Poisoning in Israel: Annual Report of the Israel Poison Information Center, 2012

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ABSTRACT: **Background:** The Israel National Poison Information Center (IPIC), Rambam Health Care Campus, provides 24 hour telephone consultations in clinical toxicology as well as drug and teratogen information. It participates in research, teaching and regulatory activities, and also provides laboratory services.
Objectives: To report data on the epidemiology of poisonings and poison exposures in Israel.
Methods: We made computerized queries and descriptive analyses of the medical records database of the IPIC during 2012.
Results: A total of 31,519 poison exposure cases were recorded, a 157.6% increase compared with 1995. Children < 6 years of age were involved in 43.1% of cases; 74.0% of calls were made by the public and 23.7% by physicians; 74.8% of exposures were unintentional and 9.1% intentional. Chemicals were involved in 35.8% of all cases (single and multiple substances), pharmaceuticals in 48.8%, bites and stings in 3.8%, and plants and mushrooms in 1.6%. Substances most frequently involved were analgesics, cleaning products and antimicrobials. Clinical severity was moderate/major in 3.4%. Substances most frequently involved in moderate/major exposures were corrosives, insecticides and snake venom. Four fatalities were recorded; all were intentional exposures in adults (corrosive, medications, energy drink).
Conclusions: Poison exposures and poisonings have increased significantly and have contributed substantially to morbidity and mortality in Israel. The IPIC database is a valuable national resource for the collection and monitoring of poisoning exposure cases. It can be used as a real-time surveillance system for the benefit of public health. It is recommended that reporting to the IPIC become mandatory and its activities be adequately supported by national resources.

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One of the results of the enormous industrialization and technological advancement that began in the early 20th century is the exponential growth in the number of chemicals introduced into the environment, workplace and home. Among these chemicals are medications, complementary medicine products, cleaning substances, pesticides, fertilizers, petroleum distillates, intermediates in chemical processes, and drugs of abuse [1]. The wide availability of chemicals and medications has led to increased exposure of humans and animals to potential poisons. An unavoidable effect has been the increase in the number of poisonings, which have become the third cause of injury-related fatalities [1]. While these processes are paralleled by a continuous updating of the information on poisons and poisonings, several problems have yet to be solved: there is still insufficient awareness of the potential hazards of poisons, physicians are generally not adequately trained in clinical toxicology, and keeping pace with the increasing amount of information is not always possible.

Starting in the 1950s, poison information centers were established worldwide to improve patient care (the first in Chicago in 1953) [1,2]. Their initial objective was to provide product information to health care professionals. The same objective was the rationale for the decision of the Israel Ministry of Health to set up the Israel Poison Information Center (IPIC) at Rambam Hospital in 1964. The current concept of poison centers and of the IPIC includes additional objectives such as advice on both first aid and triage in cases of poisonings in the community, consulting health care providers on the rational management of the poisoned patient, avoiding unnecessary referrals to health care facilities and hospitalizations, teaching clinical toxicology to health care providers, collecting epidemiologic data on incidence, severity and trends of poisoning, and providing information on how to prevent poisonings. Like other poison centers worldwide, the IPIC provides telephone consultations in clinical toxicology to the general public and health care professionals 24 hours a day, as well as bedside consultations to the Rambam Health Care Campus. Other types of clinical consultations provided by the IPIC include drug information and assessment of the effects of drugs, chemicals, toxins and radiation on pregnancy and lactation.

An integral part of the IPIC is its Clinical Toxicology and Pharmacology Laboratory, which performs a variety of toxicological tests, therapeutic drug monitoring and occupational biomonitoring assays.

The IPIC clinical staff teaches clinical toxicology to health care professionals and is involved in research, updating of the commercial products database, as well as national prevention and regulatory activities. It also plays an important role in national preparedness (e.g., for multi-casualty toxicological incidents). The clinical staff includes physicians, most of whom are board-certified in Internal Medicine, Pediatrics and Clinical Pharmacology. The entire staff has received additional training in Clinical Toxicology. The physicians do daily on-duty and on-call shifts. This is unlike the situation in North America where first-line responders are poison information specialists (nurses or pharmacists) while trained clinical toxicologists (physicians) are engaged in bedside medicine and serve mainly as backup [3]. Information sources used by the IPIC include various computerized databases, textbooks and journals. Two types of computerized databases are used: The first includes toxicological medical records and commercial products. These are designated tailored databases, characterized, maintained and updated by the IPIC team. They facilitate quick searches and serve as powerful epidemiologic tools with a unique perspective. The second consists of toxicological information sources based on poison monographs (e.g., Micromedex Healthcare Series and RightAnswer, formerly Chemknowledge) and text-based search and retrieval (e.g., Toxnet). The IPIC is the national poison center of Israel and the only one providing 24 hour consultations to both the health care system and the general public.

