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About Eye Cancer

Overview and Types

If you have been diagnosed with eye cancer or are worried about it, you likely have a lot of questions. Learning some basics is a good place to start.

- [What Is Eye Cancer?](#)

Research and Statistics

See the latest estimates for new cases of eye cancer and deaths in the US and what research is currently being done.

- [Key Statistics for Eye Cancer](#)
 - [What's New in Eye Cancer Research?](#)
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What Is Eye Cancer?

Eye cancer can refer to any cancer that starts in the eye. Cancer starts when cells begin to grow out of control. (To learn about how cancers start and spread, see [What Is Cancer?](#)¹)

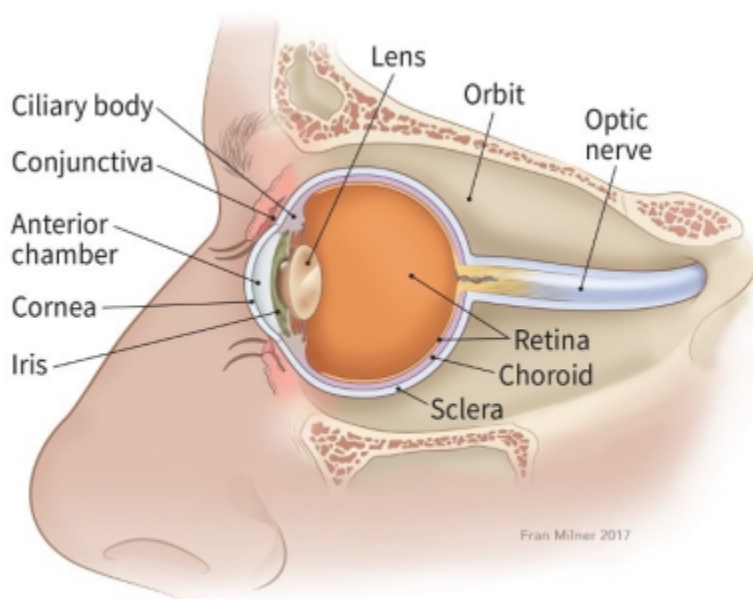
The most common type of eye cancer is melanoma. But there are other types of cancer that affect different kinds of cells in the eye.

Where eye cancers start

The eye has 3 major parts:

- the eyeball (globe) that is mostly filled with a jelly-like material called vitreous humor and has 3 main layers (the sclera, the uvea, and the retina)
- the orbit (the tissues surrounding the eyeball)
- the adnexal (accessory) structures such as the eyelids and tear glands.

Different types of cancer start in each of these areas.



Cancers in the eye (intraocular cancers)

Cancers that affect the eye itself are called *intraocular* (within the eye) cancers.

Cancers that start in the eye are called *primary intraocular cancers*, and *secondary intraocular cancers* if they start somewhere else and spread to the eye.

In adults, the most common **primary intraocular cancers** are:

- Melanoma (Intraocular melanoma is the focus of our information on eye cancer)
- Non-Hodgkin lymphoma (See [Non-Hodgkin Lymphoma \(NHL\)](#)² for more information on primary intraocular lymphoma.)

In children, the most common primary intraocular cancers are:

- Retinoblastoma, a cancer that starts in cells in the retina (the light-sensing cells in the back of the eye)
- Medulloepithelioma (This is the second most common, but is still extremely rare.)

These childhood cancers are discussed in [Retinoblastoma](#)³.

Secondary intraocular cancers (cancers that start somewhere else in the body and then spread to the eye) are not truly “eye cancers,” but they are actually more common than primary intraocular cancers. The most common cancers that spread to the eye are [breast](#)⁴ and [lung cancers](#)⁵. Most often these cancers spread to the part of the eyeball called the *uvea*.

Intraocular melanoma (melanoma of the eye)

Intraocular melanoma is the most common type of cancer that develops within the eyeball in adults, but it is still fairly rare. Melanomas that start in the skin are much more common than melanomas that start in the eye. Melanomas develop from pigment-making cells called *melanocytes*. When melanoma develops in the eye, it is usually in the uvea (*uveal melanomas*) and rarely in the conjunctiva (*conjunctival melanomas*).

Uveal melanomas

The uvea is the middle layer of the eyeball. It has 3 main parts:

- The **iris** is the colored part of the eye (most often blue or brown). It surrounds the pupil, the small opening where light enters the eyeball.
- The **choroid** is a thin, pigmented layer lining the eyeball that nourishes the retina and the front of the eye with blood.
- The **ciliary body** contains the muscles inside the eye that change the shape of the lens so that the eye can focus on near or distant objects. It also has cells that make aqueous humor, the clear fluid in the front of the eye between the cornea and the lens.

About 9 out of 10 intraocular melanomas develop in the choroid or ciliary body. Choroid cells make the same kind of pigment as melanocytes in the skin, so it's not surprising that these cells sometimes form melanomas.

Most of the other intraocular melanomas start in the iris. These are the easiest for a person (or their doctor) to see because they often start in a dark spot on the iris that has been present for many years and then begins to grow. These melanomas usually are slow growing, and they rarely spread to other parts of the body. For these reasons, people with iris melanomas generally have a good prognosis (outlook).

Uveal melanomas can spread through the blood and commonly spread to the liver.

Conjunctival melanomas

The conjunctiva is a thin clear covering over the sclera. (The sclera is the tough, white covering over most of the outside of the eyeball. In the front of the eye it is continuous with the cornea, which is clear to let light through.)

These melanomas are extremely rare. They tend to be more aggressive and grow into nearby structures. Because they can spread through the blood and the lymph system, they can also spread to distant organs like the lungs, liver, or brain where the cancer can become life-threatening.

Orbital and adnexal cancers

The *orbit* consists of the tissues surrounding the eyeball. These include muscles that move the eyeball in different directions and the nerves attached to the eye. Cancers of these tissues are called *orbital cancers*.

Adnexal (accessory) structures include the eyelids and tear glands. Cancers that develop in these tissues are called *adnexal cancers*.

Cancers of the orbit and adnexa develop from tissues such as muscle, nerve, and skin around the eyeball and are like cancers in other parts of the body. For example:

- Cancers of the eyelid are usually skin cancers. (See [Melanoma Skin Cancer](#)⁶ or [Skin Cancer: Basal and Squamous Cell](#)⁷.)
- For cancer affecting the eye muscles, see [Rhabdomyosarcoma](#)⁸.
- Lymphomas that start in the eye are discussed in [Non-Hodgkin Lymphoma](#)⁹.

Hyperlinks

1. www.cancer.org/cancer/cancer-basics/what-is-cancer.html
2. www.cancer.org/cancer/non-hodgkin-lymphoma.html

3. www.cancer.org/cancer/retinoblastoma.html
4. www.cancer.org/cancer/breast-cancer.html
5. www.cancer.org/cancer/lung-cancer.html
6. www.cancer.org/cancer/melanoma-skin-cancer.html
7. www.cancer.org/cancer/basal-and-squamous-cell-skin-cancer.html
8. www.cancer.org/cancer/rhabdomyosarcoma.html
9. www.cancer.org/cancer/non-hodgkin-lymphoma.html

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Key Statistics for Eye Cancer

The American Cancer Society's estimates for eye cancer in the United States for 2019 are:

- 3,360 new cancers (mainly melanomas) of the eye and orbit: 1,860 in men and 1,500 in women
- 370 deaths from cancers of the eye and orbit: 200 in men and 170 in women

Primary eye cancers can occur at any age, but the risk for most types increases as people get older. The rate of uveal melanomas has been fairly stable over the past few decades, but the rate of conjunctival melanomas has increased. Cancers that spread to the eye from another part of the body (secondary eye cancers) are actually more common than primary eye cancers.

Most cancers of the eye and orbit in adults are melanomas, but this cancer starts more often in other parts of the body. More than 9 out of 10 melanomas start in the skin.

Melanoma of the eye is much more common in whites than blacks, and is slightly more common in men than women.

For statistics on survival, see [Eye Cancer Survival Rates](#)¹.

Visit the [American Cancer Society's Cancer Statistics Center](#)² for more key statistics.

Hyperlinks

1. www.cancer.org/cancer/eye-cancer/detection-diagnosis-staging/survival-rates.html
2. <https://cancerstatisticscenter.cancer.org/>

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American Cancer Society. *Cancer Facts & Figures 2019*. Atlanta, Ga: American Cancer Society; 2019.

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What's New in Eye Cancer Research?

Many medical centers around the world are doing research on the causes and treatment of eye cancers. These are challenging diseases to study because they are not common. But each year scientists find out more about what causes them and how to improve treatment.

Genetics

Learning more about the gene changes that make eye cancer cells different from normal cells will likely play an important role in treating eye melanomas in the future.

Using genes to help find people at higher risk

As we learn about the gene changes in these cancers, we may be able to develop tests to identify people who are more likely to get them and then carefully screen those people.

For example, in recent years, researchers have found that some families have a change (mutation) in the *BAP1* gene that makes them more likely to develop melanoma of the eye. While this gene change affects only a small portion of people with eye melanoma, researchers might be able to study it to learn more about how eye melanomas develop.

Using genes to help predict prognosis (outlook)

The genetic changes in tumors may also help predict the likelihood of them spreading. For example, in uveal melanoma, certain genetic changes, such as the loss of one copy of chromosome 3, have been linked to an increased risk of cancer spread.

