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Problematic opioid use in Ireland, 2015–2019

HRB Health Research Board





Michael T Hanrahan, Seán R Millar, Karl P Phillips, Thomas E Reed, Deirdre Mongan, and Ivan J Perry

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Problematic opioid use in Ireland, 2015–2019

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List of abbreviations

AIC	Akaike information criterion
CHO	Community Health Organisation
CI	Confidence interval
CTL	Central Treatment List
EMCDDA	European Monitoring Centre for Drugs and Drug Addiction
GP	General Practitioner
HIPE	Hospital In-Patient Enquiry
HRB	Health Research Board
NDTRS	National Drug Treatment Reporting System
NOC	National Oversight Committee
PULSE	Police Using Leading Systems Effectively
RDATF	Regional Drug and Alcohol Taskforce

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Executive Summary

In this report, we present the results of a study that aimed to estimate the prevalence of problematic opioid use in Ireland from 2015 to 2019 using a four-source capture-recapture method. Three of the four data sources used for the analysis were derived from opioid substitution treatment records from the Central Treatment List (CTL) (clinics, general practitioners (GPs) and prisons) and the fourth data source was derived from the Probation Service.

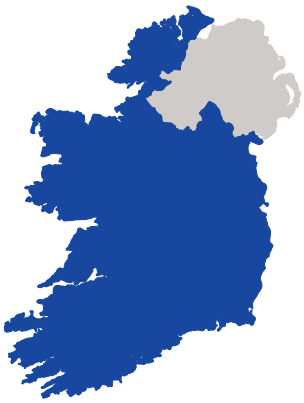
Table 1 summarises the main results of this study, stratified by Co Dublin/rest of Ireland as well as by age group and sex. In total, there were an estimated 19,875 problematic opioid users in Ireland in 2019 (95% confidence interval [CI]: 19,522–21,608), which equates to a prevalence rate of 6.68 per 1,000 population (95% CI: 6.57–7.27). The majority of problematic opioid users were male (72.30%) and more than two-thirds (72.93%) of problematic opioid users were in the older 35–64-year-old age group. There were an estimated 11,729 problematic opioid users (95% CI: 11,298–12,944) in Co Dublin in 2019, with a rate over three times higher there than in the rest of Ireland (12.72 per 1,000 population (95% CI: 12.25–14.03) versus 3.97 per 1,000 population (95% CI: 3.84–4.47).

Estimates for prevalence rates in Community Health Organisation (CHO) areas, Regional Drug and Alcohol Task Force (RDATF) areas, regional health areas, and cities are also included in this report.

Data for the prevalence of problematic opioid use for the years 2015, 2016, 2017 and 2018 are additionally presented in order to provide information on changes in trends over time. While there was a slight decrease in the overall number of opioid users between 2015 and 2019, this decrease was not statistically significant. The prevalence of problematic opioid use among younger age groups (15–24-year-olds and 25–34-year-olds) also appears to be in decline, while the number of problematic opioid users in the older age group (35–64 years) has increased.

Table 1: Summary of prevalence estimates (2019)

Breakdown	Estimate	95% CI	Rate	95% CI
Co Dublin	11,729	11,298–12,944	12.72	12.25–14.03
Rest of Ireland	8,146	7,885–9,160	3.97	3.84–4.47
15–24 years	730	717–794	1.35	1.32–1.46
25–34 years	4,650	4,567–5,055	7.48	7.35–8.13
35–64 years	14,495	14,238–15,759	8.01	7.87–8.71
Female	5,505	5,407–5,985	3.67	3.60–3.99
Male	14,370	14,115–15,623	9.76	9.59–10.61
Total	**19,875**	**19,522–21,608**	**6.68**	**6.57–7.27**

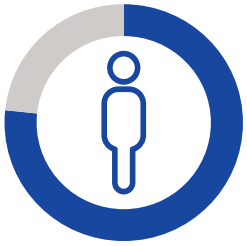


In total, there were an estimated

19,875

problematic opioid users in Ireland in 2019





The majority of problematic opioid users were male **(72.3%)**



There were an estimated

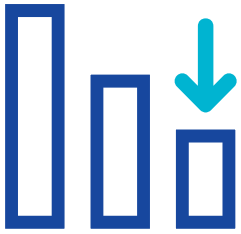
11,729

problematic opioid users in Co Dublin in 2019

More than two-thirds

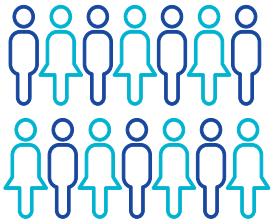
(72.93)

of problematic opioid users were in the older 35–64-year-old age group.



The prevalence of problematic opioid use among **younger age groups** (15–24-year-olds and 25–34-year-olds) appears to be in decline

Estimates



730
15–24 years

4,650
25–34 years

14,495
35–64 years

Introduction

Introduction

Drug prevalence estimates are a valuable tool for assessing treatment needs and offer a realistic basis for estimating the social costs of problematic drug use. In addition, the regular production of estimates facilitates the tracking of changes in drug use over time. One of the key methodologies favoured by the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) for estimating the number of opioid users in a population is the capture-recapture method. This report, which updates a similar national study for the period 2011–2014, uses capture-recapture analyses to estimate the extent of problematic opioid use in the Republic of Ireland for the period 2015–2019.

National drugs strategy

An Taoiseach Leo Varadkar launched *Reducing Harm, Supporting Recovery: A health-led response to drug and alcohol use in Ireland 2017-2025* on 17 July 2017. The strategy was presented as a health-led, rather than a criminal justice, approach to drug use and was the first strategy in Ireland to adopt an integrated public health approach to drug and alcohol use. The strategy defines substance misuse as "the harmful or hazardous use of psychoactive substances, including alcohol, illegal drugs and the abuse of prescription medicines" [1]. While the strategy complements the Public Health (Alcohol) Act 2018 and strengthens some of the key parts of the 2012 alcohol-focused *Steering Group Report on a National Substance Misuse Strategy* [2], illicit drug use is the primary focus of many of the actions set out in the new strategy, which covers the 8-year period 2017–2025 and is accompanied by a shorter-term action plan for the period 2017–2020. The strategy's vision is for "A healthier and safer Ireland, where public health and safety is protected and the harms caused to individuals, families and communities by substance misuse are reduced and every person affected by substance use is empowered to improve their health and wellbeing and quality of life."

The Minister for Health continues to have overall ministerial responsibility for the national drugs strategy and implementation of the strategy. Implementation of the strategy is coordinated through a National Oversight Committee (NOC), comprising senior members of the various stakeholder groups.

Following a mid-term review of the national drugs strategy in 2021, the NOC identified new strategic priorities and established six strategic implementation groups to implement these priorities. One of the national drugs strategy's strategic goals is to develop sound and comprehensive evidence-informed policies and actions. The Drugs Policy and Social Inclusion Unit in the Department of Health analyses the implications of research findings for policy and the design of initiatives to tackle the drug problem. It also advises on the commissioning of new research and the development of new data sources.

