THE SAHLGRENSKA ACADEMY

Patients presenting with acute poisoning at Sahlgrenska University hospital in 2015
- a one-year observational study

Degree Project in Medicine

Mirella Wictoran

Programme in Medicine

Gothenburg, Sweden 2017

Supervisor: Kai Knudsen
MD PhD
Associate Professor, Senior Consultant

Dep of Anesthesia and Intensive Care Medicine

Sahlgrenska University Hospital

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List of abbreviations

SOA: Substance of abuse

NSOA: Non substance of abuse

AOSA: Accidental overdose with substance of abuse

GHB: Gamma-hydroxybutyrate

NSAID: Non-steroid anti-inflammatory drugs

PCP: Phencyclidine

LSD: Lysergic acid diethylamide

MDMA: Methylenedioxy-methamphetamine

MDPV: Methylenedioxypyrovalerone

GP: General Practitioner

SU: Sahlgrenska University Hospital

Abstract

Background: Acute poisoning is a major health problem accounting for about 4-16% of all annual hospital admissions. Though most poisonings are related to recreational drug use or substance abuse, some are the result of suicidal behaviour.
It is unknown if short-term prognosis after acute poisoning, depends on a referral for further treatment, type of poisoning, suicidal intention, psychiatric comorbidity or on a propensity to re-intoxicate. Our objective is to identify possible risk factors for repetition or poor prognosis.

Methods: For one year, all patients presenting with acute poisoning at the emergency unit in Sahlgrenska University hospital were recorded in a retrospective observational cohort study, with a subsequent one-year follow-up. Data was collected from our hospital's electronical medical records database. Main outcome measures were toxic agents, sex, age, psychiatric comorbidity, referral, suicidal intention and repetition of poisoning.

Results: A total of 668 patients were treated for 784 episodes of acute poisoning. In total 85 patients (13%) presented more than once with 2-10 presentations. Twenty-five different toxic substances were registered as main agents or co-agents. Most common agents taken were ethanol, benzodiazepines opioids and paracetamol. Eighty-five percent of all poisonings presented with substance of abuse (SOA). We recorded 189 (24%) episodes with suicidal intention, 336 patients (50%) received a referral and 19 died (2.8%) during a one-year follow-up. Risk factors for repetition was identified as psychiatric comorbidity and intake of benzodiazepines, whereas intake of cannabis or ethanol was associated with lower risk for repetition. Seventy-two percent of poisonings presenting with intake of SOA had a history of psychiatric comorbidity and 62% of those had received a referral. Of those poisoned by substances other than SOA, 82% had psychiatric comorbidity and 84% of cases received a referral. Women were more likely to receive a referral than men. Intake of benzodiazepines or opioids as well as presence of psychiatric comorbidity were significantly more common among those who died within a year.

Conclusion: Strongest risk factor for repetition of poisoning was psychiatric comorbidity. Type of poisoning also matters where intake of benzodiazepines may indicate an increased risk. The tendency to give a referral was higher amongst intake of other substances than SOA without presence of more psychiatric comorbidity. Repetition of acute poisoning was high irrespective of intention behind the poisoning, toxic agent taken or if the patient received a referral for further treatment. The high incidence of re-presentations calls for better follow-up in the future.

1. Introduction

The use of substances for medical and other healing purposes, for recreational use or as a part of different rituals has been known to mankind since immemorial time. Through archaeological findings we discovered that already the Stone Age man knew the fermentation process of alcohol. It is witnessed in a book (*Germania*) written by Tacitus 98 AD, that the Svears *(lat. Suiones)* used the rush to reach ecstasy and thus come closer to the gods which ruled the fertility of man and plants[14]. Prognosis in cases of acute poisoning is usually good, where the in-hospital mortality is low in industrialised countries, provided no serious complications occurs [3,4]. Alcohol is the substance of abuse most commonly used in Sweden, followed by tobacco[6-8]. Amongst illegal substances, cannabis is the most common, especially among young adults[7,8]. Poisonings may also be due to intake of other substances such as pharmaceuticals, chemical substances, mushrooms, different plants, gas etc[3]. The use of different substances has various reasons, for some it is related to recreational drug use such as inducing relaxation, euphoria, ecstasy, hallucination, relieving stress or pain. For others it is a consequence of many years of drug abuse, substance use disorders or as a result of suicidal behaviour. The intoxicating effect from drugs is both desired and enjoyed by many. However, most of these substances have undesired and potentially dangerous effects when taken in too large doses. Excessive use may turn into abuse, leading to addiction with destructive behaviour and in worst case, the consequences are fatal.

1.1 Epidemiology

Acute poisoning is a major health problem and causes frequent appearances to emergency services. Many patients need hours of observation and a significant proportion are hospitalized[1,2,11,13]. In Sweden around 9000 cases of acute poisoning are admitted to hospital every year. Acute poisonings constitutes about 16% of all presentations to emergency unit in Sahlgrenska University hospital (SU) annually[3,9]. Poisonings occur at all ages but is most common in 20-40 y[3].

Alcohol is the substance of abuse most commonly used in Sweden[6,7]. Among adults 70 % of women and 80 % of men report having drunk alcohol during the last month in 2012. There are differences between sexes where men drink more than women[7].

The classic substances of abuse, cannabis, cocaine, heroin and amphetamine have been used in Sweden since the 1960s. Ecstasy appeared later in the early 1990s and GHB in the late 90s[14,15]. Cannabis is the most commonly illegal substance used today [7,8]. Among adult population, 2.5 % report that they had used cannabis in the past 12 months and 0.7 % in the past 30 days. The consumption of cannabis is more common among men than women[22].

In recent years, an increase in synthetic drugs have been observed in the European market. Between 2005 and 2011, 164 new drugs were reported according to EMCDDA (European Monitoring Centre for Drugs and Drug Addiction)[23]. In poisonings with pharmaceuticals, intake with multi-drugs such as neuroleptics, antidepressives, analgesics, sedatives and hypnotics are the most common[3,11].

1.2 Outpatient treatment

In industrialised countries, patients with acute poisonings are primarily treated as outpatients in hospital emergency departments. Observation time in the emergency department should be kept short, to avoid crowding, but long enough to avoid to early discharges with potentially hazardous consequences. The procedure for the observation and follow-up of these patients should be optimized so that patients in need of specific treatment or hospital admission, are identified early in the hospital process.

1.3 Mortality

The in-hospital mortality of acute poisonings is low in industrialised countries[3,4,11]. In Sweden about 700 people die as a result of acute poisoning annually. Ninety percent die due to lack of medical care outside of hospital[3,11]. Prognosis in cases of acute poisoning is usually good. Cause of death is mainly due to complications to the poisoning rather than the toxicity of the substance, where aspiration of ventricular contents and hypoxic brain damage secondary to respiratory depression are most common. About 70 % of all fatal poisonings consists of poisoning with pharmaceuticals[11].

1.4 Follow-up

Most acute poisonings occurs as an impulse action in a distressed situation and is a marker of increased risk of excess morbidity and mortality[11,15]. However, the acute poisoning is also a good opportunity for intervention. Therefore, patients with overdose should always be offered hospitalization overnight and a contact with psychiatry[5,11,12]. Follow-up is often organised after suicide attempt[11,15]. However, previous studies show that follow-up for patients treated for acute poisoning related to substance of abuse is less frequently initiated than poisoning with other substances than substance of abuse[10,15,28].

2. Objectives

We know that the prognosis deteriorates if the patient re-intoxicates after discharge. It is still unknown if short term prognosis depends on a referral for further treatment, the type of poisoning, suicidal intention, psychiatric comorbidity or on the tendency to re-intoxicate. Receiving a referral after discharge could possibly change outcome after primary care.
To our knowledge there are only a few previous studies that has taken this into account.
Our main aim is to identify possible risk factors for repetition or poor prognosis. In specific we aim to answer:

- If receiving a referral after discharge will change outcome after primary case, based on repetition and death
- if there is any specific type of poisoning which increases the risk for repetition
- if there is any specific type of poisoning that leads to an increased risk for death

3. Material and Methods

3.1 Design

The study was a retrospective observational cohort study with a one-year follow-up during 2015.

3.2 Setting

Sahlgrenska University hospital is one of Sweden's largest university hospitals. Emergency care has service all ours, including trauma and accidental centre. It has about 200 000 consultations a year. Accepts all types of acute problems in patients over 16 years of age, except for orthopedic injuries which are referred to another hospital in Gothenburg. Cases of acute poisoning can present directly to the hospital without having to go through primary care first, which makes it a suitable place to implement our study.

3.3 Participants

All patients presenting with acute poisoning at the emergency unit in Sahlgrenska University hospital, during the study period, registered by the physician, containing one of the keywords in free text field, and/or diagnose codes, shown in Appendix 1, were included in the study. Patients treated for multiple conditions were included if the poisoning was diagnosed as main or co-diagnosis and/or contained one of the keywords in free text field (Appendix 1) in their medical journal. We performed a system search in the hospitals electronical medical database, including

ICD-10 codes and/or keywords (Appendix 1). The study period was set to one year, with a one-year follow-up. To ensure we did not miss any eligible patients, we repeated the search after two months and cases that was not previously included, were included when found in these searches.

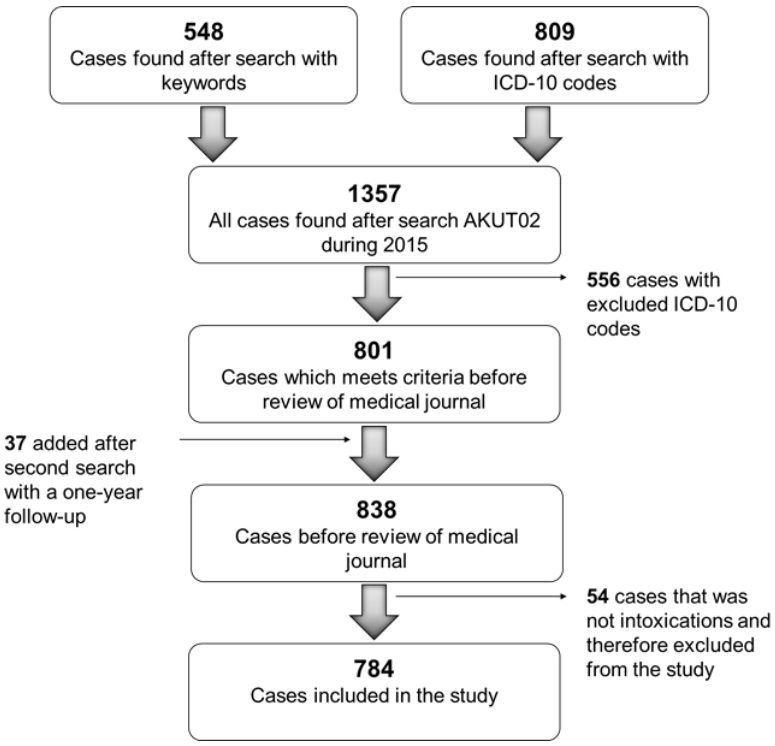

Figure 1. Cases included in the various parts of the study in patients treated for acute poisoning at emergency in Sahlgrenska University hospital in 2015.

During the one year of inclusions, a total of 1357 cases of acute poisoning were registered. 548 cases were found with keywords and 809 from ICD 10 codes. After the second search 37 cases were added to the study (Figure 1). Furthermore, 556 cases were excluded before review of medical journal due to lack of information relating to poisoning in diagnosis codes. Which led to 838 cases of acute poisonings before review of medical journal. Included and excluded diagnostic codes pretested in Appendix 1. After thorough review of all medical journals, 54 cases were excluded as they were incorrectly diagnosed as poisonings. Leaving a total of 784 cases included in the study in 668 patients 13-95 years of age.

3.4 Data collection

Data was collected from our hospital's electronical medical records database, from 1 January 2015 until 31 December 2016.
Diagnosis were coded according to the international Classification of Diseases and Related Health Problems, tenth version (ICD-10).

For all included cases, following information was collected from their medical journal and charted in an excel file:

- date of presentation;
- age and sex;
- toxic main agent and co-agents (ethanol, heroine, bensodiazepines including Z-hypnotics, amphetamine, GHB, cannabis, spice, paracetamol, methadone, cocaine, antipsychotics, antidepressants, antiepileptics, buprenorphine, NSAIDs, other opioids, other hallucinogenic substances, other pharmaceuticals, phentiazines, antihistamines, other agents, other sleeping agents, pregabalin/gabapentin, new psychoactive substances, others) explication of medicines included in respective groups presented in Table 1;
- intention behind the poisoning (suicide attempt, accidental or intentional overdose, self-inflicted or not self-inflicted overdose);
- death (within the study period);
- repeated poisonings (within the study period);
- previous history or presence of psychiatric co-morbidity (including substance abuse);
- disposition, follow-up with referral.

When all data had been collected, the file was de-identified by removing the Swedish national identity number. Each case was given a unique study serial number to comply with ethical rules and protect the identity of the participants. A key file combining the Swedish national identity numbers and the study patient identity numbers was kept on a separate USB stick and stored in a safe. Further in the study a decoded file was used for the rest of the analysis.

3.5 Outcome measures

The main outcome measures were age, sex, toxic agents, psychiatric co-morbidity, referral, fatalities, suicidal intention and repetition.

In poisonings with more than one toxic agent, the 'main toxic agent' was considered as the most toxic in the doses taken.

The first registered episode of acute poisoning was called the 'index case', following episodes within the one-year observation time was referred to as 'repeated poisonings' More than one episode on the same day was considered as one episode.

Psychiatric co-morbidity was defined as presence of concurrent mental illness including substance abuse disorders according to ICD-10 diagnosis system. All codes in the F-category was

considered as psychiatric co-morbidity. No further sectioning was made. Previous suicide attempts were included here. Most common was cohabitation with ADHD, bipolarity, depression, anxiety and PTSD.

When charting follow-up of patients after treatment of acute poisoning, the main outcome measure was follow-up initiated by the physician after discharge. If the patient received a referral during hospitalization or after discharge, it was considered as a follow-up regardless of whether the patient subsequently went to the recommended follow-up or not. We included different categories for the follow-up, defined the following:
Psychiatric hospital admission, somatic hospital admission, psychiatric emergency clinic, addiction outpatient clinic (Nordhemskliniken), child welfare services, GP within primary care.

Demises within the study period were counted, regardless of whether the cause of the decease was related to acute poisoning or to other causes. Thus, if a patient died within one year from index case, it was considered as a fatality in the study. Cause of death was not confirmed by the national mortality register .

3.6 Statistics

Statistics were analysed by using IBM SPSS statistics version 23.0. Pearson's chi-square test or Fischer's exact test were used to compare frequencies. The multi variable analysis (logistic regression) was done with significant variables. The variables analysed were sex, age, toxic agents (main and co-agents), number of toxic agents, intention, repetition, psychiatric co-morbidity, follow-up and mortality. Ethanol was chosen as the reference group when calculating odds ratios for toxic agents, as it was the largest group. Kaplan Meier plots were used to estimate repetition after index case, as well with correlation between repetition and psychiatric co-morbidity also for correlation between repetition and referral. Cox regression analysis was used to estimate the hazard ratios (HR) for potential predictors of repetition.

3.7 Ethics

Since the study was a register study only, no patients were asked for participation or to give their consent to the collection of information. All data was stored anonymously, and a key file combining the Swedish national identity numbers and the study patient identity numbers was kept on a separate USB stick. The Regional Ethical Review Board in Gothenburg, Sweden approved the study in 2017, Dnr: 121-17.

