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Epidemiological study of opioid use disorder in French emergency departments, 2010–2018 from OSCOUR database

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ABSTRACT

Objectives Opioid consumption in France has remained stable over the last 15 years, with much lower levels than in the USA. However, few data are available on patients who consume opioids and their use of the health system. Emergency department (ED) data has never been used as a source to investigate opioid use disorder (OUD) in France.
Design/settings/participants We used the OSCOUR national surveillance network, collecting daily ED data from 93% of French ED, to select and describe visits and hospitalisations after an OUD-related ED visit between 2010 and 2018 using International Classification of Diseases, version 10 (ICD10) codes. We described the population of interest and used binomial negative regressions to identify factors significantly associated with OUD such as gender, age, administrative region, year of admission and ICD10 codes. We also analysed the related diagnoses.
Primary outcome measure Trend in ED visits for an OUD-related ED visit.
Results We recorded 34 362 OUD-related visits out of 97 892 863 ED visits (36.1/100 000 visits). OUD-related visits decreased from 39.2/100 000 visits in 2010 to 32.9/100 000 visits in 2018, resulting in an average yearly decrease of 2.1% (95% CI 1.5% to 2.7%) after multivariate analysis. We recorded 15 966 OUD-related hospitalisations out of 20 359 574 hospitalisations after ED visits (78.4/100 000 hospitalisations) with an increase from 74.0/100 000 hospitalisations in 2010 to 81.4/100 000 hospitalisations in 2018. The analysis of related diagnoses demonstrated mostly polydrug abuse in this population.
Conclusions While the proportion of OUD visits decreased in the time frame, the hospitalisation proportion increased. The implementation of a nationwide surveillance system for OUD in France using ED visits would provide prompt detection of changes over time.

INTRODUCTION

High morbidity and mortality rates characterise the current unprecedented opioid epidemic in the USA,[1 2] with an estimated 135 deaths every day in 2017.[3] Initially, prescribed opioids were the primary reason for this crisis. Today, the substances involved are changing with a predominance of fentanyl

Strengths and limitations of this study

► First study on a large database containing 93% of all emergency departments (EDs) visits in France in the study period.
► Exploratory analysis of opioid use disorder (OUD) ED visit related diagnosis.
► Multivariate analysis of OUD rates to take into consideration cofounders.
► Change in the coverage of included emergencies and number of ED visit through the study period.
► No clinical data more than sociodemographic variables and diagnoses.

and heroin.[4 5] Canada has witnessed the same trend with a 43% increase in strong opioids (fentanyl, hydromorphone, oxycodone and morphine) between 2005 and 2011.[6]

In Europe, the general trend is also upward, especially for strong opioids, with a 400% and 300% increase in the UK[7] and Germany,[8] respectively, between 2000 and 2010.

In France, administrative databases and cross-sectional studies[9–11] show relative stability in opioid consumption, with an increase for some drugs (+1950% use for oxycodone, +105% for tramadol between 2004 and 2017). Between 2000 and 2015, opioid-related mortality increased from 1 to 4 deaths a week, lower than the rates observed in North America. French hospital discharge databases show that opioid-related hospitalisations increased from 17.6 to 56.9/100 000 population between 2000 and 2015.[9] Given the worrying international context, it would be beneficial to reinforce current epidemiological surveillance by exploring new data sources to accurately assess the burden of opioid use disorder (OUD) in France.

Data from emergency department (ED) visits are one such potential source, since they have already been used to monitor trends in

seasonal outbreaks,[12] non-infectious diseases[13] and to assess the health impact of environmental events.[14–16] Importantly, they also have been used specifically for OUD in the USA to monitor trends at the state and national levels.[17 18] ED data allow for the observation of a greater variety of patients than those who are hospitalised, mostly catching less serious patients.

The primary objective was to describe trends in OUD-related ED visits, defined as all visits related to opioid use (poisoning, addiction, overdose, withdrawal, side-effects), by using data from the OSCOUR network hypothesising an increase in visits over time. If such an increase were indeed observed, a rethinking of national public health policy on opioids (prescription guidelines, physicians training, implementation of a dedicated surveillance system) would seem essential. Secondary objectives were to describe ED OUD chief complaint, related diagnoses and hospitalisation after an ED visit, giving an insight of this population.

