

Melanoma Risk in Rural America

Melanoma is often associated with sun exposure, but growing research shows the story is more complex, especially for people living and working in rural and agricultural areas. Farmers, agricultural workers and others who spend long hours outdoors may face unique and layered risks that go beyond sunlight alone.

James McGee, MD, MHCM, FACRO, president of the OSF HealthCare Cancer Institute, says those risks can quietly build over time.

"Farmers who are out in the sun all of the time might get [skin cancers](#) across the head and neck areas. As they get older and their immune system declines, those become more numerous," Dr. McGee says. "Sometimes that's a prelude to getting a melanoma."

Sun exposure, immunity and cumulative risk

Melanoma risk is influenced by both genetics and sun exposure. That exposure doesn't always come from a single event. Gradual, day-after-day sun exposure – common in farming and outdoor work – can be just as harmful as intense sun exposure that causes blistering sunburns or sun poisoning.

Repeated skin blistering from sunburn has been linked to the development of more aggressive melanoma later in life. As people age, natural changes in immune function can make it harder for the body to recognize and repair damaged cells, increasing cancer risk.

Occupational patterns also matter. For example, truck drivers who spend years with one arm exposed to the sun through a window may face a higher risk of melanoma on that consistently exposed side compared to the other.

New research links agriculture and melanoma risk

Recent research adds an important environmental and agricultural layer to the melanoma conversation. After analyzing five years of [cancer registry data](#) researchers identified a cluster of elevated melanoma rates across a 15-county region of south central Pennsylvania, affecting adults over the age of 50. People in that region were significantly more likely to develop melanoma than residents elsewhere in the state.

Importantly, the increased risk was not limited to strictly rural areas. The cluster included both rural and metropolitan counties, suggesting melanoma risk can extend beyond traditionally "outdoor-only" assumptions.

Even after accounting for ultraviolet (UV) radiation levels and socioeconomic factors, two strong patterns emerged: counties with higher amounts of cultivated cropland and counties with greater herbicide use had notably higher melanoma rates. Previous studies referenced by the researchers suggest certain agricultural chemicals may increase sensitivity to sunlight and interfere with immune function or cause DNA damage – all of which may contribute to melanoma development over time.

Understanding melanoma biology and treatment advances

"Melanomas are all related but can have different molecular signatures that are associated with the underlying cause of the melanoma, region of the body and demographic factors," Dr. McGee points out.

Those molecular differences can offer important clues about which treatments may be most effective. One example is BRAF-related melanoma, which involves a specific genetic change within the tumor. Identifying those changes allows care teams to personalize treatment plans.

Melanoma is also categorized by where it starts in the body. Cutaneous melanoma begins in the skin, while mucosal melanomas develop in areas like the mouth or genital tract. Each type behaves differently and may require a different treatment approach.

Imaging, staging and immune response

Diagnosis often begins with a biopsy of a suspicious skin lesion. From there, doctors may evaluate nearby lymph nodes and use advanced imaging – such as PET scans or MRI scans of the brain – to determine if the cancer has spread. This staging process provides a clearer picture of both disease extent and tumor biology.

Genetic testing of various types can be used to predict treatment response, assess the likelihood of spread, or determine increased risk for subsequent cancers, helping guide both treatment and future surveillance.

Radiation, immunotherapy and a changing treatment landscape

Radiation has traditionally been used to treat melanoma that has spread to the brain or bones. However, melanoma cells contain precursor chemicals that help create melanin pigment, which can act as a radioprotective compound. That protection can make standard radiation doses less effective.

Dr. McGee says delivering a larger dose of radiation all at once can overcome that barrier.

"More and more we're seeing that immunotherapy is coming into play for a possible treatment of melanoma. We've known for a long time that melanomas can act weirdly," Dr. McGee points out. "There have been a lot of reports that were thought to be just happenstance of patients treated with radiosurgery for brain metastases for melanoma, who then had other lesions in their body, get better as well. Those weren't radiated."

In some cases, radiation appears to trigger an immune response. Radiation can cause tumor cells to release antigens, signaling the immune system to attack melanoma cells elsewhere in the body. Combining radiation therapy with immunotherapy is an approach increasingly used for melanoma and other skin cancers.

Dr. McGee now commonly uses a single, high-dose radiosurgery approach. He recently treated a patient with 23 brain metastases in one session that lasted about 20 minutes, with strong responses seen across all lesions. Understanding the underlying biology of melanoma has helped improve these outcomes.

Immunotherapy and survival trends

Immunotherapy has become a powerful option in melanoma treatment, helping the immune system better recognize and destroy cancer cells. These advances are reflected in national survival trends.

According to the [American Cancer Society](#), melanoma death rates in the United States declined sharply between 2013 and 2022, largely due to treatment improvements.

For 2025, the American Cancer Society estimates:

- Nearly 105,000 new melanoma diagnoses
- More than 8,400 melanoma-related deaths nationwide

Melanoma risk increases with age, with the average diagnosis occurring at 66. However, it remains one of the more common cancers in young adults, particularly young women. Lighter skin tone is a significant risk factor, though melanoma can affect people of all skin colors.

Prevention and the role of primary care

While not all melanoma risk can be eliminated, everyday choices can make a difference. Wearing sunscreen, choosing protective clothing, limiting prolonged sun exposure, moderating alcohol intake and avoiding blistering sunburns can all help reduce risk.

Primary care teams play a key role in prevention and early detection.

"One of our major projects is going to be getting our primary care offices to get equipped with tools to help motivate people to reduce their cancer risk through things that are tolerable for them to do," Dr. McGee says. "This gives them the hope that we can reduce their cancer risks."

Increasingly, computer applications and artificial intelligence (AI) are showing promise to help patients and providers sort out suspicious lesions that need to be prioritized for evaluation vs. lesions that have a lower risk of being cancerous.

For people living and working in rural and agricultural communities, understanding how sun exposure, environmental factors and immune health intersect may be the key to catching melanoma earlier or preventing it altogether.