MENOPAUSE

Climacteric, Menopausal State, Premature Menopause

The time in most women's lives when menstrual periods stop permanently, and the woman is no longer able to have children.

Diagnosis  Female

Related Diagnoses:

- Autoimmune disorders
- Premature ovarian failure
- Endometrial cancer
- Uterine fibroids
- Ovarian cancer
- Cervical stenosis
- Ovariectomy
- Tubal phimosis

About Menopause

Menopause refers to the time of cessation of a woman's reproductive ability. Medical professionals often define menopause as having occurred when a woman has not had any vaginal bleeding for a year. It occurs, on average, at around age 50 though this age varies among women worldwide.

In addition to being defined by the state of the uterus, menopause can also be described as the permanent cessation of the primary functions of the ovaries: the ripening and release of ova and the release of hormones that cause both the creation of the uterine lining, and the subsequent shedding of the uterine lining.

There are several known causes of menopause (autoimmune, x-chromosome mutations) although sometimes the cause remains unknown. At the physiological level, menopause happens because of a decrease in the ovaries' production of the hormones estrogen and progesterone. Before menopause, a woman's periods typically become irregular, which means that periods may be longer or shorter in duration, or be lighter or heavier in terms of the amount of flow.

The Three Stages of Menopause

Premenopause

Premenopause is a term used to mean the years leading up to the last period, when the levels of reproductive hormones are already becoming more variable and lower, and the effects of hormone withdrawal are present. Premenopause often starts some time before the monthly cycles become noticeably irregular in timing.
Perimenopause

The term "perimenopause", which literally means "around the menopause", refers to the menopause transition years, a span of time both before and after the date of the final episode of flow. According to the North American Menopause Society, this transition can last for four to eight years. During perimenopause, estrogen levels average about 20-30% higher than during premenopause, often with wide fluctuations. These fluctuations cause many of the physical changes during perimenopause as well as menopause. During this period, fertility diminishes, but is not considered to reach zero until the official date of menopause. The actual duration and severity of perimenopause effects for any individual woman currently cannot be predicted in advance. Even though the process, or the course, of perimenopause or menopause can be difficult to predict, the age of onset is somewhat predictable: women will often, but not always, start these transitions (perimenopause and menopause) about the same time as their mother did.

Postmenopause

The term "postmenopausal" describes women who have not experienced any menstrual flow for a minimum of 12 months, assuming that they do still have a uterus, and are not pregnant or lactating. In women without a uterus, menopause or postmenopause can be identified by a blood test showing a very high FSH level. Thus postmenopause is all of the time in a woman's life that take place after her last period, or more accurately, all of the time that follows the point when her ovaries become inactive. At this point a woman is considered infertile; however, the possibility of becoming pregnant has usually been very low (but not quite zero) for a number of years before this point is reached.

Menopause is usually a natural change. This transition from a potentially reproductive to a non-reproductive state is the result of changes in female hormonal production by the ovaries. Normally not sudden or abrupt, tends to occur over a period of years, and is a consequence of biological aging. For some women, the accompanying signs and effects that can occur during the menopause transition years can significantly disrupt their daily activities and sense of well-being. Specific treatment is not usually needed. Some symptoms, however, may be improved with treatment.

In those who have had surgery to remove the uterus but still have ovaries, menopause may be viewed to have occurred at the time of the surgery or when hormone levels fall. Following the removal of the uterus, symptoms typically occur earlier, at an average of 45 years of age. Other causes include surgery that removes both ovaries, or some types of chemotherapy. While typically not needed, a diagnosis of menopause can be confirmed by measuring hormone levels in either the blood or urine. Menopause is the opposite of menarche, the time at which a girl's periods start.

Menopause can result from:

- **Age**

  The typical age of menopause is between 40 and 61 and the average age for last period is 51 years. Menopause that occurs before the age of 40, whether natural or induced, is known as "premature" menopause.

- **Premature ovarian failure**

  In rare cases, a woman's ovaries stop working at a very early age, ranging anywhere from the age of puberty to age 40, and this is known as premature ovarian failure (POF). The diagnosis is made when women younger than 40 years, have four or more months of amenorrhea and two serum FSH levels taken one month apart in the menopausal range. Previously the term
premature menopause had been used as synonym to POF but found to be incorrect; as about 50% of women have intermittent ovarian function and may ovulate and conceive after this diagnosis.

