Information to and from Poison Control Centers*

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The collection of significant information about the effects of chemicals and chemical combinations on the human body depends on knowledge of the formulation and a complete medical resumé of resulting illness. The rate of collection of such information is retarded by lack of information on complete formulations, necessity to remove suspect offending agent from the stomach immediately, and lack of laboratory facilities to do blood chemistry on complex drugs and chemicals.

"The number and variety of chemicals that affect man have increased at an alarming rate and created a public health problem of major proportions. We are confronted with a profusion of chemicals in the form of industrial and muncipal wastes, air and water pollutants, herbicides, pesticides, cosmetics, food additives, as well as drugs administered over extended periods of time, and yet we do not know what these substances do to biological systems. In effect, we are thrust into global experiments for which we are not prepared."

This statement was contained in a paper by Bernard Brodie, George Cosmides, and David Rall, published in 1965.[1] It expands greatly on the 1950 needs of the practicing physicians (pediatricians) who sought information on the toxicity and treatment of household products which were accidentally ingested by their patients. However, as you will see, their efforts have illustrated the problems involved in collecting such material. The first poison control center established in Chicago in 1953 under the auspices of the Illinois chapter of the Academy of Pediatrics had several goals. Two are important to the discussion today. The first objective was to collect information on the formulation, toxicity, symptomatology, and treatment, if needed, of the many products found in the home—products which a child might eat. This information then would be relayed to the physician treating an emergency ingestion.

The second objective is succinctly stated by Dr. William C. Adams, past president of the American Association of Poison Control Centers:[2] "One must understand the distribution type and circumstances under which the accident can occur, and to whom. The accurate reporting of active cases provides a starting point not only for epidemiologic studies but for developing human experience data so essential to the development of the best therapeutic measures."

The fulfillment of these two objectives would indeed supply us with some excellent data. However, the reports forthcoming have not been of a nature to help us achieve completely these objectives. The National Clearinghouse for Poison Control Centers must depend on the manufacturer for the formulation and toxicity of a product. Many producers are hesitant to divulge complete formulations except where full disclosure is required. Thus, much of the information received refers, for example, to "active ingredients 2%, consisting of chemical A, 1.5% and chemical B, 0.5%," inert ingredients 98%. The inert ingredients are not listed, yet they may account for human toxicity. Although the "inert" ingredients do not contribute to the purpose of the product, they may not be inert in the toxicologic sense.

A second formulation we received contained six items, three of which were listed as solublized protein, lanolin, and preservative. The LD_{50} of the product was over 5 grams per kg., the limit of the Hazardous Substance Act, so no further information was given. With the exception of the pharmaceutical industry and agricultural chemicals, the information supplied by manufacturers is limited and usually contains little if any toxicological data on the individual components or completed formulation. We must depend on review of the scientific literature and case reports for more specific information. A manufacturer's unpublished research rarely is made available to us.

The physician with an emergency is concerned with the immediate treatment of his patient. The first evaluation he must make is whether the victim is in danger. In many childhood ingestions, the accident is discovered in sufficient time to remove the offending agent by inducing emesis or performing lavage. The material prepared by the Clearinghouse for the poison control centers is in the following format: Ingredients, Toxicity, Symptoms Expected, and Recommended Treatment. The information is distributed on 5 × 8 file cards, with attempts made to include all pertinent material on a single card.

Name: Loback Lotion Type of Product: Massage Lotion
MANUFACTURER: Backpain, Inc., Racine, Wis.
INGREDIENTS:

Stearic acid	Modified lanolin
Cetyl alcohol	Triethanolamine
Glyceryl monostearate	Mineral oil
Propylene glycol	Menthol, natural 0.095% (0.03 gram per oz.) lotion
Petrolatum	Paraben preservatives
Lanolin	

TOXICITY:
Low. Menthol has an estimated fatal adult oral dose of 2 grams, but little toxicity would be expected due to its low concentration in this product. Triethanolamine has an oral LD_{50} of 8680 mg. per kg. in rats; several ounces can probably be tolerated by adults. The other ingredients would not be expected to cause toxicity.

