

Fuel shortages at the pump and increased risk of siphoning accidents

In October 2022, against the backdrop of a national fuel shortage, poison control centres recorded five times as many accidents involving petroleum fuel siphoning as in normal times. Using your mouth to siphon fuels is dangerous and carries a risk of inhalation pneumonia and significant after-effects. While fuel siphoning accidents occur on a regular basis, an increase is seen every time there is a fuel shortage.

On 13 October 2022, a poison control centre alerted ANSES to an increase in siphoning accidents: 42 petroleum fuel siphoning accidents had been reported to all poison control centres between 1 and 12 October, compared to the usual 20 or so accidents per month.

A strike in several refineries had begun on 27 September and then gradually spread throughout the country, causing a fuel shortage. On 12 October, according to the Ministry of Energy Transition, supply difficulties for at least one type of fuel were reported in more than 30% of service stations in Ile-de-France, Bourgogne-Franche-Comté and Auvergne-Rhône-Alpes, in 15% to 30% of stations in seven other metropolitan regions, and in less than 15% for the rest of the country. Prefectoral decrees prohibiting the sale and purchase of fuel in jerry cans were issued in all *départements*.

The strike lasted up to five weeks in some refineries, and was followed by a week of gradual restoration of service. The shortage therefore lasted all of October and the first week of November, and this period coincided with a sharp increase in siphoning accidents recorded by poison control centres (Figure 1).

On 28 October 2022, ANSES and the poison control centres published an alert on the risks of poisoning in the event of siphoning fuel by mouth [1].

Siphoning of petroleum fuels: a practice that could lead to serious poisoning

Fuel siphoning consists in emptying a vehicle's tank by sucking up the fuel and transferring it to another container (jerry can, petrol can, etc.). While several techniques are possible, the principle is the same: one end of a hose is immersed in the tank to be siphoned and the other end – or the end of a second hose to which the first hose is indirectly connected – is placed in the container into which the fuel is decanted.



Priming the siphon by sucking in fuel draws the liquid from the tank into the pipe so that it then flows spontaneously out of the other end, according to the principle of communicating vessels¹. Doing this with the mouth is dangerous, as it can result in the person sucking on the hose getting fuel inside their mouth and ingesting it. To avoid this risk, there are siphon pumps that enable fuel to be sucked into the hose without any contact with the mouth.

Ingesting a small amount of fuel is enough to cause poisoning, regardless of the type of fuel siphoned (petrol, diesel, etc.). In addition, sucking by mouth runs the risk of ingesting large volumes.

Petroleum fuels are highly fluid, volatile and irritating, which stimulates the cough reflex if ingested. This causes fuel to enter the bronchi instead of being swallowed.

Vomiting must then not be induced as this could cause some of the fuel to enter the lungs.

The onset of fever or coughing a few hours after ingestion is the first sign of possible aspiration pneumonia. This chemical lung disease can also be manifested by chest pain, respiratory discomfort and shortness of breath.

Poisoning is also indicated by the occurrence of digestive symptoms, characterised by belching with a smell of fuel in the mouth, gastric reflux, abdominal pain, diarrhoea with irritating stools, nausea and vomiting. More rarely, neurological signs such as a feeling of inebriation, headache, dizziness or drowsiness are observed.

1. A mechanism for balancing the pressures of the liquid between the petrol tank at a higher level and the container at a lower level, usually on the ground.

To a lesser extent, the fuel vapours released during siphoning may cause eye and upper airway irritation, and neurological or digestive signs as described above.

A fivefold increase in poisoning in October 2022

The poison control centres' information system (SICAP) lists 4094 cases of exposure from siphoning petroleum fuels between 1 January 2008 and 31 December 2022, an average of 22.7 cases per month. In October 2022, 114 cases were recorded, five times the usual monthly number.

The Ile-de-France (39% of cases), Auvergne-Rhône-Alpes (12% of cases) and Provence-Alpes-Côte d'Azur (11% of cases) regions were the most affected. The other regions each accounted for less than 10% of cases.

Most of the people exposed were men (96%), with an average age of 36 years (median 33 years).

The fuel had been siphoned from the tanks of road vehicles (motorbikes, scooters, mopeds), and even agricultural vehicles (tractors) and petrol-driven machinery such as lawnmowers.

Exposure in these accidents was mainly oral/buccal (111 out of 114 cases), with or without inhalation of fuel vapours; three people had inhaled without ingesting.

Eighty-eight percent of people (101 cases) were symptomatic, with digestive signs in three-quarters of these cases (Figure 2). These digestive symptoms were mainly belching with a petrol smell in one third of cases, vomiting in 20%, and abdominal, epigastric and/or oesophageal pain in 19% of cases.

