



Probabilistic assessment of exposure to hair cosmetic products by the French population



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ABSTRACT

Cosmetic exposure data are limited in Europe and especially in France.

The aim of this study was to assess the exposure to hair cosmetics using recent consumption data (percentage of users, frequency of use and amount per use) generated for the French population (Ficheux et al., 2015, 2016). Exposure was assessed using a probabilistic method for eleven hair products: liquid shampoo, dry shampoo, conditioner, hair mask, hair serum, hair oil, styling lacquer, styling gel, styling foam, styling wax and styling spray. Exposure was assessed by sex and by age classes in adults and children. Pregnant women were also studied.

For liquid shampoo, conditioner and some styling products (gel, lacquer and foam), the levels of exposure were higher than the values currently used by the Scientific Committee on Consumer Safety (SCCS). Exposure values found for styling wax and styling spray were lower than SCCS values. Exposure was assessed for the first time for dry shampoo, hair mask, hair serum and hair oil products.

These new French exposure values will be useful for safety assessors and for safety agencies in order to protect the general population and these at-risk populations.

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1. Introduction

The European Regulation (EC) No. 1223/2009 specifies that a cosmetic product available on the market must be safe for human health when consumed under normal or reasonably foreseeable conditions of use. In order to perform a safety evaluation, the assessors need to possess relevant toxicological data for all the composing ingredients and accurate exposure data for the finished cosmetic product to assess systemic exposure (EU, 2009).

Cosmetic exposure data are limited in Europe and especially in France. The European cosmetics industry (Cosmetics Europe) has published adult exposure data for twelve cosmetics including showering, hair care, skin care, make-up and deodorant products (Hall et al., 2007, 2011; McNamara et al., 2007). These values are currently used by the Scientific Committee on Consumer Safety (SCCS) to estimate daily exposure levels for European consumers (SCCS, 2015). However, these data do not cover all the different types of cosmetics. Specific, potentially at-risk groups such as pregnant women or children were not included in the sample of people.

In comparison with the European exposure data, Bavoux et al. (2011) have shown differences in exposure values obtained on French pregnant women versus non-pregnant women, which may be explained by national specificities and behaviours. It is thus appropriate to assess the current exposure to cosmetic products by French consumers to ensure their safety. Cosmetic consumption data (percentage of users, frequency of use and amount per use) were recently generated for 150 products consumed by French people (Ficheux et al., 2014, 2015 and 2016). The aim of the study was to assess the exposure of the French population to eleven hair cosmetic products using these current French consumption data. Exposure was assessed using a probabilistic method. The results were presented by sex and by age classes in adults and children. Pregnant women were also taken into account.

2. Material and methods

This presented work was based on a global French cosmetic consumption study performed on 150 products including general hygiene, skin care, hair styling, hair care, make-up, nail care, solar, baby, shaving and depilatory products. Only the information concerning the cosmetics for hair will be mentioned in this publication.

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Data obtained for babies aged 0–3 years old will not be presented here; a specific publication for this sub-population will be published later.

2.1. Cosmetics studied

The hair products studied here were selected based on a previous consumption study performed on 20 hair cosmetics found in the French market (Ficheux et al., 2015). Hair cosmetics used by more than 10% of French people were included for an exposure assessment. In total, 11 hair cosmetics were shortlisted, including cleanser (liquid shampoo and dry shampoo), care (conditioner, hair mask, hair serum and hair oil) and styling (lacquer, gel, foam, wax and spray) products. Hair dyeing products were not studied here, because results concerning the exposure to these cosmetics have already been published (Bernard et al., 2016).

2.2. Enquiry design

Three enquiries were performed in order to collect the data required to assess the exposure of the French population to hair products. The first was designed to obtain the frequency of use data (web survey). The second aimed to validate or to correct the frequency data previously obtained in the web survey (phone survey). The third served to collect the amount per use data (face to face survey). Body weight data were collected in the first and in the second enquiries (web and phone enquiries): people were asked about their body weight at the end of the questionnaire (Fig. 1).

2.2.1. Web enquiry: frequency of use data (see Ficheux et al., 2015)

A web questionnaire survey (Computer Assisted Web Interview, CAWI) was conducted in France on September 2013 by a national survey company. The respondents were selected to form a nationally representative panel. Selections were made based on

quotas for sex, age (4–9, 10–14, 15–24, 25–39, 40–49, 50–59, 60–70 years old), socio-professional category, size of household, geographical area (northwest, northeast, southwest, southeast and Ile-de-France) and degree of urbanization (<2000 inhabitants, 2000–20,000 inhabitants, 20,000–100,000 inhabitants, Paris metropolitan area). Quotas were also made for pregnant women for age (15–24, 25–39, >40 years old), socio-professional category, size of household and geographical area.

