Surveillance of toxic exposures: the pilot experience of the Poison Control Centers of Milan, Pavia and Bergamo in 2006

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Summary. Between 1 February and 31 March 2006, the Poison Control Centers (PPC) active in Lombardy collaborated with an integrated surveillance system carried out in Piedmont during the Olympic Games 2006. The collaborating PPC notified to the system 697 human cases of exposure occurred in Piedmont during the observation period. Among these cases, 70% were exposed accidentally, 40% were 6 years old or younger, and 45% reported at least a clinical effect. The agents more frequently reported were: cleaning substances (household) (110 cases), fumes/gases/vapors (63 cases, comprising 38 cases accidentally exposed to carbon monoxide), and sedative/hypnotics/antipsychotics (53 cases). Although very limited, the available observations focused the attention on specific hazards and were able to highlight the potential of a toxic exposure surveillance system based on the information reported by the Italian PPC.

Key words: poison control centers, surveillance, toxic exposures.

Riassunto *(Sistema di sorveglianza integrata: un'esperienza pilota dei Centri antiveleni di Milano, Pavia e Bergamo nel 2006)*. Nel periodo 1 febbraio-31 marzo 2006 i Centri antiveleni (CAV) lombardi hanno collaborato ad un sistema di sorveglianza integrata messo in atto per la Regione Piemonte durante le Olimpiadi Invernali 2006. Complessivamente, i CAV hanno preso in esame 697 casi di esposizione umana verificatisi in Piemonte. Di questi, circa il 70% ha subito un'esposizione accidentale, il 40% ha presentato un'età inferiore ai 6 anni ed il 45% ha riportato almeno una manifestazione clinica. Gli agenti con il numero più elevato di casi sono stati i detergenti per uso domestico (n. = 110), fumi/gas/vapori (n. = 63), comprendenti 38 casi di esposizione accidentale a monossido di carbonio e sedativi/ipnotici /antipsicotici (n. = 53). Sebbene limitata, la casistica analizzata ha permesso di focalizzare l'attenzione su alcune problematiche specifiche ed ha evidenziato la potenzialità di un sistema di sorveglianza delle esposizioni pericolose basato sui CAV italiani.

Parole chiave: Centri antiveleni, sorveglianza, esposizioni pericolose.

INTRODUCTION

Poison Control Centers (PCC) are centers operating on a 24-hours-a-day basis in the framework of the National Health System to provide specialized services in the field of clinical toxicology and, in particular, to ensure proper diagnosis and management of poisonings. The exposure cases examined by the PCC involve a number of different agents and can be indicative of widespread and underestimated hazardous conditions. A systematic analysis and examination of the cases selectively reported to the PCC is extremely important for an adequate description and prevention of a wide range of events, such as pediatric poisoning, drug poisoning, household, environmental and workplace exposures and food poisoning. A careful examination of the findings of the PCC is also essential to verify the actual safety of marketed pharmaceutical and non-pharmaceutical products. More recently, the findings of the PCC have contributed to a prompt

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identification of unusual events which could be associated with the intentional or unintentional release of toxic agents [1-4].

In view of the above and using as a reference the work carried out by the PCC in the United States since the early 1980s [1-3], a working plan for the development of a surveillance system based on the information provided by the PCC was recently started at the National Health Institute (Istituto Superiore di Sanità, ISS) in agreement with the Italian Center for Disease Control (ICDC) of the Health Ministry and in cooperation with Region Lombardy. The first step in the implementation of this project was the definition of standard procedures for collection and classification of the information handled by the PCC. Indeed, preliminary observations showed that each PCC in Italy has its own data collection system, which renders difficult the integration and analysis of all the cases identified by these centers. Nevertheless, like the PCC operating in the USA [1, 2], the Italian PCC systematically collect (although with different procedures) relevant information including: type of the requested advice, patient information, exposure informatin, clinical effects and recommended therapy. The activities carried out by the PCC of Milan, Pavia and Bergamo in the framework of the health surveillance plan promoted and coordinated by Region Piedmont during the 2006 Winter Games provided a first opportunity to verify the applicability of the standard procedures proposed by the ISS [5, 6]. Indeed, during the Winter Games, the PCC of Region Lombardy, which are the reference centers also for Region Piedmont, transmitted the data regarding all the cases reported by patients from Piedmont to the Regional service for the surveillance of infectious diseases (SeREMI) and to the ISS on a daily basis. At the ISS, the information collected by the three participating centers was systematically verified and classified using standard reference categories. Analyses were carried out by the ISS and the SeREMI on a daily and weekly basis to identify any unusual condition requiring further examination and verification; at the end of the observation period, an overall analysis of all the identified cases was also carried out by the ISS. In this report, the results of that final analysis are described with a view to providing a sample of Italian data testifying to the potentials of a toxic exposure surveillance system based on the information reported by the PCC.

