

SURVEY OF TOXICOLOGICAL ANALYSES
PERFORMED AT THE INSTITUTE OF
FORENSIC MEDICINE IN LJUBLJANA
FROM 1946-1969

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(Received for publication November 17, 1970)

This is a brief report on the work of the Department of Toxicology at the Institute for Forensic Medicine in Ljubljana from the foundation of the Institute in 1946 until the end of 1969. The report includes figures and tables of analyses performed for clinical purposes for hospitals and clinics, when poisonings were not fatal, and of the analyses of tissues and body fluids received from autopsies. Since our toxicological laboratory performs chemical analyses for all the republic of Slovenia, the performed analyses indicate which poisons were most frequently used during these 23 years in Slovenia and how the frequency of their usage varied with time.

The Department of Toxicology at the Institute of Forensic Medicine in Ljubljana performs toxicological examinations for all Slovenia since its foundation in 1946. Its primary activity are toxicological analyses of body fluids and tissues, taken at autopsies upon request of law courts or hospitals. The samples for these examinations are collected by autopsy examiners from our Institute in Ljubljana or by examiners of the Celje and Maribor hospitals. Moreover, all toxicological examination for clinical purposes are performed in our laboratory. Very frequent are also analyses of animal tissues, required by various veterinary institutions, hunting and fishing associations and others. Also, it is not rare that the material, suspect of being poisoned, is brought for analysis by private persons.

For a number of years the Department of Toxicology has also performed examinations for the Occupational Diseases Unit. Recently, its activities have included also doping control at various sports championships.

From 1946 until the end of 1969 the Department completed 4000 examinations.

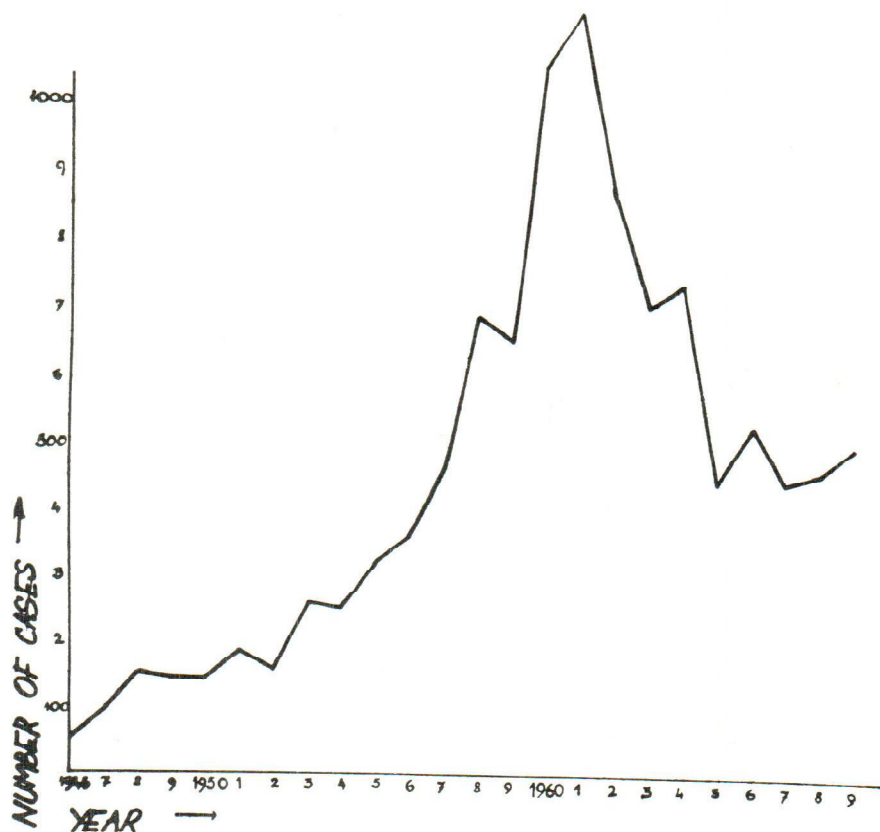


Fig. 1. *The total number of toxicological analyses*

The steep rise of the curve until 1961 is due to the fact that until that time numerous analyses for the Occupational Diseases Unit were done by our Institute, for only then the Unit founded its own toxicological laboratory.

