

# EPITOX Register of Intoxications in Spain. Year 2024

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**INTRODUCTION.** The Spanish Foundation of Clinical Toxicology has implemented an online questionnaire, called EPITOX, with the aim of standardizing the collection of characteristics of intoxications treated in emergency departments (EDs) of Spanish hospitals. This study aims to describe the epidemiological characteristics of intoxications registered in EPITOX in 2024.

**MATERIAL AND METHODS.** The EPITOX questionnaire collects patient identification data, type of intoxication and toxic agent, episode characteristics (intentionality, mode of arrival at the hospital, place of intoxication), clinical data, lab test results, treatment, and the patient's destination upon ED discharge. Data are recorded anonymously by the principal investigator at each participating center.

**RESULTS.** A total of 5,540 intoxications were registered. The patients' mean age was 38.95 (18.0) years (55.7% men and 65.5% patients of Spanish origin). Most patients (57.1%) arrived by ambulance, 33.7% of intoxications occurred in a public place, and 44.4% at the patient's home. Recreational intoxications accounted for 47.7% of cases, while 28% had suicidal intent. Ethyl alcohol was the most frequently involved toxic agent (46.3%), followed by pharmaceutical drugs (38.3%), illicit drugs of abuse (28.7%), and chemical products (11.6%). A total of 81% of intoxicated patients were discharged directly from the ED, 3.7% were admitted to the intensive care unit, 2.5% to Psychiatry (an additional 7% required transfer to a psychiatric center for evaluation), and 3.2% to a conventional hospitalization unit. Mortality rate was 0.5%.

**CONCLUSIONS.** The typical profile of an intoxicated patient treated in Spanish EDs is that of young male of Spanish origin. The most prevalent toxic agent is ethanol, followed by pharmaceutical drugs and illicit drugs of abuse. Although most intoxications are mild, up to 6.9% require admission.

**Keywords:** Intoxication. Epidemiology. Emergency Services.

## Registro EPITOX de intoxicaciones en España. Año 2024

**INTRODUCCIÓN.** La Fundación Española de Toxicología Clínica implantó un cuestionario *online*, denominado EPITOX, con el objetivo de homogeneizar la recogida de las características de las intoxicaciones atendidas en servicios de urgencias (SU) de hospitales españoles. El objetivo de este trabajo es describir las características epidemiológicas de las intoxicaciones registradas en EPITOX en el año 2024.

**MATERIAL Y MÉTODOS.** El cuestionario EPITOX recoge datos de filiación, tipo de intoxicación y de tóxico, características del episodio (intencionalidad, forma de llegada al hospital, lugar de la intoxicación), datos clínicos, analíticos y de tratamiento, así como el destino al alta de urgencias. Los datos son registrados de forma anonimizada por el investigador de cada centro.

**RESULTADOS.** Se registraron 5.540 intoxicaciones. La edad media fue de 38,95 (DE 18) años, con un 55,7% de varones y un 65,5% de pacientes de procedencia española. El 57,1% acudió en ambulancia, el 33,7% se produjeron en un lugar público y el 44,4% en el domicilio del paciente. El 47,7% de las intoxicaciones fueron recreativas y un 28% tuvieron intencionalidad suicida. El alcohol etílico fue el tóxico más frecuentemente implicado (46,3%), seguido de los fármacos (38,3%), las drogas de abuso ilegales (28,7%) y los productos químicos (11,6%). El 81% de los pacientes intoxicados pudieron ser dados de alta directamente desde el SU, un 3,7% ingresaron en la unidad de cuidados intensivos, un 2,5% en Psiquiatría (un 7% adicional requirió traslado a un centro con psiquiatra H24 para valoración) y un 3,2% en una unidad de hospitalización convencional. La mortalidad fue del 0,5%.

**CONCLUSIONES.** El perfil del paciente intoxicado atendido en los SU españoles es el de un varón joven de origen español. El tóxico más prevalente es el etanol, seguido de los fármacos y las drogas de abuso ilegales. La mayoría de las intoxicaciones son leves, pero hasta un 6,9% precisan ingreso.

**Palabras clave:** Intoxicación. Epidemiología. Servicios de Urgencias.

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## Introduction

Acute poisoning is defined as exposure to a toxic substance at a given time and for a short period, capable of harming the body through chemical reactions or other molecular-level activity.<sup>1</sup> The changing profile of poisoned patients, as well as the diversity of toxic agents, necessitates periodic studies to maintain updated epidemiological data. Therefore, recording the characteristics of poisonings is essential to understand their epidemiology. Ideally, these studies should be multicenter, involving as many hospitals as possible, and should use a shared database to collect all poisonings treated at each site. In Spain, several registries have been developed by individual hospitals or working groups, often using different data collection criteria, which makes comparisons difficult. Among the few standardized multicenter studies are SEMESTOX,<sup>2</sup> HISPATOX,<sup>3</sup> and Intox-28.<sup>4</sup> There are also ongoing registries such as the REDUrHE,<sup>5</sup> focused on poisonings caused by illegal drugs of abuse, and the Spanish Toxicovigilance System (SETV), which records exposures to chemical products used in agriculture, industry, or households.<sup>6</sup>

