**WHO GUIDELINES FOR POISON CONTROL & CENTRE**

**History**

Recognition of the problem of poisoning and of the need for specialized facilities to deal with it, as well as the existence of a number of health care professionals concerned with human toxicology, has invariably been the primary prerequisite for the establishment of poison information centres. The first centres were instituted in North America and Europe during the 1950s. Since then, numerous others have been created, principally in industrialized countries. The early poison information centres originated in a wide variety of fields, including paediatrics, intensive care, forensic medicine, occupational health, pharmacy, and pharmacology. To some extent, the original character of many centres has been maintained, and there is thus considerable heterogeneity in their structure and organization.

Poison information centres may operate effectively with various types of organizational structure. The majorities depend on a hospital administration and are, to some extent, connected with a university and with the country's public health service at national or regional level. Close association with units that treat poisoned patients and with analytical laboratories are essential to most centres, although the way in which this is organized depends on local conditions. Many centres are multifunctional, providing an information service, clinical unit, and analytical laboratory. Most are at least partially supported by public funding, and operate as independent foundations with their own governing bodies on which various public authorities are represented. It is thus impossible to specify a single organizational model for a poison information centre.

**Functions**

The poison information centre is a specialized unit providing information on poisoning, in principle to the whole community. Its main functions are provision of toxicological information and advice, management of poisoning cases, provision of laboratory analytical services, toxicovigilance activities, research, and education and training in the prevention and treatment of poisoning.

As part of its role in toxicovigilance, the centre advises on and is actively involved in the development, implementation, and evaluation of measures for the prevention of poisoning. In association with other responsible bodies, it also plays an important role in developing contingency plans for, and responding to, chemical disasters, in monitoring the adverse effects of drugs, and in handling problems of substance abuse. In fulfilling its role and functions, each centre needs to cooperate not only with similar organizations, but also with other institutions concerned with prevention of and response to poisoning.

1. ***PROVISION OF INFORMATION AND ADVICE***

The main function of a poison information centre is to provide information and advice concerning the diagnosis, prognosis, treatment, and prevention of poisoning, as well as about the toxicity of chemicals and the risks they pose. As already mentioned, centres in some countries may be required to provide a very broad range of information on toxic chemicals, including data on risks to the environment and on safe levels in food and environmental media as well as in the workplace. The information should be available to all who may benefit from it, such as medical and other professional personnel, other concerned groups, various authorities, the media, and the public.

Access to the information service is normally by telephone, especially in an emergency, but there are several other communication channels, including computer networks, written responses to enquiries, and publications. Where telephone services are inadequate, the centre can act through direct consultation with those who visit in person and by providing written material on specific topics.

If it is to be reliable, the advice should be based on the continuous, systematic collection and evaluation of data by the staff of the centre, backed by local experience. All information and advice should be adapted to the specific circumstances of the suspected poisoning, i.e. whether exposure to the poison is acute or chronic, and the condition of the patient involved, taking into consideration the type of enquiry and the enquirer's technical understanding of the poisoning. While many routine enquiries may be answered by suitably trained nurses, pharmacists, or other specialists, supervision by a physician trained in medical toxicology is essential.

The information service must be available 24 hours a day, seven days a week, throughout the year.

1. ***PATIENT MANAGEMENT***

While a poison information centre may have its own clinical toxicology unit or treatment facilities, poisoned patients may, be cared for at any of a variety of medical facilities: the centre will always provide information to a much larger area than that covered by a specific clinical toxicology unit. Many different categories of medical and paramedical personnel may be involved in the diagnosis and treatment of poisoning. Poisoning incidents frequently occur in the home, at work, or in rural areas and usually at some distance from medical facilities.

The centre exists to provide such information, giving advice on the different aspects of diagnosis and treatment that is appropriate to the enquirer's level of understanding.

It is essential for poison information centres to be closely connected with facilities that provide care for poisoned patients and for the medical staff at each centre to be involved in the treatment of poisoning. This close association between poison information services and poison treatment services facilitates the necessary updating and expansion of information on the diagnosis and treatment of local poisoning cases, encourages detailed follow-up of patients, and stimulates essential research on human toxicology and patient management.