MATERIALS AND METHODS
Materials
In France, ED data are collected from computerised medical records completed during consultations in hospitals participating in the OSCOUR network. OSCOUR grew from 23 hospitals in 2004 to 695 in 2018, covering 93.2% of all ED visits in all French administrative regions, and totalling 150 million ED visits since its inception.

Participating hospitals transmit daily data to OSCOUR about individual patients seen during the previous 7 days. Most data are transmitted the day following a visit. As patients have no unique identification number, the number of distinct individuals consulted cannot be assessed, only the total number of visits. No identifiable information are collected through the OSCOUR system.

Transmitted data contain clinical information with a primary (PD) and up to five secondary (SD) discharge diagnoses, ranked in order of significance and coded using the International Classification of Diseases, version 10 (ICD10).[19] However, PD is only indicated in 75% of visits. For each visit, the following information is collected: chief complaint in free-text, severity score (from 1 to 5), demographic information (date of birth, gender, residence zip code), administrative information (date and time of admission and discharge, orientation after ED visit (hospitalisation, death, discharge)).

While data were available from 2004 onward, we focused our analysis on ED visits documented in OSCOUR between 2010 and 2018[20] to ensure data quality.

Methods
Identification of visits
We used ICD10 to identify OUD-related records using methodologies described in the literature.[3 21–29] The suitability of each code was then discussed with a group of experts comprising emergency physicians (members of the French Society of Emergency Medicine) and actors in drug surveillance in France (French Monitoring Centre for Drugs and Drug Addiction). We used codes related to opioid poisoning, including 'Opium poisoning' [T40.0], 'Heroin poisoning' [T40.1], 'Other opioids poisoning (Codeine or Morphine)' [T40.2], 'Methadone poisoning' [T40.3], 'Synthetic narcotics poisoning' [T40.4] and 'Other narcotics' [T40.6] and codes related to 'Mental behavioural disorders due to use of opioids' [F11]. We included visits for which the corresponding codes were found in the PD or SD, keeping the first code found as the identifier code.

Statistical analyses
We calculated OUD proportions per 100 000 ED visits, dividing the number of visits corresponding to each opioid code by the number of visits associated with any ICD10 code. We then calculated hospitalisation proportions for OUD per 100 000 hospitalisations to assess the burden of OUD in all hospitalisations. To assess OUD severity, we also computed the proportion of OUD-related ED visits resulting in hospitalisation (per 100 000 OUD visits). Finally, we described the characteristics of the population for all ED visits, OUD-related ED visits and subsequent hospitalisations, using percentages for categorical variables. Continuous variables were categorised only when comparison with other studies was necessary (description section).

To identify potential OUD-related factors in all ED visits during the study period, we performed univariate and multivariate regression models. Covariates including gender, age, year of admission, administrative region and ICD10 codes were introduced into the models. After observing overdispersion in Poisson regression models, we performed negative binomial models. Continuous variables were modelled using fractional polynomials.[30] Results are presented as proportion ratios (PR) according to a reference category/value for each covariate.

In addition, we performed an exploratory analysis including a description of the chief complaint based on identification of ICD10 codes in free-text, to assess the potential value of using the chief complaint in OUD identification. Free-texts were analysed by two senior and one junior epidemiologists, manually identifying ICD10 codes for each term. We analysed the most frequent related diagnoses in order to explain comorbidity in OUD patients.

This study followed the Strengthening the Reporting of Observational Studies in Epidemiology statement[31] guidelines. All analyses were performed using R V.3.5.3[32] and SAS V.9.3. No study with human or animal subjects was performed by any of the authors during the development of this article. The study was only based on a secondary use of an anonymised database collected from health professionals. According to French law studies such studies are not required to receive ethics committee approval.

Patient and public involvement
No patients were involved in the design, or conduct, or reporting, or dissemination plans of the research.

RESULTS

ED visits

From 1 January 2010 to 31 December 2018, of the 131 524 288 ED visits recorded in OSCOUR 97 892 863 (74.4%) had a PD. We identified 34 362 OUD-related ED visits (36.1/100 000 visits), divided into 27 952 defined with PD and 6410 with SD. We excluded 32 942 (0.03%) ED visits due to missing data, 7 (0.02%) being OUD-related. Patients were mostly men (64.6%, 43.5/100 000 vs 35.3%, 26.0/100 000 ED visits), and median age was 36 (IQR: (27–48)) (table 1). Over the study period, the proportion of OUD-related ED visits according to age group (figure 1A) evolved, with a sharp decrease in the 20–49 years old group but no increase in younger or older groups.