The pronounced drop in the number of examinations following the year 1964 is to be ascribed above all to economic reasons. When the cause of death is evident, the concerned institutions (law courts, hospitals) often omit toxicological examinations.

Analyses of the samples taken at autopsies on suspicion of poisoning, are surveyed in Fig. 2.

In our opinion, the difference between the total number of analyses and the analyses in which the poisoning resulting in death was proven, is due mainly to different criteria of district attorneys who order toxic-

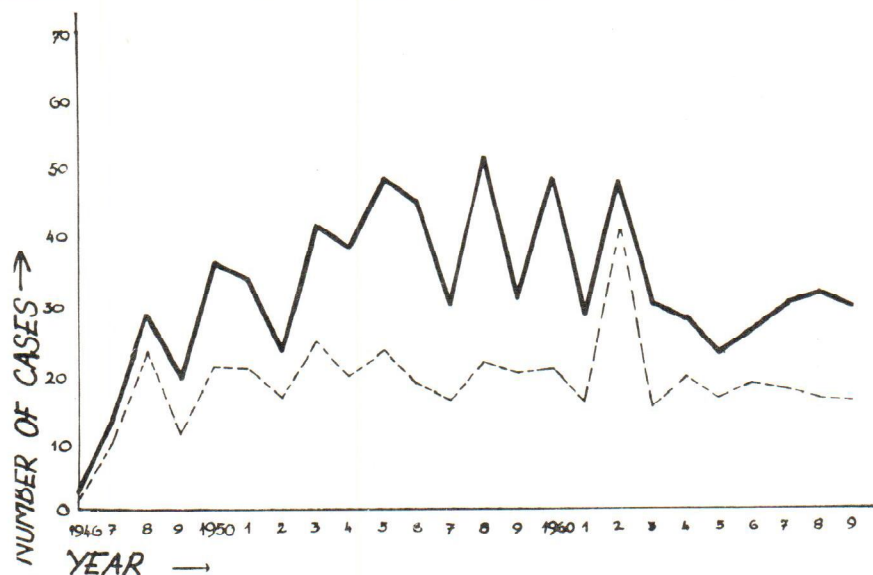


Fig. 2. Toxicological analyses of samples taken at autopsy. Full line – the total number of analyses, dotted line – the number of analyses, when poisoning was cause of death

ological examinations in suspect cases. Sometimes, however, the decision whether or not a toxicological analysis is to be performed is left to the judgement and caution of the autopsy examiner.

The analyses of the samples taken at clinics and hospitals are shown in Fig. 3.

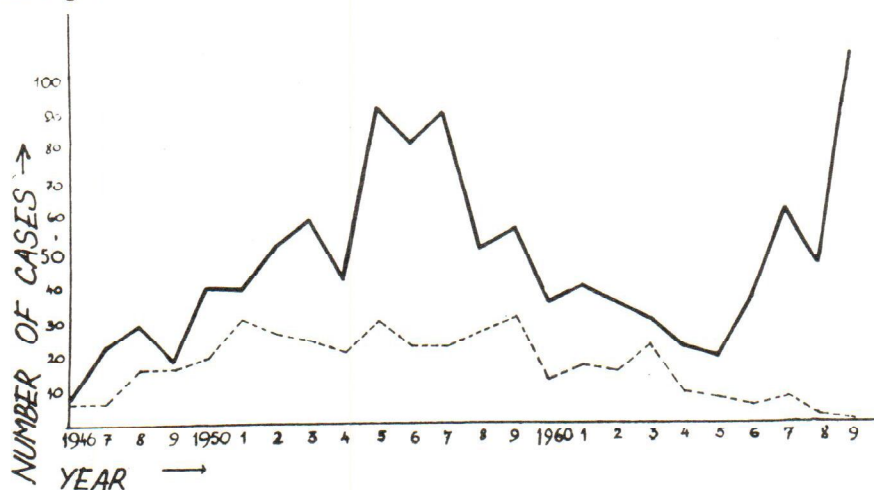


Fig. 3. Analyses of samples taken from hospitalized patients. Full line – the total number of analyses. Dotted line – the number of analyses which did not prove poisoning

Normally, in patients blood, urine and the contents of the stomach were analysed, and less frequently hair and nails. The number of cases in which poisoning could not be proved is rather high as the samples for toxicological examinations are often taken and analysed for the security.

