Exposures to liquid capsules
(laundry, dishwashing and all-purpose cleaning)

Reports to the Dutch Poisons Information Center from
2013-2018

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Abstract

In 2011 liquid laundry capsules were introduced to the Dutch market and in recent years liquid caps for dishwashing and all-purpose cleaning were added to the assortment. To identify trends, inquiries about accidental exposures to liquid capsules are monitored by the Dutch Poisons Information Center (DPIC) and periodically reported to the Netherlands Food and Consumer Product Safety Authority (NVWA). In this report data on exposures to liquid laundry capsules reported between 2013 and 2018, and exposures to dishwashing and all-purpose cleaning capsules reported between 2015 and 2018, are given. Telephone inquiries as well as inquiries on the DPIC website on these product forms are included.

Laundry

Since 2012 the number of exposures to liquid laundry capsules in the Netherlands has increased and seemed to stabilize around 235 inquiries per year in 2016 and 2017. Despite preventive measures and awareness campaigns, in 2018 318 inquiries on laundry liquid caps were recorded, a considerable rise (+35%). Possibly, an increase in market share of these products contributes to this rise in exposures. Like in former years, the reported accidents mainly happened to young children; in 2018 87% of exposures to liquid laundry capsules concerned children aged 0-4 years. Most patients remain asymptomatic or develop only mild symptoms. Vomiting was reported most often, namely in 33% of oral laundry liquid cap exposures.

Dishwashing

The number of incidents with liquid dishwashing capsules increased from 49 in 2015 to 69 in 2016, but decreased to 57 in 2017 and 54 in 2018. Children aged 0-4 years were involved most frequently. Ingestion was the predominant route of exposure. Following ingestion most patients remained asymptomatic (67%). Vomiting was the main symptom reported (14%).

All-purpose cleaning

For liquid capsules for all purpose-cleaning the decline was even more pronounced from 17 in 2015 to 5 in 2016 and only 1 case in 2017. The liquid caps for all-purpose cleaning seem to have disappeared from the market; in 2018 there were no telephone inquiries.
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**Introduction**

The Dutch Poisons Information Center (DPIC) provides physicians and other medical care workers with information on potential health effects and treatment options of acute intoxications. The DPIC is part of the Division of Anaesthesiology, Intensive Care and Emergency Medicine of the University Medical Center Utrecht (UMCU). The DPIC can be consulted 24/7 by telephone and via the website www.vergiftigingen.info. In 2018 the DPIC received telephone inquiries about 35,590 humans with a total of 47,593 exposures to potentially toxic substances. 14% of these human exposures concerned household chemicals, including liquid capsules for laundry, dishwashing and all-purpose cleaning. Liquid laundry capsules were introduced to the Dutch market in 2011 and in recent years liquid caps for dishwashing and all-purpose cleaning were added to the assortment. From 2012 onwards, the number of exposures to liquid capsules, mainly containing laundry detergents increased.¹

Inquiries about accidental exposures to liquid capsules are monitored by the Dutch Poisons Information Center (DPIC) and periodically reported to the Netherlands Food and Consumer Product Safety Authority (NVWA). In this report, data are presented on exposures to liquid laundry capsules recorded from 2013 to 2018, and exposures to dishwashing and all-purpose cleaning capsules reported from 2015, when they first appeared, to 2018. Telephone inquiries as well as inquiries on the DPIC website on these product forms are included.

The differences in health risk between exposure to the more concentrated detergents from liquid caps and the detergents from bottles are well-known and have been extensively described in our former reports.¹ The comparison of liquid caps and bottled detergents does not render any new insights, for this reason we restricted this year’s report exclusively to the data on liquid caps.

**Toxicity of liquid caps**

From our previous reports, scientific literature and also from exposure studies performed by the manufacturers of liquid caps in collaboration with European Poisons Information Centers, the health hazards of liquid caps are quite well described. Local irritation at the immediate contact sites (skin, eyes, mucous membranes) and nausea, vomiting, drowsiness or lethargy, cough and foaming (in and around the mouth) are frequently reported after ingestion of (parts of) liquid caps. Erythema, rash and incidentally blistering occurred after skin contact. Eye contact usually only resulted in conjunctivitis, but sometimes corneal ulceration is seen.³⁴⁵⁶⁷⁸ Severe incidents have also been reported, with children occasionally being hospitalized with severe respiratory symptoms and even fatal outcome has been described after biting liquid caps followed by aspiration of the fluid.⁹

**Effects of safety measures and legislation**

Despite numerous measures and campaigns to improve the safety of the packaging and to warn users for the potentially serious health risks of liquid caps,¹⁰¹¹¹² the number of incidents remains the same and even increased somewhat in 2018.
Methods

All cases regarding exposure to liquid laundry detergents from capsules for which the DPIC was consulted by telephone are included in this report. The same method was used for consultations concerning exposure to liquid caps for dishwashing and all-purpose cleaning. The data from 2018 was added to figures from earlier years.

The DPIC database was also retrospectively examined for the number of searches performed on the DPIC website (www.vergiftigingen.info). All searches performed in 2018 concerning liquid capsules (laundry, dishwashing and all-purpose cleaning) were added to this report. For consultations via the website no details are known on symptoms or severity and it is not known whether all of these concerned actual exposures of patients.
Results

Liquid laundry capsules

Number of consultations to the DPIC

Figure 1  Number of human exposures to liquid laundry capsules, per age group, per year from 2013 to 2018.

