

Four Words & an Acronym

James Hall

**Center for Applied Research on Substance Use
and Health Disparities**

Nova Southeastern University

United Way of Broward Commission on Substance Abuse

Dangerous, Imitation, Emerging Drugs (DIED)

Fake Drugs; Real Poisons



Drugs



- Not “spice,” “bath salts,” nor “incense”
- Psychoactive Substances
- Change the Brain’s Functions
- Complex Chemistry
- Complicated Neuropharmacology
- The Menu

Phenethylamines

Related to: phenethylamine

2C-x

Related to: mescaline

2C-B 2C-D
2C-I 2C-P
2C-E 2C-T-x

2C-B-FLY

Psychedelic amphetamines (DOx)

Related to: 2C-x, amphetamine

DOB DOM
DOC DON
DOI DOET

Bromo-DragonFLY

β -ketones

Related to: cathinone,
MDMA, amphetamine

Mephedrone Butylone
Methylone Flephedrone
Methedrone MDPV
Naphthylpyrovalerone

Cyclized amphetamines

Related to: MDMA,
amphetamine

2-AI 2-AT
MDAI MDAT
MDMAI MDMAT
MMAI

Ergolines

Related to: LSD, LSA

PRO-LAD
ETH-LAD

Tryptamines

Related to: psilocin, DMT, serotonin

5'-substituted

Related to: psilocin, serotonin

5-MeO-DMT 5-MeO-DALT
5-MeO-MIPT 5-MeO-MET
5-MeO-DIPT 5-MeO-DPT

5-MeO-AMT
5-MeO-AET

4'-substituted

Related to: psilocin

4-AcO-DMT 4-HO-DPT
4-AcO-DET 4-HO-DALT
4-HO-MIPT 4-HO-DIPT

4-MES-DMT

NMT MIPT
DET DALT DIPT
DPT

AMT
AET

Synthetic Cannabinoids

Functionally related to naturally occurring cannabinoids

Found in a number of branded products, most notably Spice

JWH family

CP-47,497

CP 55,940

HU-210

JWH-017 JWH-073
JWH-018 JWH-081
JWH-019 JWH-200

JWH-250

WIN-55,212-2

CB-25

CB-52

Piperazines

Related to: piperazine

BZP mCPP
MBZP pFPP
DBZP MeOPP
MDBZP TFMP

Opiates

α -methylfentanyl
3-methylfentanyl
para-fluorofentanyl
MPPP
O-desmethyltramadol
7-acetoxymitragynine

2012 NIDA International Forum
New and Emerging Psychoactive
Substances:
Second Interdisciplinary Forum*

Friday, June 8, 2012

2:30 p.m. – 7:30 p.m.

3:30 p.m. – 6:00 p.m.

Registration and Information

**Workshop: Community
Epidemiology Work Group (CEWG)
and Network-Based Models for
Monitoring Drug Abuse Trends**

The CEWG and other drug abuse epidemiology networks link areas at the community, state, national, and/or regional levels, optimizing existing data as drug "indicators" and periodically convening to examine data and trends across areas. This workshop aims to provide practical information and examples regarding: (1) establishing, operating, and maintaining networks; (2) adapting to address new/emerging drugs, issues, and technologies; and (3) using network information.

Chair: Moira O'Brien, Division of Epidemiology Services
and Prevention Research (DESPR), NIDA

Imitation

- Mimic Illegal Drugs
- Imitate
 - Fake
 - Ripe-Offs
- Synthetic Cannabinoids – **Cannabinimimetics**
- Synthetic Cathinones – KHAT-
Cathinimimetics and other Stimulants
- Phenethylamines, Tryptamines, Piperazines
- Beat the Drug Test

Imitation: Desired Effects of Known Drugs



- Synthetic chemicals that look to the brain like marijuana.
- Sprayed onto plant material for smoking
- Seeking marijuana-like effects

Toxicity: Potency and efficacy

Potency: Low dose – strong effects

Efficacy: Strong maximum effects

**Many Cannabinimimetics show higher
potency and higher efficacy than *Cannabis***



Bath salts Stimulants often have trendy names and slick packaging



Head trip
Radiance
Ivory Wave
Power surge
Sextasy
Vanilla S

White lightning
Zoom
Cloud 9
Cloud 10
Red Dove
Blue silk
Moon dust
NRG (4-MEC)



were

What ~~are~~ these Stimulant ?

Mephedrone	4-methyl-methcathinone, "Miaow" Similar to cocaine and MDMA ("ecstasy")
Methylone	bk-MDMA: 3,4-methylenedioxy-methcathinone; "Explosion"* Similar to cocaine and MDMA ("ecstasy")
MDPV	3,4-methylenedioxyprovalerone; "NRG-1"* (Brandt, 2010); ?Ivory Wave Stimulant with Rapid Onset 2-4 hour duration of action
BZP	1-benzyl-piperazine Similar to Amphetamine 1/10 Potency of <i>d</i> -methamphetamine

What are these psychedelic drugs ?

2C-I	Phenethylamine, via 5-HT _{2A} ; stimulant & hallucinogen Slow Onset (1 hour); Long duration of action (8 to 10 Hours)
2C-B	Phenethylamine, via 5-HT _{2A} ; *visuals Faster Onset (1 hour); Shorter duration than 2C-I
5-MeO-DMT	Tryptamine; naturally occurring (toad, shamanic brews) Smoked: almost immediate, very intense, short effect (<30min)
DMT	Tryptamine; naturally occurring Smoked: Almost Immediate, Very Intense, Short Effect (< 20 min)

Emerging

- **History**
- **World Tour**
- **Surveillance and Detection**

Unregulated, Synthetic Drugs: **The World Tour**



Whole New Pharmacopoeia ?

- **Synthetic Stimulants, Hallucinogens, and Marijuana Substitutes**
- **Not New Science**
 - 40 years of Pharmaceutical Research
- **Rejected for Medical/Human Use**
- **Not profitable for drug traffickers**

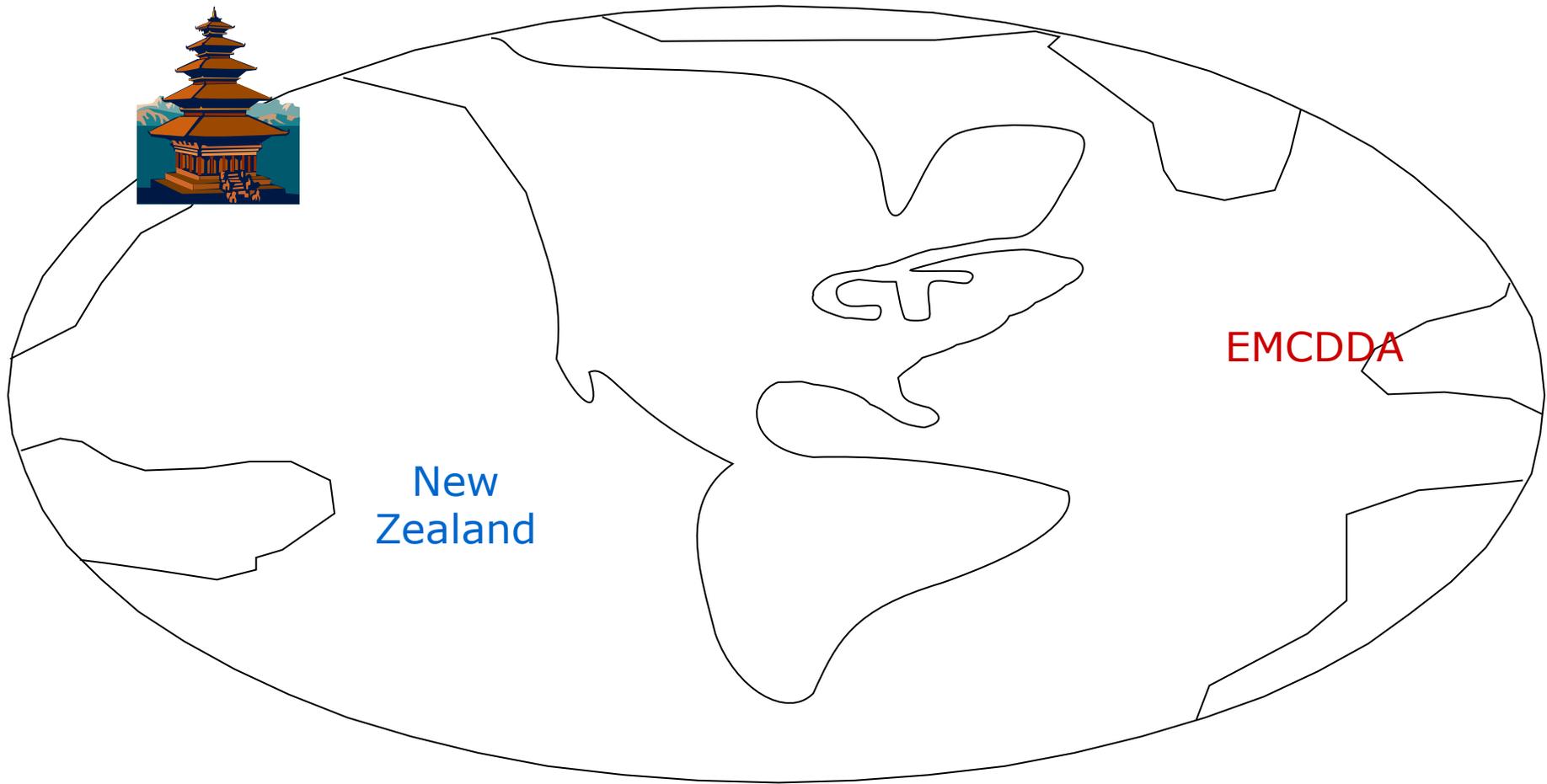
21st Century: The Perfect Storm

- **Cheap to make in China and elsewhere**
- **Easy to Market Worldwide via Internet**
 - Particularly to Drug Users Subculture
- **International Delivery Services**
- **“Legal” Retailers – “Not for Humans”**
- **The Mimic Drugs – Fake Pot, Ecstasy**
- **Beat the Drug Test**
- **Highly Profitable – *Incense. Bath Salts***
- **Role of Organized Crime or Terrorism ?**
- **Global Phenomena**