4. Results

There were 784 cases of acute poisoning in 668 patients included during one year, 432 (55%) were in males and 352 (45%) in females. Median age was 31 years, 32 years among males and 29 years among females. In total 85 patients (13%), 46 (7%) men and 39 (6%) women, presented more than once with 2-10 presentations. Twenty-five different toxic substances were registered as main agents or co-agents.

The most frequent toxic agents taken were ethanol in 350 (25%) episodes, benzodiazepines in 281 (20%), and opioids in 74 (5%) episodes. Followed by paracetamol 73 (5%), amphetamine 71 (5%), and cannabis 65 (5%) presented in Table 1. In 372 (47%) cases of acute poisoning there were more than one toxic agent, 188 (24%) were in males. In general, poisonings with illegal substances of abuse were more common in males and, pharmaceuticals in females (Table 1).

A total of 667 (85 %) cases of acute poisoning presented with substances of abuse (SOA), 383 (49%) in males and 284 (36%) in females. Most poisonings, 594 (76%) were accidental overdoses, and 189 (24%) were suicide attempts. Suicide attempts were more frequent among females 120 (15%) compared to 69 (9%) among males. Among the suicide attempter's intake with non-substance of abuse (NSOA), 32/98 (33%) were more common than intake with SOA, 120/569 (21%) ($p=0.012$). Only poisoning with benzodiazepines ($p<0.001$) or other opioids ($p=0.08$) were more common among suicide attempters than accidental overdoses. Benzodiazepines and paracetamol were the most common main toxic agents taken among suicide attempters (Table 1).

A follow-up for further treatment was initiated in 336 patients (50%), 153 (23%) were males and 183 (27%) females. Thus, females were more likely to receive a referral after discharge than males (OR 1.74, $p<0.001$). Poisonings with SOA were less likely to receive a referral than poisonings with NSOA (OR 0.56, $p=0.001$). Further, if a patient had presence of mental illness they were referred for a follow-up more often than without presence of psychiatric comorbidity (OR 5.65, $p<0.001$). In poisonings with suicide attempt a follow up was often initiated (OR 33.48, $p<0.001$). If the toxic agent taken was cannabis, they were less likely to receive a referral for further treatment ($p=0.045$).

Poisoning with benzodiazepines displayed to be more common if there was presence of current mental illness 180/457 (39%) than without presence of mental illness 31/211 (15%) ($p<0.001$). There was no difference between poisoning with SOA (68%) and psychiatric comorbidity and intake with NSOA (72%) and psychiatric comorbidity, since there was a high proportion of mental illness in both groups. Poisoning with ethanol ($p<0.001$), or heroin ($p=0.047$) were more common among those without presence of concurrent mental illness.

Table 1. Toxic agents in 1401 acute poisoinings treated at emergency in Sahlgrenska University Hospital in 2015

	All episodes	Episodes as main agent[a]			Episodes as co-agent[b]			Episodes with suicidal intention[c]		
	n(%)	Total *n*(%)	Males *n*(%)	Females *n*(%)	Total *n*(%)	Males *n*(%)	Females *n*(%)	Total *n*(%)	Males *n*(%)	Females *n*(%)
Ethanol	350 (25)	194 (25)	103 (24)	91 (26)	156 (25)	79 (27)	77 (24)	10 (5)	4 (6)	6 (5)
Heroin	17 (1)	17 (2)	12 (3)	5 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Bensodiazepines [1]	281 (20)	122 (16)	56 (13)	66 (19)	159 (26)	82 (28)	77 (24)	44 (23)	11 (16)	33 (28)
Amphetamine [2]	71 (5)	50(6)	38 (9)	12 (3)	21 (3)	19 (6)	2 (1)	5 (3)	3 (4)	2 (2)
GHB	36 (3)	36 (5)	28 (6)	8 (2)	0 (0)	0 (0)	0 (0)	1 (<1)	1 (1)	0 (0)
Cannabis	65 (5)	10 (1)	6 (1)	4 (1)	55 (9)	45 (15)	10 (3)	0 (0)	0 (0)	0 (0)
Spice	34 (2)	30 (4)	29 (7)	1 (<1)	4 (1)	3 (1)	1 (<1)	0 (0)	0 (0)	0 (0)
Paracetamol	73 (5)	47 (6)	12 (3)	35 (10)	26 (4)	5 (2)	21 (7)	24 (13)	5 (7)	19 (16)
Methadone	2 (<1)	1 (<1)	0 (0)	1 (<1)	1 (<1)	0 (0)	1 (<1)	0 (0)	0 (0)	0 (0)
Cocaine	25 (2)	16 (2)	14 (3)	2 (1)	9 (1)	8 (3)	1 (<1)	2 (1)	1 (1)	1(<1)
Antipsychotics [9]	26 (2)	13 (2)	5 (1)	8 (2)	13 (2)	1 (<1)	12 (4)	11 (6)	5 (7)	6 (5)
Antidepressives [10]	70 (5)	46 (6)	12 (3)	34 (10)	24 (4)	3 (1)	21 (7)	26 (14)	9 (13)	17 (14)
Antiepileptics	9 (1)	3 (<1)	1 (<1)	2 (1)	6 (1)	3 (3)	3 (1)	1 (<1)	0 (0)	1(<1)
Buprenorphine	9 (1)	4 (1)	4 (1)	0 (0)	5(1)	4 (1)	1 (<1)	1 (<1)	1 (1)	0 (0)
NSAIDs	12 (1)	3(<1)	1 (1)	2 (1)	9 (1)	2 (1)	7 (2)	2 (1)	1 (1)	1(<1)
Other opioids [3]	74 (5)	56 (7)	36 (8)	20 (6)	18 (3)	11 (4)	7 (2)	23 (12)	10 (14)	13 (11)
Other hallucinogenic sub. [4]	11 (1)	9 (1)	8 (2)	1 (<1)	2 (<1)	2 (1)	0 (0)	0 (0)	0 (0)	0 (0)
Other pharmaceuticals [5]	47 (3)	11 (1)	8 (2)	3 (1)	36 (6)	9 (3)	27 (8)	8 (4)	5 (7)	3 (3)
Phentiazines	39 (3)	19 (2)	5 (1)	14 (4)	20 (3)	6 (2)	14 (4)	10 (5)	1 (1)	9 (8)
Antihistamines	30 (2)	14 (2)	4 (1)	10 (3)	16 (3)	2 (1)	14 (4)	3 (2)	2 (3)	1(<1)
Other agents [6]	21 (1)	17 (2)	12 (3)	5 (1)	4 (1)	2 (1)	2 (1)	3 (2)	1 (1)	2 (2)
Other sleeping agents [7]	24 (2)	15 (2)	2 (<1)	13 (4)	9 (1)	0 (0)	9 (3)	4 (2)	0 (0)	4 (3)
Pregabalin/Gabapentin	26 (2)	11 (1)	8 (2)	3 (1)	15 (2)	5 (2)	10 (3)	7 (4)	5 (7)	2 (2)
New psychoactive sub.[8]	16 (1)	14 (2)	12 (3)	2 (1)	2 (<1)	2 (1)	0(0)	0 (0)	0 (0)	0 (0)
Others	33 (2)	26 (3)	16 (4)	10 (3)	7 (1)	3 (1)	4 (1)	4 (2)	4 (6)	0 (0)
Total	1401 (100)[d]	784 (100)	432 (100)	352 (100)	617 (100)	296 (100)	321 (100)	189 (100)	69 (100)	120 (100)

Continued

[a] The main agent was defined as the one most toxic in the doses taken

[b] Co-agent with no significant order

[c] main agents only

[d] percentages add up to more than 100 as x poisonings had more than one agent

[1] Zopiklon, Zolpiderm, Iktoviril, Rohypnol, Oxascand

[2] Dexamphetamine

[3] Opioids natural, Morphine, Fentanyl, Tramadol, Cocciliana, Targiniq, OxyContin, OxyNorm

[4] PCP, LSD, Mushrooms

[5] Lithium, Codein, Digoxine, Cortisone, Parsitan, Antabus, Campral, Buronil, Ergenyl, Bloodpressure medicine, Heracillin, Buspiron, Naltrexon, Ephedrine, Metformin, Lyrica, Atarax, Acetylcysteine

[6] Glycol, Ispropanol, Caustic acid, Nitrous oxide, Lighter fluid, Iron, Vinegar essence

[7] Valdoxan, Theralen

[8] Ecstasy (MDMA), MDPV

[9] Olanzapine, Quetiapine

[10] Citalopram, Mirtazapin

During the one-year follow-up 19 (2.8%) patients died, 12 (1.8%) males and 7 (1.0%) females. Intake of other opioids 4/56 (7.1%) were more common among those who died compared to those who died without intake of other opioids 15/611 (2.5%) (p=0.044) (Figure 2).
Poisoning with benzodiazepines as main agent were more common amongst those who died 11/210 (5.2%) compared to those who died without poisoning with benzodiazepines as main agent 8/457 (1.8%) within the study period (p=0.012) (Figure 2). It was more common with psychiatric comorbidity among those who died 17/457 (3.7%) compared to those who died without presence of psychiatric comorbidity 2/210 (1.0%) (p=0.046).
There was no significant difference between males 12/366 (3.3%) and females 7/301 (2.3%) regarding death within one year (p=0.462). Nor did we see any differences between the patients with repeated poisonings who died 1/85 (1.2%) and those without repeated poisonings who died within the study period 18/577 (3.1%) (p=0.316). There was no significant difference between patients with suicide attempt who died 7/152 (4.6%) compared to those with accidental overdose who died within the follow-up 11/514 (2.1%) (p=0.100). We did not see any significant difference between those who received a referral and died 11/336 (3.3%) and those who did not receive a referral and died 8/331 (2.4%) (p=0.506). There was no significant difference between patients with intake with SOA who perished 17/569 (3.0%) compared to intake with NSOA who perished within the study period 2/98 (2.0%) (p=0.603).

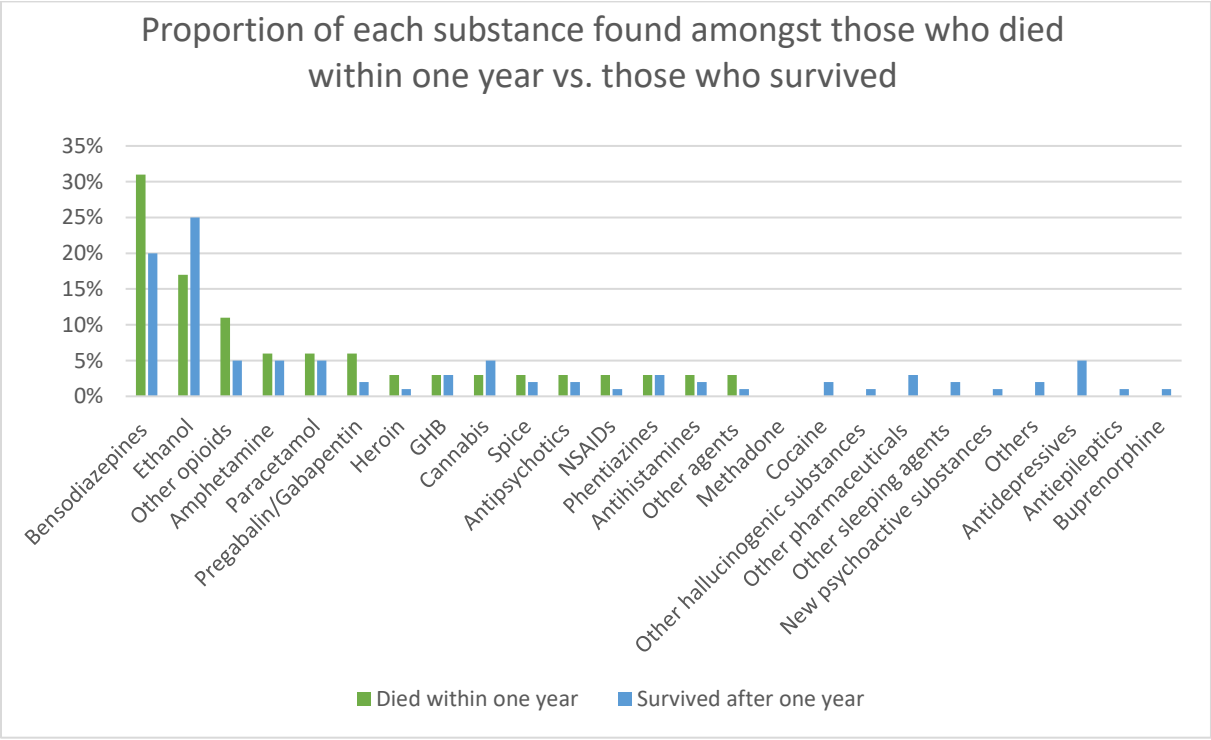

Figure 2. Proportion of each substance found amongst those who died within one year vs. those who survived within the one year follow-up in patients treated for acute poisoning at emergency in Sahlgrenska University hospital in 2015.

We found a correlation between intake of pregabalin and increased risk of death, though after adjustments with multi variable-analysis no significant association remained (p=0.062).

There were a total of 85 patients (13%), 46 (7%) males and 39 (6%) females, with repeated poisonings, with 2-10 presentations. Type of poisoning turned out to be a risk factor for repeated poisonings. Intake of benzodiazepines was associated with higher risk for repetition (OR 1.91, p=0.006), whereas poisoning with cannabis (OR 0.24, p=0.032) or ethanol (OR 0.61, p=0.039) was associated with lower risk for repetition.

We found that patients who received a referral were more likely to re-intoxicate compared to patients without a referral (OR 2.21, p<0.001) within the one year follow-up, shown in Figure 3.

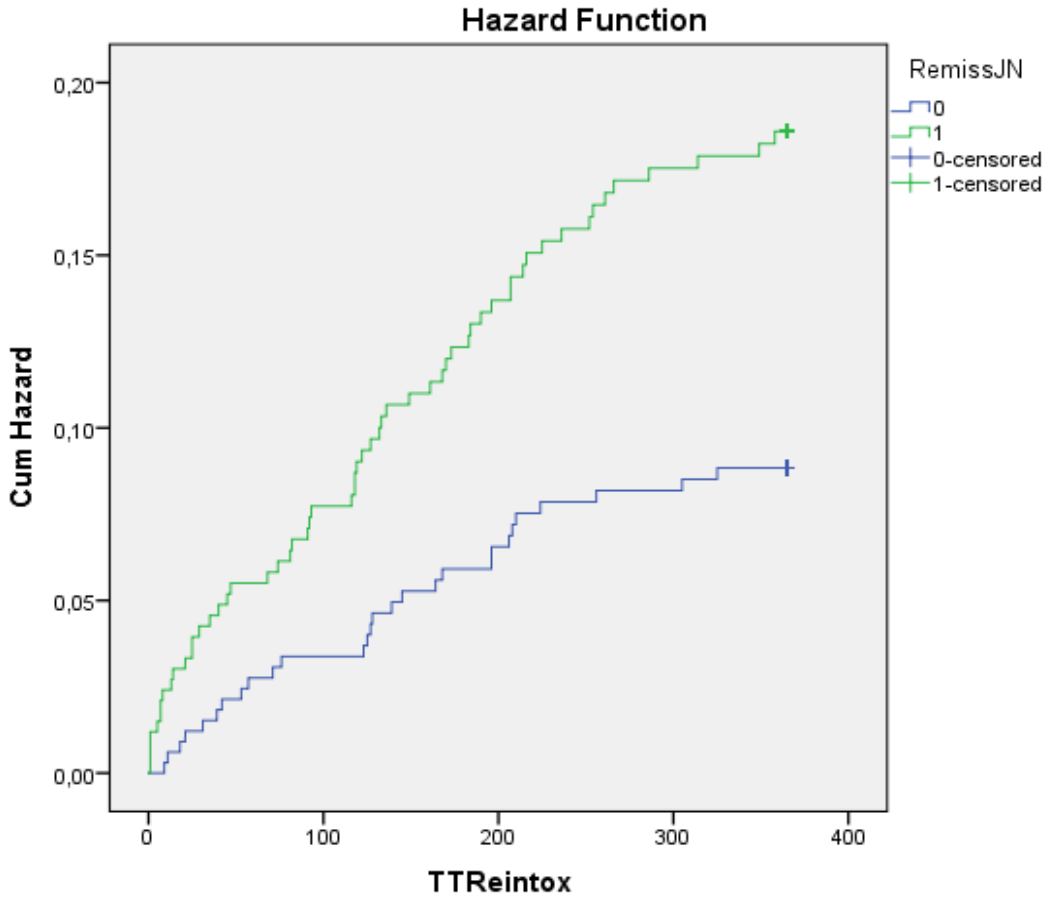

Figure 3. Kaplan-Meier plot of repeated poisonings with referral compared to repeated poisonings without referral for further treatment within the one-year follow-up.