Poisonings encompass a wide clinical spectrum determined by the characteristics of the intoxicated patient (age,<sup>7-9</sup> sex,<sup>10-12</sup> origin,<sup>13</sup> presence of comorbidities<sup>14</sup>), the type of toxic agents involved (illegal drugs of abuse, pharmaceuticals, chemical products for domestic, agricultural, or industrial use, mushrooms, plants), the intentionality of the poisoning, and the location where it occurred. Therefore, having a single unified registry, in which different centers can report cases using the same methodology, is essential to more accurately determine the characteristics of acute poisonings occurring in Spain. Moreover, with the emergence of new psychoactive substances, medications, and chemical agents, as well as demographic changes in certain geographic areas, the characteristics of poisonings can vary over time. Continuous registries are therefore necessary to detect such changes.<sup>15,16</sup>

To optimize the recording of poisonings in Spain, the Spanish Foundation of Clinical Toxicology (FETOC) has implemented an online questionnaire named EPITOX (Epidemiology of TOXic exposures), designed to standardize the collection of poisoning data. The main objective of this study is to present the results of the cases reported to the registry during 2024, its first year of operation.

## Material and methods

FETOC has developed an online registry specifically designed for the collection of poisonings treated in Spanish emergency departments (EDs). This registry integrates data corresponding to chemical product poisonings, which include different types of agents (metals, caustics, detergents, etc.) in solid, liquid, or gaseous form; acute reactions to illegal drug use; and other poisonings caused by agents such as ethyl alcohol, drugs, plants, mushrooms, or venomous animal bites/stings. Accordingly, there are 3 possible access routes to the questionnaire, available through three distinct icons on the FETOC homepage ([www.fetoc.es](http://www.fetoc.es)): 1) toxicovigilance: access to the SETV chemical exposure registry —

used only by participants contributing cases involving chemical products; 2) EPITOX: the central icon, used by centers reporting all poisonings attended in their EDs (including those corresponding to SETV and REDUrHE); and 3) REDUrHE: for centers contributing exclusively cases of illegal drug poisonings. At the center is the EPITOX icon, which should be used by those centers that report all intoxication cases treated in their hospital EDs, including those covered by SETV and REDUrHE. Access to the questionnaire is carried out online using access credentials. Each center enters the cases attended in its ED while ensuring data anonymization.

Following implementation, centers affiliated with SETV and those listed in the FETOC database were contacted. A total of 31 hospitals across 9 autonomous communities agreed to participate. Among them, some recorded only chemical toxicovigilance cases, and one recorded both chemical and drug abuse cases. Twelve centers across 6 autonomous communities reported all poisonings treated in their EDs, and these data comprise the present analysis.

At the end of the study year, the recorded cases were exported to an Excel database. Statistical analysis was performed using SPSS v15 for Windows. Results were expressed as numbers (percentages) or means (standard deviations). Student's t-test and chi-square tests (Fisher's or Pearson's correction when appropriate) were used for proportion comparisons. Statistical significance was set at  $P < .05$ .

The study was conducted in full compliance with the principles outlined in the Declaration of Helsinki for research involving human subjects. The creation of the EPITOX registry was approved by the Research Ethics Committee of the Department of Health of the Government of Aragón (Ref. 09/2024). The study was exempted from requiring informed consent, as it was an epidemiological investigation using an anonymized database.<sup>4,6,11</sup>

## Results

### General data

During 2024, a total of 6,297 poisonings were recorded. Of these, 757 corresponded to centers that recorded only toxicovigilance or illegal drug abuse cases and were therefore excluded. The final analysis included a total of 5,540 cases from 12 centers across 6 autonomous communities (Catalonia, Aragon, Galicia, Navarre, Madrid, and Castile and León). The mean age was 38.95 years (SD, 18); 55.7% were men, and 65.5%, Spanish nationals. Tourists accounted for 2.6% of cases. Monthly distribution was relatively uniform, ranging from 400 cases in July or 402 in December to 518 in August. Ambulance transport occurred in 57.1% of cases. Poisoning took place in a public space in 33.7%, and at home in 44.4%. Nearly half (47.7%) of poisonings were recreational, and 28% were suicidal in intent (Table 1).

In most cases (56.3%), only a single toxic agent was involved. The most frequent toxin was ethyl alcohol (46.3%), followed by pharmaceuticals (38.3%), illegal drugs of abuse (28.7%), and chemical products (11.6%) (Table 2).

