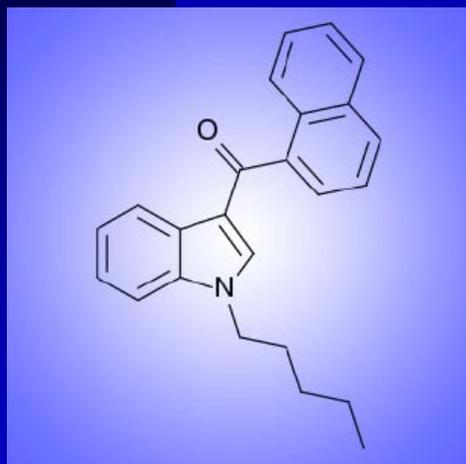




The Problems Posed by Designer Drugs (Spice/K2, Bath Salts, Etc.)



Thanks to:

Paul L. Cary

Toxicology Laboratory

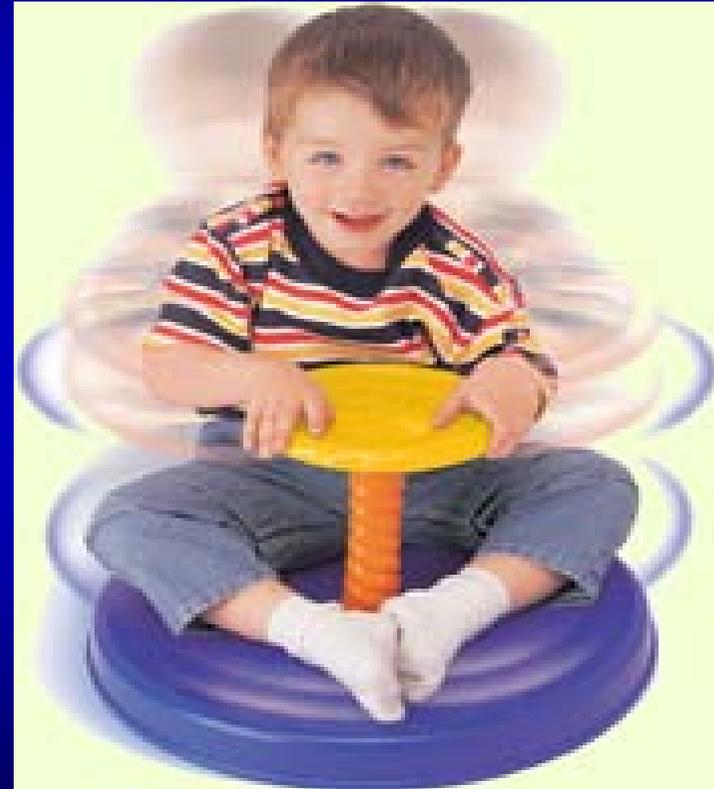
University of Missouri

Steve Hanson

Acting Associate Commissioner - NYSOASAS

Drive to Get High

- People will seek any means to alter their state of consciousness



CASES

- A 36-year-old male in the Netherlands became acutely agitated and enraged after ingesting mephedrone along with cocaine, and subsequently lost consciousness and died despite resuscitation efforts.
- A 29-year-old male found unresponsive at a nightclub died of cerebral edema and brainstem herniation. Serum sodium was noted to be 125 mmol/L, later suggested by laboratory data to have resulted from water intoxication.
- The first synthetic cathinone-related death in the United States, described in the scientific literature, involved a 22-year-old male who was found unresponsive and subsequently died at the receiving hospital.
- One case of mephedrone-related myocarditis has also been reported in the literature. A 19-year-old male presented with crushing chest pain after ingesting mephedrone sold as “not for-human-consumption” plant food.

Designer Drugs:

Created (or reformulated, if the drug already existed) to get around existing drug laws (CSA), usually by modifying the molecular structures of existing drugs to varying degrees.

