



NALOXONE ADMINISTRATION BY ADDICTION & HOMELESS SERVICE PROVIDERS IN IRELAND: 2018-2020

DRUG INSIGHTS REPORT 2

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National Social Inclusion Office, 2022

ACKNOWLEDGEMENTS

We would like to thank the following organisations and groups for their continued support, including the submission of data on naloxone administrations and naloxone training courses:

Ana Liffey Drug Project
COPE Galway
Cork Simon Community
Crosscare
Depaul Ireland
Focus Ireland
Galway Simon Community
HSE Addiction Services
Merchants Quay Ireland (MQI)
National Naloxone Oversight Quality Assurance Group
Novas
Pavee Point Traveller & Roma Centre
Peter McVerry Trust
St Vincent De Paul Ireland
UISCE

Special thanks also to Dr Ena Lynn, Research Officer, National Health Information Systems, Health Research Board (HRB) for providing additional analysis on drug deaths.

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FOREWORD

Yvonne O'Neill, National Director, Community Operations

I am pleased to be able to welcome this report from the Health Service Executive National Social Inclusion Office on the Naloxone Programme in Ireland. Naloxone is a prescription only product, available in injectable and intranasal preparations, which can reverse the effects of an opioid overdose.

Following the successful introduction of Naloxone Demonstration Project in 2015, this programme was continued and the report examines the provision and use of naloxone over the time period 2018 to 2020. In addition, the report also helpfully uses cost benefit analysis calculations to demonstrate the return on the investment in the programme over the last number of years.

It is great to read of the real human impact for people and their families, where, based on international literature on survival outcomes, at least 22 lives have been saved through the administration of naloxone on 569 occasions in overdose situations. As a secondary impact, the cost benefit analysis has demonstrated considerable savings to society and the fact that for every €1 spent on the programme there is a saving of €2.36 to the health service and society is worth highlighting.

The recommendations arising from the report are broad but nevertheless important to consider. They range from expansion and investment in the programme to the ongoing development of training, including the need for refresher training, to aspirations for the future. These aspirations include collaborations with relevant stakeholders such as An Garda Síochána and the HSE Primary Care Reimbursement Service (PCRS) as well as, strengthening recording and reporting mechanisms using newer technologies. The emphasis on training peers and family members in the administration of Naloxone will be particularly beneficial.

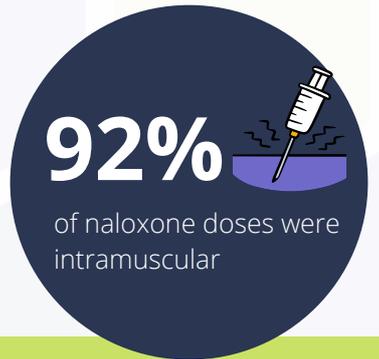
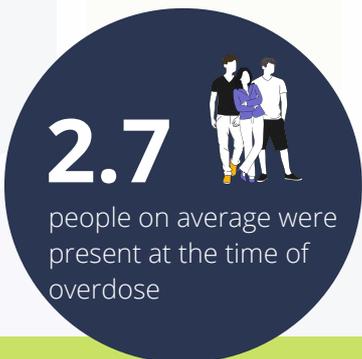
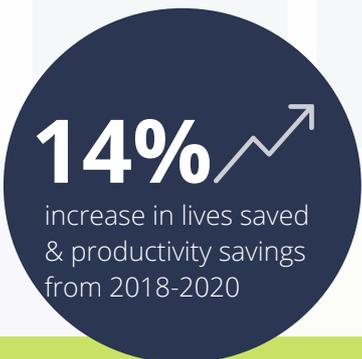
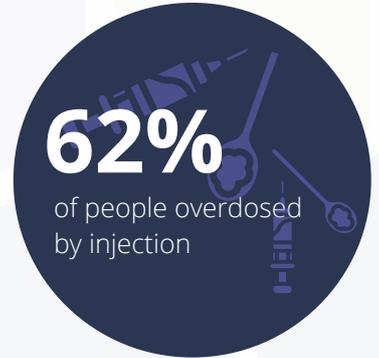
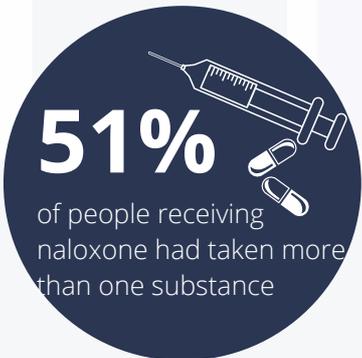
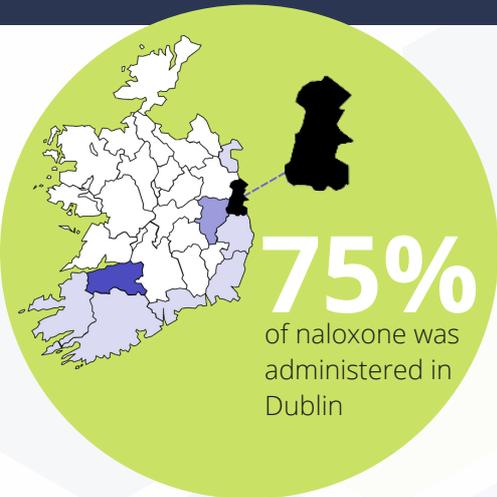
The Naloxone Programme has become an important element in HSE implementation of the harm reduction approach advocated by our National Drug and Alcohol Strategy. This is a programme that fundamentally saves lives, while also producing savings for the state. We look forward to continuing the work of the programme in the coming years and thank the authors of the report for this valuable contribution to the literature in this area.



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670,736

estimated productivity saving from 2018-2020, when supply and administration costs are deducted

EXECUTIVE SUMMARY

In Ireland, opioids are the main drug group implicated in drug overdose deaths (HRB, 2019). Deaths from opioid overdoses can be averted with the provision of naloxone which rapidly reverses the effects of the opioid. The World Health Organisation (WHO), 2014, recommend that people likely to witness an opioid overdose (e.g. close friends, a partner or family member, and staff/volunteers working with people who use drugs (PWUD)) should have access to naloxone and be trained to administer it.

Following a successful pilot project in 2015 (HSE, 2015), the HSE developed a Naloxone Training Programme for service providers. Training has been delivered to service providers that would encounter people who use drugs (PWUD), including the targeting of homeless services. In addition, naloxone kits were supplied to the service providers if service users had an overdose while attending their service. To date, there has been no evaluation of the expanded Naloxone Programme since its initial pilot phase. The aim of the study is to provide an assessment of the impact of the provision of naloxone, and training to addiction and homeless services.

The study reviewed data collected by service providers for each incident where naloxone was administered from 2018-2020. The number and type of naloxone products, purchase, supply, and training costs were obtained from data collected by the National Social Inclusion Office and an audit of service providers. Lives saved were calculated based on survival rates from best available international literature, and the productivity savings were calculated on this basis. A cost benefit framework was adopted to determine whether the benefits resulting from the programme outweigh the costs.

The following represents the key findings emerging from the study:

- Between 2018-2020, the supply of naloxone units by the National Social Inclusion Office has increased by 149% (8881 units over the 3 years)
- 569 people were administered naloxone, with 98% surviving, and nine deaths (2%), of which:
 - 61% were male, which increased from 51% in 2018 to 75% in 2020.
 - 71% were aged between 25-44 years. The average age was 37.6 years, which increased from 36.2 years in 2018 to 40.3 years in 2020. A larger proportion of females were 25-34 years (41% compared to 23% for males), while a larger proportion of men were aged 45-54 years (28% compared to 11%).
 - 60% of those that had received naloxone were also receiving Opioid Agonist Treatment (OAT).

- Almost three quarters of cases where naloxone was administered were from County Dublin (400 overdoses).
- Four areas of Dublin City (Dublin 7, Dublin 1, Dublin 8, and Dublin 2) account for over two thirds (67%) of overdoses where naloxone was administered. Overall, the proportion of females that are administered naloxone is higher in these areas (43%) than other areas of Dublin (21%).
- 92% of naloxone doses were intramuscular, with 8% intranasal.
- 51% of those that had received naloxone were reported to have taken more than one substance, with 35% taking two substances.
- 62% of people were reported to have overdosed by injection. Over two thirds (68%) of those that had taken heroin had injected.
- Other people were reported to have been present for 64% of overdoses. The average number of people present was 2.7.
- Observable signs of overdose in individuals receiving naloxone included being unconscious or non-responsive (62%), and shallow or irregular breathing (41%). Almost two thirds (64%) of respondents attempted to resuscitate the person when they were discovered.
- For 73% of overdoses, it was reported that an ambulance was called (26% did not provide information). Where an ambulance was called, 44% of overdose victims did not go with the ambulance to hospital.
- Those experiencing an overdose on average received naloxone 19 minutes sooner than if it was administered by paramedics or hospital emergency staff.
- It is estimated that the Naloxone Programme saved the lives of at least 22 people from 2018-2020.
- In terms of gained productivity savings, the 22 estimated lives saved equates to €968,550 from 2018-2020 or €14,595,365 over the lifetime of those who were saved. This results in an estimated productivity saving of €670,736 over three years, when supply and administration costs are deducted.
- For every €1 spent on the programme there was a return of €2.36 in terms of gained productivity due to death prevention.