Figure 1B shows the trends in OUD-related ED visits and post-visit hospitalisations. The proportion of visits decreased from 39.2/100 000 in 2010 to 32.9/100 000 visits in 2018. Figure 2 shows the distribution of visits according to age and gender. Three peaks are observed, the first representing children aged under 7 years old, the second patients aged between 18 and 50, mostly men, and the third patients over 75, mostly women.

The most frequent ICD10 code was 'Mental and behavioural disorders due to use of opioids' [F11], which accounted for 60.1% of visits. The other most frequent codes were 'Other opioids' [T402] (18.3%) and 'Unspecified narcotics' [T406] (12.9%). We found a difference in the use of ICD10 codes according to age, as shown in figure 3, with code F11 being more frequent in the 20–59 age group while code T402 was used mainly in young children (0–9) and the elderly (70+).

Crude and adjusted PR estimates for trends in OUD-related ED visits are shown in table 2. A crude PR yearly decrease of 1.9% (95% CI 1.3% to 2.6%) per year between 2010 and 2018 was reported. An increase of 59% (95% CI 54% to 65%) in male ED visits was observed compared with female visits. The largest increase in PR was observed in the 30–39 age group (48% increase, 95% CI 45% to 50%) while the largest decrease was found in 0–9 age group (83% decrease, 95% CI 82% to 84%). For opioid-related ICD10 codes, a higher increase for 'Mental and behavioural disorders due to use of opioids' [F11] (952% (95% CI 917% to 989%)) in the proportion of ED visits was observed than for 'Other opioids (Morphine, Codeine)' [T402].

In multivariate analysis, a 2.1% yearly decrease (95% CI 1.5% to 2.7%) in the proportion of OUD-related ED visits was observed between 2010 and 2018. A 40% increase in visits (95% CI 36% to 44%) was observed in men compared with women. The largest increase in terms of age was observed in the 30–39 age group (45%, 95% CI 42% to 47%), while the largest decrease was in the 0–9 (83%, 95% CI 82% to 83%) and 70+ age groups (77%, 95% CI 76% to 78%). The ICD10 code 'Mental and behavioural disorders due to use of opioid' (F11) was associated with an increase in the proportion of OUD-related ED visits (896%, 95% CI 864% to 928%). Significant differences in proportions were observed across France's various administrative regions. Those with the greatest decrease in the proportion

of visits were the overseas regions of French Guiana (81%, 95% CI 72% to 87%) and Mayotte (82%, 95% CI 70% to 90%). The regions with the highest increases in OUD-related ED visits were Brittany (61%, 95% CI 50% to 72%), Provence-Alpes-Côte-d'Azur (40%, 95% CI 32% to 49%) and Hauts-de-France (33%, 95% CI 25% to 41%).

Post-ED visit hospitalisations

We found 15 966 OUD-related hospitalisations (46.5% of ED visits for OUD) from a total of 20 359 574 hospitalisations after ED visits (78.4/100 000 hospitalisations). During the study period, an increase in the proportion of OUD-related hospitalisations was observed, from 74.0/100 000 in 2010 to 81.4/100 000 in 2018 (figure 1B). This increase was highest in the 20–49 years old age group and lowest in 0–9 and 70+ years old age groups. Although young patients had the highest all-cause hospitalisation proportion (247.8/100 000 hospitaliations) they had the lowest proportions after an ED visit for OUD (35.9%). Hospitalisation after an OUD-related ED visit was highest among elderly patients (68.6%).

Chief complaints

From the 34 362 OUD-related ED visits, we extracted 17 938 non-empty chief complaints (52.2%). After free-text analysis, we linked 11 978 (66.8%) chief complaints to an ICD10 code leaving 5960 which could not be used due to lack of precision or non-medical information. A wide variety was observed in the 11 978 chief complaints, with 244 unique codes being used. The most frequent codes were 'Drugs and biological substances poisoning' [T509] (27.8%), 'Malaise and fatigue or Coma or Syncope' [R53-R40] (11.3%), 'Mental behavioural disorders due to multiple drug use, alcohol' [F10] (11.1%). ICD10 codes used for identifying visits [T40.X, F11] accounted for 2.2% of the chief complaints. See online supplemental file 1 for a more detailed list of frequent chief complaints.