The American Association of Poison Control Centers publishes annual reports of poisonings and poison exposures [3]. This U.S. national database provides clinical information on a variety of poison exposures, stimulates research, and is cited in numerous articles. Similar reports from Israel were published in 1981 and 2008 [4,5].

The objective of this report is to provide data on the epidemiology of poison exposures in Israel. Periodic reports of this kind are required for characterization of poisonings, understanding trends, stimulation of research, and are essential for national decision making.

PATIENTS AND METHODS

This report analyzes the data of all calls made to the IPIC and the clinical toxicological consultations provided during the year 2012. The IPIC serves the entire population of Israel, which numbers 7,984,500. It is the only poison center in Israel that serves both the general public and health care facilities 24 hours a day. Reporting to the IPIC is passive and not mandatory. Case records in this database (as in other national poison centers [3,6]) are from self-reported calls: they reflect information provided when the public or health care professionals report an actual or potential exposure.

The process of consultation includes assessment of the patient's condition and of the exposure, advice on first aid, survey of data, triage recommendation (referral to emergency department or community physician), and management recommendations (evaluation, treatment, follow-up). Since poisoning is a medical emergency, time is of the essence and the consultation should be concise and fast while at the same time comprehensive. The main aim in the clinical toxicological consultation process is to provide practical knowledge, not information. Thus, the consultation is tailored to the patient, not to the substance.

Quality control of the clinical consultations is achieved by periodic reporting to the on-call physician during shifts, case conferences in which the previous day's activities are evaluated and discussed, establishing and updating management protocols, academic activities, and auditing the toxicological medical records.

All consultation data are recorded in a comprehensive structured form ("medical toxicological record") that includes caller and patient demographic details, substance/s involved, route, site and circumstances of exposure, time elapsed until consultation, clinical manifestations in a system-oriented approach, evaluation (including laboratory confirmation of exposure whenever possible), management, and follow-up recommendations. Follow-up is performed for moderate to severely poisoned patients, and whenever possible. The clinical severity of each case is graded as minor (minimally bothersome, self-limited), moderate (systemic, more pronounced and prolonged than minor manifestations but not life-threatening), major (life-threatening manifestations, significant disability or disfigurement), death, unknown or not applicable, according to previously published criteria [3,7]. The severity grading reflects the patient's condition at the time of consultation and may not represent peak effect or later deterioration. In addition, each case is classified into one of six main categories: chemicals, pharmaceuticals, biologicals (poisonous plants and venomous animals), miscellaneous, (foreign body, batteries, radiation, thermometers, electrical injury), disease (poison exposures eventually diagnosed as unrelated disease), and "general information." Each case is then further classified according to a previously prepared list of classifications and sub-classifications available at the IPIC.

Subsequently, all data are entered and stored in a designated tailored database using Access 2007 (Microsoft Corporation, USA) on SQL server. All records are subjected to routine quality control.

In order to obtain the epidemiological characteristics of poison exposures and poisonings for the year 2012, computerized queries were made using the various fields of the toxicological medical record. The demographic and clinical characteristics retrieved included identification of caller title and health care facility, age and gender of the patient, time elapsed between exposure and call to the IPIC, route, site and circumstances (unintentional, intentional) of exposure, agents involved,

severity of poisoning, and management recommendations. Data were subjected to descriptive analysis. The method of data collection and evaluation of IPIC consultations was previously published [8-13]. Comparisons with IPIC data prior to 2012 and with the 2011 data of the American Association of Poison Control Centers [3] were made whenever possible or relevant.

RESULTS

The IPIC recorded 31,519 poison exposure cases during 2012. Table 1 shows the growth in the number of poison exposure cases reported to the IPIC in relation to the growth of the Israeli population since 1995. Table 2 shows the clinical severity of poison exposures according to age groups. Table 3 shows the agents most frequently involved in exposures with moderate to major clinical severity. The most frequent exposures with moderate/major severity in children under 6 years were to corrosives (n=21), hydrocarbons (n=9), topical preparations (n=6), analgesics (n=5) and cleaning products (n=5). Table 4 shows a summary of single poison exposure cases by IPIC categories, classifications and sub-classifications.

