

# Why Is This Carcinogen in Hand Sanitizers?

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## STORY AT-A-GLANCE

- › The U.S. Food and Drug Administration issued temporary guidance in March 2020, allowing benzene in hand sanitizers at levels up to 2 parts per million (ppm)
- › The allowance was made due to the COVID-19 pandemic, which triggered unprecedented demand for disinfectant products like hand sanitizers
- › When hand sanitizer shortages emerged at the start of the pandemic, the FDA's temporary guidance allowed manufacturers to produce the products from lower grades of ethanol
- › Valisure tested 260 hand sanitizer products, including liquid and non-liquid products; they found that 44 batches, or 17%, contained benzene
- › The FDA finally withdrew its temporary guidances for alcohol-based hand sanitizers on October 12, 2021, but it doesn't take effect until December 31, 2021 – nearly two years after it was issued

**Benzene is a known human carcinogen, yet still ranks in the top 20 chemicals used in the U.S., based on production volume.<sup>1</sup> Despite its known toxicity, the U.S. Food and Drug Administration issued temporary guidance in March 2020, allowing it in hand sanitizers at levels up to 2 parts per million (ppm).<sup>2</sup>**

**The allowance was made due to the COVID-19 pandemic, which triggered unprecedented demand for disinfectant products like hand sanitizers. The U.S. Centers for Disease Control and Prevention recommends using alcohol-based hand sanitizer**

that contains at least 60% alcohol to prevent COVID-19 if soap and water aren't available.<sup>3</sup>

This, combined with panic and fear in the early days of the pandemic, led to shortages of hand sanitizer and supplies weren't enough to meet consumer demand. As evidence of its increased prevalence, calls to Poison Control related to hand sanitizer increased 79% in March 2020 compared to March 2019.<sup>4</sup>

This triggered the FDA to loosen its guidelines for the products, allowing increased levels of toxins like benzene, despite its cancer-causing potential.

## **FDA Opened the Door for Benzene-Laced Hand Sanitizer**

When hand sanitizer shortages emerged at the start of the pandemic, the FDA's temporary guidance allowed manufacturers to produce the products from lower grades of ethanol, provided any toxins it contained fell under their interim limits.

In addition to benzene at 2 ppm, acetaldehyde, which is genotoxic and potentially carcinogenic, was allowed at levels up to 50 ppm, even as the agency stated, "Given the large number of applications of this product expected by consumers and health care personnel during the public health emergency, exposure to hand sanitizer with high levels of acetaldehyde poses a significant safety concern."<sup>5</sup> To explain their loosened restrictions, the FDA stated:<sup>6</sup>

*"... FDA is working with industry to ensure that harmful levels of impurities are not present in ethanol used in hand sanitizer. Upon further review of the data, we are temporarily providing flexibility with respect to certain impurities at the levels established ...*

*Based on our review of available data, we have determined these interim impurity levels can be tolerated for a relatively short period of time, given the emphasis on hand hygiene during the COVID-19 public health emergency and to avoid exacerbating access issues for alcohol-based hand sanitizer.*

*Accordingly, during this public health emergency, FDA does not intend to take action against firms that manufacture fuel or technical grade ethanol for hand sanitizer that does not meet the USP or FCC requirements or firms that use such ethanol to prepare hand sanitizer on an interim basis, provided all other circumstances in the guidance are present ...”*

The move opened the door for the manufacture of hand sanitizer using cheap, low-grade ethanol that poses a health risk to humans. The FDA finally withdrew its temporary guidances for alcohol-based hand sanitizers on October 12, 2021, but it doesn't take effect until December 31, 2021<sup>7</sup> – nearly two years after it was issued.

## **FDA Warns Consumers Not to Use Hundreds of Sanitizer Brands**

So many hand sanitizers contain potentially harmful ingredients that they necessitated their own page on the FDA's website, titled “FDA Updates on Hand Sanitizers Consumers s=Should Not Use.”<sup>8</sup> As of December 1, 2021, there were 270 entries on their list, including products that were tested by the FDA and found to contain benzene, acetaldehyde, methanol, acetal or other toxins.

Other hand sanitizers on the FDA's “do not use” list were found to have microbial contamination, were made at the same facility as products that contain benzene and other toxins or were packaged in containers resembling food or beverage containers, posing an increased risk of accidental ingestion.<sup>9</sup>

In July 2020, the FDA warned that it had seen a sharp increase in hand sanitizer products labeled as containing ethanol (ethyl alcohol) but that tested positive for methanol contamination.<sup>10</sup> Methanol, or wood alcohol, is toxic and can be life-threatening if ingested.

By August 2020, they had warned consumers and health care professionals about hand sanitizer products found to be contaminated with 1-propanol, which can cause central nervous system depression and death if ingested.

