SEUP
SOCIEDAD ESPAÑOLA DE URGENCIAS DE PEDIATRÍA

EMERGENCIASPediátricas
Vol. 4. No. 2. May - August 2025

Emerg Pediatr. 2025; 4(2): 78-83

ORIGINAL ARTICLE

Annual report of the Toxicological Observatory of the Poisoning Working Group of the Spanish Society of Pediatric Emergencies. 2023

Johanna Ramírez-Romero, Ander Etxebarria, Jone Askaiturrieta, Beatriz Azkunaga, Santiago Mintegi, and Poisoning Working Group of the Spanish Society of Pediatric Emergencies

Hospital Universitario Cruces. Barakaldo, Vizcaya.

Received on february 7, 2025
Accepted on march 30, 2025

Key words:

Intoxications
Toxicologic Surveillance System
Annual report

Palabras clave:

Intoxicaciones
Observatorio toxicológico
Reporte anual

Abstract

Introduction and objective: Since 2008, the Toxicologic Surveillance System (TSS) of the Intoxications Working Group of the Spanish Society of Pediatric Emergency Medicine has recorded poisoning-related episodes on designated days each month in 58 Pediatric Emergency Departments (ED) across 15 Autonomous Communities. The objective of this study is to describe the poisoning episodes recorded in 2023.

Methodology: We conducted a descriptive study of the episodes recorded in 2023 by the 58 EDs participating in the TSS, including exposures of children under 18 years of age to different toxicants.

Results: A total of 254 episodes were recorded (62.3% female, median age 8 years, IQR 2–14). The primary route of exposure was ingestion (252 cases, 99.2%), predominantly due to unintentional ingestion (110 cases, 43.3%), followed by intentional suicidal poisonings (63 cases, 24.9%). The most frequently involved toxicants were medications (157 cases, 61.8%), household products (35 cases, 13.9%), and ethanol (33 cases, 13.1%). A total of 173 episodes (79.4%) occurred at home; 10 cases (4%) involved consultation with the National Institute of Toxicology. Of the total, 117 patients (46.4%) were symptomatic, diagnostic tests were performed in 166 cases (65.4%), treatment was administered in 114 cases (45.1%), and 163 patients (64.1%) remained under observation. No deaths were reported.

Conclusion: In 2023, an increase in suicidal poisonings was confirmed, along with changes in the most frequently involved toxic agents compared to previous TSS studies.

INFORME ANUAL DEL OBSERVATORIO TOXICOLÓGICO DEL GRUPO DE TRABAJO DE INTOXICACIONES DE LA SOCIEDAD ESPAÑOLA DE URGENCIAS DE PEDIATRÍA. 2023

Resumen

Introducción y objetivo: *El Observatorio Toxicológico (OT) del Grupo de Trabajo de Intoxicaciones de la Sociedad Española de Urgencias de Pediatría registra desde 2008 mensualmente, en unos días designados, los episodios relacionados con intoxicaciones en 58 Servicios de Urgencias Pediátricas (SUP) de 15 Comunidades Autónomas. El objetivo del estudio es describir los episodios de 2023.*

Metodología: *Estudio descriptivo de los episodios registrados en los 58 SUP del OT por exposiciones de niños menores de 18 años a sustancias potencialmente tóxicas en 2023.*

Corresponding author:
Dr. Santiago Mintegi
E-mail:
santiago.mintegiraso@osakidetza.eus

Resultados: *Se registraron 254 episodios (62,3% mujeres, mediana de edad 8 años, RI 2-14). La vía de intoxicación principal fue la ingesta (252, 99,2%), sobre todo por ingestas no intencionadas (110, 43,3%), seguida de intoxicaciones suicidas (63, 24,9%). Los grupos de tóxicos más frecuentes fueron los fármacos (157, 61,8%), productos del hogar (35, 13,9%) y etanol (33, 13,1%). 173 (79,4%) ocurrieron en domicilio, 10 (4%) contactaron con el Instituto Nacional de Toxicología, 117 (46,4%) fueron sintomáticos, en 166 (65,4%) se practicaron pruebas, 114 (45,1%) recibieron tratamiento y 163 (64,1%) permanecieron al menos unas horas en observación. Ninguno falleció.*

