



Schweizerisches Toxikologisches Informationszentrum
Centro Svizzero d'Informazione Tossicologica
Centre Suisse d'Information Toxicologique
Swiss Toxicological Information Centre

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Numerous experts, mainly from hospitals, institutes, as well as state and federal offices, act as honorary advisers.

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Editorial

Dear Readers

Since our relocation to Freiestrasse in 1999, calls to the Swiss Toxicological Information Centre have continually increased. In the year 2000 by 4.3 % overall; 6.5 % in the first quarter alone! This clearly shows that the Tox Centre's function is firmly anchored in the public's awareness.

Along with the general trend, inquiries by E-mail have multiplied, and visits to our Internet website www.toxi.ch have more than doubled from the previous year. For us, this development is a huge challenge both from a material and from a staff point of view; we are being called on more than ever to meet the growing needs and demands of our users yet without neglecting our core tasks.

An illustration of our expanding range of services is the doping hotline for athletes which the Tox Centre took on for the Swiss Olympic Sport Association last year, and which is increasingly being made use of.

We have also been entrusted with a further area of high priority: the Drug Information Service for physicians, in partnership with the Department of Pharmacology and Toxicology at the University Hospital Zurich, commissioned by the Intercantonal Office for the Control of Medicines (IOCM).

We have got our work cut out for us! All the more therefore, does it please us that the Swiss Government has returned to the ranks of our supporting organisations. We are convinced that with the solidarity and energetic assistance of all concerned, the Tox Centre will continue to fulfil its duties expertly and in the way expected in this day and age.

To you - all our supporting agencies, donors, and readers of this report, we extend our sincere thanks.

Dr. Franz Merki, President of the Foundation Council



2 Introduction

In the year 2000, the number of inquiries handled by the Tox Centre exceeded the 30'000 mark for the first time. Parallel to this, the number of visitors to the Centre's internet website more than doubled in the same time. Most requests came from lay persons and hospital physicians. An additional workload was created by intense media interest in the Tox Centre's activities and an increase of requests for special expertises. Despite labour-reducing electronic data collecting and evaluation facilities, the increased demands necessitated engaging an additional senior resident with clinical experience.

On occasion, especially problematic cases could be solved only with the assistance of the relevant specialists of the nearby University Hospital of Zurich and of the toxicological scientists of the University of Zurich and the Federal Institute of Technology. It is in this respect that our cooperation with XERR, Center for **X**enobiotic and **E**nvironmental **R**isk **R**esearch, is especially beneficial.

This year's annual report will furnish you with the usual details concerning call statistics, type and severity of poisoning, educational activities, research projects, cooperations and publications. But it also contains a surprise: we have examined case statistics from 1998 - 2000 for medication errors. The total of 1'035 spontaneous calls requesting advice on wrongly administered drugs shows that the Tox Centre is a frequent "first port of call". Provisional details of the type of error, drugs involved and circumstances of poisoning can be found in section 5 of this report. As in the case of all spontaneous call systems, the data gives no information about the actual frequency of erroneous drug use. It does however, clearly show that the Tox Centre is an important partner, especially at night, that assists the caller in assessing the risks and in suggesting measures to counter the possible consequences of the error. An in-depth analysis will show to what extent the available (anonymised) data may be used to develop one or more strategies to prevent such erroneous administrations.

3 Emergency and information service

The central services of the Tox Centre are the phone consultations for lay people and physicians in case of acute and chronic poisoning. Additionally, the centre answers theoretical questions and contributes greatly to the prevention of accidental poisoning.

3.1 Methods

All calls to the information service of the Tox Centre are registered electronically. If there is a potential danger for a patient, the information provided to physicians and veterinarians is confirmed in writing, together with a request for feedback on a standardised form. By this means the Tox Centre obtains medically evaluated information on symptoms, treatment and outcome of cases of acute and chronic poisoning. This data is then fed into our own databank and evaluated.

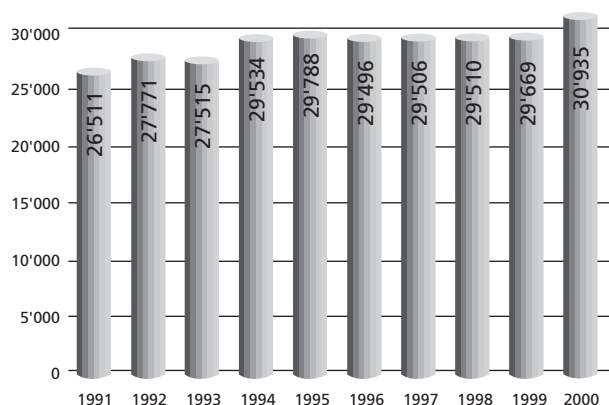
The data have been standardised with respect to the causality of symptoms, the circumstances of poisoning and the disease severity. The corresponding definitions were published in the 1998 Annual Report. They apply also, without modification, to the present report. The 1998 Annual Report is available at the Swiss Toxicological Information Centre, or can be accessed on www.toxi.ch.

3.2 Call statistics

Use of the service

In 2000, the information service of the Tox Centre was called 30'935 times, which represents an increase of 4.3 % over the previous year. For the first time, the mark of 30'000 inquiries was exceeded.

Fig. 1 Number of calls to the centre over the last ten years



Origin of calls

Table 1 shows the geographical and professional origin of the calls.

As in previous years, in 2000 the largest number of calls came from lay persons. These calls reflect not only an important information need of the population, but they also mirror the degree of how well the Tox Centre is known. The largest proportion of public calls originated from the canton of Zurich (4.2 per 1'000 inhabitants). Fewest calls came from the cantons of Jura, Nidwalden and Obwalden.



Physicians used our service 9'243 times, veterinarians 616 times. Compared with 1999, there was a renewed increase of calls from hospital physicians (+ 579), but a slight decrease of inquiries from general practitioners (- 79). The largest proportion of calls from physicians per 1'000 inhabitants came from the cantons of Basel-Stadt and Geneva, followed by the canton of Jura.

Pharmacists called our centre 582 times, which is a significant increase (+ 67) over the last year. Another important service of the Tox Centre is supplying information to the media (newspapers, radio and television), as well as to emergency services, homes, companies and foreign toxicological centres. In 2000, we received a total of 1'533 information requests from such organisations.

Types of calls

Calls can be categorised into theoretical questions without toxic exposure and those with toxic exposure. In cases of toxic exposure, a difference must be made between harmless situations where no or no relevant symptoms are expected, and cases of potential or definite danger to health.

Among the 6'179 calls without toxic exposure, frequent questions pertained to drugs and their interactions, toxicity of plants for children and pets, and to dangers of poisoning from spoiled food and household products. To this group too, belongs advice and documentation for authorities, media, individuals and various organisations.



