



Swiss Toxicological  
Information Centre

# Annual Report 2002

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- the Swiss Society of Chemical Industries (SSCI)
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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

For the fifth consecutive year the annual report shows increasing utilisation of the services provided by the STIC. This annual report will again represent a valuable source of information to those who are interested in recognising, dealing with and preventing today's poisoning challenges. Thanks to a modern information system, careful recording of enquiries and systematic analysis of cases, the STIC is well equipped to provide appropriate and useful information to federal authorities, physicians, industry, trade and consumer organisations in the interest of preventing poisoning incidents. The STIC is also advising the general public on current toxicological dangers through the increasing utilisation of its website ([www.toxic.ch](http://www.toxic.ch)).

This work requires comprehensive and multi-disciplinary collaboration with similar organisations, institutes, universities and the University Hospital Zurich. It also requires substantial funding which is increasingly difficult to obtain in today's economic climate. This is why we are especially grateful to our main private sponsors for the decision to increase their financial contribution for the year 2003 by 11%. By the same token however, we are concerned that the Swiss Conference of the Cantonal Directors of Public Health (CDS) has decided not to increase their contribution next year, having already left its contributions unchanged for ten years. Poisons centres worldwide are highly developed centres of excellence in terms of technology, documentation and staff and rely on substantial support.

Despite increasing deficits we will take another step this year towards improving our services and accelerating our emergency response time by introducing a 24-hour, national, three digit emergency number: Dialling 145 will be operational from November 2003.

Nowadays more than ever the STIC depends on individual donations and is extremely grateful to all those who have been supporting the STIC for a long time, not to mention those who are today supporting it for the first time.

DR. FRANZ MERKI,  
PRESIDENT OF THE FOUNDATION COUNCIL

## ■ Introduction

In the format which has been used for the past five years, this annual report provides information on the utilisation of the emergency and information service, type and severity of poisoning incidents, educational activities, research projects, collaborations, the Swiss Antidotes Network and publications.

Once again, the number of calls received has slightly increased in the year 2002 by 2.5% to a total of 33 111 calls. The number of visitors to our website has increased from 40 415 to 71 669. Hospital physicians in particular have again contributed to the increasing utilisation of the STIC. Furthermore, we have dealt with an increased media interest in our activities and received additional enquiries for expert statements. Due to the budget remaining unchanged this increased utilisation of our services could only be accommodated by streamlining our internal processes and making them even more efficient. Very complex cases were dealt with in collaboration with relevant experts at the University Hospital Zurich and toxicologists based at Zurich University and the Swiss Federal Institute of Technology.

This year's annual report also includes the results of a survey entitled «Advice given by the Swiss Toxicological Information Centre – its value in the eyes of the treating physicians» (page 22).

The aim of this survey was to ascertain levels of satisfaction with the information service, highlight any differences in the language regions of Switzerland and to establish how beneficial the advice given proved to be for the enquiring physicians. A total of 786 questionnaires were distributed. The overall response rate was 79%, however, fewer replies were received from the French and Italian speaking parts of Switzerland compared to German speaking regions. 76% of the questionnaires were completed by hospital physicians, 18% by general practitioners and 6% by veterinarians. The results of the survey show that the STIC provides a valuable service to the physicians, but that there is room for improvement.



## Emergency and information service

The main services provided by the STIC are telephone consultations for members of the general public and physicians in cases of acute and chronic poisoning. In addition, the centre answers theoretical questions and contributes to the prevention of accidental poisoning.

All calls to the information service of the STIC are registered electronically in our own data base, and are analysed in the Annual Report.

### Overview of all calls

#### Use of the service

In 2002, the information service of the STIC received 33 111 enquiries which represents an increase of 2.5% over the previous year.

Figure 1

#### Number of enquiries to the centre over the last ten years

1993	27 515
1994	29 534
1995	29 788
1996	29 469
1997	29 506
1998	29 510
1999	29 669
2000	30 935
2001	32 330
2002	33 111

#### Origin of calls

Table 1 shows the number of calls received in 2002 from the individual cantons of Switzerland and the different population groups.

The largest number of calls came from the general public (61.1%). These calls reflect the need for information by the general public, and also how well the STIC is known. The largest proportion of calls from the public originated from the canton of Zurich (4.4 per 1000 inhabitants). The smallest number of calls was received from the cantons of Jura, Ticino and Nidwalden.

Physicians used our service 9878 times. Compared to the year 2001 this represented an increase of 254 calls by hospital physicians, whereas usage by general practitioners decreased slightly (-19). Based on population, the largest proportion of physician calls came from the cantons of Basel-Stadt and Jura, followed by the cantons of Schaffhausen and Zurich. Veterinarians accounted for 605 calls to the STIC, pharmacists for 551.

The STIC also supplies information to the media (newspapers, radio and television), the emergency services, care homes, industry and poisons centres abroad. In 2002 we received a total of 1840 information requests from these different and diverse organisations.

Table 1

Shows the number of calls received in 2002 from the individual cantons of Switzerland and the different population groups

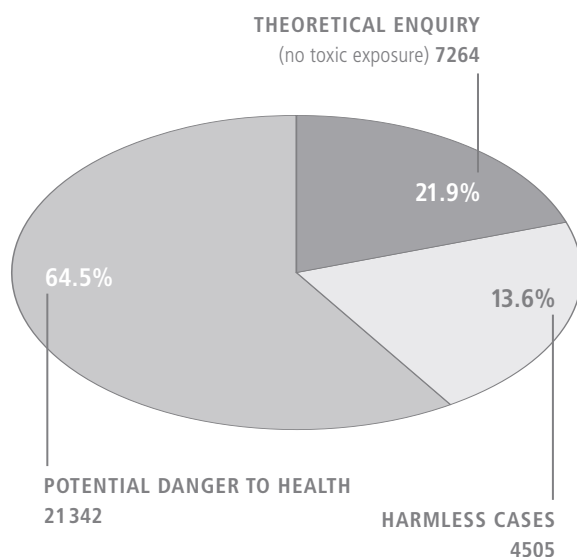
Canton	Population	General public	Hospital doctors	Practitioners	Veterinarians	Pharmacists	Various	Total	Calls per 1000 inhabitants	
									Public	Physicians
AG	550 898	1 443	515	114	40	36	100	2 248	2.6	1.2
AI	14 984	26	4	5	6	–	1	42	1.7	1.0
AR	53 233	78	38	17	3	1	5	142	1.5	1.1
BE	947 079	2 636	825	306	115	84	187	4 153	2.9	1.3
BL	261 449	776	226	67	24	15	53	1 161	3.0	1.2
BS	186 677	550	374	66	11	24	118	1 143	3.0	2.4
FR	239 102	514	213	34	13	26	29	829	2.2	1.1
GE	414 259	833	572	100	20	41	65	1 631	2.0	1.7
GL	38 326	110	31	16	1	–	2	160	2.9	1.3
GR	185 676	475	147	91	15	12	29	769	2.6	1.4
JU	69 065	80	111	12	6	3	2	214	1.2	1.9
LU	350 640	828	266	135	30	12	61	1 332	2.4	1.2
NE	166 469	350	219	24	16	21	26	656	2.1	1.6
NW	38 563	49	5	5	–	1	1	61	1.3	0.3
OW	32 735	64	26	11	1	1	5	108	2.0	1.2
SG	452 641	1 400	425	134	20	15	85	2 079	3.1	1.3
SH	73 395	167	92	23	19	2	13	316	2.3	1.8
SO	245 546	471	153	39	13	7	42	725	1.9	0.8
SZ	131 441	228	80	27	8	6	11	360	1.7	0.9
TG	228 209	477	152	62	24	4	32	751	2.1	1.0
TI	311 887	393	299	56	11	25	35	819	1.3	1.2
UR	34 996	61	16	5	2	1	1	86	1.7	0.7
VD	626 208	1 505	657	136	58	67	126	2 549	2.4	1.4
VS	278 212	480	240	60	19	35	21	855	1.7	1.2
ZG	100 892	234	76	28	5	8	29	380	2.3	1.1
ZH	1 228 628	5 434	1 540	508	112	100	637	8 331	4.4	1.8
FL	33 525	59	3	20	1	1	11	95	1.8	0.7
Foreign	–	234	407	41	11	2	76	771	–	–
Unknown	–	282	8	16	1	1	37	345	–	–
<b>Total</b>	<b>7 294 735</b>	<b>20 237</b>	<b>7 720</b>	<b>2 158</b>	<b>605</b>	<b>551</b>	<b>1 840</b>	<b>33 111</b>	<b>2.8</b>	<b>1.4</b>
%	–	61.1	23.3	6.5	1.8	1.7	5.6	100	–	–



