PHONE NUMBERS TO REMEMBER

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National Poisons Information Centre

The Poisons Information Centre in Dublin was opened in 1966 by Dr Joseph Woodcock at the instigation of the Department of Health and the Irish Medical Association. It was located in Jervis Street Hospital until 1987 when it was relocated to Beaumont Hospital where it is based today. Dr Woodcock remained Director of the Centre until his retirement in 1986 at which time Dr Joseph Tracey took up the position.

The Centre operates 365 days a year and provides a 24-hour service to medical staff and other health care professionals.

Roles of the National Poisons Information Centre

• Advice on exposure to poisons

The main function of the Poisons Information Centre is to provide information on the management of acute poisoning. Poisons may include pharmaceuticals, agrochemicals, household products and plants. Our service is aimed primarily towards members of the medical profession, and the staff of the centre are responsible for providing accurate and detailed information about acute and chronic toxicity. We also provide a limited service to members of the public although we can not provide them with detailed information about the clinical effects or toxicity of drugs or other agents.

• Data Collection

The secondary role of the Centre is to collect and interpret epidemiological data on acute poisoning. This information is sent to the Department of Health, the WHO, and the European Commission. It is used to monitor trends in poisoning and to identify when new treatment protocols are required.

Poisons Information Officers

Staff in the Poisons Centre comprises a Clinical Director, one part-time and four full-time information officers, and a clerical officer. The information officers answer enquiries between 8am and 10pm every day. At other times, telephone enquiries are automatically re-routed to the Welsh Poisons Centre in Cardiff. Plans are being made for the Dublin staff to provide 24-hour cover in the near future.

European guidelines for Poison Centres require that all information officers are educated to university level in a relevant subject. They must also be aware of all new developments in clinical toxicology. In addition, the information officers in the Dublin centre are undertaking the Diploma in Medical Toxicology from the University of Wales, College of Medicine.

All staff are expected to attend scientific meetings on a regular basis and they frequently submit abstracts and posters to the annual International Congress held by the European Association of Poisons Centres and Clinical Toxicologists (EAPCCT).

The poisons information officers can provide information to assist in the management of poisoned patients, but they are **not** qualified to make clinical decisions regarding admission or discharge of a patient.

Before phoning the Poisons Information Centre, it is useful to have the following information available:

- name and age of patient
- name of drug, chemical, household product etc
- quantity of agent involved
- route of exposure (ingestion, inhalation, skin contact)
- time since exposure and symptoms of toxicity

Information Sources

The information officers use a combination of computer databases, paper indexes and toxicology journals to answer queries. The most commonly used computer databases are Toxbase, Poisindex, and UKPID. We also use TOMES, TicTac and a poisonous plants identification database on CD-ROM.

-Toxbase is the clinical toxicology database of the National Poisons Information Service in Britain and is updated every 3 months. It should be available in Irish A/E departments in 2001.

-Poisindex is a comprehensive North American Database that includes information about drug kinetics, pharmacology and range of toxicity in addition to clinical effects and treatment of overdoses.

-UKPID is the secondary database of the UK Poisons Centres and is used both as an information source, and to record our statistics.

-The paper index is compiled by the staff in the Centre and is regularly updated to include new products on the market. It also contains information received from the London Poisons Service.

-Tomes is a North American Industrial Products database.

-TicTac is a CD-ROM database that is used to identify tablets by appearance. Information about colour, shape and markings on the tablet is required when using TicTac.

Due to the number of different databases used by the staff in the centre, it is not possible to routinely fax information to enquirers.

Enquiries received by the Poisons Centre

The number of enquiries received by the poisons centre has more than doubled in the past ten years and this trend is expected to continue in the future. Most of our enquiries are received between 10:00 am and 11:00 p.m. The summer months tend to be the busiest every year and December is usually the quietest.