New Zealand

EMCDDA



European Monitoring
Centre for Drugs and
Drug Addiction

EMCDDA

27 European Union Member
States plus Croatia, Turkey
and Norway

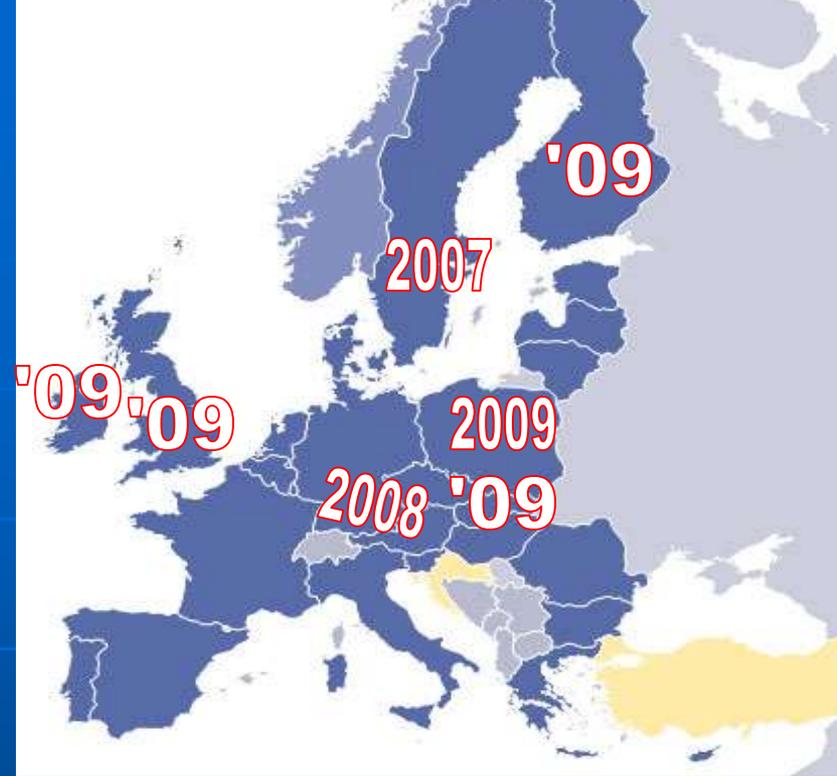
Paul Griffiths,

EMCDDA

Lisbon

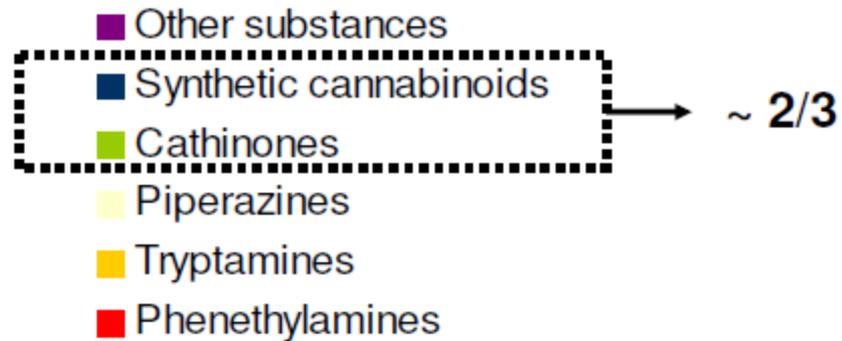


Spice or K2

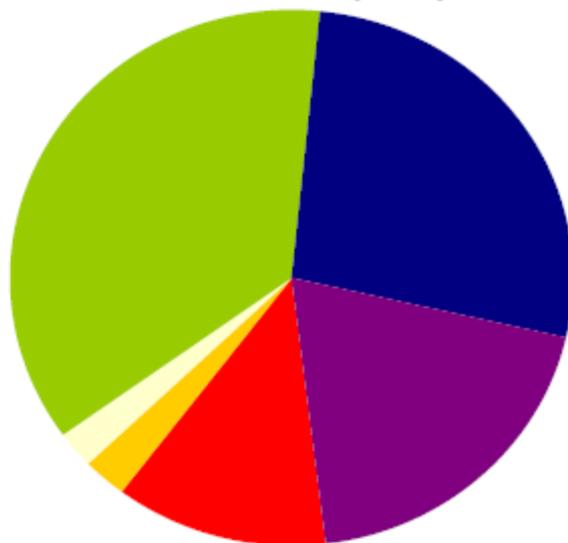


- **As early as 2004**
- **Sweden – 2007**
- **German, Austria -2008**
- **Poland, United Kingdom, Slovakia, Finland, Ireland -2009**
- **United States – March 2009**
- **Now Banned in Most of Europe**

New substances notified (by chemical family)



2010 (41)



2011 (49)



Recent drug trends in New Zealand

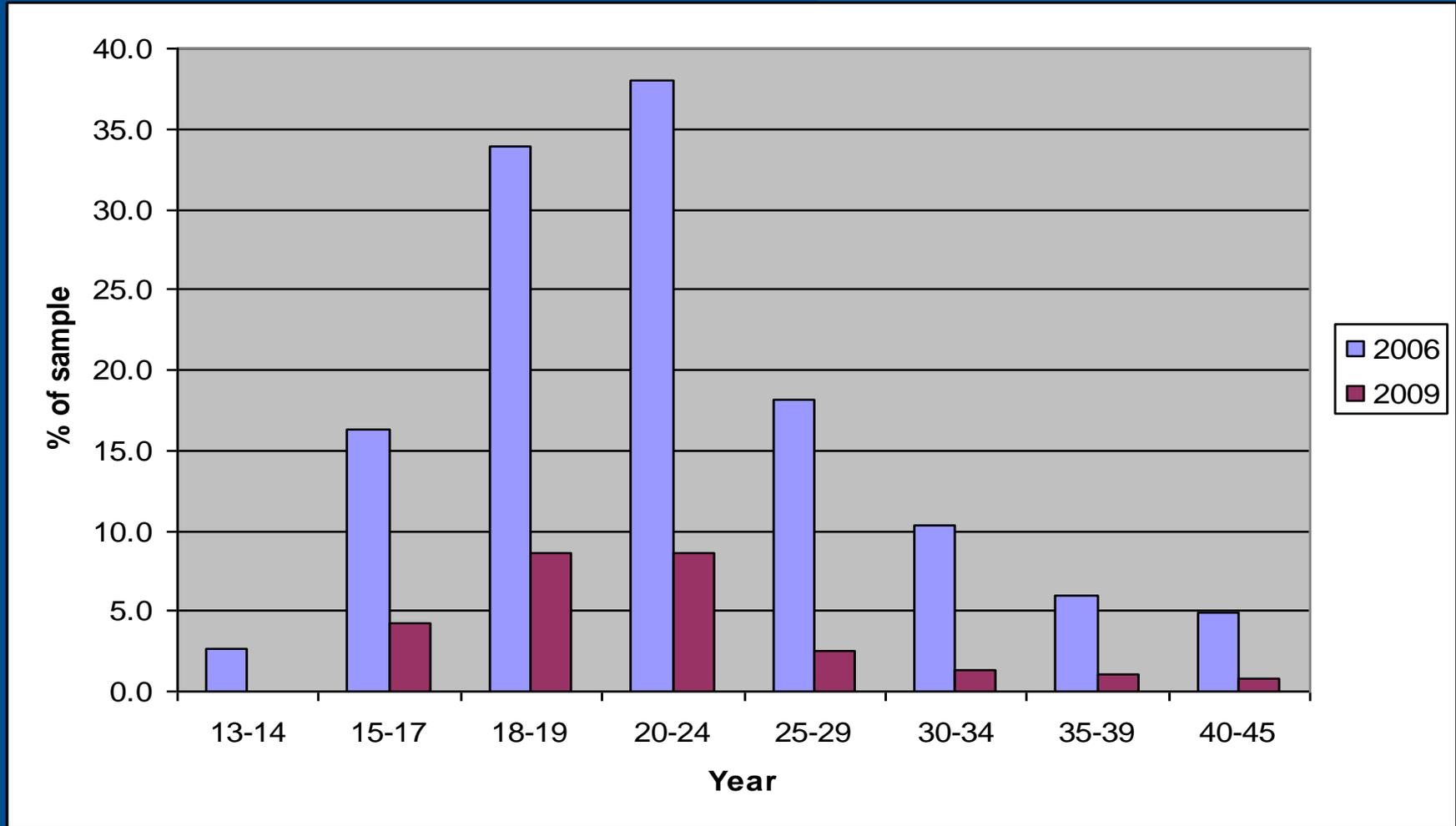
Chris Wilkins

**Massey University
June 2012**

BZP 'legal highs' in New Zealand

- In 2006, 15% of population aged 13-45 used BZP in previous 12 months
- Estimated 200,000 pills sold every month with annual sales worth \$24 million
- Wide range of sales outlets (pubs, corner stores)
- **Manufacture/sale of BZP prohibited in April 2008**
- **Enforcement modest (6 arrested for BZP supply in 2008, 4 in 2009 and 2 in 2010)**