Table 5 (see online) illustrates the various callers and sites of exposure. The majority of calls (74.0%) came from the public, and the most common site of exposure was the home. The percentage of calls from hospital physicians decreased by 15.6% and those of community physicians increased by 18.6% compared with 1997. In the United States, 18.8% calls came from health care facilities [3] compared to 24.7% in Israel. Eighteen calls were made by veterinarians.

Table 6 (see online) presents the age and gender distribution. Children and adolescents under 18 years old accounted for 53.2% of cases; 39.3% involved adults. More cases involved females (49.2%) than males (41.7%); gender was unknown in 9.1%.

The time that elapsed from exposure to the call was less than one hour in 16,729 (53.8%), 1–2 hours in 2103 (6.7%), 2–8 hours in 3286 (10.4%), 8–24 hours in 2030 (6.4%), more than 24 hours in 947 (3.0%), and unknown or not relevant (e.g., inquiries on drug information or general information) in 6424 (20.4%) cases.

Table 1. Annual number of poison exposure cases reported to the IPIC

Year	Population served*	Poison exposures reported	Exposures per thousand population	Exposures per thousand population, USA [3]
1995	5,619,000	12,235	2.2	9.3
1996	5,759,400	16,695	2.9	9.3
1997	5,900,000	14,792	2.5	8.8
1998	6,041,400	15,712	2.6	8.7
1999	6,209,100	15,729	2.5	8.4
2000	6,369,300	16,687	2.6	8.0
2001	6,508,800	17,035	2.6	8.1
2002	6,631,100	18,775	2.8	8.2
2003	6,748,400	19,582	2.9	8.1
2004	6,869,500	22,602	3.3	8.3
2005	6,990,700	24,605	3.5	8.2
2006	7,116,700	24,218	3.4	8.0
2007	7,242,200	26,738	3.7	8.1
2008	7,412,200	28,198	3.8	8.1
2009	7,552,000	29,042	3.8	8.0
2010	7,695,100	26,981	3.5	7.6
2011	7,836,600	30,137	3.8	7.4
2012	7,984,500	31,519	3.9	7.2

*According to the data of the Central Bureau of Statistics, Israel http://www.cbs.gov.il/publications13/yarhon1013/pdf/b1.pdf; accessed November 27, 2013

Table 2. Distribution of the clinical severity of poison exposure cases according to age groups

Severity	< 6 years n (% of age group)	6–12 years n (% of age group)	13–17 years n (% of age group)	≥ 18 years n (% of age group)	Unknown age n (% of unknown age)	Total n (% of total)
No effect	10,580 (77.9)	1013 (56.5)	475 (37.8)	3793 (33.3)	1403 (40.3)	17,264 (54.8)
Minor	2401 (17.7)	642 (35.8)	620 (49.3)	4606 (40.4)	645 (18.5)	8914 (28.3)
Moderate	112 (0.8)	40 (2.2)	77 (6.1)	538 (4.7)	86 (2.5)	853 (2.7)
Major	14 (0.1)	9 (0.5)	13 (1.0)	153 (1.3)	27 (0.8)	216 (0.7)
Death	0	0	0	4 (0.03)	0	4 (0.01)
Unknown	481 (3.5)	89 (5.0)	72 (5.7)	2303 (20.2)	1323 (38.0)	4268 (13.5)

Table 3. Substances most frequently involved in single poison exposures with moderate/major clinical severity*

Substance	n	Most frequent agent	n
Corrosives	67	Alkali	31
Insecticides	63	Organophosphates	28
Snake venom	62	*Vipera palaestinae*	54
Drugs of abuse	54	Opioids	15
Alcohols	46	Ethanol	40
Analgesics	44	Acetaminophen	19
Gases	42	Irritant gases	22
Sedatives/Hypnotics	36	Benzodiazepines	32
Anticonvulsants	30	Carbamazepine	10
Scorpion venom	27	*Leiurus quinquestriatus*	27
Neuroleptics	22	Atypical neuroleptics	10
Antidepressants	19	Lithium	7
Hydrocarbons	18	Petroleum distillates Organic solvents	9 5
Spider venom	18	*Loxosceles*	10
Cardiovascular drugs	15	Digoxin	9
Mushrooms	11	Unknown	3
Plants	11	Anticholinergic	3

