

Vigil'Anses

THE BULLETIN OF VIGILANCE

#22

APRIL
2024

TOXICOVIGILANCE

What are the causes of accidental poisoning in children, and how can they be prevented? P. 2

Electricity generators used indoors: a source of carbon monoxide poisoning P. 9

VIGILANCE FOR CHEMICAL PRODUCTS

Transferring household products to unsuitable containers is a very poor practice responsible for serious accidents every year. P. 15

VIGILANCE FOR BIOCIDAL PRODUCTS AND PLANT INPUTS

No adverse effects from vector control: a finding that will need to be confirmed in the coming years P. 21

NUTRIVIGILANCE

Eleven cases of oesophageal and gastric obstruction (bezoars) attributed to consumption via gastric tube of a nutrition product in an intensive care unit P. 24

VIGILANCE FOR OCCUPATIONAL AND ENVIRONMENTAL DISEASES

Hair dyes: plant-based does not mean risk-free P. 26



anses

What are the causes of accidental poisoning in children, and how can they be prevented?



© 123RF

Accidental poisoning in young children is common and, for the most part, preventable. Although cases are usually benign, some can be serious or even fatal. Between 2014 and 2020, the top three causes of poisoning were cleaning and maintenance products, medicines for human use and carbon monoxide. Others, however, are also a concern, such as cannabis poisoning or ingestion of button batteries. Preventing accidents by raising awareness among relatives or carers, wherever the child may be, is a priority. First and foremost, it is essential to keep small objects and hazardous products out of the reach of children.

Following a request from the Directorate General for Health and the Directorate General for Competition, Consumer Affairs and Fraud Control, ANSES analysed various health databases in order to describe accidental poisonings occurring in children under the age of 15 between 2014 and 2020.

With the help of *Santé Publique France* and experts from an ANSES working group, national data from French poison control centres (PCCs) and on emergency department admissions (OSCOUR® network¹), hospital admissions (PMSI²) and mortality (CépiDc³) were studied to obtain an overview of accidental paediatric poisoning cases in France.

The full study report also includes the results of the permanent survey on everyday accidents (EPAC), conducted by *Santé Publique France*, which confirmed the results obtained from the other data sources and described the trends over time in certain types of poisoning.

These sources complement each other (see box), in particular when describing poisoning cases according to their severity – whether the child stayed at home, was taken to the emergency department, hospitalised or even died – but also when documenting the agents involved and the circumstances. It should be noted that the same patient may have been counted in several sources without being identified: the counts from different databases should not therefore be added together.

By comparing the results for each source, accidental paediatric poisonings can be classified according to two criteria: frequency and severity (Table I). Cleaning products (mainly household products), medicines for human use and carbon monoxide made up the top three most common and most serious causes of poisoning.

¹ OSCOUR®: OSCOUR®: Organisation of coordinated emergency surveillance, led by *Santé Publique France*.

² PMSI: French Programme for the Medicalisation of Information Systems.

³ CépiDc: Epidemiology Centre on Medical Causes of Death.

Box – Information provided by each of the health data sources for the multi-source study of accidental paediatric poisoning cases

POISON CONTROL CENTRES – PCCS	EMERGENCY DEPARTMENT VISITS – OSCOUR®	HOSPITALISATIONS – PMSI	DEATHS – CÉPIDC
N=143,144, 2014–2020 <15 years (<6 years: 87%) Around 20,500 cases/year Calls made by individuals or healthcare professionals	N=63,406, 2014–2020 <6 years Around 9100 cases/year Source for nearly all (94%) emergency department visits	N=22,785, 2014–2019 <6 years Around 3,800 cases/year Source for all hospital admissions	N=23, 2014–2017 <15 years Around 6 cases/year Source for all deaths
Most often mild poisonings, calls made by the child's relatives or carers. Generally required monitoring at home.	Children brought to the emergency department spontaneously by relatives or carers, or on the advice of a healthcare professional. Severity indicator when the emergency department visit was followed by hospitalisation.	Poisonings requiring hospitalisation (severity indicator).	Precise causes of death not always available in the certificate: some poisonings may not have been identified as such.
Also more serious cases of poisoning, calls made by a healthcare professional for advice on how to treat the child.	Agent not always detailed.	Another severity indicator if admitted to intensive care.	
Detailed description of the agent responsible for the poisoning, all severity levels combined.	Difficulty distinguishing between accidental and intentional poisoning. Analysis limited to poisonings in children under 6 years of age, all accidental.	Agent not always detailed.	
		Difficulty distinguishing between accidental and intentional poisoning. Analysis limited to poisonings in children under 6 years of age, all accidental.	

Table I – Categories of products or agents causing the most common and/or most serious accidental paediatric poisonings

(multi-source study, 2014 to 2020)

CATEGORIES OF PRODUCTS OR AGENTS	MOST COMMON POISONINGS	MOST SERIOUS POISONINGS
Cleaning, maintenance, stripping and descaling products, including: - Detergent pods - Drain unblockers	Yes, but increasingly rare No	Yes Yes
Medicines, including: - Neurological - Dermatological - Respiratory - Cardiovascular	Yes Yes Yes No	Yes No No Yes
Carbon monoxide	Yes	Yes
Animals, including: - Snakes - Arthropods (insects)	No Yes	Yes No
Drugs, including: - Cannabis	No, but increasingly common	Yes
Foreign bodies, including: - Button batteries	No	Yes
Plants	Yes	No
Cosmetics	Yes	No

Categories causing poisonings that are uncommon and mild are not shown.

**CLEANING AND MAINTENANCE PRODUCTS:
BEWARE OF LIQUID DETERGENT PODS AND
DRAIN UNBLOCKERS**

During the period 2014–2020, cleaning and maintenance products were the leading cause of accidental poisonings in children under 15 years of age recorded by PCCs (29%, Figure 1). Nearly half of these cases (45%) were due to textile treatment products (liquid or powder detergents, fabric softeners, stain removers, etc.), followed by surface cleaning products (32%). While water-soluble detergent pods accounted for more than two-thirds (69%) of poisonings by textile treatment products, these paediatric accidents nevertheless fell by half between 2014 and 2020 following the introduction of mandatory European prevention measures in 2015: product packaged in an opaque box with reinforced closure, prevention pictograms, bittering agent in the

film enclosing the pod, reduced solubility of the film, increased resistance to pressure, etc.

Cleaning and maintenance products were responsible for almost a quarter of the serious poisonings recorded by PCCs (22%, 88 cases – Figure 2). Textile treatment products accounted for more than a third of serious cases (30 out of 88, i.e. 37%), mainly due to liquid detergent pods (23 cases), which were responsible for respiratory distress in the event of choking or serious corneal damage following splashes in the eyes. They were followed by drain unblockers (15 serious cases out of 88, or 20%), which caused corrosive digestive lesions in the event of accidental ingestion by the child.

Figure 1 – Most common accidental poisonings recorded by PCCs in children under 15 years of age. Categories of agents accounting for at least 2% of these poisonings.
(Source SICAP, 2014–2020)

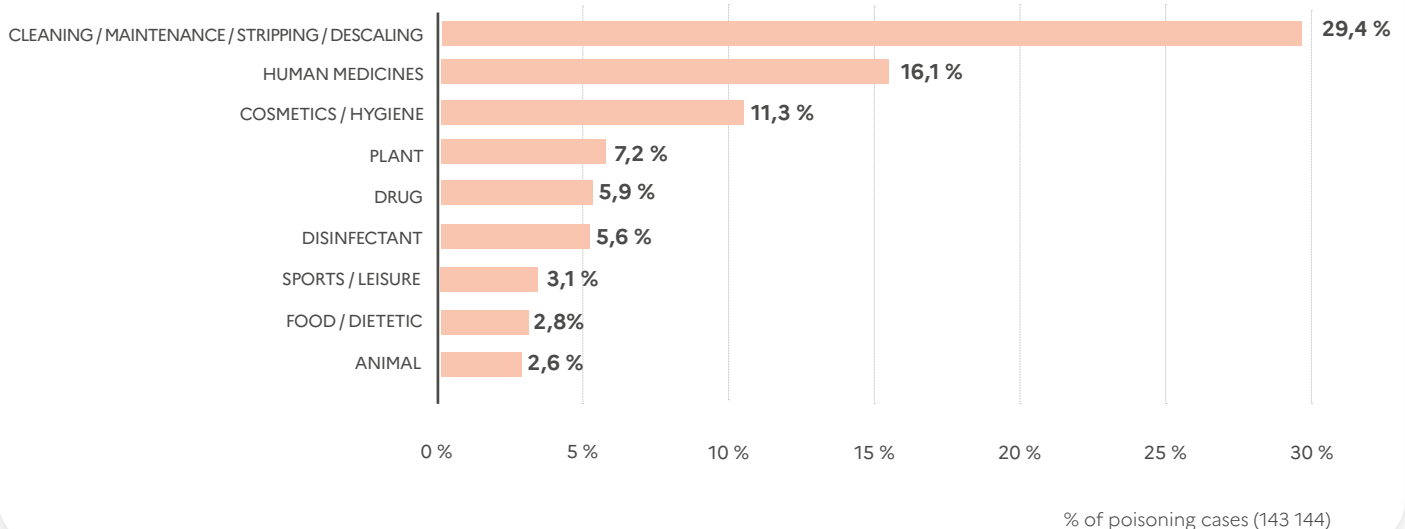
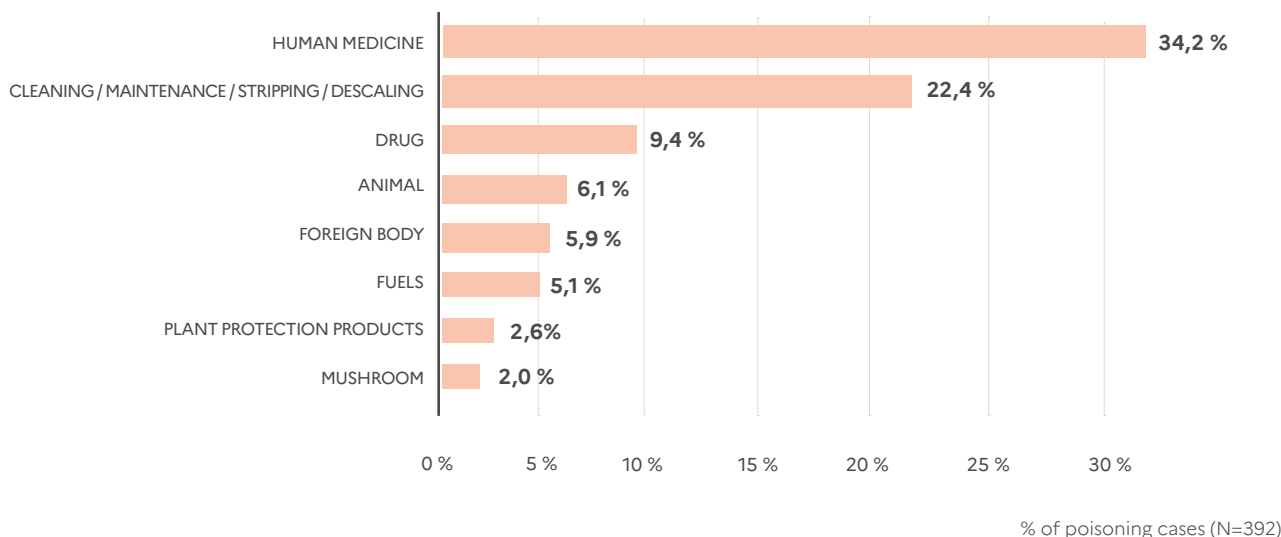


Figure 2 – Most common serious accidental poisonings recorded by PCCs in children under 15 years of age. Categories of agents accounting for at least 2% of all these poisonings.

