



NPS Here today, dead tomorrow?

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Outline

- o Introduction to New Psychoactive Substances (NPS)
- o Different classes of NPS
- o Key players
- o Key issues
- o NPS in WA
- o Laboratory challenges
- o Legislation
- o A couple of case examples
- o Summary

Introduction to NPS

What are new psychoactive substances (NPS)?

UNODC definition:

“substances of abuse, either in a pure form or a preparation, which 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. The term ‘new’ does not necessarily refer to new inventions but to substances that have recently become available”

Introduction to NPS

- o Many NPS are designed to mimic the effects of traditional illicit drugs, such as cannabis, cocaine, ecstasy and LSD
- o Designed to bypass legislation

Types of substances included in UNODC NPS classification

1. Synthetic cathinones
2. Synthetic cannabinoids
3. Phenethylamines
4. Piperazines
5. Ketamine
6. Plant-based psychoactive substances: (i) kratom, (ii) Salvia divinorum, (iii) khat
7. Other substances



Key players



1. Synthetic cathinones:
 - “BATH SALTS”
 - i.e. mephedrone (“MCAT”, “meow meow”)
 - Stimulant effects similar to cocaine or methamphetamine
 - Worldwide no. 3 prevalence in 2014; UK +
 - Many reported side effects, including **bizarre behaviour**, excited delirium, hallucinations, increased suicide



Key players



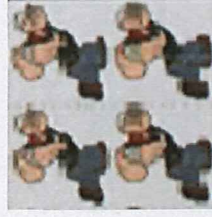
2. Synthetic cannabinoids (syn cannas):

- “Spice”, “Kronic”, “K2”
- Easy to obtain, no. 1 prevalence worldwide
- Cannabis and THC internationally controlled, but only few syn cannas
- The challenge of diversity; not detected on conventional drug screens
- More potent than THC
- Associations: heart attacks in otherwise healthy young people, increased psychosis, resp problems, liver and kidney failure, sudden death

Key Players

3. Phenethylamines:

- Include many NPS: PMMA, Bromo-DragonFLY, 2C-X compounds, **NBOMe** compounds
- Also include illicit/controlled drugs: (meth)amphetamine, methylphenidate (Ritalin®), MDMA (Ecstasy), mescaline
- Worldwide no. 2 prevalence in 2014



A quick comparison

	Synthetic Cathinones	Synthetic Cannabinoids
First emergence	2006	2004
Mode of action	Inhibit reuptake of serotonin, dopamine, NA	Agonists at CB1 and CB2 receptors
Active dosage	Mephedrone 150-250mg, MDPV 5-20mg	Unknown
Usual ROA	Nasal insufflation, oral ingestion	Smoking, vaporisation, ingestion
Common/severe side effects	Erratic behaviour, paranoia, aggression ↑HR, HTN, myocarditis, MI	↑HR, ↑temp, N&V, myocardi isch, MI, AKI lowered seizure threshold/psychosis
Deaths reported; circumstances	YES; suicide, sudden, homicide	YES; accidental (MVC), sudden
Tox data	Some, AM and PM data; fatal ranges reported for mephedrone	Limited, some PM data; toxic/fatal levels not known
Routine tox screening	May cross-react with methamphetamine immunoassay	Not detected
Detection/Quantification	Possible, GC-MS, LC-MS/MS	Possible, GC-MS, LC-MS/MS
Compounds most assoc with toxicity/fatalities	MDPV, mephedrone	5F-PB-22, JWH-018, AM-2201

Recent trends

- o Increased **injecting use of NPS**, particularly synthetic cathinones – resultant increasing rate of HIV infection (mostly Europe)
- o Emergence of substances not belonging to any of the major groups identified in previous years, i.e. **synthetic opioids** (mostly fentanyl derivatives)
- o **Surge in syn cann use in prisons** (England and Wales)
 - mental/physical health problems & altered behaviour

General issues with NPS

- o *Ongoing increasing emergence* – UNODC WDR 2016 states number of NPS reported between 2008 and 2015 is **644**, with never seen NPS being reported
- o *Diversity* – huge number of different substances, including amongst the same class (i.e. syn cannas)
- o *Regulation* - difficult to control as NPS market constantly and rapidly changing; occult sale and purchase

Public health issues

- Effects of NPS use on human body not yet fully understood – safety data regarding toxicity lacking and long-term side effects unknown
- Unknown ingestion of NPS – sold as known illicit drugs
- Risk of mixtures of NPS – i.e. NPS with known illicit drugs, mixtures of NPS from same NPS group (syn cans esp), mixtures of substances from different NPS groups

Prevention strategies?