It is highly desirable that each country or major population area should have at least one clinical toxicology service dedicated exclusively to the management of poisoning cases and located in a hospital that can provide a wide range of services, including intensive care. Clinical toxicology services fulfil a specialized medical function in the management and treatment of poisoning, helping to improve the identification of toxins and evaluation of their effects, to elucidate the mechanisms and kinetics of different kinds of toxic action, and to assess new diagnostic and therapeutic techniques. They also play an important role in evaluating the clinical efficacy of antidotes.

Rapid transport of severely poisoned persons to treatment facilities, or of doctors to patients who cannot be moved may be required. It is essential for poison information centres to be aware of the availability of ambulances - and possibly helicopters and aeroplanes - for transporting patients who need intensive care. Some ambulances and other means of transport may be specially equipped for transporting critically ill patients to the appropriate hospital facilities. In emergencies, coordination with the traffic police authorities may also be needed to help speed the transport of poisoned patients. Rapid delivery of antidotes and of samples for laboratory analysis must also be ensured, and could be coordinated by poison information centres.

1. ***LABORATORY SERVICES***

A laboratory service for toxicological analyses and biomedical investigations is essential for the diagnosis, assessment, and treatment of certain types of poisoning. It is especially important for clinical units treating poisoned patients: without analytical data, many toxicological problems cannot be accurately assessed. The data are required primarily to assist diagnosis and to back up decisions on the use of various therapeutic procedures to support prognosis. The laboratory service can also determine the kinetics of the toxin, particularly its absorption, distribution, metabolism, and elimination. Analytical facilities are also essential for research and for monitoring populations at risk from exposure to toxic chemicals. A laboratory service of the type outlined will permit the identification, characterization, and quantification of toxic substances in both biological and non-biological samples, i.e. in body fluids such as blood and urine, and in hair and nails, and in scene residues, as well as of both natural toxins and substances suspected of being poisonous.

If adequate general laboratory facilities already exist, it is possible to give general guidelines for the development of a service, although the requirements for particular analyses will vary with local circumstances. Two levels of operation may be envisaged. The first would offer a relatively restricted but more widely distributed service based mainly on simple spot tests, immunoassays, and thin- layer chromatography. Field tested techniques for use at this first level are detailed in an IPCS manual.1 The second level would support the first but be more advanced, offering a full range of analyses using a wide variety of techniques. Laboratories operating at this level would be capable of acting as reference laboratories, confirming the results of screening tests and engaging in quality control and method development. Links should be developed between laboratories in such areas as training, research, and quality assurance.

The analyses to be developed should be selected according to proven clinical need and should:

\*be backed up by a supply of appropriate pure reference compounds;

\*be backed up by an adequate supply of consumables, such as reagents, and by satisfactory arrangements for maintenance; and

\*use practical analytical techniques that can provide results within a reasonable time.

It may be economical and advisable for the laboratory to undertake other related work, such as the provision of services for monitoring therapeutic drug use, dealing with occupational chemical exposure, and screening for drug abuse, since these services require similar skills and can be undertaken with the same or similar equipment.

Adequate safety precautions must be taken to protect the laboratory staff from health risks, such as hepatitis and human immunodeficiency virus (HIV) infection, associated with handling biological samples.

A laboratory should have adequate staff and equipment to carry out the analyses that are essential in cases of poisoning within the country or region. Thus, an analytical toxicology service will need at least one trained analyst and one assistant, but larger numbers of personnel will be needed as the range of techniques in use and the number of analyses being performed increases. Analyses that are directly concerned with the treatment of poisoned patients should be available 24 hours a day.

Siting the laboratory in the same place as the poison information centre and treatment service has marked advantages as regards interdisciplinary collaboration. Many countries lack adequate toxicological laboratory facilities; in such cases it may be necessary to combine the services providing clinical analytical toxicology with those used in forensic medicine, occupational toxicology, monitoring of therapeutic drug use, food contaminants or substance abuse, and veterinary toxicology.