Recently, researchers have found that patterns of gene expression in tumor cells appear to be an even better way to tell if an eye melanoma is likely to spread. Based on these gene patterns, a little more than half of eye melanomas are shown to be “Class 1” tumors. These cancers have a low risk of spreading. The remaining eye melanomas fall into the “Class 2” category, which have a very high risk of spreading.

Some doctors now offer a test (DecisionDx-UM) for these gene changes, and some patients may want to have them to learn if their cancer is likely to spread. If a patient is found to be at high risk, the doctor might follow them more closely to try to detect cancer spread as early as possible. But other doctors are not as keen on using the test at this time, because we don't yet have proven ways to prevent the cancer spread or alter the

outcome in people who are in the high risk group.

Using genes to help find new treatments

Identifying gene changes in eye cancer cells might also provide specific targets for newer drugs. For example, most eye melanomas have changes in either of 2 related genes, *GNAQ* or *GNA11*. The proteins made by these genes are part of the *MAPK* signaling pathway inside cells that helps them grow. It's not yet clear if drugs will be able to target these proteins directly, but drugs that target other proteins in the *MAPK* pathway are now being studied for use against eye melanomas, and some have shown early promising results. (See "Targeted therapy" below.)

New tests for eye cancer

A new type of biopsy called a liquid biopsy is being looked at more often. Instead of having to make a cut or put a needle into the eye, melanoma tumor cells can be collected from a blood sample. These cancer cells can then be tested for certain traits, including genetic changes, that can help predict how likely the cancer is to spread or come back after treatment.. Liquid biopsies might help diagnose tumor spread earlier, or help the doctors know if treatment is working. This could be very helpful in people who did not have a biopsy of the tumor and want to preserve their vision. However, the equipment needed for this test is not readily available so this type of biopsy is not done routinely and is mainly done as part of a clinical trial.

Advances in treatment

Immunotherapy

Immunotherapies are treatments that boost the body's immune system to try to get it to attack the cancer. Cytokines, monoclonal antibodies, cancer vaccines, and other immunotherapies are among the most promising approaches for treating melanoma. Although most clinical trials of these treatments include people with melanomas of the skin, results of these studies might help treat people with eye melanomas as well.

One example is ipilimumab (Yervoy), a type of drug called a *monoclonal antibody* that boosts the overall activity of the immune system. This has been shown to help some people with advanced melanomas of the skin live longer, although it can also have some serious side effects. Newer drugs such as nivolumab and pembrolizumab (Keytruda), which boost the immune response against cancer cells in a slightly different way, have shown even better results against skin melanomas. Sometimes giving two of

these drugs together works better than just one drug alone. Initial studies of all these drugs in uveal eye melanoma have shown some benefit. More clinical trials are needed.

Targeted therapy

As researchers have learned more about some of the changes in cells that cause them to become cancer, they have begun to develop drugs that target these changes. These new targeted drugs work differently from standard chemo drugs. They might work in some cases when chemo drugs don't, and they tend to have different side effects than chemotherapy.

Most eye melanomas have changes in the *GNAQ* or *GNA11* genes. Proteins made by these genes are part of the *MAPK* gene signaling pathway that helps cells grow. Selumetinib is a drug that targets the *MEK* protein, which is also part of the *MAPK* pathway. Selumetinib has been shown to slow the growth of advanced eye melanomas in one clinical trial, but other studies have had disappointing results. The role of selumetinib in treating eye melanoma is not clear and for now, this drug is only available through [clinical trials](#)¹.

Some newer drugs, such as vemurafenib, dabrafenib, and trametinib, target cells with a mutation in the *BRAF* gene. This mutation is found in about half of patients with skin melanoma, but only in about 5% of patients with conjunctival eye melanoma. Still, these or similar drugs might help people whose cancer cells have these mutations.

IMCgp100 is a new drug that attaches to two proteins at the same time to kill cancer cells. It shows promising results in people with advanced uveal melanoma. More research is being done.

Many targeted drugs are already used to treat other types of cancer. Some of them are now being studied for use against melanoma of the eye as well, including sunitinib, sorafenib, vorinostat , and everolimus.

Hyperlinks

1. www.cancer.org/treatment/treatments-and-side-effects/clinical-trials.html

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Eye Cancer Causes, Risk Factors, and Prevention

Risk Factors

A risk factor is anything that affects your chance of getting a disease such as cancer. Learn more about the risk factors for eye cancer.

- [Risk Factors for Eye Cancer](#)
- [What Causes Eye Cancer?](#)

Prevention

There is no way to completely prevent eye cancer, but there may be things you can do that might lower your risk.

- [Can Eye Cancer Be Prevented?](#)

Risk Factors for Eye Cancer

A risk factor is anything that increases your chance of getting a disease such as cancer. Different cancers have different risk factors. Some risk factors, like smoking, can be changed. Others, like a person's age or family history, can't be changed.

But having a known risk factor, or even several risk factors, does not mean that you will

get the disease. And many people who get the disease may have few or no known risk factors.

Race/ethnicity

The risk of eye melanoma is much higher in whites than in African Americans, Hispanics or Asian Americans.

Eye color

People with light colored eyes are somewhat more likely to develop uveal melanoma of the eye than are people with darker eye and skin color.

Age and gender

Eye melanomas can occur at any age, but the risk goes up as people get older. Eye melanoma is slightly more common in men than in women.

Certain inherited conditions

People with *dysplastic nevus syndrome*, who have many abnormal moles on the skin, are at increased risk of skin melanoma. They also seem to have a higher risk of developing melanoma of the eye.

People with abnormal brown spots on the uvea (known as *oculodermal melanocytosis* or *nevus of Ota*) also have an increased risk of developing uveal eye melanoma.

BAP1 cancer syndrome is a rare inherited condition in which family members are at increased risk for uveal eye melanoma, as well as [melanoma of the skin](#),¹ [malignant mesothelioma](#)², [kidney cancer](#)³ and and others. This condition is caused by an inherited mutation (change) in the *BAP1* gene and tends to form aggressive cancers that appear at younger ages.

Moles

Different types of moles (nevi) in the eye or on the skin have been associated with an increased risk of uveal eye melanoma. In the eye, these include choroidal, giant choroidal, and iris nevi; on the skin, atypical nevi, common nevi of the skin, and freckles. An eye condition, known as primary acquired melanosis (PAM), where the melanocytes

in the eye grow too much, is a risk factor for conjunctival melanoma.

Family history

Uveal eye melanomas can run in some families, but this is very rare and the genetic reasons for this are still being investigated.

Unproven risk factors

Sun exposure: Too much exposure to sunlight (or sunlamps), a known risk factor for melanoma of the skin, has also been proposed as a possible risk factor for uveal or conjunctival melanoma of the eye, but studies so far have shown mixed results. More research is needed to answer this question.

Certain occupations: Some studies have suggested that welders may have a higher risk of uveal eye melanoma (of the choroid and ciliary body), but more studies are being done.

Skin melanoma: Some patients with uveal eye melanoma have a history of melanoma of the skin, but it is still not known if having skin melanoma increases your risk of eye melanoma.

Hyperlinks

1. www.cancer.org/cancer/melanoma-skin-cancer.html
2. www.cancer.org/cancer/malignant-mesothelioma.html
3. www.cancer.org/cancer/kidney-cancer.html

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What Causes Eye Cancer?

The exact cause of most eye cancers is not known. But scientists have found that the disease is linked with some other conditions, which are described in [Risk Factors for](#)

Eye Cancer. A great deal of research is being done to learn more about the causes.

Scientists are learning how certain changes in the DNA inside cells can cause the cells to become cancer. DNA is the chemical in each of our cells that makes up our *genes*, the instructions for how our cells function. We usually look like our parents because they are the source of our DNA. But DNA can also influence our risk for developing certain diseases, such as some kinds of cancer.

Some genes control when our cells grow, divide into new cells, and die.

- Genes that help cells grow, divide, or stay alive are called *oncogenes*.
- Genes that slow down cell division or cause cells to die at the right time are called *tumor suppressor genes*.

Cancers can be caused by DNA changes that turn on oncogenes or turn off tumor suppressor genes.

Some people with cancer have DNA changes they inherited from a parent that increase their risk for the disease. For example, some people inherit a mutation (change) in the *BAP1* tumor suppressor gene, which raises their risk of eye melanoma and some other cancers. When the *BAP1* gene is mutated, it doesn't work normally, which can allow cells with this change to grow out of control.

Most DNA changes linked to cancer are acquired during a person's life rather than inherited before birth. For example, about half of uveal eye melanomas have changes in either of 2 related oncogenes, *GNA11* or *GNAQ*.

Scientists are studying these and other DNA changes to learn more about them and how they might lead to eye cancer. But it is still not exactly clear what causes these changes to occur in some people and not others.

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Can Eye Cancer Be Prevented?

We do not yet know [what causes most eye cancers](#), so it is not yet possible to prevent them.

We know there is a link between sunlight and melanomas of the skin, and there are [things you can do](#)¹ that might reduce your risk of these cancers, including limiting your exposure to intense sunlight, covering up with protective hats and clothing, and using sunscreen.

