

**European Cities Network for Drugfree Societies -  
Baltic Spice Alert Project Conference #3:  
Synthetic opioids and cannabinoids – A challenge  
for the region?  
Stockholm City Hall, Sweden  
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***The world of NPS and overdose***

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## Overview

- Defining Novel Psychoactive Substances (NPS)
- How many NPS are there and what types?
- Defining NPS-related deaths
- Prevalence of use at different levels
- Patterns in European drug-induced deaths
- Data on NPS-related deaths from the EC-funded EU-MADNESS and EPS/NPS projected and UK unpublished and published data
- Differences between countries and what the future may hold
- Current and future work being undertaken by University of Hertfordshire
- References
- Acknowledgements



2



## Definitions of NPS

UNODC - [http://www.unodc.org/documents/scientific/NPS\\_2013\\_SMART.pdf](http://www.unodc.org/documents/scientific/NPS_2013_SMART.pdf)

The challenge of new psychoactive substances : A Report from the Global SMART Programme  
March 2013, Vienna: United Nations Office on Drugs and Crime

NPS – “New psychoactive substances are substances of abuse, either in a pure form or a preparation, that are not controlled by the 1961 Single Convention on Narcotic Drugs or the 1971 Convention on Psychotropic Substances, but which may pose a public health threat. In this context, the term ‘new’ does not necessarily refer to new inventions but to substances that have been recently become available.”

EMCDDA-Europol 2013 Annual Report on the implementation of Council Decision 2005/387/JHA, EMCDDA, Lisbon, July 2014 [http://www.emcdda.europa.eu/attachements.cfm/att\\_229598\\_EN\\_TDAN14001ENN.pdf](http://www.emcdda.europa.eu/attachements.cfm/att_229598_EN_TDAN14001ENN.pdf)

A new psychoactive substance is defined as “a new narcotic or psychotropic drug, in pure form or in preparation, that is not controlled by the United Nations drug conventions, but which may pose a public health threat comparable to that posed by substances listed in these conventions”.

Advisory Council on the Misuse of Drugs (ACMD: Consideration of the Novel Psychoactive Substances (‘Legal Highs’)

October 2011.

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/119139/acmdnps2011.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/119139/acmdnps2011.pdf)

“Psychoactive drugs which are not prohibited by the United Nations Single Convention on Narcotic Drugs or by the Misuse of Drugs Act 1971, and which people in the UK are seeking for intoxicant use.”



## Numbers of NPS

Over the last decade, the 'traditional' drug scene has been supplemented – but not replaced – by the emergence of a series of psychoactive substances which are either newly created or existing drugs (including medications) which are now being used in novel ways.

These are referred to as 'new/novel psychoactive substances' (NPS). Commonly, the term 'legal high' has been used to describe such substances. However, this is misleading since often these molecules are already subject to regulation and, moreover, because they are 'legal' they are incorrectly assumed to be safe.

The speed with which NPS emerge onto the drug market(s) has been accelerating over this period.

The United Nations Office for Drugs and Crime (UNODC) suggests that between 2009 and 2014 the number of NPS reported increased from 126 to 450. By the end of 2015, 644 substances had been reported by 102 countries through the global Synthetics Monitoring: Analysis, Reporting and Trends (SMART) programme (UNODC, 2016a).

Data from the European Centre for Drugs and Drug Addiction (EMCDDA) provides a more complete assessment of these trends. The agency has been systematically monitoring NPS since 2005. Their latest report (EMCDDA, 2016) shows that of the 98 NPS notified during 2015, 26 were cathinones and 24 synthetic cannabinoids; these together with phenethylamines account for the largest number of NPS (see Table 1). By 1 October 2016 the number of NPS notified to the agency was 615. Of these, 169 were synthetic cannabinoids, 114 were synthetic cathinones; 22 were synthetic opioids and 18 were benzodiazepines. So far in 2016, 4 new benzodiazepines have been reported, together with 6 opioids, 8 cannabinoids and 11 cathinones.



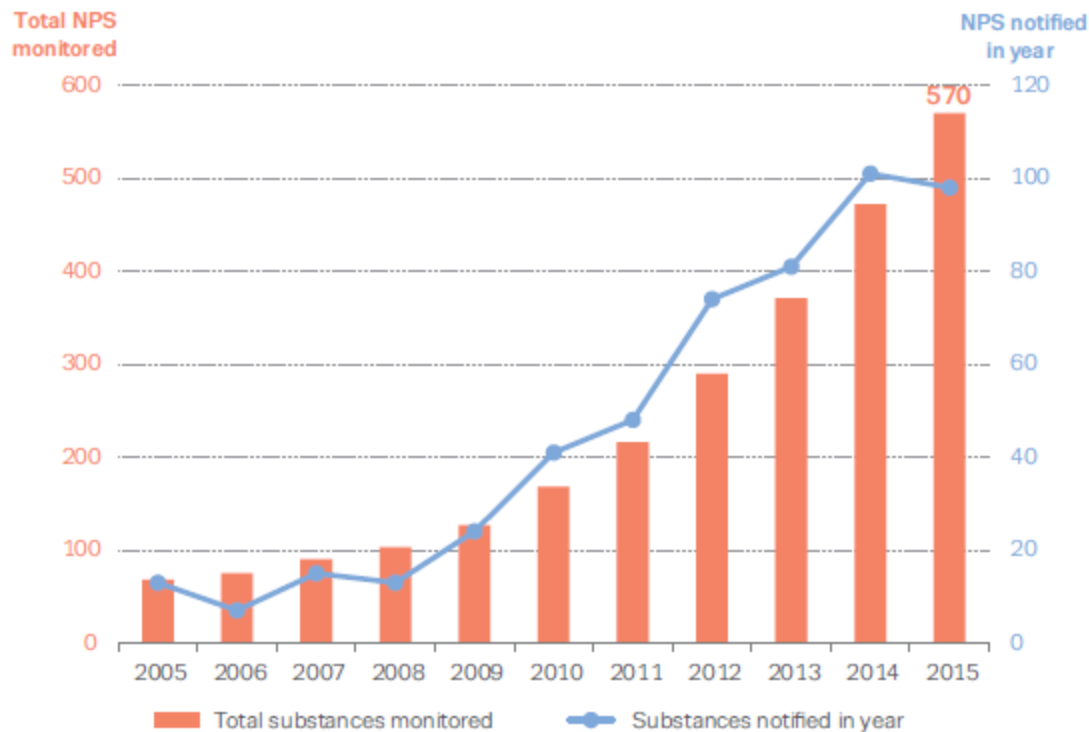
**Table 1: Number of NPS first notified to the EMCDDA, by group, 2005-2015**