1. ***TEACHING AND TRAINING***

The experience gained in a poison information centre can be an important source of human and animal toxicological data. The application and communication of this knowledge are vital for improving the prevention and management of poisoning. Centres thus have educational responsibilities that extend to the training of medical practitioners and other professional health workers likely to encounter cases of poisoning, and to communication with the local population and the mass media. Later sections of these guidelines include advice on the training needs of centres as well as on their teaching and training functions.

1. ***TOXICOVIGILANCE***

Toxicovigilance is an essential function of poison information centres. **It is the active process of identifying and evaluating the toxic risks existing in a community, and evaluating the measures taken to reduce or eliminate them.** Analysis of enquiries received by centres permits the identification of those circumstances, populations, and possible toxic agents most likely to be involved, as well as the detection of hidden dangers. The role of a centre in toxicovigilance is to alert the appropriate health and other authorities so that the necessary preventive and regulatory measures may be taken. For example, the centre may record a large number of cases of poisoning by a specific product newly introduced to the local market; cases occurring in a particular population group (e.g. analgesic poisoning in children); or cases occurring in particular circumstances (e.g. carbon monoxide poisoning from faulty heating stoves) or at particular times of the year (e.g. mushroom poisoning in the autumn or snake bites in the summer). Only now is the unique role of poison information centres in toxicovigilance being widely recognized. This role enables them to make a major contribution to the prevention of poisoning through their collaboration with the health and other appropriate authorities.

1. ***PREVENTION***

Drawing on its observations and experience, a poison information centre can contribute to the prevention of poisoning by:

\*alerting responsible authorities to circumstances where the risk of poisoning is high so that appropriate preventive measures may be taken, including: drawing the attention of various users of toxic chemicals to the risks involved, introducing codes of practice or legislation to control the labelling of toxic products or special packaging to reduce the risk of exposure to toxic substances, and modification or withdrawal of products from the market;

\*encouraging manufacturers to employ less toxic formulations and to improve the packaging and labelling of their products;

\*informing the general public, as well as special groups at risk, about recognized or emerging risks to the community posed by the use, transport, storage, and disposal of specific chemicals and natural toxins, and giving guidance on how to avoid exposure to, or accidents with, these substances; means such as brochures, leaflets, posters, educational programmes, and campaigns in the media may be employed, but should not arouse unjustified false anxieties and should take due account of local psychosocial and cultural circumstances;

\*giving special warnings to professional health care workers concerning specific toxic risks.

1. ***DRUG INFORMATION AND PHARMACOVIGILANCE***

The medical profession must have access to advice on the therapeutic and adverse effects of pharmaceutical agents; some countries have drug information centres that provide this specialized information. Poison information centres are automatically concerned with problems of adverse drug reactions and side-effects, and may be contacted by physicians and the public for advice on both drug overdoses and the adverse effects of therapeutic doses. Enquiries may also relate to contraindications, for instance whether a drug should be prescribed in pregnancy or to a patient with a history of hepatic or renal disease. Poison information centres thus have the responsibility of contributing to pharmacovigilance in collaboration with other institutions established for that purpose. In a developing country, a combined drug and poison information service may be a logical use of resources.

1. ***SUBSTANCES OF ABUSE***

All poison information centres receive enquiries about substances of abuse, including substances of natural origin such as cocaine, chemicals with a specific use such as solvents, pharmaceutical agents such as amfetamines, and illicit drugs designed for abuse. There are also increasing demands on analytical laboratories to identify substances of abuse. As many as 10% of patients seen at clinical toxicology facilities may be people poisoned by such substances; in some cases a mixture of substances may be involved, and in others the effects of one substance may be masked by those of another.