Education

Example:

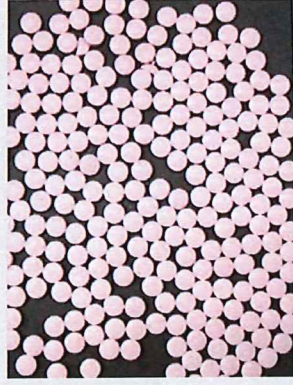
- o US has highest prevalence of syn cans use
- o US seeing declining use of syn cans among secondary school students, associated with an increase in the PERCEIVED RISK of taking these substances

Toxicology Challenges

- o Rapid emergence and rate of change of NPS
- o Limited analytical information and difficulty in sourcing certified reference standards
- o Costly investment
- o Different jurisdictional approaches
- o Stability of NPS
- o Metabolism
- o Interpretation of drug concentrations

Toxicology challenges

- Some have a reported short “shelf-life”, for example synthetic cannabinoids have a reported “shelf-life” of ~3 years.
- Challenge to keep analytical methodology abreast of the market.

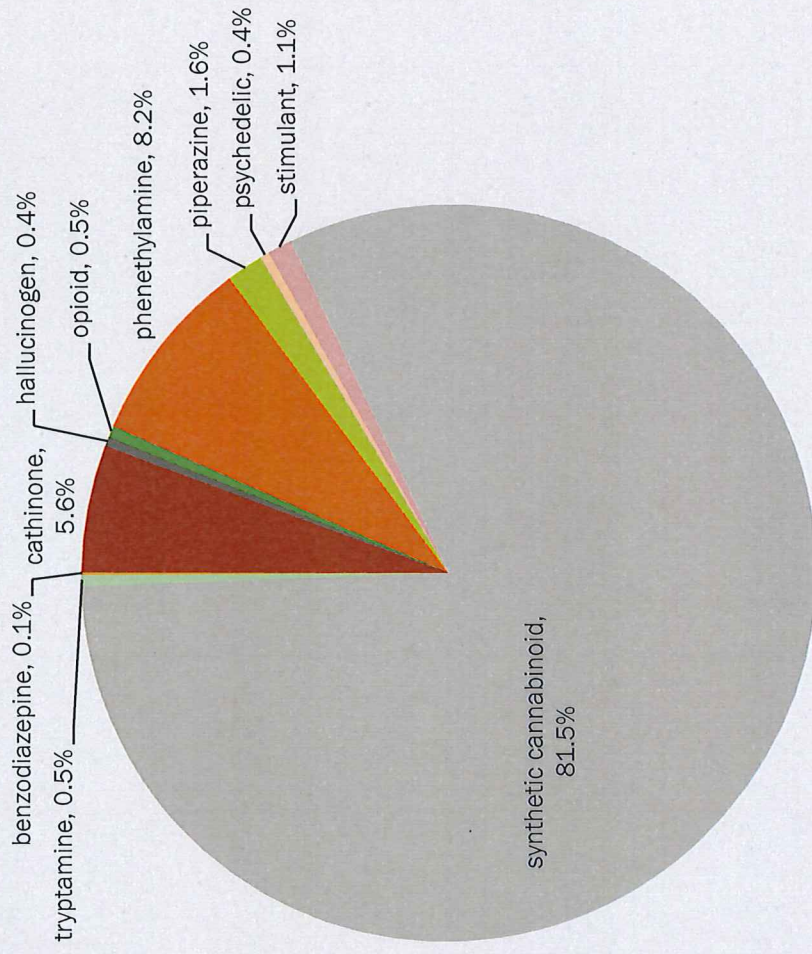


A Closer Look at NPS

According to UNODC Global SMART, the proportion of all NPS detections 2008 to 2015, categorised by pharmacological effect are:

o Synthetic cannabinoids	35%
o Stimulants	35%
o Classic hallucinogens	18%
o Dissociatives	3%
o Sedatives / hypnotics	2%
o Opioids	2%
o Not yet assigned	5%

WA Illicit Drug NPS Data



WA Toxicology NPS Data

NPS Detections in Forensic Toxicology Casework 2011 to 2016