General population prevalence of BZP by age 2006 & 2009



Conclusions

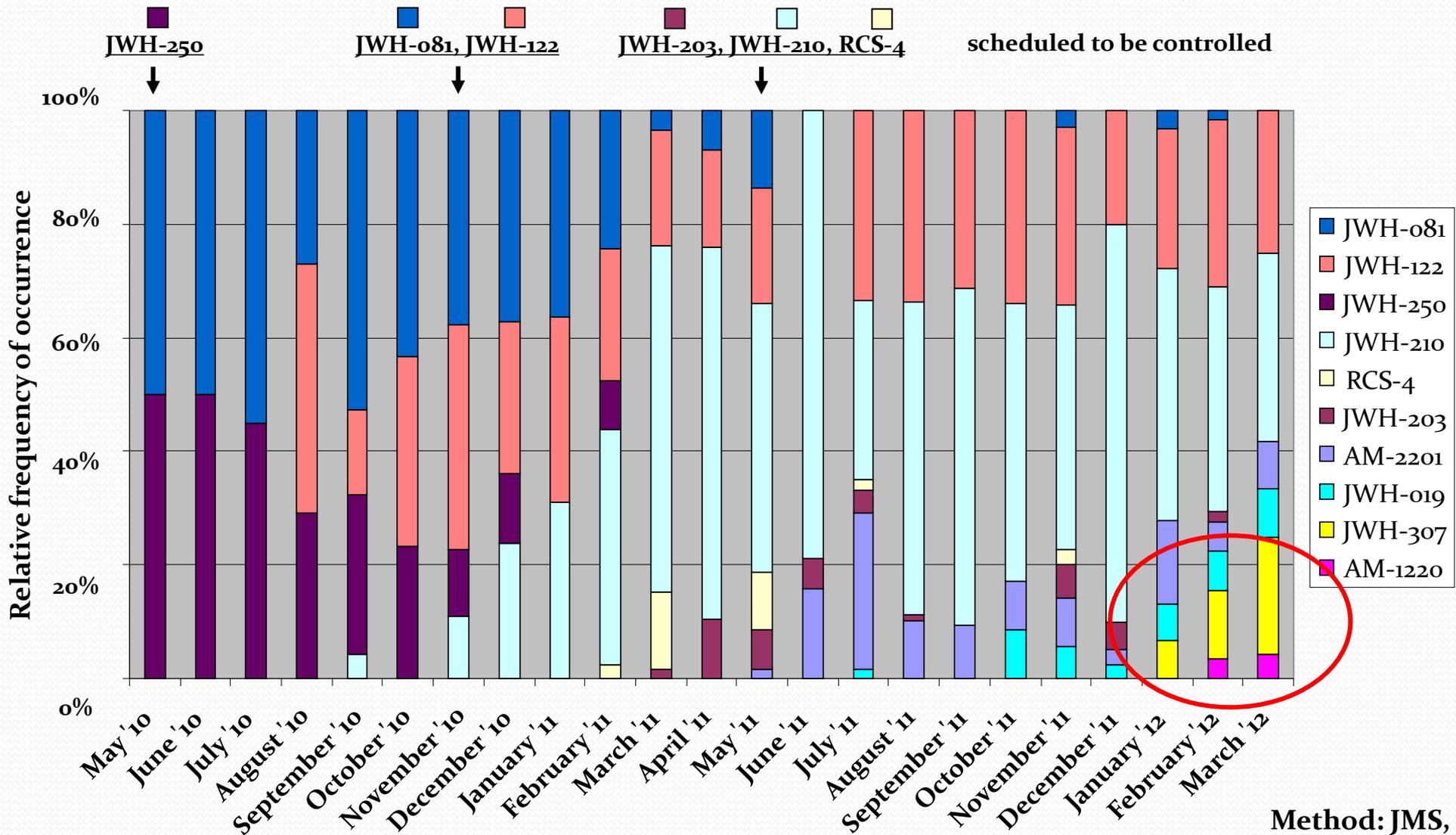
- Prohibition can reduce the use and availability of legal highs (even with internet supply!)
- Price rises and reduced availability can be achieved with very modest enforcement

Emerging

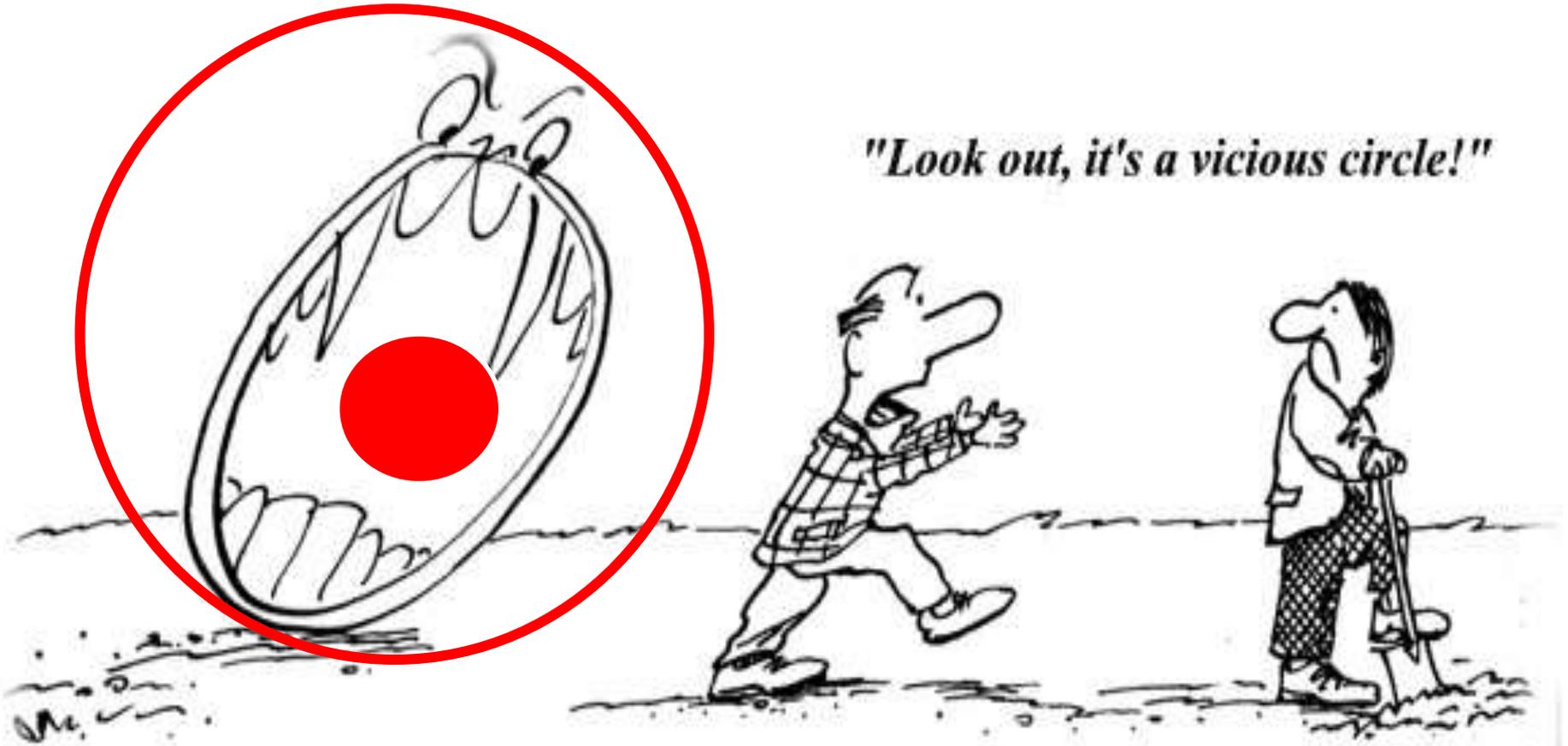
- **History**
- **World Tour**
- **Surveillance and Detection**
- **Legal Status**
- **Vicious Circle**