Group	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total @ 31 December 2015
Aminoindanes			2			1	1		1			5
Arylalkylamines		1	3			3	5	5	7	4	4	32
Arylcyclohexylamines	1	1				2	1	3	1		2	11
Benzodiazepines							2	1	2	4	5	14
Cathinones	1			9	5	14	7	3	7	31	26	103
Indolalkylamines (e.g. Tryptamines)	6	2	3	9	2	1		4	1	5	3	36
Opioids					1			3	6	4	4	18
Other substances	1	1		2	3	3	4	8	13	14	12	61
Phenethylamines	9	3	4	6	8	3	5	15	14	9	9	85
Piperidines & pyrrolidines			1		1		3		1		6	12
Piperazine derivatives	2	4	2	3	1			1	1		3	17
Plants & extracts				5	2	1						8
Synthetic cannabinoids				2	6	11	24	31	32	30	24	150
Total	14	7	15	13	24	41	49	74	81	101	98	562



# The EU EARLY WARNING SYSTEM – increase of the number and diversity of new drugs

Number of NPS formally notified for the first time each year (line, right axis) and total number of NPS monitored by the EU Early Warning System (bars, left axis) (2005–15)

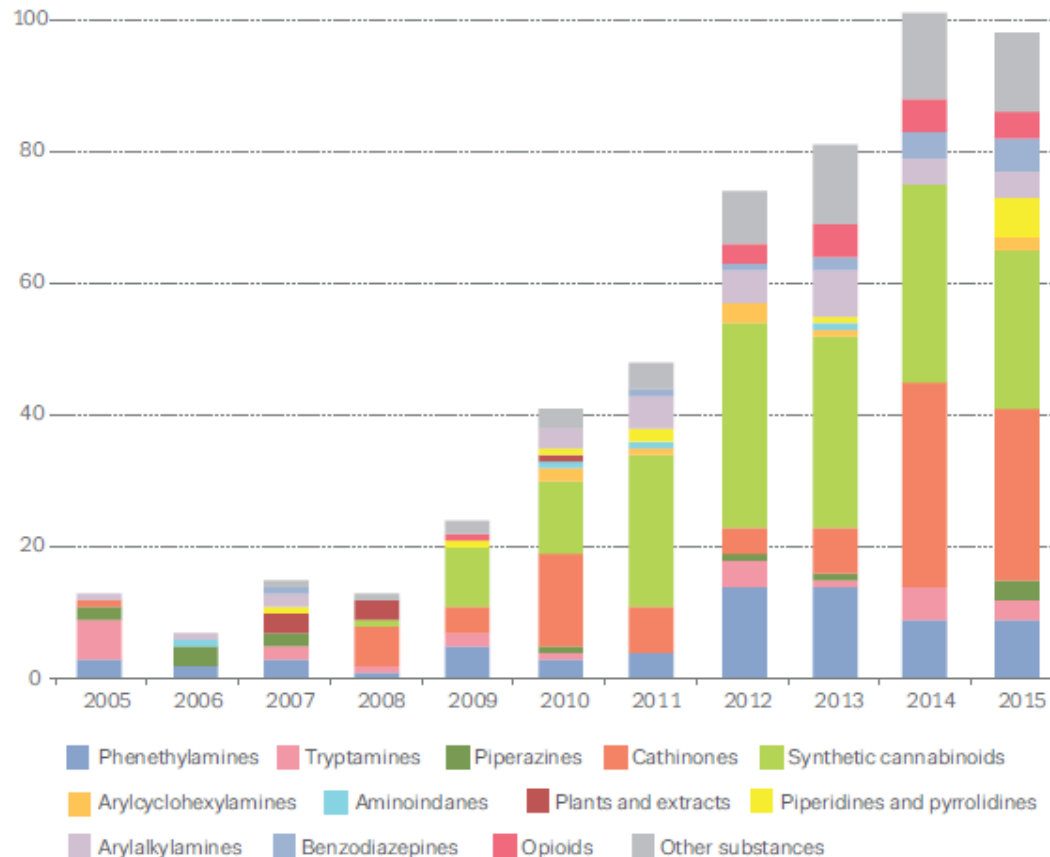


Source: EMCDDA, reproduced with permission



# The EU EARLY WARNING SYSTEM – increase of the number and diversity of new drugs

Number of new psychoactive substances notified for the first time to the EU Early Warning System by category (2005–15)