Tab. 1 Origin of calls

Canton	Popu- lation	General public	Hospital doctors	Practi- tioners	Veteri- narians	Pharma- cists	Various organi- sations	Total	Calls per 1'000 inhabitants	
									Public	Physicians
AG	540'639	1'392	383	111	50	37	84	2'057	2.5	1.0
AI	14'946	20	3	4	1	-	-	28	1.3	0.5
AR	53'737	75	34	9	4	1	6	129	1.3	0.8
BE	943'427	2'516	782	290	117	71	190	3'966	2.6	1.2
BL	258'602	681	144	70	21	14	39	969	2.6	0.9
BS	188'458	590	288	62	13	15	56	1'024	3.1	1.9
FR	234'307	474	240	42	23	27	27	833	2.0	1.3
GE	403'067	999	668	80	31	40	71	1'889	2.4	1.9
GL	38'708	87	27	16	1	-	5	136	2.2	1.1
GR	186'026	399	104	74	21	6	12	616	2.1	1.0
JU	68'818	72	103	14	7	6	2	204	1.0	1.8
LU	345'357	759	282	122	28	14	55	1'260	2.1	1.2
NE	165'649	405	181	37	16	30	13	682	2.4	1.4
NW	37'657	35	7	8	-	4	4	58	0.9	0.3
OW	32'225	37	29	10	2	1	6	85	1.1	1.2
SG	447'609	1'143	325	132	25	11	82	1'718	2.5	1.0
SH	73'552	139	67	19	6	4	11	246	1.8	1.2
SO	243'908	519	131	60	12	10	25	757	2.1	0.8
SZ	128'248	232	60	31	15	6	7	351	1.8	0.8
TG	227'285	425	131	65	18	5	32	676	1.8	0.9
TI	308'498	402	279	49	11	26	38	805	1.3	1.0
UR	35'487	53	11	8	1	1	3	77	1.4	0.5
VD	616'275	1'358	663	148	51	76	100	2'396	2.2	1.3
VS	275'632	434	228	74	16	36	39	827	1.5	1.1
ZG	97'758	206	68	34	6	9	15	338	2.1	1.1
ZH	1'198'569	5'048	1'439	510	107	124	522	7'750	4.2	1.7
FL	32'426	38	9	14	1	4	3	69	1.1	0.7
Foreign	-	194	410	36	10	4	69	723	-	-
Unkn.	-	229	5	13	2	-	17	266	-	-
Total	7'196'870	18'961	7'101	2'142	616	582	1'533	30'935	2.6	1.3
%	-	61.3	23.0	6.9	2.0	1.9	4.9	100	-	-



A special occasion was the participation at the "Crime Days 2000" in Burgdorf. On two evenings, between courses of mushroom dishes, crime writer Martin Suter read sections from his latest book. The Tox Centre, represented by Dr. Monika Guirguis, commented on the excerpts with scientific facts on hallucinogenic mushrooms, fungal poisoning and other areas of "culinary toxicology". On a third evening, the Tox Centre presented its activities to the public, who were especially interested in criminal poisoning.

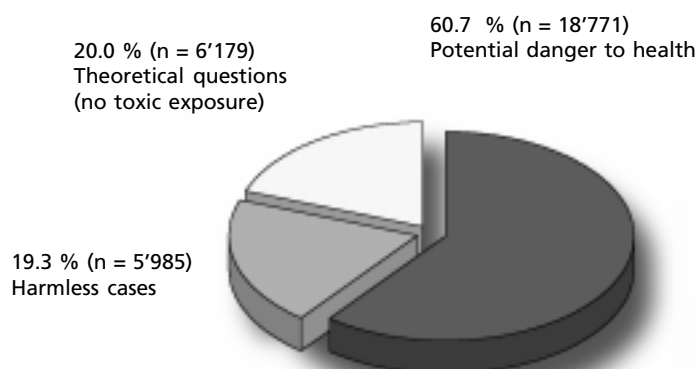
The 24'756 calls following toxic exposure concerned 23'667 humans and 1'089 animals. The following section will discuss human poisoning, while animal calls will be dealt with in section 3.4.

3.3 Human poisoning

The calls with toxic exposure (23'667) are presented by age and gender in Table 2. Children were concerned in 52.6 % of the cases, adults in 46.9 %. In 111 cases (0.5 %), the age group remained unknown.

The most frequent incidents concerned children under five years of age. The proportion of harmless cases was significantly higher in children (18.8 %) than in adults (5.8 %). In contrast, the proportion of potentially severe cases was somewhat higher in adults (41.1 %) than in children (33.8 %). Boys predominated among the children (24.0 % vs. 22.1 %), women among the adults (26.0 % vs. 17.2 %).

Fig. 2 Types of calls (n = 30'935)



Tab. 2 Age and gender of human cases with toxic exposure

Age		Harmless cases		Potentially severe cases		Total	
Children		4'445	(18.8 %)	8'003	(33.8 %)	12'448	(52.6 %)
Age	< 5 years	3'529	(14.9 %)	6'107	(25.8 %)	9'636	(40.7 %)
	5 - <10 years	284	(1.2 %)	552	(2.3 %)	836	(3.5 %)
	10 - <16 years	110	(0.5 %)	624	(2.6 %)	734	(3.1 %)
	unknown	522	(2.2 %)	720	(3.1 %)	1'242	(5.3 %)
Sex	girls	1'868	(7.9 %)	3'356	(14.2 %)	5'224	(22.1 %)
	boys	1'978	(8.4 %)	3'699	(15.6 %)	5'677	(24.0 %)
	unknown	599	(2.5 %)	948	(4.0 %)	1'547	(6.5 %)
Adults		1'382	(5.8 %)	9'726	(41.1 %)	11'108	(46.9 %)
Sex	female	787	(3.3 %)	5'375	(22.7 %)	6'162	(26.0 %)
	male	455	(1.9 %)	3'609	(15.3 %)	4'064	(17.2 %)
	unknown	140	(0.6 %)	742	(3.1 %)	882	(3.7 %)
Unknown		31	(0.1 %)	80	(0.4 %)	111	(0.5 %)
Total		5'858	(24.7 %)	17'809	(75.3 %)	23'667	(100.0 %)

Circumstances of poisoning

Table 3 shows the circumstances of poisoning in 23'667 cases. **Accidental acute intoxications** (17'240) occurred most frequently at home; especially by children ingesting easily accessible drugs or household products. In adults, a significant number of accidental poisonings occurred at the working place (790).

Acute intentional poisoning was mostly suicidal (3'948 cases), less frequently due to drug abuse (599 cases), and rarely to criminal behaviour (59 cases).