The study has demonstrated the value of the wider distribution of naloxone to those that provide services or have regular contact with people who use drugs (PWUD). The following recommendations have been made to help enhance and further develop the programme:

1. The Naloxone Programme should continue to be resourced and expanded to achieve a stronger geographical spread given the demonstrated lifesaving benefits.
2. The need for gender specific initiatives in terms of overdose prevention and treatment needs further recognition and wider implementation.
3. Ensure that all those individuals who have been administered naloxone are 'signposted' to relevant treatment services to ensure that their ongoing health needs are addressed.
4. Reimbursement of intramuscular naloxone by the PCRS, in line with the National Centre for Pharmacoeconomics, Ireland (NCPE) would merit consideration.
5. Ambulance services should be called in all instances where naloxone is administered. This should be a target set for all service providers and should be reviewed annually and this recommendation should be incorporated into training.
6. The training programme should be reviewed yearly to ensure that the course content is up to date with developments in drug trends, in particular any emergence of synthetic opioids that may influence naloxone requirements. In addition, a refresher training programme should be developed to facilitate skill retention. This should contain practical examples and utilise both face-to-face and remote options to expand the provision of training.
7. Naloxone training and distribution to PWUD should include other potential bystanders, such as; family members, close friends and members of An Garda Síochána.
8. A specific drug education programme for PWUD on overdose risks, in particular polydrug use, should be developed.
9. The process of recording naloxone administrations should be streamlined to facilitate data analysis and to ensure that all naloxone administrations are recorded. Consideration should be given to redesigning the form and developing a secure mobile 'App' or online submission system, in line with GDPR.

INTRODUCTION

1.1 Background

Opioids are a class of drugs used for pain relief. They can also lead to feelings of relaxation, happiness, and euphoria, and are highly addictive. Opioids are available both as a prescription (e.g. methadone, fentanyl) and as an illegal drug (e.g. heroin). Opioids act as a respiratory depressant and high doses can cause respiratory failure, leading to death. Drug overdose is a leading cause of death among those who use opioids (WHO, 2014). In Ireland, opioids are the main drug group implicated in drug overdose deaths (HRB, 2019). Among opioid users, those who inject heroin and other opioids are recognised as being at an increased risk of harm (WHO, 2014; European Monitoring Centre for Drugs and Drug Addiction [EMCDDA], 2015).

Deaths from opioid overdoses can be averted with the provision of naloxone. In order to be effective, naloxone needs to be administered as soon as possible once symptoms of an overdose present themselves. Darke et al (2016) in a study of heroin related deaths found that 43% of cases had survival times of less than 20-30 minutes. Emergency service providers may subsequently be too late to revive overdose victims (Giglio, et al, 2015). To help overcome this issue, the WHO (2014) recommend that people likely to witness an opioid overdose should have access to naloxone and be trained to administer it. They suggested that this should include close friends, a partner or family member, and staff/volunteers working with PWUD.

In 2015 the HSE established a pilot project which trained 600 service users, family members, and front line workers in overdose recognition and response, and prescribed naloxone to 95 service users. Naloxone was administered five times over the course of the pilot and all five overdose victims recovered. The evaluation recommended that the 'roll out' of the project should be continued (Clarke and Eustace, 2016). This led to the development of a Naloxone Training Programme for service providers. Employing a 'train the trainer' approach, training has been delivered to service providers that regularly encounter PWUD, including the targeting of homeless services. Homeless people have been shown to have a greater risk of opioid overdose (Yamamoto et al 2019, Magwood et al, 2020). Following training, service providers delivered naloxone training to key staff within their service including those who would have direct contact with homeless people using opioids. In addition, all services that provided training were given naloxone kits (supplied 'on foot' of a prescription by a GP), to administer if service users had an overdose while attending their service. When the project was continued in 2016, naloxone was not a reimbursable product under the Primary Care Reimbursement Service (PCRS) therefore the naloxone was provided free of charge to services via an arrangement with the National Social Inclusion Office. To date, there has been no evaluation of the expanded Naloxone Programme since its initial pilot phase. It is within this context that the current study has been undertaken.

1.2 Aims and Objectives

The aim of the study is to provide an assessment of the impact of the provision of naloxone and training to addiction and homeless services. More specifically, the evaluation aimed to:

1. Provide an overview of the naloxone supplied, and its administration by health service providers.
2. Undertake a cost-benefit analysis of the programme.

METHOD

2.1 Introduction

The study comprised the following components:

- Supply and administration of naloxone over the years 2018-2020
- Cost-benefit analysis of the Naloxone Programme

2.2 Administration of Naloxone

Addiction and homeless service providers record all incidents where naloxone has been administered. For each incident, key information is recorded including:

- Sociodemographic information
- Outcome of overdose (survival or death)
- Naloxone dose administered
- Attendance at hospital
- Whether the person receiving naloxone was known to have injected at the time of the incident
- Whether the person receiving naloxone was known to have been receiving opioid agonist treatment (OAT) at the time of the incident

In addition, the number and type of naloxone products that was supplied from 2018-2020 was obtained from the HSE National Social Inclusion Office.

2.3 Cost Benefit Analysis

A cost benefit analysis framework was adopted to determine whether the benefits of the Naloxone Demonstration Project outweighed the costs. Both costs and benefits were calculated in monetary terms to determine the overall cost or savings associated with the project.

2.3.1 Costs

Naloxone purchase and supply costs, training equipment and administration costs for 2018-2020 were supplied by HSE National Social Inclusion Office. It was assumed that no additional cost was incurred for training venues (renting rooms, heating lighting etc.).

In addition, instructor salary costs, instructor travel and subsistence costs, and trainee lost productivity costs were estimated by asking service providers to complete an audit form (see Appendix 1). This was administered online to key stakeholders from each service provider organisation to complete on behalf of their organisation. The audit aimed to determine:

- Number of staff attending training and number of training courses provided
- Approximate length of time of the training programme
- Frequency of having to travel to deliver training

A total of 22 service providers were contacted and 15 completed the audit. This information was used to calculate an estimate of:

1. Instructor salary costs

Cost, in terms of total time spent delivering training was based on hourly income data from the Central Statistics Office (CSO) for earnings by economic sector (CSO, 2020). Hourly rates for 2018 and 2019 were used, with an estimate calculated for 2020 based on the percentage increase in hourly rates between 2018 and 2019.

2. Lost productivity costs

Lost productivity for trainees in terms of total time spent attending the training was also based on CSO hourly income data (CSO, 2019).

3. Travel and subsistence

A travel and subsistence cost was applied to a service provider who had to travel to deliver training all or most of the time. The number of courses delivered by these providers was multiplied by the 2020 HSE five hour subsistence rate (€15.41) and the 2020 HSE travel kilometre rate (44.79 cent per km) for a 50 kilometre trip by car (HSE, 2021).

2.3.2 Benefits (Productivity Savings)

Although difficult to estimate, without the administration of naloxone, a proportion of those experiencing a drug overdose would probably have died. While such deaths are a significant loss to relatives, friends, and society overall (Daley et al, 2018, Vincenzes, et al, 2019, Lambert et al, 2021, Titlestad et al, 2021), in economic terms they represent a loss to productivity. The Department of Health (DoH) and the Department of Public Expenditure and Reform (DPER) have produced estimates of annual and lifetime losses due to drug related premature death (Bruton et al, 2021). This employed a human capital approach to calculate productivity losses utilising Irish wage and employment rates by gender. These estimates in turn were utilised to calculate productivity savings for lives saved due to the administration of naloxone. The productivity costs they estimated captured the indirect cost of lost production due to imprisonment, morbidity and premature death. As noted above, given that the proportion of people that would have died without naloxone is difficult to determine, the analysis was undertaken using a range of survival rates, including rates of overdose survival from available literature (Darke et al, 2003, Neale, 2003). Although these studies are almost 20 years old, further correspondence with the EMCDDA, as well as one of the study's authors was unable to identify more up to date figures. Lives saved using a range of overdose survival rates were then translated into annual and lifetime productivity savings using the DoH and DPER's lost productivity data (Bruton, 2021). The project costs were deducted from this figure to produce a financial estimate of the annual utility of the programme.

PROVISION & ADMINISTRATION OF NALOXONE

3.1 Introduction

In this section data on naloxone supply and administration is presented from 2018-2020. The majority of naloxone was administered by service provider staff (94%) with 3% administered by peers, 2% by an unspecified individual and 1% by a General Practitioner (GP) or a Nurse.

3.2 Number of Units Supplied

Table 3.1 shows that from 2018-2020, 8881 units of naloxone were supplied by the National Social Inclusion Office to service providers. The number of units has increased by 149% since 2018. Overall 59% of units were intramuscular, with 41% intranasal. Intramuscular naloxone units decreased by 6% in 2019, and then increased by 157% in 2020 compared to 2018. Intranasal units increased by 6% in 2019, and by 163% in 2020 compared to 2018.

Table 3.1: Number of Naloxone Units Supplied to Service Providers 2018-2020

| Type of naloxone | Year | | |
|-----------------------|-------------|-------------|-------------|
| | 2018 | 2019 | 2020 |
| Nyxoid (intranasal) | 775 | 818 | 2037 |
| Prenoxad (injectable) | 1210 | 1132 | 2909 |
| Total | 1985 | 1950 | 4946 |

3.3 Profile of Those Receiving Naloxone

Between 2018 and 2020 it was reported that naloxone was administered to 569 people. Of these, 98% survived the overdose with nine deaths (2%). The number of people receiving naloxone has fluctuated, with a 13% increase experienced in 2020 compared to 2018 (Table 3.2).