Figure 1 shows the number of reports about human exposures to liquid laundry capsules per age group, per year. The number of reported cases with exposure to liquid capsules was 237 in 2013, 270 in 2014 (+14%), 279 in 2015 (+3%), 239 in 2016 (-15%), 236 in 2017 (-1%) and 318 in 2018 (+35%). The 35% rise is the sharpest increase in six years and 318 is the highest number of telephone inquiries ever received in one year about this product group.

Age and route of exposure

Like in former years, mainly 0 to 4 year-olds (278 or 87%) were exposed to the contents of liquid caps. The exposure routes were mainly by mouth (69%), in the eye (23%) and on the skin (12%). The total is more than 100%, because sometimes multiple routes of exposure occur in one patient, e.g. ingestion and skin contact.

Symptoms

A little over one third of the patients did not develop any symptoms (114x or 36% of all exposures).

Oral exposure: Frequently occurring after ingestion of (part of) a liquid cap were nausea (13x), vomiting (86x, 33% of all oral exposures) and other mild gastrointestinal upset (9x). Airway symptoms like coughing and dyspnea were reported less frequently (24x), but can develop into severe breathing problems in the hours following an oral exposure to liquid cap detergent.

Eye exposure: Eye exposure was recorded 73 times, resulting mainly in eye irritation (43x or 59% of all eye exposures) and pain (19x), blurred vision was only recorded once, as was corneal abrasion.
Skin exposure: Exposure of the skin occurred 38 times, usually without any symptoms because it was rinsed off rapidly. In 9 cases dermal irritation with redness and swelling occurred.

**Remarkable cases**
Two remarkable cases in 2018 concerned a 53-year old psychiatric patient who, on two separate occasions, ingested at least 10 liquid laundry caps. Both times she vomited and lost consciousness, the second time she also developed hypothermia and respiratory problems. Both ingestions required hospital treatment. It is not clear whether she co-ingested anything else, together with the liquid caps. The first time she regained consciousness quite rapidly, but the second time she became comatose, which is not expected as a direct effect of the liquid cap detergent; possibly coma was the result of severe hypoxia. She was admitted to the ICU and further outcome is unknown.

Another remarkable case concerned a 60-year old woman, who was found unconscious in her own vomit and had a blue-reddish discolouration in her mouth. She was found about a day after the supposed ingestion. Upon arrival in the hospital she was still unconscious and her oxygen levels were too low. She reportedly also ingested medication (TCA’s, lorazepam and paracetamol), which caused loss of consciousness and increased risk of aspiration. She was admitted to the ICU, further outcome is unknown.

**Liquid capsules for dishwashing**
In 2018 54 exposures to dishwashing liquid caps were reported, 45 in children under the age of 12 and 9 in adults. After oral exposure (57x) most patients remained asymptomatic (67%) and vomiting occurred 8 times (14%). In 12 cases eye exposure occurred, causing eye irritation, blurred vision and in one case corneal abrasion.

**Liquid capsules for all-purpose cleaning**
There were no telephone inquiries on this type of liquid caps in 2018.

**Consultations of www.vergiftigingen.info on liquid caps**
A total number of 236 consultations on liquid caps was received via the website; in 2017 there was a total of 189 consultations via www.vergiftigingen.info. The figure shows the age entered by the user; however, it is not known how many of these consultations concern actual patients.

![Figure 2](image-url)
Discussion & recommendations

The decrease in the number of exposures to liquid laundry capsules as reported to the DPIC in 2016, stabilized in 2017. Unfortunately in 2018 there was an increase in the number of exposures. This is possibly related to the increasing sales volume of liquid caps (pers. comm. Dutch soap producers (NVZ)).

The DPIC can be consulted either by telephone or by the website www.vergiftigingen.info. For 2017 and 2018 the number of website inquiries is also given, but note that it is unknown how many of these website inquiries concern actual exposures. Website users often enter a case more than once, with variation in for example product or body weight, to learn about the differences in outcome. As concluded in previous reports, the analysis of the 2018 telephone inquiries show that most patients remain asymptomatic or develop only minor symptoms. Vomiting was reported most often. The occurrence of vomiting increases the risk of aspiration (i.e. the flowing of the detergent into the respiratory tract), and thus the risk of respiratory distress and chemical pneumonia. One case of aspiration followed by serious respiratory difficulties was reported in an adult. However, in this case co-ingestion of medication most likely contributed to the severity of the symptoms. Another adult lost consciousness twice after ingestion of a number of laundry liquid caps, the second time she developed respiratory problems as well. Both times she was admitted to hospital, it is unclear whether she ingested anything else.

The main exposure route to liquid caps is ingestion, often in combination with eye and/or skin contact. The colourful product appearance is attractive to children. They grab and squeeze or bite the capsule, resulting in ingestion often combined with skin and eye contact.

Health effects after oral exposure to dishwashing liquid capsules appear to be less severe when compared to incidents with laundry liquid capsules. Eye exposure to all types of liquid caps can cause eye irritation, pain and incidentally corneal damage. From literature and earlier years we know that prolonged skin contact can lead to blistering and chemical burns. In the cases of skin exposure reported in 2018, the contact site was often rinsed rapidly, which prevented skin damage from occurring.

The data about circumstances of exposure and the clinical course of liquid cap exposures has shown a rather consistent pattern over the last years. For 2019 we propose to continue to monitor the number of liquid cap exposures to the DPIC, and to make a concise report again. Follow-up will be limited to remarkable cases with unusual exposure circumstances and/or severe effects.
References


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