

# The Adverse Health Outcomes of Benzene in Skincare Products



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## Abstract

Benzene is a known carcinogen commonly used in daily skin care products that could have negative physiological effects on the body.

The risks associated with the use of benzene-containing products have been researched, however, current evidence has not fully differentiated whether the potential negative effects of benzene outweigh the protection that benzene products provide against the development of skin cancer.

**Keywords: Benzene, oxybenzone, physiologic effects of benzene, carcinogen, skin cancer**

## Introduction

The use of anti-aging products have increased dramatically in the last 10 years. Benzene enters the body in many ways: through the lungs, GI tract, or absorption through the skin.<sup>1</sup>

When Benzene enters the body, it quickly causes cells to become defective. This includes red blood cells, white blood cells, as well as bone marrow potentially leading to anemia. The harm of benzene depends on both exposure amount and as well as the length of exposure.<sup>1</sup>

Immediate effects of inhaled benzene include drowsiness, dizziness, headaches, rapid or irregular heartbeats, and confusion. One of the most prevalent benzene-containing products is sunscreen.<sup>2</sup>

The Journal of Cutaneous Medicine and Surgery presented research highlighting levels of benzene shown in sunscreen. Of 294 unique batches from 69 different companies, 78 lots (27%) were found to have detectable benzene at a concentration ranging between <0.1-6.26 ppm. Most of the products over 2.0 ppm were chemical sprays and not lotions.<sup>2</sup>

## Effects of Benzene

### KEY POINTS

- Hawaii banned the use of sunscreen with oxybenzone in January 2021 due to carcinogenic effects.
- The FDA limit of benzene is 2.0 ppm as of March 2021
- Exposure to benzene has been linked to an increased risk of developing cancer.

### CANCER

- High levels of benzene exposure during childhood (> 90th percentile) were associated with relative risks for acute lymphocytic leukemia (ALL) and acute myeloid leukemia (AML).<sup>7</sup>
- Melanoma had a 12.03% highest risk in those exposed to benzene versus those who weren't in the NHANES study.<sup>8</sup>
- NHANES study showed a 7.98% higher risk of breast cancer with benzene exposure

### PHYSIOLOGIC

- In a study done by Chowdhary *et al*, there were decreased FT4 and T4 as well as lowered testosterone levels in males within the 3rd and 4th quartiles of benzene
- There has also been a connection to a higher concentration of benzene affecting early breast development and association with earlier menarche overall.

## Discussion

The greatest correlation found was between benzene use and developing melanoma. Two types of cancer that also had a large correlation with use of benzene were breast cancer and lymphoma.

Benzene use also plays a role in non-oncogenic risks. Some additional risks that were noted include decreased thyroid levels, decreased testosterone levels, kidney values (ACR), and early menarche in women.

Although the studies and sample populations that were utilized throughout our research were valuable, it is limited by the consumers' availability to choose. Research strives to make consumers aware of the major risks associated with prolonged benzene exposure so that educated decisions can be made when choosing skincare products.

## Conclusion

There are small but evident links between benzene use and multiple physiological effects including melanoma and breast cancer. Benzene exposure risk is underrecognized by both consumers and medical professionals. More research is warranted to assess long-term risk. The FDA guidelines created in 2021 aim to decrease the amount of benzene exposure. However, public knowledge of these guidelines is not fully appreciated or understood. With more time and research, both producers and consumers will give further evidence to understand the risks and make educated decisions on their health, and the contents of skincare products.

## References

1. *Benzene and Cancer Risk*. American Cancer Society. (2023, February) <https://www.cancer.org/cancer/risk-prevention/chemicals/benzene.html>
2. Conte S, Lagace F, Nechiporouk E, Sasseville D, Litvinov IV. Benzene, a Known Human Carcinogen, Detected in Suncare Products. *Journal of Cutaneous Medicine and Surgery*. Published 2021. Accessed October 8, 2023.
8. Chowdhary A, Bapat P, Dawoodi I, et al. Prevalence of Cancer & Cancer Subtypes and Association with Benzene, Toluene, Ethylbenzene, and Xylene - a Study from the National Health and Nutrition Survey. *Blood*. 2022;140:12081-12082. doi:<https://doi.org/10.1182/blood-2022-155833>