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TRENDS IN NATIONAL POISON CONTROL SERVICES

POISON PREVENTION AND THE ROLE OF POISON CONTROL CENTRES IN THE HEALTH CARE SYSTEMS

Report on a Working Group

Rome
10-13 November 1981

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1. Introduction

A Working Group arranged by the WHO Regional Office for Europe discussed these topics at a meeting at the Catholic University of the Sacred Heart, Reanimation Centre "Biancarosa Fanfani", Rome, Italy, from 10 to 13 November 1981. The Working Group was composed of ten temporary advisers from nine countries of the European Region, one representative for both the International Academy of Forensic Medicine and Social Medicine and the World Federation of Associations of Clinical Toxicology Centres and Poison Control Centres, and a representative from the WHO Secretariat in Copenhagen. A list of the participants is given in Annex 1.

In 1974, the WHO Regional Office for Europe arranged a meeting of a Working Group in Lyon from 7 to 10 May.[a] In a report from the meeting, the situation with regard to frequency of poisonings and the existing poisons information systems were described, and recommendations for future work given.

The purpose of the present Working Group was to discuss the role of poison control centres in poison prevention, and further developments in poison information systems in Europe since 1974.

The meeting was opened by Professor C. Manni, Director of the Biancarosa Fanfani Intensive Care Unit. Dr A.H. Wahba, Regional Officer for Appropriate Technology for Health, greeted the participants on behalf of the Regional Director, Dr Leo A. Kaprio, and thanked Professors Manni and Magalini for acting as hosts to the meeting.

Professor S.I. Magalini was elected Chairman of the Working Group, and Dr F.A. Chandra Rapporteur.

2. Trends and problems - overview

During the 1970s and 1980s new trends have emerged in health care. More emphasis has been placed on self-care, preventive medicine and health information. The projects include systems for preventing accidents, and information to the general public to motivate people to make changes in lifestyle, e.g. changes in the use of traditional food and drink, which may again promote better health. In many countries the cost of health services has increased rapidly, and as funds may be limited, programmes for rationalization and money saving are adopted. In these programmes, the systems for preventing accidents and for education in self-care and health are very important as they may reduce the need for hospitalization and thereby the cost of the health service.

These trends concern the poison centres, as they are part of the health care systems. It will be more important than ever to be able to give the best possible service with limited funds. The work of the poison information centres will be particularly important, because their information to the general public as well as to general practitioners will reduce the number of unnecessary hospitalizations and visits to the emergency rooms. This again will reduce the costs of the health service.

Toxicology covers an enormous field and is of great importance in modern life. It is of great interest to industries in connection with product safety as well as occupational hazards. The control authorities rely on toxicological research and evaluation when making decisions on legislation and licensing, and consumers and health professions are dependent on toxicological services.

Work in poison control centres is interdisciplinary and involves the following main activities:

- data collection and evaluation of toxicity of drugs, chemicals, plants, etc.;
- provision of emergency information on toxicity and treatment of poisonings;
- dealing with late and chronic effects of poisoning;
- providing information for prevention of poisoning.

Data collection requires collaboration with industry for information on the composition of chemical products. Evaluation often makes it necessary to cooperate with experts within different fields of toxicology, medicine, occupational hygiene and biology.

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[a] National poisons control services: report on a Working Group. Copenhagen, WHO Regional Office for Europe, 1974 (unpublished document EURO 7405).

Provision of emergency information on toxicity and treatment of poisonings will, in addition to the staff at the poison centre, also involve intensive care units and other hospital departments, clinical toxicologists and pharmacologists, laboratories, environmental monitoring and occupational health services.

Dealing with late and chronic effects involves collaboration with experts in rehabilitation, epidemiology, occupational health, authorities on food and drug regulations, social and community medicine as well as environmental monitoring and health legislation services.

The present position is that existing systems in some countries need improvements for better peripheral coverage in poison information as well as better communication from the periphery to the centre.

In addition, the European Region of WHO includes all Asian parts of the USSR, Algeria and Morocco, and some of the smaller countries within the Region might benefit from collaboration with the more advanced countries in developing poison information systems.

3. The situation with regard to poison information services in some selected countries of the European Region

The poison control services in some of the countries were described in the report of the meeting in Lyon in 1974, and are only mentioned here as far as new improvements have been made.

Algeria. It is planned that the poison information system will be integrated into the general first-aid system of the country during 1982. In the years 1979-1983 the plans for developing the information service have been as follows with regard to product groups: caustics and household products, pesticides, cosmetics and body-hygiene products, food additives and drugs.