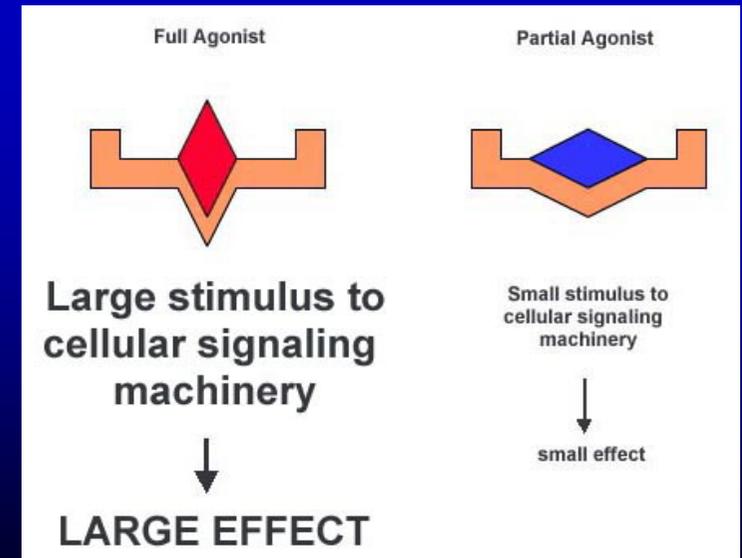
What Drives the Production Designer Drugs ?

- consumer preferences
- law enforcement control

An agonist is a chemical that binds to a receptor and triggers a response – often mimicking the action of a naturally occurring substance.

Receptor

Drug (agonist)



Why Change the Key?

- prolong the effect of the drug
- increase the potency of the drug
- “select” the desired effect
- make the drug more difficult to detect
- avoid patent infringement
- make an illegal drug “legal”



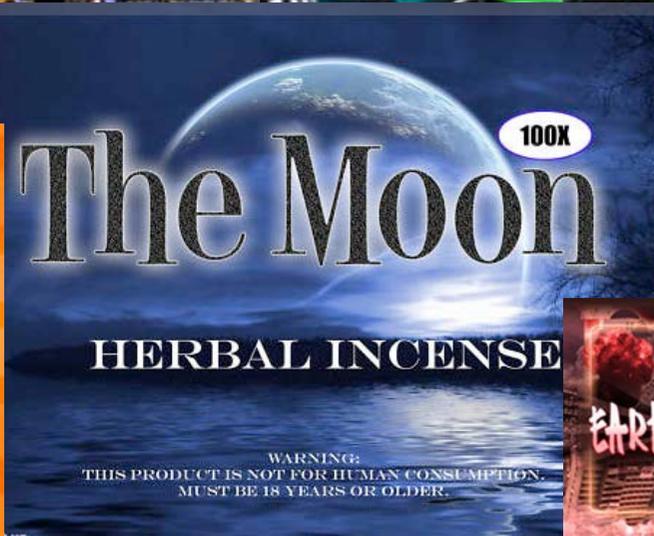
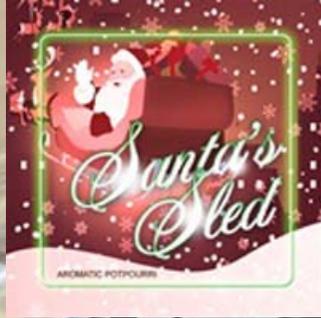
Spice/K2 and Synthetic Cannabinoids

No! We're
not talking
about this!



We're talking about this!





What's in these
“incense” products?

Preparation of the “incense”:

- botanicals are sprayed with liquid preparations of:
 - ◆HU-210
 - ◆HU-211
 - ◆CP 47,497
 - ◆JWH-018
 - ◆JWH-073



Origins of Synthetic Cannabinoids

- HU-210 & HU-211 - synthesized at Hebrew University, Israel in 1988. HU-210 is an anti-inflammatory; HU-211 as an anesthetic
- CP 47,497 - developed by Pfizer in 1980 as an analgesic
- JWH-018 & JWH-073 - synthesized by a researcher at Clemson (1995) for use in THC receptor research - John W. Huffman
- more than 100 different synthetic cannabinoids have been created

