses of immunoglobulin intravenously. A chronic demyelinating neuropathy (CIDP) also occurs. Some forms of Charcot–Marie–Tooth disease are also demyelinating. Most other polyneuropathies, in contrast, are axonal.

In a large minority (if not the majority) of nondiabetic individuals with neuropathic symptoms, a cause of neuropathy is not found. Such cryptogenic neuropathy tends to be relatively mild and indolent.

Evaluation for neuropathy includes a careful neurological and physical examination and blood and urine tests to look for possible causes. Electrodiagnostic examination (or EMG and nerve conduction studies) is invaluable for the objective diagnosis of neuropathy, assessment of severity, and identification of demyelinating neuropathy. In rare cases a nerve biopsy is indicated.

Treatment involves reversing the cause (if identified), pain control (medications known as tricyclic antidepressants and some antiepileptic drugs are commonly used), foot care, orthotic devices (if there is foot drop), and aids for walking and hand use. Some mononeuropathies are amenable to surgery.

**SEE ALSO:** Chronic pain, Pain

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NIMISH J. THAKORE

## New England Female Medical College

### New England Female Medical College

The world's first medical college for women was established in the United States in 1848. Originally the school was called the Boston Female Medical College, but later the name was changed to the New England Female Medical College. The school first opened its doors in 1848 and immediately enrolled 12 women in its first class. By 1850 all 12 women graduated with medical degrees and began practicing medicine. Among the graduating 12 was Rebecca Lee, the first African American woman to become a physician in the United States. The New England Female Medical College was founded with the ultimate goal of educating women in obstetrics and gynecology.

The establishment of a medical school for women stirred up an enormous amount of controversy. At the time there was a common misbelief that women could never become doctors because all women had certain characteristics that made them ill-suited for the role of a physician. Male leaders in medicine attributed these characteristics to a woman's inability to make decisions, lack of rational judgment, emotional instability, lack of stamina, and biological inferiority.

Nonetheless, social reform helped women in their struggle to become doctors, since there was a need in society for women to care for the poor, children, and other women. In addition, society became more accepting of women taking on significant roles in the areas of sanitation, personal hygiene, and diet. Furthermore, the women's suffrage movement had just begun and it fueled the momentum for women's physicians.

Although the New England Female Medical College allowed women to study medicine, the curriculum still oppressed women. The basic medical curriculum was limited in its focus, which was only on obstetrics and gynecology. Samuel Gregory, the school's founder, was the leader of a crusade against men delivering babies because he believed it was immoral for men to be involved in the birth process. His intention for creating the school was to train women only as midwife physicians rather than true physicians.

The next obstacle a woman with medical degrees had to overcome was a lack of adequate clinical training. Many hospitals denied female medical students the opportunity to obtain clinical experience. Further, even if a hospital did permit female students to do a clinical rotation, the students were still limited to obstetrics and gynecology. This forced many women to go overseas for clinical training. The expense of such an endeavor

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## Nicotine

discouraged many women from pursuing medicine. Furthermore, medical societies refused to give women physicians a medical license. In an effort to discourage the training of women, any male physician who taught or consulted with women physicians were threatened with loss of their medical license.

To enrol in the New England Female Medical College, a woman had to have an English education and submit a medical thesis. The 3-year medical program required 30 hr of instruction per week over a period of 17 weeks. During the last 2 years the student was required to do a preceptorship under a supervising physician.

In 1874, the New England Female Medical College made an offer to merge the school with Harvard Medical School. However, Harvard rejected the offer because its board believed women should not be doctors. After 26 years of training women physicians to deliver babies, in 1873 the school merged with the Boston University School of Medicine, creating one of the first coeducational medical schools in the world.

Although there has been progress for women in medicine in the last century, women are still underrepresented in medicine. By 1979 only 10% of the physicians in the United States were women. This disparity led to the American Medical Association's Outreach Program for Women Physicians, which focused on the recruitment of women physicians to medical leadership positions. Today, this program has been expanded and now includes the Women Physicians Congress. As a result, medical student enrolment among females is quickly rising. In 2002, 45.7% of enrolled medical students were women. Despite the increased enrolment, only 24.6% of physicians in the United States today are women. Another disparity is that women physicians, on average, make \$45,000 less than their male counterparts.

Women are also underrepresented in academic medicine. For instance, in academic medicine, when comparing the makeup of medical school faculties, on average there are only 21 women per 161 men. In addition, only 7.5% of medical school department chairs are held by women and only 4 of the 125 U.S. medical schools have women as deans.

The creation of the New England Female Medical College was a landmark event for women in medicine. The school not only allowed women to obtain their medical degrees but was also key in the creation of one of the first coeducation medical schools in the world. Undoubtedly, there has been much progress for women in medicine since the mid-1800s. However, much more

work remains. Women are still significantly underrepresented in the practice of medicine, academic medicine, and other medical leadership positions. Even as we have entered the new millennium efforts to advance women in medicine are still needed.

**SEE ALSO:** Discrimination, Education, Midwifery, Pregnancy, Women's Medical College of Pennsylvania

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ELIZABETH MARIE VALENCIA

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**Nicotine** Nicotine was first identified in the early 1800s. It is a stimulant from the same family as cocaine. Nicotine is a naturally occurring colorless liquid that turns brown when burned and acquires the odor of tobacco when exposed to air. Most nicotine is obtained through tobacco use.

## THE EFFECTS OF NICOTINE

Most cigarettes in the U.S. market contain 10 mg or more of nicotine. The effects of nicotine in people are influenced by: (a) the rate and route of dosing, (b) the development of tolerance, and (c) the metabolism of nicotine.

The average smoker smokes about  $1\frac{1}{2}$  packs of cigarettes a day and takes between 10 and 20 puffs per

## Nicotine

cigarette. According to the National Institute on Drug Abuse, this average smoker gets 300 “hits” of nicotine to the brain each day. The average smoker takes in 1–2 mg of nicotine per cigarette. It takes only a few seconds for nicotine to enter the bloodstream after inhalation and less than 10 s to reach the brain. It is likely that the targets of nicotine in the central nervous system (CNS) are receptors found throughout the brain called nicotinic acetylcholine receptors (nAChRs). Cigar and pipe smokers typically do not inhale the smoke, so nicotine is absorbed more slowly through the mucosal membranes of their mouths.

Unlike most abused drugs, a smoker does not become intoxicated on cigarettes. In fact, the immediate effects of smoking are positive effects on mood, alertness, and ability to concentrate. This is because nicotine is activating the brain circuitry that regulates feelings of pleasure. The acute effects of nicotine dissipate in a few minutes, causing many smokers to continue dosing frequently throughout the day to maintain the drug’s pleasurable effects. These effects are the primary reasons why so many smokers continue to smoke.

Eventually, the body develops a tolerance to nicotine’s effects and physical dependence develops. When someone who is nicotine dependent tries to quit smoking, they experience a nicotine withdrawal syndrome. Symptoms of nicotine withdrawal include irritability, insomnia, anxiety, difficulty concentrating, depressed mood, decreased heart rate, and increased appetite. The withdrawal symptoms may peak within 1–4 days and persist for 3–4 weeks. Their persistence makes cessation difficult; most smokers who try to quit on their own relapse within a few days.

Nicotine has a rapid onset and short duration of action. Nicotine disappears from the body in a few hours. Under natural conditions, persons may have some cigarettes as often as every 20–30 min to keep a steady dose of nicotine in their body. Recent studies are looking at genetic variations in the enzymes that metabolize nicotine. According to Walton and colleagues “it should soon be possible to identify fast metabolizers (of nicotine) by DNA analysis.”

Nicotine has different effects on mood. At first, it acts as an “upper” and, after a while, it acts as a “downer.” Recent studies are examining the relationship between nicotine and depression.

Niaura et al. (2001) review the literature on maternal influences of smoking behaviors on their offspring. In particular, several studies have examined the effects of in utero exposure to smoking and the neuropsychiatric

effects on the offspring. In women who smoke, neuropsychiatric deficits may be transmitted from mother to child.

### NICOTINE ADDICTION

The addictive power of nicotine is shown in animal studies in which rats will self-administer intravenous nicotine. Despite knowing the negative health consequences, many adult smokers are addicted to nicotine. They crave for the cigarette within 15 min of awakening; they compulsively seek out nicotine throughout the day; and they find it difficult to refrain from smoking in areas where it is prohibited. Recent research studies are examining whether smoking, nicotine dependence, and nicotine addiction runs in families and whether genetic variations in brain neurotransmitter receptors may predispose someone to nicotine addiction.

### TREATING NICOTINE ADDICTION

According to the Tobacco Advisory Group of the Royal College of Physicians in London, nicotine addiction is “a life-threatening, but treatable disorder.” In fact, nicotine has been developed as a medication to assist smoking cessation. Nicotine replacement therapy (NRT) is a safe, approved method that helps take care of the nicotine addiction, while the smoker works on breaking the smoking habit. Often, NRT in the form of nicotine patch, gum, or inhalant is combined with some form of behavioral treatment program. Another medication used for nicotine addiction is the Bupropion slow-release (SR). NRT and Bupropion SR are Food and Drug Administration (FDA) approved and are prescribed to alleviate withdrawal symptoms, depressive symptoms, or to delay weight gain following smoking cessation.

**SEE ALSO:** Cardiovascular disease, Coronary risk factors, Lung disease, Smoking, [Smoking cessation](#), Tobacco

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## Nightingale, Florence

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MARILYN DAVIES

**Nightingale, Florence** During her parents' 3-year honeymoon in Europe, Florence Nightingale was born on May 12, 1820, in Florence, Italy. She was named after her birthplace. Her only sister, Frances Parthenope, or Parthe, had been born a year before, also named after her birthplace (Parthenope is the Greek name for Naples). Florence's parents were socially and politically connected, due to their wealth and membership in England's upper class. The family had two homes, although they spent the majority of the year at Embley Park in southern England. Their summer home in Derbyshire, Lea Hurst, was Florence's favorite of the two. Religion and education were integral parts of the Nightingale home; both would have a monumental impact on Florence's later life.

There was little opportunity for formal education during this time since universities were generally closed to women. Fortunately, Florence's father, William Edward Nightingale, was an educated man and desired to share this education with his daughters. Florence studied history, philosophy, ethics, grammar, writing, and mathematics. She learned to speak Latin, Greek, French, German, and Italian. These teachings would prepare Florence for her later role in life.

In 1837, while at Embley Park, Florence received her first "call from God." At that time, she did not fully understand what it meant, but the call drove her to become more active in helping the local poor. In 1849, while traveling in Egypt with friends, Florence received her second call from God. The following year she vowed chastity and obedience to God. After this time in her life, nursing took a priority for Florence. Although she received two marriage proposals, Florence never married; instead she chose to remain true to her calling.

Florence knew her calling was to serve the poor and sick. Her parents refused to allow her to become a nurse as nursing was not considered to be a suitable profession for a well-educated woman. However, during her trip to Europe and Egypt with friends, Florence visited Pastor Theodor Fliedner's hospital and school for deaconesses at Kaiserswerth, near Dusseldorf. In 1851, the following year, she returned to Kaiserswerth and spent 3 months training as a nurse. This training and her experience working with the sick and poor led her to Harley Street, London, where in 1853 she was offered an unpaid position as the Superintendent of the Establishment for Gentlewomen during Illness.

Florence Nightingale, the founder of modern nursing, thus began her career in nursing and hospital reform. She was able to utilize not only her fine education, but also her natural organizational skills to revamp the administration of the Establishment. In 1854, Sidney Herbert, the Minister at War, appointed Florence to oversee the introduction of female nurses into military hospitals during the Crimean War; Herbert selected Florence since he knew her both socially and professionally through her work at Harley Street. In November 1854, Florence Nightingale arrived at the Barrack Hospital in Scutari, Turkey, with 38 nurses. Although the doctors did not want the nurses there, within 10 days the medical and nursing staff were stretched to their limits due to the arrival of fresh casualties.

The British hospital at Scutari was in shambles; there were no beds, no kitchen, little water, and few doctors. Florence was not only a caretaker, but also an administrator, organizing nursing support for the doctors and provisions and facilities for the hospital. During this time, Florence came to be known by the soldiers as a caring and dedicated woman; one who cared no matter what the social status of the person was. It was during this time that Florence Nightingale became known as "the Lady with the Lamp." After the Crimean War, Nightingale quietly returned home. During the next few years, Florence made Army nursing reform the focal point of her career.

In 1860, at the St. Thomas's Hospital, the Nightingale School of Nursing opened in London. During this time, Florence was also consulted by U.S. President Abraham Lincoln for advice on Civil War nursing. In 1861, Florence developed severe spinal pain, which would limit some of her later endeavors. However, she did not let poor health keep her from implementing sanitation reform in India, which became

## Novello, Antonia

the focus of her attentions for the next several years. After India, Florence turned to reform of another kind: nursing reform and women's progress. In 1893, at the Chicago World's Fair, Florence's last paper was read to the Nurse's Congress. On August 13, 1910, she died in her sleep at age 90. Today, Florence Nightingale is remembered for her pioneering work in public health, hospital administration, sanitary reform, and the use of statistical data for decision-making processes.