The aim of the questionnaire was to determine, for all hair products used during the past 12 months by each participant, the corresponding frequency of use. For people with one or more children younger than 15 years old, the questionnaire could concern a child. In this case, the adult completed the questionnaire on behalf of the child based on his memory of the child's behaviour.

Two frequency scales were proposed according to consumed cosmetics.

- Scale 1: > once a day, once a day, every 2–3 days, once a week, 2–3 times per month, once a month and less often for liquid shampoo, dry shampoo, conditioner, styling lacquer, styling gel, styling foam, styling wax and styling spray products.
- Scale 2: > once a week, once a week, 2–3 times per month, once a month, 6–10 times per year, 3–5 times per year and less often for hair mask, hair serum and hair oil products.

Values were assigned for the frequency choices selected by the panellists. For example, if a volunteer checked “> once a day”, a frequency of twice a day was noted. In the same way, if a respondent checked “every 2–3 days”, “2–3 times per month”, “6–10 times per year” or “3–5 times per year”, these data were replaced by “every 2.5 days”, “2.5 times per month”, “8 times per year” and “4 times per year” respectively. If people checked “less often”, this information was not taken into account in the frequency determination.

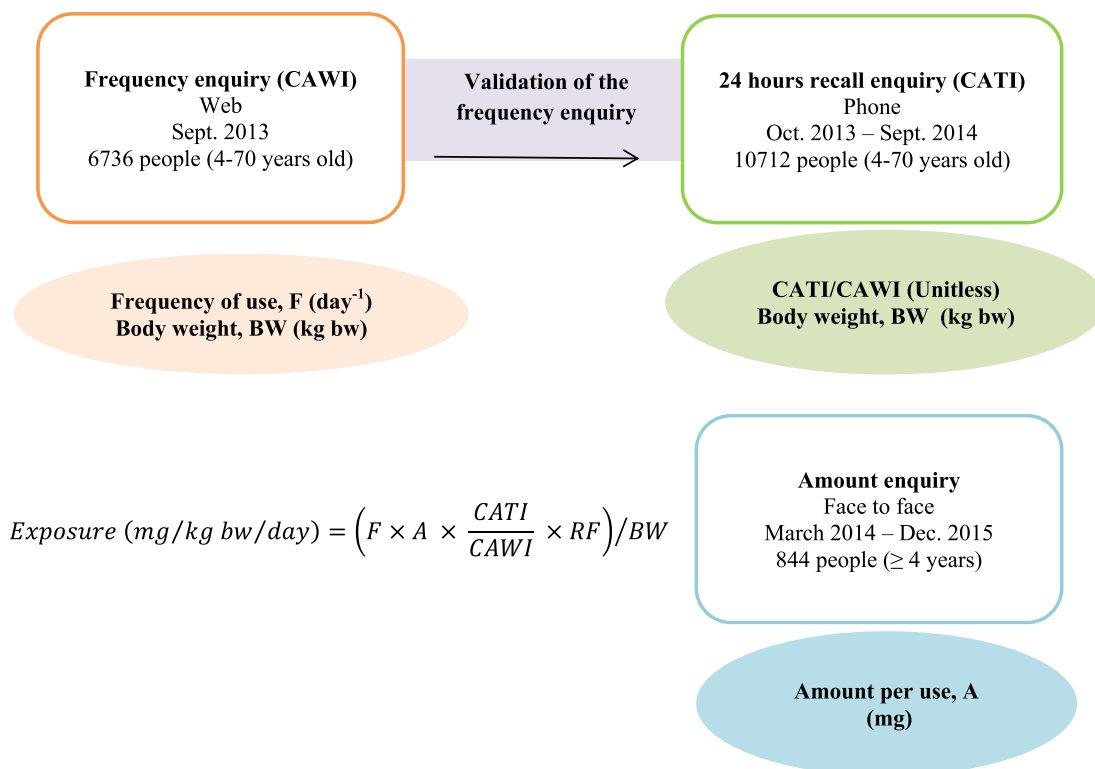


Fig. 1. Enquiry design and parameters obtained in order to assess the exposure to cosmetic products by the French population.

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