### Types of calls

Calls can be sub-divided into enquiries without exposure and enquiries where exposure has taken place. In cases of exposure a difference has to be made between harmless situations where no or no relevant symptoms are to be expected, and cases of potential or definite danger to health.

Figure 2  
Types of calls (n = 33 111)



Among the 7264 calls without toxic exposure, frequent questions concerned drugs and antidotes, toxicity of plants to children and pets, and dangers of poisoning from spoilt food, household products and chemicals. This sub-category also includes advice and preparing reports for authorities, media, private individuals and various organisations as well as distribution of fact sheets and referring enquiries on to appropriate experts.

The 25847 calls received following potentially toxic exposure concerned 24772 humans and 1075 animals. The following section discusses human poisoning, whereas animal poisoning is dealt with in a separate section (page 16).

### Human poisoning

Table 2 shows a breakdown of the calls received with potentially toxic exposure (24772). Children were involved in 50.6% of the cases, adults in 49.1%. In 76 cases (0.3%), the age group remained unknown.

The highest number of calls involved children under five years of age (35.6%). The proportion of harmless cases was significantly higher in children (13.3%) than in adults (4.4%). In contrast, the proportion of cases with potential danger to health was somewhat higher in adults (44.7%) than in children (37.3%). Boys were more frequently represented amongst the children (22.2% vs. 19.0%), women amongst the adults (25.7% vs. 17.0%).



Table 2  
Age and gender of human cases with potentially toxic exposure

		Harmless cases		Potential danger to health		Total	
<b>Children</b>		<b>3 307</b>	<b>13.3%</b>	<b>9 234</b>	<b>37.3%</b>	<b>12 541</b>	<b>50.6%</b>
Age	< 5 years	2 337	9.4%	6 494	26.2%	8 831	35.6%
	5 – < 10 years	229	0.9%	732	3.0%	961	3.9%
	10 – < 16 years	91	0.4%	663	2.7%	754	3.1%
	unknown	650	2.6%	1 345	5.4%	1 995	8.0%
Sex	girls	1 198	4.8%	3 509	14.2%	4 707	19.0%
	boys	1 423	5.7%	4 082	16.5%	5 505	22.2%
	unknown	686	2.8%	1 643	6.6%	2 329	9.4%
<b>Adults</b>		<b>1 078</b>	<b>4.4%</b>	<b>11 077</b>	<b>44.7%</b>	<b>12 155</b>	<b>49.1%</b>
Sex	female	556	2.3%	5 811	23.4%	6 367	25.7%
	male	323	1.3%	3 890	15.7%	4 213	17.0%
	unknown	199	0.8%	1 376	5.6%	1 575	6.4%
<b>Unknown</b>		<b>21</b>	<b>0.1%</b>	<b>55</b>	<b>0.2%</b>	<b>76</b>	<b>0.3%</b>
<b>Total</b>		<b>4 406</b>	<b>17.8%</b>	<b>20 366</b>	<b>82.2%</b>	<b>24 772</b>	<b>100%</b>

### Circumstances of poisoning

Table 3 shows the circumstances of poisoning in the 24 772 cases with potentially toxic exposure. **Acute accidental intoxications** (17 934) represented the largest group. These occurred frequently at home with children ingesting easily accessible drugs, household products or plant parts. Adults too were involved in toxic exposures at home, but a significant number of enquiries involved work place accidents (839).

**Acute intentional poisoning** was mostly due to attempted suicide (4463 cases), less frequently due to drug abuse (518 cases) or related to criminal behaviour (39 cases).

**Chronic poisoning** was relatively rare (578 cases) compared to acute intoxications. **Adverse drug** reactions in therapeutic doses led to 291 information requests. These were mainly related to the establishment of a causal link between the observed symptoms and the medication taken.



Table 3  
Circumstances of toxic exposures

Circumstances of toxic exposures		Acute poisoning (Exposure <8h)		Chronic poisoning (Exposure >8h)	
Accidental domestic	15 586	62.9%	229	0.9%	
Accidental occupational	839	3.4%	109	0.4%	
Accidental environmental	39	0.2%	9	0.1%	
Accidental others	1 470	5.9%	62	0.2%	
<b>Total accidental</b>	<b>17 934</b>	<b>72.4%</b>	<b>409</b>	<b>1.6%</b>	
Intentional suicide	4 463	18.0%	27	0.1%	
Intentional abuse	518	2.1%	53	0.2%	
Intentional criminal	39	0.2%	5	0.1%	
Intentional others	675	2.7%	84	0.3%	
<b>Total intentional</b>	<b>5 695</b>	<b>23.0%</b>	<b>169</b>	<b>0.7%</b>	
<b>Total accidental and intentional</b>	<b>23 629</b>	<b>95.4%</b>	<b>578</b>	<b>2.3%</b>	
<b>Total acute and chronic</b>		<b>24 207</b>	<b>97.7%</b>		
<b>Adverse drug reactions</b>		<b>291</b>	<b>1.2%</b>		
<b>Unclassifiable</b>		<b>274</b>	<b>1.1%</b>		
<b>Total</b>		<b>24 772</b>	<b>100%</b>		

### Agents involved

For analysis, the agents and toxins involved in enquiries were split up into 12 groups. Table 4 shows these different groups and how often they were involved in the total of 24 772 poisonings in humans.

Most toxic exposures occurred with drugs (37.7%), followed by household products (23.5%) and plants (11.5%). The severity of poisoning in the individual agent groups will be discussed later in this section.