OUD-related diagnoses

We identified 27 952 ED visits where OUD was the primary discharge diagnosis. Of these, 4981 (17.9%) had at least one related diagnosis for a total of 6940 related diagnoses. We identified 6410 ED visits where OUD was the secondary discharge diagnosis. We extracted a total of 13 350 related diagnoses of an ED visit for OUD, resulting in 607 unique related diagnoses. The most frequent related diagnoses were 'Mental and behavioural disorders due to use of alcohol' [F10] (11.2%), 'Benzodiazepines poisoning' [T424] (7.8%), 'Mental and behavioural disorders due to use of opioid' [F11] (4.1%), 'Intentional self-poisoning by and exposure to narcotics and psychodysleptics' [X62] (3.7%), 'Poisoning by non-opioid analgesics, antipyretics and antirheumatics' [X42] (3.0%), 'Somnolence, stupor and coma' [R40] (2.8%) and 'Depressive episode' [F32] (2.9%).

We performed a subgroup analysis in the three age groups observed earlier. In the paediatric population (0–7 years), accidental poisoning [X40-49] accounted for

Table 1 ED visits and hospitalisations for opioid use disorder

	ED visits					Hospitalisations					
	Number	%	Number of OUD-related ED visits	%	Proportion of OUD-related ED visits/100000 ED visits)*	Number	%	Number of OUD-related hospitalisations	%	Proportion of OUD-related hospitalisations (/100000 hospitalisations)†	Proportion of OUD-related hospitalisations after an ED visit (%)‡
Overall	97 892 863		34 362		36.1	20 359 574		15 966		78.4	46.40
Gender											
Female	46 703 789	48	12 128	35	26	9 973 304	49	6498	41	65.2	57.30
Male	51 022 814	52	22 193	65	43.5	10 379 105	51	9464	59	91.2	42.60
Unidentified	166,26	0.2	41	0.1	24.7	7.165	0	4	0	55.8	9.80
Age (years)											
0–9	14 219 838	15	620	1.8	4.4	1 324 424	6.7	306	1.9	23.1	49.40
10–19	12 273 794	13	2563	7.5	20.9	1 154 524	5.9	1210	7.6	104.8	47.20
20–29	13 522 858	14	7860	23	58.1	1 378 686	7	2822	18	204.7	35.90
30–39	11 331 629	12	8569	25	75.6	1 430 061	7.3	3543	22	247.8	41.30
40–49	10 202 226	11	7122	21	69.8	1 719 576	8.8	3367	21	195.8	47.30
50–59	9 012 155	9.6	3289	9.6	36.5	2 056 094	11	1848	12	89.9	56.20
60–69	7 463 405	7.9	1432	4.2	19.2	2 396 151	12	889	5.6	37.1	62.00
70+	16 333 519	17	2832	8.3	17.3	8 192 414	42	1942	12	23.7	68.60
Year											
2010	5 417 628	5.5	2123	6.2	39.2	1 202 155	5.9	890	5.6	74	41.90
2011	6 940 082	7.1	2642	7.7	38.1	1 527 334	7.5	1175	7.4	76.9	44.50
2012	8 005 769	8.2	2820	8.2	35.2	1 761 210	8.7	1213	7.6	68.9	43.00
2013	9 038 982	9.2	3296	9.6	36.5	1 968 554	9.7	1462	9.2	74.3	44.40
2014	10 783 928	11	3935	12	36.5	2 260 275	11	1804	11	79.8	45.80
2015	12 894 907	13	4571	13	35.4	2 624 995	13	2107	13	80.3	46.10
2016	14 092 119	14	4786	14	34	2 886 361	14	2303	14	79.8	48.10
2017	14 982 603	15	5013	15	33.5	3 026 234	15	2486	16	82.1	49.60
2018	15 736 845	16	5176	15	32.9	3 102 456	15	2526	16	81.4	48.80
ICD10 code											
[F11] Mental and behavioural disorders due to use of opioids			20 657	60				9471	59		45.80
[T40] Poisoning by narcotics and psychosleptics			185	0.5				69	0.4		37.30

Continued

Table 1 Continued

	ED visits			Hospitalisations					
	Number of OUD-related ED visits	%	Proportion of OUD-related ED visits(/100000 ED visits)*	Number	%	Number of OUD-related hospitalisations	%	Proportion of OUD-related hospitalisations (/100000 hospitalisations)†	Proportion of OUD-related hospitalisations after an ED visit (%)‡
[T400] Opium	169	0.5				93	0.6		55.00
[T401] Heroin	1181	3.4				482	3		40.80
[T402] Other opioids	6299	18				3749	24		59.50
[T403] Methadone	1129	3.3				577	3.6		51.10
[T404] Other narcotics	307	0.9				159	1		51.80
[T406] Unspecified narcotics	4435	13				1366	8.6		30.80

