

# Recreational Drug use during the Amsterdam Dance Event: Impact on Emergency Services



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**Submission:** September 09, 2021; **Published:** November 10, 2021

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## Abstract

**Aim:** To evaluate the impact of recreational drug related complaints (RDRC) during Amsterdam Dance Event (ADE) 2016.

**Methods:** A prospective, observational study of patients presenting at first aid stations (FAS), ambulance service (AS) and emergency departments (ED) with RDRC.

**Results:** An estimated 375.000 people attended ADE. The number of RDRC was 459 at the FAS, 113 at AA and 81 at the ED, and increased ( $P < 0.001$ ) during ADE by 225% at AA and by 236% at OLVG ED. Eight patients were admitted. A higher percentage of poly-drug use among ED patients (58%) was found, compared to the FAS patients (25%). Also, the proportion of tourists in the ED (51%) was higher compared to the FAS (30%).

**Conclusions:** During ADE 2016, eight patients were admitted to the hospital, without any deaths. Although the number of intoxicated patients increased, the absolute number of patients stayed within normal range of capacity.

**Keywords:** Emergency Medicine; Prehospital Emergency Medicine; Recreational Drugs; Dance Event

**Abbreviation:** RDRC: Recreational Drug Related Complaints; FAS: First Aid stations; AA: Ambulance Amsterdam; ED: Emergency Department; DTC: Diagnosis and Treatment Combinations; RDRC: Recreational Drug-Related Complaints; SPSS: Statistical Package for the Social Sciences

## Introduction

At large-scale dance events, recreational drug use is common [1,2], and 27.4% of incidents at these events are drug-related<sup>3</sup>. Besides alcohol and cannabis (>50%), the most commonly used recreational drugs are [3,4] methyleendioxyamfetamine (MDMA), amphetamine, and 4-Fluoramphetamine (4FA) [1,2]. The Amsterdam Dance Event (ADE) is a festival with over 300.000 visitors annually. During previous events, severe drug-related complications and deaths occurred [4-6]. Therefore, the ADE is expected to cause an increased demand on emergency medical services [7,8]. We aimed to evaluate the impact of recreational

drug-related complaints at first aid stations, ambulance services and emergency departments during the ADE 2016.

## Methods

This prospective observational study included all patients, > 12 years old, with RDRC at first aid stations (FAS) of Event Medical services (EMS), ambulance Amsterdam (AA) and the four largest emergency departments, two academic level I trauma centers (AUMC) and two locations of the largest regional teaching hospital (OLVG) in Amsterdam, the Netherlands, between October 19<sup>th</sup> 8

am and October 24<sup>th</sup> 8 am 2016. From OLVG and AA, two weeks before and after the ADE, additional information on intoxication related incidents were also collected. An acute intoxication was defined as any complaint, diagnosed by the treating nurse or physician, related to the ingestion, injection or snorting of recreational drugs, like MDMA, 4FA, amphetamine, cocaine, new psychoactive substances, heroin, cannabis, psilocybin, gamma-hydroxybutyrate (GHB), ketamine, and/or alcohol. Recreational drug use was self-reported, information retrieved from witnesses, or based on available analytical information, like urine toxicology screening results. Poly-drug use was defined as the use of two or more of the above-mentioned substances. Patients presenting more than once within 24 hours, with the same complaint, were only included once. Medical chart review to obtain patient demographics, recreational drug(s) used, hospital admissions, length of ED and hospital stay, and mortality, was performed. Patients without a current permanent Dutch address were defined as tourists.

The Dutch institute for medical aid in the region, determined the number of permitted visitors per site where EMS was present. EMS, the biggest provider of FAS, is staffed with advanced life support skilled staff and able to monitor and treat non-severe recreational drug-related complaints. AA is the only ambulance service in Amsterdam and serves a region with approximately 1.2 million inhabitants. All dispatches involving the use of recreational drugs were included, based on the preliminary diagnosis recorded by paramedics. At the EDs, all patients with recreational drug-related complaints (RDRC) as presenting complaints or diagnosed by the physician, were included and additionally cross-referenced with the term 'intoxication' in the Dutch computerized Diagnosis and Treatment Combinations system (DTC), a nationwide system used for reimbursement of medical care. Two other, smaller, Amsterdam hospitals were not involved in the study, because they rarely

see recreational drug-related complaints. Standard descriptive statistics were used including means and percentages for frequency counts. Comparisons of proportions were made using the chi-squared test. A Bonferroni correction was used in order for a pairwise comparison to be made. P values of  $p < 0.005$  were considered statistically significant. Data was processed anonymously. Statistical analysis was performed using the Statistical Package for the Social Sciences version 21 (SPSS). This study was approved by all four participating hospitals institutional ethical boards.