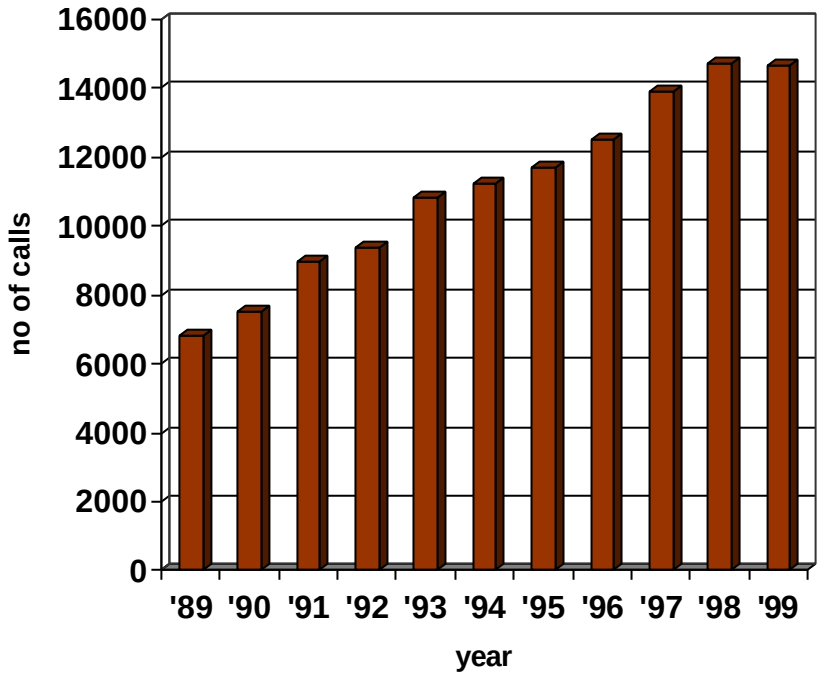


Fig 1: Number of calls received by the Poisons Centre 1989-1999

Pharmaceuticals are involved in almost 70% of the calls received by the Poisons Centre every year. Benzodiazepines top the list, followed closely by paracetamol.

Every year, more than 60% of our callers are medical doctors in casualty departments or general practices. We also receive calls from other health care professionals such as staff nurses or pharmacists, and members of the public.

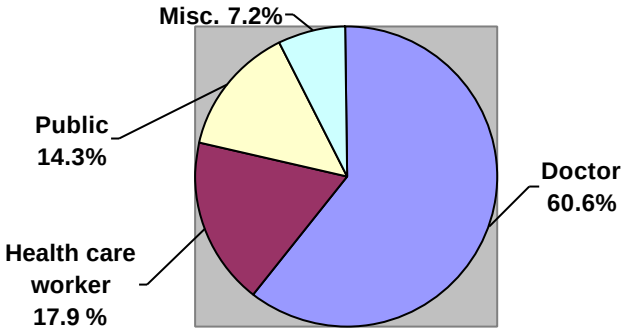


Fig 2: Type of Caller in 1999

The 15 most common agents involved in poisoning

Benzodiazepines
Paracetamol
Other anti-depressants
Non-steroidal anti-inflammatories
Tricyclic antidepressants
Anti-infective agents
Hydrocarbons
Phenothiazines
Salicylates
Analgesics with opiates
Cough syrups
CNS stimulants
Bronchodilators
Alcohol
Bleach

Management of the Poisoned Patient

The general management of poisoning can be divided into 3 stages:

1/ General Supportive Therapy.

Initial treatment of acute poisoning involves provision of adequate airway, breathing and circulation.

A: The airway should be cleared of obstruction.
B: Respiration should be assessed and supplemental oxygen should be given if required. Some patients may need endotracheal intubation if there is loss of cough or gag reflexes.
C: Circulatory impairment may be due to hypovolaemia or relative hypovolaemia cause by peripheral vasodilation. Hypotension can often be treated by elevating the foot of the bed. In some cases crystalloid or colloid volume expansion may be required and inotropic support is indicated in more resistant cases.
Rhythm disturbances will often settle with correction of oxygen tension, acid-base and electrolyte status. Anti-arrythmic agents are contra-indicated following overdose with some drugs and the clinician should contact the Poisons Centre for advice.

2/ Methods of decreasing absorption.

In 1998, the American Association of Clinical Toxicology (AACT) and the European Association of Poisons Centres and Clinical Toxicologists (EAPCCT) published Position Statements on Gut Decontamination in the Journal of Toxicology, Clinical Toxicology. A summary of these statements is provided below and the full drafts are published in J Toxicol Clin Tox 1998; **35** (7).