Table 3.2: Naloxone Administration by Outcome (2018-2020)

| Year | Fatality | | Non-fatality | | Total | |
|------|----------|-----|--------------|-------|-------|------|
| | No. | % | No. | % | No. | % |
| 2018 | 5 | 2.6 | 184 | 97.4 | 189 | 33.2 |
| 2019 | 0 | 0 | 166 | 100.0 | 166 | 29.2 |
| 2020 | 4 | 1.9 | 210 | 98.1 | 214 | 37.6 |

Age and gender information was supplied for 79% and 91% of those receiving naloxone respectively. A total of 61% were male. Figure 3.1 shows that the proportion of males significantly increased from 51% in 2018 to 75% in 2020 ($\chi^2 = 24.151$, $df = 2$, $p < 0.001$).

Figure 3.1: Age and Gender of Those Receiving Naloxone by Year

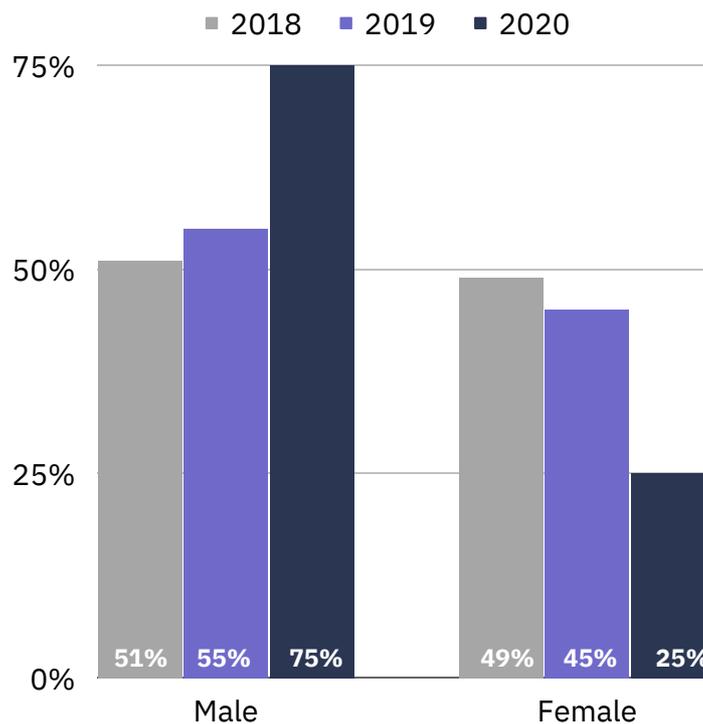


Table 3.3 shows that 71% were aged between 25-44 years. The average age was 37.6 years. Average age significantly increased from 36.2 years in 2018 to 40.3 years in 2020. (One_way Anova, $F = 8.807$, $df = 2$, $p < 0.001$). In comparing age and gender, a larger proportion of females were 25-34 years (41% compared to 23% for males) while a larger proportion of men were aged 45-54 years (28% compared to 11%). These patterns were statistically significant ($\chi^2 = 26.369$, $df = 3$, $p < 0.001$).

Table 3.3: Age by Gender of Those Receiving Naloxone (2018-2020)

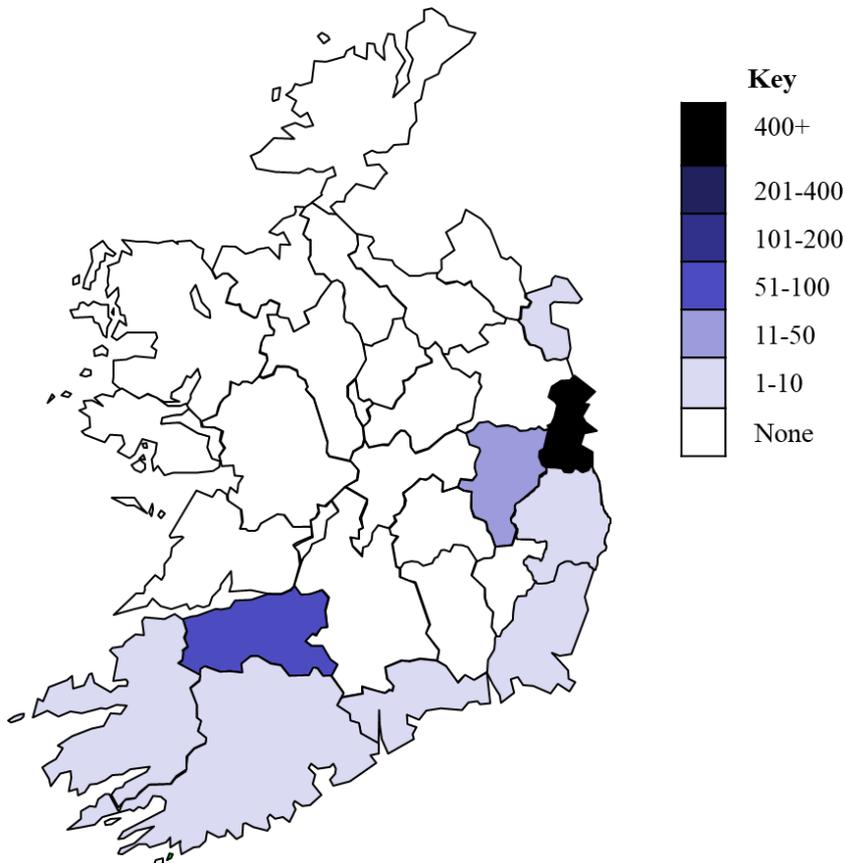
| Age group | Male | | Female | | Total | |
|-----------|------|------|--------|------|-------|------|
| | No. | % | No. | % | No. | % |
| 18-24 | 21 | 8.1 | 14 | 7.7 | 35 | 7.9 |
| 25-34 | 59 | 22.7 | 74 | 40.7 | 133 | 30.1 |
| 35-44 | 107 | 41.2 | 74 | 40.7 | 181 | 41.0 |
| 45+ | 73 | 28.1 | 20 | 11.0 | 93 | 21.0 |

Two thirds of service providers supplied information on OAT. Of these, it was reported that 60% of those that had received naloxone were also receiving OAT.

3.4 Geographical Distribution of Reported Naloxone Administration

Figure 3.2 shows that naloxone was primarily reported to have been administered in County Dublin (400 overdoses) followed by County Limerick (92 overdoses). Almost three quarters of cases where naloxone was administered were from County Dublin.

Figure 3.2: Number Receiving Naloxone by County 2018-2020



Within County Dublin, figure 3.3 shows that the highest amount of naloxone was administered in Dublin 7 (157 overdoses, 39%), followed by Dublin 1 (88 overdoses, 22%), Dublin 8 (84 overdoses, 21%), and Dublin 2 (10%). These four areas of Dublin City account for over two thirds (67%) of overdoses where naloxone was administered in Ireland.

Figure 3.3: Number Receiving Naloxone in County Dublin 2018-2020

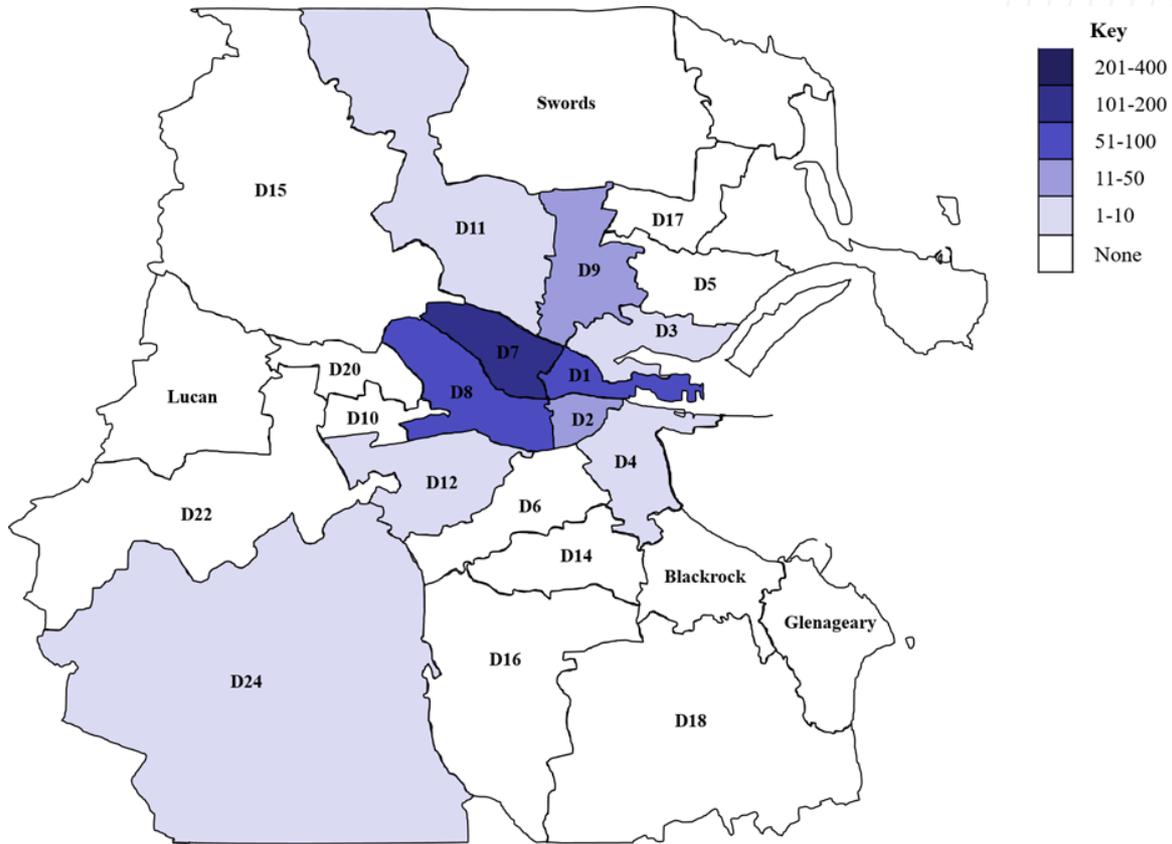


Table 3.4: Gender Comparison of Areas of Dublin with Largest Numbers Receiving Naloxone with Other Areas (2018-2020)