- Chemotherapy-induced premature menopause

Chemotherapy-induced premature ovarian failure is reversible for the infertility of women. Damaged ovarian function can be rescued after stem cell transplantation. Nevertheless, the mechanism behind this still remains unclear. Although these stem cells may potentially differentiate into oocytes or granulosa cells, studies have proved they could not develop into fully functional follicles in vivo. Both the proliferation and apoptosis of granulosa cells are critical in the development of follicles. Greater numbers of studies have revealed stem cells transplanted into the damaged ovary are more inclined to differentiate into granulosa cell-like cells to replenish the lost granulosa cells. Additionally, factors produced by stem cells could inhibit stromal cell apoptosis, thereby playing a part in rescuing damaged ovarian function.

- Surgical menopause

Menopause can be surgically induced by bilateral oophorectomy (removal of ovaries), which is often, but not always, done in conjunction with removal of the Fallopian tubes (salpingo-oophorectomy) and uterus (hysterectomy). Cessation of menses as a result of removal of the ovaries is called "surgical menopause". The sudden and complete drop in hormone levels usually produces extreme withdrawal symptoms such as hot flashes, etc.

**Associated disease**

Reduced estrogen levels lead to an increased risk of osteoporosis, and increased risk for colon and ovarian cancer.

**Complications**

While menopause is often thought to be linked to an increase in heart disease, this primarily occurs due to increasing age and does not have a direct relationship with menopause. A possible but contentious increased risk of atherosclerosis.

**Risk factors**

Factors related to earlier age at menopause include childhood undernutrition, low menstrual cycles, never having given birth, low socioeconomic status, low education level, rural living, and lifestyle factors such as smoking or alcohol consumption.

Factors that lower the age of physiologic menopause include:

- hysterectomy
- Fragile X carrier
- autoimmune disorders
- living at high altitude
- history of certain chemotherapy medications and/or radiation treatment

**Impact on fertility**

Chances of conception after menopause are very small but possible. In some cases, early
diagnosis by genetic investigation may instead lead to advice for early conception or oocyte harvesting and preservation. Hormone defect may be substituted by estrogen/progestin preparations. Moreover, sexual hormone defects represent an important risk factor for frequent and severe neurological, metabolic or cardiovascular disorders such as Alzheimer’s disease, hypercholesterolemia or ischemic diseases. The only solution presently available for the fertility defect in women with absent follicular reserve is represented by ovum donation. Gestation after menopause is with complications. The health of the mother and of the baby is at risk.

**Prevention**

Physical activity may be an effective way of preventing or attenuating menopause-related symptoms, and it has been shown to improve quality of life in menopausal women. Nutrition plays an important role in the prevention and management of changes in body composition, but the role of nutrition in treating symptoms such as hot flashes is unclear.

**Symptoms**

Vasomotor symptoms such as; hot flashes and night sweats; somatic symptoms such as vaginal dryness and dyspareunia; psychological symptoms such as anxiety, nervousness, lack of concentration, overreacting to mild problems, irritability, and poor memory, are all symptoms of menopause. However, the severity and influence of these symptoms of menopause in different women and populations are varied. In some women, these symptoms are so severe that they affect their social and individual lives. Decreased estrogen secretion, metabolic changes, general health and psychosocial factors result in menopausal symptoms. The frequency of symptoms can vary based on epidemiological characteristics of the population and the assessment tools used.

**Therapies**

**Self therapy**

Alternative medicine

In the area of complementary and alternative therapies, acupuncture and acupressure treatments are promising. Numerous studies indicate positive effects, especially on hot flashes but also others showing no positive effects of acupuncture regarding menopause.

With respect to hot flashes, avoiding smoking, caffeine, and alcohol is often recommended.

**Conventional medicine**

Pharmacotherapy
There are a number of treatments to relieve the symptoms of menopause:

Hormone replacement therapy (HRT)

Hormone replacement therapy (HRT) in menopause is medical treatment in surgically menopausal, perimenopausal and postmenopausal women. Its goal is to mitigate discomfort caused by diminished circulating estrogen and progesterone hormones in menopause. Combination HRT is often recommended as it decreases the amount of endometrial hyperplasia and cancer associated with unopposed estrogen therapy. The main hormones involved are estrogen, progesterone and progestin. Some recent therapies include the use of androgens as well.

Tibolone

Tibolone is an alternative to estrogen replacement therapy for the treatment of climacteric complaints and postmenopausal bone loss while not having harmful effects on the endometrium and the breast.

Selective estrogen receptor modulators (SERMs)

SERMs are used for various estrogen-related diseases. Including treatment of ovulatory dysfunction in the management of infertility, treatment and prevention of postmenopausal osteoporosis, treatment and reduction in risk of breast cancer and treatment of dyspareunia due to menopause. SERM is also used in combination with conjugated estrogens indicated for the treatment of estrogen deficiency symptoms, and vasomotor symptoms associated with menopause.