Chronic poisoning was relatively rare (655 cases). **Adverse reactions to drugs** in therapeutic doses provoked 345 information requests.



Tab. 3 Circumstances of toxic exposures

Circumstances of toxic exposures	Acute intoxications (Exposure <8h)		Chronic intoxications (Exposure >8h)	
Accidental domestic	14'598	(61.7 %)	140	(0.6 %)
Accidental occupational	790	(3.4 %)	152	(0.6 %)
Accidental environmental	52	(0.2 %)	45	(0.2 %)
Accidental others	1'800	(7.6 %)	93	(0.4 %)
Total accidental	17'240	(72.9 %)	430	(1.8 %)
Intentional suicidal	3'948	(16.7 %)	29	(0.1 %)
Intentional abusive	599	(2.5 %)	74	(0.3 %)
Intentional criminal	59	(0.3 %)	19	(0.1 %)
Intentional others	601	(2.5 %)	103	(0.4 %)
Total intentional	5'207	(22.0 %)	225	(0.9 %)
Total accidental and intentional	22'447	(94.9 %)	655	(2.7 %)
Total acute and chronic	23'102		(97.6 %)	
Adverse drug reactions	345		(1.5 %)	
Unclassifiable	220		(0.9 %)	
Total	23'667		(100.0 %)	

Agents involved

Table 4 shows the different groups of agents involved in the 23'667 cases of human poisoning.

Most toxic exposures occurred with drugs (36.5 %), followed by household products (24.0 %) and plants (11.0 %).

Drugs: Adults clearly dominated this group (5'143 cases vs. children 3'474 cases). Very different, however, were the age groups and circumstances that led to drug ingestion, respectively the quantities

ingested. Small children ingested numerous different pharmaceutical products, but generally only in minor, non life-threatening amounts. Leading culprits were homeopathic globules, contraceptive pills, cough suppressants, dental decay prophylactics and vitamin supplements. Abusive intentional ingestion of drugs by adolescents to produce euphoric states occurred mainly with high quantities of tablets or cough syrup containing dextromethorphan, methaqualone or opiates. In adults, intoxications occurred most frequently with suicidal intent by ingesting hypnotics, tranquillizers and analgesics.



Household products: Small children ingested common household products like washing-up liquid, cleaners, lighter fluid or batteries. Fortunately few cases caused severe poisoning. More or less evenly distributed between adults and children were the cases of eye splashing caused by careless manipulation of household sprays such as impregnating sprays, bath cleaner, pre-wash sprays and window cleaner. 3 % of the information requests involved cases of intentional exposure; drinking methylated spirits, sniffing paint and varnish fumes or ingestion with suicidal intent. Of the suicide attempts, around one third involved products containing hypochlorite.

Plants: The number of accidents with plants has increased both in number and proportion. Again, plant exposures concerned mainly children who ingested not only tempting berries and fruits, but also leaves and flowers. Most calls (more than 200) concerned cherry-laurel (*Prunus laurocerasus*) followed by yew (*Taxus baccata*). All parts of these two plants are poisonous except for the fruit, respectively the red seed pod which is low in toxin in cherry-laurel and toxin free in the yew. The poinsettia (*Euphorbia pulcherrima*) and other types of euphorbia warranted many calls. Lilies of the valley (*Convallaria majalis*), cotoneaster, ivy (*Hedera helix*), wild privet (*Ligustrum vulgare*), honeysuckle (*Lonicera* sp.), and ficus (*Ficus benjamina*) were cause for more than 50 calls each. More than 50 calls also concerned angel's trumpet (*Datura suaveolens*), an attractive but toxic tub plant containing the same substances as deadly nightshade (*Atropa belladonna*). These plants were repeatedly abused by adolescents.

Technical and industrial products: From a total of 1'598 calls, 19 % requested information about acids and alkalis. Accidents were generally a result of incorrect handling or carelessness and calls came from the work and home areas. Acids and alkalis generally provoke local burns to the skin; concentrated hydrofluoric acid, formic acid, hydrochloric acid, and phosphoric acid can lead to severe systemic toxicity. Again, many requests regarded the toxicity of

mercury thermometers, amalgam fillings, escaped ammonia gas from defective refrigerators and ingested tin foil balls.

Toilet articles and cosmetics: This year too, exposures in this group were mainly children. They frequently ingested small amounts of bath, hair, or skin products without experiencing any significant symptoms, or just a slight irritation of the gastro-intestinal tract. Perfumes of all types accounted for 131 consultations. With perfumes, the alcohol content of 60-80 % is relevant and can lead to ethanol intoxication if ingested in large amounts. Adults seldom ingested toilet articles and cosmetics and, if at all, it was due to inattention by confused patients, or to suicide attempts (32 cases of which 3 concerned children).

Recreational and abused drugs: Alcohol and nicotine predominated in this group. In the former mostly adults were involved, in the latter small children who accidentally came upon cigarettes. Party drug presence is increasing; we registered calls concerning A2 (similar to amphetamine), "Thai pills", and other substances. Ecstasy and gamma-hydroxybutyrate (GHB) are still in trend despite the known dangers.



Tab. 4 Agents and age groups involved in human poisoning

Agent groups/Age groups	Adults	Children	Age unknown	Total	
Drugs	5'143	3'474	11	8'628	(36.5 %)
Household products	1'725	3'929	25	5'679	(24.0 %)
Plants	443	2'159	10	2'612	(11.0 %)
Technical and industrial products	1'203	386	9	1'598	(6.8 %)
Toilet articles and cosmetics	164	949	-	1'113	(4.7 %)
Recreational and abused drugs	478	421	6	905	(3.8 %)
Food and beverages	583	299	18	900	(3.8 %)
Products used in agriculture and horticulture	348	409	6	763	(3.2 %)
Poisonous animals	292	119	2	413	(1.7 %)
Mushrooms	253	114	7	374	(1.6 %)
Veterinary drugs	41	37	-	78	(0.3 %)
Other or unknown agents	435	152	19	606	(2.6 %)
Total	11'108	12'448	113	23'667	(100.0 %)

Food and beverages: 90 % of calls came from the general public and mainly concerned spoiled food (seafood, meat or eggs). Physicians requested information on various food additives, as well as unusual or hefty reactions to food. In May, additional calls concerned a batch of savoury snacks that had been contaminated by lye during production.

Products used in agriculture and horticulture: 763 calls concerning agricultural products constitute a relatively small percentage of all toxic exposures. It is however, still a potentially dangerous group. 42 % concerned exposure to insecticides, of which some can lead to serious poisoning. Other inquiries concerned fertilisers, snail bait and rat poison.