Table 3.4 compares gender for the four areas of Dublin with the largest number of people receiving naloxone to other areas of Dublin and other areas of Ireland. Overall the proportion of females that are administered naloxone is higher in these areas (43%) than other areas of Dublin (21%) and other areas of Ireland. This pattern is statistically significant ($\chi^2 = 7.561$, $df = 2$, $p < 0.05$). There are no significant age differences between areas for males or for females.

| Area | Male | | Female | |
|------------------------|------|------|--------|------|
| | No. | % | No. | % |
| Dublin 1 | 36 | 47.4 | 40 | 52.6 |
| Dublin 2 | 19 | 50.0 | 19 | 50.0 |
| Dublin 7 | 75 | 52.8 | 67 | 47.2 |
| Dublin 8 | 61 | 76.3 | 19 | 23.8 |
| Other areas of Dublin | 22 | 78.6 | 6 | 21.4 |
| Other areas of Ireland | 97 | 66.0 | 50 | 34.0 |

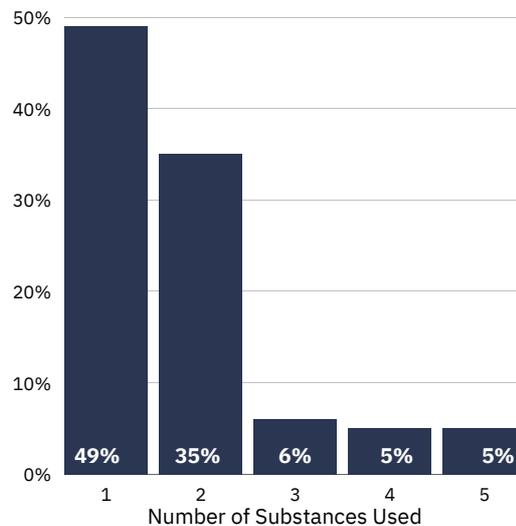
3.5 Type of Naloxone Administered

Data on the type of naloxone administered was provided for 58% of service providers that received naloxone through the NSIO. Overall 92% of doses were intramuscular while 8% were intranasal doses. The mean number of intramuscular doses administered was 2.53, whereas the mean for intranasal doses was 1.37. This pattern is statistically significant (Independent t test, $t = 3.059$, $df = 345$, $p < 0.01$).

3.6 Substances Used

From 2019, service providers were asked to list the substances used by individuals receiving naloxone, if known. Two thirds knew what substances had been taken. Of these, 51% took more than one substance with 35% taking two substances (figure 3.4). The average number of substances taken was 1.83.

Figure 3.4: Number of Substances Taken by Those Receiving Naloxone (2019-2020)



A wide variety of substances were reported with 22 specific substances given. Table 3.5 shows the substances that were used, grouped into substance types. The results indicate that the main substances reported to have been taken are opioids (73%). Of these, heroin was the main opioid taken (58%). The other main substances taken were anti-anxiety medication (25%) and alcohol (7%). In addition, 18% reported general substances with no detail on the specific type (e.g. street tablets, prescription medication) and a quarter did not know what substances were taken. In comparing substances taken by gender in terms of the top three substances used it can be seen that a larger proportion of men used anti-anxiety medication (77%) and opioids (65%), while a larger proportion of females used alcohol (65%). These differences are statistically significant for anti-anxiety medication ($\chi^2 = 6.578$, $df = 1$, $p < 0.050$) but not for opioids or alcohol.

Table 3.5: Substances Taken by Gender for Those Receiving Naloxone (2019-2020)*

| Substance taken | Male | | Female | | Total | |
|--|------|------|--------|------|-------|------|
| | No. | % | No. | % | No. | % |
| Heroin | 96 | 69.6 | 42 | 30.4 | 138 | 57.5 |
| Other opioids | 17 | 44.7 | 21 | 55.3 | 38 | 15.9 |
| Anti-Anxiety medication | 47 | 77.0 | 14 | 23.0 | 61 | 25.4 |
| Alcohol | 6 | 37.5 | 10 | 62.5 | 16 | 6.7 |
| Stimulants (e.g. cocaine) | 5 | 50.0 | 5 | 50.0 | 10 | 4.2 |
| Psychoactive drugs | 3 | 50.0 | 3 | 50.0 | 6 | 2.5 |
| Painkillers | 2 | 66.7 | 1 | 33.3 | 3 | 1.3 |
| Antipsychotic medication | 1 | 50.0 | 1 | 50.0 | 2 | 0.9 |
| Other substances (e.g. 'street tablets') | 20 | 47.6 | 22 | 52.4 | 42 | 17.5 |
| Unknown | 30 | 50.8 | 29 | 49.2 | 59 | 24.6 |

*multiple response therefore percentages may not add to 100%

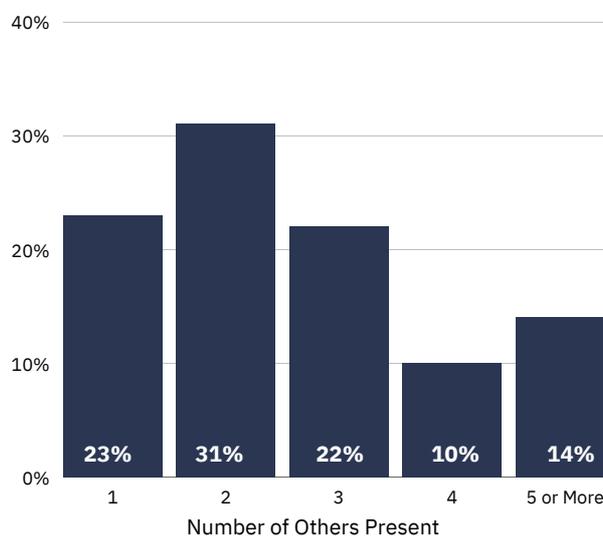
3.7 Overdose by Injection

In 47% of overdose events, service providers were able to identify the route of use of the drug. For these cases, 62% of people had injected with 38% using another method (e.g. oral, smoked). Over two thirds (68%) of those that had taken heroin had injected.

3.8 People Present at Overdose

From 2019, service providers were asked to state if others were present with the individual at the actual time of the overdose. In 64% of cases it was reported that other people were present (33% did not respond, while nobody else was present for 3% of overdoses). Figure 3.5 shows that where people were present, there was more than one person at the scene in three quarters of overdoses and in almost half of cases (46%) three or more people were present. The average number of people present was 2.7.

Figure 3.5: Number of People Present for Overdoses (2019-2020)



3.9 Observable Signs

From 2019, service providers were asked to state the observable signs of overdose displayed by the individual that was administered naloxone. These are shown in figure 3.6. It can be seen that a wide variety of responses were given, with the most common being unconscious or non-responsive (62%) followed by shallow or irregular breathing (41%).

Figure 3.6: Observable Signs of Overdose (2019-2020)