**SEE ALSO:** Women in the health professions, Women in health: Advocates, reformers, and pioneers, Blackwell Elizabeth Healers, Nurse practitioner

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TAMBRA CAIN

**Novello, Antonia** Born in 1944 in a small town in Puerto Rico, Antonia Novello experienced the hardships of pain and disease early in life. Like many who go on to do great works, rather than breaking her, the challenges she faced shaped her character. Her father died when she was 8 and her childhood was overshadowed by illness. She had an abnormality of the colon that was not fully corrected until she was 20 years old. Overlooked by the public health system in Puerto Rico and hospitalized every summer, she learned first hand what it is like to be a helpless patient. Through these experiences came the desire to be a doctor. Not only did she become a physician, she specialized in health problems of children and adolescents and has dedicated her life to the service of public health.

Dr. Novello finished high school at age 15, entered medical school at age 20, and graduated in 1970. She

began her career in medicine, excelling immediately. She was named "Intern of the Year" by the University of Michigan for her work in pediatric nephrology, the first woman to receive that honor. She did a fellowship in pediatrics at Georgetown University Hospital in Washington, DC, and then spent a few years in private practice.

In 1978, she began her career in public health. She joined the Commissioned Corps of the U.S. Public Health Service, headed by the U.S. Surgeon General. The Commissioned Corps works in poor areas, on Indian Reservations, or wherever there is a scarcity of medical personnel. In 1982 she received a master's degree in public health (MPH). She became deputy director of the National Institute of Child Health and Human Development, where she was an influential spokesperson for children with AIDS. She was a major contributor to the drafting of the Organ Transplant Procurement Act of 1984, and she was integral in lobbying for mandatory warning labels on cigarette packaging.

In 1989, when AIDS had become fully recognized as a national and worldwide health crisis, Dr. Novello was nominated as Surgeon General of the United States by the then president, George H. Bush. She served in that capacity from 1990 to 1993, having the special distinction of being the first woman and the first Hispanic to be the Surgeon General. As the country's lead physician she continued to work on issues surrounding children, women, and minorities. She brought attention to the problems of underage drinking and smoking; she worked to raise awareness about the AIDS virus, especially the plight of children with AIDS. She was the first Surgeon General to bring the issue of domestic violence as a public health concern into the national spotlight. Because of her efforts, the medical community is more aligned with legal and social support services in the effort to end abuse against women. She acknowledged violence among young people as a public health issue, recognizing that those at highest risk are largely the poor and minorities.

After her tenure as Surgeon General, Dr. Novello served as a Special Representative for Health and Nutrition for United Nations International Children's Emergency Fund (UNICEF), and in 1996 was a visiting professor of Health Policy and Management at Johns Hopkins University. She has received numerous awards, including the U.S. Public Health Service Achievement Award and the Congressional Hispanic Caucus Medal. She has edited a book on Hispanic/Latino health and is the author of the forward to

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## Nurse Practitioner

*Salud!: A Latina's Guide to Total Health—Body, Mind, and Spirit.* In 1999, she became the Health Commissioner of the State of New York, the first Hispanic to hold that position. There she continues to advocate for children, adolescents, and families. She has worked toward solutions for the medically uninsured, teen pregnancy, underage smoking, substance abuse, AIDS, and vaccination shortages. She continues to spend energy on reducing domestic violence, increasing organ donation, and pushing for clean air legislation.

In a commencement speech given by Dr. Novello in 1992 at Providence College, she encouraged graduates to set their goals high but to plan realistically and thoughtfully, and to remember that while “getting there” is important, how you get there is what matters most. She endorsed that failure can be a useful experience, because what is learned along the way is what will shape your life; that each person, in spite of the odds, has the most wonderful opportunity to make a difference. Dr. Novello has certainly made a difference with her life.

**SEE ALSO:** Acquired immunodeficiency syndrome, Adolescence, Domestic violence, Latinos

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JUDITH HAHN

**Nurse Practitioner** In the year 2000, the U.S. Department of Health and Human Services reported that 2,694,540 of the workforce were licensed registered nurses, representing the largest segment of health care personnel. Of this number, 102,829 were nurse practitioners (NPs). The most recent Advanced Practice Nursing Survey, indicates that women represent 81% of this population with approximately 80% being women over 40 years of age.

Broadly defined, an NP is an advanced practice registered nurse, who has attained a formal NP education, primarily at the master's degree level. NP's scope of practice is delineated by The Nurse Practice Act in each state, with specialization in one of seven patient populations, including acute care (ACNP), adult (ANP), family (FNP), gerontology, pediatrics, women's health care, and adult or family psychiatric and mental health. Other advanced practice nursing specialties that are not considered to be part of the NP discipline, include the nurse anesthetist (CRNA), clinical nurse specialist (CNS), and midwife. Formal educational programs for NPs and all advanced practice nurses must meet accreditation standards and graduates must pass a certification exam administered by one of five certifying bodies: The American Academy of Nurse Practitioners (AANP), American Nurses Credentialing Center (ANCC), the National Certification Board of Pediatric Nurse Practitioners (NCBPNP/N), the Council on Certification of Nurse Anesthetists, and The National Certification Corporation for the Gynecological/Obstetrics and Neonatal Nursing Specialties. Currently, a minimum of a master's level education is required by some of the organizations listed, but will be required by all by the year 2007.

The NP's scope of practice is continually evolving, but in general is characterized by education and health promotion, diagnosis, and the provision of services necessary for the treatment of acute and chronic illnesses. In all 50 states, NPs are granted at least some prescriptive privilege, with state formularies that include controlled substances, to states that require physician supervision and impose formulary limits.

Advanced practice in nursing dates back to 1877 when Sister Mary Bernard administered anesthesia at St. Vincents Hospital in Erie, Pennsylvania. Schools for nurse anesthesia were established from 1909 to 1914. The American Association of Nurse Anesthetists was founded in 1931. Midwifery, the second oldest advanced nursing specialty, began when Clara D. Noyes proposed the training of nurses as midwives and Mary Breckinridge established the Frontier Nursing Service in Eastern Kentucky. A long-established discipline in Europe, Mary Breckinridge traveled throughout England and France observing the nurse midwives' contributions to health care. In 1929, she brought British nurse midwives to the United States to join with public health nurses to serve in rural and remote areas. Neither anesthesia nor midwifery advance practice required an advanced education until the late 1950s and early

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## Nursing

1960s. The first advanced practice program to require a master's degree was the Clinical Nurse Specialist track developed by Hildegard Peplau at Rutgers's University in 1963.

Responding to a physician trend toward medical specialization and a subsequent shortage of primary care providers, the first NP program was established at the University of Colorado in 1965. Loretta Ford, collaborating with a physician, Henry Silver, developed a collaborative practice certificate program, with an emphasis on health and wellness. Diagnosing and treating health problems in children, particularly in rural areas, signaled a trend toward broadening the NP's responsibilities and increased autonomy. Federal funding increased to support the NP's professional development and set the stage for nurses to be designated as primary care providers. In 1971, additional support for NPs assuming primary care for patients came when the secretary of Health, Education, and Welfare issued the recommendation that NPs and physicians could share the responsibility of providing primary care for all populations. By the mid-1970s there were more than 500 NP certificate programs across the United States. The emphasis shifted to advanced education in nursing and by the beginning of the 1980s several master's programs were developed, outnumbering certificate programs. Currently, 70% of nurse-midwives graduate from [MSN] programs accredited by the American College of Nurse Midwives. There are over 7,000 certified nurse midwives in the United States and abroad in developing countries. In the year 1995 there were more than 200 university or college programs offering a master's level preparation. This rapid increase in advanced practice necessitated The American Nurses Association (ANA) to establish standard curriculum guidelines for the burgeoning number of preparatory programs and initiate credentialing requirements to ensure a level of competence.

Presently, the NP works in a number of settings, including the community or public agencies, private practice with their collaborating physician, or in the ambulatory, inpatient, or emergency and operating room settings of hospitals. Nurse-midwives attend approximately 300,000 deliveries per year. However, despite continued rural health care shortages, and the role these shortages played in the development of the NP role, less than 15% of all NPs practice in rural areas. Additionally, rural areas continue to lose primary care physicians as managed care recruits MDs out of these rural settings. Telemedicine may potentially present a solution by making it possible for NPs to communicate

and collaborate with urban-based physicians, therefore to work independently in remote areas.

Since the inception of the NP role, there have been several studies supporting the NP's effectiveness and safety in providing independent care comparable to that of a primary care physician. The most recent findings of a Columbia University study were published in the *Journal of the American Medical Association*, which concluded that in an ambulatory care site, with no disparity in assigned responsibilities, there were no significant differences between the primary care outcomes of a physician and those of an NP.

Traditional registered nurses, drawn to advanced practice role, with its greater professional autonomy, and more flexible work scheduling, is likely a factor in today's nursing shortage. However, as the largest group of nonphysician, primary care providers, NPs occupy an important place among the health care workforce, and offer health care consumers an additional choice, while permanently altering health care delivery in this country.

**SEE ALSO:** Midwifery, Nursing, Physicians, Rural health

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DOROTHY M. MEYER

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**Nursing** Nursing is the profession of caring for the health of others; it is as much an art as it is a science. Nursing care was given by family members for many centuries and soldiers took care of wounded comrades

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## Nursing

in battles. However, nursing education did not begin until the 1800s when a hospital in Kaiserwerth, Germany opened a training school for deaconesses in 1836. Doctors began educating women about childcare and nursing. Florence Nightingale, the forerunner of modern nursing spent a short time there gaining a limited amount of formal training.

The modern day profession of nursing is defined thanks to the contributions of Florence Nightingale, a British woman who led 38 women to care for the wounded and dying soldiers in 1854 in the Crimea. While dealing with the tragedies of war, Nightingale made sweeping social changes that have influenced how care is given for sick and wounded people today. After the war, Nightingale wrote extensively about nursing and developed London's first training school for nurses in 1860. She believed there was a need for education in both the classroom and the health care setting. Students worked in the hospitals and acquired skills and applied their knowledge while caring for their patients.

In the United States, within a few years, two female physicians began The New England Hospital for Women and Children and started the first general training school for nurses. Linda Richards completed the training in 1867 and is noted as America's first "trained" nurse. Training schools soon opened in New York (Bellevue Hospital), New Haven, and Boston. The educational programs proliferated across the country and by the 1920s many hospitals were staffing their units with inexpensive student labor. The older design of the large wards for patients evolved due to the need for one supervisor to oversee a larger number of students.

Education for nurses has changed dramatically since then. Today there are different programs for the entry-level education offered at colleges and universities, while some hospital-based diploma programs still survive. Diploma programs, an outgrowth of the original hospital-based training education, take about 3 years to complete. Due to declining hospital funding, rising education costs, and the increasing need for degreed professionals, only a small number of programs still exist. Associate degrees in nursing (ADN) are offered at community and junior colleges and take 2–3 years to complete. In 2000, approximately 40% of **registered nurses** (RNs) received their basic education in Associate degree programs while only 6% of RNs graduated with a "Diploma in Nursing."

The Bachelor's of Science in Nursing (BSN) degree programs are offered by colleges and universities and

take 4 or 5 years to complete. The American Nurses Association (ANA), the national professional organization for nurses has designated the BSN as the entry level for professional nursing. This preparation allows for greater advancement and opportunity and is often required for administrative positions. By 2000 about 38% of RNs had graduated from baccalaureate programs with another 16% (ADN and Diploma RNs) returning to school to advance their education to a bachelor's degree. All three levels of education permit the nurse to be a candidate for the licensing exam, which, when successfully passed, results in licensure as an RN in the state the exam was taken. State laws provide for the election or appointment of members who form a Board of Nursing. The Board of Nursing for each state regulates the practice and standards of nursing in that state.

Advanced degrees in nursing have also developed, and as of 2000, more than 196,279 RNs have the education to work as advanced practice nurses (APNs). Advanced practice nurses complete a BSN, and most pursue a graduate program in nursing (MSN) and take a nationally recognized certifying exam. The four categories of advanced practice are nurse anesthetists, nurse-midwives, nurse practitioners, and clinical nurse specialists. Advanced practice nurses receive advanced education and specialization, which prepares them for more complex tasks in their chosen clinical area. Advanced practice nurses may specialize in the primary care of children, adults, or geriatrics, or focus on anesthesia, cardiac care, mental health, community health, or obstetrics. Depending on state laws they may perform history and physicals, prescribe medications or treatments, offer education and consultation, and even attend or assist in childbirth.