MATERIALS AND METHODS

Between February 1 and March 31, 2006, the PCC of Milan, Pavia and Bergamo notified to the ISS, on a daily basis, all relevant information (stored in their own databases) concerning the professional advice provided the day before. Such information was made available in the form of Microsoft Excel tables. The data included:

1. Details of the advice provided
   - date and time
   - type of advice
   - advice-seeker
   - site of the call
2. Patient information
   - gender
   - sex (in human exposure cases)
   - age (in human exposure cases)
3. Exposure information
   - geographical location where the exposure occurred
   - time interval between exposure and advice-seeking
   - agent
   - reasons for exposure
   - route of exposure
   - frequency
   - site of exposure
4. Clinical effects
   - latency between exposure and clinical effects
   - signs and symptoms

At the ISS, the professional advice provided by the PCC was initially classified into the following categories: "case of exposure", including all cases of exposure handled for the first time by the PCC; "follow-up", including any follow-up advice provided with regard to a previously reported case of exposure but recorded in one or more entries other than the original one; "information calls", including requests for further information on toxicological issues rather than actual exposures. Eventually, all of the records regarding the same exposure case were unified and the original "follow-up" category was eliminated. In case of exposures involving more than one individual (multiple exposures), the actual correspondence between the number of affected individuals and that of identified cases was systematically verified requesting, whenever possible, the retrieval of data regarding cases handled but not reported in details by the PCC. Each of the individuals involved in multiple exposures was recorded in a separate record maintaining the indication of the original incident. For all the exposure cases identified by the PCC, the date when the incident occurred was calculated subtracting the time interval between exposure and advice-seeking from the date and time in which advice was sought. On this basis, only exposures occurred during the period at issue (1 February - 31 March) were considered for further examination. Most reasons for exposure were coded according the following definitions: "unintentional", including accidental exposures or exposures resulting from mistakes (general incidents, unintentional misuse, occupational incidents, environmental incidents, incapacity, therapeutic error, animal bites and stings); "intentional", including intentional abuse or self-destructive purposes; "malicious", including condition in which a patient is victim of another person's intent to harm him; "adverse reaction", including adverse effects occurring with normal use of farmaceutical or non farmaceutical products; "food poisoning", including suspected or confirmed ingestion of food

contamitated with microorganisms or chemical. The agents involved in the exposures were classified into two main groups: "pharmaceuticals" and "non-pharmaceuticals". The first group included all the agents used for therapeutic purposes and provided for in the plus the "substances of abuse", including street drugs and other stimulants. The drugs which were found to be associated with human exposure cases were originally classified according to the Anatomical Therapeutic Chemical (ATC) classification system and eventually grouped in the categories adopted by the US PCC in the framework of the Toxic Exposure Surveillance System (TESS) [2, 3]. The non-pharmaceutical substances were also classified according to the categories adopted by the American Association of Poison Control Centers TESS. Clinically relevant signs and symptoms were identified using a standardized nomenclature and grouped in 12 categories (cardiovascular, cutaneous, hematological, hepatic, gastrointestinal, metabolic, neuromuscular, ocular, oropharyngeal, renal, respiratory and related to the nervous system). The patients exhibiting at least one sign or symptom whose association with their exposure to the reported agent was not excluded by the PCC were classified as symptomatic. At the end of the review and classification processes, the data collected by the three PCC were transferred to a single file to find out all separate entries regarding the same case reported to more than one participating center. The variables used to identify any duplicate report included: date and site of exposure, agent, sex and age. In cases of confirmed duplicate reports, all the information provided by the separate PCC was integrated into a single record.

A descriptive analysis of the available data was made possible using the EpiInfo statistical software.