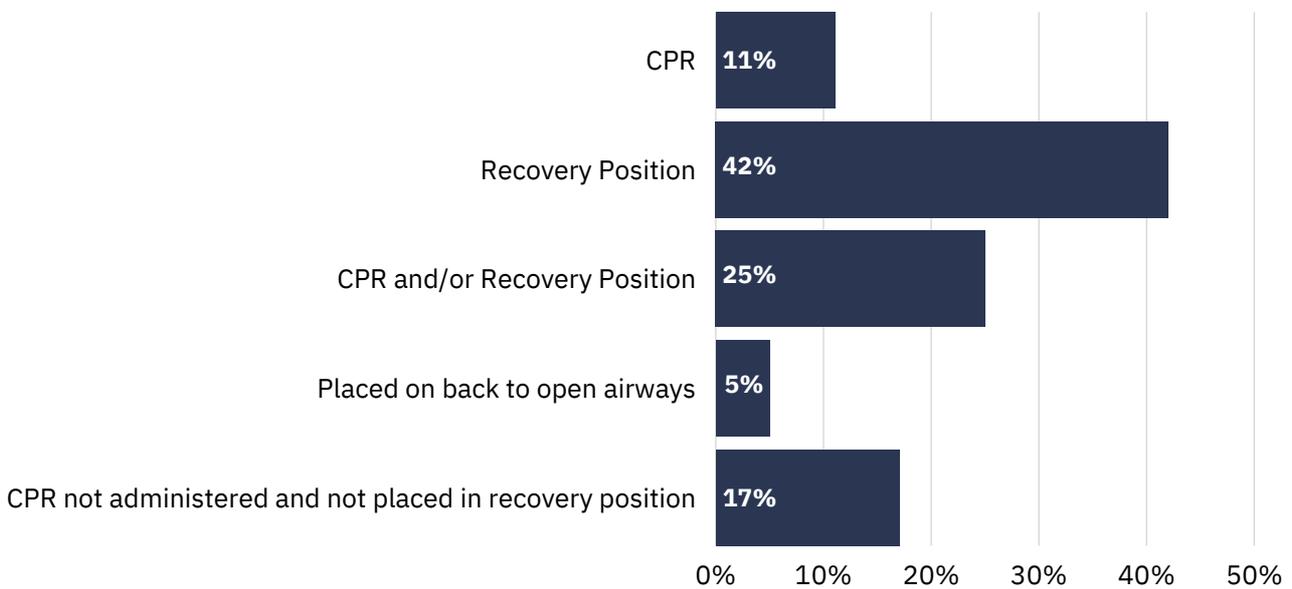
| Observable signs | No. | % |
|--|-----|------|
| Unconscious/unresponsive/barely responsive | 235 | 61.8 |
| Shallow breathing/irregular/laboured | 157 | 41.3 |
| Pasty colour/pale/grey/grey complexion | 38 | 10.0 |
| No response to pain threshold/pain/pain stimulus | 29 | 7.6 |
| Pinpoint eyes/pinhole | 29 | 7.6 |
| Blue lips/dark purple | 24 | 6.3 |
| Blue face/purple | 10 | 2.6 |
| No observable signs (advised to administer based on reported drug use) | 10 | 2.6 |
| Glazed eyes/dilated | 9 | 2.4 |
| Low heart rate/pulse | 8 | 2.1 |
| Not breathing | 8 | 2.1 |
| Blue finger nails/tips | 6 | 1.6 |
| Blue earlobes/dark purple | 6 | 1.6 |
| Clammy skin/sweating | 6 | 1.6 |
| Unbalanced/disorientated | 5 | 1.3 |
| Blue around eyes | 3 | 0.8 |
| Blackish colour/black lips | 3 | 0.8 |
| Loss of colour to lips/fingertips | 3 | 0.8 |
| Frothing at mouth | 3 | 0.8 |
| Slurred speech | 3 | 0.8 |
| Low blood oxygen | 2 | 0.5 |
| History of overdose | 2 | 0.5 |
| Hallucinating | 1 | 0.3 |
| Responsive to pain | 1 | 0.3 |
| Blood around groin area | 1 | 0.3 |
| Drug paraphernalia | 1 | 0.3 |
| Fast pulse | 1 | 0.3 |

*multiple response therefore percentages may not add to 100%

3.10 Resuscitation by Service Providers

Almost two thirds (64%) of those that administered naloxone attempted to resuscitate the person when they were discovered, while 22% did not state whether resuscitation was attempted. Where information on resuscitation was provided, figure 3.6 shows that 42% placed the person in the recovery position, a quarter carried out Cardiopulmonary Resuscitation (CPR) and also placed the person in the recovery position, while 11% carried out CPR and did not report undertaking any other intervention. For 17%, no attempt was made to resuscitate or place in the recovery position. In four cases where no resuscitation was attempted (1%), the client had become alert and responsive while two (0.5%) were dead on arrival at the scene.

Figure 3.6: Resuscitation by Service Providers



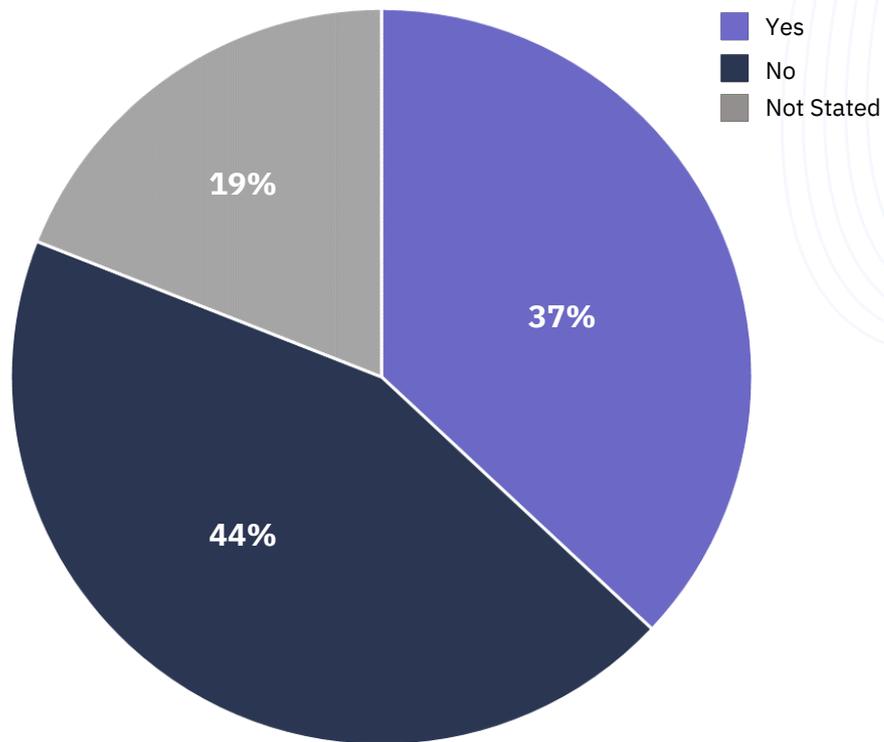
3.11 Use of Ambulance Services

For 73% of overdoses, an ambulance was called, with 1% reporting an ambulance was not called and 26% not reporting whether an ambulance was called. When an ambulance was called, 98% of service providers waited for the ambulance to arrive.

In instances where an ambulance was called 37% of those who had overdosed went with the ambulance to hospital, with 44% not going and 18% not stating whether the individual went to hospital (figure 3.7).

For those who did not use the ambulance, 26% had refused to attend hospital or had left the location of the overdose, 56% did not state why they did not attend, while 18% gave other reasons.

Figure 3.7: Travel with Ambulance to Hospital for Person Experiencing an Overdose



3.12 Presence of Gardaí

Information about the presence of Gardaí was provided by 36% of service providers. Of these, 84% reported that the Gardaí were not present at the overdose, with 13% stating they were present, while 2% stated the Gardaí had been contacted and expected.

3.13 Time Savings Administering Naloxone

How much time was saved in terms of administering naloxone immediately (on discovering a person experiencing an overdose), compared to administering on arrival of Ambulance Services (for the paramedics to administer) was calculated. On average naloxone was administered 19 minutes sooner.

3.14 Resupply of Naloxone

A third of service providers gave information about the resupply of naloxone following administration. All except five (97%) had been resupplied with naloxone.

COST BENEFIT ANALYSIS

4.1 Introduction

In this section project costs and productivity savings are presented within a cost benefit analysis framework to provide a financial estimate in terms of the utility of the programme.

4.2 Training Costs

The service provider audit (Appendix 1) obtained information on the number of training courses provided by year. These are shown on table 4.1. From the responses received, 255 courses were delivered from 2018-2020 and 1412 staff received naloxone training. The number of training courses increased by 20% from 2018-2020, with a 41% increase in the number of staff trained. On average, the training programme took 2.5 hours to deliver (range = 1-4 hours). From this data, estimates of training costs have been calculated and are shown in table 4.2. It can be seen that the overall cost of training from 2018-2020 was €112,605. Training costs have increased by 47% since 2018, which coincides with increases in the number of courses provided and the number of staff trained (table 4.1). The largest component of training costs is lost productivity of trainees (90,041; 80% of costs) which has increased by 318% since 2018 due to increases in the number of people receiving training.

Table 4.1: Naloxone Training Courses and Staff Trained (2018-2020)

| Training courses and staff trained | 2018 | 2019 | 2020 | Total |
|------------------------------------|------|------|------|-------|
| Number of training courses | 81 | 77 | 97 | 255 |
| Number of staff receiving training | 369 | 522 | 521 | 1412 |

Table 4.2: Training Costs Estimates (2018-2020)

| Training cost estimates | 2018 | 2019 | 2020 | Total |
|--------------------------------------|---------------|---------------|---------------|----------------|
| | € | € | € | € |
| Instructor costs | 5,025 | 4,690 | 5,855 | 15,570 |
| Training material and equipment | 400 | 9,195 | 0 | 9,595 |
| Lost productivity of trainees | 21,572 | 34,325 | 34,144 | 90,041 |
| Travel and subsistence costs | 2,004 | 2,268 | 2,722 | 6,994 |
| Total training cost estimates | 29,001 | 50,478 | 42,721 | 112,605 |

4.3 Supply, Distribution, and Administration Costs

Supply, distribution, and administration costs have increased by 100% since 2018, totalling €297,814 from 2018-2020 (table 4.3). Administration costs have reduced by 26% since 2018, whereas supply and distribution costs have increased by 108%.