A total of 57/336 patients, in 33/183 females and 24/153 males received a referral for further treatment and re-presented with an acute poisoning during the one year follow-up. In contrast to 28/332, in 6/118 females and 22/214 males who did not receive a referral after discharge and later repeated with a poisoning within the study period (Figure 3).

We found a strong correlation between repeated poisonings and psychiatric comorbidity, where it was more common with repetitions if the patient had a concurrent mental illness (OR 5.99 , $p<0.001$) shown in Figure 4.

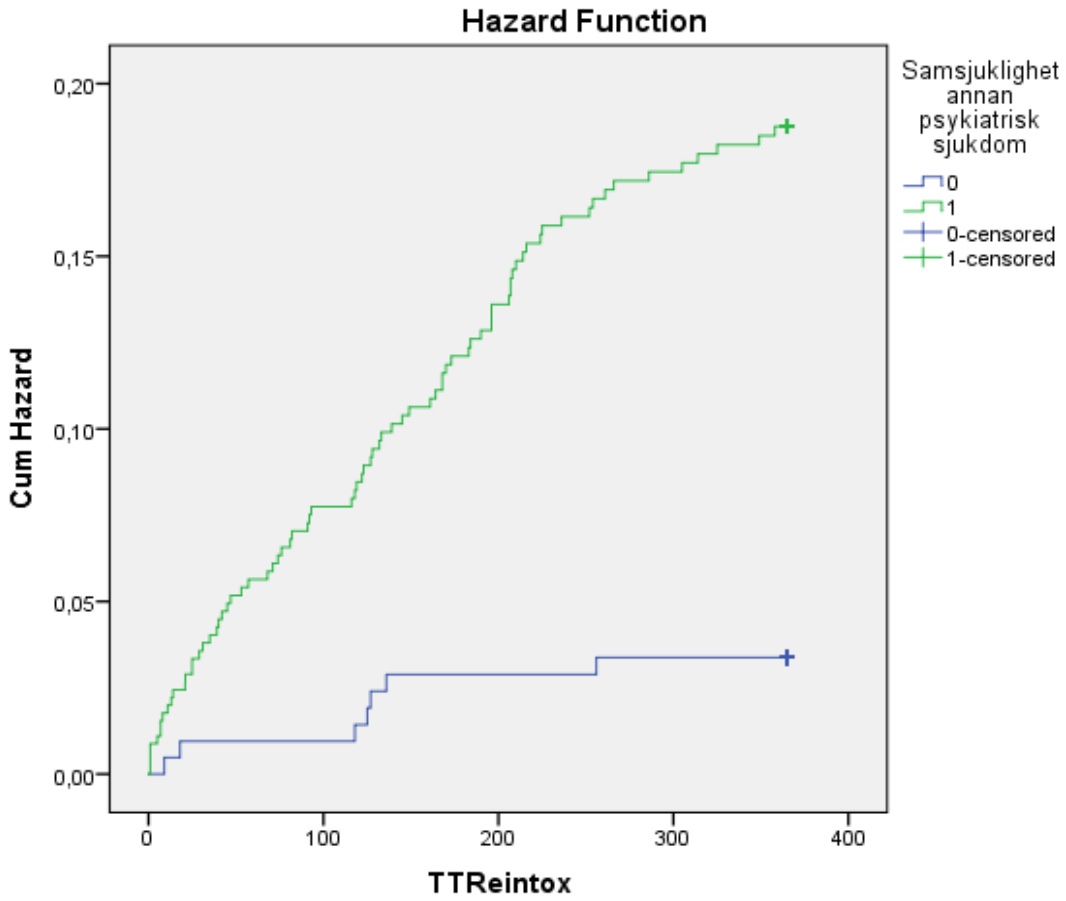

Figure 4. Kaplan-Meier plot of repeated poisonings with psychiatric comorbidity compared to repeated poisonings without psychiatric comorbidity within the one-year follow-up

Among the re-presenting patients 78 (17%), 35 (8%) females and 43 (9%) males had a mental cohabitation. In contrast to 7 (3%), 4 (2%) females and 3 (1%) males who did not have a mental illness and repeated poisonings. In addition to this, we also investigated the relation between patients who received a referral for further treatment, had a mental cohabitation and re-intoxicated, 55/78 (71%) and patients who received a referral, without mental cohabitation and re-intoxicated 2/7 (29%). A strong significant association between mental co-morbidity and repeated poisonings remained after adjustment for confounders.

There was no difference between intake with NSOA and repeated poisonings and intake with SOA and repeated poisonings (p=0.867) within the one year follow-up, displayed in Figure 5.

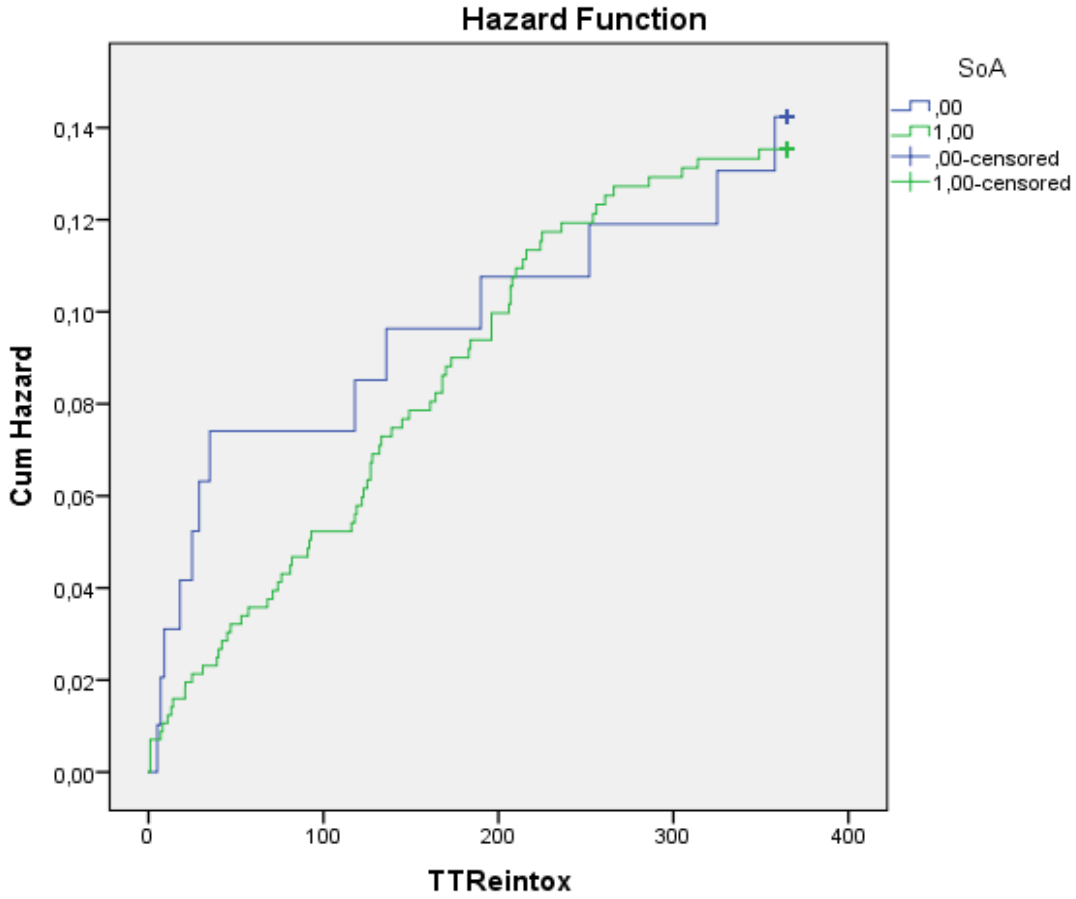

Figure 5. Kaplan-Meier plot of repeated poisonings with intake of substance of abuse compared to repeated poisonings with intake of non-substance of abuse within the one-year follow-up

However, in analysis within the first month after index case, re-presentation was more common among patients presenting with poisoning with NSOA than poisoning with SOA (p=0.023) (Figure 6).

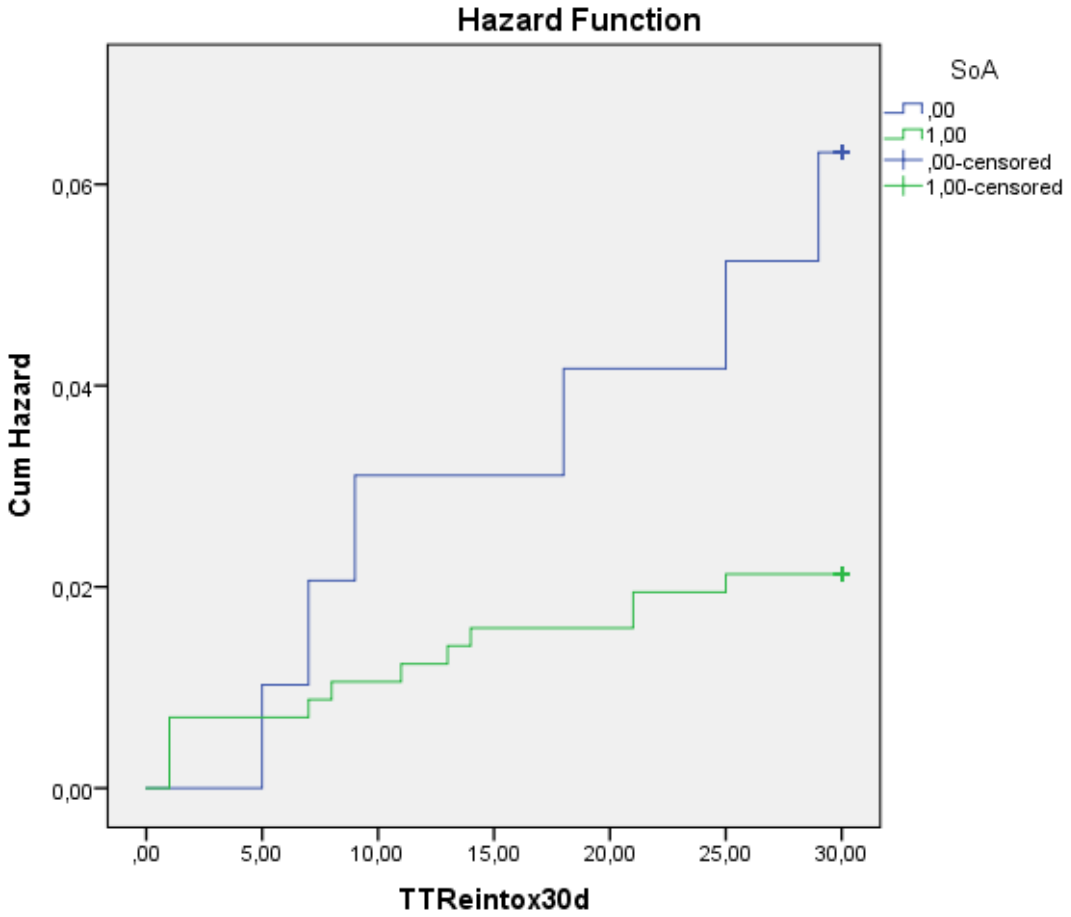

Figure 6. Kaplan-Meier plot of repeated poisonings with intake of substance of abuse compared to repeated poisonings with intake of non-substance of abuse with a 30 day follow-up

There was no significant difference between age (p=0.075) or sex (p=0.870) and the propensity to re-intoxicate.

We found a correlation between intake of antiepileptics and the tendency to re-intoxicate, though after adjustment with multi variable-analysis no significant association remained (OR 3.51, p=0.079).

A strong significant association between intake with benzodiazepines and repetition (OR 1.91, p=0.006) was found, but after adjustment for confounders with multi variable-analysis, only co-habitation with mental illness as a single factor, remained as an increased risk for repetition (OR 5.99, p<0.001).

5. Discussion

Our main focus in this study was to identify predictors for repeated poisoning or poor prognosis. The strongest risk factors for repetition were identified as psychiatric comorbidity and intake of benzodiazepines. Whereas intake of ethanol or cannabis was associated with lower risk for repetition. Acute poisoning often occur after an impulse action in a distressed situation, and not as a suicide attempt. Patients with anxiety, use benzodiazepines to a greater extent than others. This could possibly explain why patients presenting with intake of benzodiazepines had an increased risk for re-presentations. Similar observations were made in a recent study performed in Norway[20]. Another study reported rates for antidepressives and antipsychotics in the same range as benzodiazepines, which is inconsistent with our findings[27].

Poisoning presented with intake of benzodiazepines or opioids displayed highest mortality risk along with psychiatric comorbidity. The increased risk of mortality in poisoning with benzodiazepines, is believed to depend more on the character of the patient than the toxicity of the substance since poisoning with benzodiazepines in general are harmless. As our study presents that poisoning with benzodiazepines have an increased risk for both repeated poisonings and mortality, within the one-year follow-up, these findings should be taken seriously, and a follow-up for further treatment should be initiated at all times.

The use of alcohol and cannabis is often associated with recreational use and intoxication is generally harmless and rarely requires urgent medical care. Since we only included patients presenting with acute poisoning at the emergency unit in Sahlgrenska University hospital, it could explain why patients with intake of alcohol or cannabis was associated with lower risk for repetition. Still, any patients with conditions severe enough to be in need of medical treatment, would show up in our data.

Moreover, we did not see any significant difference between sex and the propensity to re-intoxicate, and previous studies had comparative observations [20]. However, in contrast to their findings, our study found no association between age and the propensity to re-intoxicate.

Seventy-two percent of poisonings presenting with intake of SOA had a history of psychiatric comorbidity and 62% of these received a referral. Of those presenting with intake of other substances than SOA 82% had psychiatric comorbidity and 84% received a referral. There was a significant difference in the distribution of referrals, where poisoning with substance of abuse were less likely to receive a referral. Despite the fact that both groups had similar mental co-habitation. It is worrying that patients with intake of SOA, especially men, are less likely to receive a referral, even though it has been established that they are at risk for future drug related

mortality. A recent study in Norway presented high attendance rates for follow-up among patients presenting with substance of abuse, where nearly all patients referred to specialist health services attended[18].