## Results

Based on ticket sales, the ADE organizers estimated a total of 375.000 visits (not unique visitors) during the ADE 2016. EMS was present at 40 of the large-scale dance events with an estimated total of 201.850 visits, 54% of all ADE visitors. The number of recreational drug-related complaints at EMS, AA and the EDs is shown in Figure 1. At EMS, a total of 609 people was seen, 459 with RDRC, of which 243 (53%) were male and 139 (30%) tourists, with a mean age of 24 years old (range 12-64). For 315 patients (69%), poly-drug use was reported, of which 104 (33%) tourists. 75% (n=103) of all tourists, compared to 66% (n=211) of Dutch patients, presenting at EMS, used two or more substances including alcohol. The use of three or more recreational drugs was reported by 115 (25%) patients of which 46 (40%) were tourists. A total of 11 intoxicated patients (2.4%) were referred, and transported by AA, to the ED. During ADE the AA dispatched 986 times, of which 113 (12%) were due to RDRC (Figure 2), a significant increase ( $P < 0.001$ ) compared to the two weeks prior and after the ADE where on average 51 patients per week were seen with RDRC. Poly-drug use was reported by 39 (35%) patients (Figure 2).



**Figure 1:** Amount of patients with recreational drug-related complaints in the acute healthcare chain.

\*Estimated total visits by ADE organization, \*\*Limited to EMS data, accounting for 54% of all events, \*\*\* All ambulance dispatches due to recreational drug-related complaints. ADE; Amsterdam Dance Event, ED; Emergency department.

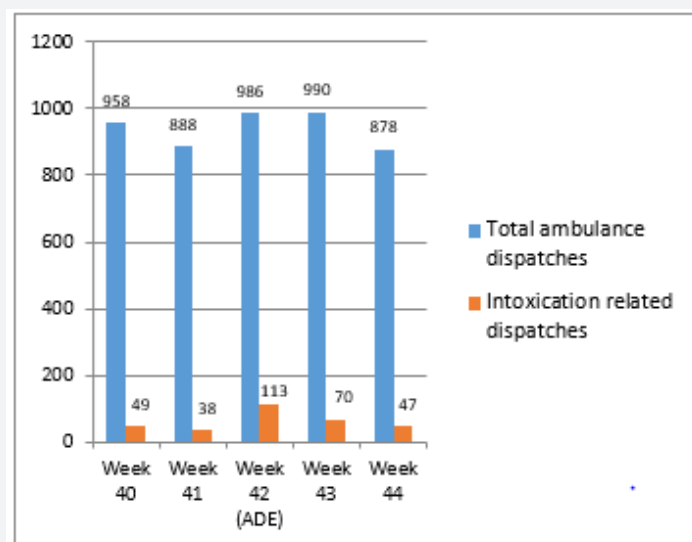


Figure 2: Proportion of recreational drug-related ambulance dispatches.

At all participating EDs, a total of 81 patients presented with RDRC. Sixty patients were male (74%), and 41 (51%) were tourists. The mean age was 28 years (range 14-72 years). Poly-drug use was reported by 47 (58%) patients of which 26 (55%) were tourists. Twenty-four (30%) patients had used three or more substances, and in 59% (n=48), alcohol was the most frequently used recreational drug. Of all tourists, 26 (63%) reported the use of two or more drugs, compared to 21 (53%) Dutch patients. The total amount of ED visits at OLVG hospital during the ADE was 971 of which 52 (5%) were due to RDRC (Figure 3), a significant increase ( $p < 0.001$ ) compared to the two weeks prior and after ADE where on average 22 patients per week presented with RDRC (Figure 3). The 81 ED patients cumulatively, have used recreational drugs

158 times of which 48 times alcohol, 34 times MDMA, 34 times marijuana and 17 times cocaine (Figure 4). Of all ED patients, 90% (n=73) were discharged home and eight (10%) were admitted, half of which were tourists (Figure 4). Average ED length of stay was 3.45 hours (range 0.25 – 13.25). Four patients (5%, n=3) were transferred to the intensive care unit (ICU). One agitated patient had received a high dose of sedatives in the ambulance and was admitted for observation due to a lack of medium care beds and was discharged within 8 hours. The other three ICU patients were intubated for airway protection, due to a low Glasgow coma scale score. They were discharged after 7, 21 and 34 hours. No deaths occurred during the study period.