Surgical therapy

Operation is not menopause treatment, but conditions requiring surgery become more common during menopause. Menopause surgery may be necessary to relieve symptoms of menopause (e.g. vaginal bleeding).

Assisted reproduction

Motherhood after the age of menopause, facilitated by assisted reproductive technologies (ARTs), has raised much controversy in recent decades. To date, pregnancy in postmenopausal women has required the use of donated oocytes by using oocytes from a younger donor (even when the prospective mother still has her own).

Subsequent to recent developments, oocytes can now be preserved much more effectively than before, through vitrification. However, oocyte preservation will be useful only if a woman knows of its existence, while she is still young enough to have healthy eggs, and has access to it. For those who are already heading toward age-related subfertility or menopause, the possibility of vitrification offers little hope.
Diagnoses

Autoimmune disorders
A condition arising from an abnormal immune response to a normal body part.
Learn more at: www.fertilitypedia.org/therapy/diag/autoimmune-disorders-1

Premature ovarian failure
The loss of function of the ovaries before age 40.
Learn more at: www.fertilitypedia.org/therapy/diag/premature-ovarian-failure

Endometrial cancer
Cancer that arises from the endometrium, the lining of the uterus.
Learn more at: www.fertilitypedia.org/therapy/diag/endometrial-cancer

Uterine fibroids
The most common benign smooth muscle tumors of the uterus encountered in women of reproductive age.
Learn more at: www.fertilitypedia.org/therapy/diag/uterine-fibroids

Ovarian cancer
A type of cancer in which abnormal cells begin to grow in one or both of a woman's ovaries.
Learn more at: www.fertilitypedia.org/therapy/diag/ovarian-cancer

Cervical stenosis
Narrowing of cervix - the opening to the uterus.
Learn more at: www.fertilitypedia.org/therapy/diag/cervical-stenosis

Ovariectomy
Surgical removal of one or both ovaries.
Learn more at: www.fertilitypedia.org/therapy/diag/ovariectomy

Tubal phimosis
The type of blockage that affects the part of the fallopian tube end towards the ovary.
Learn more at: www.fertilitypedia.org/therapy/diag/tubal-phimosis

Organs

Hypothalamus
A region of the forebrain that regulates body temperature, some metabolic processes and governs the autonomic nervous system.
Learn more at: www.fertilitypedia.org/edu/organs/hypothalamus
Ovary
The ovum-producing organs of the internal female reproductive system
Learn more at: www.fertilitypedia.org/edu/organs/ovary

Pituitary gland
An endocrine gland, about the size of a pea, whose secretions control the other endocrine glands and influence growth, metabolism, and maturation.
Learn more at: www.fertilitypedia.org/edu/organs/pituitary-gland

Uterus
The uterus is the largest and major organ of the female reproductive tract that is the site of fetal growth and is hormonally responsive
Learn more at: www.fertilitypedia.org/edu/organs/uterus

Reproductive cells

Cumulus oophorus
A group of granulosa cells that support the oocyte in an antral follicle.
Learn more at: www.fertilitypedia.org/edu/reproductive-cells/cumulus-oophorus

Endometrium
The innermost layer of uterus forming the uterine lumen where the implantation of an oocyte happens.
Learn more at: www.fertilitypedia.org/edu/reproductive-cells/endometrium

Oocyte
A female germ cell involved in reproduction.
Learn more at: www.fertilitypedia.org/edu/reproductive-cells/oocyte

Biological control

Estrogen
The primary female sex hormone responsible for the development and regulation of the female reproductive system and secondary sex characteristics.
Learn more at: www.fertilitypedia.org/edu/biological-control/estrogen

Follicle-stimulating hormone
FSH is a hormone secreted by the anterior pituitary gland. It regulates the development, growth, pubertal matur and reproductive functions of the body
Learn more at: www.fertilitypedia.org/edu/biological-control/follicle-stimulating-hormone

Progesterone
Steroid hormone, secreted by the ovaries, whose function is to prepare the uterus for the implantation of a fertilized ovum and to maintain pregnancy.
Learn more at: www.fertilitypedia.org/edu/biological-control/progesterone

Reproductive functions
Endometrial receptivity
Period when the womb is receptive for implantation of the free-lying blastocyst.
Learn more at: www.fertilitypedia.org/edu/reproductive-functions/endometrial-receptivity

Implantation
The very early stage of pregnancy at which the embryo adheres to the wall of the uterus.
Learn more at: www.fertilitypedia.org/edu/reproductive-functions/implantation