RESULTS

Over the period at issue, the three participating PCC received 776 requests for professional advice from patients living in Region Piedmont, which accounted for

Table 1 | *Human exposure cases occurred in Piedmont over the period February 1- March 31 2006 and examined by the PCC of Lombardy (Italy)*

	PCC									
	Milan		Pavia		Bergamo		More PCC		Total	
	n.	(col. %)	n.	(col. %)	n.	(col. %)	n.	(col. %)	n.	(col. %)
Province										
Alessandria	21	6.0	58	20.4	1	25.0	2	14.3	82	12.5
Asti	15	4.3	15	5.3	1	25.0	0	0.0	31	4.7
Biella	10	2.8	34	11.9	0	0.0	1	7.1	45	6.9
Cuneo	51	14.5	26	9.1	1	25.0	1	7.1	79	12.1
Novara	56	15.9	14	4.9	0	0.0	3	21.4	73	11.1
Turin	153	43.5	120	42.1	0	0.0	5	35.7	278	42.4
Verbania	25	7.1	5	1.8	0	0.0	0	0.0	30	4.6
Vercelli	21	6.0	13	4.6	1	25.0	2	14.3	37	5.6
Total Region	**352**	**100.0**	**285**	**100.0**	**4**	**100.0**	**14**	**100.0**	**655**	**100.0**
Advice-seeker										
Hospitals	233	66.2	244	85.6	1	25.0	12	85.7	490	74.8
Others										
Private invidual	94	26.7	24	8.4	3	75.5	2	14.3	123	18.8
Doctor/health care operator	20	5.7	7	2.5	0	0.0	0	0	27	4.1
Emergency service	5	1.4	5	1.7	0	0.0	0	0	10	1.5
Unknown	0	0.0	5	1.8	0	0.0	0	0.0	5	0.8
Latency between exposure and consultation with PCC (in hours)[a]										
≤ 1	188	53.0	120	41.2	0	0.0	8	57.1	316	47.5
2-12	87	24.5	106	36.4	0	0.0	4	28.6	197	29.6
> 12	35	9.9	28	9.6	2	40.0	1	7.1	66	9.9
Unknown	45	12.7	37	12.7	3	60.0	1	7.1	86	12.9
One	347	98.6	269	94.4	4	100.0	14	100.0	634	96.8
More than one	5	1.4	16	5.6	0	0.0	0	0.0	21	3.2
Total consultations	**352**	**100.0**	**285**	**100.0**	**4**	**100.0**	**14**	**100.0**	**655**	**100.0**

[a]*includes 10 cases reported in February but occurred in January and excluded from analysis work.*

Table 2 | *Main features of human exposure cases occurred in Piedmont over the period February 1 - March 31 2006 and examined by the PCC of Lombardy (Italy)*

	PCC									
	Milan		Pavia		Bergamo				Total	
	n.	(col. %)	n.	(col. %)	n.	(col. %)	n.	(col. %)	n.	(col. %)
Symptoms										
Not observed/associated	216	60.3	148	46.1	2	50.0	8	57.1	374	53.7
Observed	134	37.4	173	53.9	2	50.0	6	42.9	315	45.2
Unknown	8	2.2	0	0.0	0	0.0	0	0.0	8	1.1
Age groups										
≤ 6	164	45.8	92	28.7	2	50.0	10	71.4	268	38.5
6-19	36	10.1	29	9.0	0	0.0	0	0.0	65	9.3
19+	141	39.4	195	60.7	1	25.0	4	28.6	341	48.9
Unknown	17	4.7	5	1.6	1	25.0	0	0.0	23	3.3
Reasons for exposure										
Unintentional	274	76.5	199	62.0	4	100.0	11	78.6	488	70.0
Intentional	76	21.2	110	34.3	0	0.0	3	21.4	189	27.1
Criminal/malicious	0	0.0	6	1.6	0	0.0	0	0.0	6	0.9
Food poisoning	3	0.9	1	0.3	0	0.0	0	0.0	4	0.6
Adverse reaction	1	0.3	2	0.7	0	0.0	0	0.0	3	0.5
Unknown	4	1.1	3	0.9	0	0.0	0	0.0	7	1.0
Site of exposure										
Residence	332	92.7	297	92.5	3	75.0	14	100.0	646	92.7
Workplace	10	2.8	6	1.9	0	0.0	0	0.0	16	2.3
Other	14	3.9	15	4.7	0	0.0	0	0.0	29	4.2
Unknown	2	0.6	3	0.9	1	25.0	0	0.0	6	0.9
Agents										
Non-pharmaceuticals	212	59.2	168	52.3	1	25.0	6	42.9	387	55.5
Pharmaceuticals	137	38.3	140	43.6	3	75.0	8	57.1	288	41.3
More than one category	9	2.5	13	4.0	0	0.0	0	0.0	22	3.2
Total individuals	358	100.0	321	100.0	4	100.0	14	100.0	697	100.0