(Source SICAP, 2014–2020)



The agents in the other databases were not coded as precisely as in the PCC data. However, in children under 6 years of age, poisoning by corrosive substances (descalers, unblockers, etc.) accounted for 5% of emergency department visits (Table II), 6% of hospital admissions

(Table III) and 2% of intensive care admissions (Table IV).

Table II – Most common poisonings in children under 6 years of age treated in emergency departments. Categories of toxic substances accounting for at least 4% of these emergency department visits.

(Source : OSCOUR®, 2014-2020)

TOXIC SUBSTANCE CATEGORIES	NUMBER (TOTAL N=63,406)	PERCENTAGE
Toxic effect of venom from other arthropods	19211	30,3
Poisoning by medicines, biological substances, other and unspecified substances	5697	9,0
Toxic effect of a substance, unspecified	4393	6,9
Toxic effect of a corrosive substance, unspecified	2995	4,7
Toxic effect of carbon monoxide	2625	4,1

Table III – Most common hospital admissions for poisoning in children under 6 years of age. Categories of toxic substances accounting for at least 2% of these hospital admissions.

(Source: PMSI, 2014–2019)

TOXIC SUBSTANCE CATEGORIES	NUMBER (TOTAL N=22,785)	PERCENTAGE
Toxic effect of carbon monoxide	2472	10,8
Non-opioid, antipyretic and antirheumatic analgesics	2365	10,4
Of which 4-aminophenol derivatives (paracetamol)	1340	5,9
Benzodiazepine poisoning	2161	9,5
Poisoning by medicines, biological substances or other substances	2070	9,1
Cannabis poisoning (derivatives)	1671	7,3
Toxic effect of a corrosive substance, unspecified	1326	5,8
Psycholeptics, antipsychotics, psychostimulants	775	3,4
Antiepileptics	563	2,5
Soaps (household, etc.) and detergents	515	2,3
Beta-blockers, not classified elsewhere	499	2,2

Table IV – Most common admissions to intensive care in children under 6 years of age. Categories of toxic substances accounting for at least 2% of these admissions.

(Source SICAP, 2014–2020)

TOXIC SUBSTANCE CATEGORIES	NUMBER (TOTAL N=559)	PERCENTAGE
Cannabis poisoning (derivatives)	130	23,3
Toxic effect of carbon monoxide	116	20,6
Benzodiazepine poisoning	42	7,5
Psycholeptics, antipsychotics, psychostimulants	32	5,7
Poisoning by medicines, biological substances or other substances	24	4,3
Other opioids	19	3,4
Antiepileptics	14	2,5
Antidepressants	14	2,5
Methadone	14	2,5
Toxic effect of a corrosive substance, unspecified	13	2,3
Calcium channel blockers	12	2,1
Non-opioid, antipyretic and antirheumatic analgesics	11	2,0
Snake venom	11	2,0

SERIOUS POISONINGS FROM MEDICINES WITH NEUROLOGICAL OR CARDIAC ACTION

Medicines for human use were the second leading cause of accidental poisoning in children under 15 years of age (16%, Figure 1) and the leading cause of serious cases (34%, Figure 2) in the PCC database. Poisoning due to a treatment error by relatives or carers was more common in children under one year of age than in children aged one to five years (23% and 4% respectively), as the children in the latter group more often accessed the medicinal product on their own. All severity levels combined, medicinal products for the nervous system such as analgesics, anxiolytics and antipsychotics were most often implicated (30% of drug poisonings), followed by dermatological (antiseptics, disinfectants – 19%) and respiratory treatments (antihistamines – 12%). While nervous system medicines, mainly opioid analgesics, dominated serious drug poisoning cases (57%), they were followed by cardiovascular system medicines (21%), mainly beta-blockers, calcium channel blockers and treatments for high blood pressure.

The PMSI data showed that non-opioid analgesics, which include ibuprofen, aspirin and paracetamol, were responsible for 10% of hospital admissions for paediatric poisoning in children under six years of age, followed by benzodiazepines for almost 10% (they were respectively the second and third causes after carbon monoxide, Table III).

In terms of serious poisoning, benzodiazepines accounted for 7.5% of intensive care admissions for poisoning in children under six, followed by psycholeptics, antipsychotics and psychostimulants (antidepressants, anxiolytics, etc.) responsible for 6%. Calcium channel blockers accounted for 2% of these hospital admissions (Table IV).

Accidental medication poisoning was involved in six of the 10 deaths of children under 15 years of age recorded by PCCs between 2014 and 2020. In addition, of the 23 deaths of children under 15 recorded by the CépiDc between 2014 and 2017, seven (30%) were due to medication (the second leading cause of death), although there were no details of the product responsible.

CARBON MONOXIDE: A DOMESTIC GAS THAT CAUSES FREQUENT AND SERIOUS POISONINGS, ESPECIALLY IN VERY YOUNG CHILDREN

Carbon monoxide, a colourless, odourless, non-irritant toxic gas, is known to be responsible for multiple poisonings, often involving families and most commonly occurring during the winter (see the article on the subject

in this issue).

Between 2014 and 2020, carbon monoxide poisoning accounted for 4% of emergency department visits for children under six years of age (fifth cause, Table II). It was also the leading cause of hospitalisation (11%, Table III) and the second leading cause of admission to intensive care (21%, Table IV) for poisoning in children under six.

Children under one year of age were particularly affected, accounting for 12% of emergency department visits (second leading cause) and 33% of intensive care admissions for poisoning in this age group (leading cause).

Inhalation of gas or smoke, including carbon monoxide and smoke from fires, was the leading cause of death in the under-15s among the deaths recorded by the CépiDc (9 out of 23 deaths, 39%). In addition, one of the 10 deaths recorded by PCCs was due to inhalation of carbon monoxide and smoke from a fire.

CONTACT WITH ANIMALS: FREQUENT INSECT BITES AND SERIOUS SNAKE BITES

While contact with animals of all species accounted for just under 3% of poisonings in children under 15 years of age recorded by PCCs (Figure 1), contact with the venom of arthropods (stinging caterpillars, wasps, bees, hornets, etc.) was the main cause of emergency department visits for children under six between 2014 and 2020 (30%, Table II). Animals were the fourth most common source of serious cases recorded by PCCs (6%, Figure 2). This primarily involved another class of animal, since 20 of the 24 serious cases recorded were due to snake bites (83%). Moreover, viper bites were responsible for 2% of intensive care admissions for accidental poisoning in children under six years of age (Table IV).

No paediatric deaths were reported as a result of contact with animals.

CANNABIS AND BUTTON BATTERIES: VERY SERIOUS POISONINGS

Cannabis poisoning accounted for 7% of hospital admissions for poisoning in children under six years of age (Table III), but 23% – the leading cause – of admissions to intensive care for poisoning in this same age group (Table IV). These cases increased in frequency over the study period, particularly in children under one year of age (from 9% of hospital admissions for poisoning in 2014 to 16% in 2020), but also in severity: the percentage of intensive care admissions following emergency department visits for cannabis poisoning in children under six doubled between 2014 and 2020 (from 5% to 11%). Narcotics were the third leading cause of serious

poisoning in children under 15 years of age in the PCC data (9%, Figure 2). Moreover, 33 of the 37 serious cases associated with narcotics were due to cannabis.

Although foreign bodies accounted for only 1% of the poisonings recorded by PCCs, they were responsible for 6% of serious cases (23 cases – Figure 2). Nineteen children swallowed button batteries⁴, one of whom eventually died from perforation of the oesophagus and aorta. Another child ingested a water bead⁵, leading to digestive complications and death. In both cases, ingestion of the foreign body had gone unnoticed at the time of the accident, delaying medical treatment.

COSMETICS AND PLANTS: FREQUENT BUT GENERALLY NOT VERY SERIOUS POISONINGS

Cosmetics and personal hygiene products – nail care products and nail varnish, skin cleansers, bath and shower products, etc. – were the third leading cause of accidental paediatric poisonings between 2014 and 2020 (11%, Figure 1), but represented barely 1% of serious cases.

Poisoning due to plants, for example as a result of ingestion or mucocutaneous contact, accounted for 7% of poisonings recorded by PCCs (Figure 1) but fewer than 1% of serious cases. Wild plants caused more serious cases than house plants.

None of these categories were listed as common reasons for visits to the emergency department in the OSCOUR® data, or for hospitalisation in the PMSI data.

WHAT RECOMMENDATIONS SHOULD BE GIVEN TO THE CHILD'S PARENTS AND CARERS?

The frequency and severity of accidental paediatric poisonings, in all their diversity, are grounds for continuing and even stepping up communication to the general public, especially young parents and childcare professionals, in order to avoid complacency about certain risks and reduce the number of accidents.

In the first few years of life, poisoning mainly occurs when children are beginning to stand up and reach for products they can access on their own and that are not intended for them: cleaning products in the kitchen or bathroom, medicines in the bathroom or bedroom, small objects in the living room (button batteries in remote controls), but also drugs and narcotics. They then tend to put these products in their mouths. Decanting a household product by pouring it into a food container such as a water, soda or fruit juice bottle exposes children to the risk of accidental ingestion.

An article in this issue is devoted to this problem.

Toddlers are particularly vulnerable to overdose, or administration of medicines that are not intended for them, both of which can lead to serious poisoning. Preventing these situations involves first and foremost keeping small objects or hazardous products out of the reach of children even when they are not at home, storing prescription medicines — whether for a child or other family members — out of sight, and being sure to correctly use any heating appliances that could emit carbon monoxide.