Role of the Health Research Board

The Health Research Board (HRB) commissions research and monitors projects on behalf of the Department of Health and as part of its role as Ireland's national focal point to the EMCDDA. The EMCDDA provides factual, objective, reliable, and comparable information concerning drugs and drug addiction, and their consequences, and monitors the drugs situation and responses to drug-related problems in Europe. Problem drug use is one of the five key epidemiological indicators used by the EMCDDA to assess the prevalence of drug use in Europe. While this indicator has recently been revised, mainly in response to the ever-changing drugs situation, it continues to focus on "recurrent drug use that is causing actual harms (negative consequences) to the person (including dependence, but also other health, psychological or social problems), or is placing the person at a high probability/risk of suffering such harms" [3].

The most recent drugs strategy report, *Reducing Harm, Supporting Recovery: A health-led response to drug and alcohol use in Ireland 2017-2025* designated the HRB as the main information hub for evidence on the drugs situation and responses to it [1]. Action 5.1.45 (to strengthen Ireland's drug monitoring system) of this strategy gives the HRB responsibility for the EMCDDA indicators pertaining to problem drug use among the general population.

Background

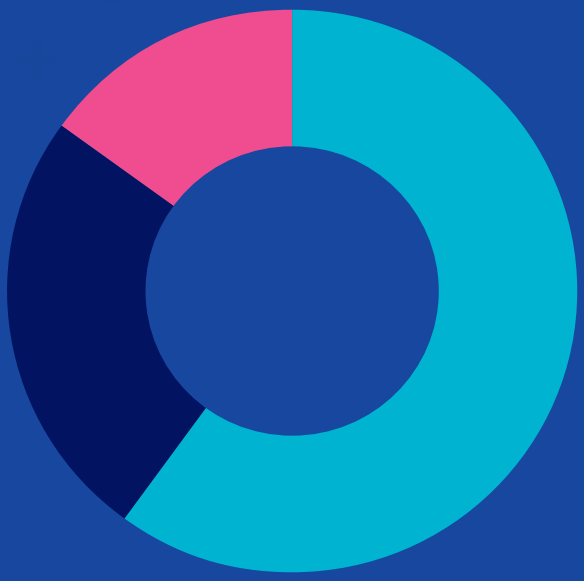
Problematic opioid use is a significant problem in Ireland and across the world [4,5]. Opioids, which include heroin, morphine, methadone, codeine, hydrocodone, fentanyl, and tramadol, are addictive, sedating, narcotic drugs. While some of these drugs have valid medical purposes, their misuse as 'street drugs' can lead to many health and social issues for users and society.

The most recent estimates of problematic opioid use in Ireland are from a 2014 capture-recapture study [4], which estimated that there were 18,988 (95% CI: 18,720–21,454) problematic opioid users in Ireland in 2014. This contrasts with a 2006 prevalence study, which estimated the number of opioid users at 20,790 (95% CI: 18,136–23,576) [6]. The 2014 study suggested that the scale of the problem had remained relatively stable and that the number of young opioid users (aged 15–24 years) was in decline. However, there was evidence of an ageing cohort effect, as the proportion of those in the older age category (aged 35–64 years) had increased since 2006. It should be noted that these estimates of opioid use are high, with comparable international studies conducted at a similar time suggesting rates of problematic opioid use in Ireland to be among the highest in Europe [7].

Measuring the prevalence of problematic opioid use is challenging. Given the nature of this population, a simple head count is not feasible, as some opioid users have no contact with any service provider and general population surveys are known to be ineffective at capturing this "hidden" population. Hence the need to rely on a statistical model based on what is known [6]. Because drug users fear stigmatisation and are often marginalised in society, the EMCDDA recommends the use of indirect approaches such as the capture-recapture method or the multiplier method in order to estimate the prevalence of problematic (high-risk) drug users [3].

To date, one regional and three national capture-recapture studies have been conducted in Ireland to estimate the prevalence of problematic opioid use. These were undertaken in 1996 [8], 2001 [9], 2006 [6] and 2014 [4]. The 1996 regional study examined opioid use in Dublin only, and used three data sources from the Central (Methadone) Treatment List (CTL), the Hospital In-Patient Enquiry (HIPE) scheme of four Dublin hospitals, and the An Garda Síochána arrest database. The 2001 and 2006 studies were three-source capture-recapture studies that used national data from the CTL, the HIPE scheme and An Garda Síochána PULSE (Police Using Leading Systems Effectively). The 2014 study used four national data sources: the CTL was divided into three sources based on clinics, GPs and prison data and the Probation Service provided the fourth source. In 2020, the HRB contracted the School of Public Health, University College Cork, Ireland, to conduct a fourth national study on the prevalence of problematic opioid use in Ireland for the period 2015–2019, the results of which are presented here.

Methods



Methods

Case definition

Appropriate reporting on the prevalence of problematic opioid use requires a clear case definition. As this study utilised capture-recapture methodology, our case definition depends heavily on the case definitions used in the contributing case sources. As previously mentioned, the EMCDDA emphasises the monitoring of problematic (or high-risk) drug use which is defined as "recurrent drug use that is causing actual harm (negative consequences, including dependence, but also other health, psychological or social problems) to the person or is placing the person at a high probability/risk of suffering such harms" [3]. This case definition is intended to best identify those in need of treatment and intervention and is not intended to include experimental and occasional drug users. We have applied this principle to identifying problematic opioid users (i.e. individuals who are harmed or who are at high risk of harm secondary to opioid use).

It is important to note that in the Irish context, the primary opioid misused is heroin. The National Drug Treatment Reporting System (NDTRS) is a national epidemiological database coordinated by HRB staff on behalf of the Department of Health that provides data on treated drug and alcohol misuse in Ireland. Data from the NDTRS, reported by the HRB to the EMCDDA as part of the treatment demand indicator, show that 36.5% of cases were treated for problematic opioid use in 2020, with heroin misuse comprising the majority of these cases (89.7%), similar to previous years [10]. Other synthetic opioids such as methadone, buprenorphine, and fentanyl are used to a lesser extent but may be increasingly misused [5], while recent information suggests that non-medical use of prescription opioids remains low in Ireland [11]. Data from the NDTRS also show that in 2020, 31.6% of those treated for problematic opioid use reported injecting as their primary route of administration. Other common routes of administration for cases entering treatment for opioid use were smoking (56.0%) followed by eating/drinking (9.6%) [10].

Study population

This report estimates the number of opioid users aged 15–64 years in Ireland for the period 2015 to 2019. The main estimates presented are for each Community Health Organisation (CHO) area in 2019; estimates for each Regional Drug and Alcohol Taskforce (RDATF) area and each regional health area in Ireland in 2019 are also included.

Data sources

We have used the same data sources as the 2014 prevalence study [4]. The four sources used for capture-recapture analysis were the CTL (split into three sources based on data collected by clinics, GPs and prisons) and the Probation Service.