Europe: Cannabinimimetics May 2010 – March 2012

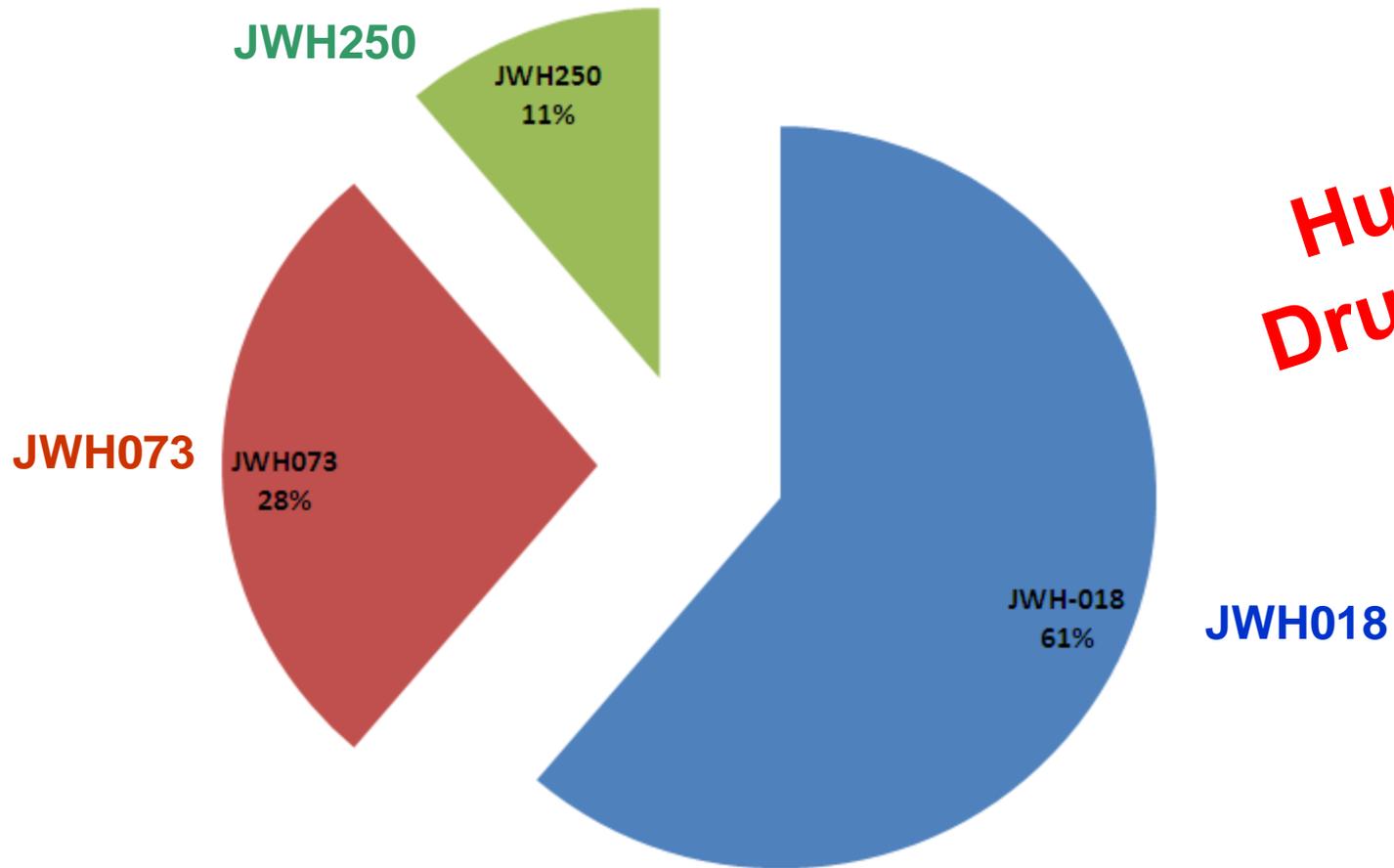
Results in Positive Serum Samples (n = 734)



New Drugs of Abuse, New Regulation, New Drugs of Abuse, New Regulation...



