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Fragrance exposure in the UK: has there been a change in the last decade?

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Dear Editor,

Fragrance allergy constitutes a significant public health problem that affects 1-2% of the general population and 6-13% of consecutively patch tested patients¹. The European Union (EU) Scientific Committee on Consumer Safety (SCCS) independently advises the EU on its regulation of allergens such as fragrance.

At present, a total of 26 fragrance allergens are subject to mandatory individual labelling on product packaging in the EU, including all 14 that form Fragrance Mixes 1 and 2 in the European and British Baseline patch test series. For consumer safety and transparency, these fragrances must be mentioned, in addition to the words 'parfum' or 'aroma', if present at more than 10 parts per million (ppm) in 'leave-on' and 100 ppm in 'rinse-off' products, allowing those sensitised to avoid them. Fragrance markers in the European Baseline patch test series fail to detect a significant subset of allergic patients, who would have been identified by routinely testing all 26 fragrances. It has recently been recommended that the oxidised terpenes limonene and linalool, 2 fragrances which elicit a particularly high rate of contact allergy, be added to the British Baseline series².

In 2004, the SCCS recommended that chloroatranol and atranol, the 2 potent sensitising fragrances in the lichen extracts tree moss (*Evernia furfuracea*) and oak moss (*Evernia prunastri*), be banned from consumer products. In 2011, it additionally proposed a ban on the highly sensitising synthetic fragrance hydroisohexylcyclohexene carboxaldehyde (HICC or 'Lyrall'), due to increasing frequency of contact allergy³. These recommendations will be enforced by EU law in August 2021, such that chloroatranol, atranol and HICC must not be present in consumer products after that date.

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In 2006, we conducted a survey of exposure to fragrance sensitizers in cosmetics and detergents on sale in the UK. HICC was labelled in 29% of products, *Evernia prunastri* in 4% and *Evernia furfuracea* in 3⁴. A 2007 German multicentre study of 21,325 consecutively patch tested patients identified HICC, *Evernia prunastri* and *Evernia furfuracea* to be the fragrances with the highest rates of sensitization: 2.3, 2.0 and 2.4% respectively⁵. However, oxidised limonene and linalool were not tested at that time. Limonene and linalool were the most frequently labelled fragrance constituents in our 2006 study, identified in 63% of UK products surveyed⁴. Rates of allergy to oxidised limonene and linalool in consecutively patch tested patients have subsequently been documented to be far higher than other fragrances, at 5.0 and 5.9% respectively in the UK and 5.2 and 6.9% worldwide⁶⁻⁸.

We aimed to assess whether UK fragrance exposure patterns have changed during the last 10 years. We performed a survey of household and cosmetic products in UK retail stores in December 2016. Products were included if 'parfum' or 'aroma' were listed among the ingredients. 314 products were surveyed; the presence of any of the 26 fragrances subject to mandatory labelling in the EU was recorded.

Of the 314 products examined, 251 products (79.9%) contained at least 1 of the 26 fragrances subject to mandatory labelling in the EU. 20.1% of products surveyed contained fragrances falling outside EU labelling laws. The most commonly encountered fragrances were limonene and linalool, identified in 62.4% and 58.3% of products respectively.

The frequency of labelling of the potent sensitizer HICC reduced from 29% in 2006 to 7.6% in 2016 (Figure 1). Similarly, the frequency of labelling of *Evernia prunastri* reduced from 4% to 1.3%, and that of *Evernia furfuracea* from 3% to 1.6% of products. Limonene and linalool remained the most commonly labelled fragrances, present in about 2/3rds of all products, as in 2006⁴.

Limonene was identified in all product categories and was the most common fragrance in household products (46%), women's fragrances (92%), men's products (96%) and dental products (47.4%). Linalool was the most common fragrance in personal care products such as soaps, shampoos and shower gels (64%) and was present in 15% of cosmetics. *Evernia prunastri* and *Evernia furfuracea* were found in men's products and women's fragrances; HICC was still identified in a wide range of products.

There has been a vast reduction in the frequency of labelling of HICC in cosmetic products available in the UK, well in advance of its prohibition. Similarly, manufacturers are moving away from *Evernia prunastri* and *Evernia furfuracea* before the legal ban is enforced. The significant reduction in consumer exposure to HICC may lead to a decline in sensitization. It is hoped that future sensitization to *Evernia prunastri* and *Evernia furfuracea* may also be prevented. However, sensitization to oxidized limonene and linalool is likely to remain a very significant problem.

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Figure 1: Comparison of the frequency of the 26 fragrances in UK products in 2006 vs. 2016