**Table 1.** Baseline characteristics of poisonings during 2024

|                                       | N (%)        |
|---------------------------------------|--------------|
| <b>Age</b> [mean (SD)]                | 38.95 (18.0) |
| <b>Sex</b>                            |              |
| Male                                  | 3,086 (55.7) |
| Female                                | 2,454 (44.3) |
| <b>Origin</b>                         |              |
| Spanish                               | 3,636 (65.5) |
| Latin America                         | 460 (8.3)    |
| Maghreb                               | 350 (6.3)    |
| European Union                        | 262 (4.7)    |
| Rest of Europe                        | 110 (2)      |
| Sub-Saharan Africa                    | 44 (0.8)     |
| Indian Subcontinent                   | 26 (0.5)     |
| Rest of Asia                          | 25 (0.5)     |
| USA and Canada                        | 23 (0.4)     |
| Australia and New Zealand             | 1 (0.0)      |
| Unclassified                          | 37 (0.7)     |
| <b>Tourist</b>                        | 145 (2.6)    |
| <b>Mode of arrival at the ED</b>      |              |
| Ambulance                             | 3,166 (57.1) |
| Own means                             | 1,736 (31.3) |
| Law enforcement                       | 190 (3.4)    |
| Transfer from another center          | 88 (1.6)     |
| Fire department                       | 4 (0.1)      |
| Unknown                               | 342 (6.2)    |
| <b>Place of poisoning</b>             |              |
| Home                                  | 2,457 (44.4) |
| Street or public place                | 1,867 (33.7) |
| Workplace                             | 84 (1.5)     |
| Correctional facility                 | 9 (0.2)      |
| School                                | 4 (0.1)      |
| Unknown                               | 1,018 (18.4) |
| <b>Type of poisoning</b>              |              |
| Recreational                          | 2,644 (47.7) |
| Suicidal intent                       | 1,549 (28)   |
| Accidental domestic                   | 530 (9.6)    |
| Accidental occupational               | 77 (1.4)     |
| Other accidental                      | 77 (1.4)     |
| Accidental overdose                   | 54 (1.0)     |
| Assault                               | 9 (0.2)      |
| Foodborne                             | 14 (0.3)     |
| Iatrogenic                            | 101 (1.8)    |
| Other                                 | 172 (3.1)    |
| Unknown                               | 226 (4.1)    |
| <b>History of previous poisonings</b> | 2,296 (41.4) |
| <b>Psychiatric history</b>            | 2,699 (48.7) |

SD: standard deviation; ED: emergency department.

Tables 3 and 4 describe the clinical signs and treatments administered. The most common signs were neurological (55.8%), followed by psychiatric (25%) and digestive (16%). GI decontamination was performed with activated charcoal in 11.6% of cases and gastric lavage in 1.6%. Antidotes were administered in 15.1%, mainly flumazenil (9%).

At ED discharge, 2,600 patients (81%) were discharged directly, 203 (3.7%) were admitted to the intensive care unit (ICU), 140 (2.5%) to psychiatric wards, and 390 (7%) were referred to psychiatric centers for further assessment. Additionally, 177 (3.2%) were admitted to general hospital wards. There were 231 (4.2%) voluntary discharges and 295 (5.3%) absconded cases. Mortality during the poisoning episode was 0.5% (25 patients). The main causes of death were multiple organ failure (6 cases) and cardiovascular complications

**Table 2.** Type of toxic agents involved

|                                                             | N (%)        |
|-------------------------------------------------------------|--------------|
| <b>Type of toxic agent</b>                                  |              |
| Alcohol                                                     | 2,565 (46.3) |
| Alcohol only                                                | 1,515 (27.3) |
| Alcohol + drugs of abuse                                    | 493 (8.9)    |
| Alcohol + drugs                                             | 361 (6.5)    |
| Alcohol + drugs and drugs of abuse                          | 113 (2)      |
| Unknown                                                     | 83 (1.5)     |
| <b>Drugs</b>                                                | 2,123 (38.3) |
| Benzodiazepines                                             | 1,443 (26.0) |
| Atypical neuroleptics                                       | 217 (3.9)    |
| SSRIs antidepressants                                       | 210 (3.8)    |
| Paracetamol                                                 | 160 (2.9)    |
| NSAIDs and ASA                                              | 150 (2.7)    |
| Opioids                                                     | 116 (2.1)    |
| Antiepileptics                                              | 115 (2.1)    |
| Gabapentinoids                                              | 115 (2.1)    |
| Heterocyclic antidepressants                                | 39 (0.7)     |
| Lithium                                                     | 22 (0.4)     |
| Metformin                                                   | 19 (0.3)     |
| Others                                                      | 327 (5.9)    |
| <b>Drugs of abuse</b>                                       | 1,591 (28.7) |
| Cocaine and derivatives                                     | 663 (12.0)   |
| Cannabis and derivatives                                    | 615 (11.1)   |
| Amphetamine-type substances                                 | 314 (5.7)    |
| GHB/GBL                                                     | 61 (1.1)     |
| Heroin                                                      | 50 (0.9)     |
| Methadone                                                   | 41 (0.7)     |
| Ketamine                                                    | 37 (0.7)     |
| Others                                                      | 74 (1.3)     |
| Unknown                                                     | 74 (1.3)     |
| <b>Chemical products</b>                                    | 641 (11.6)   |
| Toxic gases                                                 | 239 (4.3)    |
| Caustics                                                    | 137 (2.5)    |
| Irritant gases                                              | 89 (1.6)     |
| Solvents                                                    | 40 (0.7)     |
| Detergents                                                  | 34 (0.6)     |
| Pesticides                                                  | 20 (0.4)     |
| Others                                                      | 82 (1.5)     |
| <b>Mushroom poisonings</b>                                  | 14 (0.3)     |
| <b>Bites or stings</b>                                      | 11 (0.2)     |
| <b>Plant poisonings</b>                                     | 4 (0.1)      |
| <b>Number of toxic agents involved (out of 4,744 cases)</b> |              |
| 1                                                           | 3,120 (56.3) |
| 2                                                           | 1018 (18.4)  |
| 3                                                           | 409 (7.4)    |
| 4                                                           | 125 (2.3)    |
| ≥ 5                                                         | 75 (1.3)     |

SSRIs: selective serotonin reuptake inhibitors; NSAIDs: nonsteroidal anti-inflammatory drugs; ASA: acetylsalicylic acid.