Denmark. The poison information centre is located at the Department of Occupational Medicine in the State Hospital in Copenhagen. It receives information on product formulas from the manufacturers and also works in close cooperation with several State departments in many fields of toxicology and health monitoring. Because of its location it receives many inquiries in connection with workplace exposure, and is particularly concerned with problems in occupational toxicology, e.g. brain damage from long-term exposure to organic solvents.

Finland still has its poison information centre at the Children's Department at the University Hospital in Helsinki. There has been a committee, however, which has proposed that the poison centre should be transferred to the Department of Clinical Toxicology, University of Helsinki. It was also recommended that the poison centre cooperate closely with the Central Laboratory for Public Health (dealing with drugs and poisons in general), the Institute of Occupational Health (dealing with occupational toxicology and biological monitoring of workers) and also with the laboratory in the Department of Forensic Medicine (dealing with post-mortem analyses). As yet no provision has been made for the centre to change its location.

France. The three main centres in Paris, Lyon and Marseille are now using a computerized system for collection of case records and statistics of poisoning. To improve the information service provided by these centres the manufacturers of chemical products are now compelled by law to give details of formulations to the three centres, usually in confidence to the directors.

Hungary has its poison centre at the Institute of Occupational Health, and it collaborates with three other Institutes (of Public Health, Food Hygiene and Pharmacy). There are large, well-equipped regional hospitals for treatment centrally, and industrial physicians and local doctors peripherally. Relevant information passes in both directions between centre and periphery and this probably helped to reduce the incidence of organo-phosphorous poisoning from 236 during 1966 when such chemicals were introduced, to 25 during 1977. There is compulsory notification of all poisonous substances produced, as well as of all incidents of poisoning.

Italy. The country is divided into 18 autonomous sanitary regions, each with its own Department of Justice, Work and Health. This makes it difficult to coordinate and harmonize regulations and practices. The poison control centre in the reanimation centre of the Catholic University of the Sacred Heart in Rome has developed a computer system and network for poison information. Terminals are placed in centres in different regions.

In Portugal, the centre run since 1966 by a few dedicated doctors from private funds was recognized this year by the Government as the official poison control centre. Information on the composition of marketed products, however, is lacking and laws for controlling environmental

pollution due to discharges from factories are not yet being enforced. Regulations exist as regards sales only of drugs and pesticides. The consumers' associations, though becoming stronger, have still very little influence.

United Kingdom. The National Poisons Information Service was described in the report on the meeting in 1974. It deals mainly with information, diagnosis and treatment of acute poisoning. Governmental bodies for trade, the environment, health and safety, agriculture, food and fisheries, safety of medicines and the Pesticide Safety Precaution Scheme are dealing with prevention of poisonings, acute, subacute and chronic. These bodies are advised by a network of independent expert committees and supported by laboratories attached to various ministries and hospitals.

4. Epidemiology of poisonings in some countries in Europe in recent years

In all countries in Europe, the number of inquiries to the poison information centres is increasing. This does not mean, however, that the number of cases of poisoning which are treated in hospitals has increased in the same way. A great number of cases of suspected poisoning which are referred to the poison centre will not require hospital treatment. Adequate information given by poison centres may often prevent unnecessary visits to hospitals or emergency rooms. In many countries in Europe the greatest number of acute poisonings treated in hospitals are due to self-poisoning.

In Algeria self-poisoning cases (mostly by means of drugs or household products) are 2-3 times the number of accidental poisonings and are more than three times as frequent in women as in men. This was attributed partly to the great social changes which have occurred in Algerian society over the past 15 years. The substances causing poisoning in adults are mainly medicaments (especially barbiturates and other hypnotics), and to a lesser degree household products (mainly hypochlorite solutions used as a disinfectant, petrol used for heating and lighting, and pesticides), town gas (especially in crowded urban households), carbon monoxide (where ventilation is poor as in Moorish type steam baths, or around brasiers used to heat a confined space), and industrial chemicals. Children were poisoned by drugs, petrol, the plant called "chadron à glu" which grows everywhere and is used as chewing gum, and finally caustics such as hypochlorite solutions or hydrochloric acid used for cleaning purposes. Young adults aged 16 to 20 and 21 to 30 years of age were mostly affected, accounting for most of the adult cases. Among children under 5 years of age, boys are in the majority.

In the first 7 months of the telephone poison information service, 948 calls were dealt with on a 24-hour basis. About 5 cases per day required medical care. Medical personnel made 10% of the inquiries, about 10% concerned occupational exposures, and 80% were from the general public. Overall, causes were medicaments (56%), household products (30%), pesticides (5%), industrial chemicals and cosmetics (4%), and carbon monoxide, plants and animals (5%). About 40% of all inquiries concerned children, usually accidentally poisoned, and of these, 48% involved household products, 43% involved medicaments, and 9% involved industrial chemicals and pesticides. Inquiries concerning adults (usually self-poisonings) were 58% of the total, of which drugs were involved in 80%, industrial and household chemicals 16%, and pesticides only 4%. Self-poisonings predominated from 16 to 35 years of age and of these, 40% were women. In children, accidental poisonings were maximal in the group aged 1-3 years.