*Exposure to multiple pharmaceuticals occurred in an additional 213 moderate/major cases

Table 4. Summary of poison exposure cases by IPIC categories, classifications and sub-classification
The numbers refer to exposures to a single agent. The actual number of exposures in each category classification or sub-classification might be higher because of additional multiple exposures

Table 4A. CHEMICALS

Adhesives	**261**
Contact glue	73
Cyanoacrylate	83
White glue	37
Other/unknown	68
Alcohols	**338**
Ethanol	296
Ethylene glycol	8
Isopropanol	1
Methanol	3
Other/unknown	30
Aldehydes	**12**
Formaldehyde	11
Other/unknown	1
Arts & office supplies	**472**
Correction fluid	43
Crayons	39
Ink	215
Plasticine	29
Other/unknown	146
Asbestos	**3**
Bleaches (e.g., hypochlorite)	**838**
Cleaning products	**1900**
Deodorizers	158
Detergents	1,459
Waxes	6
Other/unknown	277
Corrosives	**932**
Acid	286
Alkali	436
Hydrofluoric acid	4
Phenol	5
Other/unknown	214
Cyanide	**0**
Essential oils	**284**
Fertilizers and growth regulators	**34**
Fungicides	**4**
Gases	**672**
Asphyxiants	62
Carbon monoxide	10
Freons	13
Hydrogen sulfide	9
Irritants	463
Smoke	77
Other/unknown	38

Herbicides	**69**
Carbamates	3
Glyphosate	34
Paraquat	12
Other/unknown	20
Hydrocarbons	**732**
Halogenated hydrocarbons	2
Paints, solvent-based	63
Petroleum distillates	252
Solvents	264
Other/unknown	151
Insecticides	**973**
Carbamates	53
Methyl bromide	11
Mixed insecticides	127
Organochlorines	13
Organophosphates	157
Pyrethrins	343
Other/unknown	269
Metals	**84**
Lead	14
Mercury	16
Metal fume fever	6
Other/unknown	48
Miscellaneous	**1910**
Aquarium products	20
Cigarettes	52
Fire extinguishers	49
Insect repellents	116
Paints, water-based	73
Silica gel	526
Light stick	413
Other/unknown	661
Multiple chemicals	178
Personal care products	**1033**
Cosmetics	164
Perfumes and colognes	101
Soaps	195
Other/unknown	563
Pesticides, other	3
Rodenticides	154
Anticoagulants	134
Phosphides	4
Other/unknown	16
Scale removers	551
Unknown	139
Total chemicals: 11,580 (36.7%)	

Table 4B. PHARMACEUTICALS

Analgesics	**2934**
Acetaminophen	1220
Aspirin	68
Dipyrone	222
Ibuprofen	844
Mixed analgesics	106
NSAIDs	265
Opioids	133
Tramadol	11
Other/unknown	66
Anesthetics	**64**
General	18
Local	48
Other/unknown	3
Anticholinergics	**125**
Atropine	88
Other/unknown	37
Anticoagulants	**44**
Heparin	5
Warfarin	25
Other/unknown	14
Anticonvulsants	**282**
Barbiturates	7
Carbamazepine	63
Lamotrigine	40
Phenytoin	40
Valproic acid	76
Other/unknown	56
Antidepressants	**406**
Cyclic	52
Lithium	35
MAO inhibitors	1
SSRIs & SNRIs	288
Other/unknown	30
Antihistamines	**389**
Astemizole/terfenadine	2
Fexofenadine	4
Loratadine/desloratidine	87
Other (e.g., chlorpheniramine, promethazine)/ unknown	296
Antimicrobials	**1389**
Aminoglycosides	10
Antifungal	81
Antiparasitic	145
Antituberculosis	9
Antiviral	57
Cephalosporines	176
Macrolides	152
Penicillins	573
Quinolones	41
Sulfonamides	14
Tetracyclines	25
Other/unknown	106
Antineoplastic	**24**