Conclusión: *En 2023 se confirma el aumento de las intoxicaciones con fin suicida apreciándose cambios en los tóxicos más frecuentemente implicados en relación a estudios previos del OT.*

INTRODUCTION

The Toxicological Observatory (TO) was established within the Poisoning Working Group of the Spanish Society of Pediatric Emergencies (SEUP) in October 2008. This observatory collects, on a monthly basis, episodes of exposures to potentially toxic substances recorded in Pediatric Emergency Departments (PED)[1]. Until 2014, all episodes were recorded on a single day each month, and from 2014 onward, episodes have been recorded on three days per month (the 13th, 14th, and 15th). Currently, the Toxicological Observatory comprises 58 hospitals across 15 Autonomous Communities.

Up to 2023, the TO has recorded 3,939 episodes corresponding to exposures to toxic substances, the annual distribution of which is shown in Figure 1. Of these, the clinical-epidemiological characteristics have been documented in 3,429 episodes.

The aim of this annual report is to present the episodes recorded in 2023.

MATERIALS AND METHODS

This descriptive study reviews the episodes recorded in 58 PEDs from 15 Autonomous Communities in Spain (Appendix 1) by the TO, concerning exposures of children under 18 years of age to potentially toxic substances in 2023. Among these centers, 32 serve patients up to 14 years old and 11 serve patients up to 18 years old.

During the study period, consultations for exposures to possible toxic substances were recorded in the PEDs on the 13th, 14th, and 15th of each month using electronic questionnaires.

The participating PEDs reported the total number of visits as well as the details of all consultations related to exposures to potentially toxic substances using electronic forms completed via Google Drive. The data collection questionnaire for each patient includes the date of the episode, age, sex, toxic substance, mechanism of poisoning, location and type of storage of the potential toxin, previous similar episodes in the patient or another family member, prehospital evaluation or treatment, accompanying person at the emergency department, mode of transportation, time elapsed from the contact with the toxic substance to arrival at the PED, symptoms and signs, additional examinations performed, treatment received in the PED, patient disposition, and outcome.

The severity of the episodes was measured using the Poisoning Severity Score (PSS): PSS= 0 (no toxicity), PSS=1 (mild toxicity with mild, transient, or self-limited symptoms), PSS = 2 (moderate toxicity with marked or persistent symp-

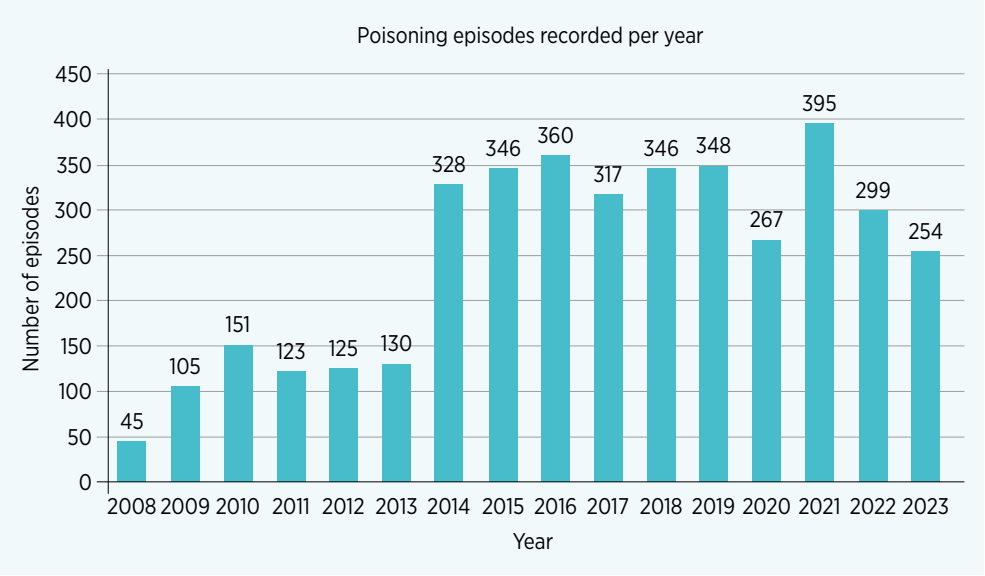

FIGURE 1. Number of poisoning episodes recorded by pediatric emergency departments in the Toxicological Observatory between 2008 and 2014. Until 2014, all episodes were recorded on a single day each month, and from 2014 onward, episodes were recorded on three days per month, on the 13th, 14th, and 15th.