Poisonous animals: The rise as seen in the previous year was not continued. The 413 calls involved poisonous animals in most cases. Inquiries were very varied; on the one side there were cases of poisoning from actual poisonous reptiles (50), spiders (38) or poisonous fish (29). On the other side, 123 calls regarded insect bites where we must differentiate between actual poisoning from multiple stings by wasps and bees, and allergic reactions that in sensitive persons can arise after only one sting. Further calls concerned animal-transmitted infectious diseases like rabies, or those from ticks.



Mushrooms: The 374 inquiries in this group make up 1.6 % and therefore a very small proportion of all cases. Two subgroups can be formed: 25 % concerned intentional ingestion of hallucinogenic mushrooms, and 75 % constituted accidental consumption of inedible to frankly poisonous mushrooms. In initial calls to the Tox Centre, in 65 cases the mushroom had not yet been identified, and in many cases the mycologist had to identify them. Cooperation with VAPKO (Association of Mycologists) in 2000 was very good; not only in routine cases, but also in complex cases such as that of a *Cortinarius orellanus* poisoning.

Veterinary drugs: In most cases, poisoning with veterinary drugs was due to unintentional ingestion - by children who didn't recognise them as poison in the animal's feeding bowl, and by adults who took them by mistake. A few cases were intentional - be it with suicidal intent or on the premises that what is good for an animal must be good for its owner. A young woman de-wormed herself with her horse's remedy; another woman ingested equine cough syrup. As the dosage from horse to human had not been adjusted, symptoms of poisoning appeared.

Other or unknown agents: Included in this heterogeneous group were inquiries concerning an industrial gas cloud in a neighbouring country that led to the hospitalisation of several persons, and a Swiss military incident in which fumes from a diesel generator resulted in carbon monoxide poisoning of a group of soldiers. The latter was of particular interest not only to those affected and their physicians, but because it also obtained widespread press coverage.

Severity of poisonings

6'524 inquiries from physicians (71 % of all medical calls) concerned cases with potential or effective poisoning. In these cases, the treating physicians received a written confirmation of the phone consultation, together with a request for a clinical feedback. A report on the outcome was received in 68 % of the cases.

The clinical reports were classified according to causality and symptom severity.

On the basis of the clinical outcome, 3'926 medical cases with and without symptoms, with ascertained and probable causality, were further analysed.

1'027 cases concerned children and 2'899 adults. The degree of poisoning severity is documented in Fig. 3.

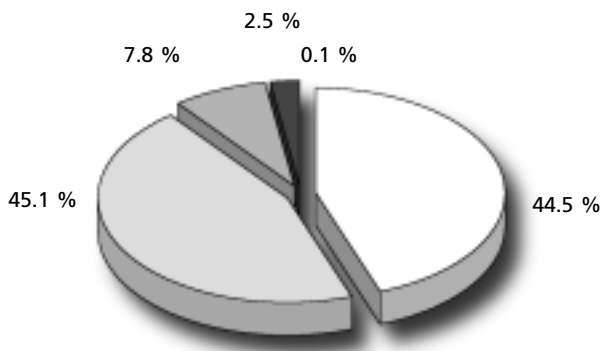
Among children, one half (457 = 44.5 %) experienced no symptoms; among adults, only 350 (12.1 %) were without symptoms. Minor symptoms were seen in 463 children (45.1 %) and in 1'642 adults (56.6 %). Moderate symptoms appeared in 80 children (7.8 %) and 650 adults (22.4 %). Severe poisoning occurred in 26 children (2.5 %) and 242 adults (8.4 %). There was one fatal outcome among the children. Among the adults, we registered 15 fatal cases (0.5 %).

Table 5 shows the relationship between the agents involved and the degree of poisoning severity.



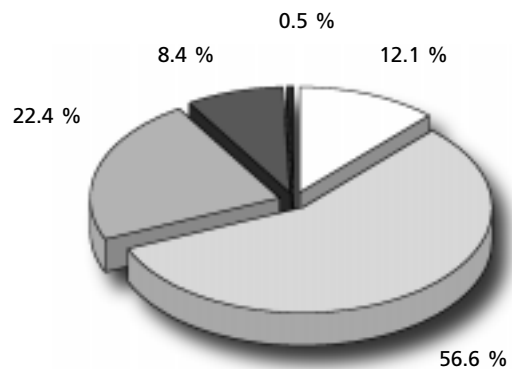
Fig. 3 Clinical outcome of poisoning cases in different age groups

Children (n = 1'027)



□ no symptoms □ minor ■ moderate ■ severe ■ fatal

Adults (n = 2'899)



Approximately two fifths of the 3'926 cases studied were mono-intoxications. In approximately three fifths of the cases, two or more agents were involved. These combined intoxications have been classified under the most important agent.

Drugs: Therapeutic drugs were by far the most frequent cause of poisoning (2'586 cases = 65.9 %). While we registered a significantly high proportion of moderate to severe cases in adults, with 11 fatalities, this was seldom the case in children. Sadly, one 1.5 year old child died as a result of accidental methadone ingestion. While methadone ingestion in small children is still a rare occurrence, it poses a serious danger; in 2000 two further cases were registered, albeit without fatal consequences. One case with no symptoms, the other with severe symptoms. A 3.3 year old boy was comatose and suffered hypoxic cerebellar damage combined with choreatic movements. Of the 11 fatal cases in adults, 7 were due to combined intoxications with therapeutic drugs (opiates, hypnotics, tranquillizers, antidepressants, neuroleptics, and analgesics). Mono-intoxications with overdoses of methotrexate, phenobarbital, and propranolol each led to one

fatality. One patient died from liver failure as an adverse effect of naproxen.

Household products: Household products were the second most frequent cause of poisoning (359 cases). 36 cases (10 %) were moderate to severe. For 7 children and 2 adults, pneumonia resulted from the ingestion of even small amounts of products containing petrol distillates (lamp oil, lighter fluid or solvents). Of the other 27 cases, some concerned local injuries after spraying paint in the eyes or on the skin, or rashes after ingesting bleach, acid or alkali. To prevent serious household accidents, great care should be taken with household products containing caustic substances, petrol distillates, as well as any aerosols (danger of eye splashes). For children's safety, such products should be locked away securely.

Technical and industrial products: This group provoked 301 cases of poisoning. Of the 81 cases involving acids and alkalis, 14 showed moderate to severe symptoms, 2 cases were fatal (suicide with formic acid, industrial accident with hydrofluoric acid). The tragic hydrofluoric acid incident



highlighted the extreme importance of immediate on-site first aid measures. In a cooperation between the industry and the Tox Centre, the hydrofluoric acid emergency kit has been updated. This kit should be available wherever hydrofluoric acid is used and can be obtained from Schweizerhall Synopharm (Basle, +41 61 326 85 20).