Cardiovascular	**311**
Alpha-blockers	5
ACE inhibitors & ARBs	73
Antiarrhythmics	15
β blockers	104
Ca channel blockers	37
Digoxin	19
Nitrates	6
Other/unknown	52
Cold & cough preparations	**459**
Complementary medicine products	**249**
Botanicals	72
Dietary supplements	28
Homeopathic	33
Mixed preparations	17
Other/unknown	99
Contrast media	**26**
Corticosteroids	**237**
Inhaled	78
Systemic	104
Topical	48
Other/unknown	7
Diuretics	**22**
Furosemide	6
Thiazides	2
Other/unknown	14
Drugs of abuse	**197**
Amphetamines/ cathinone	10
Cannabinoids	49
Cocaine	3
Hallucinogenic amphetamines	3
LSD	3
MDMA	8
Opioids	27
Other/unknown	94
Eye/ear/nose/throat preparations	**663**
Gastrointestinal drugs	**443**
Antacids	84
Antidiarrheal	39
Antiemetics	51
Antispasmodic	18
H_2 antagonists	16
Laxatives	62
Proton pump inhibitors	92
Other/unknown	81
Hormones	**579**
Eltroxin	128
Insulin	30
Oral contraceptives	300
Other/unknown	121
Immunosuppressants	**128**

Minerals	**340**
Calcium	6
Fluoride	4
Iron	303
Potassium	1
Other/unknown	26
Miscellaneous	**661**
Antileukotrienes	92
Antimigraine	18
Antiparkinson	14
Colchicine	28
Hypolipidemics	104
Mouthwashes	70
Mucolytics	6
Oral hypoglycemics	44
Other/unknown	285
Multiple pharmaceuticals	**2116**
Neuroleptics	**269**
Atypicals	73
Butyrophenones	7
Phenothiazines	80
Thiobenzo-diazepines	5
Other/unknown	104
Sedatives /hypnotics	**555**
Benzodiazepines	478
Other/unknown	77
Sympathomimetics	**641**
Dietary amphetamines	7
Methylphenidate	252
Nasal drops	5
Theophylline	2
β_2 agonists	336
Other/unknown	39
Topical preparations	**1161**
Analgesics	70
Antimicrobials	267
Disinfectants	253
Mixed preparations	83
Pediculocides	87
Other/unknown	401
Vaccines	**70**
Veterinary drugs	**30**
Vitamins and supplements	**1079**
Multivitamins	117
Vitamin A+D	5
Vitamin D	579
Other/unknown	378
Unknown	**143**
Total pharmaceuticals: 15,953 (50.6%)	

Table 4C. BIOLOGIC AGENTS

Bites & stings	**187**	**Scolopendra**	**149**	**Plants**	**407**
Animal bites	58	**Scorpions**	**253**	Anticholinergic (e.g., Datura)	20
Insect stings	73	**Snakes**	**184**	Digitalis-like (e.g., *Oleander*)	46
Aquatic creatures	**75**	*Echis coloratus*	5	Irritants (e.g., *Arum*)	120
Fish	47	*Vipera palaestinae*	115	Palm	15
Jellyfish	7	Other/unknown	64	Other/unknown	206
Other/unknown	21	**Spiders**	**91**	**Mushrooms**	**86**
Hymenoptera	**128**	*Latrodectus*	11	**Total biologic agents: 1726 (5.6%)**	
Bees	57	*Loxosceles*	26		
Wasps	39	Other/unknown	54		
Other/unknown	32	**Unknown bite/sting**	**222**		

Table 4D. MISCELLANEOUS AGENTS

Food, contaminated/poisoning	655
Foreign bodies (e.g., batteries)	93
Radiation	103
Thermometers	229
Other/unknown	313
Total miscellaneous:1583 (5.0%)	

Table 7 (see online) shows the distribution of the routes of exposure. The most common route(s) were oral/buccal (64.8%), followed by inhalation/nasal (6.1%), ocular (4.9%), dermal (3.9%), and bite/sting (3.6%).

Table 8 (see online) presents the circumstances of exposure. Unintentional exposures accounted for 96.3%, 92.1%, 57.0% and 55.4% of cases in age groups < 6 years, 6–12 years, 13–17 years and ≥ 18 years, respectively. Intentional exposures accounted for 0.06%, 2.5%, 37.3% and 18.5% of cases in age groups < 6 years, 6–12 years, 13–17 years and ≥ 18 years, respectively. Drug information accounted for 2.4%, 3.6%, 2.9% and 20.4% of cases in age groups < 6 year, 6–12 years, 13–17 years and ≥ 18 years, respectively.

The management sites recommended by the IPIC were: at the site of exposure for 53.9% (e.g., no need for referral to health care facility, no treatment required or only first-aid measures such as skin irrigation or dilution with water), emergency department 17.4% (e.g., referral to emergency department or observation/treatment in a hospital was required), community clinics 13.9%, admission to hospital ward 2.6%, admission to intensive care unit 1.4%, and not applicable 10.8% (e.g., retrospective questions, prospective drug information inquiries, general information).