Source: EMCDDA, reproduced with permission



## 2015 overview OF EMCDDA activities

- 98 new substances notified for the first time
- 17 public health-related alerts were issued by the EMCDDA to the EU EWS Network
- 2 Joint Reports were prepared by the EMCDDA and Europol:
  - 1  $\alpha$ -PVP (1-phenyl-2-(1-pyrrolidinyl)-1-pentanone) a potent psychostimulant used by 'recreational' drug users, and by those who inject stimulants and opioids;
  - 1 acetylfentanyl (N-phenyl-N-[1-(2-phenylethyl)piperidin-4-yl]acetamide)
  - a synthetic opioid associated with an outbreak of acute intoxications in 2015;
- Risk assessment on  $\alpha$ -PVP was conducted by the Scientific Committee of the EMCDDA
- > 560 new psychoactive substances are now routinely monitored by the EU EWS; close to 600 reporting forms were submitted by national early warning correspondents to the EMCDDA.

Source: EMCDDA, reproduced with permission





## 2015 overview OF EMCDDA activities

The public health-related alerts issued by the EMCDDA have addressed public health concerns of diverse nature:

- deaths associated with the use of potent opioids (deaths associated with oxycodone and acetylfentanyl);
- clusters and outbreaks of intoxications associated with synthetic cannabinoids (alerts on ADB-CHMINACA, ADB-FUBINACA, MDMB-CHMICA and herbal smoking mixtures sold as 'Mocarz');
- seizures of 'ecstasy' tablets containing 4-CMA, which has been linked to neurotoxicity;
- infections among those who inject drugs, including those who inject NPS (alerts on wound botulism and soft tissue infections);
- and deaths associated with PMMA sold as ecstasy and heroin sold as cocaine.

Source: EMCDDA, reproduced with permission



## Prevalence of NPS

At the international level there is limited information on the prevalence of NPS, especially over time, and the variety of definitions and ways of measuring use means that it is difficult to make comparisons over time and between countries (UNODC, 2016b). Country level data are available (<https://data.unodc.org/>). These indicate that lifetime use of synthetic cannabinoids in Europe ranges from 0.5% of 15-64 year olds in Spain to 13.2% of 15-16 year-olds in Latvia.

The most recent Eurobarometer report looking at the use of 'new substances' in Europe reported that on average 3% (range 0-5%) of 15-24 year-olds had used such substances in the previous 12 months (European Commission, 2014). Most got them from a friend (68%), drug dealer (27%), 'head'/'smart' shop (10%) and only 3% from the Internet. The majority of these 'legal highs' were taken at a party or event (65%), with friends (60%), whilst 15% used them when they were alone.

The ESPAD survey for 2015, covering 35 European countries, found that average of lifetime experience with NPS was 4% , with the highest rates in Estonia and Poland (10 % each), and the lowest in Belgium (Flanders), Denmark, Finland, Norway and Portugal, with rates of 1%. The average prevalence of lifetime use was 5% among boys and 4 among girls (ESPAD Group, 2016).

The Crime Survey for England and Wales 2015/6 (Lader, 2016) indicates that 244,000 adults (0.7% of the population aged 16-59) reported the use of NPS. Among young adults (ages 16-24), the prevalence of NPS use was much higher (2.6%), the majority of the users being young men. Herbal smoking mixtures were the most commonly used form of NPS, with 52% of those aged 16-59 reporting their use the last time they had used an NPS. NPS were most commonly obtained from a friend, neighbour or colleague (35%). Other common sources were shops (25%), known dealers (9%), or the Internet (8%).

In Scotland lifetime use of NPS in 2015 by school students aged 15 was 5%, last month use being 2%. 13% had been offered NPS. 27% of those who had used drugs in the last month thought it was alright to take legal highs, compared to 10% who hadn't used drugs (Black et al., 2016).



## Defining NPS-related deaths

- The EMCDDA focuses on deaths directly related to drug use with the following case definition: ‘a death happening shortly after consumption of one or more illicit psychoactive drugs, and directly related to this consumption’. Often these deaths are referred to as ‘overdoses’, or ‘poisonings’ or ‘drug-induced deaths’. From 2008 they started using the latter term, i.e. ‘drug-induced deaths’ (EMCDDA, 2009).
- Here the focus is on cases where “the underlying cause of death was mental and behavioural disorders due to psychoactive substance use (harmful use, dependence, and other mental and behavioural disorders - F-codes) due to a number of drugs of abuse, or the underlying cause of death was poisoning (accidental, intentional or of undetermined intent - X- and Y-codes) due to a number of drugs of abuse” (EMCDDA, 2009:10).
- As a consequence, other fatalities associated with drug use are not typically taken into consideration in headline statistics (Corkery, 2008).
- In terms of applying this approach to NPS, it means that indirect NPS are going to be missed from the head-line indicators not only in terms of the EMCDDA DRD Standard but also national DRD definitions (drug misuse) as well as its wider ‘drug poisoning’ one, and thus will not contribute to the total burden of mortality at a population level.