In Belgium the poison information centre handled 22 000 inquiries during 1980. It seems that high-risk groups are children under 5 years of age, elderly persons living under poor social conditions or under severe stress and people in certain occupations. Dangerous substances were caustics, certain drugs, some pesticides, and toxic plant materials.

In Finland there was the highest rate of accidental poisoning in Europe ($6.7/10^5$ population), largely due to excessive ethanol ingestion by a few persons in a country where the average consumption per person was less than in most other countries. If these cases were excluded, other types of poisoning showed a distribution similar to that elsewhere: homicides (very rare), undetermined 10%, accidental 25%, and suicidal 65%, with a male preponderance strongly evident, especially in suicides around the age of 50. Of all suicides, one in five was due to a poison. Excluding those caused by ethanol, of all fatal poisonings, 90% were due to drugs, most by hypnotics and tranquillizers and 10% due to other chemicals and gases, mainly carbon monoxide from malfunction of heaters or from car exhausts. Gas heaters are no longer commonly used in Finland. Cases of poisoning admitted to hospital are mainly due to drugs, ethanol, corrosives and solvents, and the average stay is two days. Poisoning accounts for about 4% of patients in intensive care units in Finland.

Inquiries received during 1980 by the National Poison Centre (Helsinki) totalled 11 000 of which only about 9500 were related to individual cases of poisoning. Of those, the degree of effect was considered as severe in 16%, mild in 39.5%, negligible in 39% and unknown in 5.5%.

Fifty-seven per cent of the cases concerned children up to the age of 15. Looking at the substances and agents involved, it seems that relatively harmless substances such as vitamins and fluoride-containing substances caused many calls relating to children up to 6 years of age.

In France the poison centre at Lyon serves a population of about 1.5 million and deals every year with about 15 000 inquiries, 3000 hospital admissions over the age of 15 and 80 autopsies related to poisoning. More than a half of the number of inquiries concerns children, but they account for only 6% of admissions. More than 80% of those admitted are self-poisonings and less than 8% are accidental poisonings. Women account for 61% of the admissions or about two thirds of the self-poisoned group. For both sexes, admissions for poisoning were high in the 15-19 year age group, rose to a maximum at 20-29, and then fell off sharply after 30-39 years of age. Psychotropic drugs were the toxic agents in 70% of admissions, carbon monoxide in about 8% (although accounting for about half the total deaths), household products in about 6%, and pesticides in less than 1%. Alcohol was involved in 20% of cases, often in association with other poisons.

The inquiries to the poison centre concerned medicaments in 62% of the causes, household products in 11%, industrial products in 6%, pesticides in 3% and carbon monoxide in 2%.

In Hungary total cases of poisoning has declined from 1974 to 1977, being due mainly to the fall in the yearly number of incidents due to gases and other materials used in industry. The number of cases in the categories acids and alkalis, and lead and its compounds were rising slightly, but the preventive impact of the poisons information centre was shown in the marked reduction of cases of lead poisoning from about 500 per year in the 1960s to levels of less than 50 per year in the late 1970s. There was concern about the level of poisonings from aromatic hydrocarbons and monitoring was being extended to include carbon tetrachloride and similar substances in factories. Toluene was the most common cause of poisoning followed by benzene and benzidines, then xylene, trichloroethylene, methyl chloride and carbon tetrachloride. In 1966 the use of chlorinated hydrocarbons was restricted, and this resulted in a 25% decrease in poisoning from this source, but organophosphorus pesticides were introduced in the same year, resulting in a sharp rise in poisonings. By 1977 there had been 406 such cases with 216 admissions to hospital, as compared with 229 cases of hydrocarbon poisoning with only 60 admissions to hospital. Serious poisoning from organophosphorus compounds was, however, a small hazard in occupational use. Due to monitoring and control it numbered one to three cases per year only. Overall for pesticides, the greatest incidence of poisonings was from herbicides, followed by fungicides and then by all other types. Data analysed to show causes (occupational, accidental, suicide) against outcome (lethal, non-lethal), indicated that occupational poisoning was mainly by inhalation resulting in mild symptoms, whilst suicide attempts mainly involved the oral route and resulted in severe clinical pictures.