Oogenesis
The process of the maturation of the female gametes through the meiotic division.
Learn more at: www.fertilitypedia.org/edu/reproductive-functions/oogenesis

Ovulation
The release of egg(s) from the ovaries.
Learn more at: www.fertilitypedia.org/edu/reproductive-functions/ovulation

⚠️ Risk factors

Alcohol drinking
A pattern of drinking that results in harm to one's health, interpersonal relationships, or ability to work.
Learn more at: www.fertilitypedia.org/therapy/rf/alcohol-drinking

Chemotherapy
A category of cancer treatment that uses one or more anti-cancer drugs.
Learn more at: www.fertilitypedia.org/therapy/rf/chemotherapy

Eating disorder
A mental disorder defined by abnormal eating habits that negatively affect a person's physical or mental health.
Learn more at: www.fertilitypedia.org/therapy/rf/eating-disorder

High level of FSH
FSH levels above what an expected levels for one's age and is indicator of proper ovarian function.
Learn more at: www.fertilitypedia.org/therapy/rf/high-level-of-fsh

Hysterectomy
Surgical removal of the uterus.
Learn more at: www.fertilitypedia.org/therapy/rf/hysterectomy

Low level of estrogen
A diminished level of blood estrogen level.
Learn more at: www.fertilitypedia.org/therapy/rf/low-level-of-estrogen

Ovariectomy
The removal of the ovaries.
Learn more at: www.fertilitypedia.org/therapy/rf/ovariectomy
Poor dietary habits
Eating habits are one of the few factors within our control that impact not only our chances of falling pregnant.
Learn more at: www.fertilitypedia.org/therapy/rf/poor-dietary-habits

Smoking
Long-lasting inhalation of the smoke of burning tobacco.
Learn more at: www.fertilitypedia.org/therapy/rf/smoking-1

Symptoms

Absence of menstrual periods
The absence of a menstrual period in a woman of reproductive age.
Learn more at: www.fertilitypedia.org/edu/symptoms/absence-of-menstrual-periods-1

Frequent and urgent urination
The need to urinate more often than usual and a sudden, compelling urge to urinate.
Learn more at: www.fertilitypedia.org/edu/symptoms/frequent-and-urgent-urination

Infertility
The failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse.
Learn more at: www.fertilitypedia.org/edu/symptoms/infertility

Irregular menstruation
Irregular menstruation is a menstrual disorder whose manifestations include irregular cycle lengths as well as metrorrhagia
Learn more at: www.fertilitypedia.org/edu/symptoms/irregular-menstruation

Osteoporosis
A chronic condition characterized by low bone mass and increased risk of fracture.
Learn more at: www.fertilitypedia.org/edu/symptoms/osteoporosis

Painful sexual intercourse
The painful feelings during sexual intercourse.
Learn more at: www.fertilitypedia.org/edu/symptoms/painful-sexual-intercourse

Painful urination
A burning or stinging sensation during urination.
Learn more at: www.fertilitypedia.org/edu/symptoms/painful-urination-1

Therapies

Acupuncture
A form of alternative medicine and a key component of traditional Chinese medicine involving thin needles inserted into the body at acupuncture points
Learn more at: www.fertilitypedia.org/edu/therapies/acupuncture
**Egg donation**
Process by which a woman donates eggs for purposes of assisted reproduction or biomedical research.  
Learn more at: [www.fertilitypedia.org/edu/therapies/egg-donation](http://www.fertilitypedia.org/edu/therapies/egg-donation)

**Fertility preservation**
The field of reproductive medicine, that focuses on helping reproductive-age men and women to prevent infertility and birth defects.  
Learn more at: [www.fertilitypedia.org/edu/therapies/fertility-preservation](http://www.fertilitypedia.org/edu/therapies/fertility-preservation)

**Hormone replacement therapy**
Learn more at: [www.fertilitypedia.org/edu/therapies/hormone-replacement-therapy](http://www.fertilitypedia.org/edu/therapies/hormone-replacement-therapy)

**Sperm donation**
The procedure in which a man (sperm donor) provides his sperm for fertility treatment.  
Learn more at: [www.fertilitypedia.org/edu/therapies/sperm-donation](http://www.fertilitypedia.org/edu/therapies/sperm-donation)

**Standard IVF**
A process in which an egg is fertilised by sperm outside the body: in vitro. Own or donated gametes may be used.  
Learn more at: [www.fertilitypedia.org/edu/therapies/standard-ivf](http://www.fertilitypedia.org/edu/therapies/standard-ivf)