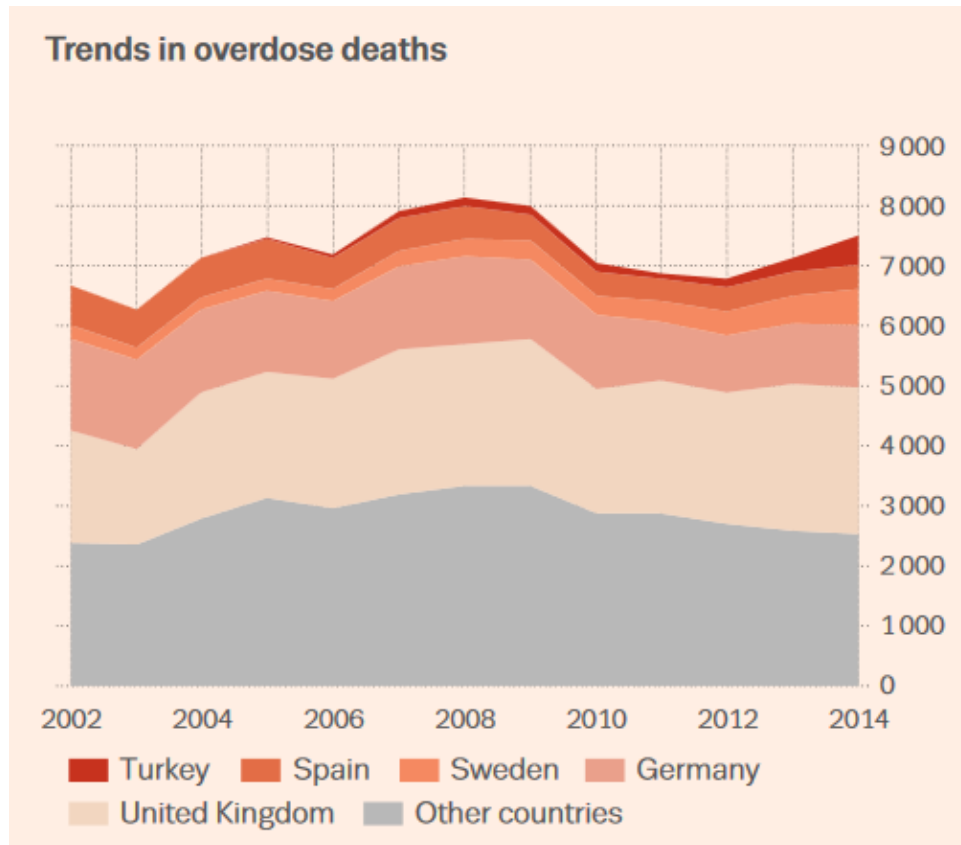


## Defining NPS-related deaths

- The types of NPS deaths unlikely to be caught by the 'drug-induced' approach are:
- Infections caused by injecting cathinones and other classes of drugs e.g. HIV/AIDS, hepatitis, clostridium novyi, anthrax, septicaemia, necrotizing fasciitis, etc.
- Road traffic and other accidents, fall from heights, drownings, hypothermia, etc. where the perception or assessment of risk/speed is impaired and/or reaction times slowed.
- Some deaths could be indirectly attributed to drugs through violence, e.g. acquisitive crime, organised crime, homicide.
- Due to the differences in defining NPS, there are no commonly agreed definitions of NPS-related fatalities. This means it is impossible to make internal UK comparisons let alone international ones, unless one has access to the details of each potential NPS case and are able to collate data according to a study protocol.