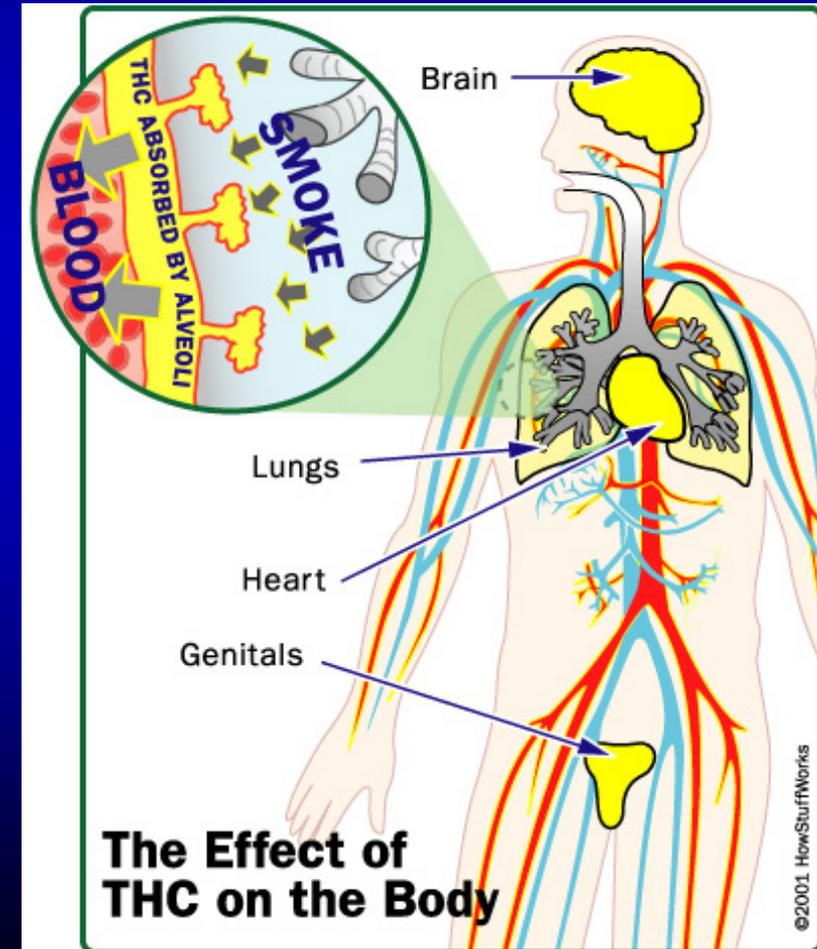
Usage

- Very little known about the extent of use
- 2009 Survey in Frankfurt
 - ◆ Surveyed 1463 students aged between 15 and 18 at schools providing general and vocational training.
 - ◆ Prevalence of use was 6% of respondents reported using Spice at least once
- National Poison Data System in 2010 (Aurora, CO)
 - ◆ During the 9 month study period, there were 1898 exposures reported with a mean age of 22.5 years old
 - ◆ Most cases reported were in men.
- Community Epidemiologic Work Group (CEWG) noted K2 epidemic in Midwest US in 2010
- Appears to be shifting from marijuana to synthetics

Smoking Cannabinoids

What does CB₁ receptor control?

- Basal Ganglia: motor control, learning
- Hippocampus: memory, spatial navigation
- Cerebrum: cognitive functions - attention, language, emotions



Pharmacological Effects of Synthetic Cannabinoids are Similar to THC

- Mental (these affects predominate):
 - ◆ Altered state of consciousness
 - ◆ Mild euphoria and relaxation
 - ◆ Perceptual alterations (time distortion)
 - ◆ Intensification of sensory experiences
 - ◆ Pronounced cognitive effects
 - ◆ Impaired short-term memory
 - ◆ Anxiety
 - ◆ Paranoia
 - ◆ Avoidant eye contact
 - ◆ Agitation
 - ◆ Delusions (paranoid, grandiose)
 - ◆ Psychosis

Pharmacological Effects of Synthetic Cannabinoids are Similar to THC

■ Physical:

- ◆ Increase heart rate & blood pressure
- ◆ Dry eyes
- ◆ Diaphoresis
- ◆ Mild decrease in potassium
- ◆ Seizures
- ◆ Reduction in motor skill acuity
- ◆ Increase in reaction times