The analysis in cases of poisoning with a single poison are surveyed in Figs. 4-8.

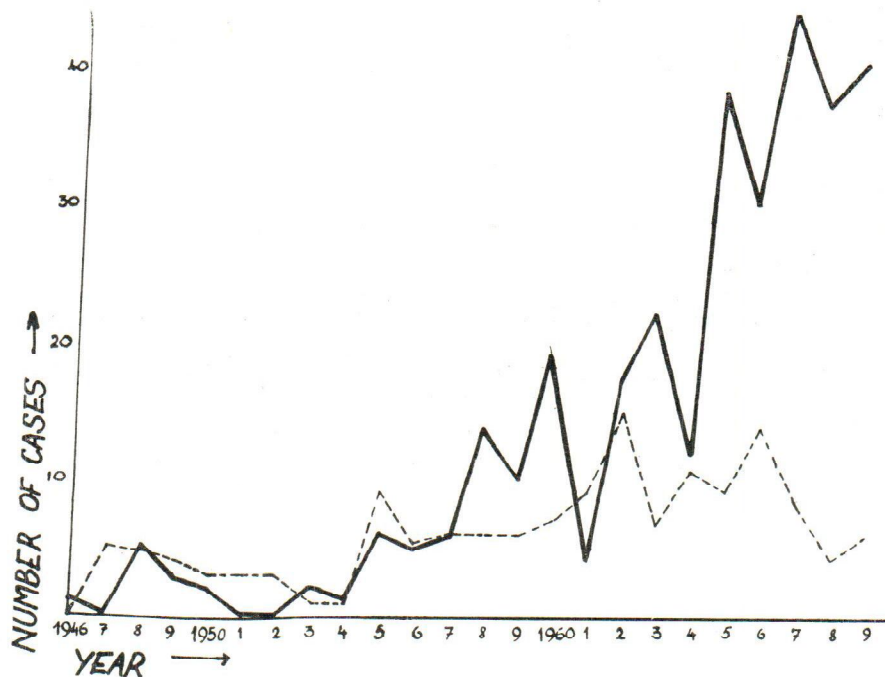


Fig. 4. Analyses for carbon monoxide. Full line - the number of analyses in samples taken from patients who survived. Dotted line - the number of analyses in samples taken from patients who died

Analyses for carbon monoxide were the most frequent. This type of poisoning is steadily increasing.

In fatal poisonings with barbiturates a frequent cause of death was found to be a combined effect of barbiturates and alcohol, or death occurred as a consequence of poisoning due to aspiration pneumonia or hypothermia.

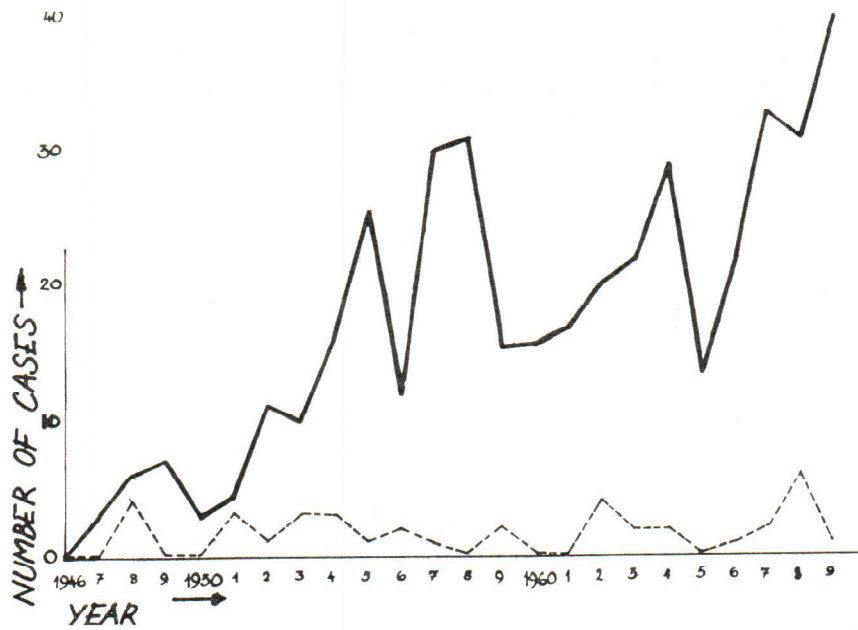


Fig. 5. Analyses for barbiturates. Full line – the number of analyses in samples taken from patients who survived. Dotted line – the number of analyses in samples taken from patients who died