Registered nurses today are offered a variety of fields and settings in which to work. Nurses work to promote health and prevent disease as well as educate and advocate for vulnerable populations. They work in collaboration with physicians to perform complex procedures and staff various inpatient and outpatient areas that provide comprehensive care to a wide variety of patients. They also supervise licensed practical nurses and other unlicensed personnel in administering direct care to patients. Usually, nurses choose a specialty area and become experts in providing care in a particular setting and/or for a specific subgroup of patients, such as geriatrics, orthopedics, school nursing, occupational or forensics, psychiatry, medicine, surgery, oncology, maternity, pediatrics, or one of the acute or critical care areas, like emergency rooms or cardiac care. Some

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## Nursing Home

nurses become managers within the hospital and direct nursing activities and are administratively responsible for a specific section of the hospital or at higher levels often designated as a vice president of patient care.

Apart from hospital settings, nurses work in nursing homes, within the military, in doctor's offices, home health care, and rehabilitation; occupational nurses work in manufacturing plants and industry providing both emergency care and preventive wellness and while maintaining safety, nurses are recruited today to work for health maintenance organizations and insurers as case managers.

### DEMOGRAPHICS OF NURSES

Generally, women predominate the nursing profession. Gradual changes have helped the number of men in nursing increase. The military excluded men from serving as nurses from 1901 until after the Korean war and the ANA did not permit males to join the organization until 1930. The proportion of men in the profession of nursing increased from 1% in 1966 to 6% in contemporary times. This increase may have resulted from greater employment opportunities in nursing, the growing acceptance of men in the profession, as well as the improved gender balance elsewhere—in areas that were dominated by one gender versus another.

In 2000, 59% of employed nurses were working in hospitals; 71.5% were married and 17.9% were widowed, divorced, or separated. People of Caucasian origin represent 88% of the RN population, while roughly 12% of the employed nurses come from non-Caucasian backgrounds. In 2000 only 9.1% of RNs were under the age of 30.

The "typical" RN is now a 46-year-old married woman from the baby boom generation. Since population growth has declined, the number of people entering the workforce will be less and a decreasing number of nurses will be available to take care of a growing number of aging Americans. Currently, nurses have reported working longer hours in highly stressful environments and a significant proportion of nurses are leaving the profession in search of working opportunities that are more flexible and less stressful. A long-term shortage of nursing is projected due to the increasing demand for nurses, the aging of the current workforce, and the decline in the number of people seeking to enter the profession. The shortage of nursing as well as the heightened level of stress and job dissatisfaction

have raised important concerns over quality of care. California is the first state to attempt to regulate the nurse–patient ratios, by limiting the number of patients per RN. The outcome of this regulation remains to be seen.

Research has shown that women who graduated from high school in the 1990s were 30–40% less likely to enter nursing than those who graduated in the 1970s. Changing the image of the profession may improve recruitment, but there is a need to raise relative wages, improve working conditions and other benefits, and lower education costs, so nursing can retain its workforce rather than lose people to other occupations that may offer greater opportunity or prestige. Despite the stress and demands of health care, nurses continue to find great personal rewards when able to practice the art and science of the profession.

**SEE ALSO:** Women in the health professions, Women in the workforce, Midwifery, Nurse practitioner

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MELISSA ZUPANCIC

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**Nursing Home** Nursing homes serve as residence for individuals who are too frail, too sick, or too disabled to live in their homes. It is estimated that nearly 12 million individuals are disabled enough to require long-term care. As of 1999, 1.5 million resided in nursing homes and over one third of nursing home residents were 85 years of age or older. Residence in a

## Nursing Home

nursing home can be temporary, during a recovery period in which the patient requires skilled nursing care, or permanent, in the presence of severe and irreversible decline of functional and cognitive abilities. Most individuals prefer to reside in their homes, especially when a network of friends, family members, and professional individuals is available to provide help. The decision to reside in a nursing home is postponed both for financial and psychological reasons. Psychologically, the impact of placement in a nursing home suggests this is the final move and represents a loss of function and familiarity. Placement is postponed while the caregiver tries to provide as much care as possible for as long as possible; it is materialized when the caregiver is physically and psychologically exhausted because care for physical and/or behavioral problems is required 24 hr a day. Also, when resources in the community are not predictably and promptly accessible, the individual may be no longer safe in the community and a move to a nursing home becomes warranted. Despite the number of services available to support long-term care to community-dwelling residents, long-term care has remained fragmented and care management or care coordination among various agencies to promote individual choice and control has been less than optimal.

Nursing home care is very costly, amounting to \$90 billion dollars in 1998. Out-of-pocket expenditures by consumers have accounted for nearly one third of the total costs. Nearly 50% of all nursing home residents pay for their care out of their own savings. Medicare provides coverage for such services only on a temporary basis. Individuals with low incomes/resources can qualify for Medicaid to obtain coverage for care in nursing homes. Most individuals "spend down" to levels of income/resource that are low enough to qualify for Medicaid, a mechanism that often leads to spousal impoverishment. It is important to note that Medicare and Medicaid programs will reimburse only to nursing homes that are certified by the government to provide service to Medicare and Medicaid beneficiaries.

Nursing home residents have certain protections under the law, and, similar to all patients, they have the right to be treated with respect and dignity; to be informed about their medical condition and medications, to see their own doctor; to be informed in writing about the services and associated fees before being admitted to the nursing home; and to manage their own resources or choose an individual that they trust to do so. On the other hand, nursing homes are not required

to admit a patient if he or she cannot show how they will pay for services and may legally discharge a resident for nonpayment. Although a patient's family is not liable to reimburse for services received in a nursing home, the patient's estate is. Families get pursued by nursing homes for debt collection after the patient's death. Some are able to pay, and others not, especially in the event that they are financially devastated by the lengthy episode of illness. Families can seek financial advice through the legal services of the Area Agency on Aging.

There have been concerns about the quality of care rendered in nursing homes, following a report by the United States General Accounting Office in 1997 noting the presence of "serious or potentially life-threatening problems associated with nursing home care." Issues such as the qualification and level of staffing have been central to such concerns. Several indicators of quality of care have improved over time, including the lower use of antipsychotic drugs and a decrease in the inappropriate use of each of physical restraint, indwelling urinary catheters, and the increase in the number of nursing home residents receiving hearing aids. Many areas still need improvement, however. For example, a number of patients continue to suffer unnecessarily from pressure ulcer, malnutrition, and dehydration. Furthermore, many elderly continue to experience verbal abuse and neglect.

The Center for Medicare and Medicaid Services proposes a checklist of items to inquire about when selecting a nursing home. This checklist is available through their website, cited below. Briefly, the person inquiring about a nursing home must check that the institution is Medicare and Medicaid certified; can provide the level of care and special services needed for the patient, if the patient has dementia, is on ventilator, or needs rehabilitative services; the residents are dressed appropriately for the season of the year and time of the day; the facilities are clean, and odor-free; the temperature and the lighting are adequate; the noise level is comfortable; the furnishings are sturdy; and the facility is located at a reasonable distance from family and friends. With respect to the staff, the person inquiring about the nursing home must ensure that staff members are warm, polite, and respectful to patients; there is a full-time RN in the nursing home at all times, in addition to the Director of Nursing; the same team of nurses and Certified Nursing Assistants (CNAs) work with the same resident 4–5 days a week; that the ratio of CNAs to residents is reasonable; that there is

## Nutrition

a full-time social worker; and that a licensed physician affiliated with the facility can be easily accessible. Serious quality problems can be reported to the Ombudsman of the Area Agency of Aging if matters are not resolved through discussions with the nursing home staff.

Parallel to the increase in life expectancy, the size of the elderly population is projected to grow substantially in the next decades. For example, the population 85 years of age or older, the frailest group of the elderly, and comprised of 4.2 million individuals in 1999, is expected to double in 2030, and more than quadruple by 2050. Such changes in population demographics are bound to strain the existing system for providing long-term care to elderly Americans. Given the disproportionate representation of women among nursing home residents, women are encouraged to be active participants in debates shaping relevant public policies.

**SEE ALSO:** Activities of daily living, Long-term care, Medicaid, Medicare, Patients' rights

### Suggested Resources

American Association of Retired People: [www.aarp.org](http://www.aarp.org)  
Center for Medicare and Medicaid Services: [www.cms.gov](http://www.cms.gov)  
Legal Counsel for the Elderly: [www.uaelderlaw.org](http://www.uaelderlaw.org)

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**Nutrition** Nutrition is the sum of the processes involved in consuming food and assimilating and utilizing it. Nutrition is concerned with all the nutrients that are needed to build sound bodies and promote health such as proteins, fats, carbohydrates, vitamins, minerals, water, and fiber. Good nutrition provides the essential nutrients that the body needs to function normally and to have an optimum nutritional status.

Malnutrition is poor nutritional status resulting from dietary intakes either above or below the required range. Thus a person may be obese, but still be malnourished if he or she has poor stores of protein, iron, or vitamins. Malnutrition can result from poor food choices, fasting, starvation, poor absorption from the

gastrointestinal tract, or interference with nutrient utilization by drugs, alcohol, or metabolic diseases.

Protein–energy malnutrition is the result of deficiencies of protein and energy. Fasting and starvation can lead to severe protein–energy malnutrition. This kind of malnutrition causes rapid weight loss and decreased resistance to infection. Anorexia nervosa, a self-induced aversion to food is a unique type of malnutrition. People with anorexia nervosa take extreme measures to maintain a low body weight, including constant exercise. This disease can be fatal if not treated early.

Marasmus and Kwashiorkor are diseases due to protein–energy malnutrition among children. These are wide spread nutritional disorders in developing countries especially in children under 5. Marasmus is derived from the Greek word *marosmos*, meaning wasting or withering. Marasmus is due to the deficiency of protein and calories, while Kwashiorkor is due to a deficiency of protein only. When children are weaned from mother's milk and fed on a starchy low protein diet, they develop Kwashiorkor.

### NUTRITIONAL NEEDS THROUGH THE LIFE CYCLE

Nutritional needs vary, depending on the body's requirements at different stages of life. Growth is most rapid before birth, and therefore maternal nutrition is extremely important. Each stage of life has its own special requirements and meeting these needs is vital for a healthy life.

#### Nutrition in Infancy

Nutrition during the first year of life lays the foundation for future health, growth, and development. Growth during the first year of life is more rapid than at any other period of life beyond intrauterine life. Without adequate nutrients, signs of nutritional deficiency appear in infants much sooner than in any other age group. The consequences of malnutrition in infancy are more severe, delaying physical and mental development and resulting in learning disabilities.

During infancy, caloric needs per unit body weight exceed those of all other age groups. Infants require more calories because they are very active and have a greater surface area in proportion to their

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weight resulting in greater heat loss. By the end of first year of age the birth weight has usually tripled. An intake of about 100 cal/kg is optimal. Intake of less than 80 cal/kg is usually inadequate and intake of more than 120 cal/kg leads to obesity.

Breast-feeding is the optimal way of providing food for infants. Human milk provides important immunologic protection. Breast-fed infants have a slower rate of weight gain than formula-fed infants and lower rates of obesity. Breast-fed infants do not require solid foods during the first 6 months of life. Cow's milk should not be given until after the first year of life because it can cause intestinal bleeding. For optimal brain development, only whole milk should be used until the age of 2.

### Nutrition in Childhood and Adolescence

After the first year, the rate of growth slows and changes in body structure begin to occur. Much of the fat present during infancy is lost. Muscles become stronger and bones lengthen and increase in density. Children should participate in vigorous physical activity and establish healthy nutritional habits that will last into adulthood. Children should eat a variety of foods in three meals each day with healthy snacks between meals. Serving milk with all meals increases the protein intake. The nutrients most commonly deficient in childhood are calcium, vitamin C, thiamine, and riboflavin. Instead of soft drinks, candy, and other less nutritional snacks, offer cheese, yogurt, fruits, and raisins, which will supply these essential nutrients.

During adolescence, growth occurs in spurts. Calcium is very important because bone density increases. Adolescents require adequate calories to support their activity level and growth needs. A nutritious breakfast improves mental alertness and provides energy for physical activity until lunchtime.