(arrhythmia or cardiac arrest, 5 cases). Poisoning was considered the definite cause of death in 10 cases, probable in 5, and contributory in another 5.

### Data by Autonomous Community

During 2024, 12 centers from 6 autonomous communities contributed cases to EPITOX. The distribution was uneven: 6 EDs in Catalonia, 2 in Castile and León, and 1 each in Aragon, Galicia, Madrid, and Navarre, limiting interregional comparisons in four of them to data from a single center. Table 5 shows the characteristics of poisonings by region, highlighting their differences.

**Table 3.** Clinical signs

|                                    | N (%)        |
|------------------------------------|--------------|
| <b>Digestive symptoms</b>          | 886 (16.0)   |
| Nausea                             | 345 (6.2)    |
| Vomiting                           | 588 (10.6)   |
| Abdominal pain                     | 172 (3.1)    |
| Diarrhea                           | 45 (0.8)     |
| GI bleeding                        | 5 (0.1)      |
| Caustic injury                     | 14 (0.2)     |
| <b>Neurological symptoms</b>       | 3,089 (55.8) |
| Amnesia                            | 87 (1.6)     |
| Headache                           | 211 (3.8)    |
| Confusion                          | 286 (5.2)    |
| Intoxication                       | 802 (14.5)   |
| Drowsiness (GCS = 13–15)           | 1,212 (21.9) |
| Tremor                             | 79 (1.4)     |
| Decreased consciousness (GCS < 13) | 934 (16.9)   |
| Focal neurological signs           | 19 (0.3)     |
| Seizures                           | 90 (1.6)     |
| <b>Cardiovascular symptoms</b>     | 590 (10.6)   |
| Chest pain                         | 105 (2.0)    |
| Tachycardia (HR > 90 bpm)          | 1918 (41.8)* |
| Palpitations                       | 340 (6.1)    |
| Syncope                            | 70 (0.1)     |
| Acute pulmonary edema              | 1 (0.0)      |
| Cardiac arrest                     | 9 (0.2)      |
| <b>Respiratory symptoms</b>        | 291 (5.3)    |
| Dyspnea                            | 164 (3.0)    |
| Cough                              | 67 (1.2)     |
| Bronchospasm                       | 39 (0.7)     |
| Bronchoaspiration                  | 37 (0.7)     |
| <b>Cutaneous signs</b>             | 136 (2.5)    |
| <b>Ocular signs</b>                | 139 (2.5)    |
| <b>Psychiatric symptoms</b>        | 1,390 (25.1) |
| Agitation                          | 739 (13.3)   |
| Hallucinations                     | 80 (1.4)     |
| Anxiety                            | 415 (7.5)    |
| Aggressiveness                     | 643 (11.6)   |
| Behavioral disorder                | 106 (1.9)    |
| Psychosis                          | 97 (1.7)     |
| Depression                         | 205 (3.7)    |

\*Calculated based on 4,584 cases with recorded HR.

GCS: Glasgow Coma Score; HR: heart rate; GI: gastrointestinal.

The mean age of poisoned patients was higher in Galicia and Navarre (44 years) compared to under 40 years in other regions.

Regarding sex distribution, men predominated in all regions except Galicia and Madrid, where women were slightly more frequent, though proportions were close to 50%. Most patients were Spanish nationals, though in Catalonia this group represented only 57.4%, the only region with a significant number of tourists (6.2%) ( $P < .001$  in all comparisons).

Other notable differences included the intentionality of poisoning, with 45.4% suicidal cases in Madrid ( $P < .001$ ). The location of poisoning varied between home and public spaces, and ethyl alcohol was the most common toxin except in Aragon (predominantly illegal drugs) and Madrid (higher percentage of pharmaceutical poisonings) ( $P < .001$ ). Regarding disposition, most patients were discharged from the ED, exceeding 80% in Aragon, Castile and León, and Galicia ( $P < .001$ ). Voluntary discharges ranged from 3.2% in