## EU trends in Drug-induced Deaths

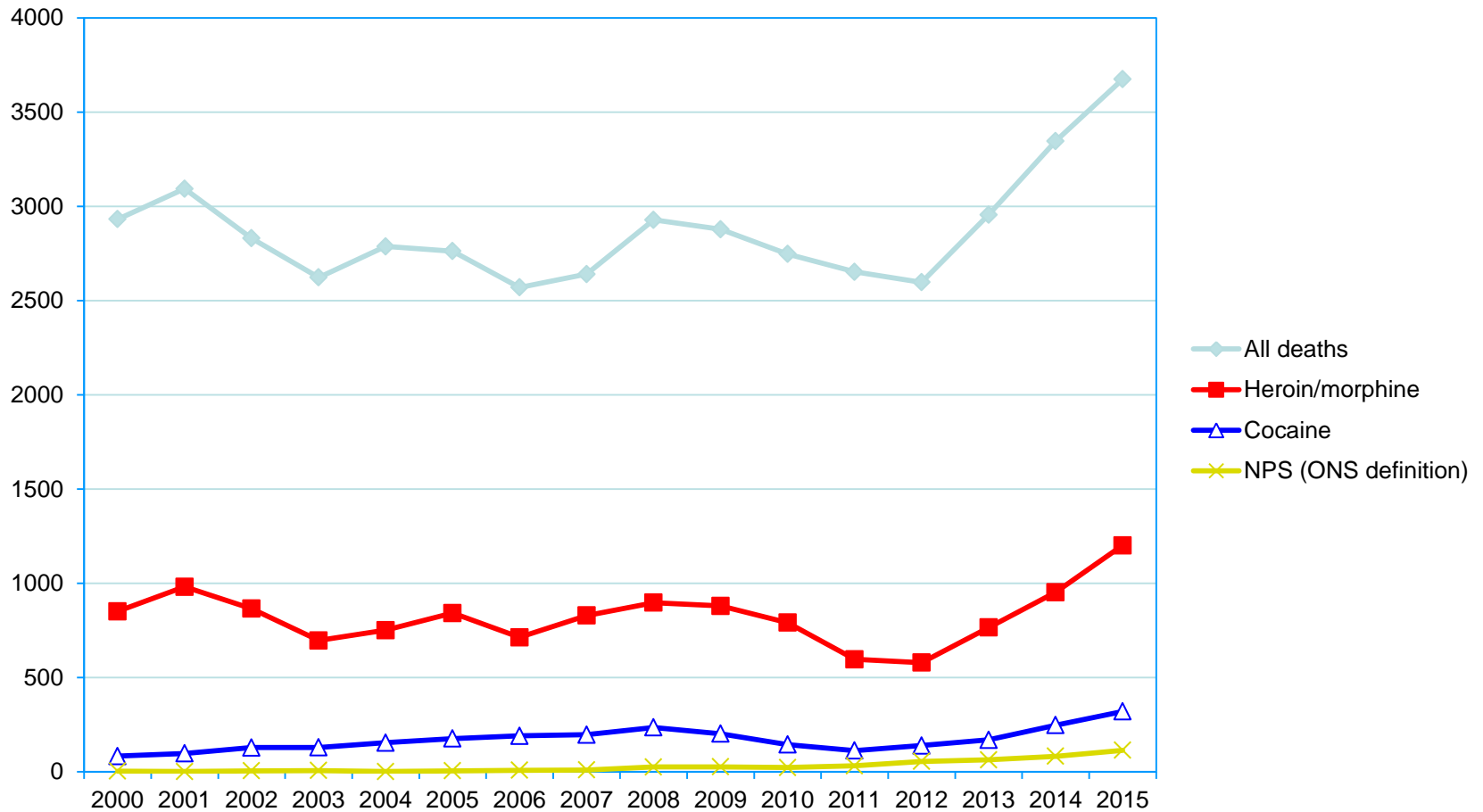


Source: EMCDDA, reproduced with permission

These deaths, based on the EMCDDA DRD-standard, are mostly opiate ones. The UK contributes significantly to the overall total.



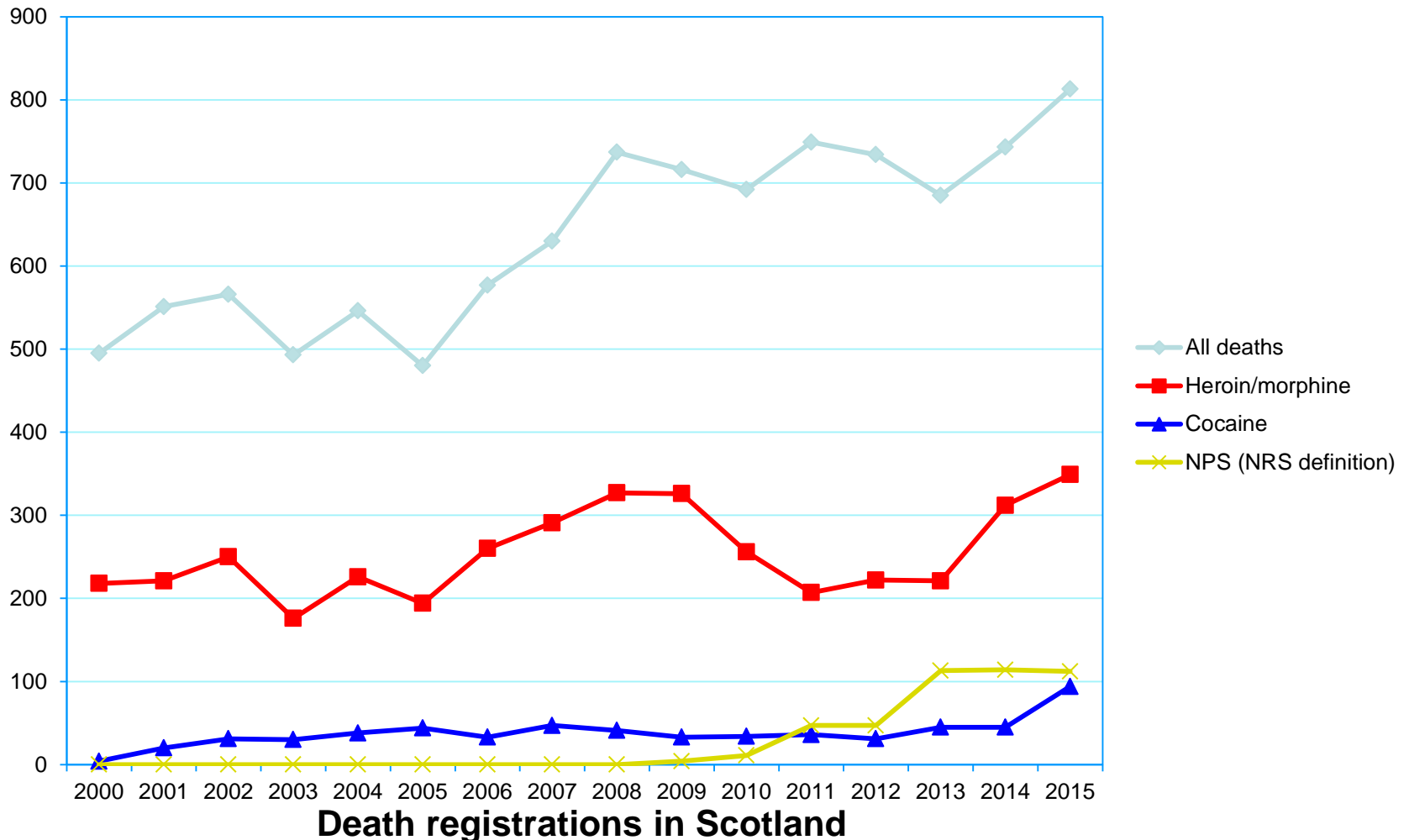
# Data on NPS-related deaths from the UK and EC-funded projects



