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### New Psychoactive Substances Constant State of Flux: NBOMe Brazilian Case

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**Abstract.** The new psychoactive substances (NPS) market is in a constant state of flux, with new substances being synthesized regularly and marketed in many ways and forms. These substances often emerge quickly, just as they disappear, evidencing a clear attempt to circumvent the control trafficking enforcement agencies and the international community. Among the wide variety of NPS, the NBOMe series attracted attention from medical and legal authorities due to the high number of cases of intoxication, followed or not by death in several countries around the world, including Brazil. So, this brief communication aimed to evaluate the number of NBOMe Brazilian Federal Police (BFP) over the past eight years, and highlight the NPS constant state of flux, evidencing by the Brazilian NBOMe case. This is a retrospective study based on information from forensic analysis reports from seizures of BFP. The NBOMe seizures generated 4 forensic analysis requests in 2012, 21 in 2013, 45 in 2014, 61 in 2015, 80 in 2016, 22 in 2017, 19 in 2018 and 2 in 2019, totaling 254 forensic analysis reports

analyzed. This NPS emerged quickly in Brazil from the year 2012, and tended to disappear in recent years, from the perspective of the BPF forensic analysis reports, evidencing the NPS constant state of flux, represented here by the Brazilian NBOME case.

**Keywords:** Designer drugs; Drug market; Forensic report; NBOME; New psychoactive substances.

## 1. Introduction

New psychoactive substances (NPS) are substances with stimulant properties that are not controlled by the Single Convention on Narcotic Drugs of 1961 or the Convention on Psychotropic Substances of 1971 but may a public health threat similar to substances that are under international control. NPS include substances that are projected to mimic substances with stimulant properties that are under international control, like amphetamine, methamphetamine, cathinone and methcathinone<sup>1</sup>. These substances generate subjective effects in users like “boosted mood” or euphoria, empathy feelings and compassion (empathogenic and entactogenic effects of serotonin-releasing drugs), increased sociability and sex drive, a perceived increase within the ability to learn and focus, increased energy and alertness<sup>2</sup>.

The NPS market is in a constant state of flux, with new substances being synthesized regularly and marketed in many ways and forms, like blotter papers, seals, tablets, crystals, bath salts, among others. These substances often emerge quickly, just as they disappear, evidencing a clear attempt to circumvent the control trafficking enforcement agencies and the international community<sup>1</sup>. In the late 1990s, there were approximately 230 psychoactive substances under international control, and some of which dominated the global drug market, the best-known being cannabis, cocaine, opium, heroin, amphetamines and “ecstasy”. Two decades later, the situation has changed, as there are now much more substances on the market. Several synthetic NPS emerged on the drug markets, and the total number of substances under international control increasing from 234 in 2014 to 282 in 2018. At an equivalent time, the amount of NPS rose from 166 substances over the amount 2005–2009 to 950 substances by the top of 2019<sup>1</sup>.

Worldwide, in recent years authorities have identified quite three times

as many NPS as there are psychoactive substances under international control<sup>1</sup>. Among the wide variety of NPS, the NBOMe series, attracted attention from medical and legal authorities due to the high number of cases of intoxication, followed or not by death in several countries around the world, including Brazil<sup>3-9</sup>. NBOMes are derived from the 2C-X family of hallucinogenic phenethylamines, and they are sold under different names as “designer drugs”, “herbal highs”, “synthetic drugs”, “research chemicals”, “legal highs”, “smile”, “synthetic lysergic acid”, “Nbomb”, “Acid”, “25B”, and “25C”. These drugs act as partial agonists of serotonin receptor 5-HT<sub>2A</sub>, being used mainly by oral/sublingual sporadically intravenous, nasal, vaginal, rectal, and reported their use smoking<sup>4</sup>. Some studies describe psychiatric manifestations, like euphoria and panic attacks, and also its consumption can also increase risky behaviors, like suicide attempts, unprotected sex with multiple partners<sup>9</sup>. In this context, this paper aimed evaluate the number of NBOMe Brazilian Federal Police (BFP) forensic analysis reports over the past eight years, and highlight the NPS constant state of flux, evidencing by the Brazilian NBOMe case.