The Central Treatment List

The CTL provides data on those who are receiving opioid substitution treatment in Ireland. A national database that is a well-maintained and valuable source of cases for this study, the CTL distinguishes between patients who are treated through clinics, their GPs, and in prison, and therefore can be divided into three separate sections.

The Probation Service

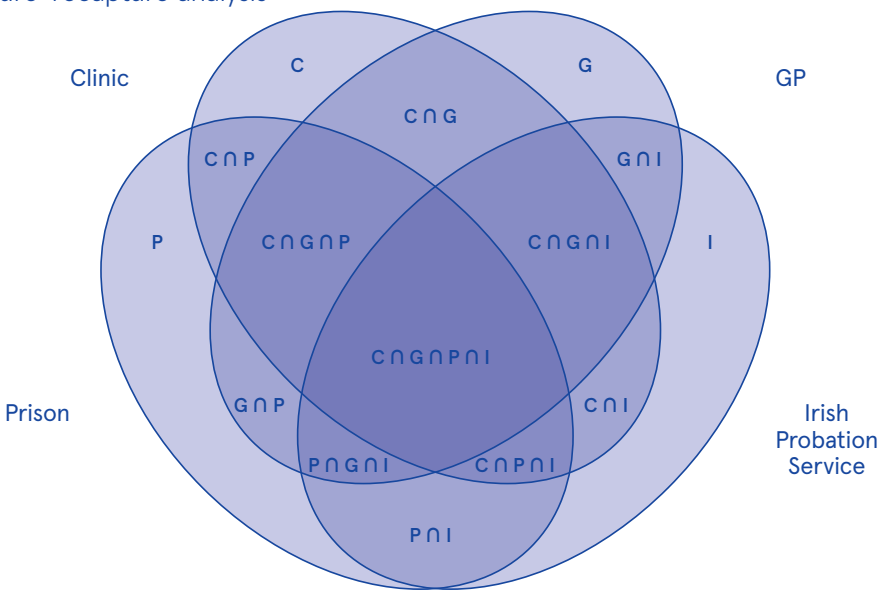
Data from the Probation Service were used in the 2014 prevalence study and also in this research. Data for the current study were compiled by the Probation Service through a data scraping exercise, using agreed terms, of a number of databases that make up the Probation Service Case Tracking System. The databases used consisted of case notes created between 2015 and 2019 and included different reporting forms such as the "Pre-Sanction Report", "Community Service Report", and "Level of Service Inventory – Revised Risk Assessment". The search terms "opiate", "opioid", "methadone", "oramorph", "oxycodone", "fentanyl", "heroin", "tramadol", "codeine", and "oxy" were used to identify individuals for inclusion in this research. The extracted raw data were processed by a Probation Service statistician in a Microsoft Excel spreadsheet using Statistical Analysis System software. The data were reviewed in order to ensure that every individual was counted only once for each year of study.

Capture-recapture method

Capture-recapture analysis is useful for estimating the size of hidden populations, such as problematic opioid drug users. It generally requires the use of two or more lists of known drug users. The degree of overlap between these lists allows models to be created that can predict the size of the uncaptured population. This is the method that the EMCDDA recommends for estimating the prevalence of problematic opioid use in European countries [3].

Figure 1 illustrates the principle behind the capture-recapture method for a four-source model. The overlap between the four sources creates 11 distinct areas of overlap and 4 areas with no overlap. Poisson log-linear models are then fitted to the data in order to estimate the number of individuals who were not present in any data source.

Figure 1: Venn diagram illustrating the overlap and non-overlap of data sources used for the capture-recapture analysis



Note: "∩" denotes the intersection between two or more sources.

C = Clinic Central Treatment List data source

G = GP Central Treatment List data source

P = Prison Central Treatment List data source

I = Irish Probation Service data source

Matching

The following information was required for matching cases between lists and for stratifying data: date of birth, sex, name, and address (town/village/city and county).

The datasets were cleaned for consistency and a unique case identifier was generated based on initials, date of birth, and sex. Case identifiers were sorted and exact duplicates were removed. Cases were then matched between source lists. All exact matches were considered a match and fixed on this list. We also considered near matches in order to allow for human error in data entry. We considered near matches with +/-1 or +/-10 in the day, month or year fields, and reversal of day/month order for identifiers with the same initials, sex and address [6]. Other near matches were considered such as variations in the spelling of names that resulted in different initials or inconsistent classification of sex between data sources.

Individuals were designated an age based on a mid-year (30 June) capture date. Individuals were also designated according to the area of their most recent capture or their most likely correct address. This is based on the completeness of the address (i.e. a specific address was preferred to those who gave their address as "no fixed abode"), as well as the frequency that an address recurs across data sources. As individuals in the study were free to move throughout the country, this classification of addresses may have led to over- or underestimation of the prevalence of problematic opioid use in some individual subunit areas as we attempted to avoid the double-counting of individuals that might have occurred if we had included these individuals in two subunit areas.

Ethical approval

Consent declaration was obtained from the Irish Health Research Consent Declaration Committee. Ethical approval to conduct the project was granted by the Research Ethics Committee of University College Cork, Ireland.

Data analysis

Data analysis was conducted using the R statistical package (https://www.R-project.org/). Employing the capture-recapture method, Poisson log-linear models were applied to the overlap data to find the model with the best fit in order to estimate the hidden population not identified by any of our data sources. Source-by-source interaction terms were tested by adding them to the base model in all possible combinations [12]. The best model for estimating the size of the hidden population was determined by comparing the deviance to the χ^2 distribution and the Akaike information criterion (AIC) value [13]. The simplest model with the lowest AIC value that provided a credible estimate was used.

For 2019 estimates, a capture-recapture analysis was performed for each subunit area in order to allow reporting of opioid use prevalence by CHO area, RDATF area, regional health area, city, and for Co Dublin versus the rest of Ireland. This involved performing the capture-recapture analysis on unstratified data, data stratified by sex, data stratified by age group and data stratified by sex and age group. Each model was checked in order to determine which models provided the most credible estimates. This involved comparing the model fit and consistency of unstratified estimates with the sum of sex- or age-stratified estimates. Preference was given to the age and sex-stratified estimates, while the age-stratified estimate was used if the other models did not provide a good model fit.

Once a model was selected, the point estimates of the stratified models were used to determine the estimated proportion of individuals in each stratum. These proportions were applied to the overall 95% CIs to derive the reported stratified 95% CIs. The main estimates in each subunit area were then added together to provide prevalence estimates for larger areas. The 95% CIs for areas where the estimate was determined as the sum of smaller subunit areas were calculated using a method described by Gemmell et al. [14]. To obtain trend information, the same method was applied to the data from years 2015-2018.

The prevalence of opioid users per 1,000 population was calculated using population data from Census 2016 (www.cso.ie).