*Number of opioid abuse/number of visits.
†Number of hospitalisations for OUD/number of hospitalisations.
‡Number of hospitalisations for OUD/number of OUD-related ED visits. Reference for ICD10 code is 'Other opioids' [T402] accounting for morphine and codeine.
ED, emergency department; ICD10, International Classification of Diseases, version 10; OUD, opioid use disorder.
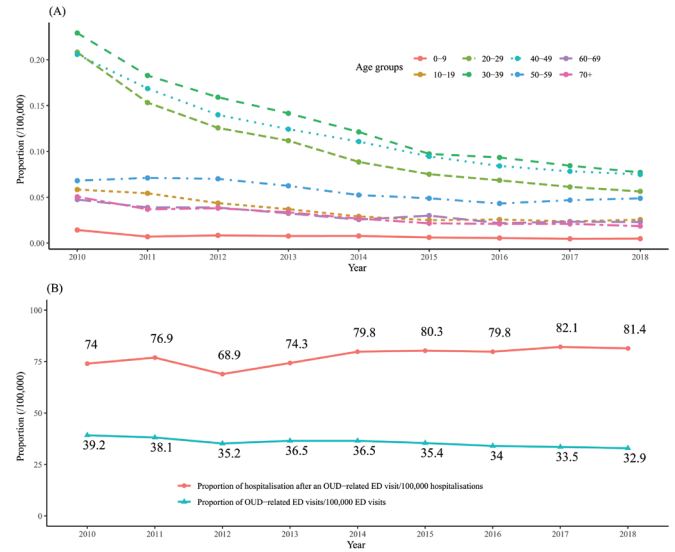
Figure 1 (A) Distribution of OUD-related ED visits according to age group by year, France 2010–2018. (B) Trends in proportion of OUD-related ED visits and subsequent hospitalisations per 100 000, 2010–2018. ED, emergency department; OUD, opioid use disorder.

37.9% of related diagnoses while other poisoning [T39-44] accounted for 24.2%. In the 18–50 years old population, related diagnoses were similar to those of the overall population, the most frequent diagnosis in men being 'Mental and behavioural disorders due to use of alcohol' [F10] (15.3%), and 'Benzodiazepines poisoning' [T424] in women (10.6%). For visits in patients 75 years of age and older, most of the related diagnoses were comorbidities ('Acute renal failure', 'Volume depletion', 'Congestive heart failure', etc) rather than diagnoses associated with other poisoning which was seen in the other age groups. See online supplemental file 2 for a detailed list of frequent related diagnoses.
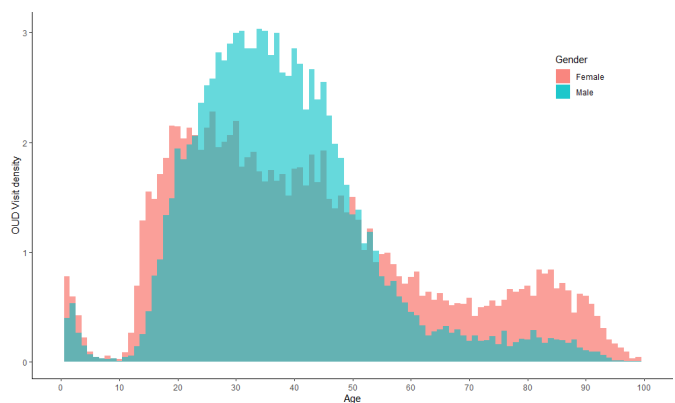

Figure 2 Distribution of the age density function according to the number of emergency department visits by gender. OUD, opioid use disorder.
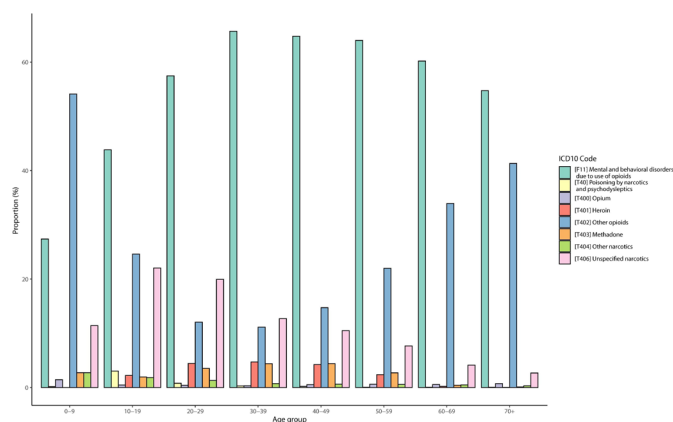
Figure 3 Distribution of identification code for opioid use disorder by age. ICD10, International Classification of Diseases, version 10.