### Severity of poisonings

6837 enquiries from physicians (66% of all medical calls) concerned cases with expected or already established poisoning. In these cases, the treating physicians received a written follow-up of the telephone consultation, together with a request for feedback on the clinical outcome. The STIC received a report on the outcome in 71% of these cases. Thus the STIC received additional information, evaluated by physicians, concerning symptoms, clinical outcome and treatment of acute and chronic poisonings which was entered and analysed in our in-house information system.

Table 4  
**Agents involved in all cases of poisonings in humans**

Agents/Age groups	Adults	Children	Age unknown		Total
Drugs	5 819	3 520	16	9 355	37.7%
Household products	1 916	3 897	21	5 834	23.5%
Plants	560	2 271	8	2 839	11.5%
Technical and industrial products	1 293	357	7	1 657	6.7%
Cosmetics and personal care products	145	918	–	1 063	4.3%
Recreational drugs, alcohol	512	401	1	914	3.7%
Food and beverages	586	262	7	855	3.4%
Agricultural and horticultural products	348	411	6	765	3.1%
Poisonous animals	285	148	1	434	1.8%
Mushrooms	222	123	1	346	1.4%
Veterinary drugs	36	41	–	77	0.3%
Others or unknown agents	433	192	8	633	2.6%
<b>Total</b>	<b>12 155</b>	<b>12 541</b>	<b>76</b>	<b>24 772</b>	<b>100%</b>

Data capture and data evaluation was standardised according to circumstances, causality and severity of poisoning. This annual report only includes poisonings where the causality was confirmed or likely. Confirmed means the toxin has been found in the body, the time course and symptoms are compatible with the toxin, and the symptoms could not be explained by an underlying illness or any other cause. Likely causality fulfils the same criteria, except that the agent has not been detected in the body.

4161 human cases both asymptomatic and symptomatic with sufficient evidence of causality were analysed further with regard to clinical course.

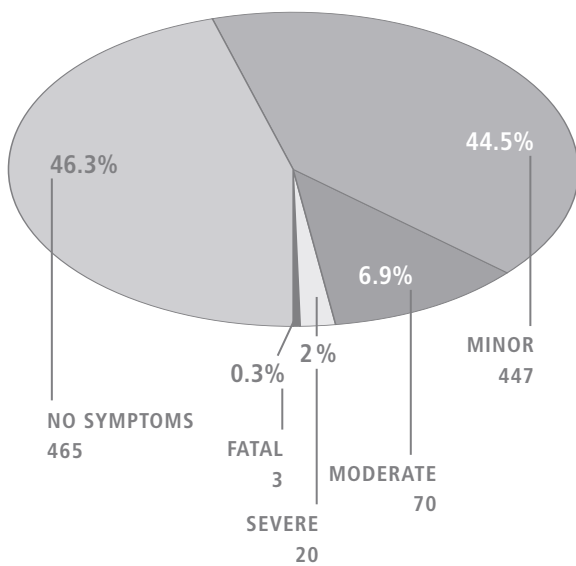
1005 cases involved children and 3156 adults. The severity of these cases is documented in Figure 3 with cases cate-

gorised as follows: no symptoms, minor, moderate, severe, or fatal. Minor symptoms generally require no treatment; moderate symptoms usually require treatment, and cases with severe symptoms must always be treated.

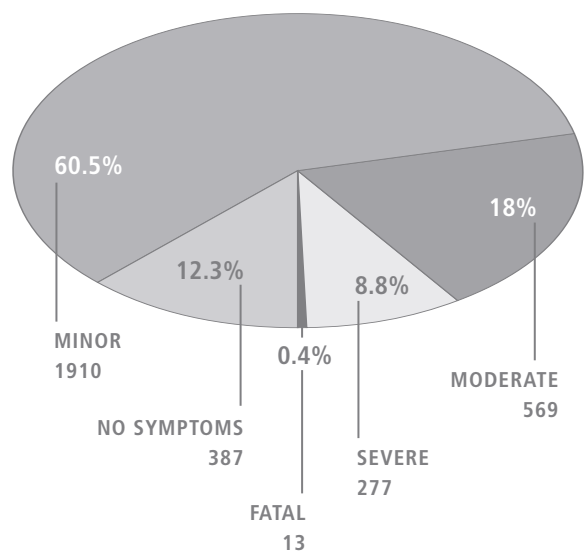


Figure 3  
**Clinical outcome of poisoning cases in children and adults**

**Children (n = 1005)**



**Adults (n = 3156)**



Amongst children, slightly fewer than half (465 = 46.3%) were asymptomatic in contrast to adults where only 387 (12.3%) were asymptomatic. Minor symptoms were observed in 447 children (44.5%) and in 1910 adults (60.5%). Moderate symptoms were seen in 70 children (6.9%) and 569 adults (18.0%). Severe poisoning occurred in 20 children (2.0%) and 277 adults (8.8%). Three cases in children (0.3%) and 13 cases in adults (0.4%) had a fatal outcome.

Of the 4161 cases where causality was confirmed or likely (Table 5), about three fifths involved ingestion of only one toxin. In approximately two fifths of the cases, two or more agents were involved. For the purpose of this report, those cases have been classified according to the most important agent involved. In those cases where follow up information was received and analysed, therapeutic drugs were again the most frequent cause of poisoning (67.4%), followed by household products (9.7%), and technical and industrial products (7.3%).

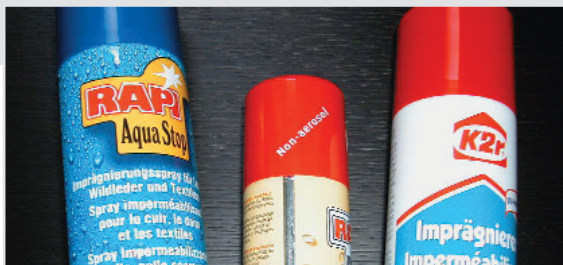
Table 5  
**Frequency of agent group and severity of human poisoning in cases where medical feedback was received and analysed**

Agent groupe	Adults					Children					Total	
	Severity of poisoning	N	Mi	Mo	S	F	N	Mi	Mo	S		F
Drugs	296	1380	364	204	7	279	219	43	13	–	2805	67.4%
Household products	29	120	24	7	1	92	118	8	1	2	402	9.7%
Technical and industrial products	24	170	45	15	–	17	27	5	2	–	305	7.3%
Recreational drugs, alcohol	12	91	86	32	2	12	17	3	1	–	256	6.1%
Plants	9	25	7	1	2	34	21	2	–	1	102	2.5%
Poisonous animals	1	25	8	3	–	2	11	1	–	–	51	1.2%
Mushrooms	2	12	19	2	1	5	4	1	–	–	46	1.1%
Cosmetics and personal care products	5	11	1	1	–	7	17	2	–	–	44	1.0%
Agricultural and horticultural products	6	16	2	4	–	9	3	3	–	–	43	1.0%
Food and beverages	–	13	5	2	–	2	1	1	–	–	24	0.6%
Veterinary drugs	1	4	1	–	–	1	2	–	–	–	9	0.2%
Others or unknown agents	2	43	7	6	–	5	7	1	3	–	74	1.9%
<b>Total</b>	<b>387</b>	<b>1910</b>	<b>569</b>	<b>277</b>	<b>13</b>	<b>465</b>	<b>447</b>	<b>70</b>	<b>20</b>	<b>3</b>	<b>4161</b>	<b>100%</b>

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

**Drugs:** In 2002, the STIC was contacted in 9355 cases following drug intake (Table 4). We have analysed medical feedback for 2805 of those cases (Table 5). Seven ended in death which invariably concerned adults. The agents involved in these fatal poisonings were betablockers (twice) and an opioid, tricyclic antidepressant and antidiabetic in a further three cases. Renal failure led to one death following chronic overdosage of a painkilling drug (mefenamic acid) and the seventh case involved a female who died following aspiration after taking a benzodiazepine-related sleeping drug.