Ipecac

Ipecac should only be considered in an alert conscious patient who has ingested a potentially toxic amount of poison. As the effect of ipecac decreases with time and clinical studies have demonstrated no benefit from its use, it should be considered only if it can be administered within 60 minutes of the ingestion. Even then clinical benefit has not been confirmed
Contraindications include: •compromised airway protective reflexes (including coma and convulsions), • ingestion of a substance that night compromise airway protective reflexes or anticipate the need for advanced life support within 60 minutes, •ingestion of hydrocarbons with high aspiration potential, •ingestion of a corrosive substance, such as an alkali or strong acid.

Gastric Lavage

Gastric lavage should not be considered unless a patient has ingested a potentially life-threatening amount of a poison and the procedure can be undertaken within 60 minutes of ingestion.
Contraindications include: •ingestion of a corrosive substance such as a strong acid or alkali, •ingestion of a hydrocarbon with a high aspiration potential, •patients with loss of airway protective reflexes (unless intubated), •patients at risk of haemorrhage or gastrointestinal perforation.

Single dose Activated Charcoal

Activated charcoal may be considered if a patient has ingested a potentially toxic amount of a poison (known to adsorb to charcoal) up to 1 hour previously. It may be useful after 1 hour but there is little available evidence to support or exclude its use.
Contraindications include: • an unprotected airway, • a gastrointestinal tract not anatomically intact, • when activated charcoal therapy may increase the risk and severity of aspiration (e.g. hydrocarbons with a high aspiration potential)

3/: Methods of enhancing elimination.

Multiple-dose activated charcoal

Although animal and volunteer studies have shown that multiple-dose activated charcoal increases drug elimination, this benefit has not been shown to reduce morbidity and mortality in controlled studies. Multiple-dose activated charcoal may be considered for patients who have ingested a life-threatening amount of carbamazepine, phenobarbital, quinine or theophylline. The normal dose is 25g every 4 hours. The use of multiple-dose charcoal in salicylate poisoning remains controversial and there are insufficient data to recommend it.

Specific Antidotes

While most patients recover completely with good supportive care, there are some cases when administration of an antidote is required. The more common of these is listed below.

Table 1: Antidotes used in the treatment of poisoning

Agent	Antidote
Paracetamol	N-acetylcysteine (Parvolex)
Opiates	naloxone (Narcan)
Iron	desferrioxamine
Cyanide	1) oxygen, amyl nitrite 2) sodium nitrite & sodium thiosulphate
Ethylene glycol or methanol	ethanol
Benzodiazepines	flumazenil (anexate)

Dosages of specific antidotes

N-acetylcysteine

This antidote protects the liver by replenishing cellular glutathione stores.
Dosage: Initially 150mg/kg in 200mls of 5% dextrose by slow iv injection over 15 minutes; followed by 50mg/kg in 500mls of 5% dextrose by iv infusion over 4 hours. Finally 100mg/kg in 1 litre of 5% dextrose over 16 hours.
Adverse effects such as nausea, flushing, urticaria and pruritis may occur in the first hour of treatment due to the high infusion rate. They can be managed by stopping the infusion and giving an antihistamine. It should then be possible to resume the infusion.

Naloxone

An intravenous infusion of naloxone may be considered if coma or respiratory depression is present following an opioid overdose. Adults should receive an initial dose of 1.2mg and children should receive 0.01mg/kg body weight. Repeat the dose if there is no response within 2 minutes. The plasma half-life of naloxone is shorter than that of most opioid analgesics so the patient should be observed carefully for recurrence of CNS and respiratory depression.

Desferrioxamine

An iv infusion of 15mg/kg/hour should be given to patients who are at risk of severe iron toxicity. The dose should not exceed 80mg/kg in 24 hrs. Rapid infusion rates can increase the risk of hypotension while infusion of desferrioxamine at 15mg/kg/hr for longer than 24 hours appears to be of little benefit and may lead to increased risk of pulmonary oedema.

Oxygen / Amyl nitrite

Until recently, amyl nitrite was the preferred first aid antidote used in the treatment of cyanide poisoning. It is toxic when given in the absence of cyanide however, and most authors now recommend giving oxygen instead. The patient can then be transferred to a casualty department for further treatment.
For moderate poisoning, the treatment of choice is a combination of sodium nitrite (10mls of a 3% solution i.v. over 5-20min) and sodium thiosulphate (50mls of a 25% solution i.v. over 10 min) which can be given when the patient reaches a casualty department.