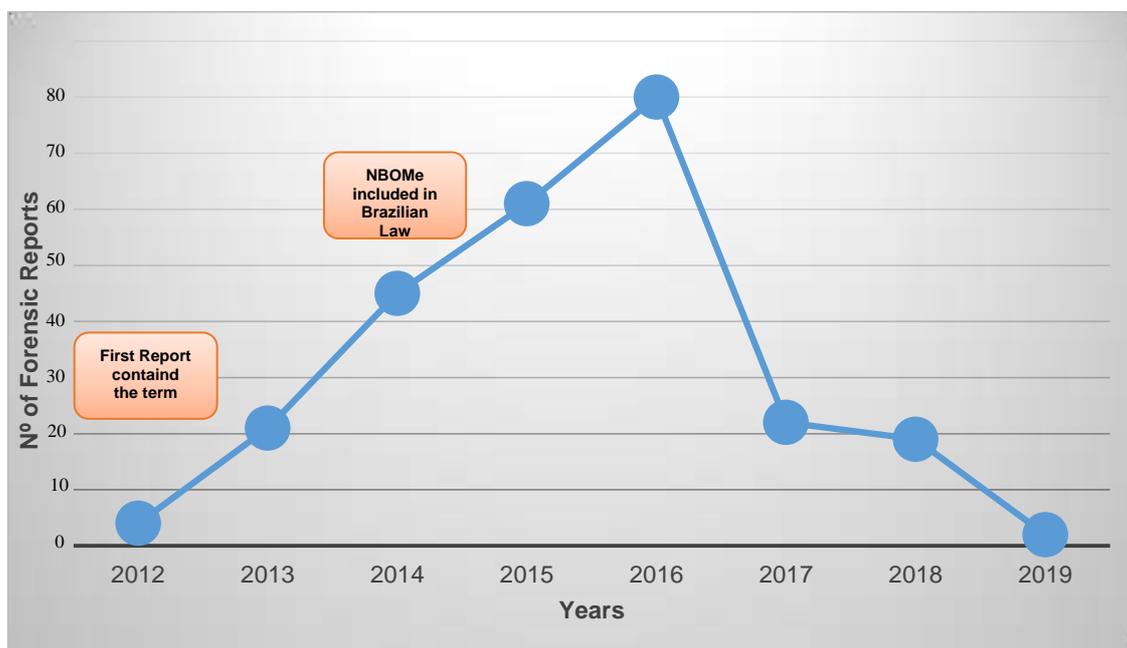
## 2. Material and methods

This is a retrospective study based on information from forensic analysis reports from seizures of BPF. The database used was the Criminology System of BFP, a national database of digitized expert reports produced by the forensic units of the Brazilian states. The forensic reports that containing the term “NBOMe” their salts and isomers, dated from 01 January 2012 to 31 July 2019 were accessed individually by FP intranet. Data were collected, grouped into spreadsheets, tabulated, analyzed and interpreted using Microsoft Excel<sup>®</sup>.

## 3. Results

The number of BFP forensic analysis reports containing the term NBOMe, their salts and isomers, over the past eight years (2012 to 2019) presented in the Criminology System of BFP is presented in Figure 1. The first time that this NPS was identified by BFP was in 2012, when the NBOMe seizures generated 4 forensic analysis expert requests (1.6%). Posteriorly, were identified 21 in 2013 (8.3%), 45 in 2014 (17.7%), 61 in 2015 (24.0%), 80 in 2016 (31.5%), 22 in 2017

(8.7%), 19 in 2018 (7.5%) and 2 in 2019 (0.8%), totaling 254 forensic analysis reports analyzed.