Sandra SINNO-TELLIER (ANSES)
Christine TOURNOUD (Nancy PCC)

FIND OUT MORE:



NOTE:

Because everyday accidents can very often be avoided by taking appropriate preventive action, the Ministry of Health has made the prevention of everyday accidents in children under 15 years of age one of the priorities of the [2018-2022 national health strategy](#). In this regard, the serious game «*Zéro accident: un jeu d'enfant !*» («Zero accidents: it's child's play») <https://www.cesim-sante.fr/innovation-developpement/serious-game-realite-virtuelle/serious-game-zero-accident-un-jeu-denfant-aventure-preventive-securiser-maison-3d/> was developed by CESIM-Santé, a scientific interest group set up by the University of Western Brittany and Brest university hospital, with financial support from the Directorate General for Health.

⁴ Beware of button batteries! A potential hazard for young children. Vigil'Anses 7, February 2019. https://vigilanses.anses.fr/sites/default/files/Vigil%27Anses-N7_Fevrier2019VF_0.pdf

⁵ Beads made from super-absorbent polymers, used as decorative items, plant supports or toys. Water beads: keep them out of the reach of children. Vigil'Anses 11, July 2020. https://vigilanses.anses.fr/sites/default/files/VigilAnsesN11_Juillet2020_3.pdf

Electricity generators used indoors: a source of carbon monoxide poisoning



© 123RF

CARBON MONOXIDE, A SILENT KILLER

Carbon monoxide, which has the chemical formula CO, is responsible for around a hundred deaths and 1300 poisonings in France every year [1]. Odourless, colourless and non-irritating, it can lead to coma and death sometimes within just a few minutes. It is therefore vital to spot the symptoms of poisoning as quickly as possible: headaches, tiredness, nausea and dizziness, which can affect several people in the same place at the same time. Depending on its severity, poisoning may require hospitalisation and sometimes leaves sequelae such as neurological disorders and cardiac problems.

In addition to immediate treatment by firefighters or mobile emergency services, French poison control centres (PCCs) are closely involved in the treatment of this type of poisoning. Contacted by the medical services or individuals themselves, they carry out individual medical investigations, searching for the cause of the poisoning and monitoring its progression. Moreover, by entering this information into the PCCs' national database, they help improve knowledge of this type of accident.

POISONING DUE TO GENERATORS FOLLOWING THE STORMS OF WESTERN FRANCE IN NOVEMBER 2023

Carbon monoxide is mainly produced when combustion appliances (such as water heaters, boilers or wood-burning stoves) malfunction. However, it can also be emitted by appliances used due to exceptional weather conditions such as storms: generators during power cuts, motor-driven pumps in the event of flooding, braziers during heating cuts, etc. The toxic exhaust gases emitted by these appliances include carbon monoxide.

Carbon monoxide continues to be responsible for around 1300 cases of poisoning a year in France. It is mainly emitted when combustion appliances malfunction, but also when they are used inappropriately. Between 1 and 8 November 2023, the power cuts caused by storms Ciarán and Domingos led to a need for auxiliary heaters. The inappropriate use of generators or the escape of combustion gases from boilers caused 91 people to be exposed to carbon monoxide. Symptoms occurred in three-quarters of cases: 69% were mild and 24% were of medium severity. Serious poisoning caused life-threatening symptoms in four people and one death. When generators are needed, such as during exceptionally bad weather conditions, they must never be operated inside homes.

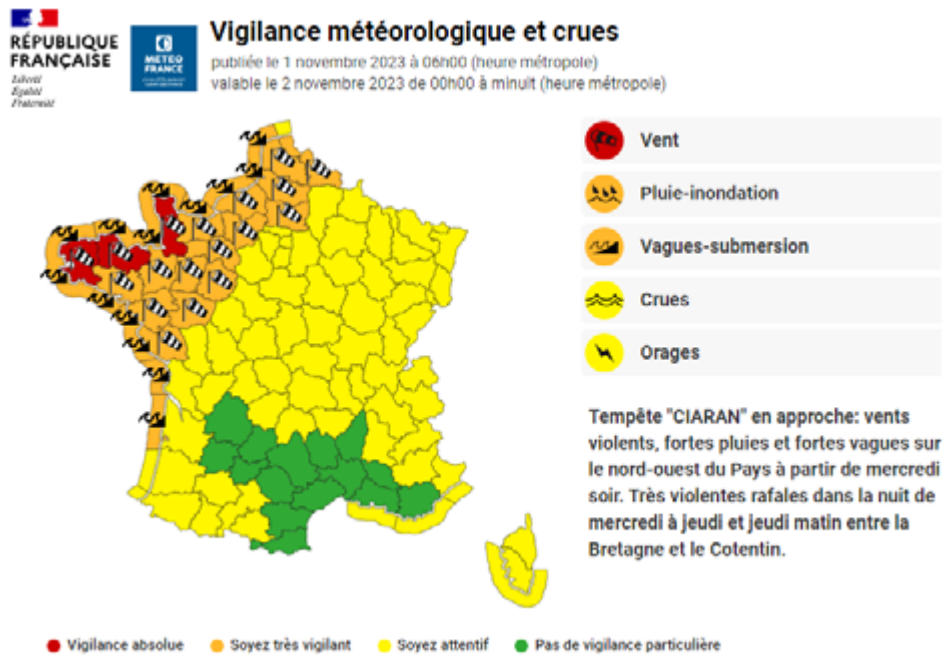
When mistakenly used inside homes, cellars, garages or attics, they can cause poisoning.

Between 1 and 6 November 2023, severe weather warnings were issued for the départements of Finistère, Côtes d'Armor and Manche, rising to «red» on 2 November 2023,

in anticipation of storm Ciarán (see Figure 1). An «orange» alert was then issued for Domingos, a less violent storm than Ciarán, in the Vendée département between 3 and 5 November 2023 [2]. Between 1 and 8 November 2023, these storms caused lengthy power cuts for many households [3].

Figure 1 – Map of France showing weather forecasts for the passage of storm Ciarán

(Source Météo France)



An analysis of calls to poison control centres during the storms and in the days that followed, i.e. from 1 to 25 November 2023, confirmed that these two exceptional climatic events were responsible for an increase in carbon monoxide poisoning.

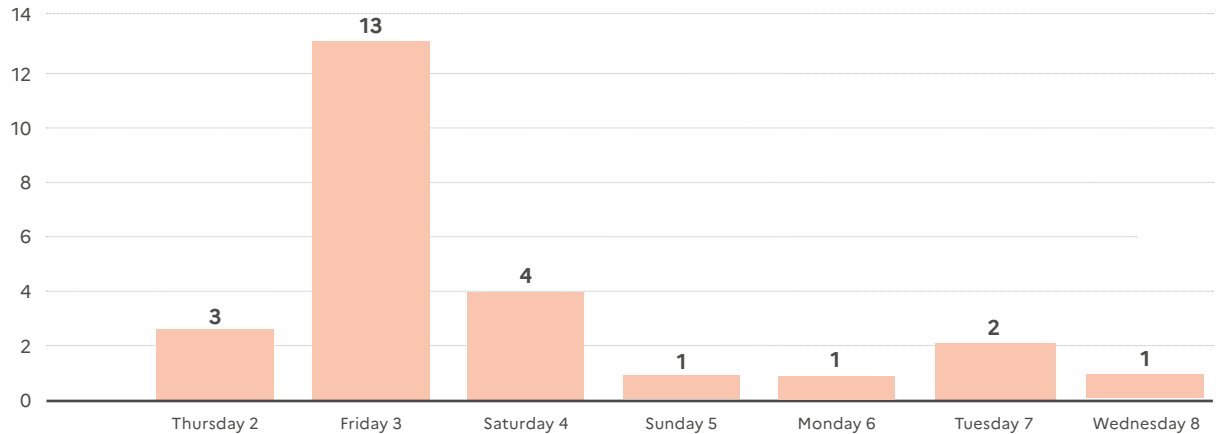
For this analysis, the events of interest corresponded to a place where one or more people had been accidentally exposed to carbon monoxide during the storm period.

Excluding all other circumstances that could have been responsible for poisoning (e.g. fires, intentional poisoning, boiler malfunctions unrelated to the storms), 25 events occurring between 2 and 8 November 2023 and directly due to the weather conditions were identified. After this date, the events no longer had any link with the severe weather alert issued for storm Ciarán. More than half of the events (52%; 13 out of 25) were reported

24 hours after the storm, i.e. on 3 November (see Figure 2), then there were between one and four events per day until 8 November.

Figure 2 – Number of carbon monoxide exposure events during storms Ciarán and Domingos in November 2023

(Source SICAP)

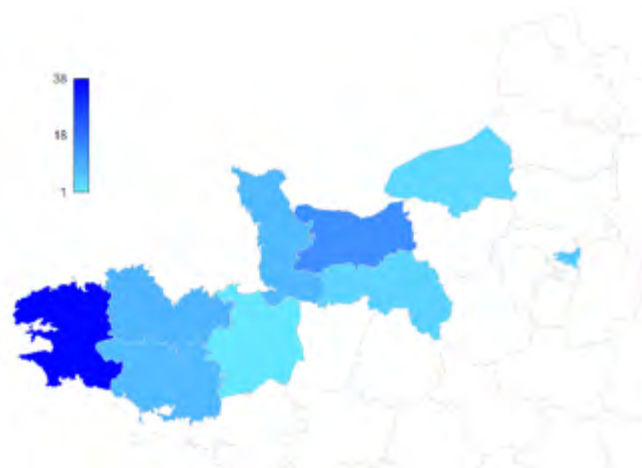


The most affected regions and départements corresponded to the areas through which the storms passed, i.e. mainly Finistère in Brittany (36%; 9 events out of 25) and Calvados in Normandy (16%; 4 out of 25) (see Figure 3). One event occurred in Ile-de-France on 4 November 2023:

the environmental investigation concluded that combustion gases from a boiler had escaped due to a faulty flue and the extremely windy weather conditions that day. The strong winds at the time of the accident had caused an inversion of the draught in the flue to which the boiler was connected.

Figure 3 – Breakdown of cases of exposure to carbon monoxide, by *département* for the north-west regions and Ile-de-France

(Source SICAP)



Dans plus de 90 % des évènements rapportés (23 sur 25), use of a generator was the cause of the carbon monoxide poisoning. With the exception of one event for which the location was not specified, the generators had always been placed inside or very close to a dwelling: in a garage (52%; 12 out of 23), in a cellar (30%; 7 out of 23), in a home with no further details (9%; 2 out of 3), in a kitchen (1 out of 23).