The American Cancer Society also recommends wearing UV-protected sunglasses when outside in strong sunlight. Wrap-around sunglasses with 99% to 100% UVA and UVB absorption provide the best protection for the eyes and the surrounding skin. This might help reduce the risk of developing cancers of the skin around the eyes. The link between sunlight and eye melanomas is not proven, but some doctors think that sunglasses might also reduce eye melanoma risk.

Hyperlinks

1. www.cancer.org/cancer/skin-cancer/prevention-and-early-detection.html

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Eye Cancer Early Detection, Diagnosis, and Staging

Detection and Diagnosis

Catching cancer early often allows for more treatment options. Some early cancers may have signs and symptoms that can be noticed, but that is not always the case.

- [Can Eye Cancer Be Found Early?](#)
- [Signs and Symptoms of Eye Cancer](#)
- [Tests for Eye Cancer](#)

Stages and Outlook (Prognosis)

After a cancer diagnosis, staging provides important information about the extent of cancer in the body and anticipated response to treatment.

- [Eye Cancer Stages](#)
- [Eye Cancer Survival Rates](#)

Questions to Ask About Eye Cancer

Here are some questions you can ask your cancer care team to help you better understand your cancer diagnosis and treatment options.

- [Questions to Ask About Eye Cancer](#)
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Can Eye Cancer Be Found Early?

Eye cancer is uncommon, and there are no widely recommended screening tests for this cancer in people at average risk. (Screening is testing for a disease like cancer in people without any symptoms.) Still, some eye cancers can be found early.

Some doctors may recommend yearly eye exams for those at [higher risk of eye melanoma](#)¹, such as people with dysplastic nevus syndrome or BAP1 cancer syndrome. Regular eye exams are an important part of everyone's health care, even if they have no symptoms. Often melanomas of the eye are found during a routine eye exam. When the doctor looks through the pupil at the back of the eye, he or she may see a dark spot that might be an early melanoma.

Many doctors feel that most melanomas start from a *nevus* (mole), which is a benign (non-cancerous) tumor of pigment cells. If an eye nevus is present, it should be looked at regularly by an ophthalmologist (a doctor who specializes in eye diseases). People who notice a dark spot on the colored part of their eye (the iris) should have a doctor look at it, especially if it is getting bigger.

Hyperlinks

1. www.cancer.org/cancer/eye-cancer/causes-risks-prevention/risk-factors.html

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Signs and Symptoms of Eye Cancer

Many people with eye melanoma don't have symptoms unless the cancer grows in certain parts of the eye or becomes more advanced. Other, less serious conditions can also cause many of these symptoms. For example, floaters can be a normal part of the aging process. Still, if you have any of these symptoms, it's important to see a doctor right away so the cause can be found and treated, if needed.

Signs and symptoms of eye melanomas can include:

- Problems with vision (blurry vision or sudden loss of vision)
- Floaters (spots or squiggles drifting in the field of vision) or flashes of light
- Visual field loss (losing part of your field of sight)
- A growing dark spot on the colored part of the eye (iris)
- Change in the size or shape of the pupil (the dark spot in the center of the eye)
- Change in position of the eyeball within its socket
- Bulging of the eye
- Change in the way the eye moves within the socket

Pain is rare unless the tumor has grown extensively outside the eye.

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Tests for Eye Cancer

Eye exam

Examination of the eye by an ophthalmologist (a medical doctor specializing in eye diseases) is often the most important first step in diagnosing melanoma of the eye. The doctor will ask if you are having any [symptoms](#) and check your vision and eye movement. The doctor will also look for enlarged blood vessels on the outside of the eye, which can be a sign of a tumor inside the eye.

The ophthalmologist may also use special instruments to get a good look inside the eye for a tumor or other abnormality. You may get drops in your eye to dilate the pupil before the doctor uses these instruments.

- An **ophthalmoscope** (also known as a *direct ophthalmoscope*) is a hand-held instrument consisting of a light and a small magnifying lens.
- To get a more detailed view than with a direct ophthalmoscope, an **indirect ophthalmoscope** or a **slit lamp** may be used. With either instrument, the doctor looks into your eye through a stronger magnified lens, but the slit lamp tends to have more magnification and sits still on a platform in front of you. With an indirect ophthalmoscope, the doctor has you recline a bit, opens your eye, and holds the magnifying lens very close to it while a bright light shines into the eye.
- A **gonioscopy lens** is a specially mirrored lens that is placed on the cornea (the outer part of the eye) after it is numbed. It can be used to look for tumor growth into areas of the eye that would otherwise be hard to see.

Even if you recently had an eye exam, if you start to have any symptoms, get another exam. Sometimes these tumors are missed or grow so fast that they weren't there when you were last examined.

If an eye exam suggests you might have eye cancer, more tests such as imaging tests or other procedures might be done to confirm the diagnosis.

Imaging tests

Imaging tests use sound waves, x-rays, or magnetic fields, or radioactive particles to create pictures of the inside of your body. These tests might be done for a number of reasons, including:

- To help find a suspicious area that might be cancer
- To help determine the [stage](#)(extent) of the cancer
- To help show if treatment is working
- To look for possible signs of [cancer coming back](#)¹after treatment

Ultrasound

[Ultrasound](#)²is a very common test used to help diagnose eye melanomas. Ultrasound uses sound waves and their echoes to make pictures of internal organs or masses. For this test, a small wand-like instrument is placed up against the eyelid or eyeball, sends sound waves through the eye, and picks up the echoes as they bounce off the organs. The echoes are converted into an image on a computer screen.

This test is especially useful for diagnosing eye melanomas because they look a certain way on ultrasound. Using this test, doctors can confirm a diagnosis of melanoma of the eye in most cases. This test can also show the location and the size of the tumor. If you have already been diagnosed with eye melanoma, an ultrasound of your abdomen may be done to look for tumors in the liver, which is a common site of spread of this cancer.

Ultrasound biomicroscopy (UBM): This is a special type of ultrasound that uses high-energy sound waves to create very detailed images of the front parts of the eye.

Optical coherence tomography (OCT)

This test is similar to an ultrasound, but it uses light waves instead of sound waves to create very detailed images of the back of the eye.

Fluorescein angiography

For this test, an orange fluorescent dye (fluorescein) is injected into the bloodstream through a vein in the arm. Pictures of the back of the eye are then taken using a special light that makes the dye fluoresce (glow). This lets the doctor see the blood vessels inside the eye. Although melanomas don't have a special appearance with this test, some other eye problems do. Doctors can use this method to tell if something is not a melanoma.

Chest x-ray

If you have been diagnosed with eye melanoma, an [x-ray of your chest](#)³ may be done to see if the cancer has spread to your lungs.

Computed tomography (CT) scan

A [CT scan](#)⁴ combines many x-rays to make detailed cross-sectional images of parts of the body. This scan is sometimes used to see if a melanoma has spread outside of the eye into nearby structures. It may also be used to look for spread of the cancer to distant organs such as the liver.

Magnetic resonance imaging (MRI) scan

[MRI scans](#)⁵ are particularly useful for looking at eye tumors and spread of tumor outside the eye orbit in places like the liver. MRIs provide detailed images of soft tissues in the body, but use radio waves and strong magnets instead of x-rays.

Biopsy

For most types of cancer, the diagnosis is made by removing a small piece of the tumor and looking at it in the lab for cancer cells. This is known as a [biopsy](#)⁶.

A biopsy is often not needed to diagnose eye melanomas because almost all cases can be accurately diagnosed by the eye exam and imaging tests. Sometimes, a biopsy may be useful to check for certain gene mutations (changes) that can predict outcomes (prognosis) as well as help choose targeted drugs for your cancer. Also, certain eye melanomas can spread for many years before they are diagnosed so doing a biopsy of a worrisome area early may be helpful.

If a biopsy is needed, it can be done either with sedation and local anesthesia (numbing

medicine) or while a person is under general anesthesia (in a deep sleep). Different types of biopsies can be done for eye melanoma depending on where it is located including:

- A [FNA](#)⁷ (fine needle aspiration): Using a thin needle to remove a small sample of aqueous humor (the liquid between the cornea and the lens)
- An [incisional or excisional biopsy](#)⁸ (cutting out either part of or all of the tumor)
- A fine needle biopsy of the tumor: Cells from the tumor are sucked up into a syringe through a small needle and examined in the lab.

Newer techniques help to lower the chances of tumor cells leaking and spreading along the needle path during these biopsies so the cancer doesn't spread within or outside the eye.

While most people with melanoma of the eye are treated without having a biopsy first, your doctor may recommend a biopsy depending on your specific situation. They can discuss the risks and benefits of the procedure they feel is best for you. Some doctors have started using biopsies to get a sample of the tumor for gene testing (DecisionDx-UM). They have found that certain patterns of genes in tumor cells are a good way to tell if an eye melanoma is likely to spread. Based on these gene patterns, a little more than half of eye melanomas are shown to be Class 1 (1A or 1B) tumors which have a low risk of spreading. The remaining eye melanomas fall into the Class 2 category, which have a very high risk of spreading. See [What's New in Eye Cancer Research?](#)⁹ for more information.

Liquid biopsy

A new type of biopsy called a liquid biopsy is being looked at more often. Instead of having to make a cut or put a needle into the eye, melanoma tumor cells can be collected from a blood sample. These cancer cells can then be tested for certain traits, including genetic changes, that can help predict how likely the cancer is to spread or come back after treatment.. Liquid biopsies might help diagnose tumor spread earlier, or help the doctors know if treatment is working. This could be very helpful in people who did not have a biopsy of the tumor and want to preserve their vision. However, the equipment needed for this test is not readily available so this type of biopsy is not done routinely and is mainly done as part of a clinical trial.