Table 9 (see online) shows clinical severity by circumstances of exposure. No effect or minor effect occurred in 83% of cases, with more severe outcomes occurring in 3.4%. Severe outcomes (moderate or major effect) occurred more frequently when the exposure was intentional (14.2%) rather than unintentional (2.1%).

Four human fatalities were recorded during 2012: a 19 year old female took acetaminophen (deliberate self-poisoning), a 24 year old male ingested an energy drink (abuse), a 38 year old female ingested a corrosive, unknown type (deliberate self-poisoning), and a 42 year old female – unknown (suspected opioid; deliberate self-poisoning).

The various therapies and interventions recommended by the IPIC included: supportive measures, mechanical ventilation, decontamination (skin irrigation, dilution, activated charcoal, gastric lavage, whole bowel irrigation), enhanced elimination (multiple-dose activated charcoal, hemodialysis/hemoperfusion, urine alkalinization), hyperbaric chamber, gastroscopy, local treatment, and drugs and antidotes (antitetanus, β2 agonists, N-acetylcysteine, antihistamines, corticosteroids, atropine, obidoxime, naloxone, flumazenil, H2 antagonists/proton pump inhibitors, ethanol, fomepizole, antivenoms, glucagon, benzodiazepines, antiparkinsonians, calcium gluconate, digoxin Fab-fragments antibodies, methylene blue, sodium thiosulfate and hydoxocobalamin).

The distribution of categories of all exposures (single and multiple substances) was as follows: chemicals (35.8%), pharmaceuticals (48.8%), bites and stings (3.8%), plants and mushrooms (1.6%), and miscellaneous (e.g., batteries, electrical injury, foreign bodies; 4.8%). Calls for general information and medical illness unrelated to poison exposures accounted for 3.6% of the cases.

Table 10 (see online) shows the agents most frequently involved in single poison exposures. The most frequently involved single substances were analgesics, cleaning substances, antimicrobials, topical preparations, vitamins and supplements, personal care products, insecticides and corrosives. The most frequent poison exposures in children under 6 years old were to analgesics (1499), cleaning products (1390), miscellaneous chemicals (1196), vitamins and supplements (806), and personal care products (713).

DISCUSSION

Our data show a 113% increase in poison exposure cases reported to the IPIC in the past 15 years and an increase of 56% in penetrance (poison exposures per 1000 population). Seventy-four percent of calls to the IPIC were made by the public, unlike the situation in the past with 34.7% and 10% in 1995 and 1981, respectively. Although the current data are similar to the U.S. report, the penetrance per population is 3.9, i.e., 3.5 (47%) lower than in the U.S. [3]. This trend of increased calls from the public should be encouraged as many poison exposures (mainly pediatric and in the home) are asymptomatic or mild and can be managed at home with Poison Center follow-up, as needed. Thus, rational triage by poison centers can prevent unnecessary referrals to health care facilities, prevent unnecessary evaluations and

treatments, reassure victim and family, and reduce health expenditures [14-19].

A decrease of 11.5% in physicians' calls was observed over the last 15 years. Hospital physicians' calls decreased by 15.6%, whereas calls from community physicians increased by 18.6%. These trends can be explained by the "fee for service" system which discourages physicians from consulting the IPIC (as indicated by physicians calling the IPIC), as well as improved patient care provided by emergency medicine physicians and increased utilization of community-based medical services. It should be emphasized that the toxicological consultation provided by the IPIC has never been withheld or delayed because of payment issues.

It is known that poison centers contribute markedly to the rational care of the poisoned patient and reduce health care costs [14-19]. Therefore, it is of utmost importance that the Ministry of Health fully support all costs of the IPIC (e.g., tenures, operational budget), and enable canceling the "fee for service" system. This will encourage physicians to consult with experts in clinical toxicology and improve the care of the acutely poisoned patient. In 2012 the IPIC initiated a project of nurses practicing as poison center specialists, similar to the situation in North America. The project was approved and supported by the Israel Ministry of Health. The nurses will undergo theoretical and practical training and then become integrated in the IPIC service. They will provide toxicological consultations to the public under the supervision of the IPIC clinical toxicologists. The benefits of the project will be assessed in the next few years.