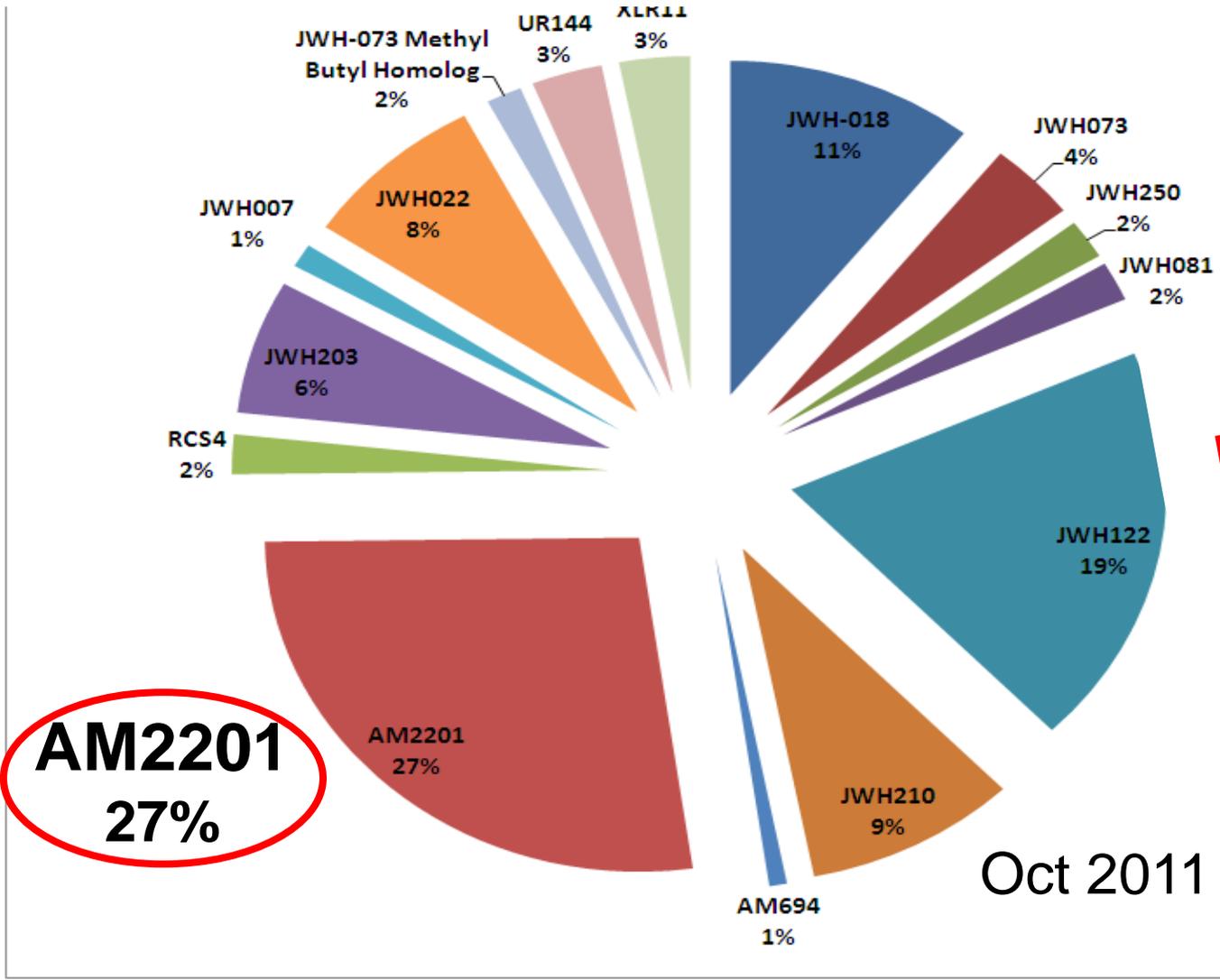
USA: Cannabinimimetics July- Dec 2010



**Human
Drug Tests**

July – December 2010

USA: 15 Cannabinomimetics Oct 2011-Apr 2012



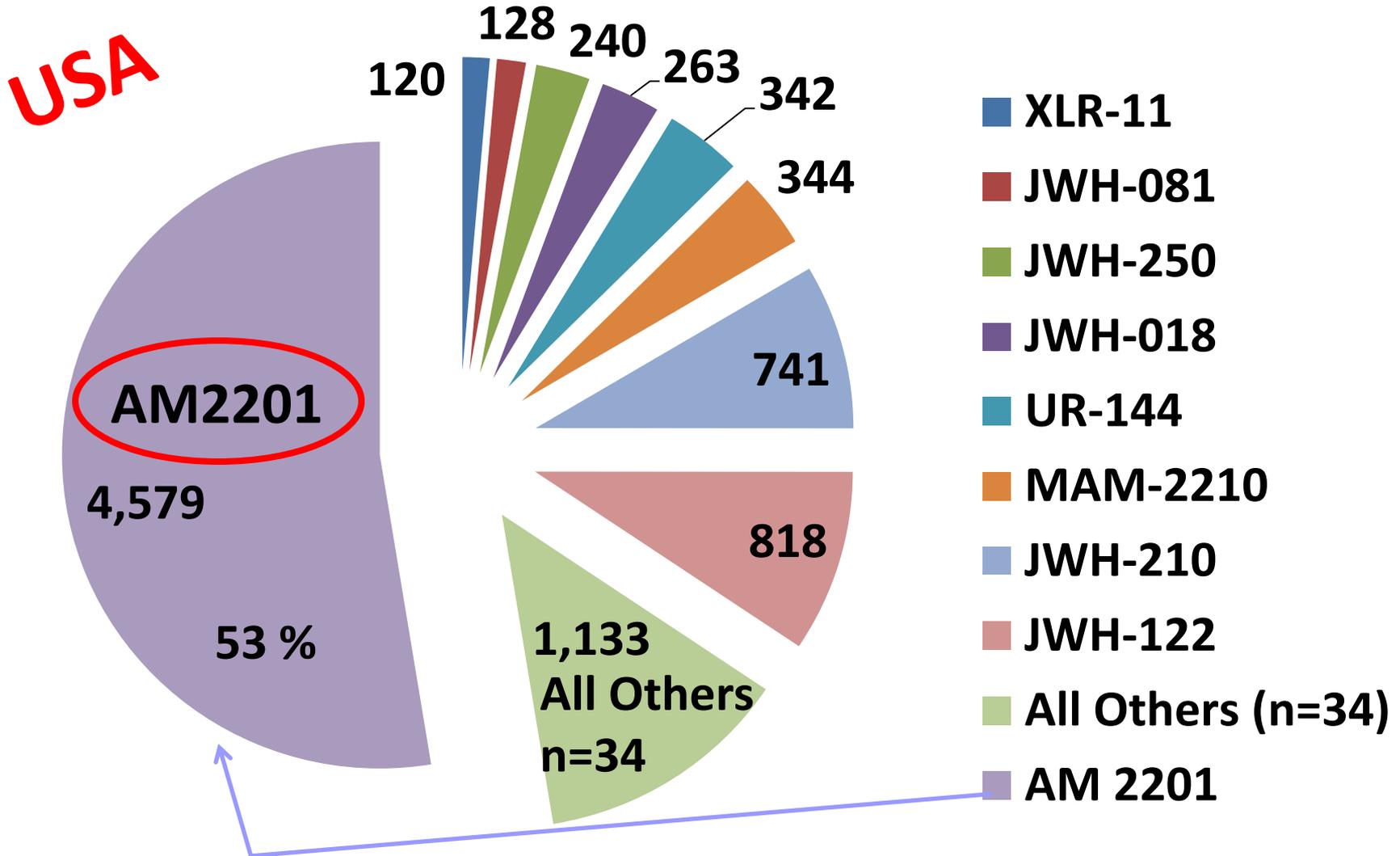
Human Drug Tests

**AM2201
27%**

Oct 2011 – April 2012

USA: 43 Different Cannabinimimetics Jan. - July 2012

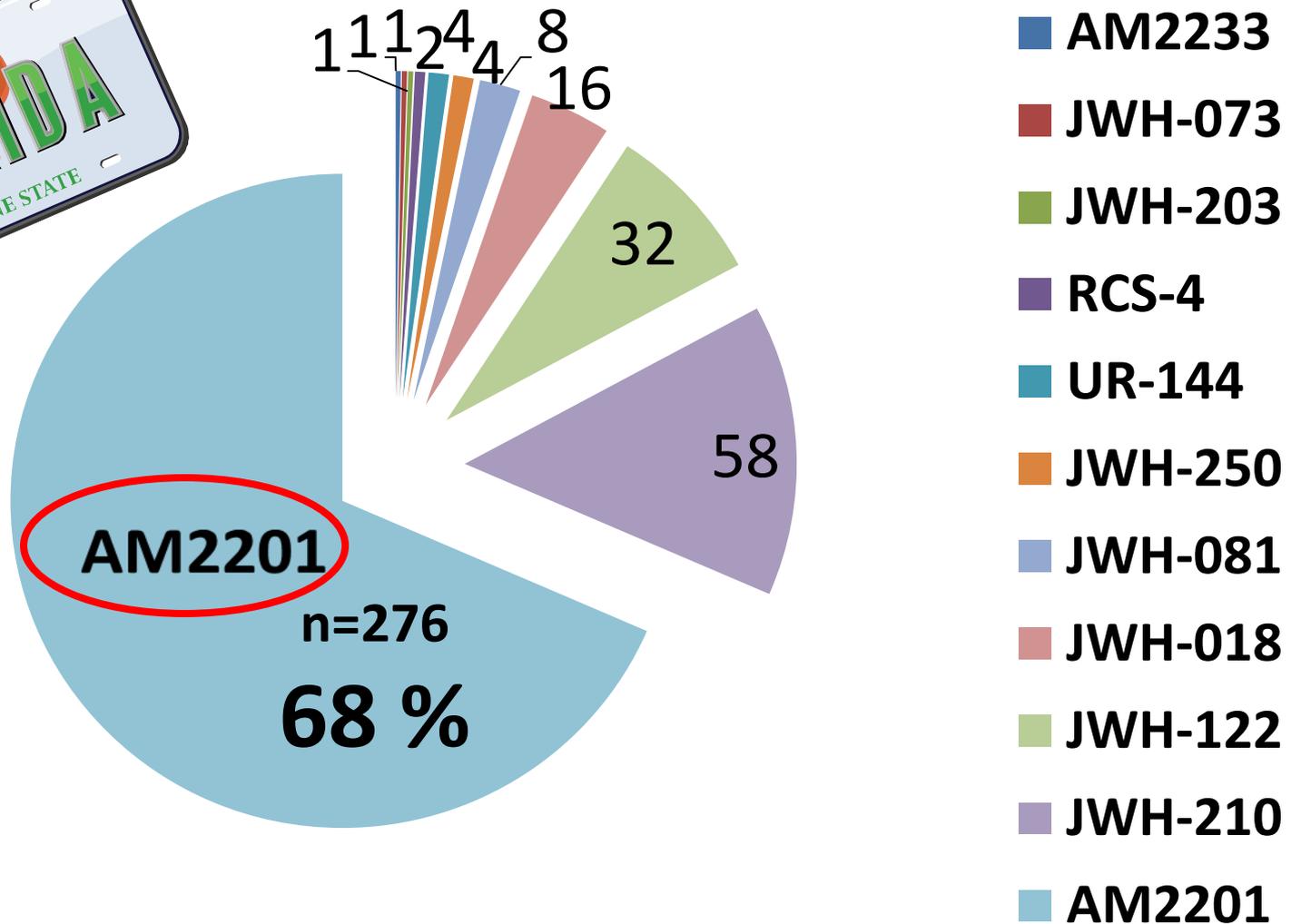
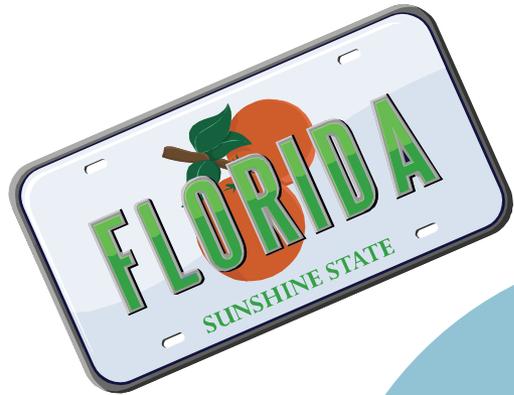
National Crime Lab Reports n= 8,708



Source: US DEA: National Forensic Lab Information System (NFLIS) 08/23/2012

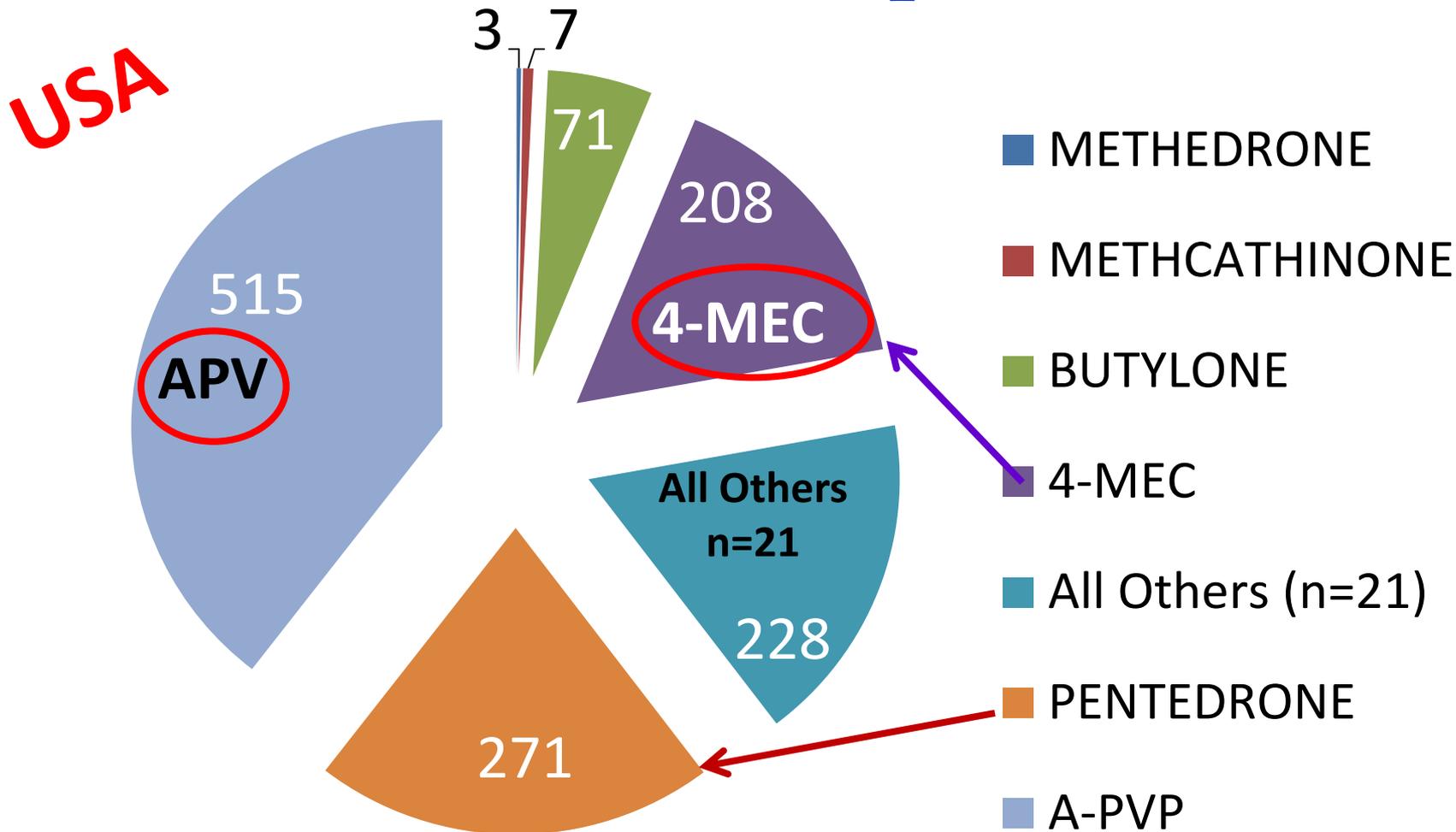
11 Different Cannabinimimetics Jan. - July 2012