Ethanol

Ethylene glycol (antifreeze) and methanol are both broken down by alcohol dehydrogenase to glycollate and glyoxylate. These metabolites can cause severe symptoms and death. Ethanol is the preferred substrate for alcohol dehydrogenase and oral administration of 40% alcohol will prevent toxicity. The initial dose is 2mg/kg of oral ethanol in the form of gin, vodka or whiskey. Intravenous infusions of 2ml/kg/hr of **10% alcohol** may be required in more severe cases.

Flumazenil

This antidote is rarely recommended because most benzodiazepine overdoses can be adequately managed by supportive care. In rare cases of severe poisoning respiratory depression can occur and flumazenil may be indicated. The initial dose is 0.2mg iv over 30 seconds. If there is no response, a further 0.5mg i.v. over 30 seconds may be given every 60 seconds to a maximum of 3mg.
N.B. Flumazenil has a short half-life and there is always a risk that patients may become resedated.

Treatment Guidelines for Specific Drugs.

Benzodiazepines

Most of the benzodiazepines are relatively safe *when taken alone* in acute overdose and they tend to cause only mild symptoms of CNS depression. Common features may include drowsiness, ataxia, dysarthria, and nystagmus. Co-ingestion of alcohol or other CNS depressants may potentiate the effects. Hypotension and respiratory depression sometimes occur but serious toxicity in adults or children is rare. Flumazenil is not usually required but may be given in cases of severe respiratory depression.

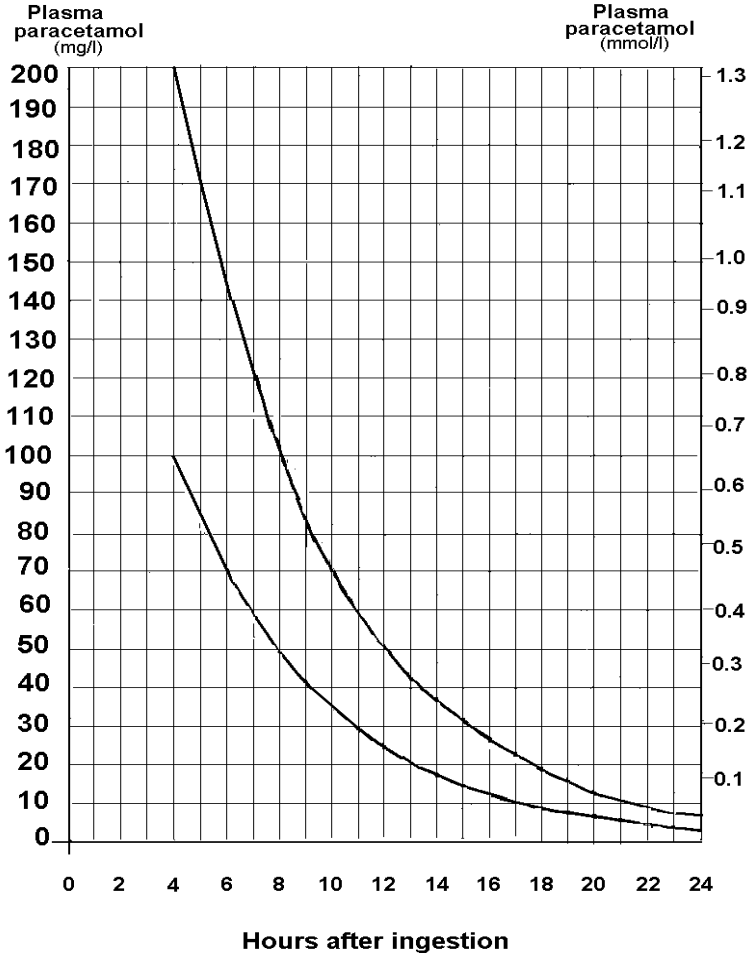
Paracetamol

Features:
Acute hepatic necrosis is the most common complication of untreated paracetamol overdose and it usually occurs more than 2 days after ingestion. Toxicity is likely if more than 150mg/kg of paracetamol is ingested. Many patients may remain asymptomatic for the first 24 hours, or at most they may develop nausea, vomiting and diarrhoea. Abnormal liver function tests are not usually detectable until at least 18 hours after ingestion and maximum liver damage occurs 72 to 96 hours after ingestion.