It is part of the task of a poison information centre to provide information relating to substances of abuse and, when necessary, to be able to refer enquiries or patients to institutions or authorities dealing with other aspects of substance abuse. Centres must know how to recognize the signs and symptoms of substance abuse, how to treat an overdose in an emergency, and how to deal with withdrawal syndromes. They must know what facilities are available for patients needing rehabilitation and for those who wish to give up substance abuse. Advice must be available for the families and friends of substance abusers on how to identify signs of intoxication and the substances involved.

1. ***ENVIRONMENTAL TOXICOLOGY***

There is growing anxiety among the general public about the possible deleterious effects on health of toxic chemicals found in food, in consumer goods such as cosmetics, and in the environment (air, water, and soil). People are uncertain about whether pollution is giving rise to chronic poisoning among those exposed to it, whether the effects are cumulative, and whether there are long-term sequelae. Furthermore, the harmful effects on non-human species, and whether they may be acute or chronic, are of growing concern to both the scientific community and the public. Poison information centres, particularly in countries where there is no other readily accessible source of information on toxic chemicals, are being asked to provide information on the effects of environmental contaminants, on the risks associated with toxic wastes, and on safe levels of chemicals in the environment and in food and other consumer goods.

Poison information centres could play an important role in quantifying the relationship between exposure to toxic chemicals and observed clinical features of poisoning, including long-term sequelae. They should work closely with the medical profession, particularly general practitioners and occupational health physicians, hospital outpatient departments and pre- and postnatal clinics, who may be well placed to observe the possible clinical features and sequelae of exposure to chemicals. Medical practitioners must also be provided with data on the possible effects of exposure to environmental contaminants, and information on the types of biological and other samples that should be collected and analysed. Mechanisms for the systematic collection, validation, and follow-up of data should be established; it is also essential that the data are comparable, both nationally and internationally, so that they may be used for the benefit of all.

1. ***CONTINGENCY PLANNING FOR CHEMICAL INCIDENTS AND DISASTERS***

Poison information centres can contribute to the handling of major chemical incidents and disasters by providing appropriate information in the event of an emergency and by taking an active part in contingency planning and in education and training. They should also take part in epidemiological follow-up studies and other research initiatives, where appropriate, collaborating and acting in concert with other bodies involved in accident prevention and control. A national or regional poison information centre can serve to centralize and coordinate such activities.

1. ***COOPERATION AND INTERRELATIONSHIPS***

To provide an effective information service and help in the prevention and management of the deleterious effects of toxic chemicals on human health and the environment, it is essential for centres to cooperate closely with a wide range of partners, particularly medical experts. Relationships should be fostered with other professional and social institutions that can contribute to the effective provision of information by poison information centres. For example, specialists in fields such as botany and zoology can assist in the rapid identification of toxic plants or animal species. Cooperation must also be established with industrial and commercial enterprises that manufacture, import, or handle chemicals, various research institutions, and consumer organizations and trade unions.

Contacts are needed with ministries of health and the full range of health services and institutions, including different hospital departments, general practitioners, paediatricians, pharmacists, coroners and medico-legal experts, occupational physicians, epidemiologists, experts in information technology, scientific societies, and local and central health authorities. It is also important for poison information centres to cooperate with other government bodies, such as ministries of agriculture, the environment, labour, industry, trade, and transport, and with consumer protection agencies.

Good relationships with newspapers, radio, and television are valuable, since the media have a key role in bringing information to the public. The publishing or broadcasting of educational messages on the prevention of poisoning can form part of a general process of health education; poison information centres should provide the media with appropriate information and material. In the event of a major chemical incident the media have an even more significant part to play: they must be kept fully and properly briefed by poison information centres and the emergency services so that all essential information can be given to the public without causing undue panic and alarm. In either role, the media have a responsibility to check the accuracy of the information they disseminate, so that any tendency to speculate or exaggerate is avoided. Regular contact between the media and poison information centres will lay the foundation for mutual confidence in the relationships.

Of equal importance is contact between the poison information centres themselves, both nationally and internationally. This may be established directly or through national and regional scientific and professional associations, as well as through the World Federation. Other means of contact include national and international congresses and meetings. Important areas for international collaboration are: exchange of case data and product and substance data in comparable formats, evaluation of antidotes, quality control, training, response to major accidents, and research.