DISCUSSION
Key results
This is the first study to use ED data to investigate OUD in France. We showed a 2.1% decrease per year in the proportion of OUD-related ED visits between 2010 and 2018 after adjusting for gender, age, administrative region and ICD10 code. This contrasts with data in USA, where the proportion of OUD-related ED visits observed in 2010 was 63/100 000[18] with an increase between 2011 and 2015.[17] However, our data are consistent with those previously observed in France showing relative stability between 2004 and 2017 in opioid consumption. The discrepancy between the increase in the raw numbers of OUD-related ED visits and the decrease in the proportion of visits can be explained by the increase in total ED activity in France,[33] a phenomenon seen worldwide.[34]

We described different populations of interest, showing differences in ED use according to age and gender. We identified three subgroups of interest. The first comprised children from 0 to 7 years, mostly affected by accidental poisoning. The two others comprised mainly young men and elderly women, respectively. A percentage of the former was associated with recreational drug consumption and polydrug abuse, while the latter included a visit for a comorbidity linked to side effects of opioids prescribed for chronic pain.

Table 2 Univariate and multivariate analyses for trends in the proportion of opioid use disorder-related emergency department visits

	Ref	Crude PR	95% CI	P value	Adjusted PR	95% CI	P value
Gender							
Female	Ref	1			1		
Male		1.59	(1.54 to 1.65)	<0.001	1.4	(1.36 to 1.44)	<0.001
Unidentified		0.89	(0.64 to 1.25)	0.524	0.7	(0.50 to 0.97)	0.032
Age (years) (reference)							
0–9	5	0.17	(0.16 to 0.18)	<0.001	0.17	(0.17 to 0.18)	<0.001
10–19	15	0.71	(0.70 to 0.72)	<0.001	0.72	(0.71 to 0.72)	<0.001
20–29	25	1.24	(1.23 to 1.25)	<0.001	1.23	(1.22 to 1.24)	<0.001
30–39	35	1.48	(1.45 to 1.50)	<0.001	1.45	(1.42 to 1.47)	<0.001
40–49	45	1.39	(1.36 to 1.43)	<0.001	1.35	(1.33 to 1.38)	<0.001
50–59	55	1.12	(1.09 to 1.16)	<0.001	1.08	(1.06 to 1.11)	<0.001
60–69	65	0.8	(0.78 to 0.83)	<0.001	0.75	(0.75 to 0.80)	<0.001
70+	90	0.24	(0.23 to 0.26)	<0.001	0.23	(0.22 to 0.24)	<0.001
Year (quantitative)		0.981	(0.974 to 0.987)	<0.001	0.979	(0.973 to 0.985)	<0.001
ICD10 code							
[F11] Mental and behavioural disorders due to use of opioids		9.52	(9.17 to 9.89)	<0.001	8.96	(8.64 to 9.28)	<0.001
[T40] Poisoning by narcotics and psychodysleptics		0.09	(0.07 to 0.10)	<0.001	0.08	(0.07 to 0.10)	<0.001
[T400] Opium		0.08	(0.07 to 0.09)	<0.001	0.08	(0.07 to 0.09)	<0.001
[T401] Heroin		0.14	(0.13 to 0.15)	<0.001	0.13	(0.13 to 0.14)	<0.001
[T402] Other opioids	Ref	1			1		
[T403] Methadone		0.1	(0.10 to 0.11)	<0.001	0.1	(0.10 to 0.11)	<0.001
[T404] Other narcotics		0.14	(0.13 to 0.16)	<0.001	0.14	(0.13 to 0.16)	<0.001
[T406] Unspecified narcotics		1.65	(1.57 to 1.73)	<0.001	1.66	(1.58 to 1.73)	<0.001

ICD10, International Classification of Diseases, version 10; PR, proportion ratios.