Results

Results

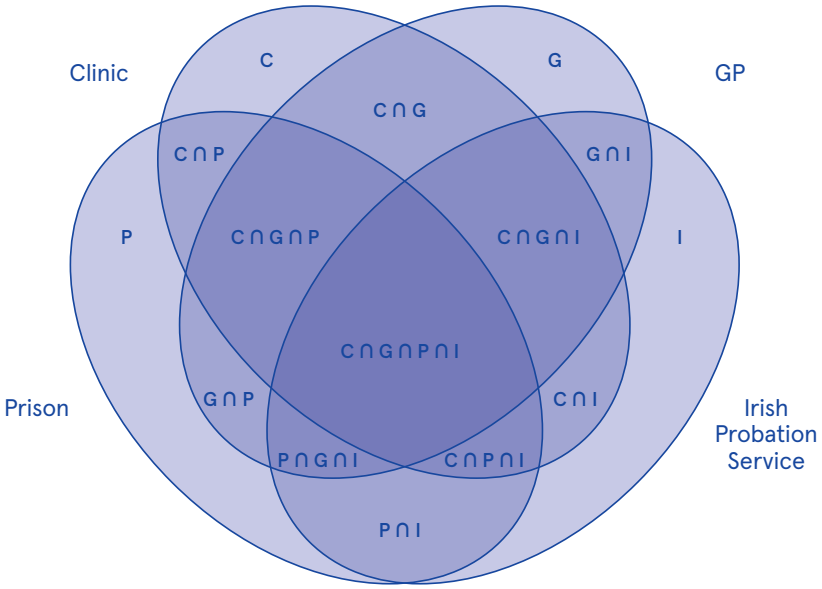
In total, it is estimated that there were 19,875 opioid users aged 15–64 years in Ireland in 2019 (95% CI: 19,522–21,608). This corresponds to a prevalence rate of 6.68 per 1,000 population (95% CI: 6.57–7.27). As outlined in Table 2, almost six in ten opioid users lived in Co Dublin and the prevalence rate per 1,000 population was significantly higher there than in the rest of Ireland (12.72 versus 3.97).

Table 2: Estimates of the number of problematic opioid users for Co Dublin and the rest of Ireland, and rates per 1,000 population aged 15 to 64 years (2019)

Area	Known	Estimate	95% CI	Rate	95% CI
Co Dublin	7,916	11,729	11,298–12,944	12.72	12.25–14.03
Rest of Ireland	4,396	8,146	7,885–9,160	3.97	3.84–4.47
Total	**12,312**	**19,875**	**19,522–21,608**	**6.68**	**6.57–7.27**

Figure 2 demonstrates the degree of overlap and non-overlap between the four data sources of problematic opioid users for 2019. This information is presented for illustrative purposes, while the estimates in this report are produced from the sum of smaller capture-recapture models based on subunit areas, by sex and age group.

Figure 2: Venn diagram illustrating the number of known opioid users according to each data source and the degree of overlap and non-overlap between sources (2019)



Source	Count
C	5,091
G	3,974
P	540
I	591
C ∩ G	483
C ∩ P	542
C ∩ I	447
G ∩ P	63
G ∩ I	107
P ∩ I	142
C ∩ G ∩ P	31
C ∩ G ∩ I	37
C ∩ P ∩ I	226
G ∩ P ∩ I	25
C ∩ G ∩ P ∩ I	13
Total	**12,312**

Note: "∩" denotes the intersection between two or more sources.

C = Clinic Central Treatment List data source

G = GP Central Treatment List data source

P = Prison Central Treatment List data source

I = Irish Probation Service data source

Nine CHOs in Ireland deliver primary and community-based services in response to the needs of local communities. Table 3 presents the number of problematic opioid users by CHO area along with rates per 1,000 population. CHO area 7 (Dublin City (part), South Dublin, Kildare, Wicklow (part)) had the highest prevalence of problematic opioid users, at 12.14 per 1,000 population (95% CI: 11.32–14.30), while CHO area 1 (Cavan, Donegal, Leitrim, Monaghan, and Sligo) had the lowest prevalence of problematic opioid users, at 1.18 per 1,000 population (95% CI: 1.06–1.74). Table 3 also shows that the prevalence of opioid use was found to be highest in the east of the country, with lower prevalence rates recorded in the west.

Table 3: Estimates of the number of problematic opioid users by CHO area, and rates per 1,000 population aged 15 to 64 years (2019)

CHO	Known	Estimate	95% CI	Rate	95% CI
Area 1 – Cavan, Donegal, Leitrim, Monaghan, Sligo	171	292	262–430	1.18	1.06–1.74
Area 2 – Galway, Mayo, Roscommon	277	510	421–754	2.18	1.80–3.22
Area 3 – Clare, Limerick, North Tipperary	520	1,046	915–1,409	4.19	3.66–5.64
Area 4 – Cork, Kerry	838	1,543	1,400–1,889	4.27	3.87–5.23
Area 5 – Carlow, Kilkenny, South Tipperary, Waterford, Wexford	797	1,297	1,188–1,566	4.00	3.67–4.83
Area 6 – Dublin (part), Dún Laoghaire-Rathdown, Wicklow (part)	1,658	2,580	2,346–3,202	9.07	8.24–11.25
Area 7 – Dublin (part), Kildare, South Dublin, Wicklow (part)	3,417	5,493	5,119–6,469	12.14	11.32–14.30
Area 8 – Laois, Longford, Louth, Meath, Offaly, Westmeath	1,094	1,979	1,767–2,385	5.00	4.47–6.03
Area 9 – Dublin (part), Fingal	3,540	5,135	4,843–5,601	12.11	11.42–13.21
Total	**12,312**	**19,875**	**19,522–21,608**	**6.68**	**6.57–7.27**

Tables 4 and 5 present the estimated number, and rate per 1,000 population, of problematic opioid users in each CHO area in 2019 according to age group (15–24 years, 25–34 years, and 35–64 years).

Table 4: Estimates of the number of problematic opioid users by age group and CHO area, aged 15 to 64 years (2019)

CHO	15–24 years			25–34 years			35–64 years		
	Known	Estimate	95% CI	Known	Estimate	95% CI	Known	Estimate	95% CI
Area 1 – Cavan, Donegal, Leitrim, Monaghan, Sligo	9	20	18–29	44	69	62–102	118	203	182–299
Area 2 – Galway, Mayo, Roscommon	18	27	22–40	83	127	105–188	176	356	294–526
Area 3 – Clare, Limerick, North Tipperary	27	51	45–69	213	387	339–521	280	608	532–819
Area 4 – Cork, Kerry	62	94	85–115	357	479	435–586	419	970	880–1,188
Area 5 – Carlow, Kilkenny, South Tipperary, Waterford, Wexford	53	95	87–115	307	448	410–541	437	754	691–910
Area 6 – Dublin (part), Dún Laoghaire-Rathdown, Wicklow (part)	48	74	67–92	311	678	617–841	1,299	1,828	1,662–2,269
Area 7 – Dublin (part), Kildare, South Dublin, Wicklow (part)	56	127	118–150	469	957	892–1,127	2,892	4,409	4,109–5,192
Area 8 – Laois, Longford, Louth, Meath, Offaly, Westmeath	60	94	84–113	378	580	518–699	656	1,305	1,165–1,573
Area 9 – Dublin (part), Fingal	81	148	140–161	598	925	872–1,009	2,861	4,062	3,831–4,431
Total	**414**	**730**	**717–794**	**2,760**	**4,650**	**4,567–5,055**	**9,138**	**14,495**	**14,238–15,759**