Table 4.3 Supply, Distribution, and Administration Costs (2018 - 2020)

| Supply and administration costs | 2018 | 2019 | 2020 | Total |
|---|---------------|---------------|----------------|----------------|
| | € | € | € | € |
| Supply and distribution of naloxone | 77,284 | 43,585 | 160,953 | 281,822 |
| Administration costs (report, review, and accreditation) | 4,920 | 7,442 | 3,630 | 15,992 |
| Total supply and administration costs | 82,204 | 51,027 | 164,583 | 297,814 |

4.4 Benefits of Programme (Lives Saved and Productivity Savings)

A review of available literature found two studies that calculated the ratio of fatal and non-fatal overdoses (Darke et al, 2003, Neale, 2003). These found that on average 3.95% of heroin overdoses are fatal. In calculating productivity savings, the analysis therefore assumed that the lives of 3.95% of those receiving naloxone were saved. In addition, it also provided results for lives saved using a range of overdose survival rates (from 2% to all those that received naloxone). This analysis is shown in table 4.4. It can be seen that based on a 3.95% overdose fatality rate (Darke et al, 2003, Neale, 2003), the lives of 22 people have been saved between 2018 and 2020. This represents a productivity saving of €968,550 during this period and €14,595,365 over the lifetime of those who were saved. There has been a 14% increase in lives saved and productivity savings between 2018 and 2020.

By comparison in examining the results for different overdose fatality rates in table 4.4, it can be seen that if 2% of lives were saved (11 lives between 2018 and 2020) productivity savings would be €490,405 during this period and lifetime savings would be €7,390,058. If it is assumed that the lives of 10% receiving naloxone were saved, the 2018-2020 productivity savings would be €2,452,024 and the lifetime savings would be €36,950,288.

Table 4.4: Productivity Savings Based on a Range of Assumptions About the Proportion of People Who Would Have Died if They Had Not Received Naloxone

| Savings by Year* | Assumptions about the percentage (%) that would have died without naloxone | | | |
|------------------------------------|--|-----------|-----------|------------|
| | 2% | **3.95% | 6% | 10% |
| 2018 | | | | |
| Lives saved | 3.7 | 7.3 | 11.0 | 18.4 |
| Productivity savings per annum (€) | 161,133 | 318,238 | 483,399 | 805,665 |
| Lifetime (npv) saving (€) | 2,428,162 | 4,795,620 | 7,284,486 | 12,140,809 |
| 2019 | | | | |
| Lives saved | 3.3 | 6.6 | 10.0 | 16.6 |
| Productivity savings per annum (€) | 145,370 | 287,106 | 436,110 | 726,850 |
| Lifetime (npv) saving (€) | 2,190,624 | 4,326,483 | 6,571,873 | 10,953,121 |
| 2020 | | | | |
| Lives saved | 4.2 | 8.3 | 12.6 | 21.0 |
| Productivity savings per annum (€) | 183,902 | 363,206 | 551,705 | 919,509 |
| Lifetime (npv) saving (€) | 2,771,272 | 5,473,262 | 8,313,815 | 13,856,358 |

* cost calculation based on Department of Health (2021)

** (based on ratio of fatal to non-fatal overdoses from Darke et al (2003) and Neale et al, 2003)

4.5 Cost Benefit Analysis

Table 4.5 deducts all costs from the quantifiably benefits associated with the project to provide a financial estimate of the utility of the programme. It can be seen that once all costs have been deducted there has been an overall saving of €558,131 between 2018 and 2020. This figure assumes that 3.95% of those that received naloxone would have died if it had not been administered.

Table 4.5: Cost Benefit Analysis (2018-2020)

| Cost benefit analysis | 2018 | 2019 | 2020 | Total |
|--|---------|---------|---------|---------|
| | € | € | € | € |
| COSTS | | | | |
| Training costs | 29,001 | 50,478 | 42,721 | 112,605 |
| Supply and distribution of naloxone | 77,284 | 43,585 | 160,953 | 281,822 |
| Administration costs | 4,920 | 7,442 | 3,630 | 15,992 |
| BENEFITS | 318,238 | 287,106 | 363,206 | 968,550 |
| Productivity savings per annum due to lives saved* | | | | |
| SAVINGS PER ANNUM | 207,033 | 185,601 | 155,899 | 558,131 |

*assumes 3.95% would have died if they had not received naloxone

DISCUSSION

5.1 Introduction

The study provides an overview of naloxone administration by service providers throughout Ireland in addition to a cost benefit analysis to determine the overall utility of the programme. It utilised data collected between 2018-2020. The following represents the key issues emerging from the analysis.

5.2 Profile of Those Receiving Naloxone

Over the three-year period of 2018-2020, naloxone was administered to 569 people by health service providers and peers with the overall number of administrations increasing by 15% in 2020 compared to 2018. These results show how the Naloxone Programme has expanded since its initial demonstration project phase when there were five administrations of naloxone between June-October 2015 (Clarke and Eustace, 2016). The use of naloxone at the scene of an overdose appears to have been embraced by service providers. This is benefitting those who experience an overdose, as they can receive naloxone quicker than if it was administered by paramedics or hospital emergency staff. Overall, these individuals received naloxone 19 minutes sooner than would otherwise have been the case. This may have contributed to the 98% overdose survival rate.

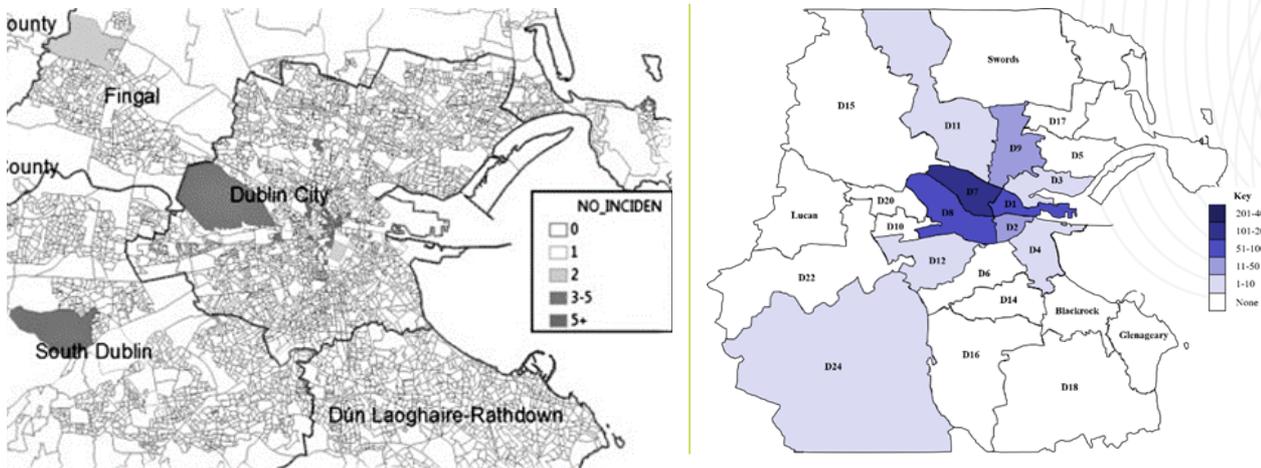
In examining the age and gender profile of those that received naloxone, it can be seen that the majority are males and this has increased to seven in ten administrations of naloxone. In addition, the age profile has increased from 37 years to 40 years. This pattern is consistent with drug deaths (HRB, 2019) and drug treatment patterns (Kelleher et al, 2021) in Ireland and reflects an aging heroin using population. However, in comparing the age profile by gender it was found that females were younger than men. This pattern warrants further investigation, as it may be indicative of a pattern of increased heroin use among the younger female population. This may require gender specific initiatives in terms of overdose prevention and treatment. The need for gender specific initiatives is also highlighted by Li et al (2012) who notes that women may be more influenced by peer relationships. They found that women on methadone treatment that had family members and friends who used drugs were more likely than men to concurrently use heroin. In addition, Merchants Quay Ireland (MQI) have identified the need to increase the number of Irish gender specific harm reduction and treatment services (2021). A number of specific treatment programmes for women have been developed that have been shown to be effective (Marsh et al, 2018).

5.3 Geographical Distribution of Naloxone Administrations

In examining the geographical distribution of naloxone administrations, it can be seen that almost three quarters were administered in County Dublin, with a quarter in other counties. By comparison 53% of drug poisoning deaths involving opioids (in 2017) were in County Dublin with 47% in other counties (HRB, 2022). Although not directly comparable, this indicates that there is a need to expand the Naloxone Programme to counties outside the Dublin region. In addition, there may be an issue with the recording of naloxone administrations. Administrations primarily took place in counties along the east and southwest, with no reported administrations in the west, midlands or northwest. Overall administrations were only reported in 9 of the 26 counties of Ireland. Analysis of opioid deaths by county for 2017 shows that opioid overdose deaths have occurred in 14 counties where no naloxone administrations have been recorded from 2018-2020 (HRB, 2022). The distribution of naloxone and training provision to service providers in these counties and the recording of administrations needs to be reviewed, to ensure that service providers in all areas are in a position to administer naloxone if a service user experiences an overdose. Informal discussions with a number of service providers suggests that recording of data may be difficult in some instances for outreach workers. The data recording system for naloxone administration should be reviewed to facilitate and improve the reporting of naloxone administrations.