**Surrogacy**
The embryo is gestated in a third party’s (surrogate) uterus.  
Learn more at: [www.fertilitypedia.org/edu/therapies/surrogacy](http://www.fertilitypedia.org/edu/therapies/surrogacy)

---

**Symptoms of menopause**
*The most common symptoms and signs of menopause.*

<table>
<thead>
<tr>
<th>Symptoms of Menopause</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Psychological</strong></td>
</tr>
<tr>
<td>- Dizziness</td>
</tr>
<tr>
<td>- Interrupted sleeping patterns</td>
</tr>
<tr>
<td>- Anxiety</td>
</tr>
<tr>
<td>- Poor memory</td>
</tr>
<tr>
<td>- Inability to concentrate</td>
</tr>
<tr>
<td>- Depressive mood</td>
</tr>
<tr>
<td>- Irritability</td>
</tr>
<tr>
<td>- Mood swings</td>
</tr>
<tr>
<td>- Less interest in sexual activity</td>
</tr>
<tr>
<td><strong>Transitional menstruations</strong></td>
</tr>
<tr>
<td>- Shorter or longer cycles</td>
</tr>
<tr>
<td>- Bleeding between periods</td>
</tr>
<tr>
<td><strong>Vaginal</strong></td>
</tr>
<tr>
<td>- Dryness</td>
</tr>
<tr>
<td>- Painful intercourse</td>
</tr>
</tbody>
</table>

**Vaginal Canal vs**
*Vaginal canal, normal vs. menopause*
Age and Bone Mass

Bone loss due to menopause occurs due to changes in a woman’s hormone levels.

Schematic depicting biocultural life course factors

Schematic depicting biocultural life course factors influencing, and varying with, ovarian steroid concentration and ovarian reserve, which in turn influence the timing and experience of menopause.

Vaginal Mucosa Normal vs

Sources

“Pathogenesis and stem cell therapy for premature ovarian failure (http://www.oapublishinglondon.com/abstract/1214)” —by Dan et al. licensed under CC BY 4.0

“Menopause (http://worldheritage.org/article/WHEBN0000049611/Menopause)” —sourced from World Heritage Encyclopedia licensed under CC BY-SA 3.0

“Menopause (https://en.wikipedia.org/wiki/Menopause)” —sourced from Wikipedia licensed under CC BY-SA 3.0

“Menopause (https://medanth.wikispaces.com/Menopause)” —sourced from Medical Anthropology Wiki licensed under CC BY-SA 3.0

“XY Chromosome in Acute Lymphocytic Leukemia Female with Secondary Amenorrhea (http://www.symbiosisonlinepublishing.com/cancerscience-research/cancerscience-research13.php)” —by Al-Jaroudi and Hijazi licensed under CC BY 3.0

“Menopause & Menstrual disorders (http://obgconsult.wikispaces.com/Menopause+%26+Menstrual+disorders)” —sourced from OBGconsult licensed under CC BY-SA 3.0

“Premature ovarian failure (https://www.researchgate.net/publication/7059365_Premature_ovarian_failure)” —by Beck-Peccoz and Persani licensed under CC BY 2.0

“Postmenopausal Motherhood Reloaded: Advanced Age and In Vitro Derived Gametes (http://onlinelibrary.wiley.com/doi/10.1111/hypa.12151/full)” —by Cutas and Smajdor licensed under CC BY 4.0
Hormone replacement therapy
(menopause) —sourced from Wikipedia licensed under CC BY-SA 3.0

The Comparison of Tibolone and Hormone Replacement Therapy on Bone Densitometry and Bone Turnover in Postmenopausal Women —by Heidari et al. licensed under CC BY-NC 4.0

Selective estrogen receptor modulator —sourced from Wikipedia licensed under CC BY-SA 3.0

Severity of Menopausal Symptoms and Related Factors Among 40 to 60 Year-Old Women —by Nasiri licensed under CC BY-NC 4.0

Association between physical activity and menopausal symptoms in perimenopausal women —by Kim et al. licensed under CC BY 4.0

Prevalence and Severity of Menopausal Symptoms and Related Factors Among Women 40-60 Years in Kashan, Iran —by Abedzadeh-Kalahroudi et al. licensed under CC BY-NC 4.0

Menopause —sourced from Wikipedia licensed under CC0 1.0

Menopause —sourced from Wikipedia licensed under CC BY-SA 4.0

Menopause —sourced from Wikipedia licensed under CC BY 3.0

Vaginal Mucosa Normal vs Menopause —by BruceBlaus licensed under CC BY-SA 4.0