**Benefits**

1. The service provided by poison information centres offers considerable direct health benefits by reducing morbidity and mortality from poisoning and enabling the community to make significant savings in health care costs.
2. Cases of exposure to chemicals that carry no toxic risk can be rapidly identified, and unnecessary medical care and transport are thus avoided.
3. Mild poisoning cases that can be treated by first-aid measures alone or by non-hospital medical personnel are quickly recognized, and physicians can be provided with advice on the management of moderately severe cases that can be treated in general health facilities.
4. Severe poisoning cases, which may need very special facilities and equipment for treatment, are sent directly to hospitals where these facilities are available, thus avoiding delays and wastage of resources at general treatment facilities.
5. Specific antidotes, therapeutic agents, and medical equipment can be made more easily available through coordination of stocks, so reducing costs and saving lives.
6. Centres can also help to prevent the unnecessary use of special antidotes and of sophisticated and expensive treatments.
7. Access to information and advice at poison information centres stimulates the interest of local communities and makes them more committed to the prevention of poisoning.
8. Centres help promote awareness of special requirements concerning the control and regulation of chemicals, including the labelling and packaging of products.
9. Through active observation and evaluation of toxic risks and phenomena in the community, they are in a position to recognize sudden, unexpected rises in the incidence of poisoning and to alert authorities capable of taking the necessary action. Particular occupational settings may be involved, as well as the community in general.
10. Indirectly, through improved prevention, the cost of poisoning to the whole community is reduced.
11. Advice provided by centres in the event of major chemical disasters will help to minimize the effects on human health, maximize the effective use of limited medical resources, and prevent a recurrence of similar accidents.
12. The education and training provided by poison information centres enable professional health workers and the general public to recognize and avoid the dangers of poisoning and to take effective action when poisoning incidents occur.
13. The case data collected by centres provide an epidemiological basis for local toxicovigilance and contribute to the international fund of knowledge about human toxicology and management of poisoned patients.
14. Through its contacts with centres in other countries and regions, a poison information centre may obtain information, notably on antidotes, that has already been evaluated, thus enabling it to respond to emergencies and other needs in a cost-effective manner. It may also identify toxic risks evaluated elsewhere, so that timely preventive action may be taken.

**Conclusions and Recommendations**

In accordance with WHO's definition of health and its goal of "Health for All by the Year 2000", everyone should have access to relevant information on how to prevent and deal with poisoning. Poison information centres provide such information and are an essential part of a country's capacity for ensuring the safety of chemical substances. Moreover, the United Nations, through its Conference on Environment and Development, has called upon all countries to promote the establishment of poison information centres with related chemical and analytical facilities to ensure prompt and adequate diagnosis and treatment of poisoning, including networks of centres for chemical emergency response.

*Establishing a poison information centre*

A poison information service should be available in *every* *country,*irrespective of its size or population. Ideally, there should be one national centre with, if necessary, a series of regional satellite centres. In a large country, or one with a large population or several different language groups, a number of regional centres may be needed, with close collaboration between them. Generally speaking, a poison information centre should serve a population of 5-10 million, but a proliferation of centres should be avoided. Depending on the availability of other services that provide information on toxic chemicals, a poison information centre may have to advise on a wide range of problems, and its associated facilities, e.g. laboratory services, may have to be multifunctional.

*Location*

When a poison information centre is established, especially in a developing country, existing medical facilities should be surveyed to determine where the centre can best be located and operate most effectively, bearing in mind that it is essential for a centre to have a number of health care professionals interested in human toxicology. Where feasible, the centre should be located at a leading hospital with emergency and intensive care services, as well as a medical library and a laboratory. If possible it should be linked directly with a hospital department where poisoned patients are treated: this may make it easier to recruit staff who already have experience and interest in the problems of poisoning. The laboratory facilities of such a hospital can usually be expanded to allow toxicological analysis to be undertaken and appropriate quality control to be exercised. Location at a university teaching hospital or in a toxicological or public health institution may also have advantages. Whatever the location chosen, it should be the aim of the facility to operate 24 hours a day all year round.