**Death registrations in England & Wales**  
**Source: Office for National Statistics (ONS, 2016)**



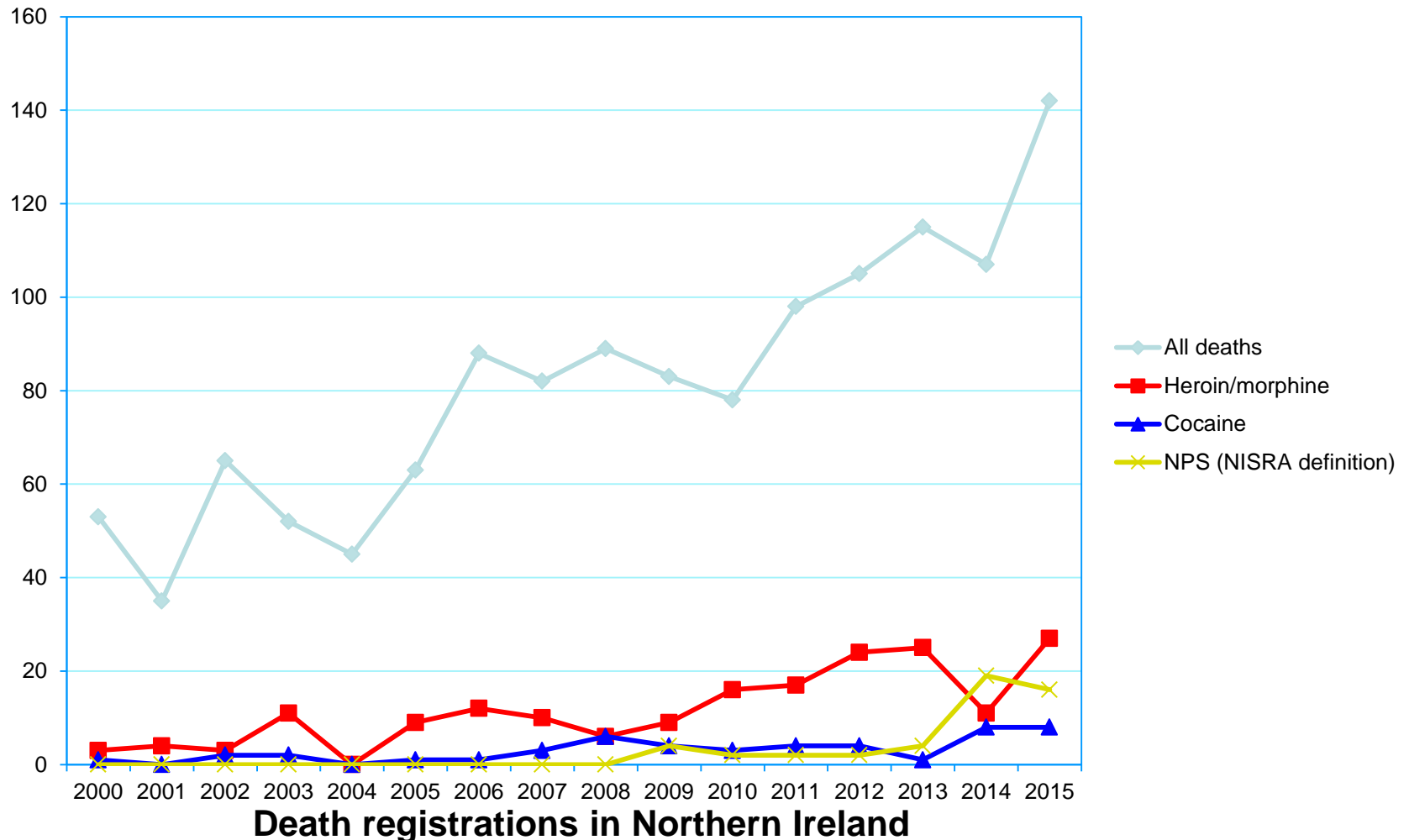
# Data on NPS-related deaths from the UK and EC-funded projects



Source: National Records of Scotland (NRS, 2016)



