Improperly used disinfectants responsible for skin burns in young children

Following several reports of severe skin disorders, ANSES analysed accidents between 2017 and 2022 involving young children in community settings and linked to the use of biocidal disinfectants. Most of these accidents, which were more common during the COVID-19 pandemic, occurred in nursery schools when toilets were being disinfected. Varying conditions of use for the same product may have contributed to errors, and labelling was sometimes deficient. In addition, the conditions of use were not always complied with. ANSES issued recommendations for reducing the risk of accidents due to the use of disinfectant biocidal products in community settings.

During the months of May and June 2021, ANSES received several reports of severe skin disorders affecting young children in community settings, associated with the use of disinfectant biocidal products. In view of the increase in the number of cases and the fact that some of them were serious, ANSES conducted a study of data from poison control centres (PCCs) to identify the circumstances of these accidents and the products involved, and to recommend preventive measures.

An increase in accidents during the COVID-19 pandemic

An "event" was defined as the occurrence of an accident affecting one or more children, on the same date, in the same place and with a given product.

The cases of interest were children (under 18 years of age) who had been indirectly exposed to a PT2 or PT4[1] disinfectant biocidal agent in a community facility, i.e. following the cleaning of a surface or object, and who developed symptoms after contact with the disinfected area.

Over the period from 01/01/2017 to 31/12/2022, the PCCs recorded 37 events representing a total of 118 cases of skin disorders among children in community settings, associated with the use of disinfectant biocidal products. These were either isolated cases, i.e. a single child affected by the event (n=20), or clustered cases (n=98) corresponding to several children affected by the same event.

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The clustered cases were divided into 17 different events, each involving between two and 26 children.

The sharp rise in the number of cases from 2020 onwards raised suspicions of a link with the COVID-19 epidemic. This pandemic led to new practices in terms of the frequency of disinfection, the surfaces disinfected and the products used, especially in places hosting children.

Disinfection of toilets in nursery schools responsible for many accidents

Most of the accidents occurred in schools (n=28), and more specifically in nursery schools (n=16). Disinfection of toilets/sanitary facilities was responsible for 56.7% (n=21) of events, with this figure rising to 94% for events occurring in nursery schools (15/16). Whereas prior to 2020, accidents of this type were almost exclusively due to disinfection of toilets, a wider variety of situations leading to skin disorders were observed in 2020 and 2021: disinfection of tables, chairs, balls and boats.

1. Biocidal products are classified into 22 biocidal product types (PTs), organised into four main groups corresponding to their specific uses. PT2 refers to disinfectants and algaecides not intended for direct application to humans or animals, and PT4 to products used on surfaces in contact with food and feed.

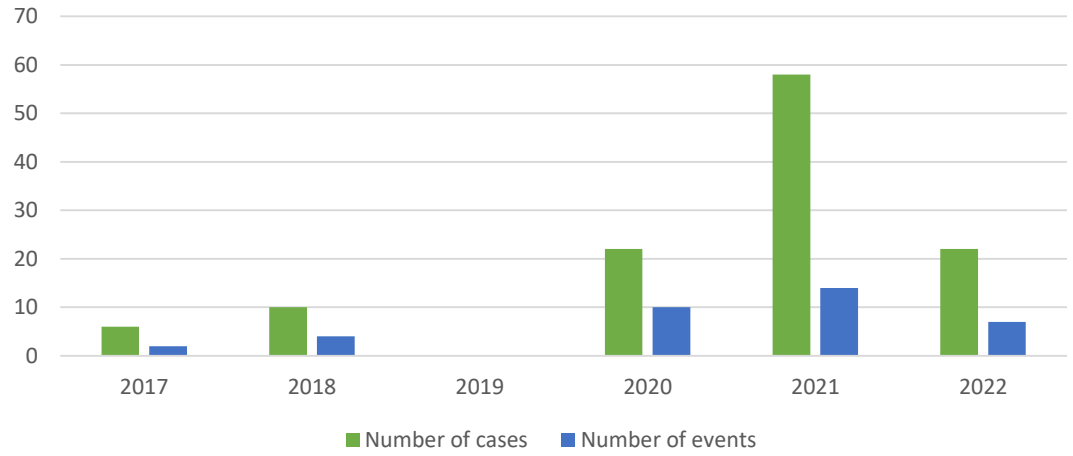

Figure 1: Annual breakdown of the number of events and number of cases of skin disorders in children following indirect exposure to a disinfectant biocidal product in a community facility, registered by poison control centres. (Source SICAP: 2017-2022).

In contrast, almost all the accidents in 2022 were again due to disinfection of toilets. This finding is consistent with the recommendations issued during the pandemic to scale up cleaning and disinfection efforts, especially for surfaces and objects, and for the servicing of sanitary facilities.

This problem mainly concerned young children (under 6 years of age), especially young girls, which can be explained by the fact that they sit down on the toilet seat far more than boys. In addition, the skin of young children is more fragile and therefore more sensitive to disinfectants.

The vast majority of skin disorders were minor (n=113). Four children nevertheless had moderately severe symptoms (second-degree burns) and one case was very serious (third-degree burn).

Dermal symptoms were mainly mild, namely pruritus (20% of cases, n=24) associated with erythema/first-degree burns (64.4% of cases, n=76) or pruritic skin rashes (22% of cases, n=26).

Eleven children suffered second-degree burns and one had a third-degree burn requiring a skin graft; this was the case that led to the alert and establishment of the study.