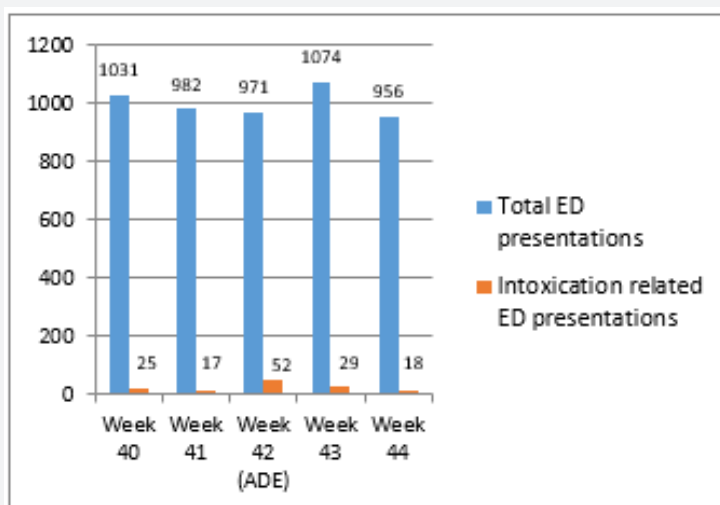
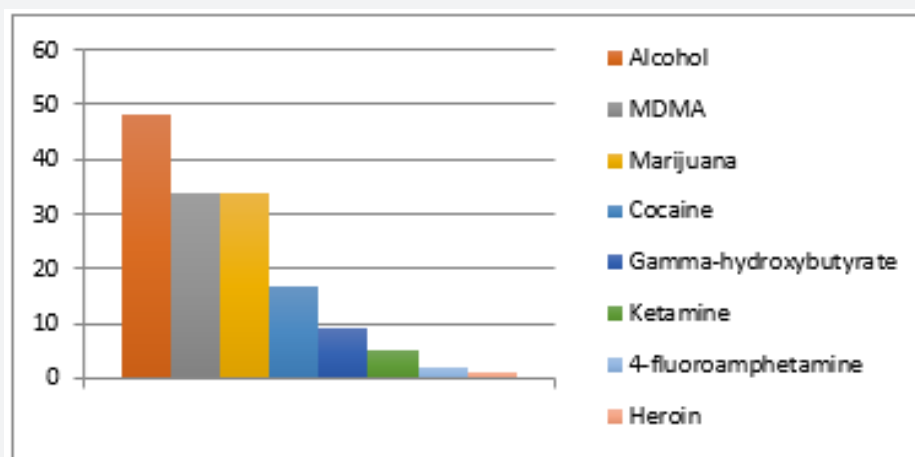


Figure 3: Proportion of recreational drug-related ED presentations at OLVG hospital ED; Emergency department, ADE; Amsterdam Dance Event.



**Figure 4:** Recreational drugs taken by patients who presented at the Eds ED; Emergency department, MDMA; 3,4-methyleendioxyamfetamine.

## Discussion

In this observational study we demonstrated that 81 ADE 2016 visitors (out of 375.000) presented with drug related complaints at Amsterdam EDs. It is known that recreational drugs are widely used at large scale dance events with a potential strain on acute healthcare services [7,8]. Partly due to increased recreational drug dosage [9,10] and due to serious drug-related complications during previous ADE editions [4-6], recreational drug use during large scale dance events remains an important topic among healthcare professionals and the general public in the Netherlands. This study shows that ADE 2016, only lead to a minor strain on the acute health care system. The presence of FAS at large dance events, most likely decreases the amount of ED presentations, since they only referred 2.4% of their intoxicated patients to the ED. Although the number of intoxicated patients increased by 225% at AA and by 236% at the OLVG EDs, the absolute number of patients stayed within the normal range of AA and ED capacity. However, the relatively long length of stay (225 minutes) [11], might increase the mostly nocturnal workload at the EDs.

Tourists are over-represented at the EDs, with 30% of all EMS patients and 51% of all ED patients. This difference is expected to be due to lack of recreational drug knowledge. Although we did not have exact data regarding the number of tourists visiting the ADE and their recreational drug use, it is known that of all 5.3 million Amsterdam tourists in 2014, 8% visited clubs and raves [12], which makes this a relevant group for the local government to address since preventive measures mostly target Dutch citizens. As mentioned previously, drug use among young (15-35) dance event visitors are common [10,13]. In addition, previous ED and FAS studies have shown that poly-drug use is common among recreational drug users [8,14-16]. In this study, a much higher per-

centage of poly-drug use among ED patients (58%) was found, compared to FAS patients (25%). This suggests that poly-drug use causes more serious complications.