6% of all the counseling provided in the same period (n. = 13 760 requests). In particular, 419 of the 776 requests for advice (54%) were handled by the PCC of Milan, 295 (38%) by the PCC of Pavia and 48 (6%) by the PCC of Bergamo. Consultations regarding new human exposure cases accounted for 84% of all the counseling work (n. = 655); 14 of these cases were examined and reported by more than one PCC. Seven animal exposure cases were reported, while information calls represented less than 15% of the total (n. = 114). As for human exposures *(Table 1)*, about 42% of all the requests for assistance came from the province of Turin which is home to some 50% of the whole population of Region Piedmont.

Most requests for assistance came from hospitals (n. = 490, or about 75% of all the exposures). The time interval between the exposure and its reporting to a PCC was one hour or less in about 47% of the cases, and 12 hours or less in about 77% of the cases. Most of the reported exposure cases (about 97%) involved only one individual. Overall, 21 multiple exposures were reported involving a total of 63 individuals. The human exposure cases amounted to 697, which result in an estimated average of 11.4 cases per 10 000 inhabitants reported annually to the PCC of Lombardy from Region Piedmont, ranging from 9.0 cases per 10 000 inhabitants in the province of Turin to 15.6 cases per 10 000 inhabitants in the provinces of Alessandria and Biella.

As shown in *Table 2*, clinical effects were reported in about 45% of the cases (n. = 315) and children younger than 6 years accounted for 38% of the total (n. = 268). 70% of all the reported exposures (n. = 488) were unintentional, while 27% (n. = 189) were intentional. The remining 2% (n. = 20) included 6 cases of suspected malicious exposure, 4 cases of food poisoning and 3 cases of adverse reaction to drugs. The most frequently reported site of exposure was the victim's own residence (646 cases, or 93% of the total) followed by the workplace (16 cases, or 2% of the total). The sites of exposure classified as "other" (about 4% of the total) included civil buildings (hospitals and schools) (14 cases), open spaces (6 cases), public premises (6 cases) and transports

Table 3 | *Main features of human exposure cases examined by the PCC of Milan, Pavia and Bergamo in February - March 2006 at the request of Region Piedmont (Italy)*