In examining naloxone administration within County Dublin, it was found that over two thirds are located in Dublin City Centre. These correspond to high areas of economic deprivation in Dublin (Teljeur et al, 2019). A study of drug overdoses attended by Dublin Ambulance Services (Kilmas et al, 2014) found 85% of overdoses were concentrated in the Inner City Centre. Although similar to our study, our findings show a wider concentration within Dublin City Centre, and also more administrations across the rest of the county (see figure 5.1). Although not directly comparable, the wider distribution of administrations shows the importance of having naloxone available in a number of locations both within Dublin City Centre and Dublin County. In 2017 47% of opioid drug overdose deaths in Dublin occurred in the four areas of Dublin City Centre that experienced the largest number of administrations. This shows that the programme is making naloxone available where a significant proportion of deaths take place, and as such may contribute to reducing overdose deaths. It also supports the rationale behind the location of a Medically Supervised Injecting Facility in Dublin City Centre, (MQI, 2018). Another notable finding is that the areas with the highest proportion of naloxone administrations in Dublin City also have the greatest proportion of administrations to females. Again, this may reflect a growing pattern of female opioid use, reinforcing the need for a gender specific approach.

Figure 5.1: Comparison of Drug Overdoses Attended by Dublin Ambulance Services in 2014* with Naloxone Administrations 2018-2020**



*Kilmas et al (2014)

**Current Study

5.4 Current Treatment

Treatment for opioid addiction has been shown to be effective in terms of overdose prevention (Ma et al, 2019). In our study, 60% of those that had been administered naloxone for an overdose were currently receiving OAT. Au et al (2021) points out that those at the initial phase of treatment may be at increased risk of overdose due to loss of opioid tolerance. Similarly, an Irish study has found that those receiving methadone treatment are at most risk of an overdose during the first month of treatment and the month after treatment has finished (Durand et al, 2020). Li et al (2012) found that 45% of clients on methadone maintenance also reported using illicit heroin in the previous 30 days. This can compromise their treatment and place them at greater risk of overdose. Such factors may help explain the current findings, although detailed information on the type of treatment received and individual risk factors is required before firm conclusions can be drawn. This was outside the scope of the current study. However, the findings do highlight the need for the Naloxone Programme to proactively inform treatment service providers of the overdose risks, as close monitoring may be required with treatment plans adapted to help prevent future overdoses. In addition, those not currently receiving treatment should be followed up via outreach initiatives and encouraged to access treatment with naloxone, and respective training provided as part of the initiation process to treatment. Studies have shown that only 30% of overdose patients are offered medication (Au et al, 2021). It would be important that service providers that administer naloxone ‘signpost’ to treatment services to ensure that the ongoing health needs of those individuals who overdose are addressed.

5.5 Administering Naloxone

Needles that have been used to inject substances and left at the scene of an overdose pose the risk of a needle stick injury and exposure to blood borne viruses such as hepatitis C (Zibbell et al, 2018), particularly if needles have been shared by PWUD. When the route of overdose administration could be identified, 62% of service providers stated that the overdose had been taken by injection. Over half were not able to identify the route of administration. When administering naloxone, it would be important that service providers take precautions to avoid against needle stick injury, and are also aware of the steps to take if they do experience a needle stick injury. These issues are addressed in the Naloxone Training Programme, including information in a pack given to those that attend training (HSE, 2015).

When the Naloxone Programme initially commenced, service providers were supplied with intramuscular naloxone which is administered by injection. In 2018, intranasal naloxone was also made available and launched on International Overdose Awareness Day (31/8/18). This is more straightforward to administer (by spraying into the nose) and avoids the risk of needle stick injury. Studies have shown that intranasal naloxone is as effective as the intramuscular format (Yousefifard et al, 2019) and the training programme was amended to also include intranasal administration of naloxone. At the start of the COVID-19 pandemic in 2020, intranasal naloxone (as an aerosol generating device) was seen as something that could potentially lead to the spread of COVID-19. It was therefore advised that intramuscular naloxone was preferable (HSE, 2020). This may explain why 92% of administrations used intramuscular naloxone. Currently, it is still advised to use intramuscular naloxone although the advice is under review as we emerge from the pandemic. Intranasal naloxone has recently been approved for reimbursement by the Primary Care Reimbursement Service (PCRS) and this may shift the type of formulation used in the coming years. An analysis of preference with service providers/peers would also be of interest as we note the low number of administrations by peers and no recorded administrations by family members. It could be that peers and family members in particular would be more comfortable using the intranasal preparation.

In almost two thirds of instances where naloxone was administered, other people were present at the time of the overdose, with 2.7 people present on average. This finding implies that other PWUD may often be present at the time of an overdose. If naloxone provision to those PWUD was enhanced, it would increase the availability of naloxone and may increase the speed of its administration. A study of bystander administration of naloxone has shown that it could significantly reduce deaths (Keane et al, 2018). The feasibility of extending naloxone training and naloxone distribution to PWUD and other potential bystanders such as family and close friends should be prioritised.

In addition, as the Gardaí may often be the first to respond to an overdose situation (13% of cases that reported on Garda attendance), it would also be important that naloxone training and possibly distribution be extended to them. This model has been introduced in Scotland after an evaluation of a pilot 'roll-out' to police officers (Hillen et al, 2022). It has also been piloted in Northern Ireland and an evaluation is currently being undertaken prior to potential wider 'roll-out' (Thomson, 2021). A discussion is required to progress this between An Garda Síochána, and the HSE.

5.6 Polydrug Use and the Need for Medical Follow Up

Polydrug use is associated with 58% of overdose deaths in Ireland (HRB, 2019). It is therefore not surprising that where service providers were aware of substances that were taken, over half involved more than one substance. Naloxone is an effective antidote for opioid overdose, but it may not be fully effective where other substances are also involved such as anti-anxiety medication, stimulants and psychoactive drugs (Compton et al, 2021). Although for over three quarters of overdoses opioid use was suspected, some nevertheless may have required additional reversal agents for other substances (Compton et al, 2021). This, combined with the fact that a third of service providers did not know what substances had been taken highlights the importance of further medical assessment following the administration of naloxone by service providers. In addition, as naloxone has a relatively short duration of action, there may also be recurring complications due to further poor respiration requiring medical intervention (Clark et al, 2014). This demonstrates the importance of calling ambulance services for further assessment and treatment. An ambulance was not called for one in five instances where naloxone was administered. The training that is provided on administering naloxone does stress the importance of calling an ambulance which is also included on step by step guides developed by the HSE (available on www.drugs.ie) and other organisations such as UISCE (HSE, 2022). There is a need to determine whether the training programme is giving sufficient emphasis to the importance of calling emergency services if naloxone has to be administered. In addition, a target should be set to call the ambulance for all administrations and this should be reviewed annually to help ensure that this is achieved. In terms of the other substances used in addition to opioids, the most frequently used were anti-anxiety medication, alcohol, and stimulants. Both anti-anxiety medication and alcohol can cause respiratory depression. When combined with opioids (also respiratory depressants) the effect of each depressant creates a higher risk of overdose than when either drug is used alone (Jones et al 2012). Stimulants by contrast increase arousal and combining with the sedation effects of opioids can also lead to an increase in the risk of overdose (Kerr et al, 2007, Al-Tayyib et al. 2017). Regular co-use of opioids with cocaine for example has been shown to lower tolerance levels for opioids (Nolan et al, 2019). Service providers have an important role in terms of highlighting the dangers of polydrug use to known drug users that attend services. A specific drug education programme for PWUD around overdose risks should be developed.

5.7 Opioid Overdose Risk Assessment

The Naloxone Training Programme instructs participants in terms of how to undertake an opioid overdose risk assessment (HSE, 2015). The training was updated during the COVID-19 pandemic to remove direct mouth to mouth rescue breaths during CPR, focusing on chest compressions with a cloth over the mouth of the person who has collapsed. A poster developed in collaboration with UISCE which includes this update is shown in figure 5.2. If someone is not breathing, CPR (using chest compressions since Covid19) should be administered, while those that are breathing should be placed in the recovery position. This study found that of the service providers who supplied information, over half placed the individual in the recovery position while over a third received CPR and a quarter received both. This, combined with the reported observable signs of overdose and almost three quarters reporting that an ambulance was called, suggests that service providers overall are adhering to the procedures set out in the training programme. However, it must be noted that 17% did not follow any resuscitation procedures (16% without adequate explanation) and 26% did not provide information in terms of whether an ambulance was called. In addition, it is not known whether the sequence of procedures that have to be followed prior to and following resuscitation were undertaken by those that did resuscitate (figure 5.2). For example, it would need to be determined if the person receiving naloxone was breathing to establish if CPR was required. It would be important that service providers maintain the knowledge and skills required to undertake an opioid risk assessment after receiving training. This could be achieved through a refresher training programme. The need for refresher training has been identified in a number of studies of naloxone administration. Deacy and Houghton (2019) in an Irish study of social workers concluded that refresher naloxone administration training should be offered on a six monthly basis. Crocker et al (2019) found that first responders identified a need for refresher training to commence three months after initial training. Refresher training is also required to ensure that people are kept up to date with developments in drug trends and such training need not be as extensive as initial training. For example, higher doses of naloxone may be required for those known to have overdosed using synthetic opioids such as fentanyl a significant problem in North America (Moss and Carlow, 2019).

Refresher training should provide a recap of the key elements of the training including the opioid overdose risk assessment. It may be possible to deliver some training online or using a mobile phone application. Existing online programmes (e.g. <https://www.overdoselifeline.org/opioid-training-and-courses/layperson-naloxone-administration/>, <https://www.naloxonetraining.com/>) could also be utilised. In addition, the development of regular drill exercises should be considered, as these have been shown to be effective in terms of skill retention (Ruttenberg et al, 2020).