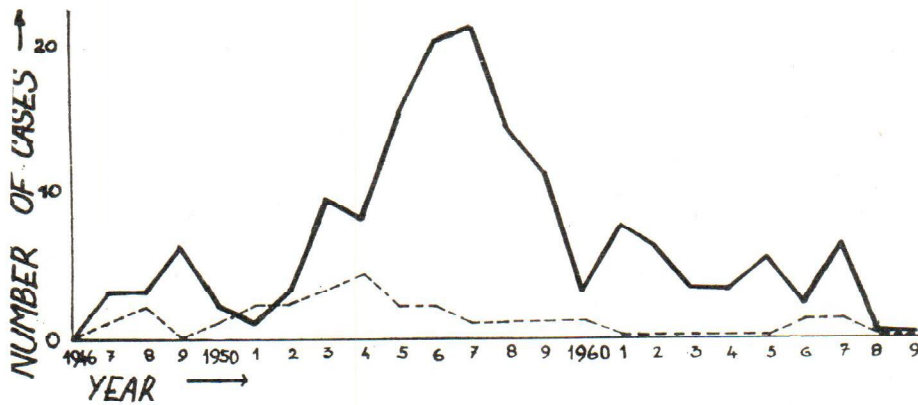


Fig. 6. Analyses for lysol. Full line – the number of analyses in samples taken from patients who survived. Dotted line – the number of analyses in samples taken from patients who died

Lysol, which used to be the most frequently employed poison in suicides, is nowadays used only rarely. This is easily explained by the fact that lysol – as a disinfectant – has been substituted by other, more effective and less toxic compounds.

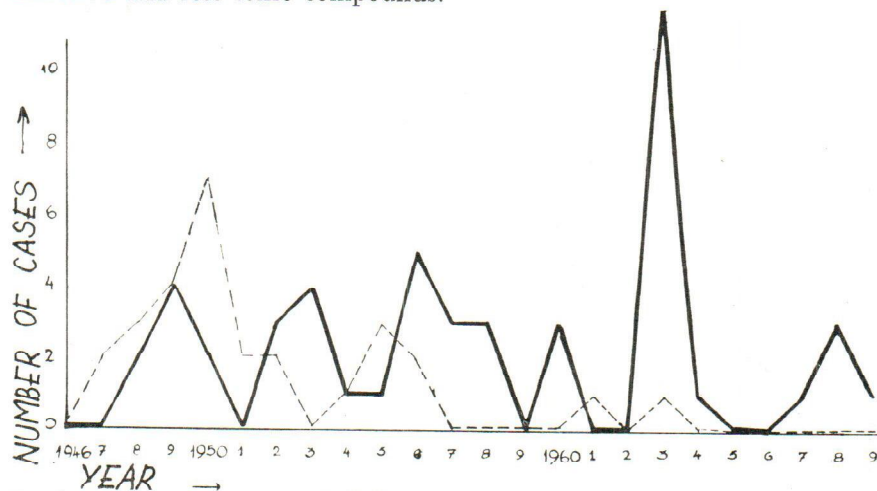


Fig. 7. Analyses for arsenic. Full line – the number of analyses in samples taken from patients who survived. Dotted line – the number of analyses in samples taken from patients who died

Early after the war arsenic used to be quite a common cause of death by poisoning. In 1963, however, the number of arsenic poisonings increased notably, owing to the careless and negligent storing of arsenic pesticide in a baker's shop. A number of persons consumed poison with bread bought in this bakery, but none of these poisonings was fatal.