toms), PSS= 3 (severe toxicity with life-threatening risk or risk of permanent sequelae), and PSS= 4 (fatal toxicity).

The quality of the care provided was measured using the quality indicators of SEUP[2].

Statistical analysis was performed using IBM SPSS Statistics for Windows, Version 24.0 (IBM Corp., Armonk, NY, USA). Data are expressed as the mean (standard deviation) for quantitative variables and as percentages for categorical variables. Quantitative variables were compared using the Student's t-test, while categorical variables were analyzed using the Chi-squared test and Fisher's exact test. A p-value of less than 0.05 was considered statistically significant. The study was approved by the Clinical Research Ethics Committee of Euskadi.

RESULTS

In 2023, on the designated recording days, 147,360 episodes were registered in the 58 pediatric emergency departments, of which 254 (0.17%) corresponded to exposures to potentially toxic substances (62.3% female). The median age was 8 years (IQR 2–14 years). Forty-seven PEDs serve patients only up to 14 years of age. The route of intoxication was oral ingestion in 252 cases (99.2%) and inhalation in 2 cases (0.8%). The predominant mechanism of intoxication was unintentional ingestion (110, 43.3%), followed by suicidal poisoning (63, 24.9%), recreational exposures (36, 14.2%), dosing errors (28, 11.1%), CO inhalation (2, 0.8%), and others (14, 5.5%).

The toxic agents most frequently involved were medications (157, 61.8%), followed by household products (35, 13.9%) and ethanol (33, 13%) (Table 1).

The distribution of the episodes according to the patient's age and the mechanism of intoxication is shown in Figure 2.

A total of 79.4% (173) of the episodes occurred at the child's home. In 210 cases (82.6%), the parents were the ones who brought the child to the PED, and in 180 episodes (75.9%), a private vehicle was used for transportation. In only 10 episodes (4%) was the National Toxicology Institute contacted prior to presentation at the PED. Furthermore, 190 patients (75%) sought consultation within the first two hours after contact with the potentially toxic substance.

Overall, 115 patients (46.4%) were symptomatic, with neurological symptoms predominating (55, 22%), followed by gastrointestinal symptoms (28, 11.4%). Physical examination was normal in 196 patients (77.2%).

The severity of the episodes, as measured by the Poisoning Severity Score (PSS), was as follows in the 251 cases for which it was recorded: PSS = 0 in 146 cases (58.2%); PSS= 1 in 87 (34.7%); PSS= 2 in 16 (6.4%); PSS = 3 in 2 (0.8%); and PSS= 4 in 0 cases.

The characteristics of the episodes according to the mechanism of intoxication are shown in Table 2.

TABLE 1. Groups of toxins involved in intoxications recorded in the year 2023.

Toxic Agent Group	n (%)
Medications	157 (61.8%)
Paracetamol	27 (10.6%)
Benzodiazepines	22 (8.6%)
Lorazepam	11 (4.3%)
Clonazepam	6 (2.3%)
Alprazolam	3 (1.1%)
Bromazepam	2 (0.7%)
Selective serotonin reuptake inhibitors	12 (4.7%)
Sertraline	9 (3.5%)
Fluoxetine	3 (1.1%)
Nonsteroidal anti-inflammatory drugs (NSAIDs)	11 (4.3%)
Ibuprofen	9 (3.5%)
Naproxen	1 (0.3%)
Dexketoprofen	1 (0.3%)
Polypharmacy	29 (11.5%)
Household products	35 (13.9%)
Ethanol	33 (13.1%)
Illicit drugs	7 (2.8%)
CO	2 (0.8%)