Blood tests

Blood tests can't be used to diagnose melanoma of the eye, but they may be done once

a diagnosis is made.

Liver function tests

If you have been diagnosed with eye melanoma, your doctor may order blood tests to see how well your liver is working. Abnormal test results can sometimes be a sign that the cancer has spread to the liver.

Hyperlinks

1. www.cancer.org/treatment/survivorship-during-and-after-treatment/understanding-recurrence.html
2. www.cancer.org/treatment/understanding-your-diagnosis/tests/ultrasound-for-cancer.html
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Eye Cancer Stages

After someone is diagnosed with eye cancer, doctors will try to figure out if it has spread, and if so, how far. This process is called **staging**. The stage of a cancer describes how much cancer is in the body. It helps determine how serious the cancer is and how best to [treat](#)¹ it. Doctors also use a cancer's stage when talking about survival statistics.

How is the stage determined?

The cancer stage is determined from the results of eye exams, imaging tests (ultrasound, CT or MRI scan, etc.) and other tests. ([See Tests for Eye Cancer.](#))

A staging system is a standard way for the cancer care team to describe how far a cancer has spread. The most common systems used to describe the stages of eye melanomas are the American Joint Committee on Cancer (AJCC) TNM system and the system used by the Collaborative Ocular Melanoma Study (COMS) group.

AJCC TNM staging system for melanoma of the eye

Most eye melanomas start in the uvea, which includes the iris, ciliary body, and choroid. (See [What Is Eye Cancer?](#)²) The system below is for these **uveal melanomas**.

Less often, melanomas can start in other areas in or around the eye, some of which have their own staging systems (such as conjunctival melanoma). Talk to your doctor to learn more about your stage if you have a less common type of eye melanoma.

The system described below is the most recent AJCC system, effective January 2018.

The TNM system is based on 3 key pieces of information:

- The size and extent of the main **tumor (T)**: How large is the eye tumor? Has it invaded into nearby structures?
- The spread to nearby lymph **nodes (N)**: Has the cancer spread to the nearby lymph nodes around the ear or neck? Has the cancer spread to (not grown into) other parts of the eye?
- The spread (**metastasis**) to distant sites (**M**): Has the cancer spread to distant parts of the body? (The most common site of spread is the liver.)

Numbers or letters appear after T, N, and M to provide more details about each of these factors. Higher numbers or letters mean the cancer is more advanced.

The T categories for iris melanomas are different from the T categories for ciliary body and choroidal melanomas. But the N and M categories are the same for melanomas in all 3 parts of the uvea.

T categories for iris melanoma

TX: The primary tumor cannot be assessed; information not known.

T0: No evidence of a primary tumor.

T1: Tumor is only in the iris.

- **T1a:** The tumor is only in the iris and touches 1/4 or less of the iris.
- **T1b:** The tumor is only in the iris and touches more than 1/4 of the iris.
- **T1c:** The tumor is only in the iris and is causing an increase in the eye pressure (glaucoma).

T2: Tumor has grown into the ciliary body or choroid (or both).

- **T2a:** Tumor has grown into the ciliary body.
- **T2b:** Tumor has grown into the ciliary body and choroid.
- **T2c:** Tumor has grown into the ciliary body, choroid, or both, and it is causing glaucoma.

T3: Tumor has grown into the ciliary body and/or choroid and into the sclera.

T4: Tumor extends outside the eyeball.

- **T4a:** The part of the tumor that is outside the eyeball is 5 millimeters (mm) — about 1/5 of an inch — or less across.
- **T4b:** The part of the tumor that is outside the eyeball is greater than 5 mm (about 1/5 of an inch) across.

T categories for ciliary body and choroidal melanoma

Ciliary body and choroidal melanomas are divided into 4 main T categories (T1 to T4), based on the diameter (width) and the thickness of the tumor. T1 tumors are the smallest; T4 tumors are the largest. Each of these categories is then broken down further, based on how far the tumor has grown.

TX: The primary tumor cannot be assessed; information not known.

T0: No evidence of a primary tumor.

T1 tumors:

- **T1a:** The T1-size tumor is not growing into the ciliary body or growing outside the eyeball.
- **T1b:** The T1-size tumor is growing into the ciliary body.
- **T1c:** The T1-size tumor is not growing into the ciliary body but is growing outside of the eyeball. The part of the tumor that is outside the eyeball is 5 mm (about 1/5 of an inch) or less across.
- **T1d:** The T1-size tumor is growing into the ciliary body and also outside of the eyeball. The part of the tumor that is outside the eyeball is 5 mm (about 1/5 of an inch) or less across.

T2 tumors:

- **T2a:** The T2-size tumor is not growing into the ciliary body or growing outside the eyeball.
- **T2b:** The T2-size tumor is growing into the ciliary body.
- **T2c:** The T2-size tumor is not growing into the ciliary body but is growing outside the eyeball. The part of the tumor that is outside the eyeball is 5 mm (about 1/5 of an inch) or less across.
- **T2d:** The T2-size tumor is growing into the ciliary body and also outside the eyeball. The part of the tumor that is outside the eyeball is 5 mm (about 1/5 of an inch) or less across.

T3 tumors:

- **T3a:** The T3-size tumor is not growing into the ciliary body and is not growing outside the eyeball.
- **T3b:** The T3-size tumor is growing into the ciliary body.
- **T3c:** The T3-size tumor is not growing into the ciliary body but is growing outside the eyeball. The part of the tumor that is outside the eyeball is 5 mm (about 1/5 of an inch) or less across.
- **T3d:** The T3-size tumor is growing into the ciliary body and also outside the eyeball. The part of the tumor that is outside the eyeball is 5 mm (about 1/5 of an inch) or less across.

T4 tumors:

- **T4a:** The T4-size tumor is not growing into the ciliary body or growing outside the eyeball.
- **T4b:** The T4-size tumor is growing into the ciliary body.
- **T4c:** The T4-size tumor is not growing into the ciliary body but is growing outside the eyeball. The part of the tumor that is outside the eyeball is 5 mm (about 1/5 of an inch) or less across.
- **T4d:** The T4-size tumor is growing into the ciliary body and also outside the eyeball. The part of the tumor that is outside the eyeball is 5 mm (about 1/5 of an inch) or less across.

T4e: The tumor can be any size. It is growing outside the eyeball and the part of the tumor that is outside the eyeball is greater than 5 mm across.

N categories for iris, ciliary body, and choroidal melanomas

NX: Lymph nodes cannot be assessed.

N0: Cancer has not spread to nearby lymph nodes.

N1: Cancer has spread to nearby lymph nodes, or it has spread as small cancer deposits in other parts of the eye.

- **N1a:** Cancer has spread to nearby lymph nodes.
- **N1b:** Cancer has not spread to nearby lymph nodes, but it has spread as small cancer deposits in other parts of the eye.

M categories for iris, ciliary body, and choroidal melanomas

M0: Cancer has not spread to distant parts of the body.

M1: Cancer has spread to distant parts of the body.

- **M1a:** The largest area of cancer spread is no more than 3 centimeters (cm) — a little over an inch — across.
- **M1b:** The largest area of cancer spread is between 3.1 and 8 cm across (8 cm is a little over 3 inches).
- **M1c:** The largest area of cancer spread is 8.1 cm or more across.

Stage grouping

To assign an overall stage, the T, N, and M categories are combined in a process called **stage grouping**. The stages are described by Roman numerals from I (the least advanced) to IV (the most advanced). Some stages are further divided with letters.

Stage I T1a, N0, M0

Stage IIA T1b to T1d, N0, M0 **OR** T2a, N0, M0

Stage IIB T2b or T3a, N0, M0

Stage IIIA T2c or T2d, N0, M0 **OR** T3b or T3c, N0, M0 **OR** T4a, N0, M0

Stage IIIB T3d, N0, M0 **OR** T4b or T4c, N0, M0

Stage IIIC T4d or T4e, N0, M0

Stage IV Any T, N1, M0 **OR** Any T, any N, M1

This staging system for uveal melanoma can be very complex. If you're interested in learning more about it and how it might apply to your cancer, ask your doctor to explain it to you in a way you understand.

Collaborative Ocular Melanoma Study (COMS) staging of melanoma of the eye

The TNM system is very detailed, but in practice doctors may use the simpler staging system devised by the COMS group, which has done most of the clinical research on how to treat intraocular melanoma. This system divides eye melanomas into small, medium, and large:

- **Small:** Between 1 mm and 3 mm in height and between 5 mm and 16 mm across
- **Medium:** Between 3.1 mm and 8 mm in height and no more than 16 mm across
- **Large:** More than 8 mm in height or more than 16 mm across

Hyperlinks

1. www.cancer.org/cancer/eye-cancer/treating.html
2. <https://www.cancer.org/cancer/eye-cancer/about/what-is-eye-cancer.html>

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Eye Cancer Survival Rates

Survival rates can give you an idea of what percentage of people with the same type and stage of cancer are still alive a certain amount of time (usually 5 years) after they were diagnosed. They can't tell you how long you will live, but they may help give you a better understanding of how likely it is that your treatment will be successful.