**Table 4.** Treatments administered

|                                 | N (%)        |
|---------------------------------|--------------|
| <b>Nonspecific treatment</b>    | 3,174 (57.3) |
| <b>Mechanical restraint</b>     | 335 (6.0)    |
| <b>Pharmacological sedation</b> | 463 (8.4)    |
| <b>Skin decontamination</b>     | 13 (0.2)     |
| <b>Ocular decontamination</b>   | 93 (1.7)     |
| <b>GI decontamination</b>       |              |
| Activated charcoal              | 645 (11.6)   |
| Gastric lavage                  | 87 (1.6)     |
| Intestinal lavage               | 9 (0.2)      |
| <b>Antidote</b>                 | 839 (15.1)   |
| Naloxone                        | 177 (3.2)    |
| Flumazenil                      | 498 (9.0)    |
| N-acetylcysteine                | 76 (1.4)     |
| Oxygen therapy                  | 192 (3.5)    |
| Hyperbaric oxygen therapy       | 78 (1.4)     |
| Vitamin K                       | 9 (0.2)      |
| Hydroxocobalamin                | 6 (0.1)      |
| Hypertonic glucose              | 10 (0.2)     |
| Others                          | 16 (0.3)     |
| <b>Extrarenal purification</b>  |              |
| Hemodiafiltration               | 11 (0.2)     |
| Hemodialysis                    | 8 (0.1)      |
| Hemofiltration                  | 2 (0.0)      |
| <b>Renal purification</b>       |              |
| Forced alkaline diuresis        | 17 (0.3)     |
| Forced neutral diuresis         | 31 (0.6)     |
| <b>OTI with MV and CPR</b>      | 24 (0.4)     |

OTI: orotracheal intubation; MV: mechanical ventilation; CPR: cardiopulmonary resuscitation; GI: gastrointestinal.

Madrid to 6.3% in Castile and León ( $P = .03$ ), while Catalonia (9.3%) and Galicia (6.7%) had the highest absconding rates ( $P < .001$ ).

Finally, the mortality rate remained low—although slightly higher than in previous series<sup>2,3</sup> with maximum rates of 0.6%, except in Navarre, where a single death was recorded ( $P < .001$ ).

### Distribution by sex

Of the 5,540 recorded cases, a total of 3,086 (55.7%) were men and 2,454 (44.3%) were women, with a mean age of 39.1 and 38.7 years, respectively. In both groups, patients of Spanish origin predominated, although among men the percentage was lower (63.5% vs 67.8%,  $P < .001$ ). Sex-based distribution showed differences in many of the parameters analyzed (Table 6). Women had fewer previous poisonings than men, but more psychiatric history (38.7% and 56.8% vs 43.6% and 42.3%;  $P < .001$  in both comparisons) and had a higher rate of poisonings with suicidal intent (41.9% vs 16.9%;  $P < .001$ ), whereas recreational poisonings predominated in men (61.3% vs 30.6%;  $P < .001$ ). Differences were also found in the place of poisoning, with a public place being most frequent in men (44.9%), while women were more often poisoned at home (58.8%).

With respect to the type of toxic agent, alcohol and illegal drugs of abuse predominated among men (54.1% and 36.2%), while drug use predominated among women (51.3%). Poisonings by chemical products represented a smaller percentage overall but were more frequent in wo-