There was no difference between intake of SOA and NSOA and repeated poisonings within a one-year follow-up. However, in contrast to these findings, there was a significate difference between intake of SOA and NSOA and re-presentation with a 30 day follow-up. Patients presenting with poisoning with NSOA were more likely to re-intoxicate after discharge. This is probably due to the fact that patients with intake of SOA suffer from a long-term addiction, and acute poisoning is usually accidental (Table 2), why there is longer time between discharge and re-presentation. While poisoning with NSOA is intentional and likelihood for re-presentation is high.

We found a strong association between receiving a referral for further treatment and re-presentations where patients who received a referral were more likely to re-intoxicate. Other long-term studies have shown that the first year after poisoning or self-harming behaviour, has the highest probability for repetition [20,24-26]. This is consistent with our findings, which show a steep Kaplan-Meier curve within the first month after index case. This raises the question if there is another more suitable path for follow-up we should embrace instead??
We believe that there is a possible benefit in more referrals of patients with poisoning with addictive substances. In poisoning with NSOA an urgent procedure is called for, as they were at high risk for repeated poisoning.

5.1 Summary of main results

Most common agents taken were ethanol, benzodiazepines, opioids and paracetamol. Repetition of acute poisoning was high irrespective of intention behind the poisoning, toxic agent taken or if the patient received a referral for further treatment. Risk factors for repetition were identified as psychiatric comorbidity and intake of benzodiazepines whereas intake of ethanol or cannabis is associated with lower risk for repetition. To our surprise age or sex was never a significant predictor for repetition. Poisonings with NSOA had the highest incidence of repeated poisoning during the first month after discharge. The tendency to give a referral was higher amongst intake of other substances than substance of abuse, without presence of more psychiatric comorbidity. Women were more likely to receive a referral.

5.2 Strengths and limitations

A major strength of our study is the fairly large material, in which we included both main and co-diagnosis. We collected all available data on the patients during one year, with a one-year follow-up. A second search was performed to ensure we did not miss any eligible patients, which further supported the quality of our data.

Diagnosis of toxic agents was based on clinical examinations, self-reports and ambulance reports. No laboratory confirmation was done. Although the categories in our study refer to toxidromes and is considered fairly distinguishable, it could give room for misclassification. One should also take into account that there are varieties in diagnostic coding among physicians and medical secretaries which could possibly affect the diagnoses in our study.

Since we did not differentiate between mental illness and substance abuse disorders when we assessed presence of psychiatric comorbidity, it could possibly give room for misleading epidemiological findings. It is also unknown which patients were admitted to psychiatric department. We considered it a follow-up if the patient received a referral after discharge, regardless of whether the patient subsequently went to the recommended follow-up or not.

The first registered episode of acute poisoning was called the 'index case', following episodes within the one-year observation time was referred to as 'repeated poisonings'. The index case in our study is not necessarily the first episode with acute poisoning for the patient. This should be taken in consideration when we talk about re-presentations.

Another weakness is the limited time for follow-up. This could possibly affect the results for follow-up and repetition. Although the time frame for repetition was probably adequate, as most repeated poisonings occur during the first year[20,27].

Patients who did not present directly to emergency care at SU, if they were referred from another hospital, or had a simultaneous trauma that required surgical treatment, they were not included in the study. Thus, there is a possibility that we missed a few patients with a poisoning diagnosis. However, it is probably not more than a few cases, and it should not affect the final result of our study.

6. Conclusions

Poisoning with benzodiazepines or opioids as well as presence of psychiatric comorbidity were more common among those who died within one year.
Repetition of acute poisoning was high irrespective of intention behind the poisoning, toxic agent

taken or if the patient received a referral for further treatment. The strongest risk factor for repetition of poisoning was psychiatric comorbidity but type of poisoning also matters where intake of benzodiazepines may indicate an increased risk. The tendency to give a referral was higher amongst intake of other substances than substance of abuse, without presence of more psychiatric comorbidity. Women were more likely to receive a referral. Patients presenting with poisoning with NSOA turned out to be at risk for repeated poisonings within the first month after discharge. Future research could focus on evaluate the benefits from a long-term follow-up.

Acknowledgements

Grants by Sahlgrenska Academy at University of Gothenburg who founded our research.
My warmest thanks to my supervisor and mentor Kai Knudsen Associate Professor, Senior Consultant Dep of Anesthesia and Intensive Care Medicine, who with his experience and expertise has guided me throughout this project.
Special thanks to Jonatan Oras, MD/PhD (statistics) and Christina Björn-Nilsson, medical secretary (data collection) who generously contributed and facilitated the study, with data collection and statistical analyses.

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Populärvetenskaplig sammanfattning (In Swedish)

Ett års observationsstudie av akuta förgiftningsfall med inriktning på eventuell förekomst av reintoxikation samt överlevnad efter ett år.

Akuta förgiftningar är ett vanligt medicinskt problem i Sverige idag med ca 9000 patienter som vårdas på sjukhus årligen. Även om de flesta förgiftningar är avsiktliga och i berusningssyfte, är flertalet resultatet av ett missbruk, och vissa med avsikt att ta livet av sig.
Akuta förgiftningar förekommer i alla åldrar men är vanligast mellan 20 och 40 års ålder.
I Sverige är bruk av alkohol vanligast, följt av tobak. Bland narkotikaklassade preparat är cannabis mest förekommande, framförallt bland unga vuxna. Men förgiftningar kan även bero på intag av andra substanser så som läkemedel, kemiska produkter, svampar, växter, gaser med mera.
Prognosen vid en akut förgiftning är i regel god med relativt låg dödlighet. Dock vet man att prognosen försämras om patienten upprepar förgiftningen efter utskrivning. Syftet med denna studie var att identifiera vilka riskfaktorer som leder till att patienten förgiftar sig på nytt. Om dessa riskfaktorer kan upptäckas tidigt så kan omhändertagandet av patienterna optimeras och risken för en eventuell repetition efter utskrivningen minimeras.
Vanligast var förgiftning med intag av alkohol, smärtstillande preparat eller lugnande medel.
Vi fann att av de 668 patienter som ingick i studien så var det ca 13% av alla patienterna som förgiftade sig på nytt efter utskrivning. I ca hälften av fallen fick patienterna en remiss för vidare vård. Det var betydligt vanligare att man skrev en remiss för vidare uppföljning till patienter som förgiftat sig med icke missbrukssubstanser än till patienter med intag av missbrukssubstanser trots att båda grupper i lika stor utsträckning visade sig ha en samsjuklighet med psykisk ohälsa. Vi tror därför att det finns en nytta med att skriva fler remisser till patienter med förgiftning med missbrukssubstanser eftersom båda grupper i lika stor omfattning visade sig ha samsjuklighet med psykisk ohälsa. Då vi kunde se att de patienter som förgiftat sig med icke missbrukssubstanser löper en högre risk för repetition inom den första månaden efter utskrivning, är uppföljningen av dessa patienter mer akut. Eftersom studien visar att förgiftning med det ångestdämpande preparatet Bensodiazepiner är förknippat med ökad risk för död, bör dessa patienter alltid följas upp.

Figures and Tables

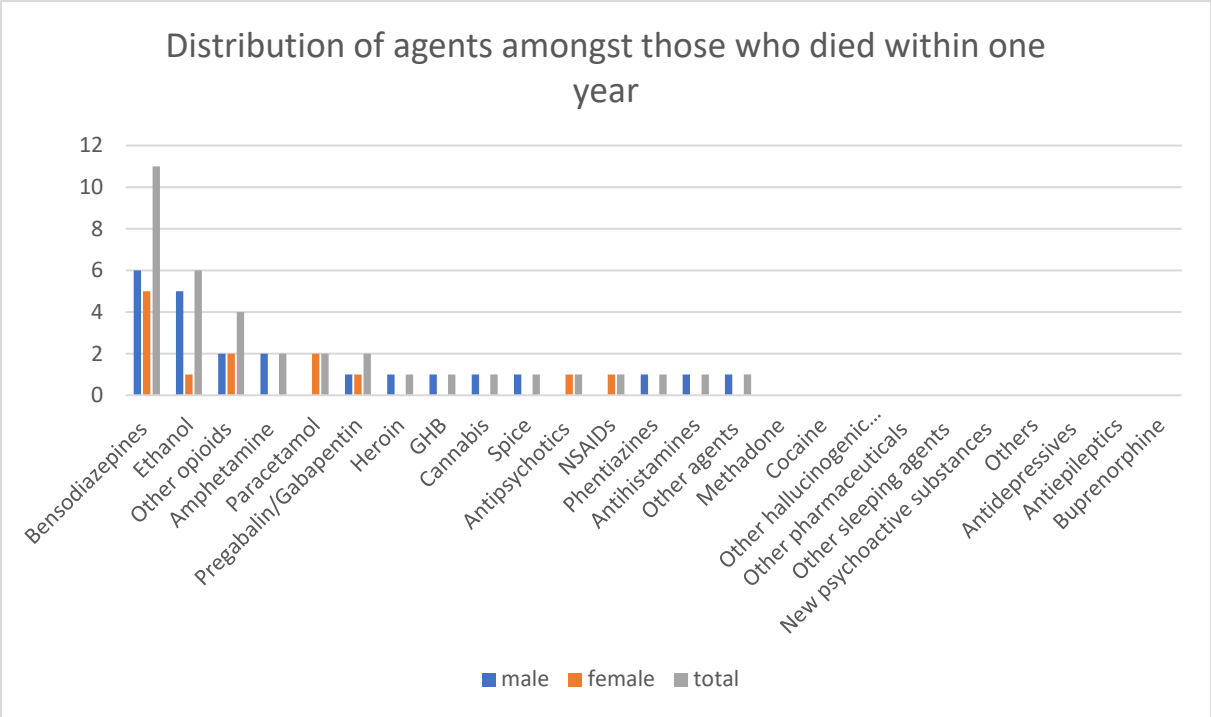

Figure 7. Distribution av agens funna bland de som avled inom ett år (OBS main och co-agent inräknat, blir därför mer än 100%) hos patienter som vårdades för akut förgiftning på akuten vid Sahlgrenska Universitetssjukhuset under 2015

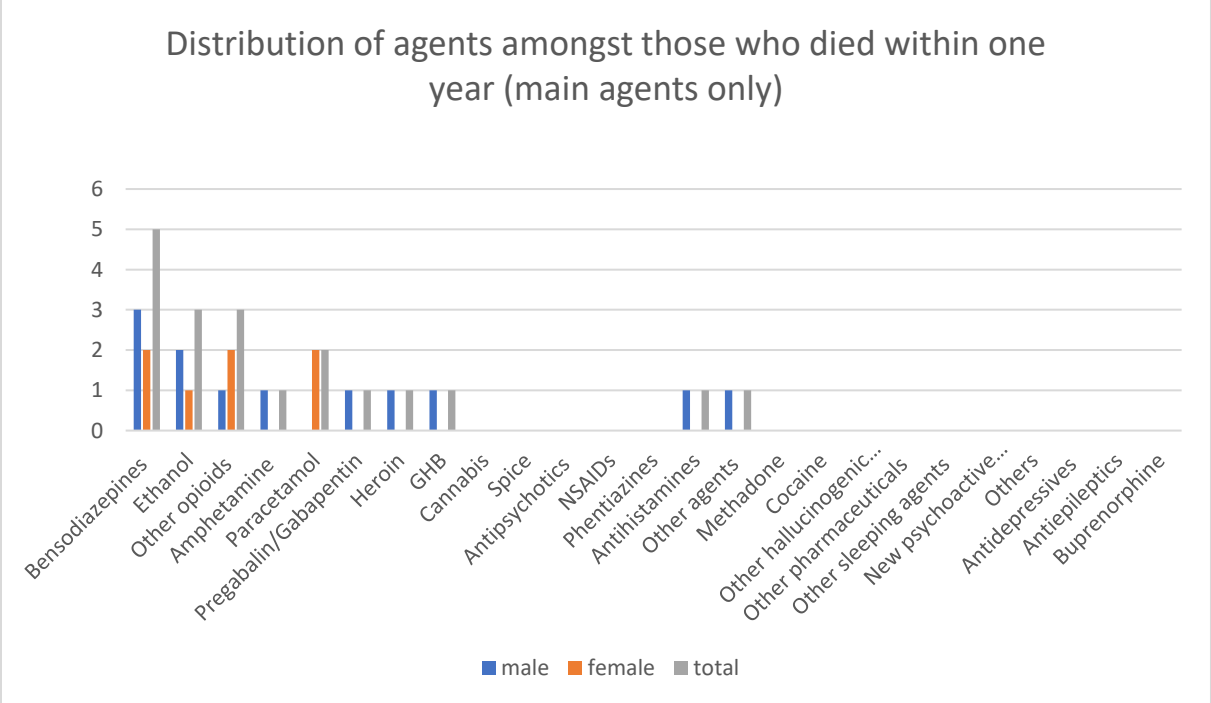

Figure 8. Distribution av agens funna bland de som avled inom ett år (endast main-agent) hos patienter som vårdades för akut förgiftning på akuten vid Sahlgrenska Universitetssjukhuset under 2015

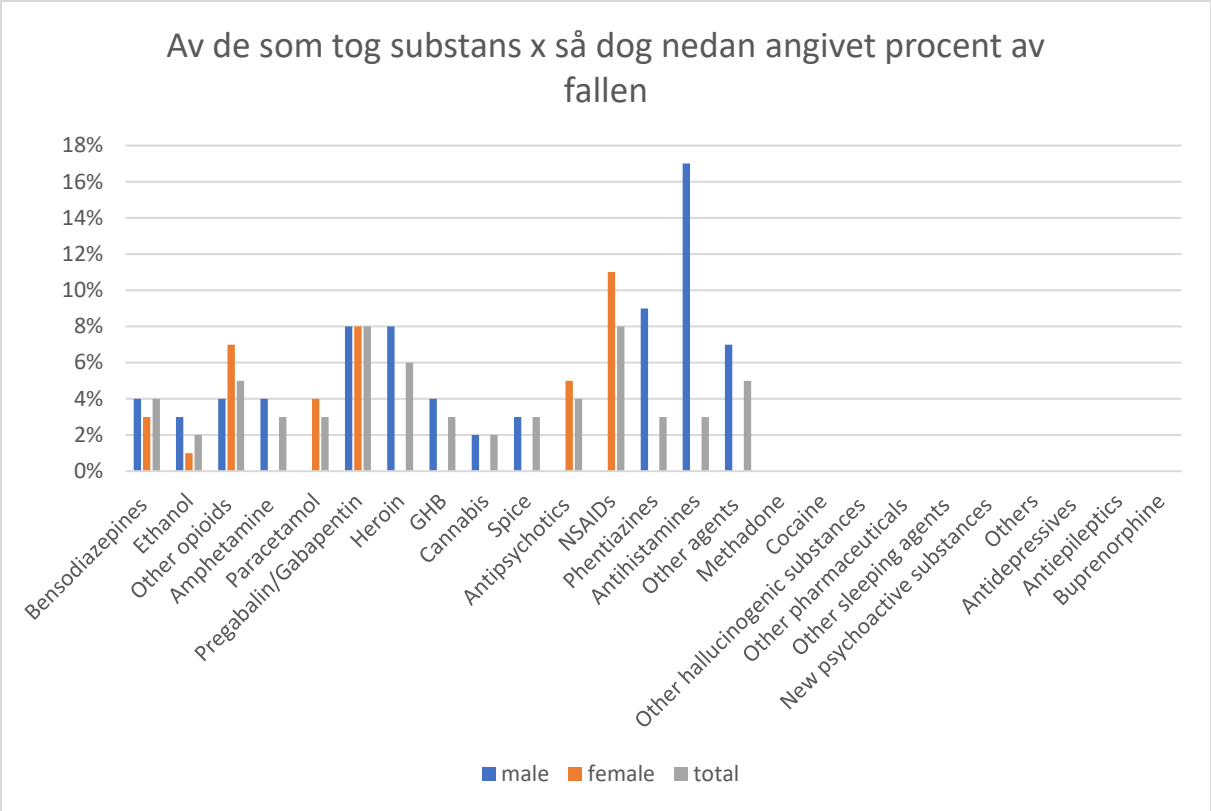

Figure 9. Andel av alla med intag av den substansen som avled inom ett år (main+co-agent) hos patienter som vårdades för akut förgiftning på akuten vid Sahlgrenska Universitetssjukhuset under 2015