One third of people reported respiratory signs, mainly coughing (29%), while 4% complained of respiratory pain or discomfort. Neurological signs were observed in almost one in five people, mainly dizziness (9%), headache (6%) or a feeling of inebriation (2%). Lastly, cardiovascular signs, mainly tachycardia or hot flush, were present in 5% of the poisoning victims.

While the vast majority of poisoning cases were mild, four patients had moderate or persistent symptoms of moderate severity. The first of these involved a 45-year-old man who briefly lost consciousness after ingesting a few gulps of petrol while siphoning from the tank of his motorbike.

He regained consciousness spontaneously and was given oxygen by the fire brigade. The progression of his symptoms was unknown.

A 16-year-old boy vomited and experienced chest pain after siphoning off-road diesel. He went to the hospital emergency department the next day with persistent respiratory pain and was placed on antibiotics. His symptoms regressed within three days.

An 18-year-old man experienced a "burning sensation in his lungs" 17 hours after ingesting two to three gulps of petrol siphoned from the tank of his moped. His symptoms regressed three days after treatment with antibiotics and a bronchodilator.

Lastly, a 25-year-old man presented with persistent vomiting and a temperature of 38°C without respiratory signs, 48 hours after ingesting a gulp of diesel fuel. The progression of his symptoms was unknown.

Although there were no serious or life-threatening cases in October 2022, several cases of poisoning requiring a stay in intensive care due to petroleum fuel siphoning accidents have been recorded in the past by the poison control centres.

A practice accentuated during periods of fuel shortage

According to the analysis of poison control centre data from 2008 to 2022, petroleum fuel siphoning accidents occur routinely and relatively constantly (Figure 3). On the other hand, each of the peaks in siphoning accidents in October 2010, May 2016 and October 2022 corresponded to a period of fuel shortage.

In October 2010, against the backdrop of opposition to pension reform, all French refineries were shut down for more than three weeks, with the result that service stations ran out of fuel, a situation unseen in France since May 1968. An increase of up to 75 fuel siphoning accidents per month was recorded by the poison control centres. Similarly, in May 2016, half of France's refineries were blockaded due to industrial action, and 55 petroleum fuel siphoning accidents were recorded during that month.

In contrast, in late December 2013, a strike at several French refineries had had no impact on fuel distribution or siphoning accidents, with 21 and 23 accidents respectively in December 2013 and January 2014.

More generally, there is an increase in fuel siphoning accidents in industrialised countries when the distribution of fuel to users is affected. For example, Hurricane Sandy, which hit the north-east coast of the United States in October 2012, caused severe damage to oil refineries, resulting in fuel shortages and rationing not seen in the country since the 1970s. The regional poison control centre recorded 283 cases of exposure to fuel in the month following the hurricane, an 18 to 283-fold increase over the previous four years [2]. More than 80% of the exposure cases were due to ingestion of fuel through reported or suspected siphoning.

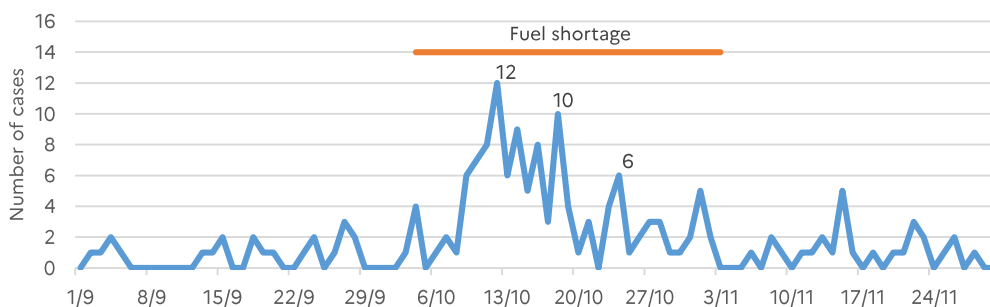


Figure 1: Daily number of petroleum fuel siphoning accidents recorded by PCCs between 01/09/2022 and 30/11/2022 (Source: SICAP)