Table 5: Estimates of the rates per 1,000 population of problematic opioid users by age group and CHO area, aged 15 to 64 years (2019)

CHO	15–24 years		25–34 years		35–64 years	
	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI
Area 1 – Cavan, Donegal, Leitrim, Monaghan, Sligo	0.44	0.40–0.64	1.50	1.35–2.22	1.30	1.17–1.92
Area 2 – Galway, Mayo, Roscommon	0.67	0.54–0.99	3.13	2.59–4.64	2.33	1.92–3.44
Area 3 – Clare, Limerick, North Tipperary	1.06	0.94–1.44	8.18	7.17–11.01	3.93	3.44–5.30
Area 4 – Cork, Kerry	1.50	1.36–1.84	7.14	6.48–8.73	4.19	3.80–5.13
Area 5 – Carlow, Kilkenny, South Tipperary, Waterford, Wexford	1.62	1.48–1.96	7.32	6.70–8.84	3.69	3.38–4.46
Area 6 – Dublin (part), Dún Laoghaire-Rathdown, Wicklow (part)	1.37	1.24–1.70	10.14	9.23–12.58	11.17	10.16–13.87
Area 7 – Dublin (part), Kildare, South Dublin, Wicklow (part)	1.52	1.41–1.79	9.02	8.41–10.62	16.79	15.65–19.77
Area 8 – Laois, Longford, Louth, Meath, Offaly, Westmeath	1.30	1.16–1.56	7.40	6.61–8.91	5.33	4.76–6.43
Area 9 – Dublin (part), Fingal	1.92	1.82–2.09	8.55	8.06–9.32	17.02	16.05–18.56
Total	**1.35**	**1.32–1.46**	**7.48**	**7.35–8.13**	**8.01**	**7.87–8.71**

CHO area 9 had the highest prevalence of problematic opioid users per 1,000 population in the 15–24-year-old and 35–64-year-old age groups, while CHO area 6 had the highest prevalence of problematic opioid users aged 25–34 years. CHO area 1 had the lowest prevalence of problematic opioid users across all three age groups.

Table 6 presents the estimated percentage of problematic opioid users in 2019 by age group and CHO area. Overall, the proportion of problematic opioid users aged 15–24 years was small (3.67%) but there were noticeable regional differences, with CHO areas 1, 4 and 5 showing a relatively higher prevalence of problematic opioid users aged 15–24 years than the other CHO areas. In all CHO areas, the 35–64-year-old age group had the highest proportion of problematic opioid users.

Table 6: Percentage of problematic opioid users in each age group by CHO area (2019)

CHO	Percentage aged 15–24 years	Percentage aged 25–34 years	Percentage aged 35–64 years
Area 1 – Cavan, Donegal, Leitrim, Monaghan, Sligo	6.85	23.63	69.52
Area 2 – Galway, Mayo, Roscommon	5.29	24.90	69.80
Area 3 – Clare, Limerick, North Tipperary	4.88	37.00	58.13
Area 4 – Cork, Kerry	6.09	31.04	62.86
Area 5 – Carlow, Kilkenny, South Tipperary, Waterford, Wexford	7.32	34.54	58.13
Area 6 – Dublin (part), Dún Laoghaire-Rathdown, Wicklow (part)	2.87	26.28	70.85
Area 7 – Dublin (part), Kildare, South Dublin, Wicklow (part)	2.31	17.42	80.27
Area 8 – Laois, Longford, Louth, Meath, Offaly, Westmeath	4.75	29.31	65.94
Area 9 – Dublin (part), Fingal	2.88	18.01	79.10
Total	**3.67**	**23.40**	**72.93**

Table 7 shows the estimated number of female and male problematic opioid users in each CHO area. Overall, females represented 27.70% of problematic opioid users in Ireland in 2019. This proportion was relatively consistent between CHO areas, with a range of 18.09% to 30.89%. In total, there were an estimated 5,505 female opioid users in Ireland (95% CI: 5,407–5,985) in 2019, which equates to a rate of 3.67 per 1,000 population (95% CI: 3.60–3.99). There were an estimated 14,370 male problematic opioid users in Ireland (95% CI: 14,115–15,623) in 2019, which equates to a rate of 9.76 per 1,000 population (95% CI: 9.59–10.61).

Table 7: Percentage of problematic opioid users who are female or male by CHO area (2019)

CHO	Female				Male			
	Known	Estimate	95% CI	%	Known	Estimate	95% CI	%
Area 1 – Cavan, Donegal, Leitrim, Monaghan, Sligo	42	73	65–107	25.00	129	219	197–323	75.00
Area 2 – Galway, Mayo, Roscommon	72	107	88–158	20.98	205	403	333–596	79.02
Area 3 – Clare, Limerick, North Tipperary	153	274	240¬369	26.20	367	772	675¬–1,040	73.80
Area 4 – Cork, Kerry	197	412	374–504	26.70	641	1,131	1,026–1,385	73.30
Area 5 – Carlow, Kilkenny, South Tipperary, Waterford, Wexford	224	361	331–436	27.83	573	936	857–1,130	72.17
Area 6 – Dublin (part), Dún Laoghaire-Rathdown, Wicklow (part)	452	797	724–989	30.89	1,206	1,783	1,622–2,213	69.11
Area 7 – Dublin (part), Kildare, South Dublin, Wicklow (part)	1,007	1,601	1,492–1,885	29.15	2,410	3,892	3,627-4,584	70.85
Area 8 – Laois, Longford, Louth, Meath, Offaly, Westmeath	276	358	320–431	18.09	818	1,621	1,447–1,954	81.91
Area 9 – Dublin (part), Fingal	1,107	1,522	1,435–1,660	29.64	2,433	3,613	3,408–3,941	70.36
Total	**3,530**	**5,505**	**5,407–5,985**	**27.70**	**8,782**	**14,370**	**14,115-15,623**	**72.30**

There are 10 RDATFs in Ireland. These task forces were developed in order to combat problematic drug use throughout the country via the area-based partnership approach adopted by the statutory, voluntary and community sectors. Tables 8 and 9 present an alternative regional breakdown of problematic opioid users in 2019 according to RDATF area, and also by regional health area. A description of the areas covered is described in the appendix of this report.