*Potential for development*

A poison information centre needs certain minimum facilities and resources to function optimally, but a modest establishment that can be expanded in the future is preferable to no service at all. Initially, it may be impossible for the centre's own staff to provide a round-the-clock service, and arrangements may have to be made for an existing service, such as a hospital emergency ward, to help out at certain times. The aim, however, should be to provide a 24-hours-a- day, 7-days-a-week information service throughout the year, with continuous access to a physician trained in toxicology, and to achieve this as quickly as possible. The treatment and laboratory facilities at a hospital may be further developed to deal with poisoning cases. The information section of the centre should work closely with the clinicians and laboratory specialists but should remain an independent unit since it will serve a much larger community than the hospital - possibly the whole country.

*Staff*

A poison information centre needs a multidisciplinary team of poison information specialists1 led by physicians with toxicological experience. The team may include physicians, nurses, analysts, pharmacists, veterinarians, and other scientists representing a wide variety of disciplines including biology, chemistry, medicine, and pharmacology. This team needs the support of documentalists and such experts in information science and informatics as the circumstances and functions of the centre may warrant. A poison information specialist helps to prepare and provide expert information and advice on preventing and dealing with poisoning. While the scientific or technical background of this specialist may vary, the work demands appropriate training, which in some countries carries a certificate or other qualification. A poison information specialist should work under the supervision of a medical toxicologist. Those members of the team who answer enquiries must have adequate knowledge of toxicology and related scientific disciplines and should also be in regular contact with analytical and treatment facilities. The medical members of the team should themselves treat poisoned patients.

1The term "poison information specialist" is used in these guidelines to include all personnel at poison information centres who are involved in providing the poison information service.

Medical personnel from emergency, intensive care, and treatment units may work part-time in the information unit, thus adding to their experience. There is growing recognition of the need for centres to have access to expert psychiatric advice, which is especially helpful in dealing with attempted suicide, the psychopathic use of poisons, and substance abuse, and in the management of some poisoned patients. Psychiatry may also provide guidance on dealing with emergency situations without causing panic, e.g. in the event of a major chemical disaster.

Good administration is of course essential. In some established centres, an administrative director is responsible for all administrative matters including funding, which allows the medical director to concentrate on the scientific supervision of the centre. Some form of administrative assistance is required at all centres, as well as adequate secretarial support.

Numbers of staff in the various categories must be sufficient to provide an adequate, continuous service at all times. While the enquiry load may vary according to the time of day, it would be desirable always to have a minimum of two poison information specialists on duty to answer calls. To provide continuous medical advice throughout the year, at least three trained physicians are needed.

Since highly experienced staff are essential, independent official recognition of the professional status of poison centre staff is desirable. Pay, working conditions, and incentives must be sufficiently attractive to keep staff turnover to a minimum. Further advice on staff requirements is provided in Section 2.

*Equipment and facilities*

If a poison information centre is to function effectively, certain basic equipment is essential, including suitable office furniture and facilities for the storage of confidential data. Specific areas should be set aside for answering telephone enquiries, consultation with patients, preparation of documents, staff meetings, and secretarial and administrative work. Staff on duty should have comfortable, suitably furnished rest areas. Additional desk space is needed at centres using computer equipment and on-line databases, and air-conditioning and humidity control may also be necessary. Centres themselves should be secure.

Poison information centres should have their own libraries and facilities for handling and reproducing documents. Reserved telephone lines are essential, and other means of national and international communication are highly desirable, such as telex, short-wave radio, and - in particular - fax. A fax machine is a recognized means of communicating information rapidly among centres and hospitals, particularly during emergencies, and should therefore be regarded as essential. Growing use is now being made of electronic mail for communication among poison control centres and other partners in poison control.