Type of agents	Exposures		Clinical effects		Age (years)				Reason for exposure		
	n.	col. %	None	Present	< 6	6-19	> 19	Unknown	Unint.	Int.	Other
NON-PHARMACEUTICALS											
Household cleaning substances	115	29.7	56	59	50	7	53	5	101	14	0
Fumes/gases/vapors	[a]63	16.3	19	44	6	10	40	7	61	1	1
Cosmetics/personal care products	36	9.3	22	14	23	4	8	1	32	4	0
Toys/foreign bodies	30	7.8	24	6	27	2	1	0	29	1	0
Food/beverages (excl. ethanol)	22	5.7	12	10	3	5	13	1	11	0	[b]11
Colors/office supplies	13	3.4	12	1	12	1	0	0	13	0	0
Fertilizers	10	2.6	10	0	2	2	6	0	10	0	0
Pesticides	7	1.8	6	1	4	0	3	0	6	1	0
Glues/adhesives	7	1.8	7	0	6	1	0	0	7	0	0
Plants	7	1.8	6	1	5	0	2	0	7	0	0
Hydrocarbons	6	1.6	1	5	0	2	4	0	5	1	0
Ethanol beverages	3	0.8	0	3	0	2	1	0	1	2	0
Tobacco	3	0.8	1	2	3	0	0	0	2	0	0
Matches/explosives/fireworks	5	1.3	4	1	5	0	0	0	5	0	0
Fire extinguishers	4	1.0	2	2	0	3	0	1	2	2	0
Bites/stings	4	1.0	1	3	0	0	3	1	4	0	0
Batteries	4	1.0	4	0	3	1	0	0	4	0	0
Non-drinking water	3	0.8	3	0	1	2	0	0	3	0	0
Room deodorizers/air fresheners	3	0.8	3	0	3	0	0	0	3	0	0
Mushrooms	3	0.8	2	1	0	0	2	1	3	0	0
Essential oils	2	0.5	2	0	1	0	1	0	2	0	0
Other	14	3.6	8	6	3	0	10	1	12	2	0
Exposure to more than one categ.	5	1.3	1	4	0	0	4	1	0	5	0
Unknown	18	4.7	7	11	4	2	11	1	15	0	3
Total n. of non-pharmaceuticals	**387**	**100.0**	**213**	**174**	**161**	**44**	**162**	**20**	**338**	**33**	**16**
% of non-pharmaceuticals	100.0		55.0	45.0	41.6	11.4	41.9	5.2	87.3	8.5	4.2
% of all substances	57.3		56.5	58.4	60.1	67.7	50.8	87.0	69.4	19.6	80.0
PHARMACEUTICALS											
Sedatives/hypnotics/antipsychot.	53	18.4	17	36	7	3	42	1	12	39	[c]2
Analgesics	32	11.1	27	5	20	1	11	0	24	7	[c]1
Gastrointestinal preparations	15	5.2	10	5	9	1	5	0	12	2	[c]1
Antidepressants	13	4.5	6	7	1	4	8	0	2	11	0
Antiepileptics	12	4.2	8	4	1	1	10	0	4	8	0
Cardiovascular drugs	12	4.2	9	3	8	0	4	0	11	1	0
Street drugs and stimulants	10	3.5	1	9	0	0	10	0	0	10	0
Vitamins	9	3.1	9	0	9	0	0	0	9	0	0
Antimicrobials	8	2.8	7	1	3	2	3	0	6	2	0
Eye/nose/throat preparations	8	2.8	8	0	6	0	2	0	8	0	0
Cold and cough preparations	8	2.8	8	0	7	0	1	0	7	1	0
Asthma therapies	8	2.8	8	0	6	1	1	0	8	0	0
Hormones and horm. antagonist	6	2.1	6	0	6	0	0	0	6	0	0
Topical preparations	5	1.7	3	2	3	0	2	0	4	1	0
Antihistamines	3	1.0	3	0	2	1	0	0	3	0	0
Diuretics	2	0.7	1	1	2	0	0	0	2	0	0
Anticoagulants	1	0.3	1	0	1	0	0	0	1	0	0
Antineoplastics	1	0.3	1	0	1	0	0	0	1	0	0
Electrolytes and minerals	1	0.3	1	0	0	1	0	0	1	0	0
Homeopathic preparations	1	0.3	1	0	1	0	0	0	1	0	0
Veterinary drugs	1	0.3	1	0	0	0	1	0	1	0	0
Others	14	4.9	10	4	9	1	3	1	14	0	0
Drug mixtures	55	19.1	13	42	0	4	51	0	4	51	0
Unknown pharmaceuticals	10	3.5	5	5	5	1	3	1	8	2	0
Total n. of pharmaceuticals	288	100.0	164	124	107	21	157	3	149	135	4
% of pharmaceuticals	100.0		57.0	43.1	37.2	7.3	54.5	1.0	51.7	46.9	1.3
% of all substances	42.7		43.5	41.6	39.9	32.3	49.2	13.0	30.6	80.4	20.0

[a]38 cases of human exposure to carbon monoxide and 13 cases of human exposure to fire smoke; [b]includes 4 cases exhibiting symptoms of "histamin fish poisoning" as a result of fish ingestion and 6 cases of suspected malicious exposure following consumption of bottled water; [c]one case of adverse reaction.

(3 cases). Non-pharmaceutical agents were found to be involved in about 55% of the reported exposure cases (n. = 387) and pharmaceutical agents in 41% (n. = 288) of the exposure cases. Both non-pharmaceutical and pharmaceutical agents were found to be involved in 3% (n. = 22) of the exposures.