Another warning, this one released in March 2021, involved Durisan Antimicrobial Solutions Hand Sanitizer manufactured by Sanit Technologies LLC, which was found to contain high levels of Burkholderia cepacia complex and Ralstonia pickettii, bacteria that can cause serious infections, including infection of the skin, soft tissues, lungs or bloodstream.<sup>11</sup>

Then, in October 2021, the FDA found “unacceptable” levels of benzene, acetaldehyde and acetal in certain hand sanitizers produced by Artnaturals.<sup>12</sup> David Light, CEO of Valisure lab, which has been testing hand sanitizers for contaminants, told NBC News:<sup>13</sup>

*“The toxicity of benzene has been known for over 120 years. It’s directly linked with causing leukemia in humans. It’s a group one carcinogen, it’s at the top of the FDA list of chemicals not to use in manufacturing. Benzene is an extremely cheap solvent. From a chemical perspective, it’s a great solvent, and it works very well to make chemicals. But as the FDA itself says, very clearly, it should not be used for that.”*

## **Benzene Found in 44 Hand Sanitizer Products**

Valisure tested 260 hand sanitizer products, including liquid and non-liquid products. They found that 44 batches, or 17%, contained benzene. The highest benzene level detected was 16.1 ppm, which is more than eight times the FDA’s interim limit of 2 ppm.<sup>14</sup>

Benzene is found in crude oil, gasoline and cigarette smoke, and is also widely used to make chemicals used in the manufacture of plastics, synthetic fibers, lubricants, rubbers, dyes, detergents, drugs and pesticides. Benzene interferes with cells, causing bone marrow to not produce enough red blood cells, triggering anemia, for instance. It can also cause immune system damage, including changes in antibody levels and loss of white blood cells.

After long-term exposure, benzene causes cancer in humans, particularly leukemia, and is known to lead to irregular menstrual periods and a decrease in ovary size in women. Further, as noted by the CDC:<sup>15</sup>

*“The major effect of benzene from long-term exposure is on the blood. (Long-term exposure means exposure of a year or more.) Benzene causes harmful effects on the bone marrow and can cause a decrease in red blood cells, leading to anemia. It can also cause excessive bleeding and can affect the immune system, increasing the chance for infection.”*

Benzene’s use in hand sanitizers is particularly egregious considering it can cause harm via skin absorption and inhalation, both of which are possible when hand sanitizer is used correctly and as intended. Valisure has asked the FDA to immediately recall the contaminated batches of hand sanitizer they revealed, and update its guidance to include an exposure limit for benzene along with a concentration limit.

They also found that at least 45% of the benzene-contaminated hand sanitizers contained additional ingredients intended to improve its smell, taste or appearance, increasing the risk of ingestion by children. In fact, Valisure stated, “Some of the highly contaminated batches Valisure analyzed appear to be specifically formulated and marketed for children.”<sup>16</sup>

## **Antiperspirants Recalled Due to Benzene**

November 23, 2021, Procter & Gamble voluntarily recalled certain lots of Old Spice and Secret aerosol spray antiperspirants and Old Spice Below Deck aerosol spray products sold in the U.S., due to the presence of benzene.<sup>17</sup>

It’s ironic that the FDA has announced the voluntary recall, even acknowledging that “exposure to benzene can occur by inhalation, orally, and through the skin,”<sup>18</sup> yet it knowingly allowed increased levels of benzene in hand sanitizers throughout the pandemic — a time when people were using the products with increased frequency — without any warning.

Meanwhile, it warns that if you have any of the hand sanitizers on its “do not use” list, you should stop using it and “dispose of it, ideally in a hazardous waste container.”<sup>19</sup> The FDA does not have the authority to force recalls, though it can warn about contaminated products.

However, unless you're in the habit of checking the FDA's website for consumer warnings, or you happen to see something in the news, you'd have no way of knowing that the hand sanitizer you're using to "stay safe" may be exposing you to cancer-causing chemicals.

## Do You Really Need Hand Sanitizer?

Overuse of hand sanitizers and other disinfectants can backfire. There are potential adverse effects to human health from inhaling disinfectants, as such chemicals are known to accumulate in the lungs, liver, kidneys, stomach, brain and blood. Exposures were certainly elevated during the pandemic for many people, who were exposed to disinfectants by inhalation and oral routes, as well as via the skin and eyes.

There are also significant environmental concerns due to the "unusual release and dissemination of higher concentrations of biocide-based products into the surface and underground waters and also wastewater treatment systems" during the pandemic.<sup>20</sup> When disinfectants and biocides enter the environment, they can wipe out beneficial bacterial species that are keeping drug-resistant microorganisms in check.

"[I]f the biocide concentrations reach the sub-minimum inhibitory concentration (sub-MIC), this event may augment the selective pressure, boost the horizontal gene transfer (HGT), and drive the evolution of AMR [antimicrobial resistance]," scientists warn.<sup>21</sup> Even during the pandemic, there's little hand sanitizers can do that soap and water can't.

Unless you're in a hospital setting, where disinfectants are sometimes necessary, you should use hand sanitizers sparingly and only when truly necessary, which typically will be hardly at all.

## Sources and References

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- <sup>2, 5</sup> [U.S. FDA, Temporary Policy for Preparation of Certain Alcohol-Based Hand Sanitizer Products During the Public Health \[...\], March 2020, page 11](#)
- <sup>3, 4</sup> [U.S. FDA, Q&A for Consumers, Hand Sanitizers and COVID-19](#)

- <sup>6</sup> U.S. FDA, Temporary Policy for Preparation of Certain Alcohol-Based Hand Sanitizer Products During the Public Health [...], March 2020, page 10
- <sup>7</sup> U.S. FDA, FDA in Brief, October 12, 2021
- <sup>8, 9, 10, 12, 19</sup> U.S. FDA, FDA updates on hand sanitizers consumers should not use December 1, 2021
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- <sup>17, 18</sup> U.S. FDA, Voluntary Recall November 23, 2021
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