Florida Crime Lab Reports n= 403



USA: 27 Different Cathinimimetics Jan. – July 2012

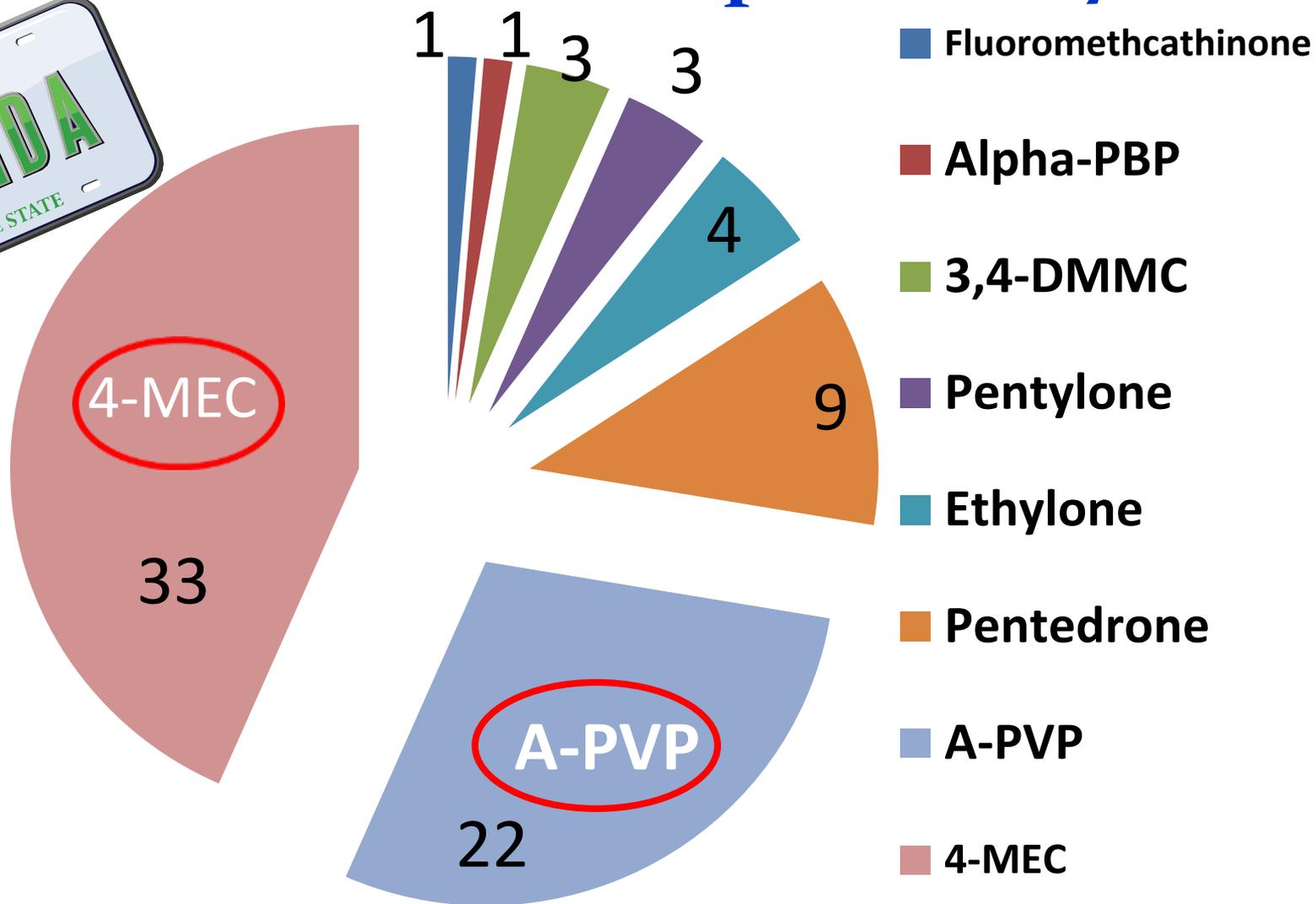
National Crime Lab Reports n= 1,303



Source: US DEA: National Forensic Lab Information System (NFLIS) 08/23/2012

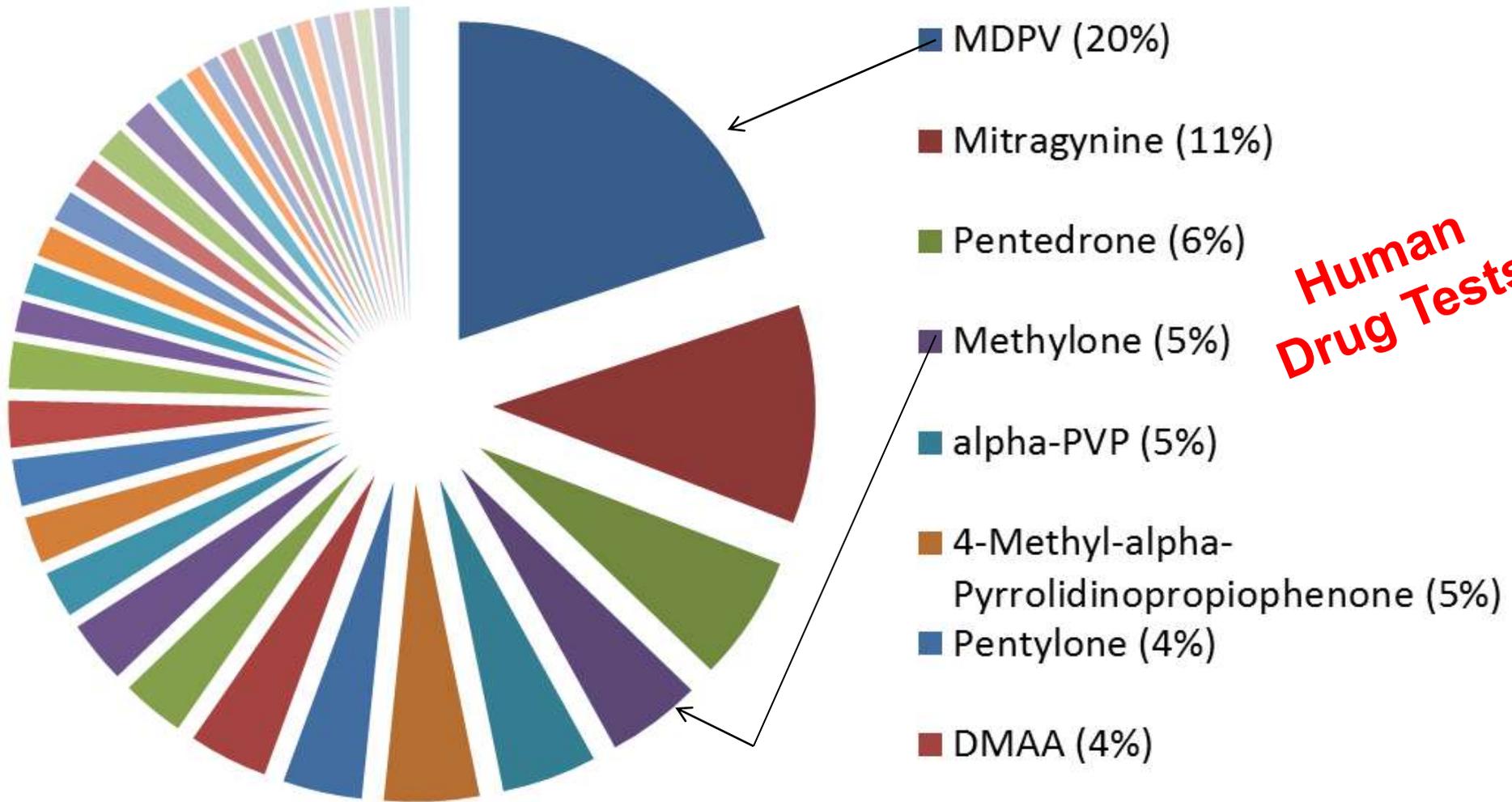
8 Different Cathinimimetics Jan. - July 2012