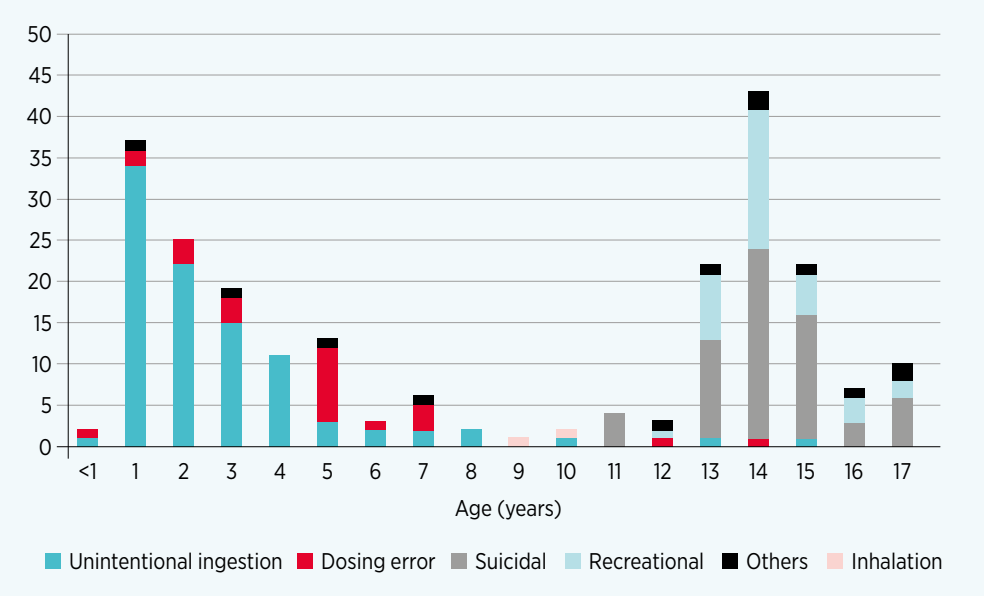

FIGURE 2. Poisoning episodes recorded according to age and poisoning mechanisms. 32 pediatric emergency departments serve patients up to 14 years old, and eleven serve patients up to 18 years old.

Additional tests were performed in 166 patients (65.4%), and 45.1% received treatment. A total of 163 patients (64.1%) remained under hospital observation for at least a few hours. No patient died, and all experienced a favorable outcome.

The interventions performed according to the mechanism of intoxication are shown in Table 3. Gastrointestinal decontamination was performed in 43 patients, including gastric lavage in 2 cases (4.6%, with the quality indicator standard

TABLE 2. Characteristics of the episodes managed according to the main mechanisms of poisoning.

	Mechanism of poisoning				
	Unintentional ingestion				
	Medications	Household products	Dosing error	Recreational	Suicidal
Number of cases	55	30	28	36	63
Female (%)	30 (55.6%)	12 (40%)	15 (53.6%)	21 (58.3%)	57 (90.5%)
Median age (IQR)	3 years (2-4.5)	2 years (1-3)	4 years (2-7)	14 years (13.25-15)	14 years (13-15)
Most frequent toxins	1º Ibuprofen 2º Paracetamol 3º Melatonin	1º Bleach 2º Hydrogen peroxide 3º Hydroalcoholic gel	1º Paracetamol 2º Vitamin D 3º Azitromicina	1º Ehtanol 2º Cannabis	1º Paracetamol 2º Lorazepam 3º Sertraline
% of patients presenting within the first 2 hours	90.9%	90%	71.4%	77.8%	52.3%
% of patients with PSS > 0	16.6%	26.6%	28.5%	83.3%	55.7%
Transport to the Emergency (n, %)*					
Family vehicle	49 (98%)	24 (88.9%)	28 (100%)	12 (35.3%)	35 (58.3%)
Non-medical ambulance	1 (1.8%)	1 (3.7%)		10 (29.4%)	11 (18.3%)
Medical ambulance		2 (7.4%)		8 (23.5)	13 (21.7%)
Police				2 (5.9%)	
Others				2 (5.9%)	1 (1.7%)
Symptomatic (%, 95% CI)	18.3% (7.1-29.6)	38.4% (18.4-58.5)	26.9% (8.6-45.1)	90.3% (79.3-100)	54% (39.6-68.3)

*PSS: Poisoning Severity Score; 95% CI: 95% confidence interval; *In 13 cases, the type of transport to the emergency department was not recorded.*

TABLE 3. Interventions performed in the episodes managed according to the main mechanisms of poisoning.