A total of 217 cases were graded as severe (Table 5). This group was dominated by poisoning in adults (204 cases) versus children (13 cases). Tranquilisers (benzodiazepines) and anti-depressants caused severe poisoning in most of the cases seen in adults. Severe poisoning with classic tricyclic continues to play the biggest part in the latter group with 16%. A prospective analysis of trimipramine intoxications currently under way at the STIC aims to check the quality of the advice given.



A wide variety of drugs was involved in the 13 severe cases seen in children, amongst them opioids, paracetamol, anti-epileptic drugs and neuroleptics. We would like to draw attention to the case of a child who was mistakenly given ten times the correct dosage of the antidote N-acetylcysteine (NAC) following ingestion of a potentially hepatotoxic amount of paracetamol. This resulted in the child suffering from anaphylactic shock. Allergic reactions to this most commonly used antidote are fairly common (the literature suggests anything from 3 to 20%) with intravenous application, however these are mostly mild and can be easily treated by temporarily stopping the antidote or administering antihistamines. Last year the first fatal case was published (Appelboam et al, *Emerg Med J* 2002; 19:594-5). Therefore oral administration of NAC should always be considered in patients with pre-existing asthma.

The usage of activated charcoal for decontamination was reported in 24% of cases following drug intake (683 out of a total of 2805). Activated charcoal is by far the most commonly used treatment to avoid absorption in potentially severe poisonings. Less frequently used (but on the increase) is whole bowel irrigation for primary decontamination (in 25 cases). This method of treatment was chosen in nine cases involving drugs not absorbed by activate charcoal (iron, lithium). Nine further cases involved drugs with sustained release. If these drugs are not removed from the stomach and intestines, a continued release and absorption of the active agent will take place over 12 to 24 hours which may delay the onset of symptoms.

**Household products:** This was the second largest agent group concerned, generating 5834 calls (Table 4). In the last quarter of 2002 an unusual amount of severe respiratory problems was reported following usage of an water proofing spray for leather and textiles. We informed the manufacturers and the Swiss Federal Office for Public Health which led to the products concerned being withdrawn from the market and a warning issued to the public to use water proofing sprays carefully, appropriately and to adhere to the instruc-

tions issued by the manufacturers. Current results of studies undertaken identify a specific fluoride chemical being partly responsible. In future all new water proofing sprays for leather and textiles will be classified as toxic class 5S which will enable the Swiss Federal Office for Public Health to insist on warning notices to be added.

In previous years a continued decrease in fatal accidents with household products was observed. Last year, however, three fatal incidents were reported. An elderly male died of pneumonia following ingestion of a foaming floor cleaner. A small child died following ingestion of a metal cleaning agent. Lamp oil caused fatal pulmonary complications in another child. Amongst the severe cases, the case of another child with pneumonia following ingestion of lamp oil is noteworthy. Two adults suffered severe alcohol poisoning caused by methylated spirits. One patient's finger had to be amputated following high pressure injection of a solvent. All other severe cases were caused by corrosives such as alkaline-containing barbecue and drain cleaners.

**Plants:** Most of the 2839 enquiries relating to plant incidents came from the general public as in previous years (Table 4). We received medical feedback for 102 of those cases (Table 5), three of which had a fatal outcome. A 3-year old child ate several leaves while playing on a meadow, these unfortunately included meadow saffron (*Colchicum autumnale*) which led to the child dying of multi-organ failure. The other two fatal poisonings were also caused by meadow saffron which were confused with bear's garlic leaves. *Colchicum autumnale* contains the highly toxic cell poison colchicine in all of its organelles and a small amount of leaves can lead to severe poisoning in adults. Most people recognise its purple blossoms appearing from August onwards which are similar to crocus blossoms. It is, however, a lot less well known that meadow saffron produces its leaves in the spring, sometimes growing together with the very popular bear's garlic. The distinguishing marks of these two plants can be found under [www.toxi.ch](http://www.toxi.ch). Media and the public mostly refer only to the danger of confusion with lily of the valley (*Convallaria majalis*).

If these two are confused, repeated vomiting and diarrhoea can occur, however fatalities are unknown. Intoxication with oleander (*Nerium oleander*) results in severe cardiac symptoms. Moderate symptoms were reported twice after ingesting yew (*Taxus baccata*), and also following alocasia (a close relative of *Dieffenbachia*), golden chain (*Laburnum anagyroides*), angel's trumpet (*Datura suaveolens*) and stinking hellebore (*Helleborus foetidus*). In two cases decorative pumpkins were confused with edible pumpkins or courgettes, respectively.

**Technical and industrial products:** 1657 calls were registered in this group (Table 4). Experience has shown that professionally used products often lead to accidents in the work place. However, these products are also often involved in accidents at home and suicide attempts. At regular intervals, strong industrial cleaning products are involved in accidents at home when these products are used as cleaning agents in private households. Suicide attempts using industrial products are often more dangerous than intoxications with household products. This is due to highly toxic products being sometimes accessible in large quantities at the work place.

We are pleased to report that despite this potential danger of several agents in this category no deaths were reported last year. We did, however, record 17 severe poisonings. Seven of those cases related to accidents at work, six were suicide attempts and four involved accidents at home.

Ten of the 15 cases of severe poisoning reported in adults related to accidents and suicide attempts with highly corrosive substances. Poisoning with organic solvents occurred in four cases, one of those involving highly toxic methyl alcohol was severe. Severe poisoning with gold cyanide proved to be challenging to the emergency advice team. In this specific case, treatment of the patient had to deal with the immediate toxicity of cyanide as well as late complications which can occur with gold intoxication.

Two severe incidents were reported in children, both involving strong industrial cleaners. A pre-school child suffered severe burns of the oesophagus after swallowing a strong caustic industrial cleaner. Another small child developed severe respiratory problems following ingestion of a product containing hydrocarbons. Products based on low-viscosity petrol distillates continue to present a substantial danger for small children – together with the accidents involving lamp oil mentioned under household products – this despite the many preventative measures already taken.

**Cosmetics and personal care products:** Most of the 1063 calls received for this agent group (Table 4) came from the general public. Accidents with cosmetics presented few problems from a toxicological point of view since these products are generally of a low toxicity.