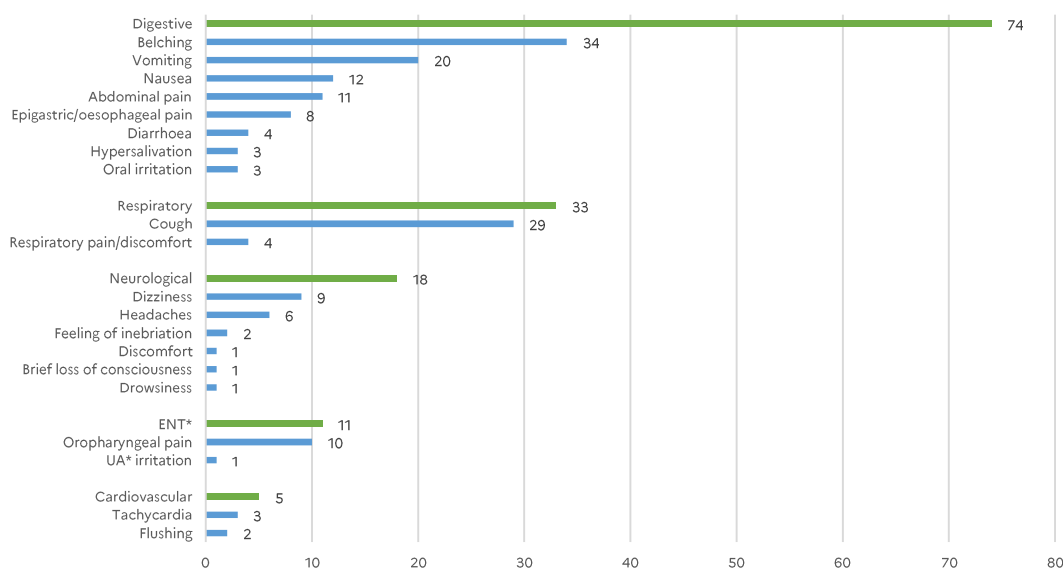


Figure 2: Petrol fuel siphoning accidents recorded by PCCs in October 2022. Symptoms presented and percentages of cases presenting with the symptom (N=101). (Source: SICAP). *ENT: Ear-nose-throat; UA: Upper airways.

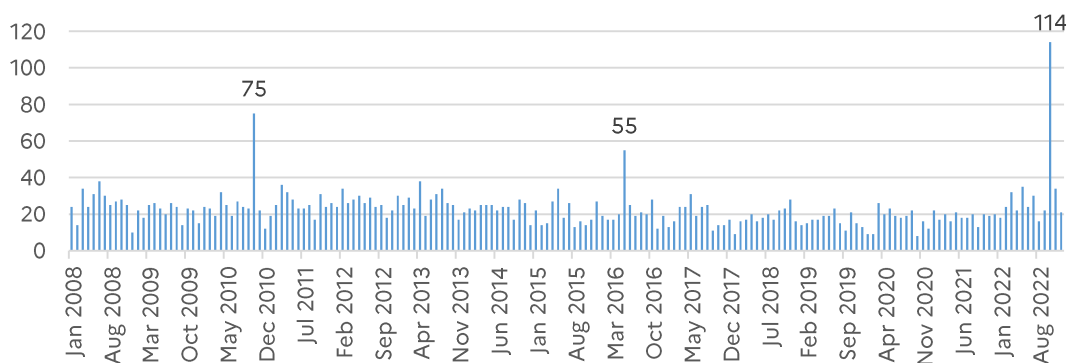


Figure 3: Monthly number of petroleum fuel siphoning accidents recorded by PCCs between 01/01/2008 and 31/12/2022 (Source: SICAP)

Monitor siphoning accidents during shortage situations

Although they are not necessarily predictable, changes in the social, economic or environmental context could lead to new episodes of fuel shortages and consequently to an increase in siphoning accidents over time.

Monitoring of these accidents could be set up quickly in the event of a shortage, to raise the alert without delay and prevent the occurrence of potentially serious accidents.

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Recommendations

ANSES and the French poison control centres strongly discourage you from using your mouth to siphon fuel, and make the following recommendations.

If you have swallowed fuel:

- **Do not make yourself vomit**, to prevent the fuel from entering your bronchi and then your lungs;
- **Do not drink anything**, to avoid the risk of vomiting;
- Rinse your mouth with water;
- Do not engage in any high-risk activity, such as driving a car or using machinery or tools, because your vigilance may be impaired;
- Watch out for respiratory symptoms (cough, fever, shortness of breath), which may be delayed;
- If any fuel comes into contact with your skin, wash your hands with soap and rinse your skin;
- Take off any fuel-soaked clothing.

In the event of a life-threatening emergency (respiratory distress, loss of consciousness, etc.): dial 15 (in France), 112 or 114 (for the deaf and hard of hearing).

Otherwise, for any medical advice after swallowing fuel: call a [poison control centre](#) or see a doctor.

References

[1] News from ANSES Daily Life – 28/10/2022. "Fuel siphoning: watch out for the risk of poisoning" <https://www.anses.fr/en/fuel-siphoning-watch-out-risk-poisoning>

[2] KimH, TakematsuM, BiaryR, WilliamsN, HoffmanR, SmithS. Epidemic Gasoline Exposures Following Hurricane Sandy. Prehosp Disaster Med. 2013;28(6):1-6.