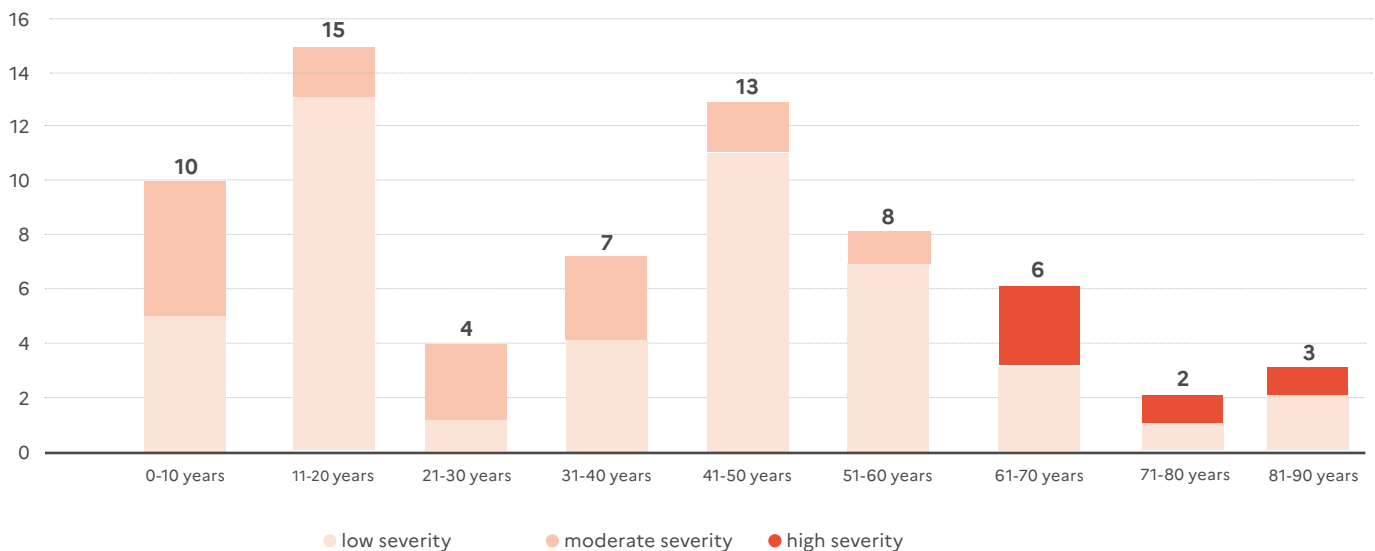
combustion gases from a boiler, another event was due to obstruction of a house's chimney flue by birds' nests, which had fallen due to the storm.

These 25 events had exposed 91 people to carbon monoxide, from one to seven people per event, most often members of the same family. They ranged in age from 7 months to 87 years, and 40% (36 out of 90) were children and adolescents (see Figure 4).

Besides the event described above due to the escape of

Figure 4 – Breakdown by age group and severity of the number of people exposed to carbon monoxide during storms Ciarán and Domingos

(Source SICAP)



People experienced symptoms following the exposure to carbon monoxide in three-quarters of the cases (68 out of 91). Among these 68 poisoning cases:

- 69% (47 out of 68) were mild. People suffered from headaches, nausea, asthenia, discomfort and dizziness, which are all signs of carbon monoxide poisoning. Six of them required hyperbaric oxygen therapy (in a hyperbaric chamber).

- 24% (16 out of 68) were of moderate severity. People suffered from discomfort and brief loss of consciousness, which in 81% of cases (13 out of 16) was treated with hyperbaric oxygen therapy.

- Four poisoning cases were very serious: these patients were all over 60 years of age (61 to 85 years) and had been found comatose in their homes. In all four cases, the generator had been placed in a cellar or garage. Three out of four patients received hyperbaric oxygen therapy.

- One person, who had installed a generator in the garage, died of cardiac arrest despite medical treatment.

OTHER PARTS OF THE WORLD ALREADY FAMILIAR WITH THIS HIGH-RISK EXPOSURE

Although exceptional climatic events such as storms are not rare in France, their number and strength could increase in the future, reaching levels already seen in many other countries. In these countries, specific warnings about the risks of

carbon monoxide poisoning in the event of bad weather are circulated widely several days before the event, to reduce the risk.

In Canada, power cuts due to bad weather are common and can last for a long time. In 1998, a cold spell that left thousands of people without electricity for 30 days led to an increase in the number of cases of carbon monoxide poisoning. After two weeks of power cuts, this number was equivalent to that observed for the whole of 1997. Six people died and 51 had to be treated with hyperbaric oxygen therapy. The National Institute of Public Health of Quebec recommended that generator manufacturers affix labels to their products warning of the risks of carbon monoxide poisoning, because many

consumers were unaware that combustion engines are a source of carbon monoxide emissions [4].

Health Canada has also warned of the risk of carbon monoxide poisoning if a generator is placed outdoors but too close to a dwelling. It recommends placing it at least 6 metres from any door, window or air vent to prevent carbon monoxide from entering the house [5]. Health Canada also recommends the purchase of generators fitted with a carbon monoxide sensor that triggers an automatic shut-off if an emission threshold is exceeded (see Figure 5).

In the United States, users are also recommended to always place the generator 6 metres away from their house and to purchase a generator fitted with a carbon monoxide sensor and a safety shut-off system (see Figure 6) [6].

Figure 5 – Safety tip of the week: Carbon monoxide

(Source Health Canada)



CONSUMER PRODUCTS SAFETY TIP OF THE WEEK In the event of a power cut this winter, never use barbecues or portable fuel-burning generators inside your house or garage, as they can produce lethal carbon monoxide gas. When buying a portable generator, opt for one fitted with a carbon monoxide sensor and automatic shut-off. Reminder: check your smoke and carbon monoxide detectors once a month and replace the batteries as needed!

Figure 6 – Carbon Monoxide (CO) The Invisible Killer

(Source Consumer Product Safety Commission)



In April 2023, the US Consumer Product Safety Commission (CPSC) resubmitted a proposed rule to require the sale of generators fitted with a carbon monoxide detector and an automatic shut-off system in the event of excessively high emissions. This proposal, which had been supported by the CPSC for several years, aims to prevent deaths from carbon monoxide poisoning: in the United States, 1300 deaths were recorded between 2004 and 2021, a quarter of which affected entire families as a result of generator misuse [7]. Pending inclusion in the regulatory framework, the CPSC reiterated its warnings to the general public and recommended the purchase of certified generators fitted with this automatic shut-off system, which can reduce deaths by 87% to 100% [8].

DO'S AND DON'TS DURING EXCEPTIONALLY BAD WEATHER

During a prolonged power or heating cut or in the event of flooding [1-2], it is essential to:

- position generators outside living areas, including cellars, attics, basements and garages, and well away from air intakes;
- place pumps or any other combustion engine-powered appliance outside homes and away from air intakes;
- never use cookers, braziers or barbecues for heating;
- never run auxiliary heaters on a continuous basis.

If you suspect carbon monoxide poisoning, take prompt action:

- ventilate the premises;
- if possible, switch off the generators or any other equipment used;
- evacuate the premises;
- call the emergency services:
 - o 15, 18 or 112 (114 for the hearing impaired),
 - o or +33 (0)1 45 42 59 59 (24/7 emergency number in France) to contact a poison control centre.



Marie Deguigne (Angers PCC)
Cécilia Solal (ANSES)

RÉFÉRENCES BIBLIOGRAPHIQUES

- [1] Directorate General for Health. ANSES. December 2023. Carbon monoxide poisoning can be fatal and concerns everyone: you can reduce the risks by adopting the right practices. Press release. <https://www.anses.fr/en/system/files/Press2023EN-CP18.pdf>
- [2] Vendée state services. 2023. STORM DOMINGOS, ORANGE alert for violent winds, from Saturday 4 November 2023 at 6 pm to Sunday 5 November 2023 at 3 am. <https://www.vendee.gouv.fr/Actualites/Grands-dossiers/Alertes/TEMPETE-DOMINGOS>
- [3] Normandy Regional Health Agency. November 2023. Attention au risque d'intoxication au monoxyde de carbone lié au mauvais usage de certains appareils. [Beware of the risk of carbon monoxide poisoning due to the misuse of certain appliances.] Press release. <https://www.normandie.ars.sante.fr/attention-au-risque-dintoxication-au-monoxyde-de-carbone-lie-au-mauvais-usage-de-certains-appareils>
- [4] National Institute of Public Health of Quebec (INSPQ). 2010. *Les avertisseurs de monoxyde de carbone comme mesure de protection au Québec. État de situation et perspectives d'intervention.* [Carbon monoxide alarms as a protective measure in Quebec. Situation and prospects for action.] https://www.inspq.qc.ca/sites/default/files/publications/1075_avertisseurscomasureprotection.pdf
- [5] Santé Canada. 2024. La sécurité dans votre cour et à l'extérieur. Génératrices portatives à combustible. <https://www.canada.ca/fr/sante-canada/services/securite-maison-et-jardin/securite-votre-cour.html#a5>
- [6] Centers for Disease Control and Prevention. 2024. Carbon Monoxide - Generator Safety Fact Sheet. <https://www.cdc.gov/co/generatorsafetyfactsheet.html>
- [7] Consumer Product Safety Commission. 2023. CPSC's groundbreaking proposed rule for portable generators will save thousands of lives and will save \$1B a year in costs. https://www.cpsc.gov/s3fs-public/TrumkaportablegeneratorsSNPRstmt4_5_23.pdf?VersionId=3pxNNcoMz3knrnSSCcx_rXPcnXjuN6jW
- [8] Consumer Product Safety Commission. 2024. As Winter Storms Continue, CPSC Urges Families to Take Steps to Prevent Carbon Monoxide Poisoning and Fires. <https://www.cpsc.gov/Newsroom/News-Releases/2024/As-Winter-Storms-Continue-CPSC-Urges-Families-to-Take-Steps-to-Prevent-Carbon-Monoxide-Poisoning-and-Fires>

Transferring household products to unsuitable containers is a very poor practice responsible for serious accidents every year



© Cécilia Solal

MORE THAN 6000 AVOIDABLE ACCIDENTS EVERY YEAR

Each year, PCCs receive more than 6000 calls about accidents due to the decanting of products, i.e. transferring a product into a container other than the original one that is not intended for this purpose. This may involve transferring a product from a large bottle to a smaller container, diluting a pure product in a larger container, bringing home a professional product (that may be highly concentrated) in an unsuitable container, etc. The new containers, usually objects intended for food use such as water bottles, no longer carry any information about the nature of the contents, potential chemical risks (no labelling, risk phrases, or hazard symbols) or precautions for use, and no longer have a safety cap.