In Italy acute poisonings accounted for about 20% of cases discharged annually from the Resuscitation Centre of the A. Gemelli Polyclinic since its opening in 1971. The Centre for Information by Telephone was also started in 1971 and has recently become better known, the number of inquiries increasing about five-fold from 1974 to 1976. The agents concerned are (for hospital cases and telephone inquiries respectively): drugs 55% and 45%, household products 20% and 25%, food chemicals 7% and 6%, industrial chemicals 3% and 5%, pesticides 1% and 1.5%, approximately. Psychotropic and analgesic drugs were most often involved. Up to the age of 11, accidental poisoning was predominant, from 12 to 15 years of age, self-poisonings increased and in the 16 to 50 age groups became the largest cause of poisoning in all age groups, outnumbering accidental poisoning by about 4 to 1; after 51 years of age both forms of poisoning dropped to low levels. Females attempted suicide more often than men, but males were more often successful.

5. Collection and handling of statistical data in poison control centres

5.1 Telephone calls

Telephone inquiries to the poisons information centre provide useful data showing not only what types of poisoning incidents actually occur but also what products are thought by the public to be toxic.

5.2 Hospital cases

Cases of poisoning reported from hospital admissions are often also reflected in the statistics for telephone inquiries, but not always. In cases concerning drugs, often used in self-poisoning, or commonly known poisons the patient is usually taken directly to the hospital without telephoning the poison centre. For accurate statistics, good communications between the poison centre and central as well as local hospitals is essential. It is also important for the

poison centre to have good communication with forensic medicine departments, to obtain information on post mortem examinations, and fatal poisonings, which would not otherwise be reported to the centre.

With regard to poisonings at the workplace, the poison centres usually receive inquiries in connection with acute accidental poisonings. They may also get some calls concerning chronic poisonings, teratogenic effect of chemicals, etc., but the monitoring and vigilance to detect hazardous substances and dangerous exposures in the work environment is made by authorities and bodies within the occupational health systems. It is, however, important for poison centres to have good communication with these bodies.

5.3 Epidemiology

Epidemiological studies may give an idea of the size of the poisoning problem, indicate new areas for concern, show which poisonings are most prevalent and which facilities for diagnosis, treatment and rehabilitation should be given priority. Hospital admissions for a particular type of poisoning, when compared with total incidence for that type of poisoning, may give an indication of the danger which these chemicals represent. Thus in Hungary, 406 poisonings with organophosphorus compounds resulted in 216 hospital admissions, but 229 poisonings with hydrocarbons caused 60 admissions, the former group of compounds being therefore the more dangerous. Dividing incidents of poisoning by different substances into lethal or non-lethal groups may also give an indication of severity and need for priority action. For example, again in Hungary in a given period, lethal and non-lethal poisonings were respectively 0 and 8 in the work environment, 10 and 9 from accidents, and 16 and 4 from suicide attempts. Occupational poisoning was usually by inhalation and was mild, whilst suicide attempts involved the oral route and were much more severe.

All epidemiological studies should try to make the following identifications :

- possible victims of poisoning, the persons who are at risk;
- the dangerous products involved in poisoning;
- the dangerous circumstances which lead to the incident.

This information would greatly increase the effectiveness of planning and carrying out preventive measures.

5.4 Evaluations in epidemiology

When comparing the statistics of poisonings in different countries in Europe, care must be taken not to draw too definite conclusions. The wide range of death rates from poisoning (0.2 to 1.3% of all deaths) might be due partly to different ways of handling cases rather than to different rates of poisoning incidents. Deaths from poisoning per 100 000 population shows a 10-fold increase from lowest rate to the highest, but this may partly be due to different recording methods. General conclusions could be misleading: the high incidence of deaths from ethanol poisoning in Finland might suggest widespread alcoholism there, but in fact was due to very high consumption of alcohol by a few persons, the average consumption by the rest of the population being lower than in most European countries.

Trends in poisonings over 10 years may be useful in assessing the new problems with emergency, the efficacy of preventive measures or the impact of fiscal, legal, social or other developments.

6. Use of computers in poison control centres

As poison centres handle a tremendous amount of data, the use of computers will greatly facilitate storage, retrieval, processing and dissemination of these data. By computer storage of data on toxicity of chemicals, signs and symptoms seen in poisonings, current treatment, and a relevant bibliography, advice on diagnosis and treatment could be quickly and easily extracted and transmitted to an inquirer. Similarly, by storing together data on poisonings which occur, collected from different sources, e.g. poison centres, hospital inpatients and outpatients departments, first-aid stations, pathology departments carrying out post-mortem examinations, occupational health centres, etc., readily available and useful statistical and epidemiological outputs may be extracted and processed to assist in evaluating current and past situations, and in planning measures for future control. In Denmark, it is planned to use computers for filing data on patients attending occupational health centres and diagnosis in relation to exposure values.