However, even products with low toxicity can lead to severe incidents if they are misused or consumed in large quantities. Accordingly, we dealt with one severe and three moderate incidents caused by personal care products in 2002. One female confused a nail softener with eye drops and suffered severe eye corrosion. One adult and one small child each suffered from severe gastrointestinal problems following ingestion of a substantial amount of fluoride-containing toothcare products. One small child drank shampoo which normally results in a harmless, although frequent poisoning. In this case, however, vomiting was induced as a first-aid-measure which enabled the resulting foam to enter the respiratory system and this led to breathing complications. Induced vomiting is only rarely used nowadays to detoxify and is contra-indicated following the swallowing of foaming, corrosive or solvent-containing products.



**Recreational drugs and alcohol:** 914 enquiries were received in this agent group (Table 4). Adults mostly consumed more than one substance, often in combination with alcohol. There is a growing trend towards hallucinogenic and stimulating drugs compared to opiates. Only one of the two fatal incidents is well documented. This involved a «body-packer» who as far as we know swallowed 66 packages, excreted 23 and presumably deliberately bit on one to open it. He convulsed and suffered cardiac and respiratory arrest, however he was resuscitated and treated in intensive care. Hyperthermia was also reported. He eventually died of multi-organ failure with anuria, rhabdomyolysis and liver failure. In line with the current trend observed, most of the severe cases were caused by gamma-hydroxybutyrate (GHB) and gamma-butyrolactone (GBL). Taken together these cases were a lot more common than those involving cocaine or heroin. Ecstasy also led to severe intoxications in several cases.

In children cigarette consumption out of curiosity was the most common cause of enquiries received. In one child this led to moderate poisoning with repeated vomiting, pallor and severe stomach cramps. Alcohol intake in children was the cause of one severe and two moderate poisonings. The third most common agent in children was cannabis.

**Food and beverages:** 855 enquiries were received, mostly from the general public (Table 4). Most questions concerned foods which had gone off, meat, eggs, fish and seafoods.

Two food poisonings were severe. In one case consumption of a ready-made sauce where the expiry date was not clear led to botulinus poisoning. In the second case, more than 30 g of nutmeg were deliberately consumed and led to a substantial fall in the patient's blood pressure. Nutmeg is often misused for its hallucinogenic properties. Five of the 24 clinical reports involving food poisoning received last year concerned nutmeg. The individuals concerned felt ill, vomited and suffered from restlessness, shivering, rapid heartbeat and dry mouth. Nine incidents were reported of tuna fish poisonings. Apart from quite common food poisonings caused by fish and sea-

food with vomiting and diarrhoea, scombroid poisoning can also occur following consumption of tuna (less commonly mackerel, herring and sardines). Histidine is present in fish and is metabolised through bacterial activity to histamine which causes symptoms similar to allergies. Patients usually respond well to treatment with antihistamines.

**Agricultural and horticultural products:** 765 calls were registered in this agent group (Table 4). The toxicological potential of agricultural products varies greatly from only slightly toxic (e.g. liquid fertilisers) to some highly toxic pesticides.

Although 54% of cases reported involved children, none of them led to severe poisonings. In adults, four cases of severe poisonings were seen. One was an accident with silage gases, two self-poisonings with the insecticide carbosulfan and one suicide attempt with rat poison.



**(Poisonous) animals:** 434 incidents with mostly poisonous animals were registered (Table 4). Most of these concerned tick bites and bee, wasp or hornet stings.

A total of nine moderately severe and three severe cases was observed (Table 5), most of them caused by snake bites. Anaphylactic shock followed by thrombocytopenia as well as severe local necrotic symptoms, gastrointestinal problems, visual disturbances, shortness of breath, and difficulty swallowing were observed in severe cases of snake bite (spectacled cobra, sand viper, chinese tree viper). There was a coagulopathy following rattlesnake, bothrops as well as mexican mocassin snake bites. Accidents with indigenous vipers, *Vipera aspis* and *V. berus*, only led to painful local symptoms which were partly accompanied by nausea and dizziness. We would like to stress once more that snake bites should never be cut out since heavy, uncontrollable bleeding could occur as a consequence of coagulopathy. After a snake bite, the extremity concerned should be rested, tight fitting objects such as rings should be removed and the patient taken to the nearest hospital.

**Mushrooms:** Last year we received 346 enquiries following mushroom consumption (Table 4). Mushroom poisonings with repeated vomiting, nausea and diarrhoea occur mostly after the consumption of decayed edible mushrooms or unchecked mixed mushroom dishes. It is important to be able to exclude poisoning with amatoxin-containing mushrooms in the case of self-picked mixed mushrooms or to be able to recognise this swiftly. Waste should therefore always be kept.

Last year, regrettably, we had to record yet one more fatal and one severe case of poisoning with amatoxin-containing mushrooms. The people concerned added self-picked, unchecked mushrooms to a ready-made dish. We have another 46 well documented cases of mushroom poisonings (Table 5) of which four were severe and 15 moderately severe. Irrespective of the time of year hallucinogenic mushrooms continue to be very popular. Consumption of psilocybe and fly agaric, also known to be hallucinogenic, led to

one severe and five moderately severe cases of poisoning. A young male became psychotic following consumption of these hallucinogenic mushrooms. Another young male was unconscious for a short period of time and hallucinated heavily afterwards. Under the influence of these hallucinations and being highly excited, some patients can turn violent towards their surroundings or harm themselves. Flashbacks were also observed. The individuals concerned can suffer repeat hallucinations days or weeks afterwards.

**Veterinary drugs:** On 77 occasions the STIC was consulted after ingestion of a veterinary drug. Most of the 41 children involved had swallowed a veterinary drug by mistake. Mild symptoms were observed in only two cases. We recorded 36 cases in adults where again the veterinary drug was mostly taken by accident or because it had been confused with something else. Intramuscular injection of a veterinary narcotic led to one moderately severe case of poisoning.

**Others or unknown agents:** This group contained 633 exposures (Table 4). Apart from cases involving unknown agents (nearly 25% of all 633 cases) we have grouped together enquiries relating to various substances such as smoke inhalation, ammonia, carbon monoxide, mildew, plastics, contaminated water or self-defense sprays. We have also included individual enquiries relating to electrosmog, various infectious diseases or, for example, airbags.



No fatality occurred in this agent group (Table 5). Severe cases in adults were mostly caused by carbon monoxide which also caused the severe poisoning in one child. We recorded one unusual case where a child sprayed self-defense spray in its face and suffered corneal injuries. Nearly all incidents with self-defense sprays were accidental, mostly involving children. These sprays should therefore be kept out of the reach of children. Carbon monoxide and self-defense sprays were also responsible for several moderately severe cases including one case where water from water cannons led to second-degree burns since tear gas had been added to the water. Unfortunately the couple concerned continued to wear their wet clothes for several hours instead of removing their clothes as quickly as possible and taking a shower.

## Animal poisoning

### Animals involved

The 1075 calls received concerned the following animal species: 671 dogs, 221 cats, 49 horses/ponies, 26 beef cattle (4 of which were calves), 21 rabbits/hares, 15 guinea pigs, 13 birds, 7 donkeys, 6 chickens, 6 goats, 5 sheep, 4 mini-pigs, 2 fish, 2 ferrets, 2 geese, 2 rats, 2 tortoises, 2 chipmunks, 1 bee, 1 chinchilla, 1 gecko, 1 domestic pig, 1 llama, 1 salamander, 1 snake and 1 scorpion. The other cases related to several or unknown animal species.