Table 5. Comparison across autonomous communities

|                                     | Autonomous Community         |                                      |                                 |                             |                            |                             | P value |
|-------------------------------------|------------------------------|--------------------------------------|---------------------------------|-----------------------------|----------------------------|-----------------------------|---------|
|                                     | Aragon<br>N = 1,062<br>n (%) | Castile and León<br>N = 788<br>n (%) | Catalonia<br>N = 2,185<br>n (%) | Galicia<br>N = 697<br>n (%) | Madrid<br>N = 691<br>n (%) | Navarre<br>N = 117<br>n (%) |         |
| Age [mean (SD)]                     | 35.9 (17.6)                  | 39.8 (18.2)                          | 37.8 (17.8)                     | 44.3 (16.7)                 | 39.8 (18.5)                | 44.4 (20.1)                 | < .001  |
| Male sex                            | 573 (54)                     | 485 (61.5)                           | 1,285 (58.8)                    | 343 (49.2)                  | 332 (48)                   | 68 (58.1)                   | < .001  |
| Spanish origin                      | 414 (76.5) <sup>1</sup>      | 686 (87)                             | 1,255 (57.4)                    | 617 (88.5)                  | 560 (81)                   | 94 (80.3)                   | .000    |
| Tourist                             | 0                            | 8 (1)                                | 135 (6.2)                       | 0                           | 2 (0.3)                    | 0                           | < .001  |
| Previous intoxications              | 348 (32.8)                   | 326 (41.4)                           | 893 (40.9)                      | 325 (46.6)                  | 360 (52.1)                 | 44 (37.6)                   | < .001  |
| Psychiatric history                 | 559 (52.6)                   | 347 (44)                             | 947 (43.3)                      | 362 (51.9)                  | 438 (63.4)                 | 46 (39.3)                   | < .001  |
| HIV infection                       | 3 (0.3)                      | 8 (1)                                | 76 (3.5)                        | 34 (4.9)                    | 6 (0.9)                    | 0                           | .000    |
| Mode of arrival                     |                              |                                      |                                 |                             |                            |                             | < .001  |
| Ambulance                           | 450 (42.4)                   | 450 (57.1)                           | 1,634 (74.8)                    | 277 (39.7)                  | 296 (42.8)                 | 59 (50.4)                   |         |
| Own means                           | 365 (34.4)                   | 255 (32.4)                           | 431 (19.7)                      | 325 (46.6)                  | 303 (43.8)                 | 57 (48.7)                   |         |
| Other/unknown                       | 247 (23.2)                   | 83 (10.5)                            | 120 (5.5)                       | 95 (13.6)                   | 92 (13.1)                  | 1 (0.1)                     |         |
| Place of intoxication               |                              |                                      |                                 |                             |                            |                             | < .001  |
| Home                                | 573 (54)                     | 319 (40.5)                           | 914 (41.8)                      | 192 (27.5)                  | 385 (55.7)                 | 74 (63.2)                   |         |
| Public place                        | 252 (23.7)                   | 304 (38.6)                           | 1031 (47.2)                     | 58 (8.3)                    | 190 (27.5)                 | 32 (27.3)                   |         |
| Other                               | 13 (1.2)                     | 19 (2.4)                             | 32 (1.5)                        | 20 (2.9)                    | 7 (1.0)                    | 6 (5.1)                     |         |
| Unknown                             | 224 (21.1)                   | 146 (18.5)                           | 208 (9.5)                       | 427 (61.3)                  | 109 (15.8)                 | 5 (4.3)                     |         |
| Type of intoxication                |                              |                                      |                                 |                             |                            |                             | < .001  |
| Recreational                        | 512 (48.2)                   | 421 (53.4)                           | 1,148 (52.5)                    | 301 (43.2)                  | 213 (30.8)                 | 49 (41.9)                   |         |
| Suicidal                            | 349 (32.9)                   | 163 (20.7)                           | 530 (24.3)                      | 167 (24.0)                  | 314 (45.4)                 | 26 (22.2)                   |         |
| Accidental                          | 100 (9.4)                    | 108 (13.7)                           | 267 (12.1)                      | 169 (24.2)                  | 62 (9.0)                   | 32 (27.3)                   |         |
| Iatrogenic                          | 26 (2.4)                     | 12 (1.5)                             | 38 (1.7)                        | 1 (0.1)                     | 21 (3.0)                   | 3 (2.6)                     |         |
| Other/unknown                       | 75 (7.1)                     | 84 (10.6)                            | 202 (9.2)                       | 59 (8.5)                    | 81 (11.7)                  | 7 (6.0)                     |         |
| Type of toxic agent                 |                              |                                      |                                 |                             |                            |                             | < .001  |
| Alcohol                             | 444 (41.8)                   | 456 (57.9)                           | 1,033 (47.3)                    | 291 (41.8)                  | 291 (42.1)                 | 50 (42.7)                   |         |
| Drugs                               | 421 (39.6)                   | 293 (37.2)                           | 793 (36.3)                      | 216 (31.0)                  | 361 (52.2)                 | 39 (33.3)                   |         |
| Drugs of abuse                      | 468 (44.1)                   | 188 (23.9)                           | 569 (26.0)                      | 163 (23.4)                  | 182 (26.3)                 | 21 (17.9)                   |         |
| Chemical products                   | 77 (7.3)                     | 85 (10.8)                            | 230 (10.5)                      | 181 (26)                    | 45 (6.5)                   | 23 (19.7)                   |         |
| Other                               | 4 (0.4)                      | 1 (0.1)                              | 11 (0.5)                        | 2 (0.3)                     | 1 (0.1)                    | 0                           |         |
| Clinical signs                      |                              |                                      |                                 |                             |                            |                             | < .001  |
| Digestive                           | 191 (18)                     | 144 (18.3)                           | 347 (15.9)                      | 83 (11.9)                   | 100 (14.5)                 | 21 (17.9)                   |         |
| Neurological                        | 565 (53.2)                   | 432 (54.8)                           | 1,367 (62.6)                    | 320 (45.9)                  | 329 (47.6)                 | 76 (65)                     |         |
| Cardiovascular                      | 300 (28.2)                   | 48 (6.1)                             | 161 (7.4)                       | 33 (4.7)                    | 38 (5.5)                   | 10 (8.5)                    |         |
| Respiratory                         | 63 (5.9)                     | 42 (5.3)                             | 109 (5.0)                       | 39 (5.6)                    | 22 (3.2)                   | 16 (13.7)                   |         |
| Cutaneous                           | 2 (0.2)                      | 58 (7.4)                             | 55 (2.5)                        | 3 (0.4)                     | 14 (2.0)                   | 4 (3.4)                     |         |
| Ocular                              | 2 (0.2)                      | 31 (3.9)                             | 19 (0.9)                        | 62 (8.9)                    | 17 (2.5)                   | 8 (6.8)                     |         |
| Psychiatric                         | 254 (23.9)                   | 239 (30.3)                           | 497 (22.7)                      | 153 (22.0)                  | 226 (32.7)                 | 21 (17.9)                   |         |
| Disposition                         |                              |                                      |                                 |                             |                            |                             | < .001  |
| Discharged home                     | 956 (90.0)                   | 681 (86.4)                           | 1625 (74.4)                     | 592 (84.9)                  | 537 (77.7)                 | 89 (76.1)                   |         |
| ICU admission                       | 46 (4.3)                     | 24 (3.0)                             | 79 (3.6)                        | 17 (2.4)                    | 35 (5.1)                   | 2 (1.7)                     |         |
| HU admission                        | 33 (3.1)                     | 30 (3.8)                             | 49 (2.2)                        | 15 (2.2)                    | 41 (5.9)                   | 9 (7.7)                     |         |
| Psychiatric unit admission          | 12 (8.6)                     | 30 (3.8)                             | 10 (0.5)                        | 40 (5.7)                    | 45 (6.5)                   | 3 (2.6)                     |         |
| Transfer for psychiatric evaluation | 8 (0.8)                      | 2 (0.3)                              | 351 (16.1)                      | 2 (0.3)                     | 21 (3.0)                   | 6 (5.1)                     |         |
| Other destinations                  | 6 (0.6)                      | 21 (2.7)                             | 71 (3.2)                        | 31 (4.4)                    | 12 (1.7)                   | 8 (6.8)                     |         |
| Voluntary discharge                 | 42 (4.0)                     | 50 (6.3)                             | 82 (3.8)                        | 31 (4.4)                    | 22 (3.2)                   | 4 (3.4)                     | .030    |
| Escape                              | 8 (0.8)                      | 23 (2.9)                             | 203 (9.3)                       | 47 (6.7)                    | 13 (1.9)                   | 1 (0.9)                     | < .001  |
| Death during the episode            | 3 (0.3)                      | 3 (0.4)                              | 12 (0.2)                        | 0                           | 4 (0.6)                    | 3 (2.6)                     | < .001  |

