



## Natural Life Consulting, LLC

7 Hodges Street, North Andover, MA 01845

339-368-7551 fax: 978-409-1269

<http://NaturalLifeConsulting.com>

### **Potential health hazards of commercial cleaning and disinfecting products**

Asthma – cleaning products usually release mists, vapors, or gasses that can be irritating to the eyes, nose, throat, and lungs. Many industrial chemicals contained in these products (including formaldehyde and quats) have been identified as asthmagens (respiratory irritants) – which can worsen asthma or cause asthma to develop in previously healthy individuals. The risk is highest with those individuals who use spray cleaners (e.g., air fresheners (which often contain phthalates), oven cleaners, chlorine bleach sprays, drain cleaners, glass cleaners, furniture cleaners, and citrus- and pine-based cleaners). A study published in 2007 included over 3,500 participants (who did not have asthma) across ten countries. After nine years, participants who used spray cleaners (air fresheners, glass cleaning sprays, and furniture cleaning sprays) in their home on a weekly basis had a 30%-50% increased risk of developing asthma.<sup>1</sup> Another study suggests that fetal exposure to household cleaning supplies may affect respiratory health. In a series of studies, scientists determined that children born to women who frequently used cleaning supplies in their home while pregnant had a higher risk of persistent wheezing and reduced lung function.<sup>2</sup> There is also risk when using multiple cleaning products at the same time. For example, mixing cleaning products that contain bleach and ammonia creates chloramine gas that may lead to severe lung damage or death.<sup>3</sup>

Cancer – the Environmental Working Group (EWG.org) surveyed the ingredients in many common cleaners (liquid laundry detergents, citrus- and pine-based cleaners, air fresheners, and mold- and mildew-control products) and found that many either contain or produce (through the addition of chemicals) known carcinogens (e.g., formaldehyde and 1,4-Dioxane).<sup>4</sup> A retrospective study of 1,500 women in Massachusetts was done in 2010 by the Silent Spring Institute. The results showed that women who reported the greatest use of cleaning products (the top 25%) were twice as likely to have been diagnosed with breast cancer than those reporting the least use (the bottom 25%). Note that as this report was a retrospective self-reported study, the authors noted that a limitation exists with valid associations and recall bias (e.g., the women having beliefs that chemicals and pollutants cause breast cancer may report higher usage of the cleaning products).<sup>5</sup>

Reproductive or developmental problems – in animal studies, chemicals in cleaning products (including quats) contributed to reduced ovulation and fertility in females, decreased sperm count in males, and damage to developing fetuses and birth defects<sup>6</sup>. In 2010, the New York Department of Health conducted a study of nearly 15,000 women and compared five occupational groups' maternal occupations with 45 types of birth defects. The study showed a correlation between women working as maids/housekeepers/janitors and birth defects such as reduced neural tube defects and cleft palates.<sup>7</sup> A study done in 2014 in Australia compared maternal and paternal exposures to solvents (e.g., benzene, chlorinated solvents, aromatics) and the risk of childhood brain tumors (CBT). The study included over 1200 children and found a positive correlation between paternal exposure to aromatic solvents (the year prior to conception) and maternal exposure to chlorinated solvents (any time before birth) and CBT.<sup>8</sup> Another study completed in Sweden published in 2019 followed 718 pregnant women exposed to various endocrine disruptors found in everyday consumer products (e.g., phthalates, BPA, and polyfluoroalkyl substances). The researchers measured these chemicals in the mother's blood during the first trimester. Some of these chemicals cross the placenta. The children were then examined at seven years of age. The children whose mothers had higher levels of these chemicals in their blood during pregnancy had lower IQ scores (particularly boys).<sup>9</sup>

Allergens and irritants – painful irritation of the skin, eyes, nose, throat, and lungs can be caused by chemicals in cleaning products. About 2.5 million people in the United States have fragrance allergies.<sup>10</sup> Fragrances (which often contain phthalates) can trigger asthma attacks, headaches, and breathing difficulties. A study was done in 2009 with workers at a detergent products plant. Workers exposed to liquid enzymes were found to be at risk of developing respiratory allergies.<sup>11</sup> Chlorine bleach is extremely irritating and has been linked to symptoms of obstructive lung disease and work-related asthma.<sup>12</sup> Another study done in 2009 found that individuals using bleach four or more times per week were more likely than non-bleach users to experience wheezing, coughing, and shortness of breath.<sup>13</sup> Volatile fumes released during ordinary cleaning processes can contaminate the air for up to 20 minutes after use.<sup>14</sup>

Chemical burns and poisoning – many household cleaners can cause severe damage when ingested or splashed directly onto the skin and eyes. In 2021, household cleaning products were implicated in 10.7% of all poison exposures compiled by the National Poison Control Call Statistics (second only to cosmetics and personal care products which were at 10.8%).<sup>15</sup>

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<sup>1</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2020829/>

<sup>2</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1747149/>

<sup>3</sup> [Protecting Workers Who Use Cleaning Chemicals \(osha.gov\)](https://www.osha.gov/protecting-workers-who-use-cleaning-chemicals)

<sup>4</sup> [https://www.ewg.org/guides/cleaners/content/cleaners\\_and\\_health/](https://www.ewg.org/guides/cleaners/content/cleaners_and_health/)

<sup>5</sup> <https://pubmed.ncbi.nlm.nih.gov/20646273/>

<sup>6</sup> [https://www.ewg.org/guides/cleaners/content/cleaners\\_and\\_health/](https://www.ewg.org/guides/cleaners/content/cleaners_and_health/)

<sup>7</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3824611/>

<sup>8</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4150269/>

<sup>9</sup> <https://www.mountsinai.org/about/newsroom/2019/exposure-to-multiple-chemicals-in-consumer-products-during-early-pregnancy-is-related-to-lower-iq-in-children>

<sup>10</sup> <https://www.webmd.com/allergies/fragrances>

<sup>11</sup> [http://www.occupationalasthma.com/occupational\\_asthma\\_viewreference.aspx?id=4678](http://www.occupationalasthma.com/occupational_asthma_viewreference.aspx?id=4678)

<sup>12</sup> <https://erj.ersjournals.com/content/27/6/1196>

<sup>13</sup> <https://pubmed.ncbi.nlm.nih.gov/19665775/>

<sup>14</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3002341/>

<sup>15</sup> <https://www.poison.org/poison-statistics-national>