Recreational and abused drugs: 256 poisonings occurred in this group, 52 with severe symptoms - 2 cases were adolescents (cocaine/alcohol). There was one fatality (multi-organ failure due to combined drug poisoning). Party drugs caused 28 severe cases with coma; 67 % of comatose cases were due to gamma-hydroxybutyrate (GHB). Cigarette ingestion in small children is fairly harmless (up to 3 cigarette butts or a whole cigarette). In 27 children's cases only one displayed moderate symptoms with more than 2 days of continued vomiting.

Plants: In the past year, again none of the 95 reported cases of plant poisoning was severe or fatal. 17 adult's and 3 children's cases were moderately severe. Most plant intoxications in adults resulted from intentional abusive/suicidal ingestion of hallucinogenic deadly nightshade varieties; 14 cases of angel's trumpet (*Datura suaveolens*), and 6 cases of deadly nightshade (*Atropa bella-donna*). One child ingested the black berries of the deadly nightshade before going to bed, woke in the night, vomited, hallucinated and was tachycardic. Another ingested thuya twigs and vomited blood. Repeated vomiting of blood accompanied by severe intestinal cramps occurred in 3 cases where leaves of the poke berry (*Phytolacca americana*) were ingested. This plant, native to America, was imported as an ornamental plant. It thrives and runs wild in the Ticino and is easily confused with wild vegetables. Of the 10 reported cases with spurge (*Euphorbia* sp.), 3 led to painful corneal erosions from splashes of the milky juice. Monkshood (*Aconitum napellus*), yew (*Taxus baccata*), golden chain (*Laburnum*

anagyroides) and barberry (*Berberis vulgaris*) were taken with suicidal intent. Monkshood and yew seeds caused slight ECG irregularities.

Mushrooms: Calls from physicians of suspected death cup (*Amanita phalloides*) poisonings were fortunately unsubstantiated. Among the 6 severe cases reported was a family of 1 adult and 2 children who experienced massive repeated vomiting with dehydration after consuming satan's bolete. 2 cases of psychosis after consumption of hallucinogenic mushrooms, and one case of renal failure after consumption of *Cortinarius orellanus* were registered. Of the 29 moderately severe cases, 16 displayed the classic symptoms of agitation, panic, tachycardia, and mydriasis after consumption of "magic mushrooms". The other 13 resulted in gastro-intestinal symptoms from eating moderately toxic or decaying mushrooms.

Products for agriculture and horticulture (including pesticides): 68 poisonings occurred in this group. Fortunately, those involving children did a minimum of damage. Some insecticides are potent neurotoxins. In adults they led to 3 moderate, 3 severe poisonings and one fatality. Another acute intoxication was attributed to glyphosate, a herbicide. A sleep-inducing rodenticide taken in combination with various other drugs also led to severe poisoning. In addition, one person suffered severe sewer gas (hydrogen sulfide) intoxication.

Toilet articles and cosmetics: 51 cases were registered, mostly with no symptoms or of minor severity. A small child suffered somnolence after accidentally ingesting 30-40 ml of perfume. 3 cases were moderately severe.

Poisonous animals: Accidents with venomous animals counted 36. One serious case concerned contact with a box jellyfish in Australia, which led to paralysis and pain. Three further severe cases involved bites from exotic poisonous snakes (Ga-



Tab. 5 Agent groups / Severity of poisoning

Agent groups/ Severity of poisoning	Adults					Children					Total
	N	Mi	Mo	S	F	N	Mi	Mo	S	F	
Drugs	264	1'126	424	161	11	263	263	58	15	1	2'586 (65.9 %)
Household products	28	123	20	4	-	83	89	6	6	-	359 (9.1 %)
Technical and industrial products	20	169	46	10	2	24	26	3	1	-	301 (7.7 %)
Recreational and abused drugs	9	72	83	50	1	16	19	4	2	-	256 (6.6 %)
Plants	8	27	17	-	-	25	15	3	-	-	95 (2.4 %)
Mushrooms	3	17	26	4	-	4	1	3	2	-	60 (1.5 %)
Products used in agriculture and horticulture	6	19	9	6	1	21	6	-	-	-	68 (1.7 %)
Toilet articles and cosmetics	2	19	3	-	-	17	10	-	-	-	51 (1.3 %)
Poisonous animals	1	15	4	4	-	2	7	3	-	-	36 (0.9 %)
Food and beverages	2	4	3	1	-	1	6	-	-	-	17 (0.4 %)
Veterinary drugs	3	1	4	-	-	-	-	-	-	-	8 (0.2 %)
Other and unknown agents	4	50	11	2	-	1	21	-	-	-	89 (2.3 %)
Total	350	1'642	650	242	15	457	463	80	26	1	3'926 (100.0 %)

Severity of poisoning: N = no symptoms, Mi = minor, Mo = moderate, S = severe, F = fatal



bun viper, Bushmaster and Monocellate cobra). 4 of the 7 moderately severe cases were due to bites from free living domestic vipers; another from a poisonous spider about which the Tox Centre had up until then never been asked about. In this case, a U.S. citizen was bitten by a loxosceles spider (Brown Recluse Spider) just before flying to Switzerland - he had to be treated in Switzerland for severe local symptoms.

Food and beverages: 17 cases of food poisoning were registered. Three concerned suspected botulism, which was confirmed in 2 cases. This rare poisoning is caused by the toxin of the bacterium Clostridium

botulinum and manifested in the two patients its typical signs of paralysis of the central nervous system.

Other or unknown agents: The 89 cases in this group were mainly due to exposure to gases and vapours of all kinds, apart from a number of exposures to unknown toxins. After a work accident with irritating fumes, a person developed a severe inflammation of the respiratory tract and shortness of breath. Moderate and severe cases of intoxication resulted from exposure to pepper spray, tear-gas, and combustion gases.



3.4 Animal Poisoning

Animals involved

1'089 calls were related to the following animal species: 661 dogs, 238 cats, 48 horses/ponies, 29 cows, 25 rabbits/hares, 14 parrots, 11 sheep, 10 guinea-pigs, 10 birds, 9 goats, 6 chickens, 4 donkeys, 3 pigs, 2 fish, 2 hedgehogs, 2 llamas, 1 chinchilla, 1 fallow deer, 1 hamster, 1 domestic pig, 1 coral, 1 crab, 1 tortoise, 1 dormouse and 1 yak. In the remaining 6 cases, various animals not further specified were involved.

Agents involved

Table 6 shows the number of calls for the 12 different groups of agents.

The calls primarily concerned products used in agriculture and horticulture (322 cases = 29.5 %), as well as plants (267 cases = 24.8 %). They were followed in descending order by drugs, household products, veterinary drugs, and technical and industrial products.