As in our 2007 report [5], the most frequent exposures were to pharmaceuticals, followed by chemicals, bites and stings, and plants and mushrooms. The five groups of substances most frequently involved in all poison exposures were analgesics, cleaning products, antimicrobials, topical preparations, and personal care products. The five groups of substances most frequently involved in moderate to major exposures were corrosives, insecticides, snake venom, drugs of abuse and alcohols. It should be noted that the number of drug information calls increased by 69.5% compared with our 2007 data; most calls in 2012 and 2007 (84.2% and 82.9%, respectively) came from the public [5]. This increase reflects the national role of the IPIC as a drug information source as well. We assume that it may also indicate better availability and utilization of the IPIC by the public.

About 53% of poison exposures were in children, 43% in children under 6 years old. The severity of exposures in this young age group is less than in adolescents and adults, probably due to limited exposures (usually to one substance, small dose) and early recognition in contrast to exposures to multiple agents and deliberate self-poisonings in older patients [8]. The most common exposures in children under 6 years old were to analgesics, cleaning products, miscellaneous chemicals, vitamins and supplements, and personal care products. Corrosives, hydrocarbons, topical preparations, analgesics and cleaning products were mostly involved in moderate to major cases. The rate of deliberate self-poisonings (suicide attempts), the distribution of severity, and management are similar to the U.S. data [3].

LIMITATIONS OF THE REPORT

Since the IPIC data rely on passive reporting and reflect only information provided by the caller, some exposures may go unreported. As a result, the data may not directly identify the overall incidence and trend of poisonings in Israel. It should be noted that aside from IPIC there is no other national registry of poisonings in Israel. The method of operation of the IPIC limits its ability to verify the accuracy of every report. The grading of severity reflects the patient's condition at the time of consultation rather than the peak effect, thus possibly underestimating to some extent the true severity. These limitations are common to other national poison centers, including in the U.S. [3].

CONCLUSIONS

The number of poison exposures reported to the IPIC has grown continuously and dramatically since its inception in 1964. Poisonings continue to be a significant health problem. The IPIC provides specific and expert means to rationalize and improve the care of the poisoned patient. The IPIC database represents a valuable national resource to collect and monitor poisoning exposures in Israel. These data should be, and have been, utilized to identify hazards early, focus on prevention education, guide and stimulate clinical research, direct training, assist in preparedness, and detect chemical/bioterrorism incidents. IPIC data should be used to support regulatory actions (e.g., prompt product reformulations, repackaging, recalls and bans), contribute to post-marketing surveillance, and monitor the implications of marketing over-the-counter medications, especially those intended for general sale out of pharmacies.

In order to reach all these targets, it is recommended that reporting to the IPIC become mandatory, the "fee for service" system be cancelled, and the IPIC be adequately supported. The latter can be achieved by increased funding from the Ministry of Health with participation of health care facilities, pharmaceutical and consumer products companies, and possibly also of the general public.

The full version of the article with 10 tables can be accessed online: www.ima.org.il/imaj

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Additional tables for the article:

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Table 5. Site of caller and site of poison exposures

Caller (%)*		Site of exposure (%)	
Public**	23,317 (74.0)	Home	24,145 (76.5)
Physicians***	7483 (23.7)	Outdoors	1426 (4.5)
Nurses	299 (9.5)	Workplace	471 (1.5)
Medics	96 (0.3)	Health care facility	216 (0.7)
Veterinarians	18 (0.1)	Army	201 (0.6)
Other	306 (1.0)	School	196 (0.6)
		Agriculture	47 (0.2)
		Sea	46 (0.2)
		Industry	8 (0.03)
		Other/unknown	4792 (15.2)

*Institutions: hospitals 5235 (16.6%), community clinics 2345 (7.4%), Magen David Adom in Israel (prehospital emergency medical service) 75 (0.2%), army 129 (0.4%)