Florida Crime Lab Reports n= 76



Source: US DEA: National Forensic Lab Information System (NFLIS) 08/24/2012

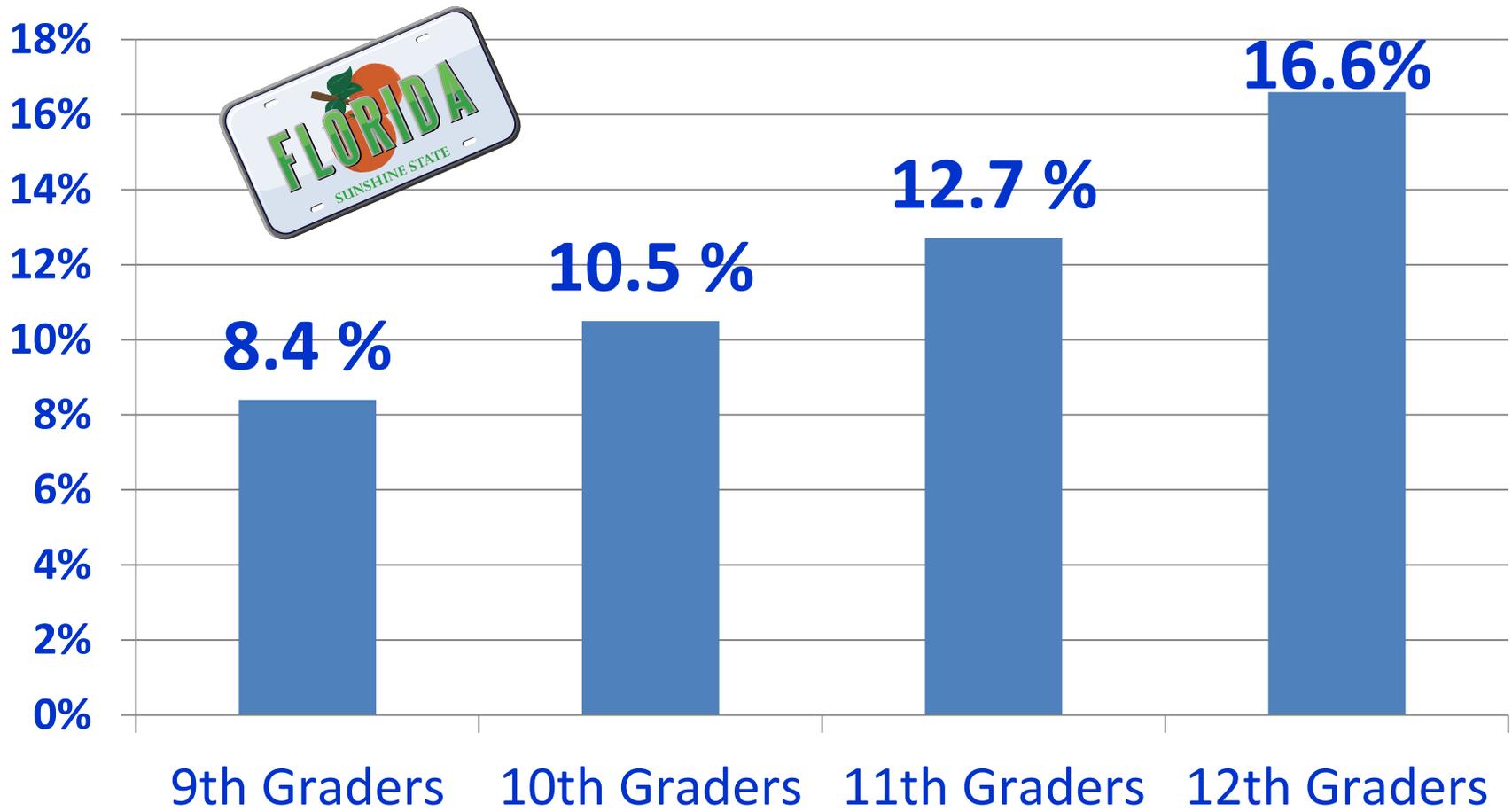
USA: 35 Cathinimimetics and Other Stimulants Oct 2011-April 2012



Emerging

- History
- World Tour
- Surveillance and Detection
- Legal Status
- Vicious Circle
- State and Local Laws and Ordinances
- Federal Regulations and Laws
- Broad Ban Regulation – State of Minnesota
- Prevalence and Spread

Percent of Florida 9th-12th Graders Reporting Having Used Synthetic Marijuana



Source: Florida Youth Substance Abuse Survey 2011

**Number of Cannabinmimetics
Poison Control Exposure Calls
Jan-Dec 2011 and Jan-June 2012**

Cannabinmimetics Poison Exposure Calls	# of Poison Exposure Calls Jan-Dec 2011	# of Poison Exposure Calls Jan-June 2012
State of Florida	499	274
Broward County	38	18
Miami-Dade County	35	21

**Source: Florida Poison Information Center – Miami
1-800-222-1222**

Number of Emerging Psychoactive Substance Drug Poison Control Exposure Calls in Florida: Jan-Dec 2011 and Jan-April 2012

Synthetic Drug Category	# of Poison Exposure Calls Jan-Dec 2011	# of Poison Exposure Calls Jan-April 2012
Synthetic Cannabinoids	499	269
Hallucinogenic Amphetamines	184	64
MDPV & Mephedrone (Bath Salts)	152	28
Other Hallucinogens DMT and 5-MeO-DIPT	6	2

1,204 Exposure calls Jan 2011 to April 2012

Source:

Florida Poison Information Center – Miami 1-800-222-1222

Phenethylamines

Related to: phenethylamine

2C-x

Related to: mescaline

2C-B 2C-D
2C-I 2C-P
2C-E 2C-T-x

2C-B-FLY

β-ketones

Related to: cathinone,
MDMA, amphetamine

Mephedrone Butylone
Methylone Flephedrone
Methedrone MDPV
Naphthylpyrrolidone

428

Exposures

Psychedelic amphetamines (DOx)

Related to: 2C-x, amphetamine

DOB DOM
DOC DON
DOI DOET

Bromo-DragonFLY

Cyclized amphetamines

Related to: MDMA,
amphetamine

2-AI 2-AT
MDAI MDAT
MDMAI MDMAT

MMAI

Florida Poison Info Exposure Calls 2011-12

Tryptamines

Related to: psilocin, DMT, serotonin

8

Exposures

Ergolines

Related to: LSD, LSA

PRO-LAD
ETH-LAD

5'-substituted

Related to: psilocin, serotonin

5-MeO-DMT 5-MeO-DALT
5-MeO-MIPT 5-MeO-MET
5-MeO-DIPT 5-MeO-DPT

5-MeO-AMT
5-MeO-AET

4'-substituted

Related to: psilocin

4-AcO-DMT 4-HO-DPT
4-AcO-DET 4-HO-DALT
4-HO-MIPT 4-HO-DIPT

4-MES-DMT

NMT MIPT
DET DALT DIPT
DPT

AMT
AET

Synthetic Cannabinoids

Functionally related to naturally occurring cannabinoids

Found in a number of branded products, most notably Spice

773

Exposures

JWH family

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CP-55,940

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JWH-019 JWH-200

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CB-25

CB-52

Piperazines

Related to: piperazine

BZP mCPP
MBZP pFPP
DBZP MeOPP
MDBZP TFMP

Opiates

α-methylfentanyl

3-methylfentanyl
para-fluorofentanyl
MPPP

O-desmethyltramadol
7-acetoxymitragynine

Dangerous

- Adverse Effects

Acute toxicity (clinical cases)

Most symptoms similar to cannabis intoxication

Tachycardia
Reddened eyes
Anxiousness
Mild sedation
Hallucinations, acute psychosis
Memory deficits

Symptoms not typically seen after cannabis intoxication

Seizures
Hypokalemia
Hypertension
Nausea/vomiting
Coma
Agitation, violent behavior
Death

Schneir 2012 J Med Tox
Rosenbaum et al. 2012 J Med Chem
Forrester et al. 2011 J Add Dis
Hermanns-Clausen et al. 2012 Addiction

Acute toxicity (ED, death cases)

-> Heart, generalized seizures / breathing problems

Long term toxicity

-> genotoxic potential

Other problems: - Risk of (persistent) psychosis
- Tolerance / addiction

Woman Loses Arm After 'Bath Salts' Injection

34-year-old woman experiments at party, nearly loses her life

By Patrick Hickey Jr. | Monday, Jan 16, 2012 | Updated 12:59 AM CST



Man commits suicide after using "bath salt"

Bremen, Ind.

The family of Denny Kurzhal, 36, blames "bath salt" for causing the psychotic episode when he committed suicide.

Posted: 11:59 PM Jun 8, 2011

Reporter: Brandon Lewis

Police: Woman on bath salts injures child

Hallucinates, carries children across I-24

Web Editor - Jay Marchmon

Story Created: Mar 1, 2011 at 10:09 AM CST
(Story Updated: Mar 1, 2011 at 10:37 AM CST)

CALVERT CITY, Ky. - Kentucky State Police are investigating an incident from Monday night on Interstate 24 in Marshall County: a woman stopped her car and carried her children across the interstate while hallucinating from synthetic cocaine.