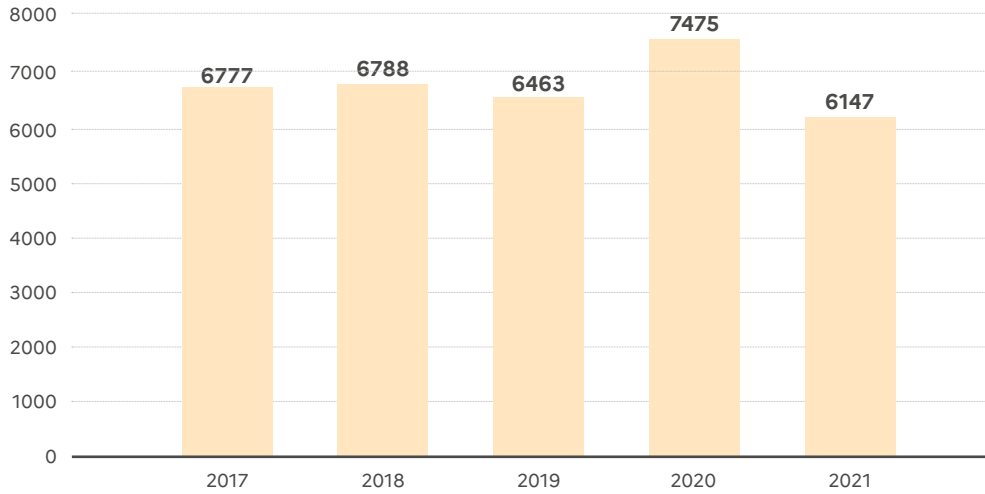
An analysis of calls to the PCCs revealed 33,650 accidents due to decanting between 1 January 2017 and 31 December 2021.

From 2017 to 2021, French poison control centres (PCCs) received more than 6000 calls a year about accidents involving decanting, mainly cleaning products decanted into water bottles.

Half of all people experienced symptoms following accidental ingestion. One hundred and eight of these poisoning cases, of which almost 18% involved patients under the age of 15, were very serious, with digestive lesions. Twenty-four people suffered sequelae, and five died. Products should never be decanted due to the risk of no longer knowing what is in the new container. If decanting is unavoidable (e.g. product to be diluted or purchased in bulk), in addition to the precautions taken during transfer, a label should be affixed to the new container.

Figure 1 – Annual breakdown of cases of exposure due to decanting reported to the PCCs between 1 January 2017 and 31 December 2021

(Source SICAP)

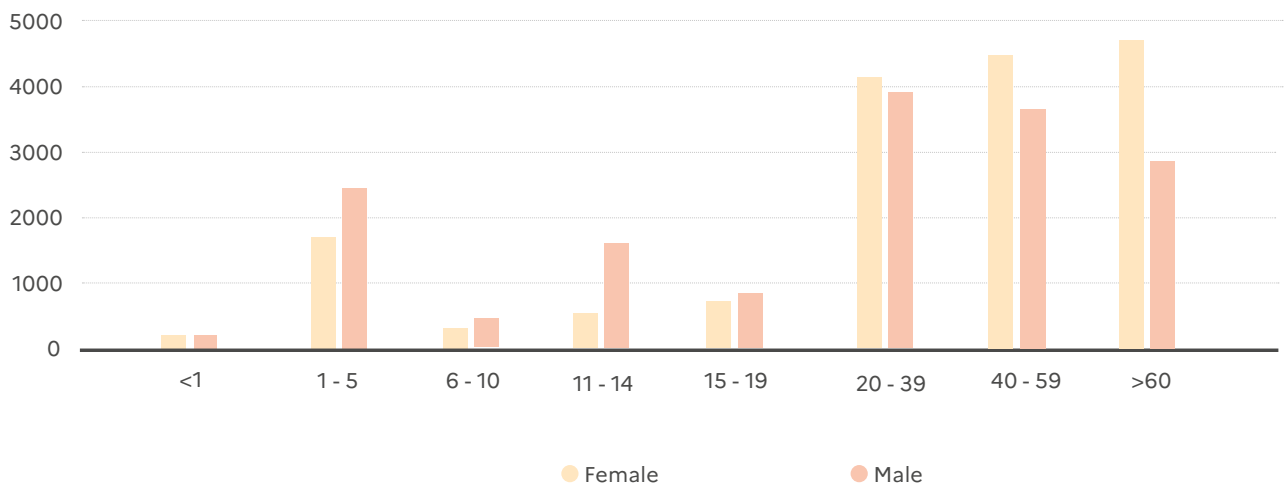


With the exception of 2020, which was characterised by a higher number of cases (N=7475), the annual breakdown was stable, fluctuating between 6147 cases in 2021 and 6777 in 2018. The patients' ages ranged

from less than one to 104 years old, with a median age of 39 years. Nearly 22% were under 15 years of age. The M/F sex ratio was 0.9.

Figure 2 – Breakdown by age group and sex of cases of exposure due to decanting reported to the PCCs between 1 January 2017 and 31 December 2021

(Source SICAP)



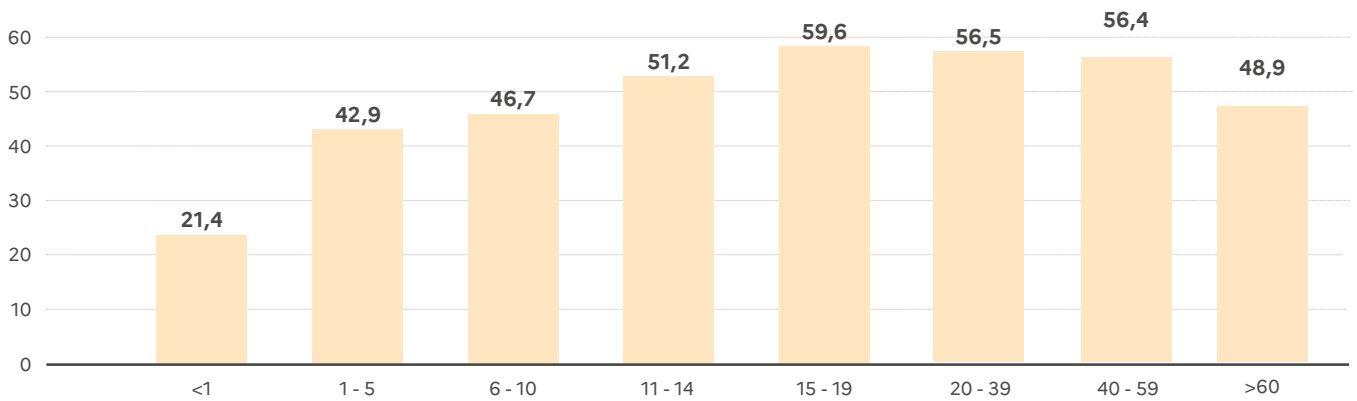
When information was provided in the dossiers (95% of cases), the predominant route of exposure was oral (97.6%), corresponding to accidental ingestion of the decanted product. Accidents by other routes were reported more rarely: 1.2% occurred via dermal exposure, 0.9% respiratory and 0.1% eye exposure.

Irrespective of the route, half of the cases (51.3%) were symptomatic. Figure 3 shows the age distribution of exposed

people and the percentage of symptomatic cases. Children under six years of age accounted for almost 15% of cases, although 60% of them were asymptomatic at the time of the call (compared with 46% of those over the age of six). This phenomenon is seen with all types of exposure; parents are very ready to call a poison control centre about their child even if they have no symptoms or exposure was not certain.

Figure 3 – Age distribution of the percentage of symptomatic cases due to decanting reported to PCCs between 1 January 2017 and 31 December 2021

(Source SICAP)



HOUSEHOLD PRODUCTS TOP THE LIST

Most of the accidents were due to the decanting of commercial mixtures, i.e. household products (79.3%),

followed by plant protection products (6.2%) and chemicals such as ammonia (4.8%) (see Table 1).

Table 1 – Product categories accounting for at least 1000 accidents due to decanting

(Source SICAP)

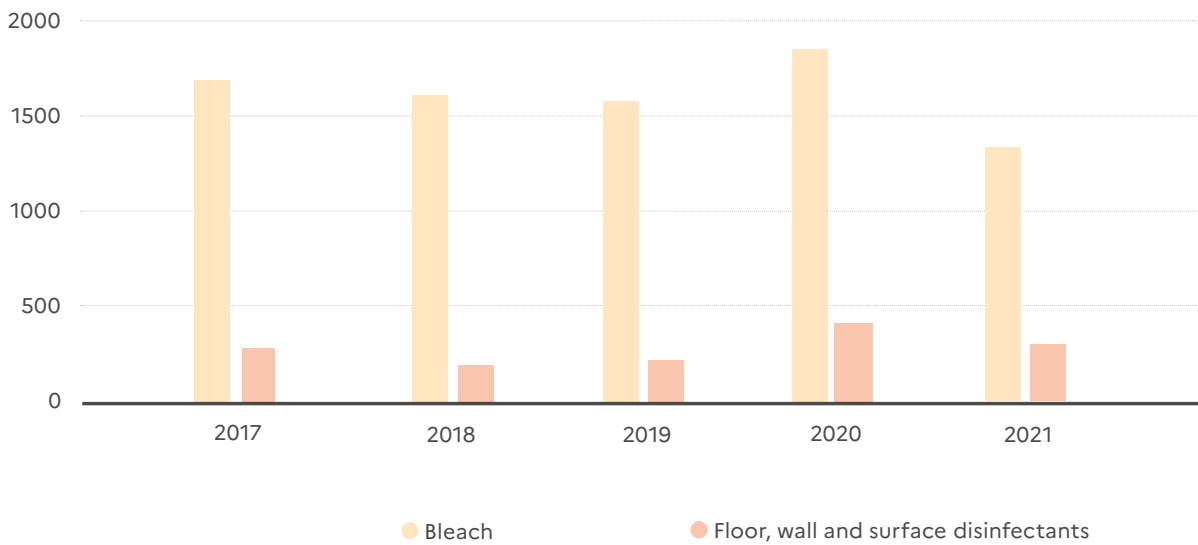
PRODUCT CATEGORIES	NUMBER OF CASES	PERCENTAGE
Commercial mixture	26 675	79,3
Plant protection product	2 099	6,2
Chemical	1 600	4,8
Drugstore product	1 295	3,8
Food or dietetic product	1 194	3,5

Accidents due to the decanting of disinfectant products, i.e. products with a biocidal action, accounted for 36.3% of cases, 59.2% of which were symptomatic. Figures for this product category were stable over the study period, with the exception

of 2020, which saw an increase, probably due to the COVID-19 epidemic and the greater use of disinfectants such as bleach sold in large volumes or in packs for dilution (see Figure 4).