Acute poisonings are mostly quite unexpected and call for immediate recognition and treatment. They occur in the home, in the street, at work, during holidays or in other circumstances which may make it difficult to obtain a reliable history and to establish a diagnosis. Diagnosis and management are simplified by having poison control centres with special facilities, so that data from the site of the accident can be matched with the data stored in a central information file. There are, however, some problems attached to this central information file. The problems arise from the large number of data items handled, the numerous synonyms used by manufacturers for ingredients in their products, the need for continuous up-dating of the data base, the need for quick retrieval of information, and the great variations in the basic data received for storing in the reference file. Such problems may be more easily solved by the use of computers. By using modern communication systems and electronic data processing and display, it is possible to arrive rapidly at the diagnosis, ascertain appropriate treatment, and advise helpers at the site of the accident on symptomatic and specific measures which might be carried out whilst awaiting the arrival of the physician or transfer of the patient to a clinic, treatment centre or hospital.

6.1 An example of the use of a computer in a poison centre

In Italy the use of computers was developed in stages so that practical difficulties could be overcome as they arose.

First stage. A start was made with substances most commonly used in incidents of poisoning. For each product, information filed included: code number, the activity in which the substance was used (medical, agricultural, etc.), the toxic and lethal doses, signs and symptoms of poisoning, treatment, and relevant bibliography. A system was adopted which gave direct access to the data bank when the name of the compound was known; otherwise, cross-indexes were used based on broad category of use, specific use, symptomatology and so on.

Second stage. Information reference sheets on each compound were prepared, with single paragraphs giving name, code number, ingredients, use, symptomatology and treatment. Cross-indexes were established between trade or common name and use, symptoms, and so on. From statistical evaluation of the frequency of occurrence, a symptom or physical sign was assigned a numerical weight, a nonspecific one being given a small weight, and a specific one a high weight. Combinations of two or more symptoms were treated similarly. It had been hoped that this would simplify the task of reaching a diagnosis from the clinical picture. However, progress was hindered by the lack of specific symptoms or signs in poisonings by most substances. Lists were prepared giving against code number of products the chemical names of active substances, other ingredients, and synonyms. The data bank had information on more than 8000 different products. From the records of the nearly 14 000 cases of acute poisoning dealt with by the treatment centre, the validity of the information stored in the data bank is revised with respect to dose-response relationships, development of the clinical picture and progress, and response to suggested treatment. To prevent mistakes and speed up retrieval of information, a definite, constant terminology should be adopted, and synonyms avoided.

The third stage concentrated on diagnosis when the toxic agent was unknown. From limited data, a list of all known agents likely to be responsible could be obtained, the probability being quantified for each. The data base covered 9000 product names, 8500 generic or specific chemical names, 1300 common or scientific names of toxic animal or plant products, 277 different uses, and 400 symptoms and signs. These were used to derive required information on emergency treatment and further clinical and laboratory procedures needed to confirm diagnosis.

Fourth stage. In stage four, the Central Poisons Information Centre had established video terminals in Bologna, Reggio Emilia, Genova, Chieti and Catania. Each region could generate an independent data bank at the central computer, thus preserving autonomy and allowing storage, retrieval and processing of material of local interest. At the same time a region could not only draw upon the large central store of information, but also feed into it new relevant material from the local area. Other terminals would be set up in other towns. A hospital convinced of the usefulness of the system could acquire a computer terminal, the cost being repayable over five years. It was considered that ultimately a network of terminals would be developed covering the whole national territory and linked to the central computer.

6.2 Relevance to other countries

The Italian project and experience provides an illustration of how a useful system might be developed, and each nation should be left to develop the use of computers as best suited to its own special needs. A national network of terminals attached to a central computer will, however, present serious problems with regard to the manufacturer's request for confidentiality and safety for information on products.

As much information on poisoning is non-confidential, international collaboration is possible. International computer links (with adequate safeguards) might be established if a working group could devise the required computer programme. Tapes could be made for distribution, or there could be multiple access by telephone line, as direct dialling would involve quicker international access to data. The problem of differences in language might be overcome by using an agreed international language such as English or French, but translation from the original language would require additional funds, and Italy, for instance, could not sell material already available without expensive translations.

6.3 Security of data storage

As its work is different and does not really overlap that of other users of computers, it is felt that a poison information centre should not merely be given space and time on a general computer, but should have an autonomous computer of its own dealing only with poisoning and toxicology. This would simplify control of data, updating procedures and maintenance of confidentiality. A special retrieval code, known only to those persons entrusted with the safeguarding of details of commercial formulations, should be used to ensure confidentiality. If too many measures are necessary, however, to safeguard the data, it will make the quick retrieval of information impossible.

7. Factors in poisoning

Studies into the causes of poisoning should seek to establish: subjects at risk, dangerous chemicals, and possible dangerous circumstances. These factors should be identified to assist in planning prevention (through education, safety measures etc.) at local or national levels, as well as in planning treatment and rehabilitation facilities.