The most frequently reported non-pharmaceutical agents *(Table 3)* included: household cleaning substances (115 cases), fumes/gases/vapors (63 cases), cosmetics/personal care products (36 cases), toys/foreign bodies (30 cases), food and beverages (22 cases). Findings in individuals exposed to fumes/gases/vapors were slightly different from those described, in general, for the cases exposed to non-pharmaceutical agents: in particular, about 97% of those individuals were exposed accidentally to the said agents, only 9% of them were younger than 6 years and some 70% exhibited at least a sign or symptom associated with the exposure. The most frequently reported compound, among the agents classified into the "fumes/gases/vapors" category, was carbon monoxide (38 cases, 31 of which as a result of multiple exposures). Other agents in this category included fire smoke (13 individuals exposed, 8 of whom as a result of occupational incidents), and chlorine vapors (6 individuals exposed as a result of improper mixing of household cleaning substances). Six of the cases exposed to food and beverages were of a suspected malicious nature: in particular, 3 cases were found to have consumed bottled water contaminated with a pesticide and 3 other cases bottled water suspected to be contaminated with an unknown agent. This category also included 4 cases of individuals who exhibited symptoms usually associated with the condition known as "histamine fish poisoning" as a result of fish ingestion. As shown in *Figure 1*, the clinical effects most frequently observed in individuals exposed to non-pharmaceutical agents were gastrointestinal illness (93 cases, or about 50% of all the symptomatic cases).

The highest number of intentional exposures was observed among exposures to pharmaceutical agents *(Table 3)* (135 cases, or about 47% of all drug-related exposures). The most frequently reported agents were those belonging to the "sedatives/hypnotics/antipsychotics" category, with 53 exposure cases, about 74% of which were found to be intentional. In this category, about 79% of all the cases involved adults (19 years old or older). Other drug categories associated with a high number of exposures included analgesics (32 cases) and gastrointestinal preparations (15 cases): in particular, a high proportion of all the cases of exposure to these categories were unintentional (75% of the cases for analgesics and 80% for gastrointestinal preparations) and involved children (about 60% of the cases were 6 years old or younger). Finally, it should be pointed out that one case of adverse reaction was observed for each of the three most frequently reported drug categories. About 90% of all