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SYMPTOMS AND FINDINGS:
Possible gastrointestinal irritation, diarrhea
TREATMENT:
Give milk, dumulcents. Emptying the stomach is probably not necessary unless a very large amount is ingested.
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The cards are prepared by our staff and are reviewed by four outside consultants. Because human life is threatened, caution is necessary when discussing toxicity and suggesting treatment. Treatment is expensive and uses manpower, which is in critical demand. Therefore, we do not hesitate to indicate that a product is of low toxicity when there is evidence to support it. Labeling every product as dangerous could cause the physician and the public to lose faith in our material and in the objective of the program—the dissemination of accurate information on the potential hazard of the product. Discussions with many physicians have confirmed that they do not desire to render treatment when it is not necessary.

The National Clearinghouse for Poison Control Centers has been receiving reports of ingestion from poison control centers since 1959. The purpose as stated is to collect data on frequency of ingestion and to develop human experience.

In 1966, the 345 poison control centers reported 73,560 accidental exposures;[3] 64,600 involved children under five years of age. In addition, 14,000 reports of self-poisoning, mostly by adults, were received. Children aged one and two years were involved in 68% of the accidental ingestions in the under-four group.[4] By category, medicines accounted for 53.6% of the ingestions by children, cleaning and polishing agents 14.5%, petroleum products 5%, cosmetics 5.9%, pesticides 5.8%, plant 3.3%, paint and paint solvents 5.0%, and miscellaneous 6.1%. The centers are being asked with increasing frequency for information on the treatment of self-poisoning by adults. This creates the need for more precise information, since the quantity is usually larger and more than one substance is involved. The patient is frequently in serious condition. For children under five, hospitalization as reported varies from 4% for cosmetics to 14% for medicines and 34% for petroleum products.

Why, then, are we not receiving the information we thought we would? There are numerous reasons. The amount of a product taken by a child is usually difficult to judge. If it is a powder, the child is playing in it in addition to eating; if it is liquid, he has frequently spilled some on himself and/or the mother is not certain how full the bottle was. So our first measurement is vague. When the child has exposure to a product with sufficient toxicity to represent a poisoning in the quantity reportedly taken, the physician must remove it immediately. Since in many reported cases, removal from the stomach is accomplished in about 1 hour or less, the possibility of symptoms occurring are decreased. The statistics will then contain a bias in favor of the producer because no illness is reported. If an illness does occur, the evaluation of the chemical or chemicals in a formulation which have caused a set of symptoms creates another problem. At our present state of development, such a determination is seldom possible without a great deal of laboratory work which is not routinely available.

The Poison Control Center can serve as an excellent source of case material when laboratory facilities are available. Many poison control centers, however, lack these facilities. It may be necessary to establish area laboratories in larger hospitals to determine blood chemical levels for smaller centers. The value of such facilities is demonstrated in the case of a 16-month-old child taking a phenobarbital-amphetamine mixture. Approximately 28 hours later, he was still comatose and deteriorating. Barbiturate level at time of admission was 11.1 mg. % and urine amphetamine level a maximum of 21 mg. %. Peritoneal dialysis (13 exchanges) was instituted, with chemical analysis showing 26% of the phenobarbital ingested recovered in the dialysate and 9.7% in the urine. Of the amphetamine ingested, 1.5% was recovered in the dialysate and 3% in the urine. The child was alert on the second day and home on the ninth day.

A similar work-up followed the ingestion of an unknown amount of isoniazid and ethanol. The patient was comatose and unresponsive on admission, with INH blood level of 71 μg.% and blood alcohol above 400 mg. %. Peritoneal dialysis was started. Blood was monitored for levels of INH and alcohol. Dialysate fluids and urine were analyzed. Figure 1 indicates the rapid lowering of blood levels and amounts of chemicals removed. One question frequently asked us is whether dialysis will be of value in a specific poisoning. Limited information is available.[5, 6]

The poison control centers and the National Clearinghouse for Poison Control Centers attempt to have information available whenever possible. However, we cannot manufacture information. Accuracy of information is subject to the limitations imposed by failure to divulge complete formulations, and there is some degree of justification for this. Then there is the limitation of published toxicity data on individual chemicals, synergistic effects, and the lack of correlation between animal findings and human reaction.[7] Our failure to utilize the accidental or intentional poisoning to obtain the maximum information as in the cases illustrated, unfortunate as it may be, is another limiting factor. So long as these limitations exist, it will be difficult to relate many of the reported cases to specific chemicals.