<sup>1</sup>Percentage calculated on 541 cases where the origin of the intoxicated patient was recorded.

ICU: intensive care unit; HU: hospitalization unit.

men (13.8% vs 9.8%;  $P < .001$ ). Finally, a higher proportion of men (82.5%) could be discharged directly from the ED, whereas women more frequently required psychiatric admission or psychiatric evaluation. Mortality was higher among men (0.6% vs 0.3%;  $P = .028$ ).

## Discussion

This work presents the results from the first year of implementation of the EPITOX registry. The poisoned patient

attended in Spanish EDs is most commonly a middle-aged man. The most frequently involved toxic agent is ethyl alcohol, followed by drugs and illegal drugs of abuse, followed by drugs, confirming the results of a former multicenter study,<sup>4</sup> in contrast to single-center studies whose results vary according to the area where they are conducted<sup>10,17</sup> as demonstrated in a recent study covering three areas of the Region of Murcia.<sup>18</sup> This percentage of pharmacological poisonings may explain why most recorded poisonings occurred at the patient's home, rather than in a public place, where

**Table 6.** Sex distribution

|                                     | Sex                        |                              | P value |
|-------------------------------------|----------------------------|------------------------------|---------|
|                                     | Male<br>N = 3.086<br>n (%) | Female<br>N = 2.454<br>n (%) |         |
| Age [mean (SD)]                     | 39.1 (17.2)                | 38.7 (18.9)                  | .367    |
| Spanish origin                      | 1,962 (63.5)               | 1,664 (67.8)                 | < .001  |
| Tourist                             | 77 (2.5)                   | 68 (2.8)                     | .004    |
| Previous intoxications              | 1,346 (43.6)               | 950 (38.7)                   | < .001  |
| Psychiatric history                 | 1,304 (42.3)               | 1,395 (56.8)                 | < .001  |
| HIV infection                       | 98 (3.2)                   | 29 (1.2)                     | < .001  |
| Mode of arrival                     |                            |                              | < .001  |
| Ambulance                           | 1,858 (60.2)               | 1,308 (53.3)                 |         |
| Own means                           | 861 (27.9)                 | 875 (35.7)                   |         |
| Other/unknown                       | 360 (11.7)                 | 271 (11.0)                   |         |
| Place of intoxication               |                            |                              | < .001  |
| Home                                | 1,014 (32.9)               | 1,443 (58.8)                 |         |
| Public place                        | 1,387 (44.9)               | 577 (23.5)                   |         |
| Other/unknown                       | 685 (22.2)                 | 434 (17.7)                   |         |
| Type of intoxication                |                            |                              | < .001  |
| Recreational                        | 1,893 (61.3)               | 751 (30.6)                   |         |
| Suicidal                            | 522 (16.9)                 | 1,027 (41.9)                 |         |
| Accidental                          | 348 (11.3)                 | 390 (15.9)                   |         |
| Iatrogenic                          | 41 (1.3)                   | 60 (2.4)                     |         |
| Other/unknown                       | 282 (9.1)                  | 226 (9.2)                    |         |
| Type of toxic agent                 |                            |                              |         |
| Alcohol                             | 1,669 (54.1)               | 896 (36.5)                   | < .001  |
| Medications                         | 865 (28.0)                 | 1,258 (51.3)                 | < .001  |
| Drugs of abuse                      | 1,116 (36.2)               | 475 (19.4)                   | < .001  |
| Chemical products                   | 302 (9.8)                  | 339 (13.8)                   | < .001  |
| Others                              | 16 (0.5)                   | 13 (0.5)                     | .393    |
| Clinical signs                      |                            |                              | < .001  |
| Digestive                           | 450 (14.6)                 | 436 (17.8)                   |         |
| Neurological                        | 1,766 (57.2)               | 1,323 (53.9)                 |         |
| Cardiovascular                      | 355 (11.5)                 | 235 (9.6)                    |         |
| Respiratory                         | 155 (5.0)                  | 136 (5.5)                    |         |
| Cutaneous                           | 98 (3.2)                   | 38 (1.5)                     |         |
| Ocular                              | 70 (2.3)                   | 69 (2.8)                     |         |
| Psychiatric                         | 842 (27.3)                 | 548 (22.3)                   |         |
| Disposition                         |                            |                              | < .001  |
| Discharged home                     | 2,547 (82.5)               | 1,933 (78.8)                 |         |
| ICU admission                       | 136 (4.4)                  | 67 (2.7)                     |         |
| HU admission                        | 97 (3.1)                   | 80 (3.3)                     |         |
| Psychiatric unit admission          | 68 (2.2)                   | 72 (2.9)                     |         |
| Transfer for psychiatric evaluation | 149 (4.8)                  | 241 (9.8)                    |         |
| Other destinations                  | 88 (2.9)                   | 61 (2.5)                     |         |
| Voluntary discharge                 | 138 (4.5)                  | 93 (3.8)                     | .207    |
| Escape                              | 210 (6.8)                  | 85 (3.5)                     | < .001  |
| Death during the episode            | 17 (0.6)                   | 8 (0.3)                      | .028    |

