

## Accidental poisoning

When most of us write a prescription we are thinking of the appropriate medicine for our patient and the type of packaging in which it is dispensed concerns us little. Since 1975 the way in which medicines have been dispensed has changed. Child resistant containers were first introduced for aspirin and paracetamol. After a dramatic reduction in the numbers of children admitted with (in particular) salicylate poisoning, an agreement was reached, in 1981, between the pharmaceutical and medical professions that all solid dose medicines should be dispensed with either a reclosable child resistant container or in unit packaging of strip or blister type. Although the impact on hospital practice of the introduction of these containers for salicylates was dramatic with an 85% fall in admissions from 1975 to 1978,<sup>1</sup> recent years have seen little apparent change in the pattern of poisonings admitted. If child resistant containers are apparently so effective for salicylate why hasn't there been the same success for other medicines since 1981? The two main reasons for this are that there has been considerably less than universal implementation of the 1981 agreement, which was not regulation, and that no effective child resistant container exists which can be put onto a standard medicine bottle containing liquid medicine. Most liquid medicines are supplied to pharmacists in bulk and have to be decanted into smaller bottles. The lack of compliance with the 1981 agreement is due to the considerable opposition of the medical and pharmaceutical profession. Many feel that they are not effective and others that most poisoning episodes are so trivial as to be not worth preventing.

Although childhood poisoning is thankfully now a rare cause of death with only five deaths in 1985, it accounted for over 25 000 admissions to hospital in England and Wales in 1984. Many of the children admitted have no symptoms and are simply observed overnight, yet considerable disruption is caused to the child and his family. Before the advent of child resistant containers attempts at prevention had been primarily educational with little noticeable effect. In order to clarify the situation with regard to childhood poisoning a multicentre study was set up coordinated by the National Poisons Information Service (NPIS). Its aims were not only to look at the causes of accidental poisoning and their outcome but also to investigate the role of the type of packaging. It was hoped that this might give information

on the effectiveness of child resistant containers compared with conventional packaging and in addition provide information on the relative safety of different forms of child resistant container concerned.

One of the problems with such studies is that where only admissions to hospital are looked at it is impossible to interpret the relative contribution of different types of packaging unless 'exposure' data is also available. A parallel survey was therefore carried out to determine the availability of medicines in the homes of children in the same study areas as used for the poisoning study. The results of these studies have recently been published.<sup>2,3</sup> An additional stimulus for this study was the move towards unit dose and original pack dispensing—that is, the drug is manufactured with a 'course' of medicine in a single pack which can then be dispensed as such without the pharmacist having to count out tablets or decant into smaller bottles. It is considered that the advantages to patients outweigh the problems of the considerably increased amount of storage space required.

The poisoning study was undertaken in nine accident and emergency and five paediatric departments throughout England and Wales between 1982 and 1984. Altogether 2043 cases of poisoning were recorded in children under 5 years of age. Drugs accounted for 59%, household products 37%, and plants 3%. The most common drugs were analgesics, anxiolytics, cough medicines, and oral contraceptives; household products were usually bleach, detergent, disinfectant, and petroleum products. Seventy five per cent of the children were either 2 or 3 years old and there was a slight preponderance of boys (56%). Most drug incidents occurred between 9 am and 10 am and 75% were in the child's own home. Seventy six per cent of incidents happened when the child was not closely supervised by an adult. Only 22% of the children were admitted for observation and most required only emesis with ipecacuanha or fluids, or both. Seven children were admitted to an intensive treatment unit and there were no deaths. This part of the study therefore provides an enormous amount of valuable information concerning the background to accidental poisoning. Comparison with other smaller surveys and with data from the Department of Trade and Industry's Home Accident Surveillance System suggests that the results are representative of the national scene.