Tab. 6 Agents involved in calls concerning animals

Agents groups	Cases	
Products used in agriculture and horticulture	322	(29.5 %)
Plants	267	(24.8 %)
Drugs	163	(15.0 %)
Household products	145	(13.3 %)
Veterinary drugs	51	(4.7 %)
Technical and industrial products	50	(4.6 %)
Poisonous animals	16	(1.5 %)
Food and beverages	16	(1.5 %)
Recreational and abused drugs	9	(0.8 %)
Toilet articles and cosmetics	7	(0.6 %)
Mushrooms	5	(0.5 %)
Other or unknown agents	38	(3.5 %)
Total	1'089	(100.0 %)

Severity of poisonings

288 clinical reports on animal poisoning were received.

Approximately one third (107 cases) remained without symptoms, 91 cases were classified as minor, and 90 cases were moderate, severe or fatal.

Products used in agriculture and horticulture (including pesticides): Rodenticides again posed the biggest dangers for other domestic animals. These products contain either narcotic substances or anticoagulants. Further intoxications were caused by insecticides and snail bait.

Drugs: Poisoning by therapeutic drugs in animals occurred mainly when pets ingested their owners' hypnotics, tranquilizers, or anticonvulsants. One dog lost consciousness for 24 hours after consuming blood from an euthanised mare.

Plants: In contrast to poisonings by plants in humans, in 10 animal cases the outcome was severe or fatal. After consuming pittosporum leaves in the Ticino, 3 goats developed severe cramps and colic and died within one to two days. 3 rabbits died after ingesting ivy leaves (*Hedera helix*), and a bull succumbed from devouring yew branches (*Taxus baccata*). Indoor plants were the cause of severe poisoning in the case

Tab. 7 Agent groups and severity of animal poisoning

Agent groups / Severity of poisoning	Outcome					Total	
	N	Mi	Mo	S	F		
Products used in agriculture and horticulture	42	31	14	14	7	108	(37.5 %)
Drugs	36	22	5	1	-	64	(22.2 %)
Plants	9	10	4	3	7	33	(11.6 %)
Household products	10	12	5	-	1	28	(9.7 %)
Veterinary products	2	8	4	8	1	23	(8.0 %)
Technical and industrial products	6	2	1	2	6	17	(5.9 %)
Poisonous animals	-	1	4	1	-	6	(2.1 %)
Recreational and abused drugs	-	2	2	-	-	4	(1.4 %)
Food and beverages (except mushrooms and alcohol)	1	2	-	-	-	3	(1.4 %)
Toilet articles and cosmetics	1	-	-	-	-	1	(0.3 %)
Other or unknown agents	-	1	-	-	-	1	(0.3 %)
Total	107	91	39	29	22	288	(100.0 %)

Severity of poisoning: N = no symptoms, Mi = minor, Mo = moderate, S = severe, F = fatal

of 3 cats; a kitten that repeatedly chewed at a philodendron plant developed severe gastro-intestinal symptoms, muscle cramping and renal insufficiency. It had to be euthanised. A second cat became severely ill after ingesting an unknown quantity of dracaena leaves, while a third cat got diarrhoea containing blood, and became hypothermic and apathetic after chewing on a tomato plant (*Lycopersicum esculentum*).

Household products: There was one fatality among the 28 cases. A cat died shortly after plunging into a wood preservation solution containing carbolineum. Further severe cases were provoked when household products partially entered the respiratory tract and caused inflammatory reactions.

Veterinary products: The number of moderate to fatal permethrine poisonings in cats has remained



unchanged. Most cases were due to anti-parasite preparations administered in a wrong species.

Technical and industrial products: This group accounted for some 6 % of cases. As potent poisons are present in this group, the number of severe or fatal cases is fairly frequent. A dog contracted severe corrosive injuries from contact with an industrial toilet cleaning product.

Poisonous animals: Three cases concerned viper bites in dogs; two with moderate effects and one severe.



4 Other Activities

4.1 Services

Directly charged services included expertises, anonymised case analyses pertaining to specific products, elaboration of special product information for safety data sheets of manufacturers, and the mailing of 12'000 first aid guidelines for acute poisonings.

The Swiss Federal Office of Public Health obtained anonymised notification of serious incidents involving all products covered by the Swiss law of poisons.

At the request of the Swiss Olympic Sports Association, the Tox Centre has set up a pay "doping hotline" for athletes, and this is being increasingly made use of.

Our emergency service is still free for the public as well as for medical professionals. The same applies to our expanding source of information on poisonings and toxicological risks on our internet website www.toxi.ch. Visitors to the site numbered 21'666 in 2000 (9'612 the previous year), and over 100'000 pages were accessed.

Regular consultations in clinical toxicology were performed at the University Hospital Zurich by the Tox Centre senior medical staff.

4.2 Education

The academic members of the Tox Centre participate actively in the teaching and educational program of the Division of Clinical Pharmacology and Toxicology of the University Hospital Zurich.

The experience of the Tox Centre is an important basis for the teaching of medical students in clinical toxicology, and of environmental science students (SFIT/ETH) in environmental hygiene.

The senior medical staff of the Tox Centre contributes regularly to the further education of physicians and other professional organisations in clinical toxicology. In 2000, the Tox Centre was consulted 124 times by the media on current problems of human toxicology.

Our research results were presented in four abstracts to the annual congress of the European Association of Poisons Centres and Clinical Toxicologists (EAPCCT) in Amsterdam. The medical directors of the Tox Centre were also invited to deliver lectures at several national and international workshops and congresses.



4.3 Research projects

The main emphasis of our research efforts continued to be concentrated on the estimation of critical doses for moderate and serious toxic effects. Specific research projects dealt with the pharmaco-epidemiology of adverse drug effects, interactions between drugs and phytopharmaceutical products, as well as genetic transport protein polymorphisms as risk factors in serious clinical-pharmacological and clinical-toxicological cases. These projects are carried out in cooperation with the Division of Clinical Pharmacology and Toxicology at the University Hospital Zurich.

4.4 Cooperations

In addition to the close cooperation with the Institute of Clinical Pharmacology and Toxicology at the University Hospital Zurich, the Tox Centre is a member of the newly created Center for Xenobiotic and Environmental Risk Research (XERR) at the Swiss Federal Institute of Technology and University of Zurich. This cooperation not only increases the competence of the Tox Centre staff members in different areas of toxicology, but it also provides the opportunity of redirecting theoretical inquiries to other experts.

5 Focus: Erroneous administration of medicinal drugs

The Tox Centre regularly receives inquiries concerning incorrect administration of drugs. Since the analysis of such cases creates an important potential for prevention, data from 1998 to 2000 was analysed retrospectively. These cases were traced by searching the Tox Centre database with distinct search terms, and subsequently manually identifying the cases of incorrect drug administration.