	Mechanism of poisoning				
	Unintentional ingestion				
	Medications	Household products	Dosing error	Recreational	Suicidal
Number of case	55	30	28	36	63
Additional tests (yes) (%, 95% CI)	55.1% (40.6-69.5)	30.7 (11.7-49.7)	61.9% (39.2-84.5)	90.3% (79.3-100)	88% (78.6-97.3)
Treatment (yes) (%, 95% CI)	44.9% (30.4-59.3)	15.3% (5.2-30.2)	38.1% (15.4-60.7)	61.2% (43.1-79.4)	62% (48-75.9)
Decontamination (yes) (%, 95% CI)	34.6% (20.8- 48.5)	3.8% (0-11.7)	7.1% (3-17.3)	3.2% (0-9.8)	28% (15.1-40.8)
Activated charcoal (single dose) (%, 95% CI)	22.8% (20.4-32.3%)	0%	21.4% (5.2-37.6%)	0%	34.9% (22.8-47)
Multiple-dose activated charcoal (%, 95% CI)	0%	0%	0%	0%	1.6% (0-4.9)
Tube insertion for charcoal administration (%, 95% CI)	0%	0%	0%	0%	1.6% (0-4.9)
Gastric lavage (%, 95% CI)	0%	0%	0%	0%	3.2% (0.9-10.8)
Antidote (yes) ** **(%, 95% CI)**	0%	3.8% (0-11.7)	10.7% (4-23.2)	0%	14% (4-29.3)
Hospital admission (yes)* **(%, 95% CI)**	59.1% (44.9-73.4)	42.3 (21.9-62.6)	53.5% (33.8-73.2)	80.6% (65.9-95.3)	90% (81.3-98.6)

*CI: 95% confidence interval; *Not enough data to calculate the exact 95% CI in the original table. **Antidotes used included N-acetylcysteine (9, 69.2%), biperiden (1, 7.6%), flumazenil (1, 7.6%), glucagon (1, 7.6%), and one unknown antidote (1, 7.6%). ***Includes observation in the pediatric emergency department. No patient underwent renal or extrarenal purification techniques.*

being < 10%). Activated charcoal was administered within the first 2 hours after ingestion in 51 patients (91.1%, quality indicator standard ≥ 90%). In the two patients exposed to carbon monoxide (CO), oxygen therapy at maximum concentration was administered (100%, quality indicator standard > 95%).

DISCUSSION

Despite the efforts undertaken by various institutions in the field of prevention, childhood poisonings continue to be a public health problem in Spain[3]. This Toxicological Observatory of the Poisoning Working Group of SEUP recorded more than 250 episodes related to toxic substance exposures in Spanish pediatric emergency departments (PEDs) in 2023.

Most of the characteristics of the episodes recorded in the Toxicological Observatory during the past year are similar to those documented in previous years[4,5]. However, there are significant changes during this latest period that warrant special emphasis.

In general, the age at presentation exhibited a bimodal distribution, with two peak incidences: a first peak in patients under 5 years of age, among whom unintentional ingestion predominates, and a second peak in adolescents over 12 years of age, where intentional ingestion predominates.

However, the incidence of the different mechanisms of poisoning deserves special mention. The increase in poisonings with suicidal intent recorded during this past year is notable compared to the incidence previously reported by this Working Group[6,7]. This increase was observed during the COVID-19 public health emergency, but it has persisted after the end of that emergency, highlighting the importance of addressing mental health in children and adolescents.