### Nutrition in Pregnancy and Breast-Feeding

A woman's nutritional status prior to her pregnancy and during pregnancy influences the pregnancy outcome. Adequate weight gain is an important factor in ensuring a healthy pregnancy. Mothers with a weight gain of less than 15 lb are at a greater risk for delivering low birth weight babies. Babies who weigh less than 5.5 lb have a higher rate of infant mortality and

decreased resistance to infection. A normal weight gain for most women is 25–30 lb. Generally a woman should gain 2–4 lb during the first trimester and about 1 lb per week during the second and third trimesters. The nutritional needs of pregnant women and nursing mothers are greater than in nonpregnant women. During the second and third trimesters, an extra 300 cal/day is required. Women use up an extra 500 cal/day during lactation, which can help breast-feeding mothers return to their prepregnancy weight. The growing baby needs a considerable amount of calcium to develop. If the mother does not take in enough calcium-rich foods, calcium from her bones is used instead. However, the mother's bones are replenished after breast-feeding stops, and breast-feeding does not seem to increase the risk of osteoporosis. The need for folic acid doubles during pregnancy. Eating adequate amount of folic acid-rich foods during pregnancy and throughout the childbearing years reduces the chance of having a baby with birth defects of the brain and spinal cord known as neural-tube defects (anencephaly and spina bifida). Excess vitamin or mineral intake during pregnancy can harm the fetus. Consult a physician before taking any supplements. Alcohol and cigarette smoking are known to cause low birth weight. Excessive caffeine may also impair the growth of the fetus. To maintain fluid balance and increase blood volume, salt intake should not be restricted during pregnancy unless there is a medical reason. Drugs taken by the nursing mother appear in the breast milk. Nursing mothers should exercise caution while nursing and consult with the physician before taking any medication.

### Geriatric Nutrition

Physical, mental, and social factors affect the food habits of the elderly. Aging is characterized by a decline in the basal metabolic rate, which decreases by 2% per decade. The elderly are often less active, and as a result have reduced caloric requirements. Older people also need more calcium to prevent bone loss. When planning meals to meet the nutritional needs of elderly people, special attention should be paid to factors that affect their food intake. Since the sense of taste declines with age, plan for colorful and nutritionally dense foods.

**SEE ALSO:** Diet, Vitamins

## Nutrition

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## Obesity



**Obesity** Obesity is a rapidly growing problem in the United States today, reaching epidemic proportions. According to the Centers for Disease Control and Prevention, during 1999–2000, 64% of Americans were overweight or obese, with 23% actually defined as being obese (see definitions below). Thirty percent of children and adolescents during the same time period were found to be overweight. The prevalence of obesity has escalated over the years: between 1971–1974, only 24.7% of the adult population was affected. Obesity is more common in women, affecting 34.8 million women compared with 26.4 million men. Obesity affects all socioeconomic and ethnic groups, particularly the less privileged and minorities. Nationally, this problem needs to be addressed promptly because obesity leads to multiple medical problems that substantially affect the quality of life, longevity, and health care costs.

### DEFINITION

Overweight refers to increased weight for given height. Obesity refers to excessive amounts of body fat relative to lean body mass. Weight is proportionate to height and is adjusted using the body mass index (BMI). BMI is calculated as a ratio of an individual's weight in kilograms, divided by the square of height measured in meters. A BMI greater than 30 defines obesity (Table 1).

Other measures of obesity include measurement of the waist circumference. Waist circumference greater than 88 cm (35 in.) in women or greater than 102 cm (40 in.) in men indicates increased abdominal fat, which

**Table 1.** Classification of overweight and obesity

	Body mass index (kg/m <sup>2</sup> )
Underweight	< 18.5
Normal	18.5–24.9
Overweight	25.0–29.9
Obese	
Class I	30–34.9
Class II	35.0–39.9
Class III	≥ 40 (extreme obesity)

is associated with insulin resistance, high cholesterol, and coronary artery disease. Obesity can be described as android (abdominal fat accumulation, or “apple-shaped”) or gynecoid (mostly peripheral fat distribution, favoring the hips and lower extremities, or “pear-shaped”).

### CAUSES OF OBESITY

Why is obesity such a growing problem? Nationally, the main problem appears to be that calorie-dense foods are easily available, which increases caloric intake along with *lifestyle changes, including* reduced physical activity. There are complex interactions between hormones that control feeding, fat breakdown, and fat storage. These include insulin, leptin, neuropeptide Y, and others. There are also rare genetic syndromes that affect a small minority of people. The number of overweight and obese children has been rising, which contributes to the growing pool of obese adults.

## COMPLICATIONS OF OBESITY

Obesity leads to complications that involve many organ systems (Table 2). Obesity is a leading cause of type 2 diabetes. In android (apple-shaped) obesity, fat is deposited in the abdomen in the form of triglycerides, or storage fat. Triglycerides in the abdomen are broken down into free fatty acids, which oppose the action of insulin and prevent tissues and organs from using glucose in the blood. High blood sugars result, and this eventually progresses to diabetes. Problems with insulin secretion may also occur as a result of this process. Triglyceride deposits also provide a source of fatty acids for lipid and cholesterol production, leading to clogged arteries. Blocked arteries can lead to heart attacks, strokes, kidney failure, impotence, abdominal pain, leg pain, and even gangrene.

Restrictive lung disease can result if obesity interferes with the ability to deeply inhale and adequately

exhale, resulting in low blood oxygen levels and occasionally high carbon dioxide levels. Such patients may require long-term, low-dose oxygen therapy. Sleep apnea due to excess amounts of tissue in the neck can lead to loud snoring and blockage of airway at the level of the pharynx. This leads to a drop in oxygen levels, which produces strain on the right side of the heart, resulting in heart failure and widespread swelling (edema). Sleep apnea with loud snoring has been known to result in marital discord as well. Finally, sleep apnea is associated with abnormal heart rhythms and high blood pressure.

Obese persons who are sedentary are at risk of forming clots in the deep veins of their legs. Clots in the veins can occasionally fragment and travel upward to the heart and lungs, which can be fatal.

Women with obesity are prone to developing menstrual irregularities. Abdominal fat deposition leads to insulin resistance, which can lead to hormonal imbalances in the ovary, which prevent ovulation. Infertility may result and some women may need assistance with ovulation and expert fertility evaluation. Also, higher levels of testosterone and other ovarian hormones can lead to acne and excess facial, abdominal, and chest hair. This is a difficult cosmetic problem and is a source of low self-esteem. Missed menstrual cycles can lead to an abnormal buildup of the inner lining of the uterus (endometrium), which can lead to uterine cancer. Finally, obesity is associated with an increased risk of breast cancer.

Low back and knee pain are frequent consequences of excess weight. Joint degeneration occurs faster in obese individuals. Joint replacement surgery is often difficult in these patients. Chronic pain often occurs even in spite of surgery. Many individuals require canes, walkers, wheelchairs, or motorized vehicles to assist with mobility for activities of daily living.

Superficial skin fungus infections may occur beneath the breasts, in the neck folds, armpits, and groins as a result of moisture from sweating between adjacent folds of skin. These can be a chronic problem and may predispose to bacterial infection, as well as causing social embarrassment.

Many obese patients are depressed. It can be difficult to tell whether depression causes altered feeding behavior leading to obesity, or whether obesity leads to depression. In some patients, a vicious cycle of obesity and depression may occur. Body-image consciousness in society leads to great difficulties for obese persons, who are often viewed in a negative light by their nonobese

**Table 2.** Complications of obesity

Cardiovascular
High blood pressure
Heart failure
Angina, heart attack
Stroke
Blood clots in leg veins and lungs
Lower leg swelling
Respiratory
Sleep apnea
Restrictive lung disease
Female reproductive and urinary problems
Irregular menstrual cycles
Infertility
Increased risk of cancer of the breast, uterus, colon
Urinary incontinence
<b>Infectious</b>
Superficial fungal skin-fold infections
Leg ulcers
Gastrointestinal
Gallstones, inflamed gallbladder
Metabolic
High cholesterol, high triglycerides
Diabetes
High uric acid, causing gout and kidney stones
Musculoskeletal
Low back pain
Degenerative arthritis, particularly knees and spine
Psychological/social
Depression
Social isolation
Impaired activities of daily living
Limited physical activity choices

AQ: Is it 'infections'?

## Obesity

peers. This may lead to social isolation, difficulties obtaining employment, and in forming meaningful relationships.

### TREATMENT

Obesity is typically a chronic disease that is difficult to treat and requires ongoing management. Many patients will require lifelong attention to control weight with diet and regular exercise. Patients need to be informed that obesity-related illness and death can be significantly reduced with a weight loss of only 5–10% of their body weight. The physician and patient need to openly discuss realistic weight loss goals and assess the patient's readiness to participate in a weight loss program. Gradual changes should be encouraged, potential adverse outcomes discussed, and ongoing positive reinforcement provided.

### DIET

There are a variety of recommended diets to promote weight loss. Regardless of the type of diet, a net reduction in caloric intake is required to lose weight. Popular low-carbohydrate diets ***go against this rule (not really as even they produce a net caloric deficit, but with a skewed nutrient intake)*** but need further study to see if they are safe and effective in the long term. Obese patients on low-calorie diets (LCD) of 1,000–1,500 kCal per day can lose about 8% of their weight. Very low-calorie diets (VLCD) of 400–800 kCal per day understandably lead to greater weight loss, up to 13–23 kg. However, this weight loss is hard to maintain. Evidence shows that at the end of 1 year, those who followed either a VLCD or a LCD approached similar weights. VLCD should therefore be recommended only if immediate weight loss is required for health reasons or surgery. Patients should be encouraged to eat a variety of nutrient-rich foods incorporating fruits, vegetables, fiber, and vitamins. Carbohydrates should be derived from whole foods; processed foods should be avoided. Low-fat diets can be effective in cutting back calories.

The primary care provider should evaluate the obese patient for obesity-related diseases. Consultation with a nutritionist is essential to calculate caloric needs according to the estimated ideal body weight and level of physical activity. Special diets may be needed for the

patient with diabetes, high blood pressure, cholesterol or triglyceride disorders, kidney stones, and heart failure.

### EXERCISE

Thirty-eight percent of adult Americans reported no leisure-time physical activity in 1997–1998. Physical inactivity increases the risk for heart disease and for high blood pressure. Women were found to be less physically active than men. More African Americans and Hispanics than Whites were found to be sedentary, as were the elderly and the less affluent. Girls with a higher BMI exercised even less. Introducing physical activity in an obese patient should be a gradual process and slowly increased as tolerated. Regular aerobic exercise (brisk walking, aerobic dancing, jogging/running, swimming, exercise bike) will produce modest weight loss in overweight and obese adults, even without dietary calorie reduction. Finally, a combination of LCD and exercise produce more weight reduction than either one alone.

### BEHAVIOR THERAPY

Behavior modification is important in achieving successful weight loss. This can be done either with a therapist (individually or as a group) or with a physician. Weight loss of about 10% of body weight can be expected with behavioral modification alone. Attention to self-monitoring of eating behavior is important, by keeping a food diary of calories, portion sizes, emotions leading to eating, and location of eating. A similar exercise log is also useful. Patients need to work on controlling their impulses when shopping for food or making menu selections. Positive changes lead to reinforcement, such as monitoring weight loss. Involvement in a support group ***may*** avoid relapses.

### MEDICATION

Medications are not routinely recommended because of side effects, limited effectiveness, and the need for more healthful interventions in the form of diet and exercise. Medications are recommended only in patients with a BMI > 30 who do not have obesity-associated risk factors or diseases, or in those with a BMI > 27 who do have obesity-related risk factors or diseases. Medication



## Obsessive–Compulsive Disorder

should be used along with, rather than as a substitute for, diet and exercise. The two medications that are currently approved for long-term treatment of obesity are orlistat and sibutramine. Orlistat inhibits 30% of fat absorption from the intestines and can also lower cholesterol somewhat. In studies, orlistat produces a 5–10% reduction in body fat. Side effects are excess gas, abdominal pain, oily rectal spotting, and incontinence of stool. The symptoms improve with time and fiber may help. Fat-soluble vitamins can be lost in the stool and supplements are recommended.

Sibutramine acts in the brain by suppressing reuptake of the transmitters norepinephrine and serotonin. This reduces appetite and therefore caloric intake. Patients may lose 5% or more of their body weight with this medication. Blood pressure elevation can occur and needs to be monitored closely. Other side effects, including dry mouth, insomnia, headache, and constipation are mild and diminish with time.

### SURGERY

Bariatric surgery is the most effective treatment for severe obesity. Bariatric surgery can be considered in patients who are 18 years or older with BMI  $\geq 40$ , or BMI between 35 and 40 if there are major weight-related complications. Patients must have failed nonsurgical methods of weight loss and/or failed treatment in obesity clinics and must be committed to long-term follow-up. They must not have medical or psychological conditions that prevent the use of anesthesia or surgery. The goal of bariatric surgery is to reduce the size of the stomach (as in vertical banded gastroplasty) or to create malabsorption of nutrients (as with the Roux-en-Y gastric bypass).

Vertical banded gastroplasty (“stomach stapling”) allows for weight loss of 20% of body weight during up to 5 years of follow-up. However, weight gain can occur in patients who consume high-calorie foods in the form of soft foods or liquids (ice cream or sugary drinks). Gastric bypass is the most effective surgery for extreme obesity, but leads to diversion of the stomach into the small intestine, and results in malabsorption of nutrients. Weight loss after gastric bypass ranges from 50 kg to as much as 100 kg, but this procedure carries a higher risk of complications and patients need to be followed closely for nutrient supplementation.