We have on file approximately 300,000 ingestion reports with varying amounts of information. These are filed by trade name to expedite retrieval. The material is tabulated by broad category—i.e., medicines, household products, and pesticides. Tables are published. We must take hand counts to determine the status of an individual trade-name product. Beginning with January, 1968, we have

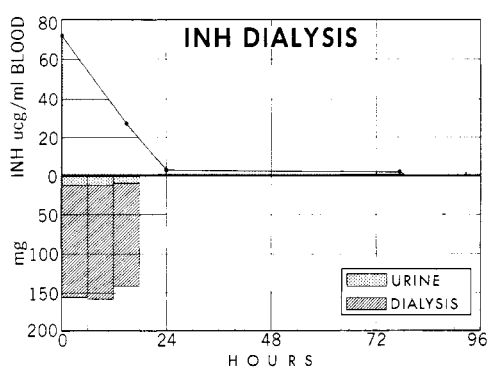

Figure 1. Analysis of dialysate fluids and urine

Table I. Cases of Poisoning Reported, April 1968 through June 1968

Product	Under 5 Yrs.	Over 5 Yrs.	Unknown Ages	Symptoms, Under 5	Symptoms, Over 5	Symptoms, Age Unk.	Hospital, Under 5	Hospital, Over 5	Hospital, Age Unk.	Fatal, All Ages
Camphor product, unspecified										
15 134239	4	...	1	1	...	...	...	...	...	...
Campho-Phenique										
15 134320	6	2	1	1	...	...	...	...	...	...
Camphor										
15 134400	3	...	...	1	...	...	...	...	...	...
Camphor ice for lips										
15 134880	...	1	...	...	...	...	...	...	...	...
Camphor liniment										
15 135760	25	11	6	2	1	...	2	1	...	...
Camphor spirits										
15 135520	2	2	1	...	...	...	...	...	...	...
Fleets Chapstick										
15 316880	1	...	...	...	...	...	...	...	...	...
Total	41	16	9	5	1	...	2	1	...	...

placed the information for each trade name product in certain categories on tape so it will be readily available for review. A pilot table of this material is appended (Table I).

We also have plans to incorporate significant statistical information into the treatment cards. Thus, the treating physician would learn that, in 200 previous ingestions, no symptoms had been noted. Although negative data of this nature might be deceiving, we believe they are of some value. This is particularly true of plant ingestions, because in many cases no information is available.

Distribution of known information is but one problem in our search. The availability of reliable, meaningful knowledge to disseminate represents a greater challenge.

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Information on Health Aspects of Pesticides*

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A program for establishing a computer-based system for national coordination and support of toxicological information, whether published or available in unpublished form, has been established at the National Library of Medicine. Planning for a national system is in progress. The relationship of this system to other national resources for information processing and dissemination, and progress in planning are described.

Since DDT, first of the modern synthetic pesticides, was introduced commercially in 1945, the amount of pesticide chemicals used in the United States has increased tremendously. This is reflected currently by the Federal registration of more than 60,000 formulations, each containing one or more of some 800 different pesticidal compounds.[1] The literature of pesticides increased proportionately, an increase which closely parallels the general growth pattern of all scientific literature. At the 1963 meeting of the American Chemical Society, a panel of four distinguished scientists met to evaluate the pesticide information problems, and among the problems defined were the following:[2]

1. The need for rapid and complete retrieval of pesticide information by government agencies.
2. The difficulty of maintaining awareness to the degree necessary for keeping the teaching of pesticides as current as possible.

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