### Agents involved

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

Table 6  
Agents involved in calls concerning animals

Agent groups	No. of cases	
Agricultural and horticultural products	328	30.5%
Plants	253	23.5%
Drugs	154	14.3%
Household products	141	13.1%
Veterinary drugs	48	4.7%
Technical and industrial products	43	4.0%
Food and beverages	27	2.5%
Poisonous animals	20	1.8%
Recreational drugs, alcohol	16	1.5%
Mushrooms	8	0.7%
Cosmetics and personal care products	3	0.3%
Others or unknown agents	34	3.1%
<b>Total</b>	<b>1 075</b>	<b>100%</b>

The calls primarily concerned agricultural and horticultural products (30.5%) followed by calls relating to plants (23.5%), drugs (14.3%), household products (13.1%), veterinary drugs (4.7%) as well as technical and industrial products (4%).

### Severity of poisonings

Veterinarians were also requested to submit clinical reports on animal poisoning. We received a total of 252 reports which could be analysed. Of those 87 cases remained without symptoms, 69 were classified as minor and 68 cases had moderate, severe or fatal outcomes (Table 7).

**Agricultural and horticultural products (including pesticides):** As in previous years this agent group was predominant with six fatal and 16 severe cases (Table 7). The death of two cattle and one dog was caused by insecticides, two dogs died after eating slug pellets containing metaldehyde. One further dog died after it had eaten rat poison containing coumarin. Severe poisonings also occurred in three

cats and two dogs who had eaten chloralose-containing rat poison and in a further three dogs after ingestion of methomyl-containing rat poison. Misuse of insecticides containing permethrin intended only for the use in dogs led to severe poisonings in four cats. We have received reports from neighbouring countries, the general public and state institutions pointing to the danger of fertilizers based on shredded castor beans which have been only insufficiently denaturised. This fertilizer contains the highly potent toxin ricin which has also been mentioned in connection with terrorist attacks during the past year. Dogs in particular like to eat this quite pleasant tasting fertiliser. Regrettably, fatal poisonings are therefore quite common.

Table 7  
Agent groups and severity of animal poisoning

Agent groups	Outcome					Total	
	N	Mi	Mo	S	F		
Agricultural and horticultural products	56	13	8	16	6	99	39.3%
Drugs	29	20	2	3	–	54	21.4%
Plants	11	7	3	1	3	25	9.9%
Household products	8	11	4	2	–	25	9.9%
Veterinary products	5	5	6	2	1	19	7.5%
Technical and industrial products	2	5	3	1	1	12	4.8%
Poisonous animals	–	2	1	2	1	6	2.4%
Food and beverages (except mushrooms and alcohol)	2	2	1	–	–	5	2.0%
Recreational drugs, alcohol	–	2	1	–	–	3	1.2%
Mushrooms	–	1	–	–	–	1	0.4%
Others or unknown agents	2	1	–	–	–	3	1.2%
<b>Total</b>	<b>115</b>	<b>69</b>	<b>29</b>	<b>27</b>	<b>12</b>	<b>252</b>	<b>100%</b>

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



**Drugs:** No fatal animal poisonings involving drugs were recorded this year. Moderately severe and severe poisonings occurred in four dogs with diclofenac- and mefenamic acid-containing painkillers.

**Plants:** Three of the 25 recorded animal poisonings with clinical reports ended in death. Gloriosa as well as meadow saffron (*Colchicum autumnale*) both contain the highly toxic cell poison colchicine in all of their organs. Gloriosa lily and broom (*Cytisus racemosus* which contains several chinolizidine alkaloids) were each responsible for a fatal poisoning in cats. Poinsettia (*Euphorbia pulcherrima*), a very common house plant especially around Christmas time, was never the cause of severe human poisonings amongst the cases reported to the STIC, in contrast to other kinds of euphorbia. However, this does not apply to animals. Last year a young dog died after eating the plant. A horse had to be slaughtered after it had access to european spindle tree (*Euonymus europaeus*) while at pasture. The horse developed severe colic and cramps. A dog vomited and was unconscious for a short period of time after eating just a few box leaves. Two cats suffered from repeated heavy vomiting. One of them had eaten leaves of a flamingo flower (*Anthurium lenicum*), the other of a tomato plant (*Lycopersicon esculentum*). Time and again we receive reports from the general public that domestic animals fell ill after nibbling at house and balcony plants. Many of these plants cause only minor symptoms in humans, but can lead to severe and life-threatening symptoms in animals. This is particularly true for all relatives of Arum family and Agave family.

**Veterinary drugs:** A cow died after ten times the recommended dose of a treatment for nematodes had been given. Permethrin can also be found amongst veterinary drugs and was confirmed as the cause for two severe poisonings in cats after they had been given collars to treat ectoparasites. These collars were only recommended for use in dogs.

**Technical and industrial products:** A flock of sheep kept for their milk was given too much copper with their feed over three months. This caused several deaths, the autopsy of one of these animals confirmed the presence of the poison in the body.

**Poisonous animals:** A horse had to be slaughtered after suffering about 400 bee stings. A dog survived a snake bite.

## ■ Other activities

### Services

We received financial compensation for the following services provided:

1. Expert statements with particular emphasis on unpublished experience of the STIC,
2. Anonymised case analysis in relation to specific toxins for the pharmaceutical industry,
3. Keeping a record of manufacturers' safety data sheets for urgent enquiries from Switzerland and abroad and
4. Distribution of printed material, in particular 10683 first aid guidelines.

The Swiss Federal Office of Public Health provided STIC with free access to its confidential product data bank in exchange for anonymised reports on all serious incidents involving agents covered by the Swiss poisons law.

At the request of the Swiss Olympic Sports Association the STIC provided a chargeable doping hotline for athletes which was called 362 times.

Use of the emergency telephone service remains free of charge. The same applies to information provided on our web site ([www.toxi.ch](http://www.toxi.ch)) which was visited 71669 times (compared to 40415 times in the previous year).

Regular consultations in clinical toxicology were performed at the University Hospital Zurich by STIC senior medical staff, especially in emergency and intensive care cases. This included weekly ward rounds in the Department of Internal Medicine together with staff from the Division of Clinical Pharmacology and Toxicology.

### Teaching and continuing education

The academic members of the STIC actively participate in the teaching and continuing education programme at the Division of Clinical Pharmacology and Toxicology of the University Hospital Zurich as part of our ongoing collaboration.

The experience of the STIC forms an important basis for the teaching of medical students in clinical toxicology, and of the University's environmental science students in environmental hygiene which is undertaken by the STIC's Chief Physician.

Senior medical staff of the STIC regularly contribute to the continuing education of physicians and members of other professional organisations in clinical pharmacology and toxicology. In 2002, the STIC was consulted 180 times by the media on current issues in human toxicology.

Three poster presentations showed the results of our research programmes at the annual congress of the European Association of Poison Centres and Clinical Toxicologists (EAPCCT) in Lisbon and one poster presentation was made to the annual meeting of the North American Congress of Clinical Toxicology (NACCT) in Palm Springs. The Chief Physician of the STIC was invited to lecture at several national and international workshops and congresses.