Treatment of patients who present within 8 hours:
Patients who have ingested more than 150mg/kg should have gastric lavage performed if they present within an hour of ingestion. Activated charcoal may also be given. A plasma paracetamol level will indicate the likelihood of a patient developing high ALT/AST activities (ie >1,000i.u. /L) and must be measured at least 4 hours after ingestion. **Plasma levels measured less than 4 hours post-ingestion can not be interpreted**. Patients with a plasma level above the treatment line require N-acetylcisteine (Parvolex).

See the paracetamol graph on the next page

TREATMENT LINES



Treatment of patients who present after 8 hours:
Patients who present to casualty more than 8 hours after ingesting a paracetamol overdose are at greater risk of developing hepatic damage. If >150mg/kg was taken, take blood for a plasma level but start the NAC infusion as soon as possible. **Do not wait for the result of the plasma paracetamol level**. Stop administration of the antidote if the plasma level is subsequently found to be below the treatment line.

At the end of the NAC infusion, a blood sample should be taken to check the INR and creatinine concentrations. If these investigations are abnormal, consider a further infusion of NAC, continued until recovery or death.

Tricyclic Antidepressants

TCAD's such as prothiaden and amitriptyline can potentially be very toxic when taken in overdose. They cause a wide range of peripheral and central symptoms but the most severe of these involve the cardiovascular system. ECG changes include wide QRS intervals, prolonged PT and PR intervals, right bundle branch block, AV block, and ST segment depression. Supraventricular and ventricular tachycardia and fibrillation may also occur. Patients who have ingested TCAD overdoses should have gastric lavage performed if they present to casualty within an hour of ingestion. (Very large overdoses may cause gastric stasis and some authors recommend gastric lavage even up to 4 hours after ingestion.). Give 50g of activated charcoal. All patients should be observed with ECG monitoring for at least 6 hours. The arterial pH should be monitored closely and corrected if necessary. Class 1a anti-arrhythmics are contra-indicated because they exacerbate the cardiotoxic effects. Patients who are symptomatic should be admitted and monitored until all symptoms resolve.

Aspirin

When ingested in overdose, aspirin causes symptoms by 2 main mechanisms. Initially it acts directly on the respiratory centre, producing hyperventilation and resulting in respiratory alkalosis. Excretion of bicarbonate in the urine, together with sodium, potassium, and water compensates for this and as a result dehydration, hypokalaemia and metabolic acidosis may occur. At the same time, salicylates in overdose cause uncoupling of oxidative phosphorylation.The energy normally used for production of ATP is dissipated as heat and the patient may experience hyperpyrexia, flushing, sweating and further dehydration.
All patients who have ingested >150mg/kg require treatment. This involves salicylate elimination together with supportive care.

Summary of management

-Give a stat dose of 50g of activated charcoal followed by further doses of 50g every 4 hours until features of toxicity resolve.

-Rehydrate the patient by giving oral or iv fluids

-Check the arterial pH and correct metabolic acidosis using iv sodium bicarbonate

-Correct hypokalaemia and hypoglycaemia

-Measure the plasma salicylate level at 4-6 hours post-ingestion. In some cases, it may be necessary to repeat this after a few hours.

-Patients who exhibit marked features or who have a plasma level greater than 500mg/l may benefit from urinary alkalinisation.

-In severe cases, haemodialysis may be required.

Paraquat

Please contact the Poisons Information Centre in all cases of paraquat exposure.

Acute paraquat poisonings are nearly always due to ingestion of liquid herbicide preparations. The poor prognosis associated with paraquat is due primarily to pulmonary fibrosis and fatalities may occur days or weeks after ingestion.
Paraquat has an alkaline pH so patients who ingest it will initially experience a burning sensation in the mouth, throat and chest, together with diarrhoea and abdominal pain. Gastric lavage should only be considered for patients who are not showing evidence of corrosive injury. Ipecac is not appropriate because all paraquat preparations contain an emetic. Repeated doses of activated charcoal or Fullers Earth should be given as soon as

possible after ingestion to try and absorb any paraquat remaining in the stomach.
If the patient presents within 12 hours of ingestion, a qualitative urine test can be performed to confirm paraquat absorption. If the urine test is positive, a plasma paraquat concentration should be measured to assess the severity of poisoning.