**SEE ALSO:** Body mass index, Diabetes, Nutrition, Weight control

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ASRA KERMANI

## Obsessive–Compulsive Disorder

Obsessions and compulsions are fairly common mental phenomena that most people have experienced, but they can become severe enough to interfere with one's functioning. At this point they are known as a disorder. Obsessions are repeated intrusive thoughts, usually unwelcome to the thinker, and may include ideas of a harmful, violent, sexual, or religious nature. Frequently the ideas are not those the individual can accept and they cause anxiety or tension. They may relate to contamination or the fear that something terrible will happen if the person does not perform perfectly some act that will take away the idea. These acts are called rituals. Compulsions are behaviors or thoughts that must be done in order to undo the terrible ideas. They may include frequent hand washing, saying certain numbers, checking the stove or windows and doors, arranging furniture or objects in a certain way, cleaning, hoarding, or other acts. Individuals who suffer from these conditions know that the obsessions and compulsions are not real, but they cannot refrain from experiencing them and they can consume a considerable amount of time taken from ordinary life.

Obsessions and compulsions must be distinguished from excessive worrying about real-life events and often there is a fine line between them. Adults usually have some insight into the realization that the ideas and behaviors are excessive, while children may not. Often these disorders occur along with other psychiatric problems such as major depressive illnesses, anxiety disorders such as phobias or post-traumatic stress disorders, and drug and alcohol abuse. Often people experiencing these disorders have obsessive–compulsive personalities

## Obsessive–Compulsive Disorder

that have been very helpful in organizing their lives and have contributed to their successful management of difficult situations, but the disorder becomes sufficient to meet the criteria outlined in the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition of the American Psychiatric Association. The definition in this book requires that for the diagnosis, the person must experience the obsessions and compulsions for at least over 1 hr a day and that they interfere with functioning such as work, school, social relationships, and self-care. It is important to find out that they are not due to the use of drugs or alcohol, or due to another medical condition. It is also important to distinguish them from the delusions of a psychotic condition such as is noted in schizophrenia, the manic thoughts in bipolar disease, or the excessive preoccupation with food and body image in eating disorders. Certain other preoccupations with body image are also distinguished from this. Sometimes it is hard to tell the difference between delusions and obsessions and compulsions or specific phobias, but careful discussion with a trained mental health professional can clarify this, which is important because of treatment considerations.

### CAUSES

The exact cause of obsessive–compulsive disorders (OCDs) are not known at this time, although extensive research is being done. Special interest has been in the genetics of the disease. In some cases a family history can be found and studies show an autosomal dominant mode of inheritance with incomplete penetrance. In some cases there is an association with Tourette's syndrome (a disorder in which individuals experience involuntary tics among other symptoms). Certain brain pathways and structures are affected including the orbitofrontal cortex, the caudate nucleus, and the cingulate cortex. There is a disturbance in the function of serotonin transmission in the orbital cortex and caudate nucleus. Recent research has suggested some cases may be due to autoimmune problems such as infection with beta-hemolytic streptococcal infection in children. Brain imaging techniques have helped greatly in clarifying more of these causes.

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### COURSE

While the mean onset of this disorder is usually between ages 20–24, many cases occur in childhood or

adolescence and some later in life, though usually before age 35. Men and women have similar prevalence rates of OCD, although men seem to have an earlier age of onset. The disorder starts often after a very stressful life event, but for women it may very well begin or be exacerbated during or after a pregnancy. Women are often very loathe to tell their doctors or midwives about their condition because it may include ideas about harming their babies. They know that they would not hurt them but their fears are major. They are usually relieved when a knowledgeable trained person can help. They are to be distinguished from women who are psychotic with delusional ideas about harming themselves or their fetuses and babies. Women tend to have depression associated with OCD more than men and the depression may resolve while the OCD persists. Gender differences in the expression of the disorder include the finding that women tend to have more hand washing rituals while men tend to have more checking rituals. Men seem to be more treatment resistant. Many individuals may keep their symptoms secret so there is often a long lag between onset and presentation of the troublesome symptoms to the attention of any professional person. Onset often happens after a very stressful life event or frequently during or after a pregnancy in women.

Treatment usually requires the integration of a few different types of therapies. These include behavioral therapy, use of serotonin reuptake inhibitor drugs such as fluoxetine (Prozac) or sertraline (Zoloft), other antidepressant or anti-anxiety medications, and making sure that all helpful approaches are used. Behavioral therapies include exposing the person to the feared objects or situation and trying to help the person resist the ritual. This is often called exposure therapy. In the most difficult cases neurosurgery has occasionally been used. There have been tremendous advances in this area in the past 30 years. Treatment has improved, as we understand more of the underlying neurobiological and psychosocial causes.

**SEE ALSO:** Anxiety disorders, Depression

### Suggested Reading

Sadock, J. B., & Sadock, V. S. (2000). *Comprehensive textbook of psychiatry* (7th ed.). Philadelphia: Lippincott, Williams & Wilkins.

MIRIAM B. ROSENTHAL

## Occupational Therapist

**Occupational Therapist** Occupational therapy is the holistic health profession that works with individuals to attain, restore, and maintain function in daily life activities and meaningful life roles such as student, homemaker, hobbyist, and worker. The word “occupation” in the context of occupational therapy refers to activities that are valued by that individual in his or her culture. Areas of occupation include activities of daily living (grooming, dressing, eating); instrumental activities of daily living (financial, household, and health management); work (job performance, volunteering); social participation (family, friends, community); education; play; and leisure.

As a profession established in 1915, the first occupational therapists were women, a trend that continues today with 90% of women in the work force. As of December 31, 2002, there were 104,741 registered occupational therapists (OTRs) and 43,019 certified occupational therapy assistants (COTAs). 90% of OTRs and 89% of COTAs are women. Occupational therapists treat a variety of human conditions and are found in diverse practice areas such as mental health, rehabilitation, schools, home health care, nursing homes, pediatrics, outpatient, community/day treatment, hospice, teaching, management, and research. Therapists can be self-employed contracting their services and/or providing staff to facilities needing occupational therapy. Those with entrepreneurial aspirations can find new niches for occupational therapy to benefit populations either underserved or not yet identified. Work in these settings can provide flexibility in work hours beneficial to women with other responsibilities and roles.

The profession of occupational therapy has two classifications of therapists: OTRs and COTAs. OTRs must graduate from an accredited masters or doctoral program in occupational therapy, successfully complete a minimum of 24 weeks of supervised fieldwork experience, and pass the national certification exam. COTAs work under the supervision of the occupational therapist, must graduate from an accredited associates degree or certificate program in occupational therapy, successfully complete 16 weeks of supervised fieldwork experience, and pass the national certification exam.

Educational programs for both the occupational therapist and occupational therapist assistant include the following: biological, behavioral, and health sciences, human development, anatomy, pathology, activity analysis, health policy, reimbursement, and ethics. Occupational therapist programs emphasize physiology,

kinesiology, the neurosciences, occupational therapy theory, evaluation, and research. Assistant programs emphasize occupational therapy skills and treatment. Occupational therapists evaluate, establish, and implement treatment programs. The occupational therapy assistant focuses on the implementation of the treatment.

The fieldwork experience is designed to blend theory and practice. These integrated experiences promote clinical reasoning and the development of a repertoire of clinical skills.

Upon passing the national certification exam, occupational therapists are registered and assistants are certified. If working in the United States, they must adhere to licensure laws regulating the practice of occupational therapy, which vary from state to state.

In most instances the process of occupational therapy begins with a referral from a physician. The referred individual is first interviewed and evaluated. The evaluation gives the therapist an understanding of the individual’s experience, builds a therapeutic relationship, identifies strengths and limitations, defines what the individual feels is important regarding goals, and establishes treatment priorities. Evaluations assess areas of occupation and performance components (motor, process, and psychosocial skills needed to do daily activities). Motor skills include muscle strength, joint range of motion, sensation, balance, mobility, and coordination. Process skills include concentration, problem solving, judgment, and memory. Psychosocial skills include reality testing, orientation, coping skills, and self-esteem.

After the initial occupational therapy evaluation, goals are established collaboratively with the individual and their significant others. Treatment interventions are identified and implemented. Clients can be seen individually or in group treatment sessions. Examples of diagnoses and treatment include the following:

Diagnosis	Treatment
Stroke	Increase coordination and balance for grooming
Hip replacement	Adaptive equipment training to simplify self-care
Hand injury	Purposeful activities to improve range of motion
Chemical dependency	Explore healthy leisure pursuits to structure time
Mental retardation	Practice and simulation of job performance activities
Chronic pain	Biofeedback techniques to better manage pain
Depression	Coping, stress management, and assertiveness training
Dementia	Adapt the environment to help orient the individual

## Oophorectomy

Diagnosis	Treatment
Pediatric	Play activities that promote balance and coordination
Learning disabilities	Adaptive techniques to enhance the educational process

The occupational therapy treatment plan may warrant more extensive testing. Occupational therapy assessments can help clarify diagnoses and aid in determining legal issues such as competency, guardianship, and placement. The data and recommendations of an occupational therapist can more clearly identify functional abilities and illuminate appropriate options to pursue.

Throughout treatment the occupational therapist monitors and reassesses the individual's response to treatment and documents progress in accordance with regulatory agencies to ensure reimbursement by third party payers. Communication with team members (physician, nurse, social worker, physical therapist), the patient, family, or caregivers is important in developing appropriate discharge plans to maintain and promote wellness.

Helping individuals achieve optimal function and satisfaction in their life roles is the unique ability of occupational therapists.

**SEE ALSO:** Activities of daily living, Alzheimer's disease, Dementia, Disability

### Suggested Reading

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CYNTHIA OLSCHESKY

**Oligomenorrhea** Normal menstrual bleeding occurs every 28 days with a normal range of 21–35 days. The duration of flow is 4.5 days with a range of

2–7 days. Normal blood loss at menses is 35 ml with a range of 20–80 ml. Oligomenorrhea is infrequent menstrual bleeding that occurs at intervals greater than 5 weeks or 35 days.

Causes of oligomenorrhea include any condition that may disrupt key components of the body endocrine system (the hypothalamic–pituitary axis). Common groups in which this may be seen include patients with eating disorders, ballet dancers, and competitive athletes such as runners, gymnasts, and ice skaters, especially if training started in the prepubertal years. This condition can also be found in patients with polycystic ovarian syndrome, conditions of abnormal metabolism (dysmetabolic syndromes), and in patients with fluctuating weight patterns.

Treatment includes cyclic progestin therapy or oral contraceptives to induce periods and protect the lining of the uterus (endometrium) long term from the development of abnormal, excessive cell growth (hyperplasia).

**SEE ALSO:** Menstrual cycle disorders

### Suggested Reading

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DIANE YOUNG

**Oophorectomy** Oophorectomy, also called ovariectomy, is the surgical removal of one or both ovaries. According to the Centers for Disease Control and Prevention (PCDC), 491,000 oophorectomies and salpingo-oophorectomies (surgical removal of the fallopian tubes along with the ovaries) were performed in the United States in the year 1998. Removal of the ovaries is often done along with a hysterectomy (removal of the uterus). The ovaries produce ova (reproductive egg cells) and the sex hormones androgens, estrogens, and progesterones. Excision of both ovaries (bilateral oophorectomy) causes a surgical menopause, with the cessation of menses and fertility.

Between the years 1988 and 1993, approximately 50% of women in the United States undergoing

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## Oral Contraception

hysterectomy also had both ovaries removed. During these years, the proportion of women having oophorectomy along with hysterectomy increased. Oophorectomy was done more frequently when the surgical approach was abdominal—63% for abdominal hysterectomy versus 18% for vaginal hysterectomy. Approximately two thirds of women with a diagnosis of cancer or endometrial hyperplasia had an oophorectomy along with their hysterectomy. Younger women are less likely to have oophorectomy accompanying hysterectomy—the incidence is 18% in the 18–24-year-old age group, 76% in those 45–54 years old, and 62% in women 55 years or older.

Oophorectomies are performed for a variety of reasons. With cancer of the ovary or ovaries, both ovaries are removed. In the past, prophylactic oophorectomy was often performed in women who were nearing menopause and undergoing hysterectomy in order to prevent future ovarian cancer. Since ovarian tissue can also grow elsewhere in the abdomen, oophorectomy does not always protect against the future development of ovarian cancer. Ovarian cancer, when caught early, has excellent 5-year cure rates. However, early detection is not common due to the lack of early signs and symptoms. Some high-risk women choose prophylactic oophorectomy to prevent ovarian and even breast cancer. Studies have shown significant risk reduction of both these cancer types with the surgery, but the procedure is still somewhat controversial and the optimal timing for such intervention is not clear.