Figure 4 – Annual breakdown of cases of exposure due to the decanting of bleach and disinfectants for floors, walls or surfaces reported to PCCs between 1 January 2017 and 31 December 2021

(Source SICAP)



In the category of drugstore products, accidents due to the decanting of hand sanitiser accounted for 51.6% of cases, of which 41.9% were symptomatic. These accidents rose sharply in 2020 and 2021, as these products were widely used during the COVID-19 pandemic.

SERIOUS CASES THAT CAN LEAD TO MAJOR SURGERY AND SEQUELAE

Of the 17,250 symptomatic cases, 93% (N=16,042) were mild, 6.4% (N=1100) were moderate and 0.6% (N=108) were serious, including five deaths.

In the serious cases, the patients ranged in age from one to 77 years (median 40 years), with 18% being under the age of 15. The sex ratio was 2.5, indicating a high preponderance of males compared with the sex ratio for low and medium severity cases, which was 0.9.

The decanted products were mainly cleaning, maintenance,

stripping or descaling products (59% of cases), materials treatment products such as moss killer (12%), food contact products and disinfectants.

When the information was available (63%; 68 cases out of 108), the products had been decanted into a water, soda or fruit juice bottle, or into a glass. Most of the time, the family or friends of the victim were responsible for this decanting (69%; 25 cases out of 36 reported). On the other hand, very little information was available about the original container before the product was decanted (cans holding several litres, pods, bottles), where the decanted product was stored, the reason for decanting (dilution needed, shared between several people, initial container too large), or whether the secondary container was labelled.

Endoscopies showed digestive lesions in 93% of patients, mainly of the oesophagus (94%) and stomach (83%). Twenty-four people suffered sequelae, mainly stenosis of the oesophagus (21 cases), pylorus (two cases) or stomach (one case), requiring surgery and the introduction of parenteral nutrition (by infusion) for some patients.

SERIOUS CASES ALSO AMONG CHILDREN

The 108 serious cases included 18 children under 15 years of age (13 boys and five girls), nine of whom were under the age of five. The decanted products involved were mainly cleaning products (N=7) and paint strippers (N=5).

When the information was available (N=13), the product responsible for the poisoning had been decanted into a water bottle in eight cases, a soda bottle in three cases and a glass in two cases. In 10 cases, the decanting had been carried out by the child's relatives or carers. In one case, the soda bottle had been given to the family in a restaurant and in another, the child had found the soda bottle in the street near a vehicle workshop. In six cases, information on the person who carried out the decanting was unavailable.

Endoscopy results were available for 15 children. Fourteen had lesions of the oesophagus and stomach. Eight children developed secondary oesophageal stenosis, one of whom required removal of the damaged part of the oesophagus.

FIVE DEATHS!

Between 1 January 2017 and 31 December 2021, five people died as a result of ingesting a decanted product:

- One child under the age of five drank a decanted liquid from a soda bottle found in the street. Although the product could not be precisely identified, a pH strip test carried out at the hospital indicated that it was an acid product.

- Two people aged over 80 and suffering from dementia or Alzheimer's disease ingested products that had been decanted into water bottles.

- Two adults in their sixties ingested disinfectants for food contact surfaces, one decanted into a water bottle and the other into a new, unspecified container.

DECANTING OF AMMONIA SPECIFICALLY FOR THE MANUFACTURE OF NARCOTICS

Ammonia solution has many uses, both domestic and professional, for its detergent, stripping and descaling properties. Accidental or intentional ingestion of this caustic product can be serious. Thirty-seven of the 108 serious cases mentioned above were due to ammonia decanting. They involved 28 men and seven women (sex ratio of 4), with a median age of 39 (from 8 to 58 years).

Ammonia decanting accidents are particularly common among cocaine users, who misuse the chemical

to make crack or freebase. In this study, 13 cases (35%) mentioned a context of cocaine use. The victim was not always the person who had decanted the product into another container and was not necessarily a cocaine user. Nine patients were cocaine users, seven of whom had explicitly confirmed when they called the PCC that they were using ammonia to make crack. In two cases, the users had decanted the product themselves, in two others it had been carried out by a third party, and in the remaining five cases the information was not provided.

The decanting container was mentioned in ten dossiers: methadone bottle (N=3), water bottle (N=3), beer bottle (N=3) and plastic bottle (N=1).

RESULTS BACKED UP BY OTHER STUDIES

In Italy, the Rome poison control centre found the same trends, confirming the increase in the number of accidents due to decanting in 2020 compared with previous years. During the pandemic, the recommended disinfection measures led to individuals making hand sanitiser at home and keeping it in unsuitable containers, purchasing it in large quantities and then transferring it into small containers, or taking decanted products home from the workplace [1].

The Marseille PCC compared domestic accidents caused by products brought back home from work with those caused by consumer products between 1993 and 1998. The poisonings differed little: the clinical development, the percentage of lesions observed from the endoscopy and the length of the hospital stay were not significantly different in the two groups [2]. It should be noted that the professional or industrial use of a product does not constitute a severity criterion, since some of these products have the same composition as certain detergents or cleaning products intended for the general public.

TO AVOID THE AVOIDABLE, IT'S TIME TO CHANGE PRACTICES

Based on this study's key findings, the following recommendations were made for reducing the risk of accidents due to decanting:

- Keep products in their original packaging, unless this is impossible.

- Never decant products (brought home from work or purchased in a supermarket): not only do you risk forgetting what is in the new container, but you also lose valuable information such as the name of the product and the instructions and precautions for use. Moreover,

in the event of poisoning, this information enables poison control centres or doctors to make an accurate assessment of the toxicological risk.

- If decanting is necessary, for example when a product is sold in refill packs to be diluted, the product should be transferred to a container suited to its chemical nature, with a safety cap for hazardous products. Affix a label clearly indicating the name of the original product and whether it has been diluted. The unique formula identifier (UFI) of the decanted product should be photographed: this 16-digit code, placed next to the trade name or hazard information, enables PCCs to identify the commercial reference and its composition.

- For products purchased in bulk, use an appropriate container (the original one if possible), then affix the label provided by the store or write all useful information on a new label (product name, precautions for use and batch number, for example).

- Never put household products in the refrigerator, and keep them in a separate place from food and drink.

- Store products carefully, whether or not they have been decanted, out of the reach of children and preferably in a locked cupboard.

If accidental ingestion occurs despite all these measures, immediately dial:

- o 15, 18 or 112 (114 for the hearing impaired),
 - o or +33 (0)1 45 42 59 59
- (24/7 emergency number in France)
to contact a poison control centre.



Ingrid Blanc (Bordeaux PCC)
Géraldine Meyer (Angers PCC)
Chloé Greillet (ANSES)

REFERENCES

[1] Milella MS, Grassi MC, Gasbarri A, Mezzanotte V, Pugliese F, Vivino G. 2022.

Transfer of chemicals to a secondary container, from the introduction of new labelling regulation to COVID-19 lockdown: A retrospective analysis of exposure calls to the Poison Control Centre of Rome, Italy, 2017–2020. *Basic Clin Pharmacol Toxicol*;130(1):200-207. doi:10.1111/bcpt.13678.

[2] Virey-Griffaton E, de Haro L, Prost N, Valli M, David J.M, Arditti J. 2000.

Accidents domestiques par produits industriels dérobés en entreprise. Expérience du centre antipoison de Marseille de 1993 à 1998 inclus. [Domestic accidents involving industrial products stolen from companies. Experience of the Marseille poison control centre from 1993 to 1998 inclusive.]

FIND OUT MORE:

ANSES. 2024. Accidents due to product decanting. Study of cases reported to poison control centres between 1 January 2017 and 31 December 2021. Internal Request No 2022-AUTO-0058



No adverse effects from vector control: a finding that will need to be confirmed in the coming years



Vector control against the tiger mosquito, responsible for diseases such as dengue fever, Zika and chikungunya, involves spraying mosquito repellent. Although no poisonings were recorded by poison control centres in 2022, not all cases were necessarily reported through this channel, and vigilance is still required with the increase in mosquito eradication operations in mainland France.

In the growing number of French départements where it has become established, the tiger mosquito *Aedes albopictus* is regularly detected as soon as temperatures start to rise. This mosquito can carry viruses responsible for arbovirus diseases such as dengue fever, Zika and chikungunya. These viruses are transmitted to humans by the bite of infected female mosquitoes.

A person can be infected by a virus in a country or region where it is circulating – whether in the French overseas territories, Asia or on the American continent, for the dengue virus in particular – and then develop clinical signs on their return to mainland France. The case is then said to be imported.

If a person is infected with the dengue virus during a trip and is still infectious when they return to France, a mosquito that bites them and then bites another person could transmit the virus to this second person. A case of this type is said to be indigenous (or autochthonous), as the person infected in France has not travelled to an area where the virus is circulating in the 15 days prior to the onset of symptoms. Sometimes, the imported case responsible for transmission can be found in close proximity to the indigenous case(s), for example, a neighbour living in the same street or neighbourhood.

STOPPING TRANSMISSION THROUGH VECTOR CONTROL MEASURES

Whether the case is indigenous or imported, it is necessary to identify anyone who may have been infected by a mosquito carrying the virus responsible for the disease, and who may have developed a mild form of the disease without reporting it. This is achieved through door-to-door surveys and communication campaigns targeting healthcare professionals, to encourage them to consider these diseases – which they may not expect in people who have not travelled – in their diagnoses. These diseases are also notifiable by doctors.

When these individuals have been identified, to interrupt the chain of transmission, the Regional Health Agency carries out mosquito eradication operations to eliminate any adult mosquitoes that may have bitten

infected people and then become infected themselves. A mosquito repellent based on a pyrethroid active ingredient, essentially deltamethrin, is sprayed at night in a 150 m radius around the homes of all these infected individuals and the places they frequented during the period when the virus was in their blood – this is the contagious period during which the person can transmit the virus to a mosquito if bitten. All residents in the area likely to be exposed to the sprays must be informed in advance, by any appropriate means of communication, to keep their doors and windows closed.

ANALYSIS OF CALLS TO POISON CONTROL CENTRES IN CONNECTION WITH MOSQUITO ERADICATION TREATMENTS

Have all the people potentially exposed to these sprays been properly informed? Has anyone been sufficiently bothered to call a poison control centre? To answer these questions, all calls received by a poison control centre during 2022 following the spraying of a product in connection with vector control were analysed.