## Research projects

The main emphasis of our research efforts continues to be on the estimation of threshold doses for moderate and serious toxic effects. Specific research projects dealt with the pharmacoepidemiology of adverse drug reactions, 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 collaboration with the Division of Clinical Pharmacology and Toxicology at the University Hospital Zurich.

## Collaborations

In addition to closely collaborating with the Division of Clinical Pharmacology and Toxicology at the University Hospital Zurich, the STIC is a member of the Centre for Xenobiotic and Environmental Risk Research (XERR) at the Swiss Federal Institute of Technology and the University of Zurich. This cooperation not only increases the competence of STIC staff in general and specific issues in toxicology, but also provides the opportunity of redirecting theoretical enquiries to other experts.

Within the framework of the new national pharmacovigilance network and under the direction of the Zurich University Division of Clinical Pharmacology and Toxicology, a point of contact has been established at the STIC for observations concerning adverse drug reactions. 255 such reports were dealt with in the year 2002 and passed on to the Swiss Agency for therapeutic products (Swissmedic).

## ■ The Swiss Antidote 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, where the antidote is being used and its availability. In general antidotes are only included in the list if they do not belong to the standard range available at high-street and hospital pharmacies. The inclusion criteria stipulate that:

1. the substance is used as a classic antidote;
2. the substance used as an antidote is not commonly available in hospitals;
3. the quantity of the drug if administered as an antidote exceeds the quantity that is usually available in hospitals for therapeutic use;
4. the use of the drug as an antidote is not well known.

The Swiss List of Antidotes does not aim to be fully comprehensive, but wants to ensure the safe and rapid availability of the selected substances. The pharmacy in Wülflingen traditionally organises the distribution of the antidotes on the list.

**News 2002:** When the new drug law came into force in January 2002, the federal state took over the registration of antidotes from the cantons. This means that some antidotes approved by the cantons which are not yet fully registered have to gain approval as a drug by Swissmedic. A working party on antidotes is collaborating with Swissmedic; the products may continue to be used during a transitional period. It is to be expected that the procurement and distribution of antidotes will become more complex under the new law.

The use of Dantrolene was restricted to malignant hyperthermia caused by anaesthesia. Labetalol was removed from the list as high blood pressure caused by cocaine is now primarily treated with sedation and alpha blockers. CaNa<sub>2</sub>-EDTA is now supplied by a different manufacturer as the existing one ceased production. Prussian Blue (Antidotum Thallii-Heyl(r)) is now also being distributed as Radiogardase-Cs(r). Botulinus-Antitoxin is available in sufficient quantities.

Table 8

### The three categories of antidotes of the Swiss Antidote List

#### Basic supply available at high-street pharmacies:

activated charcoal, amyl nitrite, biperidene (tablets), calcium gluconate (hydrogel), simeticone (drops or tablets).

#### Basic supply available at hospital pharmacies:

atropine (1 ml), biperidene (ampoules), calcium gluconate (ampoules), colestyramine, dantrolene, ethanol, flumazenil, glucagon, magnesium, N-acetylcysteine (vials and powder), naloxone, sodium bicarbonate, sodium polystyrene sulfonate, neostigmine, phytomenadione (vit. K), pyridoxine (vit. B6).

**Additionally available at regional centres:** atropine (100ml), calcium-disodium-EDTA, desferrioxamine, digitalis antidote, dimethylaminophenol (4-DMAP), dimercaptopropane sulfonate (DMPS, Unithiol), dimercaptosuccinic acid (DMSA, Succimer), iron-(III)-hexacyanoferrate(II) (Prussian blue), fomepizole, glycine, hydroxycobalamine, methylene blue, sodium thiosulfate, obidoxime, phentolamine, physostigmine salicylate, silibinin.

Decontaminants and antidotes for radioactive materials are stored at the Cantonal Pharmacy in Zurich, and can be ordered by hospitals and other pharmacies when required. The STIC provides information on antidotes for snake bites (both domestic and exotic); Botulinus-Antitoxin is stored at the Swiss Army's pharmacy and can be obtained via STIC.

The Swiss List of Antidotes is updated annually by a special working party of the STIC 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 [www.toxi.ch/eng/welcome.html](http://www.toxi.ch/eng/welcome.html) (→ Antidote) or at [www.pharmavista.net/news/antidot/maind.htm](http://www.pharmavista.net/news/antidot/maind.htm) Members of the working party are M. Eggenberger (Berne), C. Fähr (Winterthur), S. Mühlebach (Aarau), Ch. Rauber-Lüthy (Zurich), A. Züst (Zurich) and H. Kupferschmidt (Chairman, Zurich).



## Focus: Advice given by the STIC – its value in the eyes of the treating physicians

The Swiss Toxicological Information Centre (STIC) carried out a survey of all enquiring physicians who had received telephone advice between 20 January and 6 March 2002. The aim of this survey was to ascertain levels of satisfaction with the information service, highlight any differences in the language regions of Switzerland and to establish how beneficial the advice given proved to be for the enquiring physician.

A total of 786 questionnaires were distributed. The overall reply rate was 79% (620 questionnaires), however fewer replies were received from the French and Italian speaking parts of Switzerland compared to German speaking regions. 76% of the questionnaires were completed by hospital physicians (mostly junior house officers, 64%), 18% by general practitioners and 6% by veterinarians.

75% judged the time spent to research the question to be short, 21% said it was acceptable. Friendliness of service was rated as excellent (good) in 91% (8%) of all replies received; practical relevance was scored with 69% excellent, 23% good and clinical competence with 67% excellent, and 28% good.

62% were very satisfied with the verbal advice given, 36% satisfied. There was only a slight difference between French and German speaking cantons (very satisfied German 63%, French 58%; satisfied German 35%, French 41%). However, 29% of physicians from the French-speaking cantons mentioned language problems, which was not the case for physicians from the German-speaking cantons (1%).

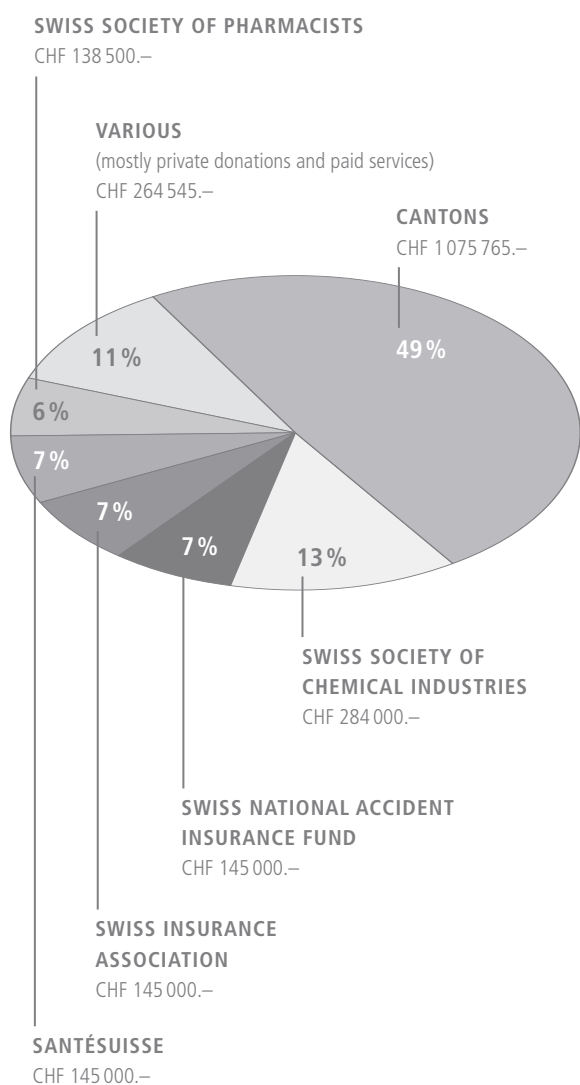
57% were very satisfied with the written report, 41% satisfied. 95% of the physicians who replied believed that the advice given by the STIC had a positive influence on the patient's treatment. 87% of all physicians had previously called the STIC on more than one occasion, and all (100%) would again seek the STIC's advice in similar situations. Phy-