7.1 Persons often involved in accidental poisonings

These may be small children, persons with special hobbies, do-it-yourself enthusiasts using dangerous chemicals, and gardeners handling pesticides, etc. The number of chemicals for different purposes in hobbies and for use in the home has been increasing.

In industries and other workplaces the workers often handle hazardous chemicals. Accidents may occur and cause acute poisonings, and there is also the danger of exposure to small amounts of chemicals over a long period of time. In the different countries, the manufacturers' and workers' associations and the governmental occupational health systems are all cooperating to establish routines and safety measures which will prevent accidents and dangerous exposures to hazardous chemicals. Often, however, it is difficult to determine a safe level of exposure and new dangers are discovered. The greater number of female workers in industries presents a special problem, as it may not be advisable for them to work with certain chemicals if they are pregnant. The question of teratogenic effect concerns not only pharmaceutical agents but indeed most of the chemicals used.

The danger of poisoning by smoke and fumes has always existed for firemen, but as new chemical products have been developed and are used, e.g. in building materials, the danger of toxic fumes in cases of fire has increased. These fumes may affect not only the firemen or persons in the actual building, but also those in the surrounding environment.

Accidents during transport of hazardous chemicals may also result in serious poisonings. For example, road accidents may present dangerous situations not only for the driver and the people travelling on the road where the accident occurs, but also surrounding areas in the form of water and air pollution.

Other environmental poisonings in humans may result from accidents in chemical factories and unintentional discharge of toxic chemicals.

Selfpoisoning, mainly by pharmaceutical agents, is a big problem in most countries. Solvent sniffing and narcotic abuse also present serious acute poisonings as well as long-term effects.

8. The role of poison control centres in connection with harmful chemicals

The poison centres are concerned with all the different poisonings mentioned above, but their main purpose is to give information quickly in suspected acute poisonings. This means that the data on toxicity of substances, etc., must be collected and stored for quick retrieval in emergencies, as has been mentioned before.

To be able to evaluate the toxicity of chemical products which are sold under special trade names or which are mixtures of different substances, the poison centres must first of all have

information on the composition of the products. This information is collected from the manufacturers, and it must be given in sufficient detail to enable the poison centres to evaluate the acute toxicity of the products. It is the acute toxicity which is needed in an emergency.

For evaluation of chronic toxicity and long-term effects, even more detailed information on the composition may be needed. In these cases, however, there will be time to collect additional information from the manufacturers. Information on the composition of products is handled strictly confidentially, but for security reasons some manufacturers may be reluctant to send in the exact formula. The poison centres must, however, insist on getting sufficient details to enable evaluation of acute toxicity. This often means a dialogue with the manufacturer sending in some information on a product and the centre asking for more details. This communication may, however, be valuable for both parties, even if it is time-consuming.

It is not possible to set up standards for the information on product formulas, which should be sent to poison centres, as this varies according to the type of product and the ingredients contained.

In a few cases the manufacturers would like to send in LD_{50} values for the product and their own toxicity evaluation only, with no information on the composition. This cannot be accepted. When the poison centre gives advice in a case of suspected poisoning, the advice must be based on information on the formula of the product and the centre's own evaluation of this information compared with data on toxicity and the centre's experience of similar cases. A poison centre can never tell a physician or a mother who telephones about a child who has ingested something, that the product is not dangerous because the manufacturer says it is non-toxic according to current legislation. The answer must be based on the centre's own evaluation of the product formula.

The legislation with regard to compulsory registration of chemical products varies from one country to another. Most countries in Europe, however, have had established poison control centres for more than 20 years, and the manufacturers now seem to accept the necessity of sending relevant information on their products to these centres. It makes a favourable impression on customers if the products are registered with the poison centre, and any inquiries the firm may receive about the toxicity of the products may be referred to the centre. In some cases workers in industries have been reluctant to handle products which have not been registered at the poison centre.

As the information on the product formulas which the poison centres receive from the manufacturers is strictly confidential, appropriate security measures must be enforced for handling and storing this information. This must not, however, interfere with the quick retrieval of information in cases of emergency. All the staff at the poison centres must accept the necessity of safeguarding confidential data and each centre must develop the necessary routines and security measures.

8.1 Groups of chemicals which are registered by legislation

In many countries pharmaceutical products and pesticides must be registered and approved by special boards before marketing. In connection with the registration, information on the complete formula must be submitted. In these countries, national poison centres established by the government will receive the necessary information from the authorities which are responsible for the registration.