Prophylactic oophorectomy may also be performed in young women who have already developed breast cancer. Since some breast cancers grow larger in response to estrogen or progesterone, the removal of the ovaries can cut the supply of these hormones to the tumor. Other indications for oophorectomy are the excision of large ovarian cysts, removal of ovarian abscess, and treatment of endometriosis.

Obstetrician/gynecologists are the surgical specialists who perform oophorectomies. Oophorectomy may be carried out through an abdominal surgical incision—either horizontal or vertical. The surgery can also be done through the vagina, which speeds recovery. Another option with a relatively quick recovery time is laparoscopic surgery. With an abdominal incision, recovery typically takes up to 8 weeks while women who have vaginal and laparoscopic surgeries usually recover within 2–4 weeks. Surgery to remove ovarian cancer requires an abdominal incision.

Following bilateral oophorectomy, a woman usually receives treatment with female hormones, such as estrogen (if the uterus is also removed) or combination therapy of estrogen and progesterone if the uterus is left intact. Use of selective estrogen receptor modulators (SERMs) and testosterone replacement are two other options. If only one ovary is resected, the remaining ovary typically makes enough estrogen to negate the need for hormonal replacement therapy postsurgically.

Women who have undergone bilateral oophorectomy and who do not take hormones may experience the usual signs and symptoms of menopause including hot flashes, sleep disturbance, vaginal atrophy, and decreased vaginal lubrication. A surgical menopause such as this causes an abrupt loss of ovarian secretion of androgens, estrogens, and progesterone. Potential psychological reactions include grief over the loss of the ability to become pregnant and/or depressive symptoms. Women who have experienced depression during times of significant hormonal shifts, such as during pregnancy or in the postpartum period, are more likely to experience depression following oophorectomy. Overall, the abrupt change in hormonal levels tends to produce more severe and pronounced symptoms than a natural menopause with its more gradual decrease in hormone production.

**SEE ALSO:** Hormone replacement therapy, Hysterectomy, Menopause

### Suggested Reading

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### Suggested Resources

Centers for Disease Control and Prevention website: [www.cdc.gov](http://www.cdc.gov)

PAULA L. HENSLEY

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**Oral Contraception** Oral contraceptives (birth control pills) are either combined estrogen and progestin or progestin-only formulations that prevent conception. Estrogen is the female hormone secreted by

## Oral Contraception

the ovary in the first half of the menstrual cycle. Progesterone is the hormone produced by the ovary in the second half of the cycle. The pill's estrogens and progestins (substances that behave like progesterone in the body) are synthetic imitators of the body's natural hormones.

The most commonly used type of birth control pill is the combined oral contraceptive. These are formulations containing combinations of various types and dosages of estrogens and progestins. The combined pills are cycles of 3 weeks of active, hormone-containing pills and 1 week of inactive placebo pills. Combined oral contraceptives may be monophasic (contain the same dose of hormone for 3 weeks of active pills) or multiphasic (containing various doses of hormones in the active pills). Monophasic pills are one color for the three weeks of active pills and a different color on the inactive week. Multiphasic oral contraceptives are multi-colored pills during the active pills specifying different dosages throughout the cycle as well as a separate color for the inactive week. There is no real advantage to either type of pill. Pills are taken daily at about the same time. Menses begins during the week of inactive pills. The primary action of combined oral contraceptives is suppression of ovulation, thus preventing conception. In addition, they also thicken the cervical mucous preventing sperm from ascending into the uterus and Fallopian tubes and change the lining of the uterus making implantation less likely.

Birth control pills are sometimes prescribed "continuously." In this case the patient does not take the placebo pills and rather goes directly to the next pack of active pills. This method is used to eliminate some or all menstrual periods.

A second type of oral contraceptive pill is the progestin-only or "mini-pill." These formulations contain only a progestin. The pill pack contains 28 active hormonal pills that are the same color throughout. There is no week of inactive/placebo pills. The progestin-only oral contraceptives prevent ovulation in some women; however, the primary method of contraceptive action is to thicken cervical mucous, preventing sperm from ascending into the upper reproductive tract, thus inhibiting conception. The cervical mucous begins to thin within 23 hr so these pills must be taken very consistently every 24 hr. Because the progestin-only pills contain no estrogen, they can be used by women who may have conditions that preclude the use of combined oral contraceptives such as history of blood clotting disorders; smokers who are over 35; women who are

lactating; those who experience severe nausea with estrogen intake; those who experience breast tenderness, severe headaches, or hypertension while taking combined pills.

### BENEFITS OF ORAL CONTRACEPTIVES

The benefits of both types of pills include:

1. *Excellent contraception.* Combined oral contraceptives have a perfect use failure rate of 0.1% (number of pregnancies per 100 couples using it for 1 year of use). Progestin-only pills have a perfect use failure rate of 0.5%. Typical use pregnancy rate for both types of oral contraceptives is 5%. Because of the effectiveness of the pill, it is estimated that for every 100,000 users, 117 ectopic pregnancies, 10,500 spontaneous abortions (miscarriages), and 10,407 term pregnancies requiring cesarean sections are prevented (Dickey, 2000).

2. *Reversibility.* Fertility returns rapidly after stopping oral contraceptives. Pills have absolutely no effect on future fertility although it can take somewhat longer to become pregnant after stopping pill use. The median time from discontinuation to conception is 3 months for combined pills and less than 3 months for mini-pills.

3. *Not coitally related.* Pills are taken daily, not just used at the time of intercourse. Therefore, women are protected consistently from unintended pregnancy. It is not necessary to interrupt the spontaneity of sexual activity to use this method.

4. *Safety.* Pills are a very safe method of contraception throughout the reproductive years. No studies have demonstrated adverse effects of long-term use. Oral contraceptives are safe for use during the full span of reproductive years in healthy, nonsmoking women. It has been well demonstrated that hospitalizations for adverse health events prevented by oral contraceptives (unintended pregnancy, ovarian cysts, and invasive cancers of the ovary and endometrium) vastly outweigh hospitalizations for conditions related to pill use. There is also no reason to take a rest or holiday from taking the pill. This increases the risk of pregnancy and has no benefit whatsoever.

5. *May be used for emergency contraception.* Within 72 hr of unprotected intercourse, larger doses of certain birth control pills may be used to prevent an unintended pregnancy. The failure rate with this method is between 1–3% depending on what method is

## Oral Contraception

used. Telephone hotline: 1-888-NOT-2-LATE (1-888-668-2528).

6. *Noncontraceptive benefits.* Combined pills provide protection against osteoporosis, functional ovarian cysts, and benign breast disease. They also decrease the risk for ovarian cancer and endometrial cancer (cancer of the lining of the uterus) significantly. Longer use conveys greater protection. The pills improve acne and decrease hirsutism (unwanted facial and body hair resulting from excessive male hormones). Both combined and progestin-only pills decrease menstrual cramps and menstrual flow, reduce symptoms of endometriosis, decrease premenstrual syndrome, diminish anemia related to heavy periods, decrease the mid-cycle pain of ovulation, and lower the risk for pelvic inflammatory disease (infection of the uterus, tubes, and pelvic cavity that can be life threatening).

### DISADVANTAGES

Disadvantages of oral contraceptives include:

1. *Risk of cardiovascular diseases.* Although the risk is very small, use of the pill can predispose women to the most serious risk attributable to combined oral contraceptives, diseases of the heart and circulatory system. Cardiovascular problems such as heart attack, stroke, and blood clots are due to: (1) an increase in coagulability (blood clotting) due to estrogen; (2) an unfavorable change in cholesterol and other fats in the blood due to male hormone activity of progestins; and/or (3) increased blood pressure in susceptible patients due to the estrogen and/or progestin components of the pill. The risk increases with age. Concomitant smoking is a major cause of these complications.

2. *Cost of method.* Oral contraceptives can be expensive if they are not covered by insurance. Unfortunately, many insurance companies do not cover oral contraceptives for birth control purposes only. If they are used to treat a medical condition such as severe cramps or irregular periods, the cost may be covered. The cost of pills depends on the type and pharmacy, but they average between \$30–35 a cycle. They can be obtained at health departments, birth control clinics, or in some instances, pharmaceutical company programs at reduced cost.

3. *No protection against sexually transmitted diseases.* While birth control pills thicken cervical mucous and may decrease the likelihood of pelvic

inflammatory disease, they do not prevent gonorrhea, chlamydia, trichomoniasis, HIV, or genital warts and human papilloma virus (HPV) that can cause cervical dysplasia and cancer. Because of changes in the cervix called ectopy, a condition that causes vulnerable cells to be more exposed in the cervical opening, chlamydial infections may be acquired more easily on oral contraceptives. For this reason, it is recommended that latex condoms be used in addition to oral contraceptives for those who are at risk for sexually transmitted infections.

4. The need to remember to take a pill each day is difficult for many patients. The vaginal ring method of hormonal contraception and the birth control patch may be excellent options for these patients.

5. *Adverse effects directly related to pill use.* These include nausea and vomiting, menstrual changes including spotting, headaches (may increase or decrease on the pill), depression (may increase or decrease), decreased libido due to decreased levels of circulating free male hormone, and increased risk of gallstones. These effects can be generally be ameliorated by adjustment of dosage or formulation of pills.

6. *Adverse effects that may be related to pill use.* Certain types of benign liver tumors have also been associated. Since cervical cancer is related to HPV, pill users may be more susceptible, because they have more sexual partners. Studies that have attempted to control for confounding risk factors have found that the risk of cervical cancer still seems to be slightly higher in patients using the pill.

Birth control pills are safe, effective, and generally very well tolerated. The decision to use an oral contraceptive should be based on personal preference, medical history including conditions that may be exacerbated or improved by pills, the ability to take a pill each day, and economics. They require a prescription by a medical provider who should monitor the patient's response to the pills and provide preventive screening for breast and cervical cancer as well as sexually transmitted diseases where the risk is great.

**SEE ALSO:** Acquired immunodeficiency syndrome, Birth control, Chlamydia, Condoms, **Endometrial** cancer, Ovarian cancer, Ovarian cyst, Pelvic pain, Sexual organs

### Suggested Reading

Dickey, R. (2000). *Managing contraceptive pill patients* (pp. 10–11). Dallas, TX: EMIS.

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## Oral Health

Hatcher, R., Trussel, J., Stewart, F., Cates, W., Stewart, G., Guest, F., et al. (1999). *Contraceptive technology* (pp. 405–509). New York: Ardent Medica.

### Suggested Resources

Planned Parenthood Federation of America. (2000, April). *You and the pill*. [http://www.plannedparenthood.org/bc/YOU\\_AND\\_PILL.HTM](http://www.plannedparenthood.org/bc/YOU_AND_PILL.HTM)

NANCY MYERS-BRADLEY

## TOOTH DECAY

Pregnancy does not directly contribute to tooth decay. However, the frequent vomiting associated with morning sickness can cause acid erosion of the teeth. Snacking on starches and sugar rich foods between meals increases acid production in the mouth. It can damage tooth enamel. The pregnant woman should try to limit sugary and starchy foods to mealtime.

## ORAL HYGIENE CARE DURING PREGNANCY

The most important objectives in planning dental treatment are establishing a healthy oral cavity and optimum oral hygiene practices. Conscientious oral hygiene care during office visits as well as at home can help control bacterial plaque formation. Gingival conditions occur most frequently among pregnant women whose oral hygiene is inadequate and promotes plaque buildup. The hormonal and vascular changes that accompany pregnancy often exaggerate the inflammatory response to plaque. The dentist is charged with monitoring the pregnant patient's oral hygiene to obtain good plaque control throughout pregnancy. Scaling, polishing, and root planing visits may be scheduled more frequently than for nonpregnant patients. Pregnant women should brush after each meal with a fluoride-containing toothpaste and floss thoroughly daily. Research has shown that women who have low-birth-weight infants as a consequence of either preterm labor or premature rupture of membranes tend to have more severe periodontal (gum) disease than mothers with normal-birth-weight babies. However, it remains unknown whether there is a causal relationship.

**Oral Health** This entry focuses on oral health during pregnancy. The imbalance of female sex hormones during pregnancy has been implicated in changes in the oral cavity. Many of the changes can be minimized or prevented with good oral hygiene and regular oral health care.

## PREGNANCY GINGIVITIS

Gingival (gum) changes become noticeable from the second month of gestation and reach a maximum level in the eighth month. Hormonal changes may cause the gingiva to become inflamed and edematous (swollen). "Pregnancy gingivitis" is characterized by a tendency to bleed easily.

## PREGNANCY TUMORS

Single, tumor-like growths may develop on the tissue between the teeth. The "pregnancy tumors" may grow rapidly reaching 2 cm during the second trimester of gestation. Most of these lesions regress spontaneously several months after the termination of pregnancy.