Keep in mind that survival rates are estimates and are often based on previous outcomes of large numbers of people who had a specific cancer, but they can't predict what will happen in any particular person's case. These statistics can be confusing and may lead you to have more questions. Talk with your doctor about how these numbers may apply to you, as he or she is familiar with your situation.

What is a 5-year relative survival rate?

A **relative survival rate** compares people with the same type and stage of cancer to people in the overall population. For example, if the **5-year relative survival rate** for a specific stage of eye cancer is 80%, it means that people who have that cancer are, on average, about 80% as likely as people who don't have that cancer to live for at least 5 years after being diagnosed.

Where do these numbers come from?

The American Cancer Society relies on information from the SEER* database, maintained by the National Cancer Institute (NCI), to provide survival statistics for different types of cancer.

The SEER database tracks 5-year relative survival rates for eye cancer (melanoma) in the United States, based on how far the cancer has spread. The SEER database, however, does not group cancers by [AJCC TNM stages](#) (stage 1, stage 2, stage 3, etc.). Instead, it groups cancers into localized, regional, and distant stages:

- **Localized:** There is no sign that the cancer has spread outside of the eye.
- **Regional:** The cancer has spread outside the eye to nearby structures or lymph nodes.
- **Distant:** The cancer has spread to distant parts of the body, such as the liver.

5-year relative survival rates for eye melanoma

(Based on people diagnosed with melanoma of the eye between 2008 and 2014.)

SEER stage	5-year relative survival rate
Localized	85%
Regional	66%
Distant	19%
All SEER stages combined	82%

Understanding the numbers

- **These numbers apply only to the stage of the cancer when it is first diagnosed.** They do not apply later on if the cancer grows, spreads, or comes back after treatment.
- **These numbers don't take everything into account.** Survival rates are grouped based on how far the cancer has spread. But other factors, such as your age and overall health, [where in the eye the cancer starts](#)¹, and how well the cancer responds to treatment, can also affect your outlook.
- **People now being diagnosed with eye cancer may have a better outlook than these numbers show.** Treatments improve over time, and these numbers are based on people who were diagnosed and treated at least 5 years earlier.

*SEER = Surveillance, Epidemiology, and End Results

Hyperlinks

1. www.cancer.org/cancer/eye-cancer/about/what-is-eye-cancer.html

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Questions to Ask About Eye Cancer

It's important to have honest, open discussions with your cancer team. They want to answer all your questions, so that you can make informed treatment and life decisions. For instance, consider these questions:

When you're told you have eye cancer

- What [kind of eye cancer](#)¹ do I have?
- Has my cancer spread beyond the eye?
- What is the [stage](#) (extent) of my cancer, and what does that mean?
- Will I need any other tests before we can decide on treatment?
- Will I need to see any other types of doctors?
- Are there other factors that could affect my treatment options?
- If I'm concerned about the costs and insurance coverage for my diagnosis and treatment, who can help me?

When deciding on a treatment plan

- How much experience do you have treating this type of cancer?
- Should I get a second opinion? Can you recommend a doctor or cancer center?
- What [treatment choices](#)² do I have? What do you recommend and why?
- What is the goal of treatment (cure, prolonging life, relieving symptoms, etc.)?
- What are the risks or side effects to the treatments you suggest? What is the risk of losing vision in the eye from the different treatments?
- What should I do to be ready for treatment?
- How long will treatment last? What will it be like? Where will it be done?
- How will treatment affect my daily activities?
- What are the chances my cancer will come back (recur) after treatment?
- What would we do if the treatment doesn't work or if the cancer recurs?

During treatment

Once treatment begins, you'll need to know what to expect and what to look for. Not all of these questions may apply to you, but getting answers to the ones that do may be helpful.

- How will we know if the treatment is working?
- Is there anything I can do to help manage [side effects](#)³?
- What symptoms or side effects should I tell you about right away?
- How can I reach you on nights, holidays, or weekends?
- Are there any limits on what I can do?
- Can you suggest a mental health professional I can see if I start to [feel overwhelmed, depressed, or distressed](#)⁴?

After treatment

- What type of follow-up might I need after treatment?
- What symptoms should I watch for?
- How will we know if the eye cancer has come back? What would my options be if that happens?

Along with these sample questions, be sure to write down some of your own. For example, you might want more information about recovery times so you can plan your work or activity schedule. You might also want to ask about [clinical trials](#)⁵ for which you may qualify.

Keep in mind that doctors aren't the only ones who can give you information. Other health care professionals, such as nurses and social workers, may be able to answer some of your questions. You can find out more about speaking with your health care team in [The Doctor-Patient Relationship](#)⁶.

Hyperlinks

1. www.cancer.org/cancer/eye-cancer/about/what-is-eye-cancer.html
2. www.cancer.org/cancer/eye-cancer/treating.html
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Treating Eye Cancer

How is eye cancer treated?

Depending on the type and stage of the cancer and other factors, treatment options for eye cancer might include:

- [Surgery for Eye Cancer](#)
- [Radiation Therapy for Eye Cancer](#)
- [Laser Therapy for Eye Cancer](#)
- [Chemotherapy for Eye Cancer](#)
- [Targeted Drugs and Immunotherapy for Eye Cancer](#)

Common treatment approaches

Sometimes, more than one of type of treatment is used. In choosing the best treatment plan for you, some important factors to consider include the location and stage of the cancer, your overall health, the chances of curing the disease, and the possible effect of the treatment on vision.

- [Treating Eye Melanoma by Location and Size](#)

Who treats eye cancer?

Based on your treatment options, you may have different types of doctors on your treatment team. These doctors may include:

- An **ophthalmologist**: a doctor who specializes in treating diseases of the eye
- An **ocular oncologist**: a doctor (usually an ophthalmologist) who specializes in treating cancers of the eye

- A **radiation oncologist**: a doctor who treats cancer with radiation therapy
- A **medical oncologist**: a doctor who treats cancer with medicines such as chemotherapy and targeted therapy

Many other specialists may be involved in your care as well, including nurse practitioners, nurses, psychologists, social workers, rehabilitation specialists, and other health professionals.

- [Health Professionals Associated With Cancer Care](#)¹

Making treatment decisions

It is important to discuss all your treatment options, including their goals and possible side effects, with your doctors to help make the best decision for you. In choosing a treatment plan, consider your health and the type and stage of the eye cancer. If there's anything you don't understand, ask to have it explained.

If time permits, it is often a good idea to seek a second opinion. A second opinion can give you more information and help you feel more confident about the treatment plan you choose.

- [Questions to Ask About Eye Cancer](#)²
- [Seeking a Second Opinion](#)³

Thinking about taking part in a clinical trial

Clinical trials are carefully controlled research studies that are done to get a closer look at promising new treatments or procedures. Clinical trials are one way to get state-of-the-art cancer treatment. In some cases they may be the only way to get access to newer treatments. They are also the best way for doctors to learn better methods to treat cancer. Still, they're not right for everyone.

If you would like to learn more about clinical trials that might be right for you, start by asking your doctor if your clinic or hospital conducts clinical trials.

- [Clinical Trials](#)⁴

Considering complementary and alternative methods

You may hear about alternative or complementary methods that your doctor hasn't mentioned to treat your cancer or relieve symptoms. These methods can include vitamins, herbs, and special diets, or other methods such as acupuncture or massage, to name a few.

Complementary methods refer to treatments that are used along with your regular medical care. Alternative treatments are used instead of a doctor's medical treatment. Although some of these methods might be helpful in relieving symptoms or helping you feel better, many have not been proven to work. Some might even be harmful.

Be sure to talk to your cancer care team about any method you are thinking about using. They can help you learn what is known (or not known) about the method, which can help you make an informed decision.

- [Complementary and Alternative Medicine](#)⁵

Help getting through cancer treatment

Your cancer care team will be your first source of information and support, but there are other resources for help when you need it. Hospital- or clinic-based support services are an important part of your care. These might include nursing or social work services, financial aid, nutritional advice, rehab, or spiritual help.

The American Cancer Society also has programs and services – including rides to treatment, lodging, and more – to help you get through treatment. Call our National Cancer Information Center at 1-800-227-2345 and speak with one of our trained specialists.

- [Find Support Programs and Services in Your Area](#)⁶

Choosing to stop treatment or choosing no treatment at all

For some people, when treatments have been tried and are no longer controlling the cancer, it could be time to weigh the benefits and risks of continuing to try new treatments. Whether or not you continue treatment, there are still things you can do to help maintain or improve your quality of life.

Some people, especially if the cancer is advanced, might not want to be treated at all. There are many reasons you might decide not to get cancer treatment, but it's important to talk to your doctors and you make that decision. Remember that even if you choose not to treat the cancer, you can still get supportive care to help with pain or other

symptoms.

- [If Cancer Treatments Stop Working](#)⁷
- [Palliative or Supportive Care](#)⁸

The treatment information given here is not official policy of the American Cancer Society and is not intended as medical advice to replace the expertise and judgment of your cancer care team. It is intended to help you and your family make informed decisions, together with your doctor. Your doctor may have reasons for suggesting a treatment plan different from these general treatment options. Don't hesitate to ask him or her questions about your treatment options.

Surgery for Eye Cancer

Surgery is used to treat some eye melanomas, but it is used much less often now because the use of [radiation therapy](#) has become more common.