8.2 Exchange of information between poison centres in different countries

Close communication between poison centres in different countries is essential. Non-confidential data and experiences on poisonings should be easily exchanged. In emergencies and in cases where the centre in one country has difficulties in contacting the manufacturer, one should expect to receive the necessary information on product formula from a centre in another country. If a poison centre becomes aware of fatal or serious poisonings by new chemical products or unexpected cases by older chemicals, it should inform the centres in the neighbouring countries as soon as possible.

9. Prevention of poisonings

9.1 Legislation

It is very important to have legislation on labelling of chemicals and restrictions on the sale of poisonous and dangerous substances. This is a matter for government authorities, usually the ministries of health, occupational safety, agriculture and environment. The role of the poison centres in this work should be to give these authorities advice on the toxicity and hazards of

chemical substances and notify them if the centre becomes aware of fatal or serious poisonings by certain chemicals. The same would apply if the centre discovered that poisonous substances were being used under dangerous circumstances. It should also encourage authorities dealing with building industries to enforce regulations on safety cupboards for drugs and chemicals in the homes, on farms, etc.

9.2 Contact with manufacturers and importers

If asked, the poison centre should also be prepared to give the firms information on the toxicity and hazards of chemicals and should try to encourage them to label their products with the necessary instructions on use and with special warnings. Especially in household products the use of less hazardous substances should be encouraged.

9.3 Information to the general public

The poison control centres should provide leaflets and information material for distribution through health centres, special centres for mother and child health care, pharmacies, schools, national health organizations, ecc. The purpose of this information should be:

- to motivate people, especially families with small children, to take more care when they are using chemicals in their homes, to read instructions on the labels and to store drugs and all types of chemicals safely;

- to make people aware of groups of products which may be particularly hazardous, especially to small children;

- to make people aware of certain circumstances in the use of chemicals which may easily lead to accidents;

- to give brief advice on first-aid measures and telephone numbers of poison centres.

9.4 Cooperation in poison prevention schemes

In poison prevention programmes the poison centres should cooperate with government bodies for health, occupational safety, consumers' safety and also with official and private organizations which are working on accident prevention and health care. It is important for the centres to have close contacts with schools and school authorities, for distribution of their information through special poison- or accident prevention programmes in secondary schools.

10. Cooperation between poison control centres and other institutions

10.1 Laboratories

Poison centres must have close cooperation with analytical and research laboratories. Very often in cases of poisoning identification of the toxic substances in biological materials and monitoring of blood and urine levels are of great value. Sometimes it may also be necessary to analyse a certain commercial product which is suspected of containing specially dangerous substances. It is therefore important for a centre to be in collaboration with laboratories which are well equipped and have experienced staff.

It is also valuable for poison control centres to have close contact with research laboratories in toxicology. This may give them an opportunity to have tests made on substances on which there is little toxicological information in the literature. The contact may also give the staff of the centre an insight into more basic and experimental problems in toxicology, which may prove valuable for a better understanding of the clinical and practical problems they are confronted with in their work.

10.2 Hospitals

Even if the poison control centre is not actually located at a hospital, it is very important to work in close contact with various hospital departments, especially intensive care units, internal medicine and paediatrics. The exchange of information and experience is of very great value.

11. Personnel at poison control centres

Poison centres need reliable and well trained staff, who are interested in toxicological problems. In many centres the staff consists of physicians and pharmacists, but specially trained

nurses are also used in the telephone answering services. As experience is so important in this type of work, it is very important that the centre has stable, permanent staff. This is also important with regard to the problems connected with security and confidential data.

Training programmes for poison centre personnel and education in clinical toxicology are being discussed further in another working group and may be published as a separate report.

12. Conclusions and recommendations

12.1 Conclusions

1. Reliable statistics and epidemiological data would allow identification of subjects at risk, harmful substances and dangerous circumstances, and would help national planning and other measures in poison control.

2. If they are to be comprehensive, statistics should be compiled on the basis of the number of telephone inquiries, cases seen at first-aid posts, hospital admissions and cases examined post-mortem. Statistics from occupational health centres may also be of value.

3. Computers would greatly assist storage, retrieval, processing and dissemination of data, would enhance communications, especially if there was a link-up with relevant data from the occupational health and forensic medicine sectors, and would facilitate confirmation of diagnosis and current methods of treatment and follow-up.

4. Integration of smaller poison centres which have developed on their own into a comprehensive national poison control service may result in harmonization of practices and improved efficiency.

5. The director and the staff of a poison control centre should be well qualified for performance of duties in respect of accurate information, care, treatment, feedback and other responsibilities in the national health system.

6. Greater efforts should be made to persuade commercial organizations to give details of the ingredients in the formulations they put on the market. The national poison control centres need at least sufficiently detailed information to be able to evaluate the acute toxicity of the products.

7. An important role of the poison control centre is to find alternatives and solutions to current harmful practices, rather than imposing bans which would be difficult to implement.