Although it was not possible to determine the number of vector control treatments carried out, data from Santé Publique France, the health agency responsible for monitoring arbovirus diseases, indicated that 2022 saw a particularly high number of cases of these viral diseases, with each one leading to mosquito eradication operations. According to Santé Publique France [1] «In 2022, 378 imported cases of dengue, 23 of chikungunya and six of Zika were notified in mainland France. Nine episodes of autochthonous dengue transmission totalling 66 cases were documented: five episodes in Occitanie (12 cases), three in Provence-Alpes-Côte d’Azur (52 cases) and one in Corsica (two cases). Six episodes occurred in départements where no autochthonous cases had been notified to date. Autochthonous dengue transmission is now expected in the south of France, but the epidemiological situation was exceptional in 2022: an increase in the number of episodes, their intensity and the geographical areas affected».

VERY FEW CALLS AND NO SYMPTOMS

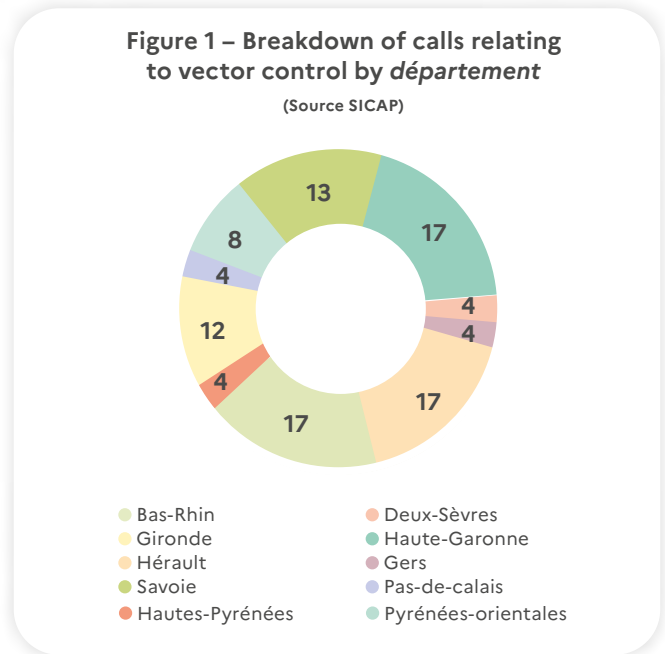
All calls from January to December 2022 for which the dossier included a reference to the agent deltamethrin or «vector control», were analysed.

There were a total of 31 dossiers over the whole period, from 10 départements (Figure 1). Three dossiers were excluded because they concerned occupational exposure, which was not the target population for this study, and four others because they involved domestic exposure due to mosquito repellent treatments applied by the users themselves and not by the health authorities.

Of the remaining dossiers, 19 people had called the PCC

to ask for details of the vector control procedures (date, etc.), the products used and the potential effects on human or animal health.

Five people had been exposed, but none exhibited any



symptoms:

- a pregnant woman had slept with her window open because she had not been warned, and was worried about her pregnancy and her baby. She had no symptoms but was bothered by the smell;
- a family consisting of a couple and an eight-month-old child had not received the brochure and had slept with their window open. None of the three had any clinical signs;
- the last person had been carrying out work in their home at night, with the windows open. They reported a bitter taste in the mouth, without any other symptoms.

VIGILANCE TO BE MAINTAINED

These results appear to be satisfactory from a health point of view, although it should be noted that a few people had not been reached by the information campaign on the night-time vector control operation. However, they should be treated with caution. It is likely that not everyone who was bothered called a poison control centre, since they were not necessarily explicitly told to call in the event of any discomfort. An analysis of data collected from general practitioners and emergency services would be a useful addition to this review.

Vigilance is therefore still needed. Repeating this study

for 2023, at a time when vector control campaigns have been particularly numerous, would enable the absence of adverse effects in the general population recorded by the PCCs to be confirmed or refuted.



Florent Battefort (Toulouse PCC)
Juliette Bloch (ANSES)

REFERENCES

[1] Arboviruses surveillance in mainland France: significant increase in the number of autochthonous dengue cases in 2022
<https://www.santepubliquefrance.fr/maladies-et-traumatismes/maladies-a-transmission-vectorielle/dengue/documents/article/surveillance-des-arboviroses-en-france-metropolitaine-nette-augmentation-des-cas-de-dengue-autochtone-en-2022>

Eleven cases of oesophageal and gastric obstruction (bezoars) attributed to consumption via gastric tube of a nutrition product in an intensive care unit



© 123 RF

ANSES received eleven reports of severe bezoars likely to be associated with consumption of the enteral (tube-fed) nutrition products Fresubin 2kcal HP Fibre® or Fresubin 2kcal HP® in patients admitted to an intensive care unit. Causality of the product was deemed to be likely or very likely in these cases. ANSES recommends paying close attention to the adverse effects that could occur following administration of any enteral nutrition product, and calls for such effects to be reported to the national nutrivigilance scheme via its website.

In 2023, ANSES published an opinion on nine reports of very severe oesophageal bezoars likely to be associated with consumption of the enteral nutrition products Fresubin 2kcal HP Fibre® or Fresubin 2kcal HP® manufactured by Fresenius-Kabi. These products, marketed in the form of 500ml enteral nutrition bags, are used in hospitals to meet the nutritional needs of under-nourished patients. These nine reports were received between 2009 (the year the nutrivigilance scheme was set up) and March 2023.

A bezoar is a compact aggregate of partially digested or undigested material that usually forms in the stomach. It can lead to total obstruction of the digestive tract. Bezoars can occur at any age and are favoured by certain oesophageal diseases or anomalies, gastric emptying disorders, altered gastrointestinal anatomy or certain eating disorders. Depending on the bezoar's characteristics, it may be dissolved using specific chemical solutions or require extraction by endoscopy or even surgery.

NINE CASES OF OBSTRUCTION REPORTED...

The nine cases of oesophageal or gastric bezoars associated with consumption of Fresubin 2kcal HP Fibre® or Fresubin 2kcal HP® involved patients aged between 58 and 76 years (five men and four women), hospitalised in intensive care. The bezoars occurred between three and 28 days after the start of enteral nutrition. Eight of these cases were of severity level 3¹, two of which were life-threatening. The last case resulted in death (severity level 4).

...IN CONNECTION WITH THE USE OF ENTERAL NUTRITION PRODUCTS

The causality of the enteral nutrition products in the occurrence of the bezoars was assessed using the method developed for the nutrivigilance scheme (ANSES 2019).

¹ The scale of severity ranges from Level 1 (low severity) to Level 4 (death).

Causality takes four components into account: the onset time, the outcome after discontinuing the product, whether or not the effect reappears upon reintroduction, and the absence of any other possible explanation for the observed adverse effect. For the enteral nutrition products Fresubin 2kcal HP Fibre[®] and Fresubin 2kcal HP[®], the time to onset of the effect was deemed «compatible». Since the effect abated after discontinuation of the product and after emergency treatment, the progression was described as «suggestive» of an association. Reintroduction was considered «absent» or «inconclusive» because the product was not reintroduced.

The aetiological investigation ruled out the most common causes of bezoars mentioned above, and in all the observed cases, the bezoar was composed of the enteral nutrition product. The Fresubin 2kcal HP Fibre[®] or Fresubin 2kcal HP[®] product was therefore deemed very likely responsible, i.e. I4, for the occurrence of the bezoars in eight cases out of nine, and likely responsible, i.e. I3, for one case, on a scale ranging from I0 (excluded) to I4 (very likely).

It should be noted that risk factors may have been involved in the occurrence of the adverse effect under study. The appearance of the bezoars may therefore have been favoured by the illness that led to the patients' admission to intensive care or by the treatments prescribed (morphine, anaesthetics, etc.).

Since publication of the opinion on 11 December 2023, two new cases of bezoar have been reported to the nutriviigilance system, involving these same two products. In both cases, causality was deemed very likely and the severity level was 3 (one was life-threatening).

HAVE SIMILAR CASES BEEN DESCRIBED IN THE SCIENTIFIC LITERATURE?

A literature search on the existence of other cases of bezoar in humans associated with the consumption of enteral nutrition products found no cases associated with the administration of Fresubin 2kcal HP Fibre[®] or Fresubin 2kcal HP[®].

On the other hand, numerous cases of bezoars occurring during enteral nutrition have been published.

They are presented as a potential complication of enteral nutrition and involve risk factors similar to those reported here, in connection with:

- the type and procedures for administration of enteral nutrition: fibre content of the solution, protein content, casein content, positioning of the nasogastric tube, co-administration of medication with enteral nutrition,

failure to rinse the tube regularly;

- digestive disorders: digestive stasis, obstruction, motor disorders, dehydration, gastro-oesophageal reflux;

- medication: sucralfate, medicines that slow digestive transit, bulk-forming laxatives, medicines that act on the pH of gastric fluid or enzymatic secretions;

- the context of the stay in the intensive care unit: mechanical ventilation, prolonged recumbency, slowed transit.

ANSES'S WARNINGS AND RECOMMENDATIONS...

Besides the cases involving Fresubin 2kcal HP Fibre[®] and Fresubin 2kcal HP[®], the recurrence of severe cases reported to the nutriviigilance scheme or occurring with other enteral nutrition products led ANSES to:

- alert hospital practitioners to the risk of bezoar formation in patients fed with enteral nutrition products, especially patients with slowed digestive transit;

- recommend that manufacturers of enteral nutrition products conduct studies to identify the conditions under which bezoars form with their products, particularly the interactions with medicines commonly used by enterally-fed patients;

- encourage healthcare professionals to use the dedicated ANSES website² to report any adverse effects associated with the use of enteral nutrition products that they observe as part of their professional practice, in order to improve patient safety.



Vincent Bitane (ANSES)
Fanny Huret (ANSES)

REFERENCES

ANSES. (2022). Opinion on cases of bezoar associated with the consumption of the enteral nutrition product «Fresubin 2kcal HP Fibre[®]» or «Fresubin 2kcal HP[®]» (Request 2022-SA-00182). Maisons-Alfort: ANSES, 22 p.

ANSES. (2019). ANSES opinion on updating the method for determining causality in reports of adverse effects in nutriviigilance (Request No 2018-SA-0026). Maisons-Alfort: ANSES, 16 p.

² <https://www.nutriviigilance-anses.fr/nutri#/>

Hair dyes: plant-based does not mean risk-free



© T23RF

TRADITIONAL DYEING AND BLEACHING PRODUCTS EXPOSE HAIRDRESSERS TO KNOWN OCCUPATIONAL RISKS

Traditional hair colouring and bleaching activities have long been known to cause skin and respiratory disorders in exposed professionals.