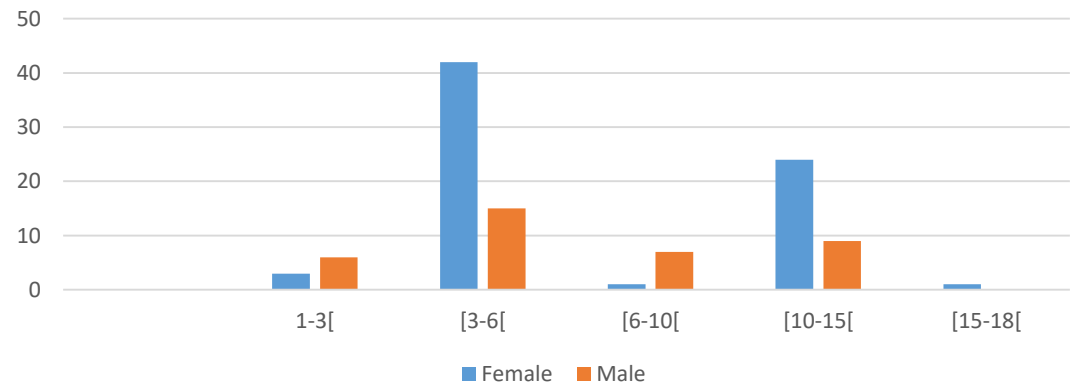

Figure 2 : Breakdown by age group of the number of children with skin disorders following indirect exposure to a disinfectant biocidal product in a community facility, registered by poison control centres (Source SICAP: 2017-2022).

Conditions of use that varied from one product to another, and labelling sometimes deficient

The conditions of use on product labels and other documents (such as technical data sheets) were examined. This showed that for the same product, these conditions of use sometimes differed according to the surface to be disinfected, potentially leading to errors in use.

For example, while 14 products were ready-to-use and 13 required dilution before application, with another six products the need for dilution depended on the type of surface to be disinfected (for example a product to be used undiluted on floors but diluted for other surfaces). Rinsing instructions also varied. With 14 products, rinsing was mandatory after application, another five did not require rinsing, and for seven products, rinsing depended on the surface being disinfected. Lastly, three products could be rinsed, dried or wiped, with the choice left up to the operator, and for the last product rinsing was optional.

Analysis of the products showed that the recommendations for use did not always appear on the labels. They were sometimes found on documents such as technical data sheets.

However, these documents are not always made available to the people handling the products, which can lead to errors in their use.

Lastly, some labels contained confusing information, such as "no rinse" (whereas the technical data sheet stated that the product could be rinsed, dried or wiped), or "use the ready-to-use solution immediately" (for a product that needed diluting).

Product conditions of use not always complied with

For most of the events reported (n=32/37), only one biocidal product had been used.

For 25 events, the product used was actually intended to disinfect the surface involved in the event. On the other hand, for 11 events, the product did not seem to be the most appropriate, or was even unsuitable, for the purpose for which it was used (for example, a moss remover for roofs and façades was used to clean a playground slide). For the last event, only one of the two products used was suitable for the purpose.

In order to determine the cause of each accident, the conditions of use stated in the technical specifications were compared with the way in which the products had actually been used during the event.

Table 1 : Breakdown of conditions of use (source: SICAP)

Compliance with product handling and application conditions	Number of events	Number of cases
No	**14**	**34**
If no, failure to follow instructions regarding:		
Rinsing	*3*	*7*
Dilution	*5*	*16*
Drying	*3*	*7*
Rinsing + waiting before contact	*2*	*3*
Product left within reach of children	*1*	*1*
Yes	**12**	**60**
but product unsuitable for the purpose	*4*	*23*
Not specified	**11**	**24**
but product unsuitable for the purpose	*3*	*3*
General total	**37**	**118**

For 14 events, the conditions of use had not been complied with. Five of these involved a problem with dilution, such as a dilution error, a failure to dilute the product, or dilution carried out in an unsuitable place. Three events concerned a problem with rinsing the product. Others concerned a failure to wait for the specified time before contact (n=2), or a problem with drying (n=3). For one event, the product had been left within the child's reach.

For 12 events, the product had been used in accordance with the recommended conditions of use, but in four of these it was unsuitable for the purpose, which may explain why the accidents occurred.

For 11 events, it was not possible to identify the reason for the accident. However, for three of these, the product used was in any case unsuitable for the purpose.

Reducing the risk of accidents due to the use of disinfectant biocidal products in childcare facilities

Although the number of accidents associated with the use of disinfectant biocidal products in community settings fell in 2022, after two years in which the number of incidents was particularly high, they have not gone away and a new series of cases was reported to the PCCs in early 2023, reflecting the persistence of the problem.

Based on this study's findings, the following recommendations were made for reducing the risk of accidents due to the use of disinfectant biocidal products in community facilities, particularly those hosting children:

- use products that are suitable for the surfaces to be disinfected;
- opt for the least hazardous products, especially in community facilities where there are young children;
- choose ready-to-use products to avoid dilution errors, and products with clear, simple instructions for use;
- keep products away from the public and, if dilution is necessary, do this in an equipment room dedicated to this purpose;
- rinse products after application or accidental spillage, or at least wipe the surfaces dry;
- wait for the specified period after disinfection before giving children access to the disinfected area/surface, in accordance with the instructions of the products used;
- do not carry out cleaning and disinfection tasks in the presence of children;
- train staff in the correct use of disinfectants;
- in the event of skin contact, remove any clothing soaked in the product and wash skin thoroughly with water. Take care not to allow the product to remain between the skin and clothing, watches, shoes, etc. If the affected area is extensive and/or skin lesions appear, see a doctor or call a poison control centre.

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TO FIND OUT MORE:

Rapport d'étude de toxicovigilance. Atteintes cutanées chez les enfants en lien avec l'utilisation de désinfectants en collectivité - Observations enregistrées par les Centres antipoison et de toxicovigilance français (2017-2022)