Types of surgery for eye cancer

The type of surgery depends on the location and size of the tumor, how far the tumor has spread, and a person's overall health. All of these operations are done while you are under general anesthesia (in a deep sleep). Most people will stay in the hospital 1 or 2 days afterward. The operations used to treat people with eye melanoma include:

- **Iridectomy:** Removal of part of the iris (the colored part of the eye). This might be an option for very small iris melanomas.
- **Iridotrabeculectomy:** Removal of part of the iris, plus a small piece of the outer part of the eyeball. This might also be an option for small iris melanomas.
- **Iridocyclectomy:** Removal of a portion of the iris and the ciliary body. This operation is also used for small iris melanomas.
- **Transscleral resection:** Surgically removing just a melanoma of the ciliary body or choroid. This type of surgery should only be done by doctors in cancer centers with a lot of experience in treating eye melanomas, because it is hard to remove the tumor without damaging the rest of the eye. This could lead to severe vision problems.

- **Enucleation:** Removal of the entire eyeball. This is used for larger melanomas, but it may also be done for some smaller melanomas if vision in the eye has already been lost or if other treatment options would destroy useful vision in the eye, anyway. During the same operation, an orbital implant is usually put in to take the place of the eyeball. The implant is made out of silicone or hydroxyapatite (a substance similar to bone). It is attached to the muscles that moved the eye, so it should move the same way as the original eye would have. Within a few weeks after surgery, you visit an ophthalmologist (a specialist in eye prostheses) to be fitted with an artificial eye, a thin shell that fits over the orbital implant and under the eyelids. The artificial eye will match the size and color of the remaining eye. Once it is in place, it will be hard to tell it apart from the real eye.
- **Orbital exenteration:** Removal of the eyeball and some surrounding structures such as parts of the eyelid and muscles, nerves, and other tissues inside the eye socket. This surgery is not common, but it might sometimes be used for melanomas that have grown outside the eyeball into nearby structures. As with enucleation, an artificial eye might be placed in the socket after surgery.

Possible risks and side effects of surgery

All surgery carries some risk, including the possibility of pain, bleeding, blood clots, infections, and complications from anesthesia.

Surgery on the eye can lead to the loss of some or all of the vision in that eye. Enucleation and orbital exenteration result in complete and immediate vision loss in the eye. Other surgeries can also cause problems leading to a loss of vision, which can occur later on. In some cases, vision may have already been damaged or lost because of the cancer.

Removal of the eyeball (enucleation) obviously can affect a person's appearance. As noted above, an artificial eye can be put in place to help minimize this.

More information about Surgery

For more general information about surgery as a treatment for cancer, see [Cancer Surgery](#)¹.

To learn about some of the side effects listed here and how to manage them, see [Managing Cancer-related Side Effects](#)².

Hyperlinks

1. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/surgery.html
2. www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html

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Radiation Therapy for Eye Cancer

Radiation therapy uses high-energy x-rays to kill cancer cells. It is a common treatment for eye melanoma. Radiation therapy can often save some vision in the eye. Sometimes

vision might be lost if the radiation damages other parts of the eye. An advantage over [surgery](#) is that the eye structure is preserved, which can result in a better appearance after treatment.

Different types of radiation therapy can be used to treat eye cancers.

Brachytherapy (Plaque therapy)

In this form of radiation therapy, the doctor places small seeds of radioactive material directly into or very close to the cancer. The radiation from the seeds travels a very short distance, so most of it will be focused only on the tumor. This has become the most common radiation treatment for most eye melanomas. Studies have shown that in many cases it is as effective as surgery to remove the eye (enucleation).

An operation is needed to put the plaque (a small round piece of metal that holds the radioactive seeds) in place. This surgery usually takes 1 or 2 hours and can be done with local anesthetic (numbing medicine) and sedation. The plaque is usually kept there for 4 to 7 days, depending on the size of the tumor and the strength of the radiation source. You will probably remain in the hospital during this time. Another surgery to remove the plaque is then done. It usually takes less than an hour, and you will probably be able to go home the same day. The full effect of the radiation on the tumor is not seen for 3 to 6 months.

This treatment cures about 9 out of 10 small to medium size tumors and can preserve vision in some patients, depending on what part of the eye the melanoma is in. The outlook for vision is not as good if the tumor is very close to the optic nerve, which carries visual images from the eye to the brain.

External beam radiation therapy

In this approach, radiation from a source outside the body is focused on the cancer. For eye melanomas, the use of this type of radiation therapy is generally limited to newer methods that focus narrow beams of radiation on the tumor.

Proton beam radiation therapy: Instead of using x-rays as in standard radiation therapy, this approach aims proton beams toward the cancer. Unlike x-rays, which release energy both before and after they hit their target, protons cause little damage to tissues they pass through and release their energy only after traveling a certain distance. This means that proton beam radiation may be able to deliver more radiation to the tumor but do less damage to nearby normal tissues. This type of radiation treatment is used more often for larger tumors and for tumors that are closer to the optic

nerve.

Getting treatment is much like getting an x-ray, but the dose of radiation is much higher. In most cases, the total dose of radiation is divided into daily fractions (usually given Monday thru Friday) over several weeks. The treatment is typically not painful.

The specialized machines needed to make protons are only found in certain centers in the United States at this time.

Stereotactic radiosurgery: Despite the name, there is no actual surgery involved in this treatment. The term "surgery" is used to describe the accurate nature of the radiation beams. This type of treatment delivers a large, precise radiation dose to the tumor area in a single session. It is not used as often as brachytherapy or proton beam therapy as the initial treatment for eye melanomas. Different machines can be used to deliver radiation in one of two ways:

- A *Gamma Knife* stays in one place and focuses radiation beams from hundreds of different angles at the tumor all at once for a short period of time in one treatment session.
- Several machines, such as *CyberKnife®* or *Clinac®* use a computer to control a radiation machine that moves in a circular motion (180 degrees) over the tumor to deliver individual radiation beams at separate times from many different angles. These treatments are done over multiple days.

Possible side effects of radiation therapy

The main concern with radiation therapy is damage to parts of the eye, leading to problems such as blurry vision, dry eye, cataracts, retinal detachment, glaucoma (increased pressure inside the eye), loss of eye lashes, problems with tear ducts, or bleeding into the eye. Some of these treatments can result in partial or complete loss of vision or other problems, which might not happen right away and may worsen with time. The risk depends on the size and location of the tumor.

Because the radiation is focused only on the affected eye, it is not likely to affect vision in the other eye or to cause other side effects sometimes linked with radiation therapy, such as hair loss or nausea.

More information about radiation therapy

To learn more about how radiation is used to treat cancer, see [Radiation Therapy](#)¹.

To learn about some of the side effects listed here and how to manage them, see [Managing Cancer-related Side Effects](#)².

Hyperlinks

1. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/radiation.html
2. www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html

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Laser Therapy for Eye Cancer

Laser therapy is sometimes used to treat eye melanoma, especially when surgery or radiation are not possible.

Transpupillary thermotherapy (TTT)

This is the most common type of laser treatment for eye melanoma. It uses infrared light to heat and kill the tumor.

TTT alone is mainly used to treat very small eye melanomas because of side effects like bleeding, retinal detachment and blockage of blood vessels in the eye, as well as a high risk of [recurrence](#)¹ (cancer coming back). More recently, TTT may be used as an adjuvant (additional) treatment after brachytherapy ([plaque radiotherapy](#)) to lower the risk of recurrence.

Laser photocoagulation

This treatment uses highly focused, high-energy light beams to burn tissue. It is rarely used now to treat eye melanoma because of side effects and a high risk of recurrence, but it can be effective for very small melanomas.

Possible side effects of laser therapy

As with radiation therapy, the main concern with laser therapy is damage to parts of the eye that could result in loss of vision. The risk depends on the size and location of the tumor.

Hyperlinks

1. www.cancer.org/treatment/survivorship-during-and-after-treatment/understanding-recurrence.html

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Chemotherapy for Eye Cancer

Chemotherapy (chemo) is the use of drugs to treat cancer. The drugs can be injected into a certain part of the body (such as the eye), or they can be injected into a vein (with an IV) or taken by mouth (as a pill) to reach most of the body, making this treatment very useful for cancers that have spread.

Melanoma usually does not respond well to standard chemo drugs. Chemo is used only when the cancer has become widespread. If chemo is used, the treatment is generally the same as for melanoma of the skin. For more information, see [Melanoma Skin Cancer](#)¹.

Newer [targeted drugs](#), which work in different ways from chemo drugs, have shown some promise in treating skin melanomas in recent years, and are now being studied for use against eye melanomas.

Possible side effects of chemo

Chemo drugs attack cells that are dividing quickly, which is why they work against cancer cells. But other cells in the body such as those in the bone marrow (where new blood cells are made), the lining of the mouth and intestines, and the hair follicles, also divide quickly. These cells are likely to be affected by chemo, which can lead to side effects.

The side effects of chemo depend on the type and dose of drugs given, how they are given, and the length of time they are taken. The side effects of systemic chemo can include:

- Hair loss
- Mouth sores
- Loss of appetite
- Nausea and vomiting
- Diarrhea or constipation
- Increased chance of infections (from having too few white blood cells)
- Easy bruising or bleeding (from having too few blood platelets)
- Fatigue (from having too few red blood cells)

These side effects usually go away after treatment is finished. There are often ways to lessen these side effects. For example, there are drugs to help prevent or reduce nausea and vomiting. Some drugs may also have specific side effects not listed above. Be sure to ask your doctor or nurse about medicines to help reduce side effects, and let him or her know when you do have side effects so they can be managed.