Synthetic Cannabinoids: Physical and Social Effects

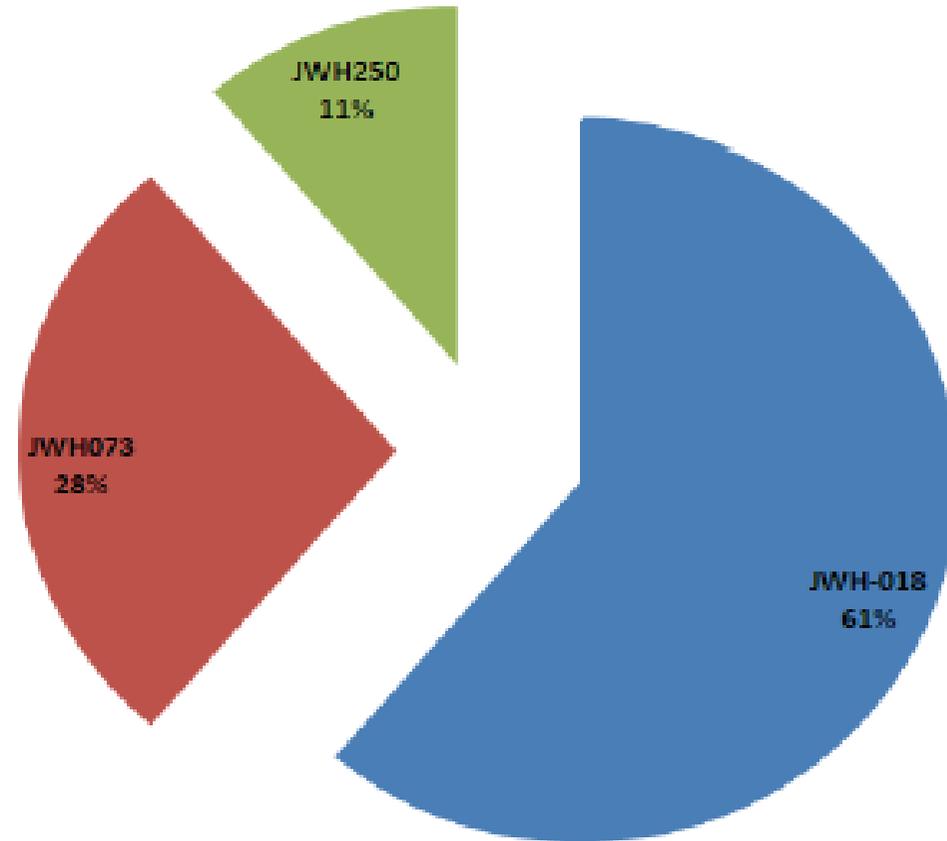
- Increasing reports of adverse effects
 - ◆ ER admits, assaults, homicides, drugged driving
- Effects similar to THC, BUT...
 - ◆ Increased anxiety, paranoia, panic
 - ◆ Increased restlessness & aggression
- Leads to untoward consequences
 - ◆ Contact with law enforcement
 - ◆ Loss of life

Testing for Synthetics

- Chemicals appearing and disappearing
- What's popular today gets cycled out for a newer analog
- Lab testing difficult as commonly used compounds change
- On-site, rapid testing can't keep pace.

