

Scents and sensibility

It's 2020 and I'm wearing perfume. I wear Very Irresistible by Givenchy. Very irresistible to some but apparently toxic to others.

It took an incident at a friend's house to make me realize the effects that fragrances can have on some individuals. I went to spend a weekend with my friend, and on day 1 everything was great, but on day 2 I awoke to a chill in the air. It was a crisp January morning and my friend had opened all the doors to her home. She had developed a cough, headache, and mild nausea in response to my perfume. She told me that this was a common occurrence for her.

I've also had patients complain of being sensitive to scents in their work environments, some to the point of opening WorkSafeBC claims. I've always advocated for my patients but have questioned the validity of such claims.

The word *perfume* derives from the Latin word *perfumare* meaning "to smoke through." The art of making perfume began in ancient Egypt and China and was refined by the Romans and the Arabs. Apparently all public places in Britain were scented during Queen Elizabeth I's rule (1558–1603) as she could not tolerate bad smells. The first scented colognes were brought to America by French explorers. As of 2019, the global fragrance market was estimated to be worth approximately US\$38 billion—expected to rise to over US\$50 billion by 2025.

Perfume is a mixture of fragrant essential oils or aroma compounds, fixatives, and solvents used to give the human body, animals, food, objects, and living space an agreeable scent. There has been limited information available about the safety of fragrance compounds as the manufacturers are not required to—nor do they want to—elaborate on the ingredients of fragrance mixtures, which are classified as trade secrets. The FDA controls the safety of fragrances through their ingredients and requires that they meet the designation of "generally recognized as safe" (GRAS). The International Fragrance Association is one of the governing bodies attempting to produce guidelines with the aim of safe production and

use of fragrances. The association can outright ban certain fragrances or conduct risk assessments for potential adverse health effects.

There have been numerous studies done to evaluate the health effects of fragrances. An article in *Environmental Research*, "Neurotoxicity of fragrance compounds: A review,"¹ states that most fragrance compounds belong to one of three families: phthalates, synthetic musks, or chemical sensitizers. Phthalates enable the slow evaporation of the fragrance allowing the scent to linger longer. Various studies have shown adverse effects of phthalates, such as endocrine disruption, bone mineral density decline, sperm dysfunction, and neurotoxicity even at the

perinatal level. Fragrances usually fall into the category of synthetic musks. There are four main groups of synthetic musks, and the newer polycyclic musks are the most popular, but there are still questions about their safety, specifically concerning estrogenic agonism and a possible increase in the proliferation rate of human breast cancer cells. These compounds have also been shown to accumulate in the environment and their biodegradability is questionable. The authors summarized that while we have considerable data on the role of fragrance compounds and their general toxicity, and more specifically endocrine disruption, less is known about their neurotoxicity. The extent to which these compounds are found in consumer products also remains a mystery due to lack of research and deficient regulation. The authors recommend additional studies elucidating the neurotoxicity of fragrance compounds.

The authors of an article in *Clinical and Experimental Allergy*, "Increased release of histamine in patients with respiratory symptoms related to perfume,"² concluded that perfume induces a dose-dependent non-IGE mediated

release of histamine from human peripheral blood basophils. This increased basophil reactivity to perfume was found in patients with respiratory symptoms related to perfume but the mechanism causing the increased reactivity was not known. This study was limited by its small sample size.

Regulatory Toxicology and Pharmacology cites a paper from 2019, "Fragrance inhalation and adverse health effects: The question of causation."³ The authors state that although some fragrances have the potential to cause skin sensitization, they lack the ability to induce allergic sensitization of the respiratory tract. They suggest that it is possible for asthmatics and other suscep-

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tible individuals to have an exacerbation of their respiratory symptoms when exposed to fragrances, but this would be more in keeping with an irritant effect of high levels of exposure to the causative agent coupled with the higher sensitivity of the exposed individual. They state that the key feature of a commercially successful fragrance is that it stimulates olfactory receptors at low concentrations and some individuals may link these olfactory triggers with adverse effects, including respiratory responses. They were unable to find a causative explanation in terms of allergy or irritation and suggested that a neurological/psychological mechanism may be involved. They felt that it was unhelpful to heighten consumer fears by unwarranted conclusions drawn from questionnaire studies with methodological weaknesses.

I was unable to find any robust studies linking exposure to fragrances with adverse health effects. I believe research still needs to be conducted in this area, especially to develop validated diagnostic toxicological tests to evaluate fragrances.

Human nature in times of stress

And I've decided that I need to be sensible when it comes to wearing scents. I have stopped wearing perfume to work or in any situations that will involve close interactions with others. I'll reserve being very irresistible for hot nights in the city. ■

—Jeevyn K. Chahal, MD

References

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A few months ago, I read something about the severe acute respiratory syndrome (SARS) outbreak of 2003 and I remember thinking, it's only a matter of time until something else strikes. In case you think I have some prophetic power, I should state that I have never won a lottery prize.

As I write this editorial in early February, the novel Wuhan coronavirus has been declared a world health emergency by the World Health Organization. At this point, there have been about 14 000 documented cases in 23 countries with over 300 deaths, all but one in China. It remains unclear if this virus is destined to become a global pandemic or fizzle out in the months to come.

Fortunately, this virus appears to be less virulent than SARS, which had a death rate of roughly 10%. However, it is much more

contagious and is already close to doubling the number of SARS cases. Also troubling, and making screening more difficult, is the virus's apparent ability to transmit prior to an individual being symptomatic. I am reminded of the Spanish flu outbreak in 1918 (no, I'm not that old), which had a lower mortality rate than SARS but by the sheer number of people infected was responsible for millions of deaths.

By the time this editorial makes it to print, the trajectory of the Wuhan coronavirus will likely have been decided. The purpose of my editorial is to reflect on human nature and the hope I have for compassion and grace. It is easy to be a positive influence in the world when everything is going well. Sadly, I have found that true human nature is often demonstrated during times of stress and difficulty. Sporadic reports of racism directed toward the Asian community have already begun to surface. Viruses don't care about human skin pigment or geographic origin. This virus could have just as easily originated in a town or city on any other continent.

I have fielded a few questions about this novel virus in my office, and I can feel the fear building among my patients. I remain hopeful that despite the challenges this virus might bring that the world will react with decency toward those less fortunate. Now don't get me wrong, I don't want my family or friends to be infected, and I'm not immune to the anxiety this potential pandemic might bring, but I will strive to focus on the caring our profession is known for. Increasingly, we live in a closely connected global society, so this situation affects all of us. I will strive to do my part with empathy and respect when faced with any threats this virus might bring. May the world do the same. ■

—David Richardson, MD

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