More information about chemotherapy

For more general information about how chemotherapy is used to treat cancer, see [Chemotherapy](#)².

To learn about some of the side effects listed here and how to manage them, see [Managing Cancer-related Side Effects](#)³.

Hyperlinks

1. www.cancer.org/cancer/melanoma-skin-cancer.html
2. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/chemotherapy.html

3. www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html

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Targeted Drugs and Immunotherapy for Eye Cancer

Melanoma that has spread outside of the eye can be hard to treat, and unfortunately standard [chemotherapy](#) drugs often are not very helpful.

In recent years, researchers have developed newer types of drugs to treat advanced melanomas. Several of these drugs are now used to treat melanomas of the skin, but it's not yet clear if they will be as helpful in treating uveal (eye) melanomas. These newer drugs generally fall into 2 groups: immunotherapy and targeted therapy.

Immunotherapy drugs

These drugs work to stimulate the body's own immune system to recognize and attack cancer cells more effectively. They are very helpful in treating skin melanoma and a few initial studies with the drugs pembrolizumab (Keytruda[®]) and ipilimumab (Yervoy[®]) have shown benefit in some people with uveal eye melanoma. (See [Immunotherapy for Melanoma Skin Cancer](#)¹.) These and some other immunotherapy drugs are being studied in people with eye melanomas.

Targeted drugs

Some newer drugs target parts of melanoma cells that make them different from normal cells. For example, about half of all skin melanomas have a change (mutation) in a gene called *BRAF*, and several drugs that target this gene change are now available to treat these cancers. (See [Targeted Therapy for Melanoma Skin Cancer](#)².) This mutation is very uncommon in uveal melanomas, but in people who have it, these drugs might be helpful. These drugs are also being tested in people with conjunctival melanoma. Drugs targeting other gene changes are also being studied.

For more information on some of these newer drugs, see [What's New in Eye Cancer Research?](#)³

Hyperlinks

1. www.cancer.org/cancer/melanoma-skin-cancer/treating/immunotherapy.html
2. www.cancer.org/cancer/melanoma-skin-cancer/treating/targeted-therapy.html
3. www.cancer.org/cancer/eye-cancer/about/new-research.html

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Treating Eye Melanoma by Location and Size

The main factors in deciding ontreatment for eye melanoma include the location and size of the cancer, as well as the likelihood of saving vision in the eye. There is not much advantage in saving an eye if a small melanoma in a crucial place has already destroyed vision in the eye. On the other hand, doctors will not necessarily want to remove an eye that functions normally even if the tumor is large. Because of this, your treatment plan will depend on your situation, and could be different than what's described here.

It's important to keep in mind thatoutcomes and quality of life both tend to be similar over time for people who have had an eye removed ([enucleation](#)) and those who have had [radiation therapy](#). Radiation therapy is more likely to preserve some vision in the eye, especially during the first few years after treatment, but studies have found that people who have had radiation therapy are also more likely to be more anxious about the chance of the cancer coming back. Be sure to talk with your doctor before treatment about what is most important to you.

Choroidal melanomas

Treating melanomas that start in the choroid depends on the size of the tumor and how well the eye functions. The smaller the tumor, the less likely surgery will be needed, unless the eye is badly damaged or vision is lost.

Small melanomas: There are often several options for treating small choroidal melanomas. Both you and your doctor should decide which option is best for you:

- Careful observation (also known as *watchful waiting*). Not all of these melanomas grow quickly and need to be treated right away. And sometimes, it's very hard for the doctor to even be sure if a spot on the choroid is truly a melanoma. If the tumor is very small, watching it closely (sometimes every 3-4 months) and treating it only if it starts to grow is often a reasonable option.
- [Radiation therapy](#), such as brachytherapy (plaque therapy), proton beam therapy, or stereotactic radiation therapy
- [Laser therapy](#), including transpupillary thermotherapy (TTT), most often along with brachytherapy
- [Surgery](#), which may require removing only the tumor or might need to be as extensive as enucleation (removing the entire eye). This might be necessary if the eye is severely damaged by the tumor.

Medium-sized melanomas: These tumors can usually be treated by many of the same approaches used for small melanomas:

- [Radiation therapy](#), such as brachytherapy (plaque therapy), proton beam therapy, or stereotactic radiation therapy
- [Laser therapy](#), including transpupillary thermotherapy (TTT) or laser coagulation, along with brachytherapy
- [Surgery](#), which may require removing only the tumor or might need to be as extensive as enucleation (removing the entire eye). This might be necessary if the eye is severely damaged by the tumor.

Once again, the choice of treatment is a decision that should be made by both you and your doctor. Radiation and surgery appear to be about equally effective. Radiation offers the best chance of preserving vision in the eye, but some people who have radiation may eventually need surgery, too.

Large melanomas: The standard treatment for these cancers is usually [radiation](#). Proton beam therapy and stereotactic radiation therapy are usually used first. Additional treatment with surgery or lasers may also be considered if the radiation does not work completely.

[Surgery](#) with enucleation (removal of the entire eye) is the preferred surgery for large melanomas when radiation is not an option. Enucleation might also be considered for cancers that take up more than half of the eye orbit, that cause significant pain, or that have caused loss of vision in the eye. In rare cases where the cancer has grown extensively outside of the eye, the doctor might recommend removing other structures

in the eye socket, such as muscles or part of the eyelid, as well.

Iris melanomas

Melanomas of the iris (the colored part of the eye) are usually small, slow-growing tumors. One option for people with an early stage iris melanoma is to watch it closely to see if it grows. A series of special photographs are taken to help monitor the tumor. If it begins to grow, treatment may be [surgery](#) or [radiation therapy](#) (in certain situations).

If surgery is recommended, the amount of eye tissue to be removed depends on the extent of the cancer. Types of surgery for early iris melanomas include:

- Iridectomy (removal of part of the iris)
- Iridotrabeulectomy (removal of part of the iris, plus a small piece of the outer part of the eyeball)
- Iridocyclectomy (removal of a portion of the iris and the ciliary body)
- Enucleation (removal of the eyeball)

Ciliary body melanomas

These rare cancers can be treated with either [surgical removal](#) of the tumor, if it is small enough, or [radiation therapy](#). In more advanced cases or if there is serious eye damage, enucleation (removal of the eyeball) may be needed.

Conjunctival melanomas

Although rare, melanomas of the conjunctiva tend to be more aggressive than most uveal melanomas. They are more likely to grow into local structures and spread to distant organs like the liver and lungs where the situation can become life-threatening. Treatment is focused on completely removing the tumor with [surgery](#) and giving adjuvant treatment with [radiation](#) or topical chemotherapy (with interferon or Mitomycin-C) to reduce the likelihood of metastases (tumor spread).

Because of the aggressive nature of this tumor, a biopsy of the tumor may be done initially to look for certain traits that can predict the likelihood the cancer will spread or [recur](#)¹. If the chances are on the high side, more frequent follow-up exams after treatment may be recommended.

Advanced and recurrent melanomas

Most uveal melanomas are still only within the eye when they are first diagnosed. It is rare for the cancer to have already spread outside of the eye. But unfortunately, in about half of all patients the melanoma will come back at some point after treatment.

Cancer that comes back after treatment is called *recurrent*. Recurrence can be local (in or near the same place it started) or distant (spread to organs such as the lungs or liver). Treating melanomas that come back depends on many factors, including where the cancer recurs and what type of treatment was used initially.

Cancers that recur within the eye (intraocular recurrence) are usually treated by removing the eye ([enucleation](#)).

When melanoma recurs outside the eye (called *extraocular recurrence*), it most often comes back in the liver. It might also come back in other areas, like the lungs or bones. These cancers are often hard to treat.

If the cancer is only in the liver, different types of treatments might help keep the cancer under control or help relieve symptoms. These include surgery (if there is only one or a few tumors), radiation therapy, destroying (ablating) tumors by heating or freezing them, or injecting drugs or other substances into the liver to try to kill the tumors or cut off their blood supply. Tumor ablation and radiation might also be used for tumors that have spread to other parts of the body, such as the lungs.

Treatment such as [chemotherapy](#) has not yet been proven to be very helpful in treating eye melanomas that have spread. However, [immunotherapy and targeted therapy](#) are showing promise and might help keep the cancer in check for a time in some people. Because current treatments for advanced eye melanomas are limited, [clinical trials](#)² of newer treatments might be a good option. (See [What's New In Eye Cancer Research?](#)³ for some examples of newer treatments now being studied.)

Hyperlinks

1. www.cancer.org/treatment/survivorship-during-and-after-treatment/understanding-recurrence.html
2. www.cancer.org/treatment/treatments-and-side-effects/clinical-trials.html
3. www.cancer.org/cancer/eye-cancer/about/new-research.html

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After Eye Cancer Treatment

Living as a Cancer Survivor

For many people, cancer treatment often raises questions about next steps as a survivor.

- [Living as an Eye Cancer Survivor](#)

Cancer Concerns After Treatment

Treatment may remove or destroy the cancer, but it's very common to worry about the risk of developing another cancer.