Illegal 'Bath Salts' Still Being Sold at Local Smoke Shops

Health officials say 'bath salts' are powerful synthetic stimulants.
VIDEO: Watch Cher Calvin's Report



LOCAL STARS ARE FRESH—OR FAMILIAR

What are the clinical effects of Synthetic Stimulants?

- ▶ No data are available from controlled studies
- ▶ Human testing is being done by “street” *guinea pig users* who purchase products
- ▶ Agitation and psychosis have been reported

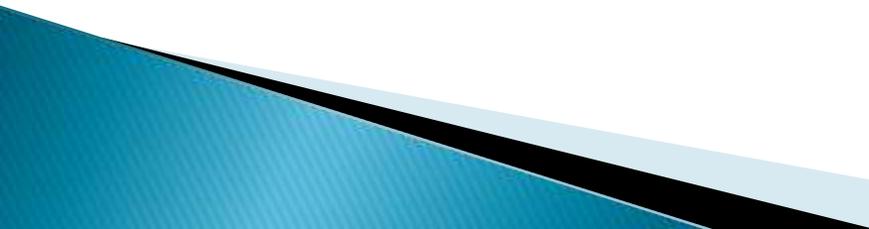


Synthetic Stimulant Cases: a 'snapshot' of first responder descriptions

- ▶ Adult male shoots out windows of house while aiming at “strangers”
- ▶ Adult female, confused and agitated, leaves 2 year old child in middle of highway because child has “demons”
- ▶ Adult male jumps out of window to flee from non-existent “pursuers”
- ▶ Adult male breaks all windows in house and wanders barefoot through broken glass

Spiller et al., 2011

Dangerous

- ▶ Adverse Effects
 - ▶ More dangerous and deadly ever week
 - ▶ Guinea Pig drugs
 - ▶ Very Addictive
 - ▶ Long-term Psychosis
 - ▶ Linked to Violent Behavior
 - ▶ Legal Strategies
 - ▶ Information Dissemination
- 

Know what you're selling:

K2 / SPICE / SYNTHETIC MARIJUANA

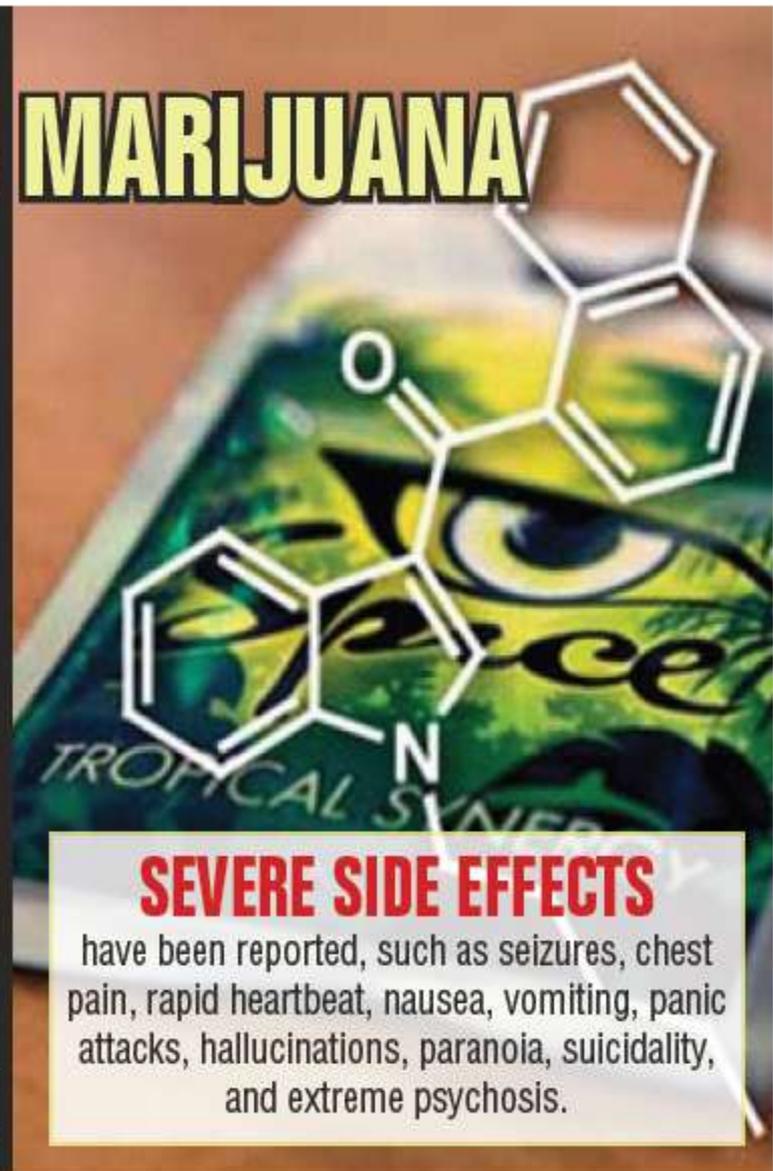
Did you know?

Synthetic marijuana, known as K2 or Spice, is a mixture of chemicals sprayed on herb mixtures to imitate the high of marijuana.

BUT...

It is actually contaminated with multiple unknown toxic substances in unknown quantities. The synthetic compounds are dissolved in various harsh chemicals such as acetone, phosphoric acid, formaldehyde, and toluene. These chemicals are similar to the compounds used to make PCP & Methamphetamine.

IT IS ILLEGAL TO SELL K2 / SPICE



SEVERE SIDE EFFECTS

have been reported, such as seizures, chest pain, rapid heartbeat, nausea, vomiting, panic attacks, hallucinations, paranoia, suicidality, and extreme psychosis.

For more resources, tools, and information on how you can help combat drug abuse in Sarasota County, contact drugfreesarasota@scgov.net

Know what you're selling:

BATH SALTS

Did you know?

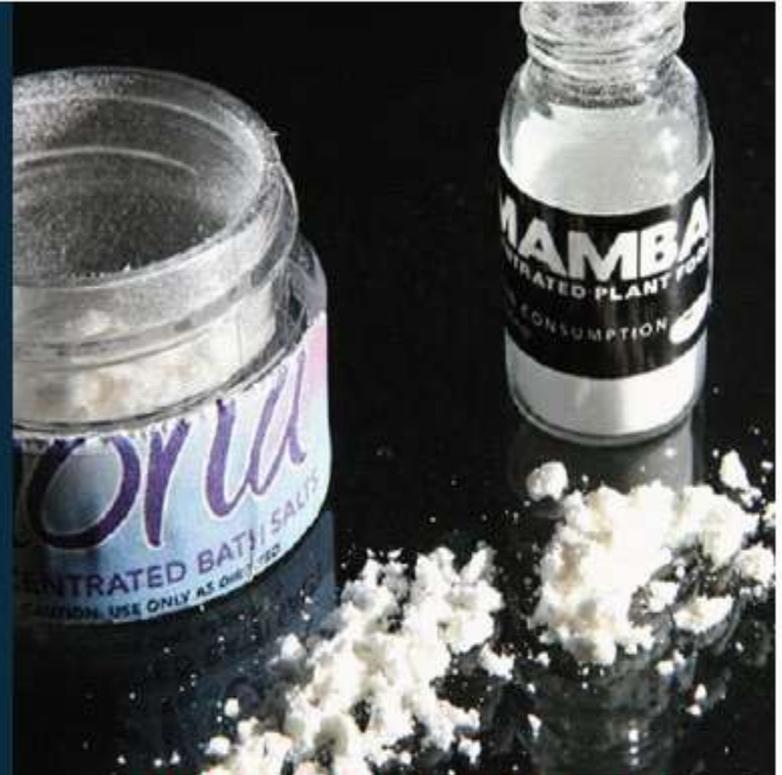
Bath Salts are thought to have a similar effect as cocaine, methamphetamine, ecstasy, and LSD.

BUT...

It is actually a “designer drug” made by chemists. It contains hydrochloride salt combined with dangerous psychoactive chemicals which act as a central nervous system stimulant.

Bath salt binges sometimes cause unretractable side effects which require large doses of sedatives.

IT IS ILLEGAL TO SELL BATH SALTS



SEVERE SIDE EFFECTS

have been reported, such as difficulty breathing, chest pain, rapid heartbeat, sweating and chills, dizziness, insomnia, intense and prolonged panic attacks, violent attacks, extreme psychotic delusions, combativeness, and suicidality.

For more resources, tools, and information on how you can help combat drug abuse in Sarasota County, contact drugfreesarasota@scgov.net

Acknowledgements

Raimondo Bruno	University of Tasmania	Australia
Julie Knight	Aegis Science Corporation	Florida, USA
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Chris Wilkins	Massey University	New Zealand
Barry Logan	National Medical Service Labs, Inc.	Pennsylvania, USA
John Power	Forensic Science Laboratory	Ireland
Wendy Stephan	Florida Poison Information Center	Miami, USA
Brooke Baker	Sarasota Co. Health & Human Serv.	Florida, USA

Dangerous, Imitation, Emerging Drugs (DIED)

www.drugfreebroward.org

Presentations