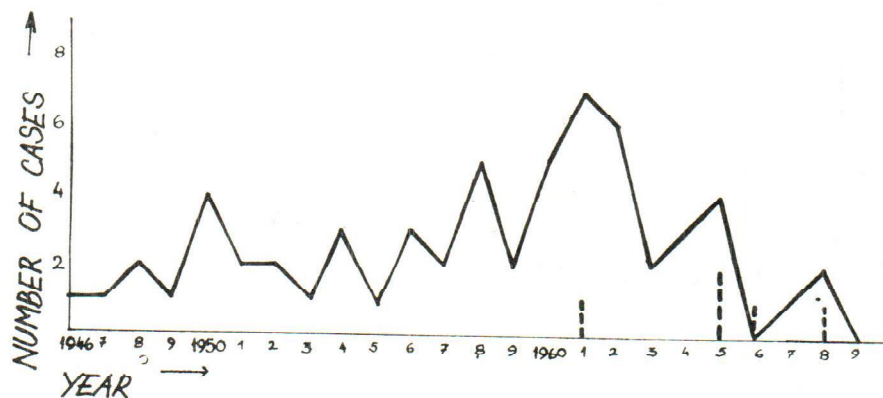


Fig. 8. Analyses for cyanide or hydrocyanic acid. Full line – the number of analyses in samples taken from patients who died. Dotted bars – the number of analyses in samples taken from patients who survived

Table 1
*Number of analyses for poisons other than carbon monoxide, barbiturates, lysol,
 arsenic and cyanide*

Year/ poison	acids		alcalies		Hg		pesti- cides		alcaloids		other pharma- ceutical agents		methyl alcohol		ethyl alcohol		other poisons	
	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D
1946-1950	2	1	1	2	1	1	1	0	6	3	0	0	0	0	3	10	6	3
1951-1955	2	2	4	1	8	1	2	7	28	10	3	1	0	4	26	8	7	
1956-1960	13	0	23	0	0	0	21	5	38	1	30	5	0	2	30	17	8	
1961-1965	7	2	4	1	7	0	25	2	31	3	15	3	1	1	24	12	5	
1966-1969	1	0	0	0	8	1	14	2	18	3	10	3	0	4	28	16	1	

C = survived

D = died

Until 1962 the most important source of poisoning with cyanides were ampules with hydrocyanic acid used by hunters to kill animals, but most often having children for victims. In Slovenia their use was forbidden by law that year. Later, poisonings were caused by potassium or sodium cyanides. In Fig. 8 the vertical lines on the abscissa represent five cases of recovery after the poisoning with cyanides, immediately treated with kelocyanor.

The number of analyses in which other poisons were determined is shown in Table 1.

Among alkaloids atropine, strychnine, morphine, quinine and aconitine were the most frequent causes of poisoning.

In the column of »other pharmaceutical agents«, which are not specified, most cases of poisoning are due to the derivatives of phenothiazine, atarax, diazepamum and meprobamate.

There were surprisingly few cases of poisoning with pesticides, and even among these few the most frequently detected agent was zinc phosphide.

In dealing with ethanol intoxications, we left out the clinical cases of poisoning, for owing to the lack of data it would be difficult to separate the analyses made only because of the acute ethanol poisoning from approximately 5000 other analyses for alcohol that our Institute performs yearly.

We believe that the main reason why a certain number of cases does not reach our Institute lies in the difficulties the responsible regional institutions have to cope with. We are convinced that toxicological problems deserve a more careful consideration.

The second reason for the negligence concerning the toxicological work, may be the shortage of qualified persons. Unfortunately, the lack of understanding for the importance of this work is something we come across very often.

*Sažetak*PREGLED TOKSIKOLOŠKIH ANALIZA IZVRŠENIH U INSTITUTU
ZA SUDSKU MEDICINU U LJUBLJANI OD 1946. DO 1969. GODINE

Prikazan je rad Toksikološkog odjeljenja Instituta za sudsku medicinu u Ljubljani od osnivanja 1946. godine do kraja 1969. godine. U tablicama su prikazane analize, pravljene za bolnice i ambulante u preživjelih otrovanih osoba za kliničke svrhe, i analize organa i tekućina umrlih i obduciranih otrovanih osoba. Budući da toksikološki laboratorij Instituta za sudsku medicinu radi sve toksikokemijske analize za čitav teritorij Slovenije, načinjene analize daju uvid u otrove koji su najčešći uzrok otrovanja u 23 godine u našoj republici, i kako se učestalost upotrebe pojedinih otrova mijenjala u toku godina.

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Primljeno 17. XI 1970.