## Data on NPS-related deaths from the UK and EC-funded projects

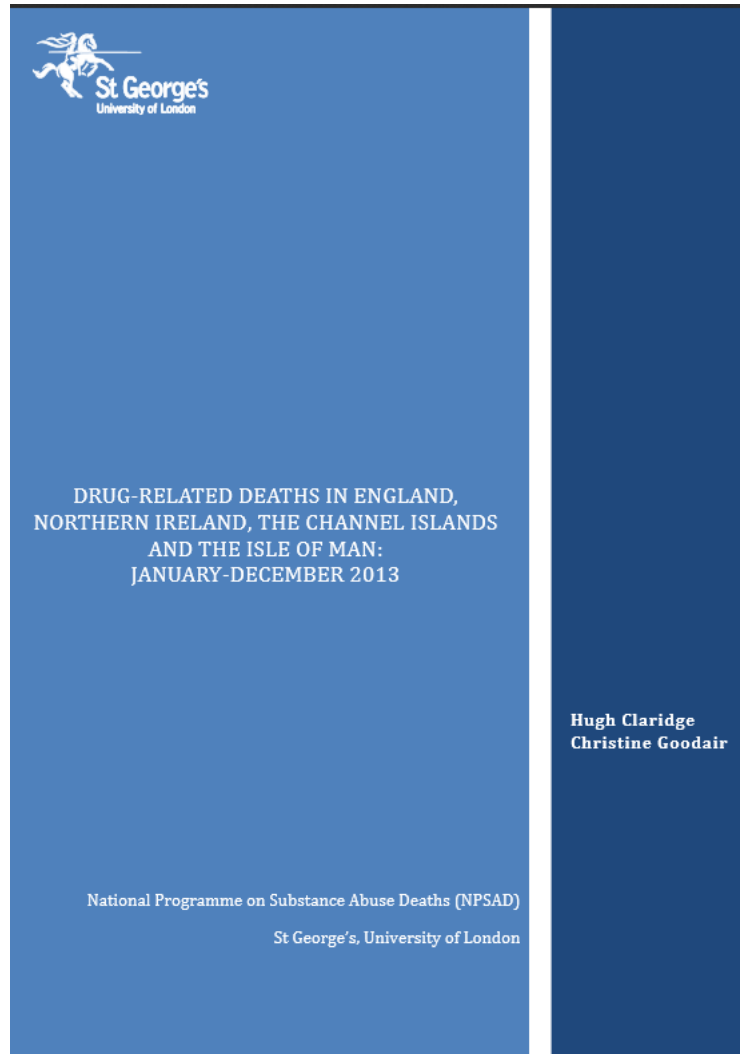


Source: Northern Ireland Statistics & Research Agency (NISRA, 2016)





# Trends in NPS deaths reported to NPSAD



# Trends in NPS deaths REPORTED TO NPSAD

**Table M: Novel Psychoactive Substance-related deaths, England, Northern Ireland and the Islands, 2009 to 2013**

		Year of death					Five year total
		2009	2010	2011	2012	2013	
<b>At post mortem</b>	<b>England</b>	22	44	40	60	60	<b>226</b>
	<b>Northern Ireland</b>	3	15	4	4	18	<b>44</b>
	<b>Guernsey, Jersey and the Isle of Man</b>	1	1	2	1	1	<b>6</b>
	<b>TOTAL</b>	<b>26</b>	<b>60</b>	<b>46</b>	<b>65</b>	<b>79</b>	<b>276</b>

		Year of death					Five year total
		2009	2010	2011	2012	2013	
<b>Implicated</b>	<b>England</b>	11	27	28	46	43	<b>155</b>
	<b>Northern Ireland</b>	3	7	3	3	15	<b>31</b>
	<b>Guernsey, Jersey and the Isle of Man</b>	0	0	2	1	1	<b>4</b>
	<b>TOTAL</b>	<b>14</b>	<b>34</b>	<b>33</b>	<b>50</b>	<b>59</b>	<b>190</b>

<http://www.sgul.ac.uk/research/population-health/our-projects/national-programme-on-substance-abuse-deaths>

# Data on NPS-related deaths from the UK and EC-funded projects

Published & unpublished data

Synthetic cathinones							
Country; data source	2010	2011	2012	2013	2014	2015	2016 Q1 & Q2
England & Wales; ONS	6	6	18	26	27	49	NA
Scotland, NRS; EU-MADNESS	8	4	2	4	6	6	0
Northern Ireland, NISRA; EU-MADNESS	1	3	2	3	8	8	NA
NPSAD; EU-MADNESS	33	25	26	24	6	1	NA
Hungary; EU-MADNESS	NA	NA	NA	NA	23	11	NA



# Data on NPS-related deaths from the UK and EC-funded projects

Published & unpublished data

Synthetic opioids							
Country; data source	2010	2011	2012	2013	2014	2015	2016 Q1 & Q2
England & Wales; ONS	0	0	0	0	4	2	NA
Scotland, NRS; EU-MADNESS	0	0	0	0	1	0	0
Northern Ireland, NISRA; EU-MADNESS	0	0	0	0	0	1	NA
NPSAD; EU-MADNESS	0	0	0	3	1	0	0
Hungary; EU-MADNESS	NA	NA	NA	NA	0	0	NA



# Data on NPS-related deaths from the UK and EC-funded projects

Published & unpublished data

Synthetic cannabinoids							
Country; data source	2010	2011	2012	2013	2014	2015	2016 Q1 & Q2
England & Wales; ONS	0	0	1	0	2	8	NA
Scotland, NRS; EU-MADNESS	0	0	0	0	1	0	0
Northern Ireland, NISRA; EU-MADNESS	0	0	0	0	0	1	NA
NPSAD; EU-MADNESS	0	0	1	3	6	0	NA
Hungary; EU-MADNESS	NA	NA	NA	NA	11	2	NA



## Data on NPS-related deaths from the UK and EC-funded projects

Published & unpublished data

PMMA/PMA							
Country; data source	2010	2011	2012	2013	2014	2015	2016 Q1 & Q2
England & Wales; ONS	0	1	20	29	24	10	NA
Scotland, NRS; EU-MADNESS	0	6	0	11	1	3	0
Northern Ireland, NISRA; EU-MADNESS	0	0	1	1	4	2	NA
NPSAD; EU-MADNESS	0	6	25	28	6	0	NA
Hungary; EU-MADNESS	NA	NA	NA	NA	0	0	NA
Italy; EU-MADNESS	NA	NA	NA	NA	1	NA	NA



# Data on NPS-related deaths from the UK and EC-funded projects

Published & unpublished data

Methylthienylpropamine (MPA)							
Country; data source	2010	2011	2012	2013	2014	2015	2016 Q1 & Q2
England & Wales; ONS	0	0	2	4	7	6	NA
Scotland, NRS; EU-MADNESS	0	0	2	2	5	4	0
Northern Ireland, NISRA; EU-MADNESS	0	0	0	0	0	0	NA
NPSAD; EU-MADNESS	0	0	4	5	8	1	NA
Hungary; EU-MADNESS	NA	NA	NA	NA	0	0	NA