Another point worth noting is the change in some of the toxic substances involved. Antipyretic/anti-inflammatory drugs (primarily ibuprofen and paracetamol) have been the main pharmacological group implicated in unintentional poisonings, despite the implementation of safety caps on liquid paracetamol containers. Notably, in 2023, ibuprofen was the drug most frequently involved in unintentional ingestions resulting from the exploratory behavior of young children, displacing paracetamol and benzodiazepines. Similarly, an increase was observed in the number of poisonings due to dosing errors with vitamin D, a finding that invites further reflection[8,9].

On the other hand, in recent years there has been an increase in cases of unintentional ingestion of illicit drugs[10] (2.8% of the episodes recorded in 2023, all due to unintentional cannabis ingestion), a phenomenon that was also reported at the SEUP congress in 2024.

Although no patient died and all had favorable outcomes, multiple interventions were performed. Recreational poisonings were the most symptomatic upon arrival at the PED (90.3%) and were associated with the highest number of additional tests performed (90.3%); poisonings with suicidal intent received the most treatments (62%), including antidotes (14%); gastrointestinal decontamination was mainly used in poisonings due to unintentional ingestion of medications (34.6%); and intentional ingestions with suicidal intent were the cases most frequently requiring hospital admission (90%). Gastric lavage was performed in only 2 children. The results demonstrate adequate compliance with SEUP quality indicators, although data regarding the time elapsed until the administration of activated charcoal are not available.

CONCLUSIONS

In 2023, the increase in poisonings with suicidal intent is confirmed, with changes observed in the toxic agents most frequently involved compared to previous OT studies. Pediatric poisonings continue to be a dynamic and evolving field. This annual report from the Toxicological Observatory underscores the need for the existence of this multicenter surveillance system established in pediatric emergency departments (PEDs). This system enables clinicians to understand the nature of the episodes they manage and allows the relevant authorities to identify the weaknesses in our system to design new prevention strategies.

CONFLICTS OF INTEREST

The authors of this manuscript declare that they have no conflicts of interest.

REFERENCES

1. Azkunaga B, Mintegi S, Bizkarra I, Fernández J; Intoxications Working Group of the Spanish Society of Pediatric Emergencies. Toxicology surveillance system of the Spanish Society of Paediatric Emergencies: first-year analysis. Eur J Emerg Med. 2011; 18(5): 285-7.
2. González Hermosa A, Benito Fernández FJ, Fernández Elías M, González Peris S, Luaces Cubells C, Velasco Zúñiga R; Grupo de Trabajo de Seguridad y Calidad. Indicadores de calidad SEUP. Revisión 2018. Madrid: Ergon; 2018. [Último acceso 17 Mar 2025]. Disponible en: https://seup.org/pdf_public/gt/mejora_indicadores.pdf.
3. Mintegi S, Fernández A, Alustiza J, Canduela V, Mongil I, Caubet I, et al. Emergency visits for childhood poisoning: a 2-year prospective multicenter survey in Spain. Pediatr Emerg Care. 2006; 22(5): 334-8.
4. Salazar J, Zubiaur O, Azkunaga B, Molina JC, Mintegi S; Grupo de Trabajo de Intoxicaciones de la Sociedad Española de Urgencias de Pediatría. Diferencias territoriales en las intoxicaciones agudas en menores de 14 años en España. An Pediatr (Barc). 2015; 82(1): e39-43.
5. Mintegi S, Azkunaga B, Prego J, Qureshi N, Dalziel SR, Arana-Arri E, et al. International Epidemiological Differences in Acute Poisonings in Pediatric Emergency Departments. Pediatr Emerg Care. 2019; 35(1): 50-7.
6. Azkunaga B, Echarte P, Zumalde A, Mintegi S; Grupo de Trabajo de Intoxicaciones de la Sociedad Española de Urgencias de Pediatría. Incremento de las intoxicaciones con fin suicida en los servicios de urgencias en España durante la pandemia COVID-19. An Pediatr (Barc). 2023; 98(1): 67-9.
7. Algarrada Vico L, Martínez-Sánchez L, Baena Olomí I, Benito Caldés C, Rodríguez Varela A, López-Corominas V, et al. Multicenter study of adolescent suicide attempts by poisoning: social, epidemiological, and clinical characteristics. Emergencias. 2024; 36(6): 438-46.