'Mental and behavioural disorders due to use of opioids' [F11] was the most frequent code found for OUD identification, accounting for 60% of ED visits. This code includes concepts such as intoxication, withdrawal and addiction, and refers to a psychiatric diagnosis, while other codes (eg, [T40X]) are related to a diagnosis of poisoning.

The increasing trend in hospitalisation after an OUD-related ED visit, from 41.9% in 2010 to 48.8% in 2018, indicates an increase in the severity of OUD over time. The 20–40 years old age group was three times more likely to be hospitalised than the other age groups. The difference in hospitalisations per 100 000 hospitalisations and the proportion hospitalised after an OUD-related ED visit across the various age groups indicates that although the severity of OUD is greater among the elderly, they are mostly hospitalised for reasons other than OUD, while among young patients OUD-related hospitalisations were more frequent than expected.

The increase in hospitalisation proportions may be explained by several assumptions. It may be due to an increased severity over the study period. This severity may be explained by a shift in the type of product consumption toward stronger opioids or in the population using opioids. However this assumption is not easily assessed as the severity score is not accurately recorded. Another assumption could be a change in the clinical management of these patients due to an awareness on OUD.

The chief complaint does not appear to be an appropriate/useful indicator for OUD identification, at least using the OSCOUR database, due to the proportion of missing data, unexploitable data and the fact that only 2.2% of the exploitable chief complaints were very similar to the identification codes. One possible explanation for this is that the chief complaint is coded at the patient's entry by paramedical staff with a lack of standardisation to guide the priority of care.

Analysis of related diagnoses showed an association of OUD-related ED visits with alcohol and benzodiazepine poisoning, which describes a polydrug abuse population, something previously reported.[35 36] OUD was also linked to psychiatric disorders such as depressive episodes or attempted drug-based suicide, and varied between the different subgroups identified through this study.

Interpretation

These results would suggest that the change over time for OUD-related ED visits in France is consistent with previous findings in the country.[9 11] They should however be interpreted with caution, as different coding practices (depending on ED or physician practices) and the fact that data on other variables were not collected in the present study, may partly explain this trend. The difference observed between France and the USA could partially be explained by opioid dispensing legislation. In France, strong opioids are listed as narcotics. They can only be prescribed for 28 days, and all refills necessitate mandatory medical evaluation. The current epidemic situation in other countries has also raised awareness about OUD, leading to guidelines at the national[37] and European levels.[38]

Limitations

This study has several limitations. Due to the increase in participation over time in the OSCOUR network, the findings might reflect discrepancies in the coding practices used in different ED.

With respect to the identification of ED visits, although the ICD10 codes were selected after a literature review, no evaluation of the code identification performance has been performed internationally. Having said that, an evaluation of the now obsolete ICD9 codes showed a positive predictive value of 81%.[21] Moreover, missing values for codes (25.6% of all ED visits) may have led to biassed estimates regarding the proportion of ED visits. Nevertheless, the trend shown in this study is very likely robust because missing data were homogeneous throughout the study period.

In the data source, we lacked clinical data such as vital signs at admission, radiological nor biological tests and we had no individual socioeconomic variables regarding education, salary or other variables reflecting social inequalities, which limits conclusions on the differences reported.

OUD may also have been underestimated through potential selection bias, since the most serious cases are admitted directly to intensive care units and do not go through the ED. Furthermore, it is sometimes difficult to make a definitive diagnosis of OUD in ED visits, which leads to classification bias, which in turn leads to underestimation of OUD-related visits.

Moreover, as it was impossible for us to link several potential ED visits for the same patient, it was not possible to identify subgroups of patients who were more likely to make return visits to the ED for further consultation.

CONCLUSION

This study describes the use of ED for OUD-related issues in France based on a nationwide syndromic surveillance system. It provides insight into trends in OUD-related ED visits and related populations.

To complete the picture of health system utilisation for OUD, it would be interesting to develop a description of the hospitalised population from another data source, in order to better identify the characteristics of these patients. Adding social inequality variables would help to better understand their burden on opioid consumption.

We showed a decreasing trend in the proportion of OUD-related ED visits between 2010 and 2018 and an increasing trend in hospitalisation after an OUD-related ED visit.

Our results demonstrated that the OSCOUR syndromic surveillance system is suitable and useful to monitor near real-time trends in OUD, and that it should be routinely used for this purpose.

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