- [Second Cancers After Eye Cancer](#)

Living as an Eye Cancer Survivor

For many people with eye cancer, [treatment](#)¹ can remove or destroy the cancer. Completing treatment can be both stressful and exciting. You may be relieved to finish treatment, but find it hard not to worry about cancer the growing or coming back. (When cancer comes back after treatment, it is called a *recurrence*.) This is a very common concern in people who have had cancer.

For other people, the eye cancer may never go away completely. These people might get regular treatments with [chemotherapy](#)², [radiation therapy](#)³, or other therapies to help

keep the cancer in check for as long as possible. Learning to live with cancer as a more of a [chronic disease](#)⁴ can be difficult and very stressful.

Follow-up care

If you have completed treatment, your doctors will still want to watch you closely. It's very important to go to all your follow-up appointments, because eye cancer can sometimes come back even many years after treatment. Follow-up is needed to check for cancer recurrence or spread, as well as possible side effects of certain treatments.

Some [treatment side effects](#)⁵ might last a long time or might even show up years after you have finished treatment. Your doctor visits are a good time to ask questions concerns you might have. Don't hesitate to tell your cancer care team about any symptoms or side effects that bother you so they can help you manage them.

Exams and tests

During your follow-up visits, your doctor will ask about any symptoms you are having, examine you, and may order blood or imaging tests.

Your doctor will most likely want to see you fairly often (every couple of months or so) at first. The time between visits may get longer if you are not having any problems. During these doctor visits, you might get:

- Physical exams (including careful eye exams if the eye has not been removed) to look for tumor recurrence or side effects of treatment as early as possible
- Blood tests to look for possible signs of cancer spread to the liver
- Imaging tests such as chest x-rays, ultrasound, CT scans, or MRI scans to watch for cancer recurrence or spread, especially to the liver or lungs

Treatments for eye cancers such as [surgery](#)⁶, [radiation therapy](#)⁷, and [laser therapy](#)⁸ can cause side effects. Your doctors will check your treated eye for complications and may recommend medicines or operations to help control side effects and help to keep your vision as clear as possible. For example, radiation therapy might cause cataracts to form or injure muscles around the eye, resulting in blurred or double vision. In either case, surgery may help with these problems.

Follow-up exams and tests are also important for people who have had an eye removed, because melanomas can still sometimes recur in the area around the eye or in distant parts of the body.

Ask your doctor for a survivorship care plan

Talk with your doctor about developing a survivorship care plan for you. This plan might include:

- A suggested schedule for follow-up exams and tests
- A schedule for other tests you might need in the future, such as early detection (screening) tests for other types of cancer, or tests to look for long-term health effects from your cancer or its treatment
- A list of possible late- or long-term side effects from your treatment, including what to watch for and when you should contact your doctor
- Diet and physical activity suggestions

Keeping health insurance and copies of your medical records

Even after treatment, it's very important to keep health insurance. Tests and doctor visits cost a lot, and even though no one wants to think of their cancer coming back, this could happen.

At some point after your treatment, you might find yourself seeing a new doctor who doesn't know about your medical history. It's important to keep copies of your medical records to give your new doctor the details of your diagnosis and treatment. Learn more in [Keeping Copies of Important Medical Records](#)⁹.

Can I lower my risk of the eye cancer progressing or coming back?

If you have (or have had) eye cancer, you probably want to know if there are things you can do that might lower your risk of the eye cancer growing or coming back, such as exercising, eating a certain type of diet, or taking nutritional supplements. Unfortunately, it's not yet clear if there are things you can do that will help.

Adopting healthy behaviors such as [not smoking](#)¹⁰, [eating well](#)¹¹, [getting regular physical activity](#)¹², and [staying at a healthy weight](#)¹³ might help, but no one knows for sure. However, we do know that these types of changes can have positive effects on your health that can extend beyond your risk of eye cancer or other cancers.

About dietary supplements

So far, no dietary supplements (including vitamins, minerals, and herbal products) have

been shown to clearly help lower the risk of eye cancer progressing or coming back. This doesn't mean that no supplements will help, but it's important to know that none have been proven to do so.

Dietary supplements are not regulated like medicines in the United States – they do not have to be proven effective (or even safe) before being sold, although there are limits on what they're allowed to claim they can do. If you're thinking about taking any type of nutritional supplement, talk to your health care team. They can help you decide which ones you can use safely while avoiding those that might be harmful.

If the eye cancer comes back

If the eye cancer does come back at some point, your treatment options will depend on the type of eye cancer, where it is, what treatments you've had before, how long it's been since treatment, and your current health and preferences. For more information on how recurrent cancer is treated, see [Treating Uveal \(Eye\) Melanoma by Location and Size](#)¹⁴.

For more general information on dealing with a recurrence, see [Coping With Cancer Recurrence](#)¹⁵.

Could I get a second cancer after treatment?

People who've had eye cancer can still get other cancers. In fact, eye cancer survivors are at higher risk for getting some other types of cancer. Learn more in [Second Cancers After Eye Cancer](#).

Getting emotional support

Some amount of feeling depressed, anxious, or worried is normal when lymphoma is a part of your life. Some people are affected more than others. But everyone can benefit from help and support from other people, whether friends and family, religious groups, support groups, professional counselors, or others. Learn more in [Life After Cancer](#)¹⁶.

Hyperlinks

1. www.cancer.org/cancer/eye-cancer/treating.html
2. www.cancer.org/cancer/eye-cancer/treating/chemotherapy.html
3. www.cancer.org/cancer/eye-cancer/treating/radiation-therapy.html

4. www.cancer.org/treatment/survivorship-during-and-after-treatment/when-cancer-doesnt-go-away.html
5. www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html
6. www.cancer.org/cancer/eye-cancer/treating/surgery.html
7. www.cancer.org/cancer/eye-cancer/treating/radiation-therapy.html
8. www.cancer.org/cancer/eye-cancer/treating/laser-therapy.html
9. www.cancer.org/treatment/survivorship-during-and-after-treatment/be-healthy-after-treatment/keeping-copies-of-important-medical-records.html
10. www.cancer.org/healthy/stay-away-from-tobacco.html
11. www.cancer.org/healthy/eat-healthy-get-active/eat-healthy.html
12. www.cancer.org/healthy/eat-healthy-get-active/get-active.html
13. www.cancer.org/healthy/eat-healthy-get-active/take-control-your-weight.html
14. www.cancer.org/cancer/eye-cancer/treating/uveal-melanoma.html
15. www.cancer.org/treatment/survivorship-during-and-after-treatment/understanding-recurrence/coping-with-cancer-recurrence.html
16. www.cancer.org/treatment/survivorship-during-and-after-treatment/be-healthy-after-treatment/life-after-cancer.html

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Second Cancers After Eye Cancer

Cancer survivors can be affected by a number of health problems, but often a major concern is facing cancer again. If a cancer comes back after treatment it is called a [recurrence](#)¹. But some cancer survivors may develop a new, unrelated cancer later. This is called a *second cancer*.

People who have had eye cancer can get any type of second cancer, but since this is a rare cancer, not many studies have been done in this area. The available information suggests they might have an increased risk of certain cancers, including:

- [Liver cancer](#)²
- [Skin melanoma](#)³
- [Breast cancer](#)⁴
- [Prostate cancer](#)⁵

Follow-up after treatment

After completing treatment for eye cancer, you should still see your doctor regularly and may have tests to look for signs that the cancer has come back. Let your doctors know if you have any new symptoms or problems, as they could be due to the eye cancer coming back, side effects of treatment, or a new disease or cancer.

Eye cancer survivors should also follow the [American Cancer Society recommendations for the early detection of cancer](#)⁶, such as those for colorectal, lung, and breast cancer. Most experts don't recommend any other testing to look for second cancers unless you have symptoms.

Can I lower my risk of getting a second cancer?

There are steps you can take to lower your risk of cancer in general and stay as healthy as possible. For example, it's important to [stay away from tobacco products](#)⁷. Smoking increases the risk of many cancers.

To help maintain good health, eye cancer survivors should also:

- Get to and stay at a [healthy weight](#)⁸
- Stay [physically active](#)⁹

- Eat a [healthy diet](#)¹⁰, with an emphasis on plant foods
- Limit [alcohol](#)¹¹ to no more than 1 drink per day for women or 2 per day for men

These steps may also lower the risk of some other health problems.

See [Second Cancers in Adults](#)¹² for more information about causes of second cancers.

Hyperlinks

1. www.cancer.org/treatment/survivorship-during-and-after-treatment/understanding-recurrence.html
2. www.cancer.org/cancer/liver-cancer.html
3. www.cancer.org/cancer/melanoma-skin-cancer.html
4. www.cancer.org/cancer/breast-cancer.html
5. www.cancer.org/cancer/prostate-cancer.html
6. www.cancer.org/healthy/find-cancer-early/cancer-screening-guidelines/american-cancer-society-guidelines-for-the-early-detection-of-cancer.html
7. www.cancer.org/healthy/stay-away-from-tobacco.html
8. www.cancer.org/healthy/eat-healthy-get-active/take-control-your-weight.html
9. www.cancer.org/healthy/eat-healthy-get-active/get-active.html
10. www.cancer.org/healthy/eat-healthy-get-active/eat-healthy.html
11. www.cancer.org/cancer/cancer-causes/diet-physical-activity/alcohol-use-and-cancer.html
12. www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/second-cancers-in-adults.html

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