## TOOTH MOBILITY

Tooth mobility may be related to the degree of gingival disease and disturbance of the attachment apparatus (tissue attaching teeth to bone). Mineral changes in the bone may also contribute to tooth mobility. Tooth mobility due to hormonal changes during pregnancy usually reverses after delivery.

## THE ROLE OF DIET

Diet plays an important role in the developing dentition of the fetus. Vitamins, minerals, and proteins are transferred through the mother's blood to the fetus. Vitamin C maintains the structure of bone and teeth. Proteins build teeth and bones. Calcium builds and strengthens healthy bones and teeth. If the mother is receiving an insufficient supply of calcium, it will be extracted from the mother's bones to meet the fetus's needs. The mother could experience skeletal problems later as a result.



## Osteoarthritis

### DENTAL CARE

Elective dental care is not advised during the first trimester or last half of the third trimester. Organogenesis (development of the organs of the fetus) takes place during the first trimester and therefore, the fetus is very sensitive to environmental influences. During the last half of the third trimester, the uterus is very sensitive to external stimuli. Dental care during this time involves the risk of premature delivery. Moreover, third trimester pregnant patients should not be subjected to prolonged chair time in a supine or semireclining position. The safest period during which a pregnant woman can obtain dental care is the second trimester. The focus should be on simple and short procedures. Any proposed emergency treatment should be discussed with the patient's physician first.

### RADIOGRAPHS

Whether or not, pregnant women should be exposed to dental radiographs (x-rays) is a controversial area. Exposure to radiographs should be minimized. Radiographs should only be taken when absolutely necessary and high-speed film should be used to minimize exposure. As with any patients, the pregnant woman should wear a protective lead apron with a thyroid collar.

### POSTPARTUM TRANSMISSION OF MUTANS STREPTOCOCCI

Research has shown that dental caries is an infectious and transmissible disease. Studies have shown that babies can acquire mutans streptococci, bacteria most strongly associated with dental caries, from their mothers. Mothers with untreated dental caries possess reservoirs of mutans streptococci.

**SEE ALSO:** Pregnancy

### Suggested Reading

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Rose, L., & Kaye, D. (1983). *Internal medicine for dentistry*. St. Louis, MO: The C.V. Mosby.

PAMELA ARBUCKLE  
JOY A. JORDAN

**Osteoarthritis** Osteoarthritis, or degenerative joint disease, is the most common form of arthritis in the United States, affecting 15.8 million Americans. More than 15% of women over the age of 80 have symptomatic osteoarthritis of the knee. Osteoarthritis is a leading cause of disability and thus has a significant economic impact. Although there is no cure for osteoarthritis, individualized treatment programs can limit loss of function, reduce pain, and maintain joint mobility.

Osteoarthritis results from degeneration of cartilage within joints. This cartilage provides a cushion between the two bones and forms the smooth gliding surface needed for normal joint function. Cartilage is composed of water, cells, and matrix. Seventy percent of cartilage is water. The cells make the stiff matrix that is composed of proteoglycans, collagen, and glycoproteins. Damage to cartilage is caused by multiple factors including biomechanical, metabolic, biochemical, and genetic factors that combine to produce inflammation. The main cause of osteoarthritis is repeated exposure to physical forces that injure cells within the cartilage, leading to the release of enzymes that degrade cartilage. Less commonly, defective cartilage can fail under normal joint loading. Multiple risk factors have been associated with the development of osteoarthritis, including age (over 50), gender, obesity, occupation, injuries, genetics, and others. Secondary osteoarthritis can also result from other conditions such as trauma, calcium deposition diseases, and other bone and joint disorders such as rheumatoid arthritis.

The main symptom of osteoarthritis is joint pain. Stiffness is also a common complaint and is usually worse in the morning or after periods of inactivity, but generally resolves in less than 30 min. The diagnosis is made by noting a characteristic pattern of joint involvement, characteristic appearance on x-rays, and the absence of clinical and laboratory evidence for other types of arthritis. The most commonly affected joints are the small joints of the fingers and the weight-bearing joints such as the knees, hips, and spine. On x-rays, osteoarthritis appears as joint space narrowing with formation of bone spurs near joints.

## Osteoarthritis

Osteoarthritis of the knee is common in patients over the age of 50 and in obese patients, and is diagnosed based on the presence of knee pain with bony tenderness and enlargement, and less than 30 min of morning stiffness. Osteoarthritis of the hands causes bony enlargement of the small finger joints as well as the joint at the base of the thumb. This form of osteoarthritis is often seen in mothers and grandmothers and is inherited as an autosomal dominant trait. When the feet are involved with osteoarthritis the joint at the base of the first toe is often affected and results in a bunion. Osteoarthritis of the hip usually produces pain in the groin area. Osteoarthritis of the spine is common in the neck and lower back. When the joints between the vertebrae are affected, nerve roots can be compressed as they exit the spine, causing nerve-related pain and weakness. Osteoarthritis of the spine can also lead to slippage of the vertebral bodies on each other and compression of the spinal cord itself.

Treatment for osteoarthritis includes medication, nondrug treatment, and surgery. Nondrug treatment includes weight loss, rest, physical therapy, bracing, and exercise. Obesity is strongly associated with the development of osteoarthritis; being obese more than doubles the risk for osteoarthritis of the knee. In one study, losing just 10 lb reduced the risk of osteoarthritis of the knee by 50%. Rest relieves pain but prolonged rest can lead to muscle weakness, so rest is recommended for only short periods of time. Physical therapy can improve flexibility and muscle strength, which is important for supporting the affected joints. By supporting more weight, strong muscles unload the joint and cartilage. Braces (e.g., to correct deformity in the knee) and knee sleeves that correct abnormal tracking of the kneecap may help pain. Exercise is important to maintain flexibility and strengthen muscles.

Pain relief is an important goal of therapy in osteoarthritis, and pain relieving drugs are a mainstay of treatment. Acetaminophen (Tylenol) in doses of up to 4 g per day is recommended as the first treatment and has few side effects. Liver damage may occur with large doses of acetaminophen in people who also drink alcohol. Nonsteroidal anti-inflammatory drugs (NSAIDs) are useful in patients who do not respond to acetaminophen. NSAIDs such as ibuprofen, naproxen, and ketoprofen are available as over the counter or by prescription. Side effects of these medications include gastrointestinal (GI) problems such as gastritis and ulcers, which occasionally can be serious. Rash and impairment

of kidney, liver, and bone marrow function are rare but do occur. Newer NSAIDs called COX-2 inhibitors (celecoxib, rofecoxib, and valdecoxib) have slightly fewer GI side effects compared to other NSAIDs. Upload medications such as codeine, tramadol, and propoxyphene should be limited to short-term use only. However, these medications may be useful for some patients who are at high risk for side effects with NSAIDs (such as people with a history of stomach ulcers or allergic reactions).

When oral medications are not enough, injection of corticosteroids into the joint is usually quite effective for short periods of time (weeks to months). These injections should be limited to 3–4 times per year in the same joint. Newer hyaluronic acid derivatives (another class of medications; Synvisc and Hyalgan) may be effective in osteoarthritis of the knee in selected patients. These medications are given in a series of 3–5 weekly injections and can be repeated twice per year.

Surgery is helpful in patients with significant limitations of joint function who are not helped by other treatments. Joint replacements of the knee and hip provide marked pain relief and improve function in most patients.

**SEE ALSO:** Obesity, Rheumatoid arthritis

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CHAD DEAL

## Osteoporosis and Osteopenia

**Osteoporosis and Osteopenia** Osteoporosis, or porous bone, is a disease characterized by low bone mass and reduced bone strength, with increased risk of fractures. The term *osteopenia* means low bone mass, which is one aspect of osteoporosis. Osteopenia is often used to describe a mild form of osteoporosis because osteoporosis is diagnosed primarily by low bone density. Several diseases produce low bone density and osteoporosis is the most common of these.

Osteoporosis is often called the “silent disease.” It can go undetected until a fracture suddenly occurs. Any bone can be affected, but osteoporotic fractures most often involve the hip and spine. The wrist is also a common fracture site. Spinal (vertebral) fractures can be very painful or they can occur silently over many years, without pain, causing a gradual loss of height or a bent upper back (dowager’s hump).

### RISK FACTORS

In general, older women are at greater risk of developing osteoporosis than men, because the decline in estrogen production at menopause speeds the loss of bone. Half of all women who live to 85 will have an osteoporosis-related fracture at some point. Although older women are at highest risk, osteoporosis can also develop in older men, and occasionally even in younger women and men. Risk factors for osteoporosis include: a personal history of fracture, family history of fracture in a first-degree (closely related) relative, a family history of osteoporosis, being female, lower body weight (weighing <154 lb or <70 kg after age 60) or having a small frame, advanced age, estrogen deficiency (because of menopause or due to surgical removal of the ovaries), abnormal absence of menstrual periods (amenorrhea), low dietary calcium intake, inactive lifestyle, excessive drinking of alcohol, and cigarette smoking. People of European and Asian descent are at more risk than African Americans or Hispanic Americans. Because certain medications such as corticosteroids or excessive thyroid hormone can cause osteoporosis, a woman should ask her physician to review her medications with this in mind.

### DIAGNOSIS AND SCREENING

Regular x-rays are not accurate for measuring bone density. Osteoporosis is best diagnosed by measuring

bone density at the hip, spine, and/or forearm using a special x-ray known as DEXA. Ultrasound (of the heel for instance) is sometimes used to diagnose osteoporosis, but is less accurate. When a patient’s bone mineral density (BMD) is measured, it is compared against the average bone density for a young healthy person of the same gender. DEXA results include the “*T* score,” which is the number of standard deviations above or below the bone density for young healthy people. Osteoporosis is diagnosed when the bone density is more than 2.5 standard deviations below this average (*T* score less than  $-2.5$ ). Bone density between 1 and 2.5 standard deviations below the average (*T* score between  $-1$  and  $-2.5$ ) is called osteopenia.

Because osteoporosis develops silently, screening with DEXA is recommended for women age 65 and older, according to the U.S. Preventive Services Task Force (USPSTF). Between age 60 and 65, women at higher risk (body weight <154 lb or <70 kg, not using estrogen) should be screened.

### PREVENTION

Bone mass peaks before age 30. Osteoporosis can be postponed by building up a healthy bone mass in childhood and young adulthood. By starting adult life with a higher bone mass, more time will pass before the bone mass becomes dangerously low. Bone mass can be maximized and maintained by including enough calcium in the diet, regular weight-bearing exercise, avoidance of smoking, and avoidance of more than moderate alcohol intake.

Calcium in the diet is very important. A daily total of 1,000 mg of calcium is recommended for most adults, but 1,500 mg is suggested for postmenopausal women. Teens, women in their early 20s, and breast-feeding women should get 1,200–1,500 mg per day. Foods high in calcium include milk, cheese, yogurt, sardines, broccoli, eggs, salmon, peanuts, soybeans, tofu, and spinach. One cup of 1% milk contains about 250 mg of calcium, one cup of broccoli has about 178 mg, and 1 cup of kidney beans has about 115 mg. Orange juice, soy milk, and other nondairy “milk” with added calcium are available. However, some women have difficulty obtaining enough calcium from foods alone, especially if they avoid dairy products.

Calcium supplements are recommended if the diet does not supply enough calcium. There are several kinds of calcium supplement (such as calcium carbonate or calcium citrate), some containing Vitamin D as well.

## Ovarian Cancer

When reading the label on calcium supplements, look for the amount of “elemental calcium.” The body will not absorb more than about 500 mg of elemental calcium at a time, so if more is needed, the doses should be spread out through the day. Postmenopausal women should consider taking Vitamin D as well, especially in winter in the northern latitudes. Calcium can interfere with the absorption of some medications, and people with a history of kidney stones should check with their doctor before taking calcium supplements.

Weight-bearing exercise can help prevent the development of osteoporosis, and of course is beneficial for other health reasons. Weight-bearing exercise is activity that exerts a force or stress on bones, such as walking. Bone responds to even mild forces or pressure by becoming more dense. The key is to include moderate weight-bearing exercise in your daily routine. Vigorous exercise is not needed for maintenance of bone density, and can increase the risk of fracture in a person who has osteoporotic bones. Very vigorous exercise, as may be performed by an elite athlete, can actually cause a decrease in bone mass in young women by decreasing the body’s production of estrogen. For many older women, a daily walk with good supportive shoes or sneakers is effective. Walking provides good gentle stress to the bones in the spine and legs. For women who can safely exercise more vigorously, jogging and climbing stairs are good. Exercises to strengthen the muscles that hold the back erect are beneficial. These include exercises that gently arch the back. Resistance training is also helpful. This involves exercise against a resistance, by using an elastic exercise band (one brand name is Theraband), or walking in water (water exercises), or lifting weights. Your physician or physical therapist can help you design an exercise program that is appropriate for you.