In order to assess the role of packaging in the incidents concerning medicines the multicentre study results were compared with data from a household survey. The latter was carried out by experienced market research interviewers among a representative sample of households with children under 5 years of age. The areas studied were within the catchment area of each hospital in the main study. The study was performed at three different times of year. Interviewers arrived at the house unannounced so that there was no opportunity to tidy up. Over 92% of houses visited willingly cooperated in the study and this compares very favourably with usual household surveys where an 85% positive response is regarded as excellent. Altogether 598 homes were visited and 5823 medicines, almost 10 per household, and their packaging were identified within them. The relation between availability of medicines within homes, the type of packaging used, and the medicines concerned in the poisoning episodes was assessed using an accident association index. A low index indicated relative safety and a high index that that substance or type of packaging was more dangerous and therefore unsafe.

Despite the current recommendations most substances concerned in the poisoning episodes either were not in child resistant containers (63%) or were in transparent blister packs (20%). Both of these had a high accident association index. Child resistant containers, strips, sachets, and opaque blisters all had a low index. The accident association index of different medications was obviously complicated by the type of packaging concerned. Those substances which had a relatively high index on their own, however, were rendered much safer by the use of a child resistant container. Prescription medicines were more dangerous than over the counter substances and the former were more commonly concerned in incidents of poisoning. Investigation of the place of storage showed that only 40% of medications were in their normal storage place at the time of the accident. No pack had a low index when stored on an open accessible shelf indicating that both safe packaging and safe storage are necessary for safety.

What are the implications of these two studies for the future management of childhood poisoning? Clearly there are implications for the pharmaceutical and packaging industries. The study has shown that child resistant containers and opaque blister packs, strip packs, and sachets were less associated with poisoning episodes whereas transparent blister packs appeared to be more dangerous. As a result of the study the Proprietary Association of Great Britain have drawn up guidelines for the

design of unit dose packs which exclude transparent blister packs. These guidelines have the backing of the Association of the British Pharmaceutical Industry. There is currently a strong move towards unit dose packaging and original pack dispensing for prescription medicines and this study will undoubtedly help to make future packaging safer for children. There are, as yet, however, no recognised standards for the production of non-reclosable packaging and no accepted test procedures for them as there are for child resistant containers. There are also no suitable child resistant containers designed for liquids and these accounted for 42% of the poisoning episodes in the NPIS study. There is a clear need to develop a child resistant container which will fit onto a standard liquid medicine bottle, although special child resistant containers have been developed for some over the counter liquid medicines—for example, Calpol.

There are also other measures that could help prevent poisonings. Currently medicine labels must bear the instruction 'Keep out of the reach of children.' It might be better to amend this to 'Keep all medicines locked up and out of sight of children.' The survey has shown that although medicines may appear to be out of the reach of children, if they are visible they will find a way of getting them. There is also a problem with liquid medicine kept in refrigerators where they are accessible to small children. Very few medicines actually need to be kept as cold as 4°C and the pharmaceutical industry is looking at stability and perhaps more appropriate labelling.

Undoubtedly most poisoning incidents are just scares and most children do not need to be admitted to hospital. Is there any way that we can make inroads into the problem? For no matter how effective child resistant containers become some children will still be poisoned. Once a child has taken an apparent excess of a substance his parents will probably panic and even if they don't they still need medical advice as to whether or not the substance is potentially dangerous. The NPIS currently responds only to inquiries within the health and emergency services and is not directly accessible to parents. Some countries do have a service that is available to the public where they can obtain reassurance or appropriate advice regarding the seeking of medical attention. Such a service could substantially reduce the number of children attending hospital but would be unlikely to alter either the number of admissions or deaths. The availability of rapid reassurance, however, would be a great saving in family distress and to the burden on the emergency services. A working party has been established under the auspices of the Childhood Accident

Prevention Trust and the National Poisons Information Service to assess the feasibility of such a service for the United Kingdom. A pilot scheme has been running in Leeds and after local publicity campaigns the public are now beginning to use it.

**References**

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- <sup>3</sup> Wiseman HM, Guest K, Murray VSG, Volans GN. Accidental poisoning in childhood: a multicentre survey 2. The role of packaging in accidents involving medications. *Hum Toxicol* 1987;6:303-14.

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