Table 8: Estimates of the number of problematic opioid users by RDATF area, and rates per 1,000 population aged 15 to 64 years (2019)

RDATF area	Known	Estimate	95% CI	Rate	95% CI
East Coast	1,658	2,580	2,346–3,202	9.07	8.24–11.25
Mid-western	520	1,046	915–1,409	4.19	3.66–5.64
Midlands	592	1,055	887–1,366	5.64	4.74–7.30
North Dublin	3,540	5,135	4,843–5,601	12.11	11.42–13.21
North Eastern	616	1,120	988–1,377	3.79	3.34–4.66
North Western	57	96	71–232	0.60	0.44–1.45
South Eastern	797	1,297	1,188–1,566	4.00	3.67–4.83
South Western	3,417	5,493	5,119–6,469	12.14	11.32–14.30
Southern	838	1,543	1,400–1,889	4.27	3.87–5.23
Western	277	510	421–754	2.18	1.80–3.22
Total	**12,312**	**19,875**	**19,522–21,608**	**6.68**	**6.57–7.27**

Table 9: Estimates of the number of problematic opioid users by regional health area, and rates per 1,000 population aged 15 to 64 years (2019)

Regional health area	Known	Estimate	95% CI	Rate	95% CI
A	4,156	6,255	5,946–6,797	8.69	8.27–9.45
B	4,009	6,548	6,146–7,579	10.24	9.61–11.85
C	2,455	3,877	3,643–4,583	6.37	5.99–7.53
D	838	1,543	1,400–1,889	4.27	3.87–5.23
E	520	1,046	915–1,409	4.19	3.66–5.64
F	334	606	516–895	1.54	1.31–2.27
Total	**12,312**	**19,875**	**19,522–21,608**	**6.68**	**6.57–7.27**

Table 10 shows the prevalence of problematic opioid use in 2019 in the cities of Dublin, Cork, Galway, Limerick, and Waterford. Dublin city had a significantly higher prevalence of problematic opioid use, at 18.62 per 1,000 population (95% CI: 17.80–20.48), than the other cities. Galway city had the lowest prevalence of problematic opioid use, at 3.27 per 1,000 population (95% CI: 2.96–4.38).

Table 10: Estimates of the number of problematic opioid users by city, and rates per 1,000 population aged 15 to 64 years (2019)

City	Known	Estimate	95% CI	Rate	95% CI
Dublin city	5,211	7,428	7,103–8,173	18.62	17.80–20.48
Cork city	556	964	861–1,171	6.69	5.98–8.13
Galway city	139	188	170–252	3.27	2.96–4.38
Limerick city	332	563	498–690	8.74	7.73–10.71
Waterford city	174	307	252–482	8.74	7.17–13.72

Additional analyses were performed for the years 2015 to 2018, in order to identify trends in problematic opioid use by year for each of the age groups (Tables 12 to 15). Table 11 shows the known number of problematic opioid users from each data source by year, from 2015 to 2019. The number of known opioid users remained relatively stable between 2015–2018, with a slight decrease in 2019. This difference is largely explained by a decrease in the number of individuals identified from the Probation Service data.

Table 11: Breakdown of known problematic opioid users by source and degree of overlap and non-overlap (2015–2019)

Source	2015	2016	2017	2018	2019
C	4,960	4,986	5,031	4,925	5,091
G	3,702	3,800	3,820	3,915	3,974
P	478	425	417	548	540
I	1,088	1,128	1,105	1,004	591
C ∩ G	453	422	459	381	483
C ∩ P	430	367	387	454	542
C ∩ I	580	588	602	610	447
G ∩ P	49	56	61	62	63
G ∩ I	166	170	185	163	107
P∩ I	171	193	182	212	142
C ∩ G ∩ P	27	24	18	34	31
C ∩ G ∩ I	59	52	41	63	37
C ∩ P ∩ I	243	213	255	300	226
G ∩ P ∩ I	29	22	27	28	25
C ∩ G ∩ P ∩ I	14	8	16	21	13
Total	**12,449**	**12,454**	**12,606**	**12,720**	**12,312**

Note: "∩" denotes the intersection between two or more sources.

C = Clinic Central Treatment List data source

G = GP Central Treatment List data source

P = Prison Central Treatment List data source

I = Irish Probation Service data source

As shown in Table 12, the total number of problematic opioid users in Ireland aged 15–64 years declined between 2015 and 2019. There were an estimated 21,198 problematic opioid users in 2015 (95% CI: 20,776–23,234), which had reduced to 19,875 by 2019 (95% CI: 19,522–21,608). However, this is not a statistically significant decrease over time, as the 95% CIs overlap.

Table 12: Comparison of the number of problematic opioid users and rates per 1,000 population aged 15 to 64 years (2015–2019)

Year	Known	Estimate	95% CI	Rate	95% CI
2015	12,449	21,198	20,776–23,234	7.13	6.99–7.81
2016	12,454	20,494	20,131–21,959	6.89	6.77–7.39
2017	12,606	20,465	19,813–22,460	6.88	6.66–7.55
2018	12,720	21,574	21,133–23,293	7.26	7.11–7.83
2019	12,312	19,875	19,522–21,608	6.68	6.57–7.27

As shown in Table 13, the number of problematic opioid users aged 15–24 years decreased significantly between 2015 and 2019, dropping from 1,357 (95% CI: 1,330–1,488) in 2015 to 730 (95% CI: 717–794) in 2019.

Table 13: Comparison of the number of problematic opioid users and rates per 1,000 population aged 15 to 24 years (2015–2019)

Year	Known	Estimate	95% CI	Rate	95% CI
2015	802	1,357	1,330–1,488	2.50	2.45–2.74
2016	707	1,129	1,109–1,210	2.08	2.05–2.23
2017	643	982	951–1,078	1.81	1.75–1.99
2018	588	978	958–1,056	1.80	1.77–1.95
2019	414	730	717–794	1.35	1.32–1.46

A statistically significant decrease in the number of problematic opioid users aged 25–34 years was also observed in the current study (Table 14). There were an estimated 6,730 problematic opioid users aged 25–34 years in Ireland in 2015 (95% CI: 6,596–7,376), with this number decreasing to 4,650 (95% CI: 4,567–5,055) in 2019.

Table 14: Comparison of the number of problematic opioid users and rates per 1,000 population aged 25 to 34 years (2015–2019)

Year	Known	Estimate	95% CI	Rate	95% CI
2015	3,860	6,730	6,596–7,376	10.82	10.61–11.86
2016	3,534	6,232	6,122–6,678	10.02	9.85–10.74
2017	3,337	5,432	5,259–5,961	8.74	8.46–9.59
2018	3,150	5,555	5,441–5,997	8.93	8.75–9.65
2019	2,760	4,650	4,567–5,055	7.48	7.35–8.13

Table 15 shows an increase in the number of problematic opioid users aged 35-64 years between 2015 and 2019. The estimated number increased from 13,110 (95% CI: 12,849–14,369) in 2015 to 14,495 (95% CI: 14,238–15,759) in 2019.