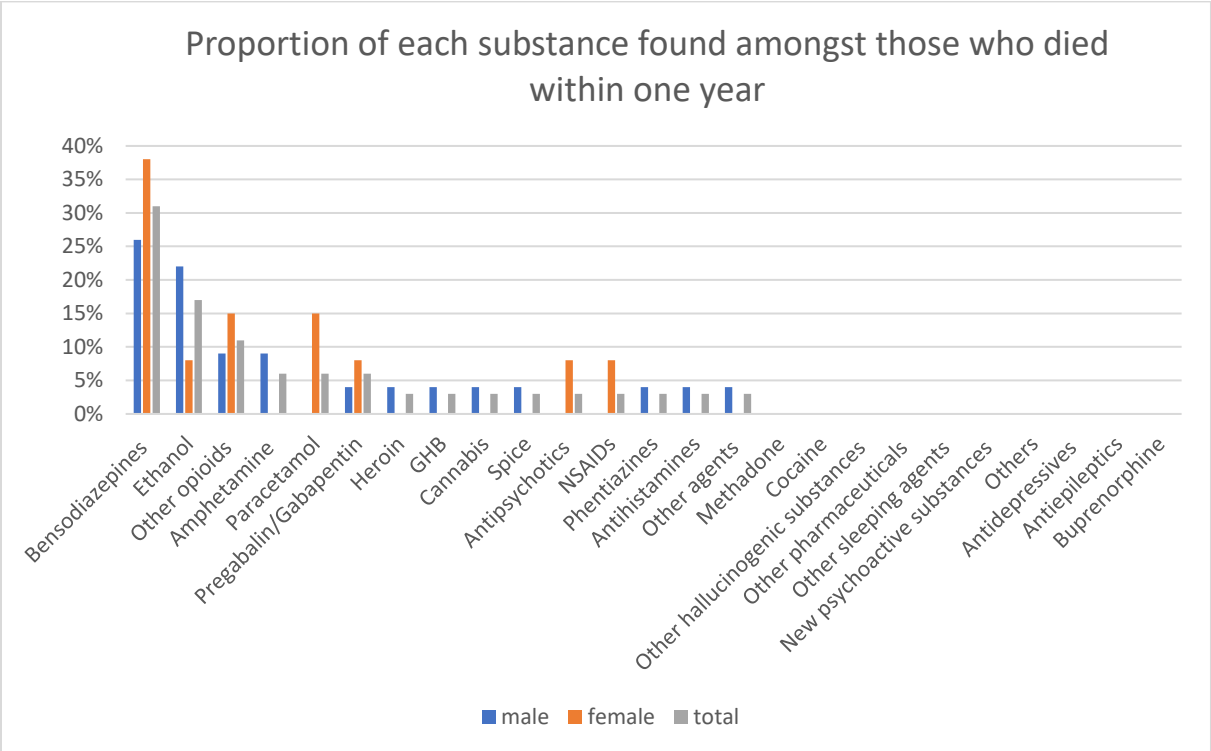

Figure 10. Proportion av agens funna bland de som avled inom ett år (main + co-agent) hos patienter som vårdades för akut förgiftning på akuten vid Sahlgrenska Universitetssjukhuset under 2015

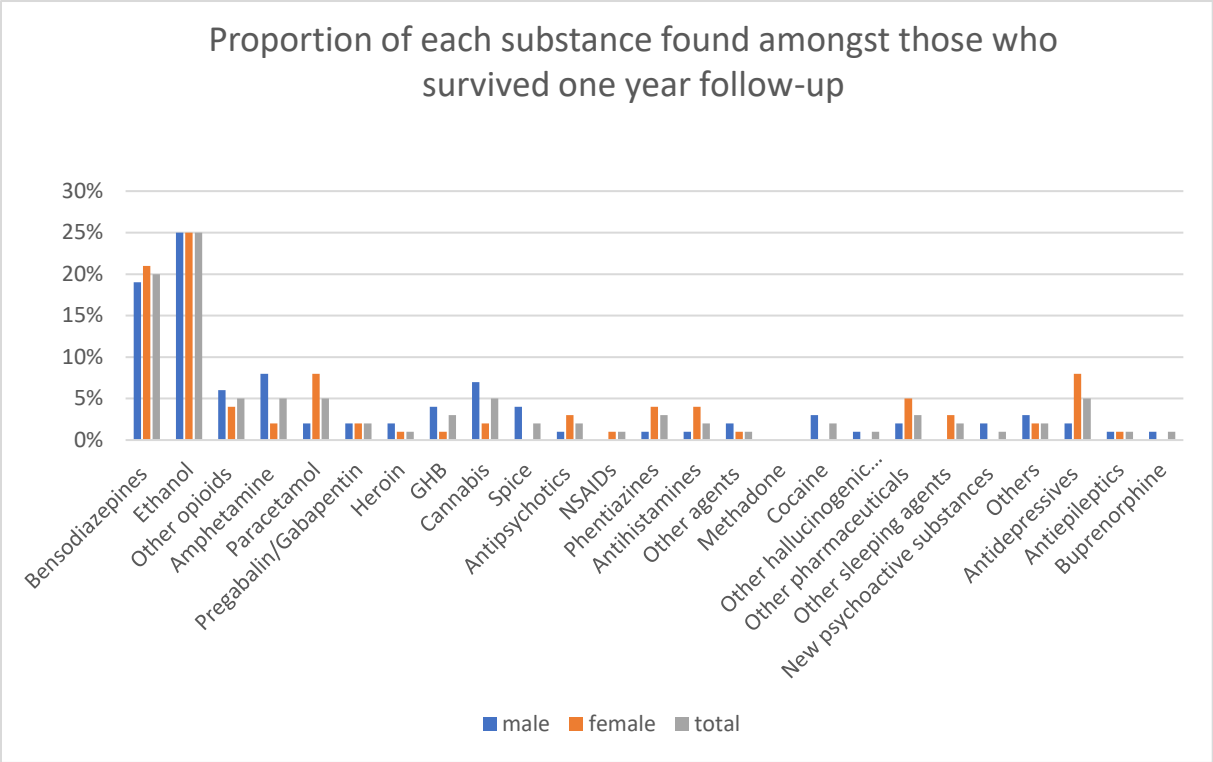

Figure 11. Proportion av agens funna bland de som inte dog inom ett år (main + co-agent) hos patienter som vårdades för akut förgiftning på akuten vid Sahlgrenska Universitetssjukhuset under 2015

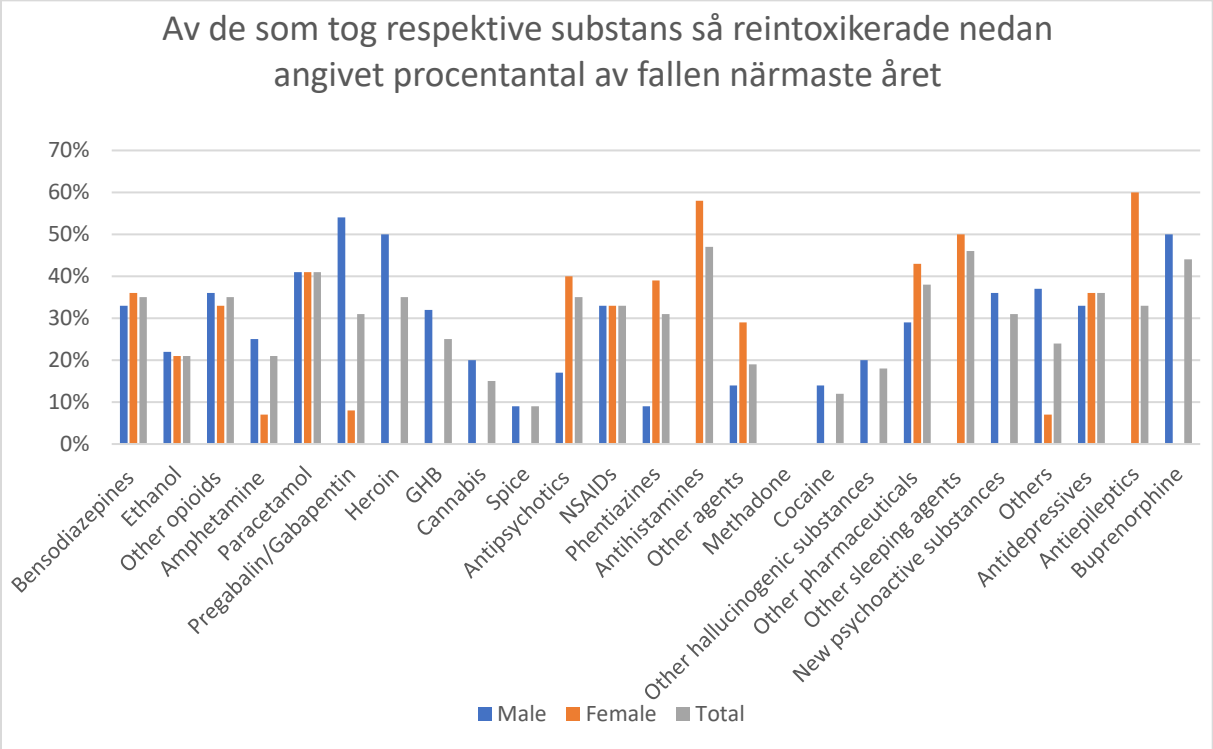

Figure 12. Andel alla med intag av den substansen som reintoxikerade inom ett år hos patienter som vårdades för akut förgiftning på akuten vid Sahlgrenska Universitetssjukhuset under 2015

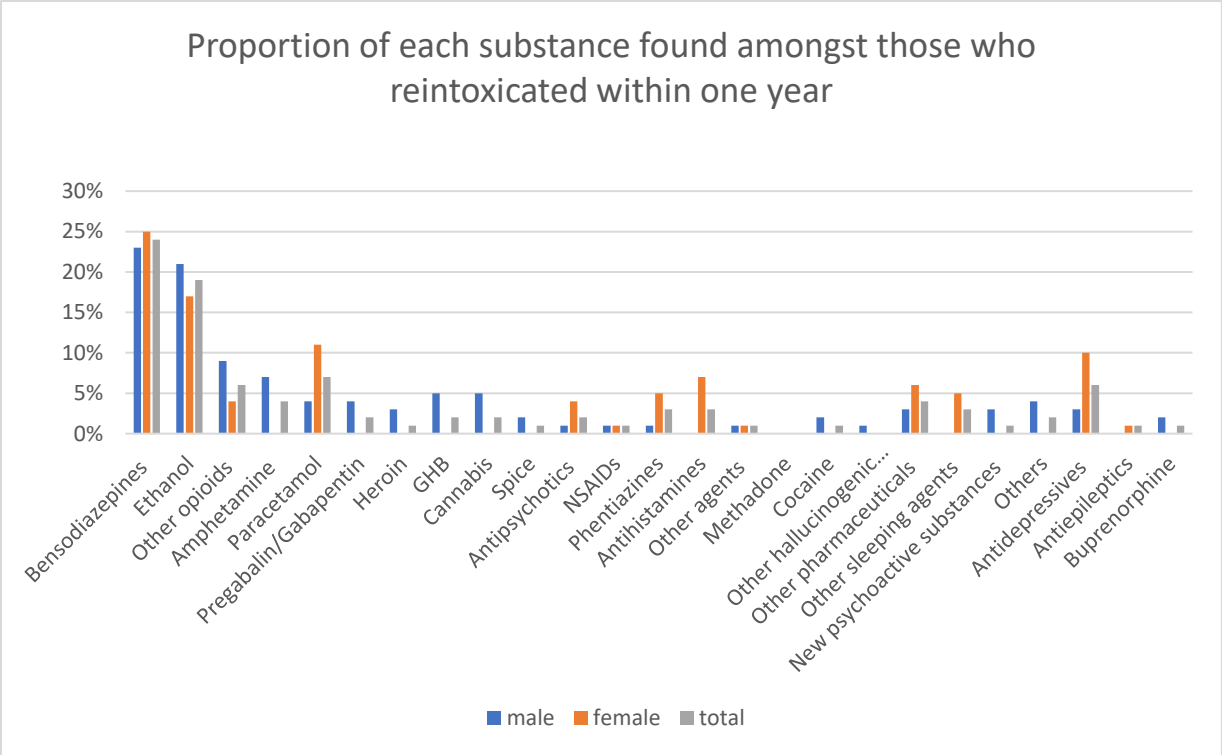

Figure 13. Proportion av agens funna bland de som reintoxikerade efter utskrivning inom ett år hos patienter som vårdades för akut förgiftning på akuten vid Sahlgrenska Universitetssjukhuset under 2015

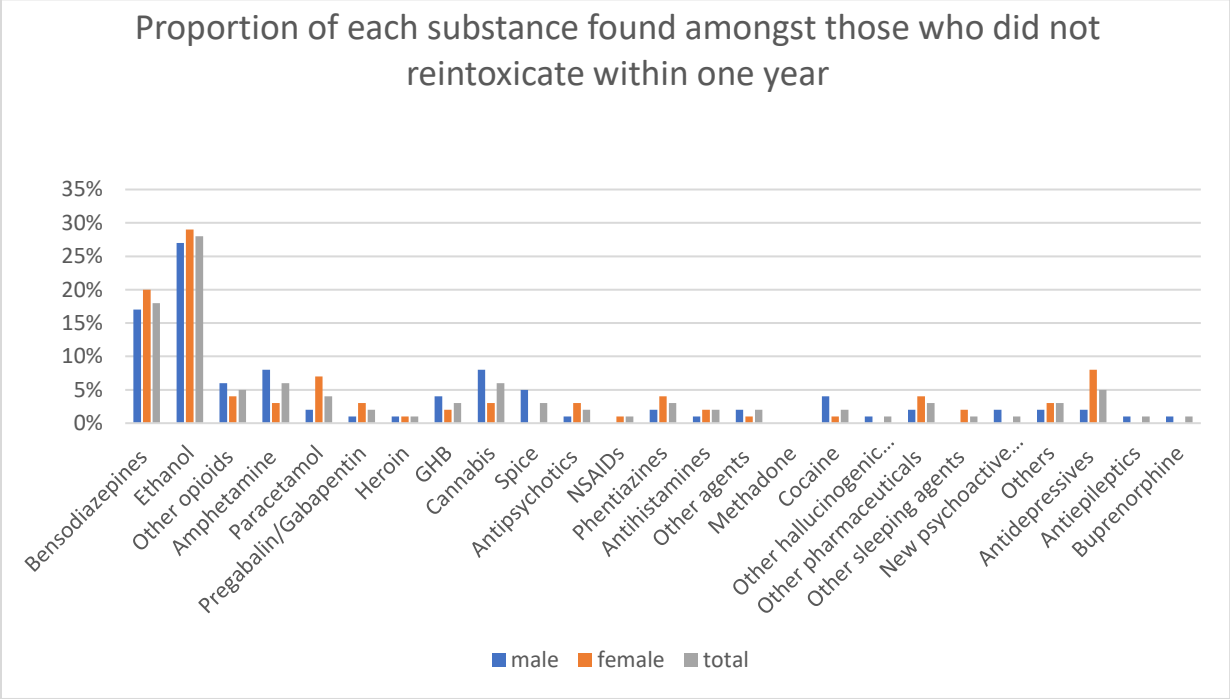

Figure 14. Proportion av agens funna bland de som inte reintoxikerade efter utskrivning inom ett år hos patienter som vårdades för akut förgiftning på akuten vid Sahlgrenska Universitetssjukhuset under 2015