**Figure 1.** Number of NBOMe Brazilian Federal Police forensic analysis reports per year.

#### 4. Discussion

In order to control the substances marketed in Brazil, the Agência Nacional de Vigilância Sanitária (ANVISA) makes use of ANVISA ordinance nº 344 of 12 May 1998 of the Ministry of Health, approving technical regulation on substances and drugs subject to special control, and this is updated whenever the need arises to control new substances<sup>10</sup>. Concerning to NBOMe class, only at the beginning of 2014, through RDC nº 6 of February 18, 2014, ANVISA included the substance NBOMe, their salts and isomers on Psychotropic Substances List (List F2) List of Outcast Substance Use in Brazil, which are considered capable of causing physical or psychic dependence<sup>11</sup>. Thus, with the updating of legislation, this class of substances can be framed in the crimes defined in Law nº 11,343/06 that sets standards for repression of unauthorized production and illicit drug trafficking, defines crimes and other measures.

Data presented in this study demonstrated the NPS constant state of flux is the result of a cycle that reflects the actions of those involved in the production and repression of this type of drug. Therefore, it was possible to

observe in practice that this process can be characterized through the following steps: traffickers first create and manufacture NPS that are not yet under international control; the fact that this NPS is not yet legally considered a banned drug, cannot be characterized as a crime or drug trafficking; authorities seize such drugs, police identify such substances in their expert reports, communicating these new findings to regulatory and control trafficking enforcement agencies; after these substances are under international control list, they start to be classified as a drug, from the legal point of view; finally, traffickers stop producing the referred drug to invest in new ones that are not yet under international control, restarting this flux continuously.

From the data presented in Figure 1, it was possible to verify that the number of NBOMe BFP forensic analysis reports exponentially increased from the year 2012 to 2016, as well as occurred its decline, from 2017, reaching almost no reports in 2019, showing that the Brazilian NBOMe market is decreasing, corroborating with the NPS constant state of flux characterization. These substances often emerge quickly, just as they disappear, evidencing a clear attempt to circumvent the control trafficking enforcement agencies and the international community<sup>12</sup>.

Our results presented here are corroborated by another study from BFP, which in a 2018 synthetic-drug report showed the fall in number of phenylethamine seizures by FP. The drop in the number of phenylethamine seizures may be related to two factors: the return of LSD in seals as a hallucinogenic substance and preferential use of synthetic cathinones or classic drugs as stimulants. The first hypothesis formulated is based on the increase in the number of reports referring to LSD, almost twice as high as compared to 2017 and 2018, together with the decrease in the reports where substances of the NBOMe type were detected<sup>13</sup>.

Moreover, the most prominent phenylethamine in the period analyzed by 2018 synthetic drugs BFP report was the 25I-NBOH, the fifth most detected substance among all synthetic drugs, whose identification in the FP occurred for the first time in 2016. The substance represented 46.3% of the forensic reports produced in the group of phenylethamines in FP. The number of reports and seized material corroborate the hypothesis of substitution of substances

containing NBOMe by the NBOH group in illegal drug market<sup>13</sup>, evidencing the NPS constant state of flux.

In this context, Brazilian control trafficking enforcement agencies have been successful in combating drug trafficking related to this dangerous designer drug, considering the great decline in the number of NBOMe BFP reports in the recent years. This result agrees with the international community that had a degree of success in addressing NPS, evidenced by a decline within the number of NPS identified and reported for the primary time to UNODC<sup>12</sup>. Thus, evidence show that international community reacted during a timely manner to assess the harms caused by NPS contributing to the drug international control.

## **5. Conclusions**

This brief communication evaluated the number of NBOMe BFP forensic analysis reports over the past eight years. This NPS emerged quickly in Brazil from the year 2012, and tented to disappear in recent years, from the perspective of the Federal Police reports, evidencing the NPS constant state of flux, represented here by the Brazilian NBOMe case.

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## **Conflict of interest**

The authors declare that there have no conflicts of interest.

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