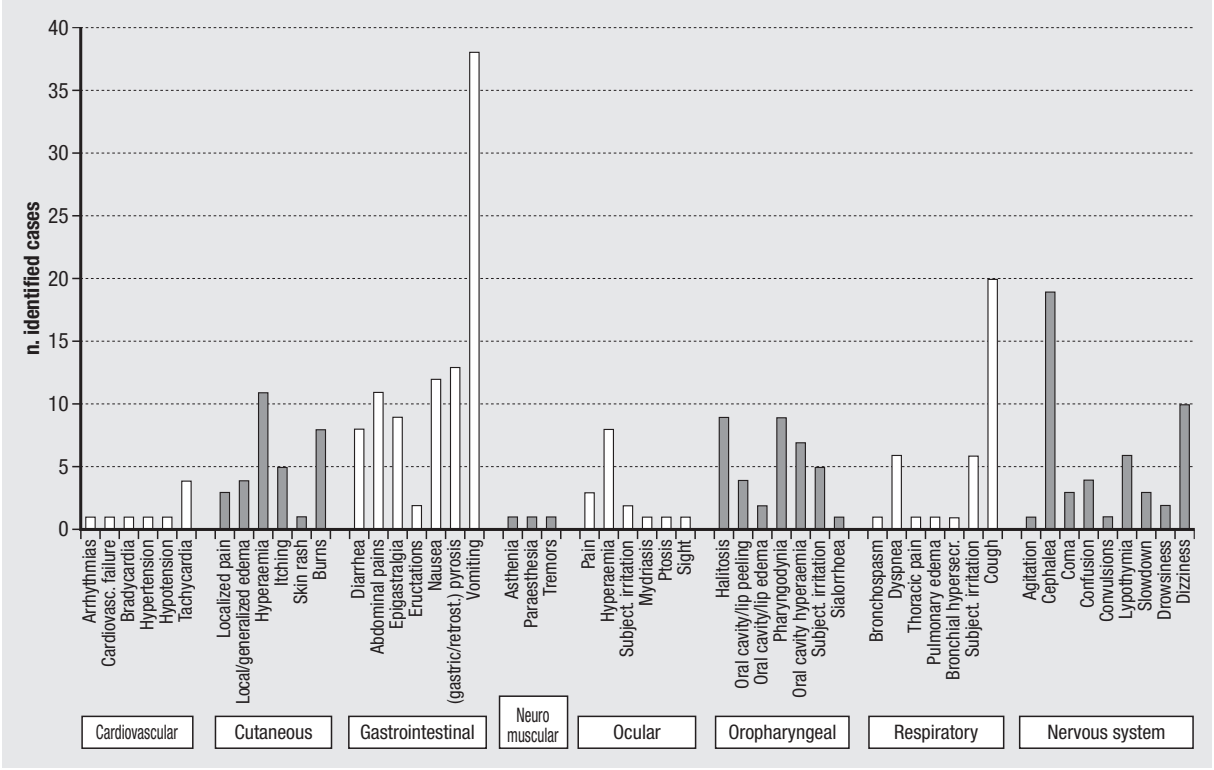

Fig. 1 | *Signs/symptoms observed in cases of exposure to non-pharmaceutical agents examined by the PCC of Milan, Pavia and Bergamo in February-March 2006 at the request of Region Piedmont (Italy).*

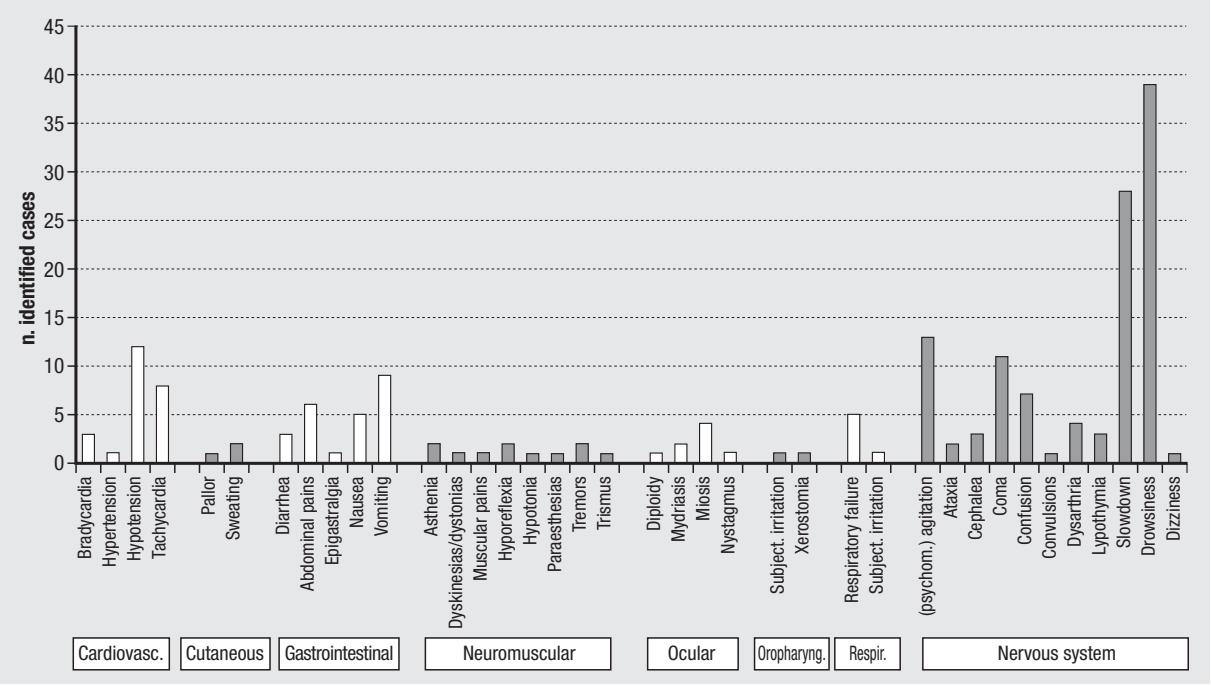

Fig. 2 | *Signs/symptoms observed in cases of exposure to pharmaceutical agents examined by the PCC of Milan, Pavia and Bergamo in February-March 2006 at the request of Region Piedmont (Italy).*

symptomatic patients reported clinical effects related to the nervous system (112 cases) *(Figure 2)*.