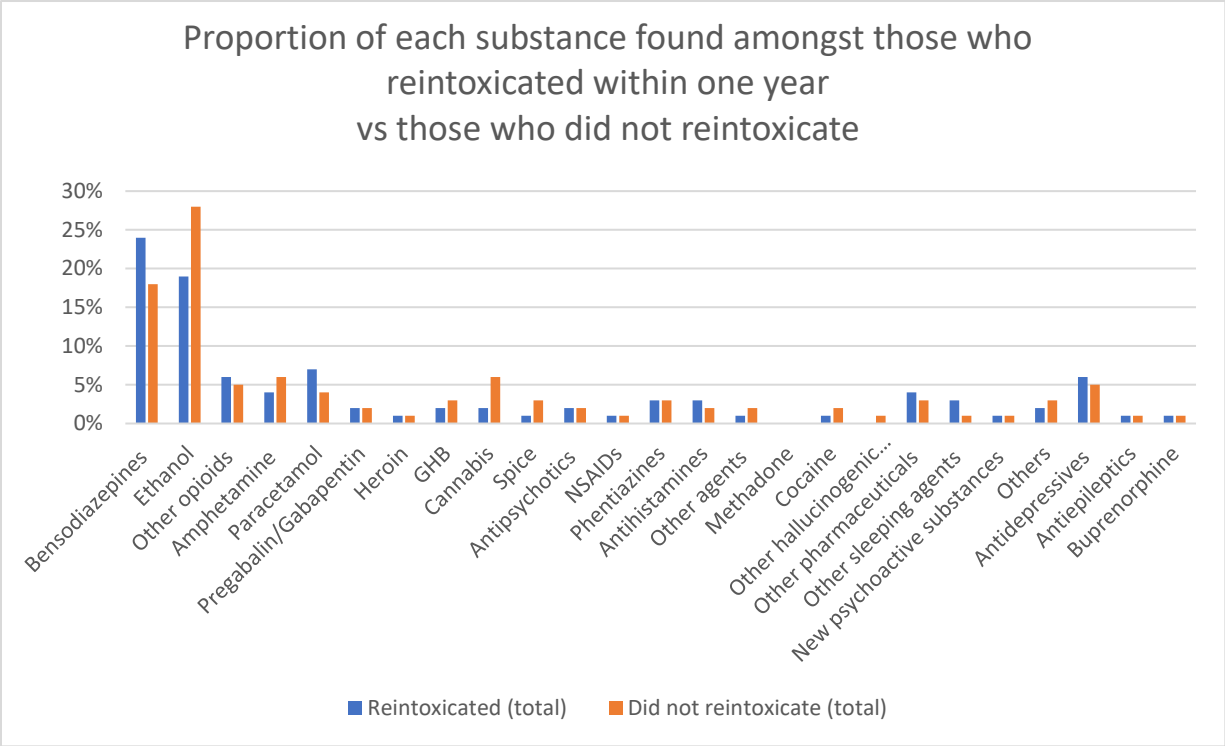

Figure 15. Proportion av agens funna bland de som reintoxikerat inom ett år efter utskrivning jämfört med proportion av agens funna bland de som inte reintoxikerat inom ett år efter utskrivning hos patienter som vårdades för akut förgiftning på akuten vid Sahlgrenska Universitetssjukhuset under 2015

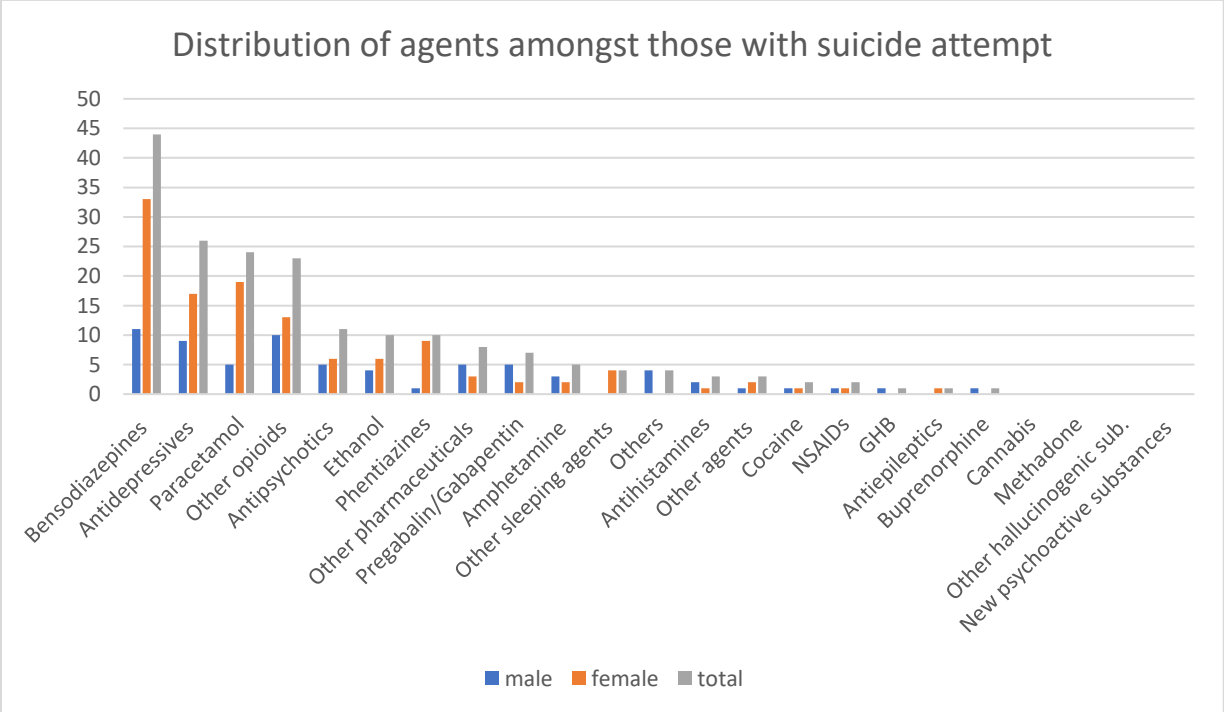

Figure 16. Distribution av agens funna bland de med suicidavsikt inom ett år (OBS endast main agents) hos patienter som vårdades för akut förgiftning på akuten vid Sahlgrenska Universitetssjukhuset under 2015

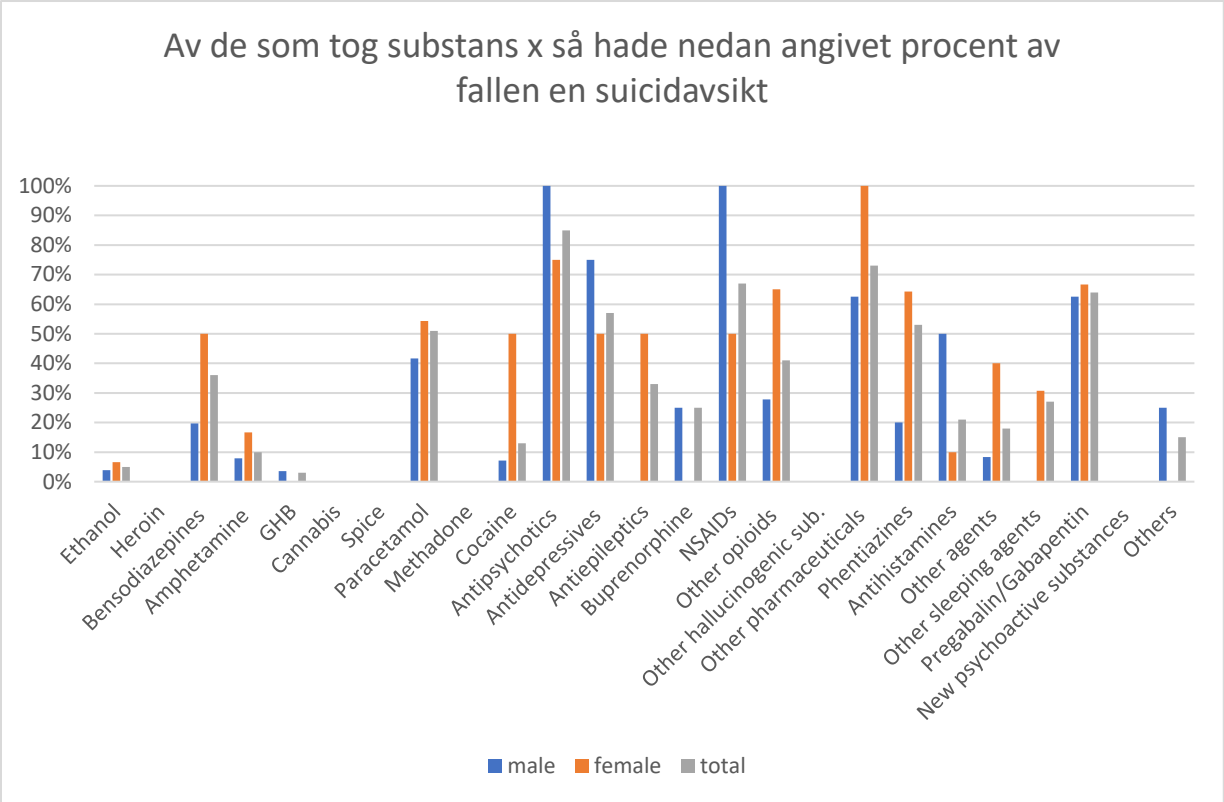

Figure 17. Andel av alla med intag av den substansen som hade en suicidavsikt inom ett år hos patienter som vårdades för akut förgiftning på akuten vid Sahlgrenska Universitetssjukhuset under 2015

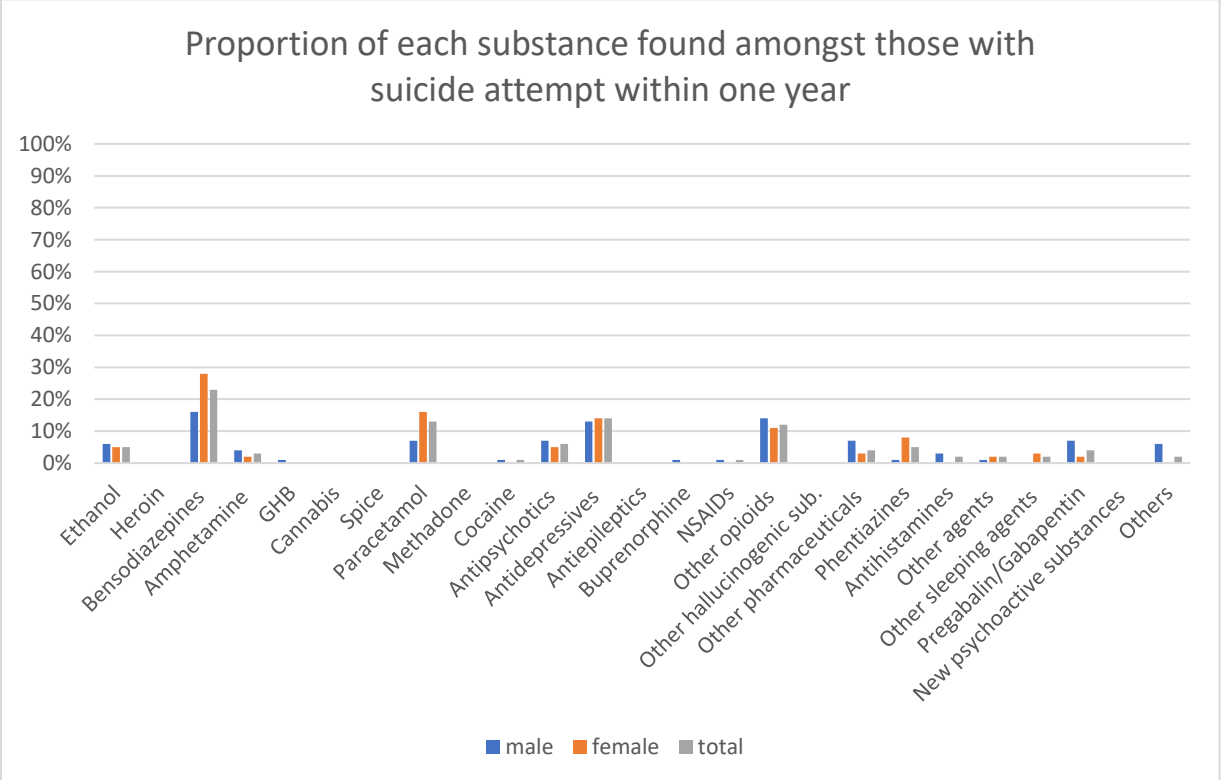

Figure 18. Proportion av agens funna bland de med suicidavsikt inom ett år Suicidavsikt hos patienter som vårdades för akut förgiftning på akuten vid Sahlgrenska Universitetssjukhuset under 2015

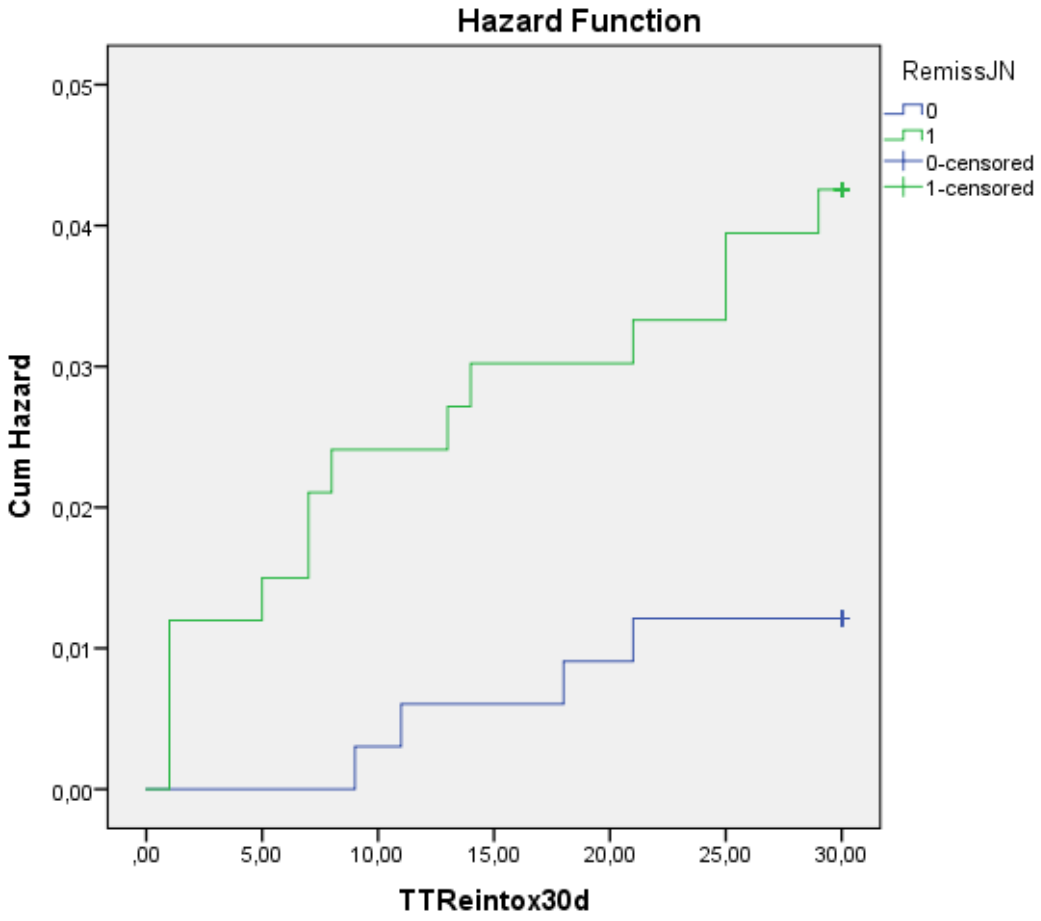

Figure 19. Skillnaden mellan med eller utan remiss vid reintoxikation efter 30 dagar (p=0.018)