Table 15: Comparison of the number of problematic opioid users and rates per 1,000 population aged 35 to 64 years (2015–2019)

Year	Known	Estimate	95% CI	Rate	95% CI
2015	7,787	13,110	12,849–14,369	7.25	7.10–7.94
2016	8,213	13,132	12,900–14,071	7.26	7.13–7.78
2017	8,626	14,051	13,603–15,421	7.77	7.52–8.52
2018	8,982	15,042	14,734–16,240	8.31	8.14–8.98
2019	9,138	14,495	14,238–15,759	8.01	7.87–8.71

Discussion

Discussion

The research in this report assessed the prevalence of problematic opioid use in Ireland between 2015 and 2019. We estimated that there were 19,875 problematic opioid users in Ireland (95% CI: 19,522–21,608) in 2019, which equates to a prevalence rate of 6.68 per 1,000 population (95% CI: 6.57–7.27). The majority of problematic opioid users lived in Co Dublin, were male, and were 35–64 years of age.

This is the second national capture-recapture study conducted in Ireland since 2014 to use four data sources: the CTL (clinics, GPs and prisons) and the Probation Service. When compared to the 2014 prevalence study, the most notable difference in our study with regard to data collection was the automated method used to extract data from the Probation Service databases. For the purpose of this study, data were extracted automatically from computerised Probation Service records based on keywords related to opioid use. In the previous study, researchers were required to manually extract data from individual records at the Probation Service office in Dublin. It should be noted that the Probation Service dataset was noticeably larger than that used in the 2014 study. Nevertheless, the number of opioid users accounted for in the Probation Service dataset was consistent with drug use reports that have been independently produced by the Probation Service [15].

Due to the differences in methodology, comparisons to the 2014 prevalence study [4] should be interpreted with caution. We have provided summary data from both studies in Table 16 for illustrative purposes. Comparing these data, we note that the overall prevalence of problematic opioid use in Ireland between 2014 and 2019 has remained stable. There has also been a slight shift in the distribution of problematic opioid users in Co Dublin and the Rest of Ireland. The prevalence of problematic opioid use has decreased slightly in Co Dublin and increased slightly in the Rest of Ireland, however, these differences are not statistically significant. There was a significant decrease in the number of problematic opioid users aged 15–24 years as well as those aged 25–34 years, while there was an increase in the number of problematic opioid users aged 35–64 years. There was no significant change in the proportion of female/male problematic opioid users between 2014 and 2019.

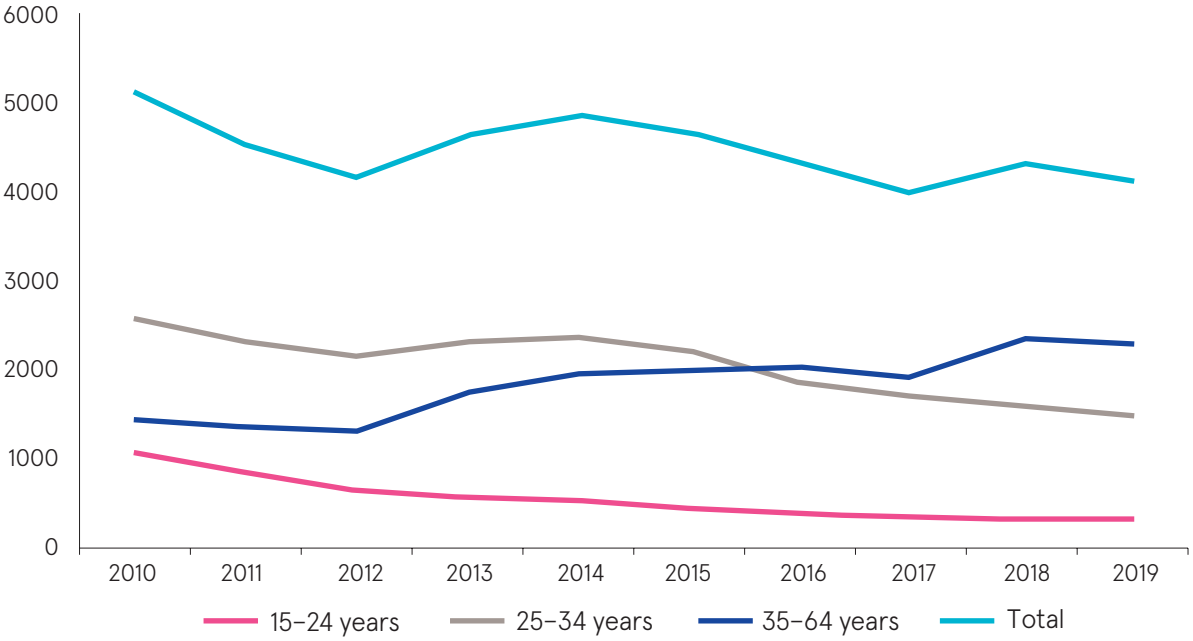
Table 16: Comparison of prevalence estimates, 2014 and 2019

2014	Estimate	95% CI	Rate	95% CI
Co Dublin	13,458	12,564–14,220	15.15	14.14–16.00
Rest of Ireland	5,530	5,406–8,023	2.53	2.47–3.67
15–24 years	1,092	1,076–1,234	1.88	1.85–2.13
25–34 years	6,672	6,578–7,539	8.84	8.71–9.98
35–64 years	11,224	11,065–12,681	6.46	6.37–7.30
Female	5,966	5,882–6,741	3.86	3.81–4.36
Male	13,022	12,838–14,713	8.52	8.40–9.63
Total	**18,988**	**18,720–21,454**	**6.18**	**6.09–6.98**
2019	**Estimate**	**95% CI**	**Rate**	**95% CI**
Co Dublin	11,729	11,298–12,944	12.72	12.25–14.03
Rest of Ireland	8,146	7,885–9,160	3.97	3.84–4.47
15–24 years	730	717–794	1.35	1.32–1.46
25–34 years	4,650	4,567–5,055	7.48	7.35–8.13
35–64 years	14,495	14,238–15,759	8.01	7.87–8.71
Female	5,505	5,407–5,985	3.67	3.60–3.99
Male	14,370	14,115–15,623	9.76	9.59–10.61
Total	**19,875**	**19,522–21,608**	**6.68**	**6.57–7.27**

In addition to differences in data collection methods previously mentioned, there are other differences in how research for this project was conducted when compared with the approach used for the 2014 study. The estimates included in this report were calculated exclusively using capture-recapture analysis, whereas the previous study used a second method, the multiple indicator method, in addition to capture-recapture analysis, for estimates of smaller regional areas. There are also subjective differences that may have occurred during the data cleaning phase of the study as individuals were matched based on similar (rather than exact) names, and/or date of birth in some instances. In addition, the allocation of address depended on the level of detail recorded for the address and consistency between data sources.