DISCUSSION AND CONCLUSIONS

About 70 000 human exposure cases are reported on an annual basis to the PCC operating in Italy [7]. An integrated analysis of these data, although extremely interesting, is still something difficult to achieve because each PCC active in Italy uses its own data collection system and does not share with other centers uniform definitions to capture data. A first attempt to define and apply standard operating procedures was made in the framework of the pesticide-related poisoning surveillance plan promoted by the ISS [8-10]. The operating procedures originally identified for the implementation of this working plan were eventually used, on an experimental basis, by the PCC of Milan, Pavia and Bergamo to notify the cases of Piedmont region detected during the 2006 Winter Games. Subsequent controls contributed to the better definition of a data collection system capable of providing a uniform database which would best suit both the counseling work carried out by the PCC and specific surveillance goals, without entailing increased workload for the operators. Moreover, the nomenclature and definitions adopted by the PCC for the variables at issue were standardized. Such results acted as a first operational reference point paving the way for adoption of shared data collection and management procedures. In particular, with regard to the categories used in this experience for the classification of the various exposure cases, it should be pointed out that the planned level of detail requires the adoption of a computerized data management system ensuring the automatic classification of all the agents or commercial products entered into the database and indicating the agents of toxicological interest composing each commercial product as well as their relative concentrations. In order to achieve this objective, which is of interest also for the routine management of exposure cases by the PCC, a matrix should be developed matching each identified category of agents with updated lists of commercial products in use. Matching functional and chemical classes, agents and commercial products is not difficult for drugs because lists of all the marketed products accompanied by their own ATC code are made available through the Health Ministry. Developing procedures for the management of non-pharmaceutical products is a more difficult. As for pesticides, however, it should be emphasized that the ISS is currently developing a database of all commercial products intended for use in agriculture, containing information on their specific agents and main toxicological characteristics [11]. This database is updated through the systematic collection of information regarding newly granted marketing authorizations and a regular consultation of the results of toxicological review and classification activities carried out by various international organizations for all active ingredients. At present, the database does not include information on pesticides intended for use at

home or other civil purposes; as a result, neither updated lists of the marketed products nor procedures ensuring the systematic reporting of newly granted authorizations are currently available. Another database that could be used for the acquisition of data regarding non-pharmaceutical commercial products is the Archivio Preparati Pericolosi (a database of dangerous preparations) implemented by the ISS which can be accessed by the PCC subject to the authorization of the Ministry of Health [12]. When it comes to developing procedures for the management of commercial product data, it is important to remember that such procedures should be regularly updated and reviewed in order to be effective. The updating and reviewing processes must be such as to ensure the immediate acquisition of information on newly marketed products and a prompt detection of any change in the composition of products already on the market and not accompanied by a change in the product's name.

The findings relative to the human exposure cases from Piedmont reported by the PCC of Lombardy, although representative of a single region and of a limited period of time, turned out to be substantially comparable with the results observed in the USA on an annual basis (about 2 400 000 cases detected by 62 PCC in 2005) [3]. Moreover, those findings contributed to highlight emerging problems, such as the high frequency of intentional exposures to carbon monoxide, and press for further investigation and controls at the local level to increase prevention. The detection of six cases of human exposure to contaminated water and 4 cases of food poisoning proved especially interesting. Indeed, these findings demonstrated that the real-time analysis of the data collected by the PCC can contribute to a prompt identification of events of a suspected malicious or accidental nature requiring quick intervention and investigations.

Therefore, the work done by the PCC of Lombardy region during the 2006 Winter Games made a qualified contribution to the surveillance system dedicated to this specific event [5, 6] and highlighted the importance of a systematic review and analysis of the data collected by the PCC.

What is more, reviewing and classifying the variables at issue, prior to the actual analysis work, proved essential for a better definition of the standard procedures to be proposed to the PCC with a view to standardizing data collection and management procedures and making them comparable with each other. A direct result of both the work done and the related considerations was the development by the ISS of a prototypical computerized system available online and capable of acquiring and integrating the data collected from different poison centers in one database. There are plans to improve this prototype through further examinations so as to turn it into a mechanism capable of both meeting the data management needs of the PCC and ensuring adequate support for regional and national surveillance activities.

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