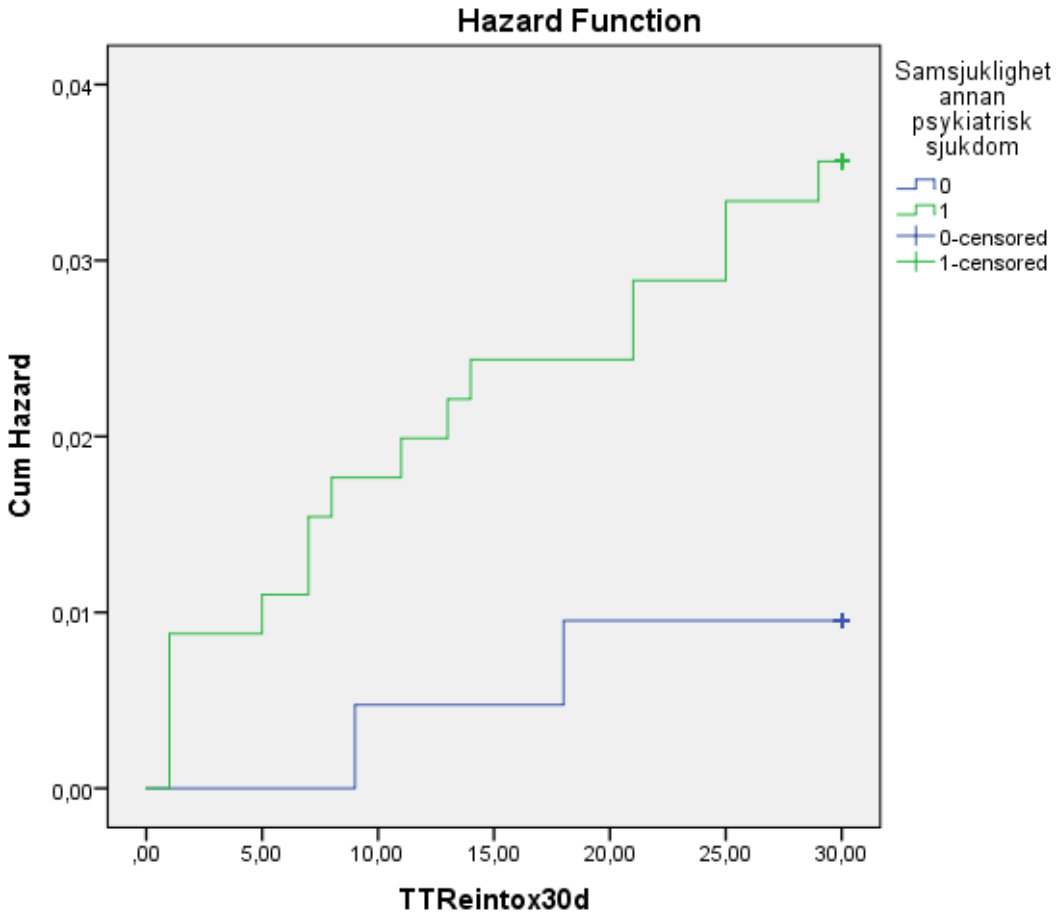

Figure 20. Skillnaden mellan med eller utan psykiatrisk samsjuklighet vid reintoxikation efter 30 dagar (p=0.059)

Table 2. Demographic data in patients included in the study, aged 14-95 years, treated for acute poisoning by substance of abuse (SOA) at emergency Sahlgrenska University Hospital in 2015.

	Age 14-95 years		
	Males	Females	Total
	n(%)	*n(%)*	*n(%)*
Main toxic agents			
ethanol	103(30)	91(43)	194(35)
benzodiazepines	56(16)	66(31)	122(22)
opioids[2]	48(14)	26(12)	74(13)
central stimulants[3]	64(18)	16(8)	80(14)
GHB[1]	28(8)	8(4)	36(6)
other [4]	47(14)	6(3)	53(9)
Intention			
AOSA[5]	314(91)	158(74)	472(84)
Suicidal	31(9)	55(26)	86(15)
Other	1(<1)	0(0)	1(<1)
Total	346(100)	213(100)	559(100)

[1]Gamma-hydroxybutyrate

[2]Morphine, heroine, methadone

[3]Cocaine, amphetamine, dexamphetamine, metylfenidat, new psychoactive substances

[4]Buphrenorphine, cannabis, spice, other hallucinogenic substances

[5]Accidental overdose with substance of abuse

Table 3. Demographic data in patients included in the study, aged 13-92 years treated for acute poisoning by non-substance of abuse (NSOA) at emergency Sahlgrenska University Hospital in 2015.

	Age 13-92 years		
	Males	Females	Total
	n(%)	*n(%)*	*n(%)*
Main toxic agents			
Paracetamol	12(17)	35(27)	47(24)
Antipsychotics	5(7)	8(6)	13(7)
Antidepressives	12(17)	34(26)	46(23)
Antiepileptics	1(1)	2(2)	3(2)
NSAIDs	1(1)	2(2)	3(2)
Other pharmaceuticals[1]	8(11)	3(2)	11(6)
Phentiazines	5(7)	14(11)	19(10)
Antihistamines	4(6)	10(8)	14(7)
Pregabalin/gabapetin	8(11)	5(4)	13(7)
Other agents[2]	12(17)	13(10)	25(13)
Other sleeping agents[3]	2(3)	3(2)	5(3)
Intention			
Suicidal	34(49)	65(50)	99(50)
AONSA[4]	36(51)	64(50)	100(50)
Other	0(0)	0(0)	0(0)
Total	70(100)	129(100)	199(100)

[1] Lithium, Codein, Digoxine, Cortisone, Parsitan, Antabus, Campral, Buronil, Ergenyl, Bloodpressure medicine, Heracillin, Buspiron, Naltrexon, Ephedrine, Metformin, Lyrica, Atarax , Acetylcysteine

[2] Glycol, Ispropanol, Caustic acid, Nitrous oxide, Lighter fluid, Iron, Vinegar essence

[3] Valdoxan, Theralen

[4] Accidental overdose with non substance of abuse

Appendices

Appendix 1. Keywords
ICD-10 codes used in search

E87.7	Ökad vätskevolym
F10.0	Psykiska störningar och beteendestörningar orsakade av alkohol, akut intoxikation
F11.0	Psykiska störningar och beteendestörningar orsakade av opioider, akut intoxikation
F12.0	Psykiska störningar och beteendestörningar orsakade av cannabis, akut intoxikation
F13.0	Psykiska störningar och beteendestörningar orsakade av sedativa och hypnotika, GHB akut intoxikation
F14.0	Psykiska störningar och beteendestörningar orsakade av kokain, akut intoxikation
F15.0	Psykiska störningar och beteendestörningar orsakade av andra stimulantia, däribland koffein, akut intoxikation
F16.0	Psykiska störningar och beteendestörningar orsakade av hallucinogener, akut intoxikation
F17.0	Psykiska störningar och beteendestörningar orsakade av tobak, akut intoxikation
F18.0	Psykiska störningar och beteendestörningar orsakade av flyktiga lösningsmedel, akut intoxikation
F19.0	Psykiska störningar och beteendestörningar orsakade av flera droger i kombination och av andra psykoaktiva substanser, akut intoxikation
F32.0	Lindrig depressiv episod
F32.1	Medelsvår depressiv episod utan psykotiska symptom
F32.9	Depressiv episod, ospec
J18.9	Pneumoni UNS
J49.9	Hjärtarytmi UNS
J96.0	Respiratorisk insufficiens, akut
J96.00	Akut respiratorisk insufficiens, hypoxi utan hyperkapné
K72.0	Akut och subakut leversvikt
N17.8	Annan akut njursvikt

N17.9	Akut njursvikt, ospec
P24.3	Aspiration, uppkräkt maginnehåll
R00.0	Takykardi, ospec
R09.2	Andningsstillestånd
R40.2	Koma, ospec medvetslöshet UNS
R56.8	Krampanfall UNS
R56.8X	Krampanfall, ospecificerade
T36.9	Antibiotika för systemiskt bruk, ospecificerade
T39.0	Salicylater
T39.1	Paracetamol
T39.3	NSAID
T40.1	Heroin
T40.2	Morfin, andra opiater
T40.6	icke specificerade narkotika
T40.7	Cannabis
T42.4	Bensodiazepiner
T42.7	Antiepileptika, lugnande medel och sömnmedel
T43.0	Antidepressiva medel
T43.3	Fentiaziner
T43.9	Psykotropt läkemedel
T44.7	Betareceptorblockare
T46.1	Kalciumantagonister
T50.9	Icke specificerade läkemedel
T51.0	Etanol
T51.1	Metanol
T51.2	Isopropylalkohol
T51.9	Alkohol, ospecificerad

T52.0	Petroleumprodukter, bensin, fotogen
T52.3	Etylenglykol
T52.9	Organiskt lösningsmedel
T54.9	Frätande substans
T56.1	Kvicksilver och dess föreningar
T57.3	Cyanväte
T58	Kolmonoxid
T59.9	Brandrök, gaser, rök, ospec
T62.2	Toxisk effekt av andra förtärda växter eller växtdelar
T62.9	Toxisk effekt av förtärd giftig substans, ospecificerad
T63.0	Ormgift
T63.4	Insektsbett eller stick, giftigt
T63.9	Toxisk effekt av kontakt med icke specificerat giftigt djur
T65.9	Förgiftning UNS
T80.6	Andra serumreaktioner
T96.9	Sena besvär av förgiftning orsakad av droger, läkemedel och biologiska substanser
T97.9	Sena besvär av toxiska effekter av substanser med i huvudsak icke medicinsk användning
Y91.0	Lindrig alkoholintoxikation
Y91.1	Måttlig alkoholintoxikation
Y91.2	Svår alkoholintoxikation
Y91.3	Mycket svår alkoholintoxikation
Y91.9	Alkoholpåverkan, som ej specificeras på annat sätt
Z03.6	Observation för misstänkt toxisk effekt av intagen substans

ICD-10 koder inkluderade efter sökning

F10.0	Psykiska störningar och beteendestörningar orsakade av alkohol, akut intoxikation
F11.0	Psykiska störningar och beteendestörningar orsakade av opioider, akut intoxikation

F12.0	Psykiska störningar och beteendestörningar orsakade av cannabis, akut intoxikation
F13.0	Psykiska störningar och beteendestörningar orsakade av sedativa och hypnotika, GHB akut intoxikation
F14.0	Psykiska störningar och beteendestörningar orsakade av kokain, akut intoxikation
F15.0	Psykiska störningar och beteendestörningar orsakade av andra stimulantia, däribland koffein, akut intoxikation
F16.0	Psykiska störningar och beteendestörningar orsakade av hallucinogener, akut intoxikation
F 170	Psykiska störningar och beteendestörningar orsakade av tobak, akut intoxikation
F18.0	Psykiska störningar och beteendestörningar orsakade av flyktiga lösningsmedel, akut intoxikation
F19.0	Psykiska störningar och beteendestörningar orsakade av flera droger i kombination och av andra psykoaktiva substanser, akut intoxikation
F32.0	Lindrig depressiv episod
F32.1	Medelsvår depressiv episod utan psykotiska symptom
F32.9	Depressiv episod, ospec
J18.9	Pneumoni UNS (OBS som bidiagnos)
K72.0	Akut och subakut leversvikt
N17.9	Akut njursvikt, ospec
N17.8	Annan akut njursvikt
R40.2	Koma, ospec medvetslöshet UNS
R56.8	Krampanfall UNS (OBS som bidiagnos)
R56.8X	Krampanfall, ospecificerade (OBS som bidiagnos)
T36.9	Antibiotika för systemiskt bruk, ospecificerade
T39.0	Salicylater
T39.1	Paracetamol
T39.3	NSAID
T40.1	Heroin

T40.2	Morfin, andra opiater
T40.6	icke specificerade narkotika
T40.7	Cannabis
T42.4	Bensodiazepiner
T42.7	Antiepileptika, lugnande medel och sömnmedel
T43.0	Antidepressiva medel
T43.3	Fentiaziner
T43.9	Psykotropt läkemedel
T44.7	Betareceptorblockare
T46.1	Kalciumantagonister
T50.9	Icke specificerade läkemedel
T51.0	Etanol
T51.1	Metanol
T51.2	Isopropylalkohol
T51.9	Alkohol, ospecificerad
T52.0	Petroleumprodukter, bensin, fotogen
T52.3	Etylenglykol
T52.9	Organiskt lösningsmedel
T54.9	Frätande substans
T57.3	Cyanväte
T58	Kolmonoxid
T62.2	Toxisk effekt av andra förtärda växter eller växtdelar
T62.9	Toxisk effekt av förtärd giftig substans, ospecificerad
T63.9	Toxisk effekt av kontakt med icke specificerat giftigt djur
T65.9	Förgiftning UNS
T96.9	Sena besvär av förgiftning orsakad av droger, läkemedel och biologiska substanser

T97.9	Sena besvär av toxiska effekter av substanser med i huvudsak icke medicinsk användning
Y91.0	Lindrig alkoholintoxikation
Y91.1	Måttlig alkoholintoxikation
Y91.2	Svår alkoholintoxikation
Y91.3	Mycket svår alkoholintoxikation
Y91.9	Alkoholpåverkan, som ej specificeras på annat sätt
Z03.6	Observation för misstänkt toxisk effekt av intagen substans

ICD-10 koder exkluderade efter sökning

E87.7	Ökad vätskevolym
J18.9	Pneumoni UNS (OBS som huvuddiagnos)
J49.9	Hjärtarytmi UNS
J96.0	Respiratorisk insufficiens, akut
J96.00	Akut respiratorisk insufficiens, hypoxi utan hyperkapné
N17.9	Akut njursvikt, ospec
P24.3	Aspiration, uppkräkt maginnehåll
R00.0	Takykardi, ospec
R09.2	Andningsstillestånd
R56.8	Krampanfall UNS (OBS som huvuddiagnos)
R56.8X	Krampanfall, ospecificerade (OBS som huvuddiagnos)
T56.1	Kvicksilver och dess föreningar
T59.9	Brandrök, gaser, rök, ospec
T63.0	Ormgift
T63.4	Insektsbett eller stick, giftigt
T80.6	Andra serumreaktioner

ICD-10 koder det inte funnits några patienter på

F17.0	Psykiska störningar och beteendestörningar orsakade av tobak, akut intoxikation