sicians requested repeatedly that the electronic information available on the Internet is expanded and that a written report be received even faster. However, the continuation of a personal advice service on the phone was explicitly requested. We conclude that the STIC provides a valuable service to the physicians in a satisfactory manner, however, there is still room for improvement in individual areas.

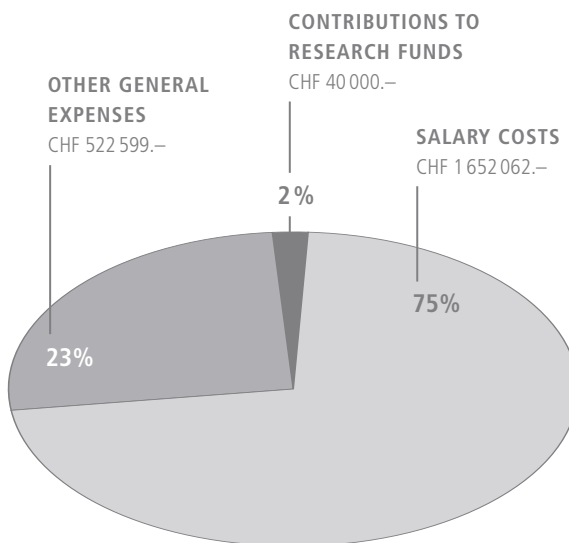


## Income and expenditure

### Income CHF 2 197 810.–



### Expenditure CHF 2 214 661.–





## Donations

Galenica AG	15 000	AstraZeneca AG	1 000
Sunrise TDC Switzerland AG (internet server hosting)	14 000	Biomed AG	1 000
Migros culture commitment	10 000	Ciba Specialty Chemicals Inc.	1 000
City of Zurich	10 000	Düring AG	1 000
Federation of the Swiss Veterinary Surgeons	8 000	Ecolab AG	1 000
Karl Mayer-Foundation	5 000	Helsana Insurances	1 000
Nestlé Switzerland AG	5 000	Jansen AG	1 000
Association of Swiss Varnish and Paint Manufacturers	3 000	Martec Handels AG	1 000
Colgate-Palmolive AG	3 000	Omya AG	1 000
F. Hoffmann-La Roche AG	3 000	Orgamol SA	1 000
Henkel & Cie AG	3 000	Pfizer AG	1 000
Lever Fabergé AG	3 000	Robapharm AG	1 000
Pomcany's Marketing AG	3 000	Sanitized AG	1 000
Procter & Gamble AG	3 000	Schindler Management AG	1 000
Swiss Life	3 000	Spirig Pharma AG	1 000
Association of the Swiss Cosmetic Industry	2 000	Staerkle & Nagler AG	1 000
Ernst Göhner-Foundation	2 000	Streuli G. & Co. AG	1 000
Reckitt Benckiser (Switzerland) AG	2 000	Swiss International Air Lines	1 000
Swiss Society of Druggists	2 000	Victorinox AG	1 000
Voigt AG	2 000		
Ebi-Pharm AG	1 500		
Swiss Petroleum Industry Association	1 500		
Unione Pharmaceutica SA	1 500		
3M (Switzerland) AG	1 000		
Association of Swiss Soap and Detergent Industry	1 000		

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

## Publications

	Order number	
<b>Errors in drug-therapy reported to a national poisons information centre</b> (Abstract). Curjuric I., Guirguis M., Kupferschmidt H., Meier-Abt PJ. <i>Journal of Toxicology – Clinical Toxicology</i> 40, 292, 2002.	1-02	<p>The publications listed above may be ordered quoting the relevant order numbers via telephone (+41 1 634 10 20), fax (+41 1 252 88 33), or by e-mail to <a href="mailto:info@toxi.ch">info@toxi.ch</a>.</p> <p>In addition, the revised leaflet about first aid and poisoning prevention is available as well as emergency telephone number stickers in German, French and Italian. Dissertations are only available on loan.</p> <p>If you require several documents, please order by mail, enclosing stamps to the value CHF 4.50 per document, or the equivalent in international reply coupons.</p>
<b>Akute Intoxikationen mit Ecstasy: Eine retrospektive Fallanalyse aus dem Schweizerischen Toxikologischen Informationszentrum.</b> Enderlin V. E. Dissertation Universität Zürich, 2002, 85 S.	2-02	
<b>Antidote bei Vergiftungen.</b> Fäh C., Rauber-Lüthy Ch., Mühlebach S., Hasler Chr., Eggenberger M., Kupferschmidt H. <i>Bulletin Bundesamt für Gesundheit</i> 4, 44–50, 2002.	3-02	
<b>Interaktionen von Phytopharmaka, Nahrungs- und Genussmitteln mit Medikamenten.</b> Fattinger K., Meier-Abt A. <i>Therapeutische Umschau</i> 59, 292–300, 2002.	4-02	
<b>Health care cost effects of public use of a national poison information centre</b> (Abstract). Fehr M., Kupferschmidt H. <i>Journal of Toxicology – Clinical Toxicology</i> 40, 294–295, 2002.	5-02	
<b>Has flumazenil an antagonistic effect in GHB-induced CNS depression?</b> (Abstract). Grob U., Schiltknecht M., Rentsch K., Kupferschmidt H. <i>Journal of Toxicology – Clinical Toxicology</i> 40, 615–616, 2002.	6-02	
<b>Acute toxicity of oral methylphenidate (MP) overdose in Switzerland</b> (Abstract). Koller M., Schnorf-Huber S., Kupferschmidt H., Meier-Abt PJ. <i>Journal of Toxicology – Clinical Toxicology</i> 40, 276, 2002.	7-02	
<b>Antidotliste 2002.</b> Kupferschmidt H. <i>Schweizerische Ärztezeitung</i> 83 (10): 485–486, 2002.	8-02	
<b>Erstversorgung bei Vergiftungen: Vergiftungsbedingtes Koma.</b> Kupferschmidt H. <i>Schweizerische Rundschau für Medizin (PRAXIS)</i> 91, 1443–1444, 2002.	9-02	



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