

## Accidental childhood poisoning by medicines

### Childhood and children

Childhood spans the period from birth to the end of physical development. Chronologically this is usually considered to be reached by the age of 18 years; which is normally used by child health services and most data collected to define the end of childhood. There is, however, evidence that brain maturation may occur somewhat later, around the mid-twenties.

Children differ physiologically from adults; although mechanisms of metabolising and eliminating medicines from the body normally mature to adult rates by the age of one year, an adult is approximately seven times heavier than a toddler. Consequently children typically have higher exposures to medicines relative to their bodyweight compared with adults.

For example, an adult medicinal dose of 200 mg elemental iron in a 70 kg adult equates to just under 3 mg/kg of iron. The same dose in a 10 kg child equates to 20 mg/kg, a concentration at which significant features of poisoning could be expected. Children, however, generally have different taste perceptions and preferences to adults, which may limit ingestion in some cases.

### Poisoning and children

Data on childhood poisoning from a range of pharmaceuticals typically shows two distinct peaks in cases at the pre-school ages of three to five years and a second peak in the teenage years of 13 to 18 years. Cases from the pre-school peak are usually accidental poisonings, resulting from encounters between a child and a medicine as part of the child's exploratory behaviour. Cases from the teenage peak are usually non-accidental poisoning and reflect episodes of deliberate self-harm.

There is limited published data readily available on the current incidence of accidental medication poisoning in children. The UK National Poisons Information Service received approximately 9,550 calls concerning poisoning in children over 2019/20. Between 2012 and 2017, 25,591 children under 5 years of age required hospitalization in NHS England due to accidental poisoning, reflecting a downward trend over the last 30 years. Single centre studies estimate that around 2% of all childhood Emergency Department presentations relate to poisoning. Of these, around half involve medications.



Approximately two thirds of cases of childhood accidental medication poisoning, children are due to medication not intended for their own use, often either their parent's or grandparent's medications. A diverse range of medications may therefore be encountered in accidental medication poisoning.

### **Harm from accidental poisoning by medications**

Most accidental poisonings in children result in no or minor symptoms. However, the potential for severe symptoms or even death is well-recognised; between 2001 and 2013, the UK Office of National Statistics recorded 28 accidental deaths in children from pharmaceutical medicines. The majority (57%) of deaths were due to opioids, specifically methadone. Other classes of drugs reported to have caused death in children outside of hospital included the tricyclic antidepressants and iron-containing medicines.

Between 2019 and 2020, the UK National Poisons Information Service classified 47 cases as severe or life-threatening following accidental poisoning with medications. Frequently reported medicines included methadone, tricyclic antidepressants, iron-containing medicines and antiepileptic drugs.

Methadone is especially problematic. Children who are not tolerant to opioids are at increased risk of respiratory depression, coma and death if exposed to methadone. A dose as little as 10 mg could be fatal in a child. Usual treatment doses for adults typically exceed this threshold; average maintenance doses are between 60 mg to 120 mg. In addition, methadone is long-acting and is also potentially toxic to the heart.

## **Public Statement.** [British Toxicology Society](#)

### **Harm reduction**

The introduction of child-resistant packing, in addition to advice on safer medicines storage, is likely to have contributed to the reduction in children admitted to hospital following accidental medication poisoning over the past 30 years. However, many medications are dispensed in blister packaging and are potentially accessible to children.

In future, focused measures could be considered for drugs known to be especially harmful to children, such as methadone. Options could include a requirement for individualised risk management plans and the co-prescription of an opioid antidote with training on its use.

### **References**

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