# Data on NPS-related deaths from the UK and EC-funded projects

Published & unpublished data

Benzodiazepine analogues							
Country; data source	2010	2011	2012	2013	2014	2015	2016 Q1 & Q2
England & Wales; ONS	0	2	4	3	14	11	NA
Scotland, NRS; EU-MADNESS	0	14	21	43	49	61	<b>61</b>
Northern Ireland, NISRA; EU-MADNESS	0	0	0	1	2	1	NA
NPSAD; EU-MADNESS	0	8	16	6	4	1	NA
Hungary; EU-MADNESS	NA	NA	NA	NA	0	0	NA





# Differences between countries and what the future may hold

Published & unpublished data

Selected molecules				
Molecule, country; data source	2013	2014	2015	2016 Q1 & Q2
4,4'-DMAR, Northern Ireland, NISRA; EU-MADNESS	0	14	2	NA
Ethylphenidate, Scotland, NRS; EU-MADNESS	1	7	5	0
Ethylphenidate, NPSAD; EU-MADNESS	0	11	5	NA
Diclazepam, Scotland, NRS; EU-MADNESS	1	6	9	<b>22</b>
Etizolam, Scotland, NRS; EU-MADNESS	8	39	47	<b>46</b>
Pentedrone, Hungary; EU-MADNESS	NA	8	4	NA
Alpha-PVP & analogues, Hungary; EU-MADNESS	NA	16	9	NA



## ***Selected current concerns***

- The increasing number of synthetic cannabinoids (especially 5F-MDMB-PINACA & MDMB-CHMICA) and synthetic cathinones (especially  $\alpha$ -PVP & analogues).
- There are currently concerns about the recent growth in use of ‘Designer Benzos’ such as Etizolam, Diclazepam, Flubromazepam and Pyrazolam, especially in parts of Scotland.
- The appearance of very potent synthetic opioids e.g. acetyl fentanyl, acroyloyl fentanyl, carfentanil, furanyl fentanyl and other related fentanyls, failed medications such as U47700 & MT-45 as well as the kratom plant. The latter contains the alkaloid mitragynine and its main metabolite 7-hydroxymitragynine. These bind to the  $\mu$ - and  $\delta$ -opioid receptors, causing an opioid-like effect at high doses and a stimulant-like effect at low doses .
- Use of amphetamine-type substances such as Methiopropamine (MPA), and the continuing presence of PMMA/PMA.
- Injecting of synthetic cathinones such mephedrone, MDPV, and  $\alpha$ -PVP, and methylphenidate analogues especially ethylphenidate.
- Injecting drugs carries public health risks of bacterial infections (e.g. wound botulism) and transmission of blood-borne viruses such as human immunodeficiency virus (HIV), hepatitis C virus and hepatitis B virus. Injecting of mephedrone within the male homosexual (MSM) community is also increasing in cities like London, facilitating the transmission of STIs. Soft tissue infections and mechanical obstructions can also occur from injecting drugs.



# An example of work coming out from EU-MADNESS

We are preparing materials for fact-sheets on specific molecules or chemical groups aimed at health and other professionals. For example, in regard to the desired effects of selected synthetic cathinones:-

Effect	Molecule		
	$\alpha$ -PVP	MDPV	Mephedrone
(Psycho-) Stimulant	“To get high” (EMCDDA, 2015b)	Increased alertness & awareness, increased wakefulness & arousal, perception of reduced need of food and sleep, increased concentration and capacity to work and study (Coppola & Mondola, 2012)	Psychostimulant (Schifano et al., 2011)
Entactogenic	Socialise/bond with others (EMCDDA, 2015b)	Increased sociability, mild empathogenic effects (Coppola & Mondola, 2012)	Empathy/feelings of closeness, sociability and talkativeness (Schifano et al., 2011)
Euphoria	(EMCDDA, 2015b)	Limited euphoria (Coppola & Mondola, 2012)	Euphoria (Kehr et al., 2011; Schifano et al., 2011); elevated mood (Kehr et al., 2011)
Sexual stimulation	Increased libido (EMCDDA, 2015b)	Increase sexual performance (Coppola & Mondola, 2012)	Sexual arousal (Kehr et al., 2011; Schifano et al., 2011)
Sensory experiences			Intensification of sensory experiences (Schifano et al., 2011)
Perceptual distortions			At higher doses (Schifano et al., 2011)

## ***Future work***

**We are also preparing fact-sheets for the EPS/NPS project aimed at law-enforcement agencies, forensic providers, etc.**

**Get more details of the NPS cases reported in media and conference abstracts.**

**Submit papers based on these cases to peer-reviewed journals.**

**Use networks and contacts to see if there are any other cases known but not reported in the media and literature, and encourage researchers to write them up.**



28



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29



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30



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31



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Acknowledgements go to EU-MADNESS and EPS/NPS partners and colleagues for provision of some of the data presented here.

The presenter would like to thank our hosts and organisers for their warm and gracious invitation to attend and speak at this prestigious conference.

You, the audience for listening attentively!

AND FINALLY OUR FUNDERS ...



32





# EU-MADNESS & EPS-NPS



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<http://www.eumadness.eu/>

and

Cross border law enforcement cooperation in the field of drug trafficking -  
DG Justice/DG Migrations and Home Affairs  
(JUST/2013/ISEC/DRUGS/AG/6429) *Project EPS/NPS* (Enhancing  
Police Skills concerning Novel Psychoactive Substances; NPS).  
<http://www.npsproject.eu/>



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34