F18.0	Psykiska störningar och beteendestörningar orsakade av flyktiga lösningsmedel, akut intoxikation
F32.1	Medelsvår depressiv episod utan psykotiska symptom
K72.0	Akut och subakut leversvikt
N17.8	Annan akut njursvikt
T36.9	Antibiotika för systemiskt bruk, ospecificerade
T39.0	Salicylater
T39.1	Paracetamol
T40.1	Heroin
T42.7	Antiepileptika, lugnande medel och sömnmedel
T43.0	Antidepressiva medel
T43.3	Fentiaziner
T43.9	Psykotropt läkemedel
T44.7	Betareceptorblockare
T46.1	Kalciumantagonister
T51.1	Metanol
T51.2	Isopropylalkohol
T52.3	Etylenglykol
T52.9	Organiskt lösningsmedel
T54.9	Frätande substans
T56.1	Kvicksilver och dess föreningar
T57.3	Cyanväte
T58	Kolmonoxid
T62.2	Toxisk effekt av andra förtärda växter eller växtdelar
T62.9	Toxisk effekt av förtärd giftig substans, ospecificerad
T63.9	Toxisk effekt av kontakt med icke specificerat giftigt djur
T80.6	Andra serumreaktioner

T96.9	Sena besvär av förgiftning orsakad av droger, läkemedel och biologiska substanser
T97.9	Sena besvär av toxiska effekter av substanser med i huvudsak icke medicinsk användning
Y91.3	Mycket svår alkoholintoxikation

ICD-10 koder som ingår i studien

F10.0	Psykiska störningar och beteendestörningar orsakade av alkohol, akut intoxikation
F11.0	Psykiska störningar och beteendestörningar orsakade av opioider, akut intoxikation
F12.0	Psykiska störningar och beteendestörningar orsakade av cannabis, akut intoxikation
F13.0	Psykiska störningar och beteendestörningar orsakade av sedativa och hypnotika, GHB akut intoxikation
F14.0	Psykiska störningar och beteendestörningar orsakade av kokain, akut intoxikation
F15.0	Psykiska störningar och beteendestörningar orsakade av andra stimulantia, däribland koffein, akut intoxikation
F16.0	Psykiska störningar och beteendestörningar orsakade av hallucinogener, akut intoxikation
F19.0	Psykiska störningar och beteendestörningar orsakade av flera droger i kombination och av andra psykoaktiva substanser, akut intoxikation
F32.0	Lindrig depressiv episod
F32.9	Depressiv episod, ospec
J18.9	Pneumoni UNS (OBS som bidiagnos)
R40.2	Koma, ospec medvetslöshet UNS
R56.8	Krampanfall UNS (OBS som bidiagnos)
R56.8X	Krampanfall, ospecificerade (OBS som bidiagnos)
T40.2	Morfin, andra opiater
T40.6	icke specificerade narkotika
T40.7	Cannabis
T42.4	Bensodiazepiner
T50.9	Icke specificerade läkemedel

T51.0	Etanol
T51.9	Alkohol, ospecificerad
T52.0	Petroleumprodukter, bensin, fotogen
T65.9	Förgiftning UNS
Y91.0	Lindrig alkoholintoxikation
Y91.1	Måttlig alkoholintoxikation
Y91.2	Svår alkoholintoxikation
Y91.9	Alkoholpåverkan, som ej specificeras på annat sätt
Z03.6	Observation för misstänkt toxisk effekt av intagen substans

Sökord i fritext på patienter utan koder

- Intox
- Förgiftning
- Överdos

Appendix 2. Statistics

	Män (%)	Kvinnor (%)	Totalt (%)
Antal patienter (n)	367 (55)	301 (45)	668 (100)
Ålder (år)	34,8	34,6	34,62
Vårdtillfällen (n)	432 (55)	352 (45)	784 (100)
Vårdtillfällen med enbart ett agens (andel av alla VTF)	244 (31)	168 (21)	412 (53)
Vårdtillfällen med flera substanser (andel av alla VTF)	188 (24)	184 (23)	372 (47)
Antal patienter som reintoxikerat (andel av alla pat)	46 (7)	39 (6)	85 (13)
Förgiftning (VTF) med suicidavsikt (andel av alla förgiftningstillfällen)	69 (9)	120 (15)	189 (24)
Psykisk samsjuklighet (andel av alla patienter)	253 (38)	203 (30)	456 (68)
Döda inom ett år (andel av alla pat)	12 (1,8)	7 (1,0)	19 (2,8)
Patienter som fått remiss inom ett år (andel av alla pat)	153 (23)	183 (27)	336 (50)
Intoxikationstillfällen med missbrukssubstanser (andel av alla VTF)	383 (49)	284 (36)	667 (85)
Intoxikationstillfällen med icke missbrukssubstanser (andel av alla VTF)	85 (11)	157 (20)	242 (31)
Förekomst av missbrukssubstanser bland förgiftningarna (andel av alla förgiftningstillbud)	601 (43)	390 (28)	991 (71)
Förekomst av icke missbrukssubstanser bland förgiftningarna (andel av alla förgiftningstillbud)	108 (8)	269 (19)	377 (27)
Avlidna			
Antal patienter med remiss som avlidit inom ett år (andel av alla som fått remiss)	5 (1,5)	6 (1,8)	11 (3,3)
Antal patienter utan remiss som avlidit inom ett år (andel av alla som inte fått remiss)	7 (2,1)	1 (0,3)	8 (2,4)
Antal patienter som avlidit inom ett år med psykiatrisk samsjuklighet (andel av alla avlidna)	10 (52,6)	7 (36,8)	17 (89,5)
Antal patienter som avlidit inom ett år utan psykisk samsjuklighet (andel av alla avlidna)	2 (10,5)	0 (0)	2 (10,5)
Antal patienter som avlidit inom ett år som reintoxikerat sig (andel av alla avlidna)	0 (0)	1 (5,3)	1 (5,3)
Antal patienter som avlidit inom ett år som inte reintoxikerat sig (andel av alla avlidna)	12 (63,2)	6 (31,6)	18 (94,7)
Antal patienter med intox av heroin, metadon, other opioids som avlidit (andel av alla med intag av dessa substanser)	2 (2,7)	2 (2,7)	4 (5,5)
Antal patienter utan intox av heroin, metadon, other opioids som avlidit (andel av alla utan intag av dessa substanser)	10 (0,9)	5 (0,5)	15 (1,4)
Intoxikationstillfällen med missbrukssubstanser där patienten avlidit inom ett år (andel av alla med missbrukssubstanser)	12 (1,8)	5 (0,7)	17 (2,5)
Intoxikationstillfällen med icke missbrukssubstanser där patienten avlidit inom ett år (andel av alla med icke missbrukssub.)	0 (0)	2 (0,8)	2 (0,8)
Intoxikationstillfällen med missbrukssubstanser där patienten avlidit inom ett år (andel av alla VTF)	12 (1,5)	5 (0,6)	17 (2,2)
Intoxikationstillfällen med icke missbrukssubstanser där patienten avlidit inom ett år (andel av alla VTF)	0 (0)	2 (0,3)	2 (0,3)
Förgiftningstillbud med missbrukssubstanser där patienten avlidit inom ett år (andel av alla förgiftningstillbud)	19 (1,4)	8 (0,6)	27 (1,9)

Förgiftningstillbud med icke missbrukssubstanser där patienten avlidit inom ett år (andel av alla förgiftningstillbud)	4 (0,3)	5 (0,4)	9 (0,6)
Suicidavsikt			
Antal patienter med intox av cannabis och suicidavsikt (andel av alla cannabisintoxikationer)	1 (2)	1 (2)	2 (4)
Intoxikationstillfällen med missbrukssubstanser där patienten haft suicidavsikt (andel av alla med missbrukssubstanser)	95 (14)	54 (8)	149 (22)
Intoxikationstillfällen med icke missbrukssubstanser där patienten haft suicidavsikt (andel av alla med icke missbrukssub.)	36 (15)	80 (33)	116 (48)
Intoxikationstillfällen med missbrukssubstanser där patienten haft suicidavsikt (andel av alla VTF)	95 (12)	54 (7)	149 (19)
Intoxikationstillfällen med icke missbrukssubstanser där patienten haft suicidavsikt (andel av alla VTF)	36 (5)	80 (10)	116 (15)
Förgiftningstillbud med missbrukssubstanser där patienten haft suicidavsikt (andel av alla förgiftningstillbud)	69 (5)	159 (11)	228 (16)
Förgiftningstillbud med missbrukssubstanser där patienten inte haft suicidavsikt (andel av alla förgiftningstillbud)	516 (37)	247 (18)	763 (54)
Förgiftningstillbud med icke missbrukssubstanser där patienten haft suicidavsikt (andel av alla förgiftningstillbud)	47 (3)	138 (10)	185 (13)
Förgiftningstillbud med icke missbrukssubstanser där patienten inte haft suicidavsikt (andel av alla förgiftningstillbud)	61 (4)	131 (9)	192 (14)
Psykisk samsjuklighet			
Antal patienter med intox av heroin, metadon, other opioids och psykisk samsjuklighet (andel av alla med psykisk samsjuklighet)	34 (7)	21 (5)	55 (12)
Antal patienter med intox av heroin, metadon, other opioids utan psykisk samsjuklighet (andel av alla utan psykisk samsjuklighet)	11 (5)	5 (2)	16 (8)
Antal patienter med intox av cannabis med psykisk samsjuklighet (andel av alla cannabisintoxikationer)	30 (53)	10 (18)	40 (70)
Intoxikationstillfällen med missbrukssubstanser där patienten haft psykisk samsjuklighet (andel av alla med missbrukssubstanser)	279 (42)	203 (30)	482 (72)
Intoxikationstillfällen med icke missbrukssubstanser där patienten haft psykisk samsjuklighet (andel av alla med icke missbukssub.)	67 (28)	132 (55)	199 (82)
Intoxikationstillfällen med missbrukssubstanser där patienten haft psykisk samsjuklighet (andel av alla VTF)	279 (36)	203 (26)	482 (61)
Intoxikationstillfällen med icke missbrukssubstanser där patienten haft psykisk samsjuklighet (andel av alla VTF)	67 (9)	132 (17)	199 (25)
Förgiftningstillbud med missbrukssubstanser där patienten haft psykisk samsjuklighet (andel av alla förgiftningstillbud)	440 (31)	295 (21)	735 (52)
Förgiftningstillbud med missbrukssubstanser där patienten inte haft psykisk samsjuklighet (andel av alla förgiftningstillbud)	161 (11)	95 (7)	256 (18)
Förgiftningstillbud med icke missbrukssubstanser där patienten haft psykisk samsjuklighet (andel av alla förgiftningstillbud)	87 (6)	236 (17)	323 (23)
Förgiftningstillbud med icke missbrukssubstanser där patienten inte haft psykisk samsjuklighet (andel av alla förgiftningstillbud)	21 (1)	33 (2)	54 (4)
Remisser			
Antal patienter med psykisk samsjuklighet som fått remiss (andel av alla som fått remiss)	132 (39)	156 (46)	288 (86)
Antal patienter utan psykisk samsjuklighet som fått remiss (andel av alla som fått remiss)	20 (6)	27 (8)	47 (14)
Antal patienter med intox av heroin, metadon, other opioids som fått remiss (andel av alla med intag av dessa substanser)	22 (30)	21 (29)	43 (59)
Antal patienter utan intox av heroin, metadon, other opioids som fått remiss (andel av alla utan intag av dessa substanser)	258 (24)	350 (33)	608 (57)
Antal patienter med intox av cannabis som fått remiss (andel av alla cannabisintoxikationer)	16 (28)	6 (11)	22 (39)
Intoxikationstillfällen med missbrukssubstanser som fick remiss (andel av alla med missbrukssubstanser)	161 (21)	179 (27)	340 (51)
Intoxikationstillfällen med icke missbrukssubstanser som fick remiss (andel av alla med icke missbrukssubstanser)	57 (24)	133 (55)	190 (79)

Intoxikationstillfällen med missbrukssubstanser som fick remiss (andel av alla VTF)	161 (21)	179 (23)	340 (43)
Intoxikationstillfällen med icke missbrukssubstanser som fick remiss (andel av alla VTF)	57 (7)	133 (17)	190 (24)
Förgiftningstillbud med missbrukssubstanser som föranlett remiss (andel av alla förgiftningstillbud)	268 (19)	263 (19)	531 (38)
Förgiftningstillbud med icke missbrukssubstanser som föranlett remiss (andel av alla förgiftningstillbud)	75 (5)	232 (17)	307 (22)
Förgiftningstillbud med missbrukssubstanser som inte föranlett remiss (andel av alla förgiftningstillbud)	333 (24)	127 (9)	460 (33)
Förgiftningstillbud med icke missbrukssubstanser som inte föranlett remiss (andel av alla förgiftningstillbud)	33 (2)	37 (3)	70 (5)
Reintoxikationer			
Antal patienter med psyk samsjuklighet som reintoxikerat (andel av alla med psykisk samsjuklighet)	43 (9)	35 (8)	78 (17)
Antal patienter utan psykisk samsjuklighet som reintoxikerat sig (andel av alla utan psykisk samsjuklighet)	3 (1)	4 (2)	7 (3)
Antal patienter med intox av cannabis och reintoxikation (andel av alla cannabisintoxikationer)	2 (4)	0 (0)	2 (4)
Intoxikationstillfällen med missbrukssubstanser där patienten reintoxikerat sig (andel av alla med missbrukssubstanser)	100 (15)	68 (10)	168 (25)
Intoxikationstillfällen med icke missbrukssubstanser där patienten reintoxikerat sig (andel av alla med icke missbrukssub.)	24 (10)	58 (24)	82 (34)
Intoxikationstillfällen med missbrukssubstanser där patienten reintoxikerat sig (andel av alla VTF)	100 (13)	68 (9)	168 (21)
Intoxikationstillfällen med icke missbrukssubstanser där patienten reintoxikerat sig (andel av alla VTF)	24 (3)	58 (7)	82 (10)
Förgiftningstillbud med missbrukssubstanser där patienten reintoxikerat sig (andel av alla förgiftningstillbud)	158 (11)	97 (7)	255 (18)
Förgiftningstillbud med icke missbrukssubstanser där patienten reintoxikerat sig (andel av alla förgiftningstillbud)	29 (2)	109 (8)	138 (10)
Förgiftningstillbud med missbrukssubstanser där patienten inte reintoxikerat sig (andel av alla förgiftningstillbud)	443 (32)	293 (21)	736 (53)
Förgiftningstillbud med icke missbrukssubstanser där patienten inte reintoxikerat sig (andel av alla förgiftningstillbud)	79 (6)	160 (11)	239 (17)
Övrigt			
Antal patienter som fick remiss och reintoxikerade (andel av alla som fick en remiss)	24(17)	33(18)	57(17)
Antal patienter som inte fick remiss och reintoxikerade (andel av alla som inte fick en remiss)	22(10)	6(5)	28(8)
Antal patienter som fick remiss, psykiatrisk samsjuklighet och reintoxikerade (andel av alla som fick en remiss)	24(16)	32(17)	55(16)
Antal patienter som fick remiss, utan psykiatrisk samsjuklighet och reintoxikerade (andel av alla som fick en remiss)	0(0)	2(1)	2(<1)
Antal intoxikationer med missbrukssubstanser, psykisk samsjuklighet som fick remiss (andel av alla med missbrukssubstanser)	138(36)	159(56)	297(45)
Antal intoxikationer med icke missbrukssubstanser, psykisk samsjuklighet som fick remiss (andel av all med icke missbrukssub.)	50(59)	117(75)	167(69)