## Limitations

This study was conducted in a country with a liberal recreational drug policy; therefore, the results of this study may not be generalizable to other countries. Possibly, the amount of RDRC was underestimated, due to the fact that recreational drug use was identified by self-report or reported by witnesses. Analytical confirmation was rare. Also, the two small Amsterdam EDs might have treated self-presenting RDRC patients, not included in the study, however, it is expected this will be a limited number of patients. Furthermore, the total amount of tourists visiting the ADE is unknown. Besides this, patients with recreational drug-related trauma were most likely missed, therefore this study does not provide any information on indirect harm.

## Conclusion

During ADE 2016, the largest five-day indoor dance event in the world with 375.000 visits, 459 patients with RDRC presented to FAS, 113 to ambulance service and 81 patients to the ED. A higher percentage of poly-drug use among ED patients (58%) was found, compared to FAS patients (25%), and the proportion of tourists in the ED (51%) was higher compared to FAS (30%). Only eight patients were admitted to the hospital, without any deaths recorded.

## References

1. Nabben TBA, Luijk SJ, Korf JD (2015) Trends in alcohol, tabak en drugs bij jonge amsterdammers. Jellinek ed. Rozenberg publishers.
2. Monshouwer K, Pol PVD, Drost YC, Laar MMV (2016) Het grote uitgaansonderzoek. Trimbos instituut, the Netherlands.

3. Krul J, Sanou B, Swart EL, Girbes ARJ (2012) Medical care at mass gatherings: emergency medical services at large-scale rave events. *Prehosp Disaster Med* 27(1): 71-74.
4. Bijl H (2014) Explosieve groei xtc-gevallen op Eerste Hulp. *het Parool* 08-11-2014.
5. Klompenhouwer L (2014) Derde dode tijdens ADE, vrouw overleed door xtc-gebruik.
6. ANP (2015) Vrouw (33) uit Zwolle overlijdt na drugsgebruik op ADE. *Algemeen dagblad*.
7. Friedman MS, Plocki A, Likourezos A, Pushkar I, Bazos AN, et al. (2017) A Prospective Analysis of Patients Presenting for Medical Attention at a Large Electronic Dance Music Festival. *Prehosp Disaster Med* 32(1): 78-82.
8. Krul J, Blankers M, Girbes AR (2011) Substance-related health problems during rave parties in The Netherlands (1997-2008). *PLoS One* 6(12): e29620.
9. (2016) European Monitoring Centre for Drugs and Drug Addiction. *European Drug Report*. Addiction EMCfDaD, ed. Luxembourg: Publications Office of the European Union, Europe.
10. Laar MMV, Ooyen-Houben MMJV (2016) *Nationale drug Monitor 2016*. Trimbos instituut, the Netherlands.
11. Linden CVD, Reijnen R, Derlet RW, Lindeboom R, Linden NVD, et al. (2013) Emergency department crowding in The Netherlands: managers' experiences. *Int J Emerg Med* 6: 41.
12. Bruijn KD, Vermeulen T, Korteweg Maris D, Rooijackers M, Most KVD, et al. (2015) *Trendrapport toerisme recreatie en vrije tijd*. NRIT Media CBvdS, NBTC Holland Marketing, Centre of Expertise Leisure, Tourism & Hospitality, ed. Den Haag.
13. (2016) *Trimbos Instituut. DIMS jaarbericht*. Trimbos instituut, the Netherlands.
14. Wood DM, Giraudon I, Mounteney J, Dargan PI (2016) Hospital emergency presentations and acute drug toxicity in Europe. *Addiction EMCf DaD ed: Publications Office of the European Union, Luxembourg, Europe*.
15. Liakoni E, Dolder PC, Rentsch K, Liechi ME (2015) Acute health problems due to recreational drug use in patients presenting to an urban emergency department in Switzerland. *Swiss Med Wkly* 145: w14166.
16. Liakoni E, Muller S, Stoller A, Meret R, Liechi ME, Exadaktylos AK (2017) Presentations to an urban emergency department in Bern, Switzerland associated with acute recreational drug toxicity. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine* 25(1): 26.



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DOI: [10.19080/OAJT.2021.05.555658](https://doi.org/10.19080/OAJT.2021.05.555658)

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