The total of such cases was 1'035. The most frequent error concerned dosage, usually an over-dosage (see Table 8). Calls concerning incorrect administration of drugs were twice as frequent between 7 p.m. and 11 p.m. than during the day (see Fig. 4). They mostly

involved drugs for the nervous system (psychopharmaceuticals, analgesics, Table 9). Specific drugs frequently involved in incorrect administration were paracetamol ($n = 42$) and methadone ($n = 24$). The administering person was in 705 cases (68 %) a private person and in 325 cases (31 %) a medical professional (physician, pharmacist, nurse). In about a third of the cases (35 %, $n = 359$) the administering and the affected person were the same, in the remainder ($n = 676$), the affected person was different. 478 cases (46 %) concerned children (<16 years with an average age of 3.5 years); adults accounted for 556 (54 %) cases with an average age of 52 years. The gender ratio was approximately 4:5 (m:f).

Tab. 8 Type of error (n = 1'035)

Incorrect dosage	482	46.6 %
Wrong drug taken	241	23.3 %
Incorrectly administered	131	12.7 %
Erroneously given	108	10.4 %
Wrong patient	39	3.8 %
Accidentally taken	12	1.2 %
Nonobservance of indications	7	0.7 %
Administration error	6	0.6 %
Other	9	0.9 %

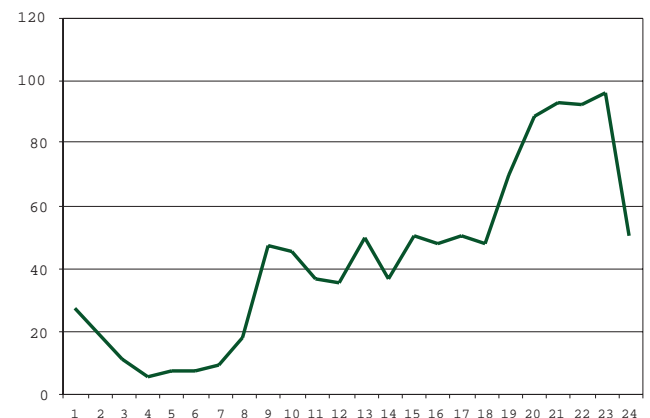
The following were identified as particularly high risk situations: maternity wards (child receives mother's medication), preparations in tube or drop form (incorrect administration), tablets or capsules not intended to be taken orally, medications with varying levels of dosage strengths (e.g. for children of different age groups). There is an increased risk of erroneous administration of drugs in intensive care wards and nursing homes. A considerable number of incorrectly administered methadone cases was observed (n = 24). The most common error was either an overdosage for the right patient, or the wrong patient mistakenly receiving a dosage. Both situations can lead to potentially life-threatening poisonings.

Tab. 9 Drugs involved

ATC class	Number	in %
Nervous system	305	29.5 %
Respiratory tract	182	17.6 %
Infection	93	9.0 %
Dermatological	83	8.0 %
Gastroenterological	60	5.8 %
Circulation	63	6.1 %
Motor apparatus	53	5.1 %
Urogenital tract	37	3.6 %
Blood	27	2.6 %
Hormone (systemic)	16	1.5 %
Oncology	15	1.4 %
Parasites	12	1.2 %
Sensory organs	17	1.6 %
Various	72	7.0 %

In order to obtain further, and more precise details of errors in drug administration, the Tox Centre is at present having a medical thesis written. On the basis of it, it will be possible to draw important conclusions about prevention.

Fig. 4 Time of calls concerning erroneous administration of drugs



6 The Swiss Antidotes Network

In Switzerland, the distribution and storage of antidotes is uniformly organised. Information on the individual antidotes and their availability is published regularly in the Swiss List of Antidotes. Antidotes are classified in three complementary categories based on the frequency of poisonings, the place of administration of the antidote and logistic criteria. In general, only antidotes are included in the List which do not belong to the standard range of public and hospital pharmacies. The inclusion criteria are 1) the application of a substance as a classical antidote; 2) the application of a substance as an antidote which is not commonly available in hospitals; 3) the quantity of a drug if administered as an antidote exceeds the quantity that is normally available in a hospital for therapeutic use; 4) the use of the drug is not commonly known as antidotal. The ultimate goal is not maximum completeness, but a safe and rapid availability of important substances as antidotes. It is a tradition that the Apotheke Wülflingen organises the distribution of the antidotes in the List.



Decontaminants and antidotes for **radioactive materials** are stored at the Cantonal Pharmacy of Zurich, and can be ordered by hospitals and other pharmacies in emergencies. Information about the availability of botulinum antitoxin and antivenins for snake bites (vipers) is provided by the Swiss Toxicological Information Centre and the Swiss Institute of Serums and Vaccinations (Schweizerisches Serum- und Impfinstitut) in Berne.

The Swiss List of Antidotes is revised and updated regularly by a special working group of the Swiss Toxicological Information Centre and the Swiss Association of Hospital Pharmacists. It is published in the Bulletin of the Swiss Federal Office of Public Health and can also be viewed on the internet at <http://toxi.ch/ger/welcome.html> (→Antidote) or at <http://www.pharmavista.net/news/antidot/maind.htm>

Members of the working group are: M. Eggenberger (Berne), C. Fäh (Winterthur), Ch. Hasler (Zurich), S. Mühlebach (Aarau), Ch. Rauber-Lüthy (Zurich) and H. Kupferschmidt (Chairman, Zurich).

Tab. 10: The three categories of the Swiss Antidotes List

For public pharmacies: activated charcoal, amylnitrite, biperidene, calcium gluconate hydrogel, dimeticone drops or tablets.

For hospitals: atropine (ampoules), biperidene, calcium gluconate, colestyramine, dantrolene, ethanol, flumazenil, glucagon, magnesium, N-acetylcysteine (vials and powder), naloxone, sodium hydrogencarbonate, neostigmine, phytomenadione (vit. K), sodium polystyrene sulfonate, pyridoxine (vit. B₆).

For regional centres: atropine (100 ml), calcium-disodium-EDTA, deferoxamine, digitalis antidote, dimethylaminophenol (4-DMAP), dimercaptopropane sulfonate (DMPs, Unithiol), dimercaptosuccinic acid (DMSA, Succimer), glycine, hydroxocobalamine, iron-(III)-hexacyanoferrate(II) (Berlin blue), labetalol, methylene blue, obidoxime, phentolamine, physostigmine salicylate, silibinin, sodium thiosulfate.

The regional centres with their phone numbers are indicated in the List.