Analog Prevalence 2010

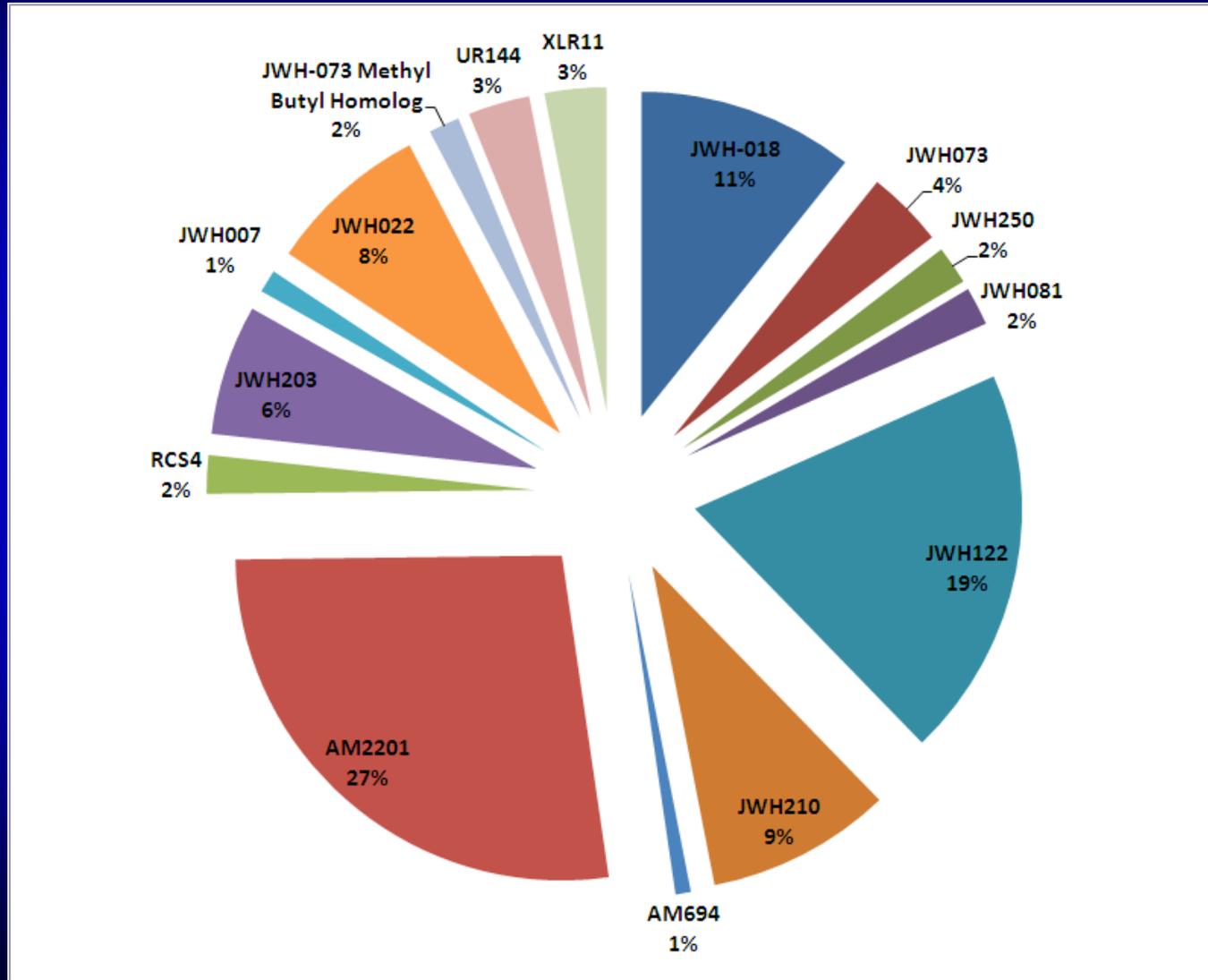
Dr. Barry Logan National Medical Services



July – December 2010

Analog Prevalence - 2012

Dr. Barry Logan National Medical Services



Designer Stimulants

Bath Salts

Novelty Powders

Designer Stimulants

Sold as:

- Bath salts/Bath Bubbles
- Plant Foods/Plant vitamins
- Glass Cleaners/Pond Cleaners
- Soft Drink Additives
- “Novelty Collectors Item”

What's in Bath Salts

- Cathinone
 - ◆ Known for centuries
 - ◆ Active metabolite is cathine
 - ◆ Found in leaves and twigs of Khat plant (*Catha edulis*)
 - ◆ **Original synthetic cathinone is methcathinone**
 - ◆ Produced in 1928
 - ◆ Public Health hazard as per League of Nations in 1933
 - ◆ Schedule I drug in 1993