8. Zubiaur O, Salazar J, Azkunaga B, Mintegi S; Grupo de Trabajo de Intoxicaciones de la SEUP. Therapeutic psychotropic drugs: Most common cause of unintentional poisoning in children. An Pediatr (Barc). 2015; 83(4): 244-7.
9. Levita J, Wilar G, Wahyuni I, Bawono LC, Ramadaini T, Rohani R, et al. Clinical toxicology of vitamin D in pediatrics: A review and case reports. Toxics. 2023; 11(7): 642.
10. Galior K, Grebe S, Singh R. Development of vitamin D toxicity from overcorrection of vitamin D deficiency: A review of case reports. Nutrients. 2018; 10(8): 953.
11. Azkunaga B, Crespo E, Oliva S, Humayor J, Mangione L. Poisoning by illegal drugs in young children in spanish paediatric emergency departments. An Pediatr (Barc). 2017; 86(1): 47-9.

APPENDIX 1. Members of Working Group of the Spanish Society of Pediatric Emergencies belonging to the Toxicology Observatory.

- H.U. Tajo: Hinojosa Mateo CM
- H. Quirón Bizkaia: Oliver P
- H.U. Arnau de Vilanova: Pociello N
- H.U. Basurto: Rodríguez Albarrán I
- H. Cabueñes: Rodríguez P, García A, Morán M
- H.U. Carlos Haya: Oliva S
- H.U. Navarra: Palacios M, Clerigué N
- C.H. Jaén: Campo T
- CAU Léon: Andrés AG, Muñiz M
- C.S. Parc Taulí: Baena I, Bajja S
- H.U. Cruces: Ramirez J
- H.U. Doce de Octubre: Mesa S
- H.U. Donostia: Muñoz JA, Muñoz MI
- H.U. Dr. Peset: Rodríguez A
- H.U. Francesc de Borja: Angelats Carlos M, Vilaplana-Mora I
- Fundació Sant Hospital de la Seu d'Urgell: Astete J
- H.U. Fundación Alcorcón: Barasoain A
- H.U. Gregorio Marañón: Vázquez P
- H. Infanta Cristina: Rodriguez MD
- H. Infanta Elena: Gómez C, Nuñez T
- H. Terrassa: Doménech F
- H. Laredo: Jorda A, Vega B
- H. Mendaro: Herrero L
- H.U. Mutua Terrassa: Pizà A
- H.U. Niño Jesús: Molina JC
- H. Materno-Infantil Las Palmas de Gran Canaria: Mangione L
- H. Materno-Infantil Badajoz: Ramiro L
- C. Asistencial Ávila: De Pedro S
- H. Montepríncipe, H. Sanchinarro, H. Torrelodones, H. Puerta del Sur: González I
- H. Príncipe de Asturias: García MA
- H.U. Puerta de Hierro: Benito C, Armero P
- H. Rey Juan Carlos: Sabrido G, Bello P
- H.U. Río Hortega: Bullón I
- H. Sant Joan de Dèu, Xarxa hospitalaria i universitaria de Manresa, Fundació Althaia: Botifoll E, Lobato Z
- H.U. Sant Joan de Déu: Martínez Sánchez L, Luaces C, Algarrada L
- H. San Pedro: Martínez L
- H.U. Salamanca: López J
- H. Virgen de la Salud: Aquino E
- H. Zumarraga: Pérez A
- H.U. Politécnico La Fe: Señer R
- H. Mataró: Baena J
- H.U .Marqués de Valdecilla, H Sierrallana: Peñalba A
- H. Gernika-Lumo: Alday A
- H. Miguel Servet: Campos C
- H.U. Son Espases: López-Corominas V
- C. Asistencia Soria: Muñoz N
- H. Infantil La Paz: De Miguel B
- H.C.U .Valencia: Khodayar P
- H. Severo Ochoa: Angulo AM
- H.U. General de Villalba: Casado E
- H.U. Santa Lucía: Ordoñez ME, H.U. Virgen del Rocío: Martínez I
- H. Infanta Leonor: Angulo AN
- H.U. Central de Asturias: Fernández R