Figure 5.2: Opioid Overdose Risk Assessment

HOW TO RESPOND TO AN OPIOID OVERDOSE DURING COVID-19

START

1. Shout for help, approach the person with care & check for 1 or more of these signs of an overdose

- Blue lips or nails
- Dizziness & confusion or drowsiness or difficulty staying awake
- Choking, gurgling or snoring sounds or slow, weak, or no breathing
- Cannot be woken up after calling to them or nudging their foot

Don't get too close: Maintain Social Distancing as much as possible

2. Call 999 OR 112

An Overdose is a medical emergency, Call 999 or 112 & follow their instructions.

3. Check for breathing

Protect yourself. Wear PPE:

- gloves
- face mask
- apron
- protective eyewear

Add face mask to the person

CORONAVIRUS & OVERDOSE RESPONSE

- Make sure you have access to proper PPE: gloves, face masks, aprons & protective eyewear
- Maintain social distancing when checking for breathing: watch for chest rising and falling
- Apply a surgical mask to the person - this is to help reduce the risks of possible transmission during CPR. If used, apply surgical mask over oxygen
- Do NOT give rescue breaths via mouth to mouth or pocket masks. IF YOU ARE TRAINED, Bag Valve Masks (BVM) fitted with an appropriate viral filter can be used
- WASH YOUR HANDS for at least 20 seconds after responding
- Know your location and Eircode if possible (for ambulance)

When the person wakes up : MAINTAIN SOCIAL DISTANCING!

1. Explain what happened so the person is aware
2. Naloxone wears off in 20-30 min. Support the person to not use opioids or other drugs e.g alcohol, benzodiazepine
3. Stay calm and comfort the person, they may be experiencing unpleasant withdrawal symptoms
4. Stay with the person until the ambulance arrives
5. Encourage the person to go with the ambulance

For more information
Contact 01 5554693
info@myuisce.org
www.myuisce.org

Source: UISCE and available via <http://drugs.ie/images/uploads/UISCE-covid-19-infographic-english.jpg>

5.8 Naloxone Saves Lives

By administering naloxone to people that have overdosed, lives in all probability have been saved. Based on available evidence (Darke et al, 2003, Neale, 2003), it is estimated that at least 22 people's lives were saved from 2018-2020 with the naloxone programme (assuming 3.95% would have died without receiving naloxone). Any life saved due to a harm reduction initiative is a significant achievement. Studies have demonstrated the significant burden of opioid use and overdose on PWUD, their relatives and friends, and society overall (Daley et al, 2018, Vincenzes, et al, 2019, Lambert et al, 2021, Titlestad et al, 2021). By saving lives this initiative has helped to reduce the negative consequences for all. From an economic perspective, lives saved can be costed in terms of gained productivity. This equates to €968,550 from 2018-2020 or €14,595,365 over the lifetime of those who were saved. These productivity benefits far outweigh the costs, and in economic terms represent a doubling in terms of return on the investment in the programme of €410,419 between 2018-2020. In 'other words', for every euro spent on the programme there was a return of €2.36 in terms of gained productivity due to death prevention. In addition, although overall death patterns may be influenced by a range of factors, it is worth noting that since 2015 (when the HSE Naloxone Demonstration Project was initially introduced) there has been a 30% decline in injector poisoning deaths involving opioids (Evans et al 2021). Other studies have also shown a positive impact of naloxone programmes on mortality rates (Walley et al 2013, Naumann et al, 2019). This pattern in addition to the economic return help demonstrate the benefits of continued investment in the naloxone programme.

5.9 Collecting Data From Service Providers

The National Social Inclusion Office supplies service providers with a form (F5) to record all naloxone administrations by service providers. This form can be completed both as a pen and paper exercise and onto a computer using a Microsoft Excel worksheet. This data is sent to the National Social Inclusion Office and amalgamated onto a single database for all service providers. From analysing the submitted data, the study team found that it was difficult to process due to the 'free text' format of the questions, many of which were more suited to the use of response choices. This may have contributed to some service providers missing out questions (e.g. presence of Gardaí at overdose, resupply of naloxone), rather than entering responses such as "no" or "not applicable." Amalgamating the data submitted into a single database is also time consuming and introduces the potential for error when merging data. In addition, from informal discussions with some service providers, it was noted that the submission form can be difficult to complete for outreach workers who do not have regular access to office/computer facilities. There is a clear need to streamline the process of recording naloxone administrations to facilitate data analysis and to ensure that all naloxone administrations are recorded. The form itself could be made more user friendly by reducing the number of 'free text' responses and increasing response choices for many questions using drop down menus. The use of a secure phone 'App' or online submission system should also be considered to make the submission system more user friendly.

5.10 Study Limitations

It must be noted that the study does have a number of limitations that need to be considered when interpreting the findings. The impact of the naloxone training programme in terms of developing knowledge and skills was not assessed. It would be important to ensure that the training programme is evaluated to ensure that people are equipped with sufficient knowledge and skills to administer naloxone and respond to an overdose situation. A skills assessment is undertaken as part of the training. These skills need to be maintained after initial training, and there may be a need to develop refresher training.

Productivity savings were based on a study undertaken by Bruton et al (2021). This study calculated productivity losses (which we translated into productivity gains) utilising wage and employment rates by gender of the general Irish population. As such, productivity gains may be overestimated as PWUD may have lower employment rates. However, it could also be argued that there is no reason why PWUD cannot participate in the workforce at the same rates as the general population if initiatives are in place that facilitate normal daily functioning, including employment. As such, the savings shown in our study are useful in that they demonstrate what can be achieved with appropriate levels of investment.

CONCLUSIONS & RECOMMENDATIONS

The study has demonstrated the value of distributing naloxone to addiction services and services providing care for homeless people and training staff and peers in the administration of this life saving product. This initiative has saved and is continuing to save lives and the overall utility of the approach has been clearly demonstrated. A number of recommendations have been developed to further enhance the naloxone programme and these are outlined below:

1. The Naloxone Programme should continue to be resourced and expanded to achieve a stronger geographical spread given the demonstrated lifesaving benefits.
2. The need for gender specific initiatives in terms of overdose prevention and treatment needs further recognition and wider implementation.
3. Ensure that all those individuals who have been administered naloxone are 'signposted' to relevant treatment services to ensure that their ongoing health needs are addressed.
4. Reimbursement of intramuscular naloxone by the PCRS, in line with the National Centre for Pharmacoeconomics, Ireland (NCPE) would merit consideration.
5. Ambulance services should be called in all instances where naloxone is administered. This should be a target set for all service providers and should be reviewed annually and this recommendation should be incorporated into training.
6. The training programme should be reviewed yearly to ensure that the course content is up to date with developments in drug trends, in particular any emergence of synthetic opioids that may influence naloxone requirements. In addition, a refresher training programme should be developed to facilitate skill retention. This should contain practical examples and utilise both face-to-face and remote options to expand the provision of training.
7. Naloxone training and distribution to PWUD should include other potential bystanders, such as; family members, close friends and members of An Garda Síochána.
8. A specific drug education programme for PWUD on overdose risks, in particular polydrug use, should be developed.
9. The process of recording naloxone administrations should be streamlined to facilitate data analysis and to ensure that all naloxone administrations are recorded. Consideration should be given to redesigning the form and developing a secure mobile 'App' or online submission system, in line with GDPR.

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APPENDIX 1

NALOXONE TRAINING REVIEW

1. Information about this survey

The National Social Inclusion Office are currently reviewing Naloxone training and provision as part of an evaluation of Naloxone administration between 2018 and 2020. As part of this process, we would like to ask you a few questions. It will only take a few minutes, and your responses will be anonymous and confidential. We would be grateful if you would answer the following questions.

Thank you for your time.

1. Are you?

| | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | HSE trainer |
| <input checked="" type="checkbox"/> | Trainer from another statutory organisation |
| <input checked="" type="checkbox"/> | Trainer from a voluntary organisation |
| <input checked="" type="checkbox"/> | Trainer from private company |
| <input checked="" type="checkbox"/> | Other (please specify): <input type="text"/> |

2. Approximately how many Naloxone training courses have you provided during 2018, 2019, and 2020?

| | Number of training courses |
|------|----------------------------|
| 2018 | <input type="text"/> |
| 2019 | <input type="text"/> |
| 2020 | <input type="text"/> |

3. Approximately how many staff have attended your Naloxone training during 2018, 2019, and 2020?

| | Number of staff receiving training |
|------|------------------------------------|
| 2018 | <input type="text"/> |
| 2019 | <input type="text"/> |
| 2020 | <input type="text"/> |

4. Approximately how long does it take to deliver the Naloxone training?

| | Hours | Minutes |
|--|----------------------|----------------------|
| | <input type="text"/> | <input type="text"/> |

5. Approximately how often do you have to travel to deliver the Naloxone training programme?

| | |
|-------------------------------------|------------------|
| <input checked="" type="checkbox"/> | All of the time |
| <input checked="" type="checkbox"/> | Most of the time |
| <input checked="" type="checkbox"/> | Some of the time |
| <input checked="" type="checkbox"/> | Never |



ISBN: 978-1-898098-91-1
National Social Inclusion Office, June 2022