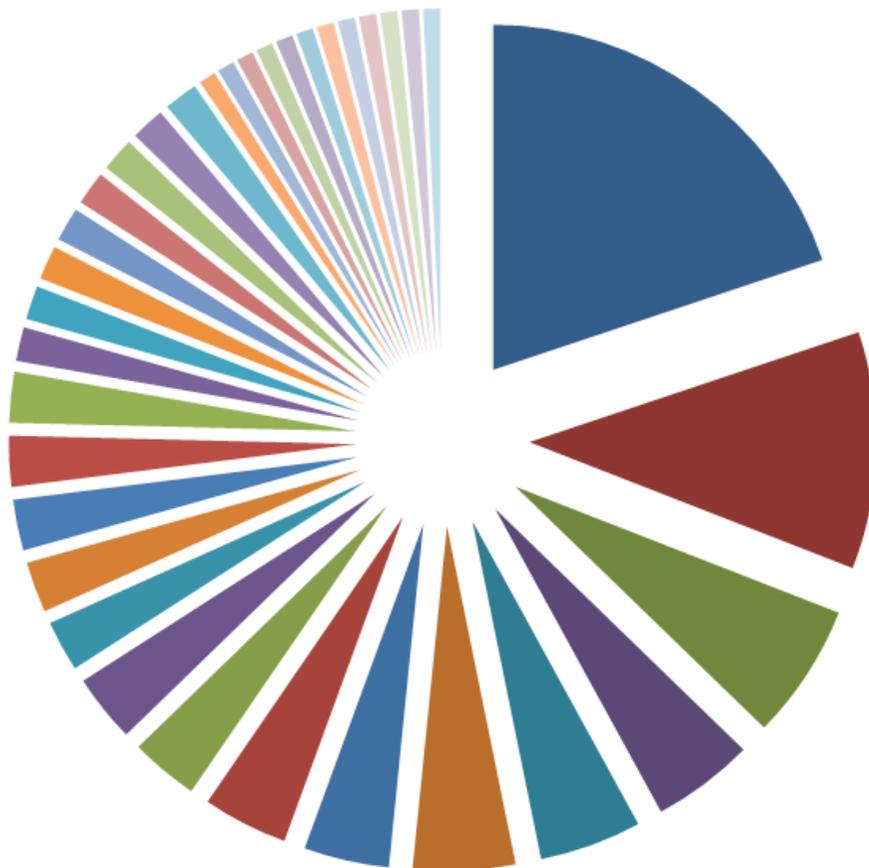
Administration – white/brown powder; capsules and tablets also available

- Oral (mouth, “bombing”)
- Intranasal (snorting, “keying”)
- Intramuscular
- Intravenous
- Rectal
- Gingival
- Inhalation via smoking

MDPV and Mephedrone Analogs

- Methylendioxypropylone (MDPV) – stimulant with norepinephrine and dopamine reuptake inhibition
- Methylmethcathinone (Mephedrone) – amphetamine like properties
- Considered highly addictive
- Adverse medical/psychiatric ramifications

Analog Prevalence

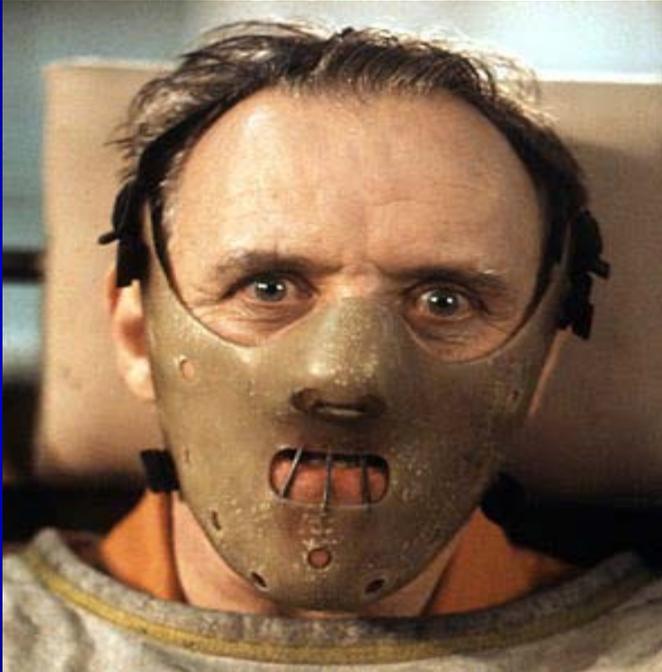


- MDPV (20%)
- Mitragynine (11%)
- Pentedrone (6%)
- Methylone (5%)
- alpha-PVP (5%)
- 4-Methyl-alpha-Pyrrolidinopropiophenone (5%)
- Pentylone (4%)
- DMAA (4%)

Pharmacological Effects of “Bath Salts”:

- increase heart rate & blood pressure
- pupil dilation
- hyperactivity, arousal & over stimulation
- increased energy & motivation
- euphoria - agitation
- dizziness
- nausea
- breathing difficulties
- diminished perception of the requirement for food and sleep

Health Hazard?



- Bizarre behavior
- Phenomenal physical strength
- Self mutilation
- Suicide
- Persistent paranoid psychosis
- Persistent symptoms of paresthesias and mood changes for days to weeks after using

Designer Drugs:

- designer drugs are here to stay
- rapid evolving landscape
- testing will nearly always lag behind
- legal controls will be challenging and delayed
- growing evidence of adverse effects
- Some become fads, others stay around (MDMA)