8. Contacts and exchange of information between poison control centres and the general public is desirable and would increase the value of the service.

9. Poison control centres should not become too involved in prevention of voluntary abuse of substances, since addictions would be better handled at other types of centre. Cooperation with the latter as well as referral services should be improved.

10. Anticipating and preventing a suicide attempt requires a specially receptive and discerning attitude in medical and paramedical staff, family members and the general population, and it is helpful to be aware of any prevailing socioeconomic factor which might impose additional mental stress.

11. Rehabilitation should be the concern of an acute poison therapy centre, generally for as long as the patient remains in an intensive care unit, and it might require a team with members drawn from psychiatry, orthopaedics, general or special surgery, physical medicine and other specialties when necessary.

12. Methods of education should be based not on admonition but on promoting and encouraging motivation and participation. The "pyramid technique" (whereby training is initiated by the poison control centre at the top of the pyramid and delegated to the consecutive levels in health care and other services down to the community at the base of the pyramid) can be a useful method of mobilizing community participation in primary prevention, if care is taken to avoid information overload.

13. The provision of balanced information coupled with adequate education in poison prevention can be planned nationally as a periodic campaign or as an ongoing activity and should be initiated and supervised by the national poison control centre.

14. National programmes of basic undergraduate and postgraduate training in toxicology and poison control for all categories of medical and other health care personnel should be planned according to the regional and national contexts.

15. Different training modules for specialized toxicologists should be developed, e.g. in clinical toxicology and experimental toxicology.

12.2 Recommendations

Poisonous substances

1. In all countries, poison control centres should have full access to the complete formulas for toxic and potentially toxic materials, and for all chemical products on the market have sufficiently detailed information on formulas to be able at least to evaluate the acute toxicity.

2. A central depository for formulas should be set up in a poison control centre. In some countries, where the depository is in another location, the information should be automatically available to the poison control centre.

3. The formulas must include the active ingredients as well as all additives, solvents or other substances contained in the product, and must give internationally accepted scientific, trade and commonly used names as well as exact amounts of each substance. Any changes of the formula should immediately be communicated to the poison control centre.

4. Industry must be given guarantees of confidentiality.

5. Legislation for disclosure of formulas should use, as a model, similar legislation passed for drugs.

Laboratories

6. Clinical, pharmacological and toxicological analyses are very much related. Their work can therefore be beneficially combined as similar types of analyses and equipment are involved, especially when it is not rational to separate both types of activity.

7. At the national level specialists should, for each health care level, collaborate in categorizing laboratory tests which are appropriate to the country's needs and resource.

8. National institutes acting as reference centres should carry out the specialized analyses not available at other levels and should also possess facilities for research.

Electronic data processing

9. Data banks should be expanded. There are advantages in having a single computer, or adequate reserved space, assigned to the poisoning and toxicology services alone, so that data may be carried on poisoning, with details of formulated products, therapies, bibliography and other relevant matters. Confidential information would only be available through special decoding.

10. As much information on poisoning is non-confidential, international collaboration should be promoted by setting up international computer links with adequate safeguards against abuse of any confidential material.

11. A computer program for an international data bank, with due regard to the problem of language differences and standardization of terminology to avoid mistakes from too many synonyms, should be established.

Chronic poisoning

12. Better relations, communications and exchange of information should be developed between the authorities concerned with acute poisoning and those concerned with chronic poisoning (e.g. poison control centres and occupational health services).

Legislation

13. Governments should obtain advice on framing legislation to control poisoning from the national poison control centre, which would have special knowledge of all relevant facts and circumstances.

Education and training

14. In order to encourage better education in toxicology for general physicians and other health care staff, particularly at primary care level, as well as increased participation in updating and orientation courses, adequate financial and other incentives should be provided.

15. For efficient planning and execution of a programme of education, whether aimed at health care personnel, volunteers or the general public, steps should be taken to ascertain what relevant information deficits exist in the target groups. The effectiveness of the completed programme should be assessed by periodic follow-up evaluation.

16. To answer questions arising from the public and news media, the poison information centre should be accessible by telephone to everyone; alternatively, inquiries should be redirected to general physicians, who might then be motivated to educate themselves and the inquirers.

17. Whenever messages are diffused through official channels or the news media, care should be taken to provide balanced information and to avoid creating unnecesssary alarm.

International collaboration

18. Poison control centres in industrialized countries should make their experience available to other countries initiating or planning to develop poison control activities.

19. This cooperation could be beneficially organized through WHO and nongovernmental organizations such as the World Federation of Associations of Clinical Toxicology Centres and poison control centres.

20. Bilateral cooperation and exchange of information and expertise should be promoted.

Annex 1

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