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## CHEMICALS IN THE MARKETPLACE

### GENERAL U.S. CHEMICAL STATS

There are more than 85,000 chemicals registered for use,<sup>1</sup> with thousands more hitting the market every year.<sup>2</sup>

Currently, there are approximately 2,800 high-production-volume (HPV) chemicals produced in the United States in quantities equal to or exceeding 1 million pounds.<sup>3</sup> They are used extensively in our homes, schools, and communities, but less than one-third of these chemicals have publicly available safety data,<sup>4</sup> and less than two percent have been assessed for their effects on children's health and development.<sup>5</sup>

The Toxic Substances Control Act (TSCA), which passed in 1976 and was updated in 2016, is the primary law that regulates chemicals. It is meant to empower the Environmental Protection Agency (EPA) to ensure that chemicals are safe. However, the EPA has not reviewed the majority of industrial chemicals for human-health impacts. Over the 30 years since TSCA was enacted, the EPA has succeeded in compelling hazard testing for only about 200 of the tens of thousands of chemicals in U.S. commerce.<sup>6</sup> The newly reformed TSCA allows the EPA to evaluate more chemicals for safety.

### COSMETIC AND PERSONAL CARE INDUSTRY

There are approximately two pages of federal<sup>7</sup> legislation to regulate the U.S. cosmetic industry, which was valued at \$62 billion in 2016.<sup>8</sup>

- The United States has banned or partially restricted approximately 30 ingredients from personal care products.<sup>9</sup>
- Health Canada has banned or restricted nearly 600 ingredients from personal care products.<sup>10</sup>
- The European Union has banned or restricted over 1,400 ingredients.<sup>11</sup>

More than 3,000 materials have been reported as used in fragrance compounds found in cosmetics and other consumer products.<sup>12</sup> But since "fragrance" is considered a trade secret, companies do not have to disclose the ingredients used to create their fragrances, and the consumer is often left in the dark.<sup>13</sup> The blends may include phthalates, synthetic musks, and other ingredients linked to hormone disruption and allergies.<sup>14,15</sup>

The 40-year-old Cosmetics Ingredient Review Panel (funded by the industry's own trade association) states that as of 2012, it has reviewed 3,156 ingredients and found only 12 to be unsafe.<sup>16</sup> The CIR has not analyzed 70% of cosmetic ingredients.

## **COSMETIC REGULATIONS**

The Food and Drug Administration (FDA) is the federal agency that oversees the cosmetic industry. Under the Federal Food, Drug and Cosmetics Act of 1938 (the federal cosmetic law that has not had a major overhaul in more than 75 years), the FDA has virtually no power to regulate the cosmetic industry.

- The FDA's authority over cosmetics is different from other products it regulates, such as drugs, food, biologics, and medical devices.<sup>17</sup> Personal care products are some of the least-regulated consumer products on the market.
- The FDA does not require that cosmetic ingredients be assessed for safety before they go on to the market, and they cannot issue a product recall.<sup>18</sup>
- According to the Office of Cosmetics and Colors at FDA, "...a cosmetic manufacturer may use almost any raw material as a cosmetic ingredient and market the product without an approval from FDA."<sup>19</sup>

## **COSMETIC USE**

Women use an average of 12 personal care products a day, and men use about six. Teenage girls average 17 *products* a day.<sup>20</sup> This can mean exposure to hundreds of chemicals just in the course of a morning beauty routine.

## **ENVIRONMENTAL HEALTH & SAFETY**

Children are far more vulnerable than adults to the effects of toxic chemicals and radiation.<sup>21</sup>

Biomonitoring studies, which measure specific chemicals found in blood, urine, or tissue, help us to understand our potential body burden of chemicals absorbed from personal care products. Highlights of recent studies include:

- Women who used more personal care products, particularly those with fragrance, had higher concentrations of several phthalates in their urine.<sup>22</sup>
- More than 200 synthetic chemicals—many of them known to be toxic—were found in the bodies of nearly all Americans, including newborn infants, who are exposed to these chemicals in utero.<sup>23</sup>
- Pregnant women represent a particularly vulnerable population, as exposure to potentially harmful chemicals during fetal development may lead to altered health outcomes for the child later in life.<sup>24</sup> Organochlorine pesticides, phenols, PBDEs, phthalates, polycyclic aromatic hydrocarbons, and perchlorate were detected in 99-100% of pregnant women in the United States. Some of these chemicals were banned more than four decades ago, indicating the persistence of these harmful chemicals in our environment.<sup>25</sup>
- More than 80% of the 163 infants tested had at least seven phthalate metabolites in their urine, some of which correlated with the use of shampoo, lotion, or powder.<sup>26</sup>
- 16 different known hormone-disrupting chemicals (including phthalates, triclosan, parabens, and musks) were found in the bodies of 20 teenage girls.<sup>27</sup>
- The use of safer personal care products (defined as those free of suspected hormone-disrupting chemicals such as phthalates, parabens, and triclosan) significantly reduced the concentration of these hormone-altering chemicals in the urine of teenage girl volunteers in just three days. These results demonstrate that with conscious consumer habits, we can reduce our body burden to harmful

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chemicals.<sup>28</sup>

In the United States, more than 4 billion pounds of toxic chemicals are released into the environment each year,<sup>29</sup> including 72 million pounds of recognized carcinogens. Of the top 20 chemicals discharged to the environment, nearly 75% are known or suspected to be toxic to the developing human brain.<sup>30</sup>

## **ILLNESSES AND DISORDERS ON THE RISE**

More than 40 years of scientific studies have fueled the growing consensus that exposure to toxic chemicals plays a role in the incidence and prevalence of many diseases and disorders in the United States.<sup>31</sup>

## **CANCER**

The statistics are alarming: In the United States, one in three women and one in two men will develop cancer in their lifetimes.<sup>32</sup>

21% of Americans will die from cancer.<sup>33</sup>

The incidence of some cancers, including some of the most common among children, is increasing in the United States.<sup>34</sup> In fact, childhood cancers have increased by 21% since 1980.<sup>35</sup>

Cancer is now the second leading cause of death in children ages 5 to 9 in the United States, exceeded only by deaths resulting from injury.<sup>36</sup>

One in eight women in the United States will be diagnosed with breast cancer in their lifetime; 40 years ago, it was one in 10.<sup>37</sup>

- Only half of these cases can be tied to traditional risk factors like genetic inheritance, diet, and reproductive history.<sup>38</sup> That's hundreds of thousands of women diagnosed with no known risk factors.
- Cancer susceptibility genes are estimated to account for only 5-10% of breast cancers overall.
- Another way of phrasing it: Approximately 90% of women diagnosed do not have a mutation in their BRCA genes, which are the genes many people think of when they think of genetic predisposition to the disease.<sup>39</sup>

In 2010, the President's Cancer Panel released its annual report, which for the first time focused on investigating the environmental links to cancer. The panel was particularly concerned to find that the true burden of non-genetic, environmentally induced cancer has been "grossly underestimated".<sup>40</sup>

## **FERTILITY/REPRODUCTIVE ISSUES**

Difficulty in conceiving and maintaining a pregnancy affected 40% more women in 2002 than in 1982. From 1982 to 1995, the incidence of reported difficulty almost doubled in younger women ages 18-25.<sup>41, 42</sup>

There is growing scientific evidence of the impact of environmental contaminants on declining reproductive function and increasing rates of reproductive illnesses since the mid-20th century,<sup>43</sup> including difficulty conceiving and maintaining pregnancy, increased rates of testicular cancer, and increased preterm birth.<sup>44, 45</sup>

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Studies indicate that sperm count and testosterone levels may be declining in U.S. males.<sup>46</sup> Environmental exposure to toxic chemicals, such as BPA and phthalates,<sup>47</sup> may play a role in these issues.<sup>48</sup>

Prenatal exposure to phthalates—chemicals found in personal care products and other consumer products—can cause the reproductive organs of male infants to develop abnormally.<sup>49</sup>

Today, girls are entering puberty earlier than they were a generation ago—in part due to childhood and, likely, in-utero exposures to endocrine disruptors (substances that can alter the body's hormonal responses).<sup>50</sup> Early puberty puts girls at a higher risk for later-life breast cancer,<sup>51</sup> and the shortened childhood undoubtedly has larger implications, including an increased risk of depression.<sup>52</sup>

## SOCIETAL IMPLICATIONS

Researchers estimate that exposure to toxic chemicals is responsible for nearly \$80 billion in annual health care costs, including a loss of productivity in the workforce from lost IQ points. Such studies are far from comprehensive; the real toll of exposure to toxic chemicals is likely far higher.<sup>53</sup>

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