Interpretation of plasma paraquat concentrations

	plasma paraquat (mg/l)		***time after ingestion (hours)***	
	2.0	at	4	
IF LESS	0.8	at	5	IF MORE
THAN-	0.6	at	6	THAN-
	0.48	at	7	
LIKELY TO	0.33	at	8	POOR
SURVIVE	0.29	at	10	PROGNOSIS
	0.23	at	12	
	0.17	at	15	
	0.12	at	20	
	0.10	at	24	

Good supportive care is essential for all patients who have ingested paraquat. Pulmonary function tests and chest x-rays should be monitored serially for several days. ***Supplemental oxygen should not be given as an initial measure because it can worsen the pulmonary toxicity of paraquat.*** It may be given when necessary for symptomatic relief.

Guidelines for the Toxicology Laboratory

The Toxicology Laboratory in Beaumont Hospital is a separate entity from the Poisons Information Centre and is under the management of Dr William Tormey. More detailed guidelines are available from the laboratory and Toxicology staff can be contacted at 01-809 2673.

Summary of Assays

Assay	Specimen required	DetectionTime (days)
Amphetamines	urine	1-3
Barbiturates	urine/serum	2-4
Benzodiazepines	urine/serum	0-14
Cannabis	urine	3-7(Avg 1-2 wks)
Carbon monoxide	blood	
Cocaine	urine	2-3 days
Cyanide	blood	
Drugs of abuse screen	urine	
Ethanol	urine / blood	up to 24 hours
Ethylene glycol	serum / urine	
Herbicides	urine / gastric	
Insecticides	urine / gastric	
Laxative Abuse screen	urine	
Methadone	urine	2-4 days
Methanol	blood	
Opiates	urine	2-4 days
Paracetamol	serum	4-24 hours
Paraquat	serum/urine	>4 hrs pi
PCP	urine	2-4 days
Propoxyphene	urine	7 days
Rodenticides	urine / gastric	
Salicylate	serum	peak at 4-6 hours
Strychnine	urine/gastric	
TCAD’s	serum	
Unknown drug screen	urine/ blood/ serum	
Volatile Substances	blood	

Blood samples for salicylate and paracetamol levels should be taken at least 4 hours post-ingestion. Levels obtained before 4 hours or after 24 hours post-ingestion cannot be interpreted. No levels can be interpreted after chronic or repeated overdoses of paracetamol or salicylate

If an initial salicylate level is greater then 25mg%, a repeat level may be measured 4 hours later.

N.B. Only **one** paracetamol level is required when treating paracetamol overdoses. There is no benefit from repeat levels.

A standard qualitative drug screen is available 24 hours a day to detect "unknown" agents when a patient is suspected of deliberate self-poisoning. The following agents can be detected in this screen:

- Benzodiazepines,
- Barbiturates,
- Tricyclic antidepressants,
- Salicylate,
- Paracetamol,
- Ethanol,

A number of other assays are available out-of-hours and these are listed below. It is always advisable to contact the toxicologist "on-call" before sending specimens.

- Theophylline,
- Paraquat,
- Ethylene glycol,
- Phenobarbitone
- Carboxyhaemaglobin
- methaemaglobin,

? Butane solvents

Recommended Reading Material

Ellenhorn's Medical Toxicology 2nd edition
Diagnosis and Treatment of Human Poisoning
Matthew J Ellenhorn (ed).
Maryland, Williams & Wilkins, 1997

Goldfrank's Toxicologic Emergencies 5th edition
Lewis R Goldfrank et al (eds)
Connecticut, Appleton & Lange, 1994

Paediatric Toxicology
Handbook of Poisoning in Children
Nicola Bates, Nicholas Edwards, Janice Roper, Glyn Volans (eds)
London, Macmillan Reference Ltd, 1997

Paraquat Poisoning
Mechanisms-Prevention-Treatment
Chantal Bismuth, Alan Hall (eds)
New York, Marcel Dekker Inc, 1995