ICU: intensive care unit; HU: hospitalization unit.

many recreational poisonings take place.<sup>10</sup> The high rate of poisonings with suicidal intent is also notable and alarming, and has been the subject of various reports, especially after the SARS-CoV-2 pandemic.<sup>19,21</sup>

Regarding treatment received by poisoned patients, the high rate of use of an antidote such as flumazenil stands out, a finding also described in a recent publication by the REDurHE group.<sup>22</sup> Although the correct indication for flumazenil use was not assessed here, the usefulness of unified registries such as EPITOX should be emphasized for detecting aspects of daily clinical practice that might be amenable to improvement. Thus, the aim of epidemiological stu-

dies is not only to describe the characteristics of a given process, but also to prompt investigation of striking findings and, ultimately, to improve the quality of care provided to patients.

Mortality associated with the poisoning episode is low, and there is a high rate of association with the poisoning episode *per se*—figures similar to those of the EXITOX study<sup>23</sup>—so no changes are observed in mortality data related to toxic agents compared with those of the previous decade, at least in the hospital setting.

Although differences were detected across autonomous communities, these should be interpreted with caution due to the number of participating EDs in each region. In fact, only 2 autonomous communities contributed cases from more than one ED. Even so, some relevant differences can be noted, such as the higher rate of poisonings with suicidal intent in Aragon and Madrid, a finding that should be confirmed in coming years as more centers join the registry. Also notable is the higher percentage of non-Spanish patients and tourists in Catalonia. This may be due to migratory flows typical of large cities and to Barcelona's status as a city with strong tourist appeal.<sup>5</sup> In this regard, the low percentage of non-Spanish patients in the Community of Madrid is striking, but this may be due to the fact that only 1 center from this community participated. As for disposition, there was a higher rate of admissions to psychiatric services in Aragon and Madrid, which is consistent with the higher rate of poisonings with suicidal intent recorded in these communities, and a higher percentage of absconding in Catalonia, which could be influenced by the higher percentage of poisonings among tourists—generally a young population with poisonings of recreational cause.

Sex-based distribution revealed numerous differences between men and women. Among women there is higher suicidal intent, more frequent poisonings at home, and greater use of drugs, whereas men are more often poisoned in public places, for recreational purposes, and tend to consume alcohol and illegal drugs of abuse. These data are consistent with previous locally conducted studies<sup>10</sup> and may indicate that the profile of poisoned patients by sex is similar across Spain. The higher rate of chemical product poisonings in women is noteworthy, which may be influenced by the fact that women continue, in greater proportion, to be responsible for household tasks, and therefore more frequently have access to household products—mainly cleaning agents.

This study has several limitations. First, not all autonomous communities are represented, and in 4 of them, cases come from a single ED, so the distribution of cases is not homogeneous, with a greater concentration in certain communities. In addition, it is possible that some participant centers could not include all cases attended in their EDs, which may be a consequence of the pressure on EDs, with a lack of time and resources necessary to carry out registries of this kind—registries that are undoubtedly necessary to understand the reality of care in our country. Another limitation is that this work only describes the characteristics of the reported cases, without performing an analysis of the quality

of care provided or follow-up of patients once discharged from the ED. These limitations may introduce bias, whether in temporal distribution by months, in the ate of poisoning types, or in inter-community differences. Nevertheless, we believe that the number of cases captured by the registry is sufficiently high to validate the results obtained.

In conclusion, implementing a single registry such as EPITOX is essential to compare the characteristics of poisonings across different autonomous communities and hospital centers. Annual analysis of this registry will make it possible to identify changes over time in the profile of poisonings attended in Spanish EDs.

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## ADDENDUM

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