The **occupational skin disorders** suffered by hairdressers are most often eczemas described as «irritant contact dermatitis» (encouraged by repeated hand washing), «allergic contact dermatitis» (delayed hypersensitivity) and, more rarely, contact urticaria. Allergic contact dermatitis is mainly caused by hair dyes containing paraphenylenediamine (PPD) or its derivatives, which are found in the majority of oxidation dyes (known as permanent dyes because they penetrate the hair). More rarely, it is due to the alkaline persulphates found in the bleaching products that are often used prior to the application of a light hair colour. It should be noted that the presence of irritant dermatitis can encourage the secondary onset of contact dermatitis, this time of an allergic nature.

The **occupational respiratory diseases** among hairdressers are mainly rhinitis and allergic asthma (involving immediate hypersensitivity), related to bleaching products and less frequently to PPD. These bleaching products contain alkaline persulphates such as ammonium persulphate. Less volatile powder formulations have been developed but appear to be little used in practice. In 2016, persulphates were the second leading cause of occupational asthma related to chemical exposure in France [1]. In 2019, ANSES recommended restricting their use in hair products in order to protect the health of exposed workers and consumers [2]. Lastly, alkaline irritants such as ammonia contained in hair dyes can also act as respiratory irritants, just like other products found in hairdressing salons.

This can have major professional ramifications for hairdressers affected by an allergy to one of the aforementioned professional products, as these disorders usually lead to them being **declared medically unfit** and therefore needing to **retrain for another occupation**.

Hairdressers are exposed to irritating and allergenic substances contained in many products, including those for dyeing or bleaching hair.

Workers who become sensitised to these substances are often forced to give up their occupations, which is a major professional loss.

Replacing these traditional chemical colouring or bleaching products with dyes made solely of active plant ingredients seems like a promising alternative for reducing the burden of these disorders among hairdressing professionals. However, there is still a risk of allergy associated with the handling of these vegetable dyes. Preventive measures in the workplace therefore remain essential.

For this reason, it is essential to implement measures to protect hairdressing professionals from sensitisation. In this respect, vegetable or «natural» dyes are an attractive alternative to chemical dyes. However, can it be said that natural hair colours, containing no chemicals, are free from risk of respiratory or skin problems for hairdressers?

WHAT DO WE MEAN BY VEGETABLE OR NATURAL HAIR DYE?

Dyes made exclusively from natural active ingredients mainly contain powders from dye plants¹. Once applied, they cover the hair cuticle rather than penetrate it, unlike the combination of alkalis and synthetic dyes. The best-known, most widely used and long-established plant is red henna, obtained by crushing the leaves and roots of *Lawsonia inermis* (syn. *Lawsonia alba*). It can be used alone or in combination with other plants, depending on the colour sought. *Indigofera tinctoria* is a shrub that produces indigo dye (dark blue), and can be used in combination with henna. Plant extracts with lower dyeing potential, but which can add highlights, shine or other benefits to the hair, are also used: *Cassia obovata* (known as neutral henna), ayurvedic plants, spices (turmeric), walnut husk, etc.

VEGETABLE OR NATURAL HAIR DYE: ALLERGIES REMAIN POSSIBLE

Professionals buying a dye labelled «plant-based», «vegetable» or «natural», especially if they suffer from occupational asthma or dermatitis, hope that the dye will be safe to handle.

However, it turns out that some plant proteins can induce allergic reactions. Handled in micronised powder form before dilution, they may be inhaled, exposing the user to the risk of respiratory problems. This was shown in certain patients seen at one of the occupational and/or environmental disease centres (CCPPEs) of the National Network for Monitoring and Prevention of Occupational and Environmental Diseases (RNV3PE), as well as in cases published in the scientific literature, reminding us that the use of natural substances does not remove the need for preventive measures.

Two cases of occupational allergic asthma recorded by the RNV3PE provide an illustration of this:

- A 31-year-old hairdresser with an allergic predisposition to common respiratory allergens such as pollen, cat hair and dust, who had been working in a salon using only vegetable dyes for 10 years, quickly developed rhinitis and sneezing during her working hours, which she had tolerated. However, once she began experiencing respiratory discomfort, coughing, shortness of breath and a feeling of tightness in the chest, she sought medical advice.

All the symptoms showed a clear occupational pattern: discomfort when diluting the powders that recurred each time she was re-exposed and improved when she stopped working, and with a reduction in symptoms when she rinsed her hair after returning home, suggesting that it contained powder residues. The allergy assessment revealed sensitisation to the following plant ingredients (highly positive in prick tests): *L. inermis* (red henna), *C. obovata* (neutral henna), *I. tinctoria* (indigo) and *acacia*, whereas the prick test for latex found in certain gloves was negative. Occupational asthma was declared and professional retraining proved necessary.

- A 40-year-old colourist suffered respiratory problems as soon as she started work in a salon using 100% natural dyes. In her case, allergy tests indicated sensitisation to red henna (*L. inermis*). Professional retraining was also recommended.

Several cases of occupational rhinitis and asthma due to the inhalation of red henna powder [3], caused by an immediate allergy mechanism, have been published in the scientific literature [4]. In most cases, sensitisation occurred during preparation of the dye, through exposure of the respiratory tract to the micronised plant powder mixed with water. Neutral henna may also be involved, as in the case of a 30-year-old hairdresser who developed occupational rhinitis and asthma, via an immediate allergy mechanism, one year after hair dyes containing a mixture of red henna (*L. inermis*) and neutral henna (*C. obovata*) were introduced into her workplace [5]. Two cases of occupational asthma, rhinitis and contact urticaria in young hairdressers (aged 22 and 28 years) sensitised to *I. tinctoria* proteins, leading to changes of occupation, were recently published [6].

LESSONS TO BE LEARNED

Overall, the rhinitis and asthma associated with the vegetable dyes, documented by the CCPPEs and the scientific literature, are a reminder that the use of these products of natural origin does not dispense hairdressing professionals from implementing preventive measures, especially given the major occupational consequences. Ceasing exposure to the allergens concerned, which is necessary to cure or improve asthma, means redeployment to another job in the same company, or even a change of occupation.

Nevertheless, sensitisation phenomena and respiratory symptoms seem to occur less frequently with natural dyes than with the handling of chemical dyes. However, this should still be qualified by the fact that the use of these products is still less widespread. Plant-based alter-

¹ Une plante tinctoriale est une plante dont certaines parties peuvent servir à préparer des colorants et des teintures.

natives therefore appear to be a promising way of reducing the risk of this type of complaint among hairdressing professionals. They are a possible alternative in the event of sensitisation to traditional dyes, for avoiding medical unfitness for work and loss of employment, but on condition that the same preventive measures are observed as those recommended for handling traditional dyeing or bleaching products, i.e.:

- using the least volatile products (compact powder, paste, granules);
- preparing powder mixtures under a local extraction system and adequately ventilating the salon;
- wearing an FFP mask when handling powders;
- and lastly, cleaning work surfaces with sponges or damp cloths to reduce dust dispersion.

Despite this apparent better tolerance, the use of these vegetable dyes calls for vigilance and information for hairdressers, occupational physicians and pulmonologists, since rhinitis and asthma could become more common if their use were to develop. It should also be noted that certain natural dye preparations also contain synthetic chemical compounds with their own toxicity risks.



Eva Ougier (ANSES)

Vincent Bonneterre (CRPPE Auvergne-Rhône-Alpes)

REGULATIONS

Hair dyes are governed by Regulation (EC) No 1223/2009 on cosmetic products. This lists the colouring ingredients that may be used in hair dye formulas, subject to certain conditions and restrictions. Assessment of the health risks, including requirements for testing the potential genotoxicity and carcinogenicity of these substances, is carried out by the Scientific Committee on Consumer Safety (SCCS) mandated by the European Commission. Concentrations of substances with respiratory and skin sensitising potential in hair dyes intended for hairdressing professionals or the general public are restricted. In addition, appropriate warnings must appear on the labelling of products containing them, in accordance with the Regulation on classification, labelling and packaging of substances and mixtures (known as the CLP Regulation).

RÉFÉRENCES BIBLIOGRAPHIQUES

[1] Iwatsubo et al. 2016. **Observatoire national des asthmes professionnels II : bilan de la phase pilote et perspectives pour la surveillance des asthmes en lien avec le travail.** [National observatory for occupational asthmas II: assessment of the pilot phase and prospects for monitoring work-related asthma.] Archives des Maladies Professionnelles et de l'Environnement, 77. 449-450

[2] ANSES, 2019. ANSES opinion on the analysis of regulatory management options for potassium, ammonium and sodium persulphates under REACH.

[3] Rosenberg, 2002. **Allergie respiratoire des coiffeurs.** [Respiratory allergy in hairdressers.] Documents pour le médecin du travail No. 92, INRS.

[4] Bolhaar et al. 2001. IgE-mediated allergy to henna. *Allergy*, 56: 248-248.

[5] Villalobos et al. 2020. Occupational Asthma and Rhinitis due to Yellow and Red Henna in a Hairdresser. *J Investig Allergol Clin Immunol.* 24;30(2):133-134.

[6] Haltia et al. 2021. Occupational asthma, rhinitis, and contact urticaria from indigo (*Indigofera tinctoria*) hair dye. *J Allergy Clin Immunol Pract* 9(9):3500-3502.

Publication director: Benoit Vallet

Editor in chief: Juliette Bloch

Editorial secretariat: Chloé Greillet

Edition follow up: Flore Mathurin

Editorial board

For the network of French Poison Control Centres:

Magali Labadie

Nutrivigilance:

Fanny Huret

Veterinary pharmacovigilance:

Sylviane Laurentie

Phytopharmacovigilance:

Ohri Yamada

Toxicovigilance:

Sandra Sinno-Tellier

Vigilance for chemical products:

Cécilia Solal

Vigilance for biocides products and plant inputs:

Chloé Greillet

**National network for the monitoring
and prevention of occupational and environmental diseases:**

Eva Ougier

ANSES, which is responsible for several health vigilance schemes (pharmacovigilance of veterinary medicinal products, nutriviigilance, phytopharmacovigilance , toxicovigilance and vigilance for occupational diseases), reports on its vigilance activities through a dedicated newsletter: Vigil'Anses.

Reflecting the latest news from each of the vigilance schemes, this four-monthly newsletter presents the main results of the Agency's work as part of its vigilance missions, in conjunction with its partners, professional networks and expert groups, along with the actions undertaken. The articles, which are deliberately short, are aimed at all environmental and occupational health players: public authorities, health agencies, ANSES's expert appraisal partner organisations and institutes, managers of prevention policies, the scientific community, professionals, associations and users. They encourage the interested reader to read the publications, opinions or reports available on the Internet for further information.



anses

**FRENCH AGENCY FOR FOOD, ENVIRONMENTAL
AND OCCUPATIONAL, HEALTH & SAFETY**

14 rue Pierre et Marie Curie
F-94701 Maisons-Alfort Cedex

www.anses.fr