7 Publications

	Order number
<p>Dose dependent toxicity of dextromethorphan overdose (Abstract). Betschart T, Rauber-Lüthy Ch., Guirguis M., Kupferschmidt H., Meier-Abt P.J. Journal of Toxicology - Clinical Toxicology 38, 190, 2000.</p>	1-00
<p>Antidote bei Vergiftungen. Fäh C., Rauber-Lüthy Ch., Mühlebach S., Hasler Chr., Eggenberger M., Kupferschmidt H. Bulletin Bundesamt für Gesundheit 3, 44 - 50, 2000</p>	2-00
<p>Reasons and motivations for calls to a Poison Information Centre concerning environmental issues (Abstract). Feser M., Kupferschmidt H. Journal of Toxicology - Clinical Toxicology 38, 1237, 2000.</p>	3-00
<p>Plötzliches Coma bei einem 20-jährigen Mann. Herbrand R., Greminger P., Schurter G., Pletscher W., Kupferschmidt H. Schweizerische Rundschau für Medizin (PRAXIS) 89, 1326 - 1330, 2000.</p>	4-00
<p>Acute poisoning with hallucinogenic psilocybe mushrooms in Switzerland (Abstract). Kunz M.W., Rauber-Lüthy Ch., Meier-Abt P.J., Kupferschmidt H. Journal of Toxicology - Clinical Toxicology 38, 233, 2000.</p>	5-00
<p>Overdose of over-the-counter (OTC) medications is less likely to cause severe poisoning than prescription drugs (Abstract). Kupferschmidt H. Journal of Toxicology - Clinical Toxicology 38, 249-250, 2000.</p>	6-00
<p>Fälle mit unklarem Koma: Information für die Notfallärzte in der Schweiz. Kupferschmidt H., Pletscher W., Vetter W. Schweizerische Rundschau für Medizin (PRAXIS) 89, 106-107, 2000.</p>	7-00
<p>Antidote in der Apotheke. Kupferschmidt H., Rauber-Lüthy Ch., Lorent J.P., Meier-Abt P.J. Schweizer Apothekerzeitung 22, 739-741, 2000.</p>	8-00
<p>Fomepizol bei Ethylenglykol-Vergiftung (Zeitschriftenreferat). Kupferschmidt H. Schweizerische Medizinische Wochenschrift 130, 249-250, 2000.</p>	9-00
<p>Vorbeugen hilft Schaden vermeiden. Meier-Abt A. Der Gartenbau 46, 6-7, 2000.</p>	10-00
<p>Bedeutung der Genetik für die Arzneimitteltherapie. Meier-Abt P., Stieger B. MAGAZIN UNIZÜRICH 2, 31-33, 2000.</p>	11-00
<p>Akute Vergiftungen. Meier-Abt P.J., Gossweiler B., Kupferschmidt H. In: T. Hess (Hrsg.): Hadorn Therapie-Handbuch, 9. Auflage, Verlag Hans Huber, Bern, Göttingen, Toronto, Seattle 2000, 23-40.</p>	12-00

Dr. Attilio Nisoli zum 80. Geburtstag.

Merki F.

Schweizer Apothekerzeitung 22, 759-760, 2000

13-00

Dose-Dependent Toxicity of Diphenhydramine Overdose.

Radovanovic D., Meier P.J., Guirguis M., Lorent J.P., Kupferschmidt H.

Human & Experimental Toxicology 19, 489-495, 2000.

14-00

Dextromethorphan, mehr als nur Hustenmittel.

Rauber-Lüthy Ch., Guirguis M., Kupferschmidt H., Meier-Abt P.J.

Schweizer Apothekerzeitung 22, 737-738, 2000.

15-00

Allergy to house-dust mites.

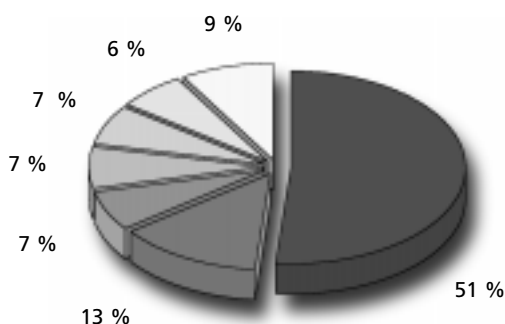
Schnyder B., Schweri T., Thomann B., Pichler C.

Schweizer Medizinische Wochenschrift 130, 443-447, 2000.

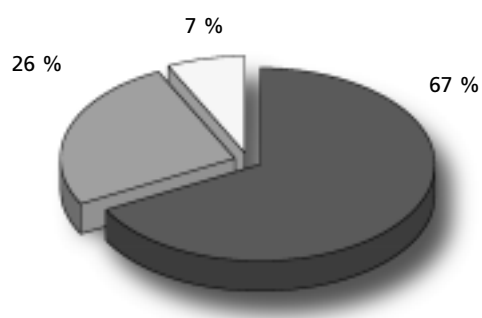
16-00

8 Income and expenditure

Income Fr. 2'131'881



Expenditure Fr. 2'115'119



- Cantons
- Swiss Society of Chemical Industries
- Swiss National Accident Insurance Fund
- Swiss Insurance Association
- santésuisse
- Swiss Society of Pharmacists
- Various (mostly private companies and individuals)

- Salaries and social contributions
- Other general expenses
- Funds and reserves



9 Donations

SFr.

Galenica Holding AG	15'000
City of Zurich	10'000
Coop Switzerland	5'000
Karl Mayer Foundation	5'000
Zurich Financial Services	5'000
Colgate-Palmolive AG	3'000
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Jansen AG	1'000
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Orgamol SA	1'000
Sanitized AG	1'000
Sanofi-Synthélabo (Suisse) SA	1'000
Sika AG	1'000
Spirig AG	1'000
Staerkle & Nagler AG	1'000
Streuli G. & Co AG	1'000
Association of the Swiss Soap and Detergent Industry (SWI)	1'000
Voigt AG	1'000

Smaller contributions not listed here are frequent and extremely welcome. We extend grateful thanks to all donors.

By Fax

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By Mail

Swiss Toxicological
Information Centre
P.O. Box
Freiestrasse 16
CH-8028 Zürich

Order

Please send me the following documents

- Sticker with the emergency phone number

- Leaflet about first aid and poisoning prevention

- Reprints from publications (order numbers see pages 22-23).
These are available on loan only.

If you require several documents, please order by mail, enclosing SFr. 4.50 in stamps per document, or the equivalent in international reply coupons.

Remarks, suggestions

My address

Signature



24 h Emergency Service: +41 1 251 51 51
Freiestrasse 16 / P.O. Box

Non urgent cases: +41 1 251 66 66
CH-8028 Zürich PC 80-26074-7

Office: +41 1 634 10 20
WebSite: www.toxi.ch

Fax: +41 1 252 88 33
eMail: info@toxi.ch