** Public: 19,427 (72.7%) in 2007, 5496 (37.2%) in 1997, and 544 (10%) in 1981

*** Physicians: 6820 (25.5%) in 2007, 8457 (57.2%) in 1997, and 4353 (80%) in 1981

Table 6. Age and gender distribution of poison exposure cases

Age (years)	Males (% of age group)	Females (% of age group)	Unknown gender (% of age group)	Total (% of total exposures)
0-5	7056 (51.9)	5697 (41.9)	835 (6.1)	13,588 (43.1)
6-12	981 (54.7)	714 (41.9)	98 (5.4)	1793 (5.7)
13-17	519 (41.3)	696 (55.4)	42 (3.3)	1257 (4.0)
Unknown child	61 (44.9)	41 (30.1)	34 (25)	136 (0.4)
≥ 18	3876 (34)	7248 (63.6)	272 (2.4)	11,396 (36.2)
Unknown adult	275 (27.8)	673 (68.3)	38 (3.9)	986 (3.1)
Unknown age	387 (16.4)	437 (18.5)	1539 (65.1)	2363 (7.5)
Total (% of total)	13,155 (41.7)	15,506 (49.2)	2858 (9.1)	31,519

Table 7. Distribution of the routes of poison exposures

Route*	n	% of all cases	% of all routes
Ingestion/buccal	20,732	66.0	64.8
Inhalation /nasal	1953	6.2	6.1
Ocular	1569	5.0	4.9
Dermal	1248	4.0	3.9
Bite/sting	1137	3.6	3.6
Parenteral	319	1.0	1.0
Rectal	313	1.0	1.0
Other/unknown	2507	8.0	7.8

*Some patients were exposed by more than one route

Table 8. Distribution of circumstances of poison exposures

Circumstances	n (%)
Unintentional	
General *	14,067 (44.5)
Therapeutic error **	4867 (15.4)
Accident	1254 (4.0)
Misuse ***	1168 (3.7)
Bite/ sting	1142 (3.6)
Food	484 (1.5)
Occupational	150 (0.5)
Environmental	126 (0.4)
Other/unknown	360 (1.1)
Total unintentional	23,618 (74.8)
Intentional**	
Suicide	2507 (7.9)
Abuse	245 (0.8)
Malicious	59 (0.2)
Other /unknown	57 (0.2)
Total intentional	2868 (9.1)
Drug information	3396 (10.8)
Chemical Information	858 (2.7)
Unknown circumstances	844 (2.7)

* Exposures that could not be classified otherwise. Refers mainly to pediatric exposures (e.g., curiosity and experimentation by young children)

** Unintentional incorrect use of a pharmaceutical (e.g., dose, route, wrong person, medication, indication, interaction). Refers to errors made by health care providers, parents or caregivers

*** Unintentional improper or incorrect use of a non-pharmaceutical (chemical) substance

**** Intentional: suicide, abuse, malicious

Table 9. Distribution of clinical severity of poison exposure cases according to circumstances of exposure

Severity	Unintentional (% of unintentional)	Intentional (% of intentional)	Drug & chemical information (% of drug & chemical information)	Unknown (% of unknown)	Total (% of total exposures)
No effect	15,119 (64.0)	886 (30.9)	1221 (28.7)	76 (9.0)	17,302 (54.8)
Minor	7091 (30.0)	1402 (48.9)	333 (7.8)	97 (11.5)	8923 (28.2)
Moderate	439 (1.9)	308 (10.7)	40 (0.9)	68 (8.0)	855 (2.7)
Major	58 (0.2)	100 (3.5)	10 (0.2)	49 (5.8)	217 (0.7)
Death	0	4 (0.1)	0	0	4 (0.01)
Unknown	911 (3.9)	170 (5.9)	2648 (62.3)	553 (65.6)	4283 (13.6)

Table 10. Agents most frequently involved in single poison exposures

Chemicals		Pharmaceuticals		Biologic agents	
Cleaning products	1900	Analgesics	2934	Plants	493
Personal care products	1033	Antimicrobials	1389	Scorpions	253
Insecticides	973	Topical preparations	1161	Snakes	184
Corrosives	932	Vitamins & supplements	1079	Scolopendra	149
Hydrocarbons	732	Ear, Nose, Throat preparations	663	Hymenoptera	128
Gases	672	Hormones	579	Spiders	91
Scale removers	551	Sympathomimetics	641	Mushrooms	86
Bleaches	838	Sedatives/Hypnotics	555	Aquatic creatures	75
Arts & office supplies	472	Cold & Cough preparations	459	**Miscellaneous**	
Alcohols	338	Gastrointestinal	443	Food	655
Essential oils	284	Antidepressants	406	Thermometer	229
Adhesives	261	Antihistamines	389	Batteries	170
Rodenticides	154	Minerals	340	Radiation	103
Metals	84	Cardiovascular	311	Foreign bodies	93
Herbicides	69	Anticonvulsants	282	Electrical injury	20