Smoking and excessive alcohol intake are both known to increase the risk of osteoporosis, so efforts to stop smoking and limit alcohol intake are important.

### TREATMENT

If you have osteoporosis, it is important to follow your physician’s recommendations. Your physician may consider laboratory tests to rule out various secondary causes of osteoporosis. Treatment of osteoporosis includes continuing the above preventive measures, and usually adding medications, with the goal of slowing the progression of the disease and reducing the chance of

fractures. Currently there are several effective medications that have been approved by the Food and Drug Administration for the treatment (and prevention) of osteoporosis. These include hormones such as estrogen, raloxifene, and calcitonin, as well as bisphosphonate medications such as alendronate. Women who take calcium supplements regularly should also take vitamin D, to help the calcium be absorbed into the bones.

Once osteoporosis has developed, the risk of fractures can be reduced by minimizing the chance of falls. This may involve such measures as wearing sensible low shoes, using a cane or a walker if needed, avoiding clutter or throw rugs on the floor in the home, installing helpful wall rails in the bathroom, and avoiding medications that can cause grogginess or dizziness. Other precautionary anti-fall measures may be needed, depending upon your level of ability or disability.

**SEE ALSO:** Estrogen, Falls Prevention, Vitamins

AQ: This entry is not provided

### Suggested Resources

- National Osteoporosis Foundation, Washington, DC: <http://www.nof.org/osteoporosis>
- National Institutes of Health (NIH). *Osteoporosis and related bone diseases, National Resource Center*. <http://www.osteoporosis.org>
- National Women’s Health Resource Center, U.S. Department of Health and Human Services: <http://www.4woman.gov/>
- Screening for osteoporosis in postmenopausal women. What’s new from the USPSTF?* (2002, September). AHRQ Publication No. APPIP02-0025. Rockville, MD: Agency for Healthcare Research and Quality. <http://www.ahrq.gov/clinic/3rduspstf/osteoporosis/osteowh.htm>

JUDITH M. FRANK

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**Ovarian Cancer** Ovarian cancer refers to a heterogeneous (diverse) group of diseases. The most common form of ovarian cancer, the epithelial ovarian cancers, tends to occur in women after the age of 50. This type of ovarian cancer was highly publicized with the diagnosis and death of actress and comedienne, Gilda Radner. It is this form of cancer that most individuals think of when they hear the term “ovarian cancer.” There are, however, two other forms of ovarian cancer: the germ-cell tumors and the stromal tumors.

The germ-cell tumors that are responsible for only 2–3% of ovarian cancers are identical to the tumors that cause testicular cancer in young men. Germ-cell tumors

## Ovarian Cancer

arise from the portion of the ovary that gives rise to the oocyte or “egg.” They tend to be diagnosed in the late teens and early 20s, they tend to involve only one gonad thus castration is not required, and they are highly curable with chemotherapy. The stromal tumors that account for only 7% of all ovarian cancers arise from the portion of the ovary that produces hormones. These tumors can occur at any point of the life cycle. Because of their tendency for hormone production, these tumors can cause early puberty as well as masculinization. Like germ-cell tumors, ovarian stromal cancers tend to be diagnosed before they have spread and are associated with a favorable prognosis.

Epithelial ovarian cancer, which is by far the most common form of ovarian cancer, arises from either the surface of the ovary or from embryologic rests within the ovary. There is no analogous (similar) tumor seen in men. The remainder of this section will focus on epithelial ovarian cancer.

While epithelial ovarian cancer is not the most common of the gynecologic cancers, it is responsible for more deaths than uterine and cervical cancer combined. For this reason, ovarian cancer is one of the most dreaded of the female cancers. The primary reason for the high mortality rates seen with epithelial ovarian cancer is the fact that this disease is usually discovered only after it has spread well beyond the ovary (only 25% of cases have not spread beyond the ovary at the time of diagnosis). When epithelial ovarian cancer is diagnosed in the early stage (i.e., still limited to the ovary), the likelihood of cure is actually quite high (approximately 70–90% cure rate). Unfortunately, once the disease has spread outside of the pelvis, the cure rates are low (less than 20% likelihood of cure).

The reason for later diagnosis of epithelial ovarian cancer is that this disease tends not to cause symptoms in its early stages. The female pelvis is built to carry a pregnancy, thus there is an ingrained tolerance for the presence of a “mass” in the pelvis. The early symptoms are often nondescript. A vague sense of bloating or abdominal discomfort and indigestion are the more commonly reported symptoms of ovarian cancer. These symptoms are common in the general population and usually do not represent the presence of a malignancy. However, if any such symptom is progressively worsening or significant enough that the physician feels a diagnostic evaluation should be undertaken, it is wise to include a pelvic ultrasound in the evaluation, even if the symptoms are more in the abdomen than the pelvis. It is not at all infrequent for a patient, who ultimately

turned out to have ovarian cancer, to have undergone an extensive gastrointestinal evaluation with specialized evaluation of the colon (colonoscopy) and stomach (gastroscopy)—both of which tend to be negative in women with ovarian cancer. Often neither specialized imaging techniques (computed tomography [CT] scan) of the abdomen and pelvis nor pelvic ultrasound (both of which would likely have made the diagnosis) are performed until a much later date, when symptoms are extreme.

### SCREENING

Because of high cure rates when discovered early and because at present most cases are diagnosed late, ovarian cancer is an excellent candidate for using a screening test. Unfortunately, development of a highly effective screening methodology has been difficult. There is a general misconception that measurement of a specific compound found to be abnormal in ovarian cancer (serum CA-125) should be performed on all women to screen for ovarian cancer. While a rise in CA-125 is associated with ovarian cancer, a large body of data has shown that in most cases, elevation of CA-125 is due to a cause *other* than ovarian cancer in the general population. For this reason, CA-125 measurement alone is not an effective screening tool, as most abnormal readings will not be due to ovarian cancer and will thus lead to unnecessary anxiety and the performance of unnecessary diagnostic evaluations and surgical treatments.

Pelvic ultrasound performed with a vaginal probe has also been investigated as a screening tool. While it has been shown to detect the presence of asymptomatic ovarian cancers, its usefulness is limited by the fact that the “false positive rate” (the percentage of women who have an abnormal ultrasound who turn out not to have ovarian cancer) is high, perhaps as high as 80%. Many of the cancers detected by ultrasound screening are of the better prognostic variety (and would have likely remained localized to the ovary even if the diagnosis had been made without screening). Some cancers, mostly those that carry a poor prognosis, are missed by ultrasound screening. The British have conducted a study on approximately 20,000 women using pelvic ultrasound in conjunction with CA-125. They found that women diagnosed with ovarian cancer while undergoing screening lived longer than women with ovarian cancer who were not screened. However, a significant

## Ovarian Cyst

difference in long-term survival was not detected, though there appeared to be a trend toward lower mortality in the screened group. A much larger study is presently underway, which will hopefully definitively answer the question regarding the use of a combined serum CA-125 and ultrasound as a valuable screening tool. It is important to note that these studies are generally performed on postmenopausal women because they are far less likely than premenopausal women to have false positive CA-125 or ultrasound readings.

At present, screening is offered to women at markedly increased risk of ovarian cancer because they carry a genetic mutation associated with a high likelihood of development of ovarian cancer. For the general population, ovarian cancer screening has not so far been proven to be beneficial in reducing the mortality from this disease. Modalities other than CA-125 and ultrasound, such as serum proteomics (a technique whereby serum is “fingerprinted” to identify its protein signature to look for patterns highly suggestive of ovarian cancer) are under investigation and show promise.

### TREATMENT

If a woman is suspected to have ovarian cancer on the basis of her diagnostic evaluation, referral to a gynecologic oncologist is necessary. This specialist who is highly trained in the management of ovarian cancer will optimize both the surgical and chemotherapeutic management of the patient. It is extremely important that the initial surgery be performed in a fashion that can optimize chances for survival. In women with apparently early tumors, it is key that a complete “staging” procedure be done to look for hidden sites of disease that are not obvious to the naked eye. This involves biopsies at multiple sites of the intra-abdominal lining and of strategic lymph nodes. Microscopic *metastases* to these structures have been reported to occur in up to 30% of individuals whose disease appears limited to the ovary. Detection of such metastases would lead to a different, more aggressive, treatment plan. For women with disease that has already metastasized, the goal of the initial surgery is to remove as much of the disease as possible, because the amount of disease remaining at the end of surgery has consistently been shown to effect outcome. This surgery can be extremely challenging and requires both the technical skill and judgment that come with experience from treating ovarian cancer. It has been shown that the outcome of the initial

surgery is clearly improved when a gynecologic oncologist is involved, as compared to a general gynecologist or a general surgeon. In some cases, it may be advisable to delay the surgery and use chemotherapy first to contain the disease because the patient is so weakened by the cancer that a large surgery is too risky.

Once a diagnosis has been made, chemotherapy is usually, but not always, necessary. The initial chemotherapeutic approach involves the use of two agents, called carboplatin and paclitaxel. These agents are usually given in an outpatient setting over approximately 5–6 hr. Generally 3–6 courses of chemotherapy are given (depending on how advanced the initial disease was), 3 weeks apart. After chemotherapy is complete, some women who had advanced disease may benefit from a second operation referred to as second-look, to try to ascertain whether the disease is no longer evident. Frequently, after the initial six cycles of chemotherapy, consolidation chemotherapy with paclitaxel alone is recommended for women who initially had advanced disease, to try to optimize outcome. While the majority of women respond well to chemotherapy eventual relapses are common. There are a variety of agents available to treat women with recurrent ovarian cancer, but cure after recurrence is extremely rare. The goal of treatment in the recurrent situation is to lengthen life (and hopefully preserve quality of life) for as long as possible.

### Suggested Resources

[www.lynnecohenfoundation.org](http://www.lynnecohenfoundation.org)

LYNDA ROMAN

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**Ovarian Cyst** An ovarian cyst is a fluid-filled sac that can occur within or on the surface of the ovary. Many women will develop an ovarian cyst at some time during their lives. Most cysts are benign (not cancerous), not dangerous, resolve on their own, and require no treatment. Ovarian cysts are generally painless, causing discomfort only if they twist, rupture, or bleed.

Most ovarian cysts result from hormonal changes that occur during the menstrual cycle. A follicular cyst results when a follicle that is produced in the ovary each month, does not release its egg and continues to grow until it forms a cyst. These cysts usually do not cause pain, and usually disappear without treatment

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## Ovarian Cyst

after several months. A corpus luteum cyst occurs in the ovary after an egg is released. The small cyst that contained the egg seals off and tissue and fluid collect inside. This cyst usually disappears on its own, but can become large, may bleed into itself, and can cause pelvic pain. It may also rupture causing severe pain and internal bleeding.

An ovarian cyst may be detected on pelvic examination or during a pelvic ultrasound. A pelvic ultrasound uses sound waves to image the internal organs. A cyst that only contains fluid tends to be benign and unless it is very large requires no treatment. A cyst that contains more solid components usually requires further evaluation.

There are several other common types of ovarian cysts. A dermoid cyst may contain different tissues, such as hair, fat, and (believe it or not) teeth. They are almost always benign, but they can become very large, and can actually twist or torse causing pain. These cysts usually require surgical removal. Another common cyst is an endometrioma that usually occurs in women who have the condition "endometriosis," where uterine lining cells grow outside the uterus. Endometriomas may become large and painful, requiring surgical treatment. Cystadenomas come from the ovarian tissue itself, and may be filled with fluid or mucus-like material. They may also become very large.

The majority of ovarian cysts are benign. There are several factors that can help predict whether or not a cyst is cancerous. The first is the size of the cyst. Very

large cysts, usually greater than 9 or 10 cm, are less likely than small cysts to resolve spontaneously. If a cyst has a large number of solid components, or separations or septations, this may also be a sign of malignancy. A postmenopausal woman who develops an ovarian cyst is less likely to have a benign cyst, than is a reproductive age woman.

The treatment of an ovarian cyst depends upon the type and size of the cyst, and the woman's age. Small cysts that are purely fluid-filled and less than 4 or 5 cm may be observed for 1–3 months and will usually resolve without treatment. Women that have a tendency to develop functional cysts are sometimes placed on oral contraceptives, which can prevent new cyst formation. In older women a cyst usually requires surgical evaluation. Surgery may also be required if a cyst is large, has solid components, is growing, or is causing pain. When ovarian cysts do require further assessment, they can usually be evaluated and treated with laparoscopic surgery, in which a narrow, telescope-like instrument is used to visualize the pelvic organs. Additional surgical instruments are placed through small incisions to perform the surgery. This is usually done under general anesthesia. Very large cysts or cysts that are more suspicious for cancer may require more extensive surgery.

**SEE ALSO:** Endometriosis, Laparoscopy

KAREN ASHBY

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references