*Legal status and financing*

Poison information centres should be officially recognized by government authorities. They should have independent status, stability, and neutrality to enable them to carry out their functions effectively. A centre may have a governing body, including representatives of various government and other authorities, to provide policy guidance and assist in fund-raising. This body should not, however, interfere with the daily operation of a centre or compromise its independence. The legal status of a centre should enable it to maintain the confidentiality of the data it handles. Its main source of financial support, which is a government responsibility, should respect its independent and neutral status. Information should be provided free of charge to enquirers, particularly in emergencies, although charges may be levied in certain circumstances.

*Twinning arrangements*

Twinning arrangements between centres in developing and developed countries can be very valuable, permitting exchanges of documentation, including case data on unusual types of poisoning, exchanges of staff for teaching and training, and the provision of antidotes, especially in emergencies. As a means of technical cooperation between developing countries, twinning should also be encouraged between new and established centres in these countries. For effective twinning it is important that centres have facilities for rapid communication (telephone, telex, and fax), and that arrangements are made to enable the rapid importation of antidotes and other essential supplies in times of emergency, without bureaucratic hindrance.

*Action by national and local authorities*

The prevention and control of poisoning could be made more effective through a number of appropriate actions by national and local authorities, where these have not yet been taken. These measures include:

\*official recognition by government authorities of the role of poison information centres in carrying out toxicovigilance and of their contribution to prevention through the provision of information services, together with adequate financial support for the centres providing these services;

\*ensuring that the community has ready access to the services provided by poison information centres;

\*establishment of channels of communication providing prompt access for poison information centres to organizations (including the media) that can be alerted, outside normal working hours if necessary, to toxic hazards and advised on appropriate ways of dealing with them;

\*ensuring that centres have access to adequate information on the composition of commercial and other products on the local market, on the understanding that the confidentiality of the information will be respected;

\*ensuring that the information on patients gathered by a poison information centre remains confidential at all times;

\*establishment of clinical toxicology services wherever needed;

\*establishment of services for toxicological analysis wherever needed;

\*provision of educational facilities and courses in toxicology, and establishment of certificates or other appropriate qualifications for information specialists at poison information centres, as well as for nursing and paramedical staff working in treatment units and analysts in toxicological laboratories;

\*official recognition of medical toxicology as a discipline in its own right, and encouragement of academic institutions to develop the discipline by providing appropriate teaching units or departments;

\*promotion of national and international exchanges of staff and experts;

\*facilitating the exchange of biological and other samples for analysis, and the import and export of equipment and chemical reagents;

\*provision of antidotes and essential supplies for the treatment of poisoned patients, and arrangements for their rapid importation in the event of an emergency;

\*provision of transport facilities for patients where existing facilities are inadequate;

\*improvement of the communications infrastructure in countries where it is inadequate; and

\*establishment of mechanisms and facilities for the systematic recording and long term follow-up of patients exposed to toxic chemicals.

*Action at the international level*

Cooperation at the international level between poison information centres, their national and regional associations, relevant professional bodies, governments, and international organizations in the following areas could do much to improve the prevention and control of poisoning:

\*improving international communication and exchange of information and experience in the field of poison control, as well as exchange of personnel, particularly for purposes of education and training;

\*harmonizing definitions of and criteria for clinical signs, symptoms, and sequelae of poisoning, including severity grading;

\*establishing comparability between methods of collecting, storing, transporting, and analysing biological and other samples, and monitoring exposure to toxic chemicals and relating these to observed features of toxicity and sequelae;

\*establishing internationally agreed mechanisms for the collection, validation, and analysis of data relating to exposure to toxic chemicals and observed features of poisoning, including long-term sequelae;

\*undertaking collaborative research projects using agreed protocols, e.g. for evaluating new antidotes, elucidating the mechanisms of poisoning, and improving treatment regimens;

\*establishing channels of communication between countries whereby antidotes, other therapeutic agents, and medical equipment can be made rapidly available on request in the event of a chemical incident or emergency, and samples for analysis can be imported and exported as necessary;

\*establishing channels of communication between countries for rapid access to information about chemical incidents or emergencies that may be of value in deciding whether a toxic alert should be called.

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