Nevertheless, the estimates provided in this report are credible based on data available from the NDTRS. Figure 3 demonstrates a general decline in the number of those receiving treatment for problematic opioid use between 2010 and 2019. The figure also illustrates a general decline in the number of opioid users in receipt of treatment aged 15–24 and 25–34 years, while also demonstrating a rise over time in the number of problematic opioid users aged 35–64 years. These trends were also observed in the 2014 opioid prevalence study [4].

Figure 3: Number of those in receipt of opioid treatment between 2010 and 2019 by age group according to NDTRS data



Source: NDTRS (2021).

It is difficult to compare our estimates of problematic opioid use in Ireland to findings from other European Union member states, due to differences in methodologies used to determine estimates as well as the year of study. However, with regard to the most recent data, the EMCDDA report that rates of high-risk opioid use in Europe at a national level range from less than 1 to more than 8 users per 1,000 population aged 15–64 years [16]. It should be noted that findings from our study show similarities with trends observed in other European countries, with a majority of opioid users being male and an ageing cohort effect [17,18].

We can only speculate as to the reasons for the suggested decline in problematic opioid use among younger age groups in Ireland. As previously mentioned, heroin is the main opioid that is misused in Ireland [5]. Qualitative research conducted in Dublin indicates that many young people have come to view heroin extremely negatively [19]. In addition, it has been observed that, even among adolescents who report extensive polydrug use, many now view heroin with disdain [20]. To explain similar observations in other countries, it has been suggested that young people may be wary of opioid use after witnessing the damage it inflicted on preceding generations [21].

The provision of prompt and accessible treatment also likely reduces the pool of active heroin users, thereby making it less likely that they in turn introduce other friends to heroin. A recent Irish study that examined cessation of heroin use among adolescents with heroin dependence demonstrated that patients did incrementally reduce heroin use over the first year of treatment and that one-half of patients were fully abstinent from heroin by the twelfth month of treatment. There was, however, less evidence of significant reductions in the use of other drugs [22].

This important finding should be viewed in light of recent data from *The 2019–20 Irish National Drug and Alcohol Survey* [11], which found that the use of stimulant-type drugs (including cocaine, ecstasy, and amphetamines) has increased in Ireland since 2014–15. This increase was particularly pronounced among younger age groups. Similar trends have been observed in Irish treatment data [23]. Research has also suggested an increase in the use of non-prescribed benzodiazepines and anti-epileptic and sedative-hypnotic drugs in Ireland, known as 'street tablets' among young people, and that use of these substances has become 'normalised' in certain communities due to their easy availability and low cost [24]. Therefore, it is possible that observed trends in opioid use among younger age groups in Ireland represent a shift to other accessible, cheaper drugs that are perceived to be less 'risky'.

Notwithstanding similar trends observed in recent opioid prevalence studies in Ireland and among treatment data, additional consideration needs to be given to the assumptions of capture-recapture analysis. These assumptions can be summarised as:

1. The population is closed.

2. Individuals can be matched from capture to recapture.

3. Capture in each sample is independent of capture in another sample, and

4. The capture probabilities are homogeneous across all individuals in the population.

The first assumption is not entirely feasible for human capture-recapture studies, as inward and outward migration is possible and deaths may also occur during the study period. This is why sampling frames of one year are used in order to minimise the likelihood of violating this assumption. Migration within counties is counteracted by taking into account 'captures' of particular individuals across regions within Ireland. However, this may lead to underestimation or overestimation of prevalence in certain areas.

We have made every effort to match individuals across data sources. The quality of the data sources was sufficient to allow for a high degree of confident matches to be made. It should be noted that this study involved the use of data that were not explicitly designed for the purposes of capture-recapture analysis, meaning that unintentional errors in matching may have occurred. It is unlikely that capture in one data source is entirely independent of capture in other data sources. Individuals who use opioids are not homogeneous and opioid users in the data sources represent a wide variety of drug use behaviour. Some individuals will be on long-term opioid substitution treatment and therefore may be less likely to appear in multiple data sources, while others may have numerous acute treatment episodes and therefore be more likely to present in several data sources. Equally, those who are treated for opioid addiction in prison may be more likely to be referred to services in the community and have keywords related to opioid use appear on their probation records as a result. Strategies for dealing with interactions between data sources were considered as part of selecting the best-fitting statistical model during the data analysis phase.

Another important limiting factor to consider when interpreting the results of this study is the requirement for a high degree of overlap between data sources. Due to relatively small numbers in some of the overlapping fields in the capture-recapture models (Table 11), slight differences in numbers may have significant impacts on the estimates provided. This is especially true for subgroups with small numbers of known problematic opioid users (e.g. the 15–24-year-old age group, females, and regions with a low prevalence of problematic opioid use). Therefore, point estimates should be interpreted with caution.

Continuity

Continuity

The effective implementation of drug policy depends on accurate estimates of the level of drug use within the population that this policy is designed to benefit. Population studies based on continuing developments in epidemiological research provide reliable data on drug prevalence, the nature of drug use, and its distribution across age groups and sexes. When repeated, these studies enable policy-makers to observe trends over time, affording an essential insight into measuring the effectiveness of interventions and predicting what phenomena will need attention in the future. Estimating the prevalence of opioid use on a national and regional basis is an important part of monitoring problematic drug use in Ireland and for planning the distribution of drug treatment services. The findings in this report will add to policy-makers', service providers', and the general public's understanding of the problematic drug use phenomenon in Ireland. We hope that continued partnership with the data providers for the CTL and Probation Service will allow for regular monitoring of opioid use in Ireland using our methods, which will be published in more detail in a separate paper.

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Appendix

Regional Drug and Alcohol Taskforce (RDATF) area definitions

Area	Description
East Coast	Wicklow and South Dublin
Mid-western	Clare, Limerick and North Tipperary
Midlands	Laois, Longford, Offaly and Westmeath
North Dublin	North Dublin city and county
North Eastern	Cavan, Louth, Meath and Monaghan
North Western	Donegal, Leitrim and Sligo and north-west Cavan
South Eastern	Carlow, Kilkenny, Waterford, Wexford and South Tipperary
South Western	South-west Dublin, west Wicklow and Kildare
Southern	Cork and Kerry
Western	Galway, Mayo and Roscommon

Regional health area definitions

Area	Description
A	County Cavan, County Louth, County Meath, County Monaghan and North Dublin (the part of Dublin city that is situated north of the River Liffey, and Fingal County)
B	County Kildare, County Laois, County Offaly, County Longford, County Westmeath, County Wexford (except for the local electoral area of Baltinglass) and West Dublin (the local electoral area of Pembroke in the city of Dublin and Dún Laoghaire-Rathdown)
C	County Carlow, County Kilkenny, County Waterford, County Wexford, County Wicklow (local electoral area of Baltinglass), South County Tipperary and South Dublin (the part of Dublin city that is situated south of the River Liffey, excluding the local electoral area of Pembroke)
D	County Cork and County Kerry
E	County Clare, County Limerick and North County Tipperary
F	County Donegal, County Galway, County Leitrim, County Mayo, County Roscommon and County Sligo