EMS AND DRUGS ON THE STREET

AN "UPHILL BATTLE"

Joe A. Nelson, DO, MS, FACOEP, FACEP
State EMS Medical Director
Florida Department of Health
"You've got two options, bud. Mercy Hospital is 20 minutes closer, but the nurses at Saratoga Hospital are really hot."
NATIONAL OVERDOSE DEATHS
NUMBER OF DEATHS FROM PRESCRIPTION DRUGS
Prescription opioid pain relievers showing a 3-fold increase.

NATIONAL OVERDOSE DEATHS
NUMBER OF DEATHS FROM RX OPIOID PAIN RELIEVERS

Source: National Center for Health Statistics, CDC Wonder
Deaths involving benzodiazepines with a 4-fold increase

Source: National Center for Health Statistics, CDC Wonder

NATIONAL OVERDOSE DEATHS
NUMBER OF DEATHS FROM BENZODIAZEPINES
Cocaine deaths increased by 29% over the same period.
The highest rise was seen for deaths involving heroin with a 5-fold increase from 2001 to 2013.
DRUG DEATHS NOT WELL QUANTIFIED: SPICE, K2, FLAKKA, METH, ETC.

“Big increase in deaths, poisonings from synthetic marijuana”
- Amy Kraft CBS News June 11, 2015
- Centers for Disease Control and Prevention: synthetic marijuana killed 15 people in the first half of 2015

“Scary new designer drug flakka hits Chicago”
- Dave Savini CBS News April 24, 2015
- The drug, also called "gravel," has been popular in Florida, Ohio and Texas, where it’s been linked to as many as 20 hospitalizations per day and nearly a dozen deaths
2014 Interim Report by Florida Medical Examiners

Frequency of Occurrence of Drugs in Decedents
January - June 2014

- Ethanol: 23.9%
- Benzodiazepines: 23.6%
- Cocaine: 8.7%
- Codeine: 1.1%
- Carisoprodol/Meprobamate: 1.1%
- Cannabinoids: 5.9%
- Fentanyl: 2.4%
- Heroin: 1.9%
- Hydromorphone: 2.5%
- Hydrocodone: 4.1%
- Hydrocodone: 4.1%
- Methadone: 3.0%
- Morphine: 6.3%
- Oxycodone: 5.7%
- Oxymorphone: 1.5%
- Transadol: 3.6%
- Zolpidem: 1.4%
- Amphetamines: 1.6%
ENDOCARDITIS ETIOLOGIES IV DRUG ABUSERS

- Staphylococcal Aureus
- Group B Streptococci
Heroin (and Fentanyl)
Prescription Opioids
Spice, K2, FLAKKA, “Bath Salts”, Methamphetamine

IMPACTING EMERGENCY SERVICES
HEROIN
HEROIN METHODS OF INGESTION

- Snorting
- Injecting
- Smoking

“Chasing the dragon”
HEROIN – EMERGENCY DEPT VISITS RISING

Chart 8. Heroin-related Emergency Department Visits
2007 - 2011

Source: Drug Abuse Warning Network
We're going to implement some costly medical procedures to help pay for the machines that perform these procedures.
The Washington Times - Friday, April 24, 2015

The Centers for Disease Control and Prevention on Friday urged emergency response agencies to make sure all of their staff members know how to use an overdose-reversal treatment that can prevent deaths from prescription opioid or heroin use.

Officials say all 50 states allow advanced EMS staff to administer the treatment, known as naloxone, yet as of 2014 only a dozen states allowed basic-level staff to administer it as an injection.


NALOXONE AS A BASIC TOOL
The FDA approved a spring loaded auto injector for IM Naloxone on April 3, 2014.

FDA approves new hand-held auto-injector to reverse opioid overdose

*First naloxone treatment specifically designed to be given by family members or caregivers*

The U.S. Food and Drug Administration approved a prescription treatment that can be used by family members or caregivers to treat a person known or suspected to have had an opioid overdose. Evzio (naloxone hydrochloride injection) rapidly delivers a single dose of the drug naloxone via a hand-held auto-injector.

This device can be used by EMT Basics, law enforcement officers, other first responders and even the general public. Numerous States have passed laws to facilitate availability and use by these groups.
Emergency medical services (EMS) traditionally administer naloxone using a needle.

Study sought to determine whether nebulized naloxone can be used safely and effectively by prehospital providers.

Retrospective analysis of 105 consecutive cases administered nebulized naloxone from January 1 to June 30, 2010, by the Chicago Fire Department.

23 (22%) had complete response, 62 (59%) had partial response, and 20 (19%) had no response.

Eleven cases (10%) received rescue (IV) naloxone, no case required assisted ventilation, and no adverse events occurred.

Conclusion. Nebulized naloxone is a safe and effective needleless alternative for prehospital treatment of suspected opioid overdose in patients with spontaneous respirations.

Can Nebulized Naloxone Be Used Safely and Effectively by Emergency Medical Services for Suspected Opioid Overdose?

Joseph M. Weber, Katie L. Tataris, Joyce D. Hoffman, Steven E. Aks, Mark B. Mycyk

Prehospital Emergency Care

Vol. 16, Iss. 2, 2012
If Opiate overdose patient has Respiratory Rate < 8 then protocol is to give 2mg of Naloxone Intranasally (1mg each nostril)

Results: 95% effective, 8% required repeat dose, Zero deaths

Persons using assistive technology might not be able to fully access information in this file. For assistance, please send e-mail to: mmwrq@cdc.gov. Type 508 Accommodation in the subject line of e-mail.

Notes from the Field: Acetyl Fentanyl Overdose Fatalities – Rhode Island, March–May 2013

Weekly
August 30, 2013 / 62(34);703-704

In May 2013, the Rhode Island State Health Laboratories noticed an unusual pattern of toxicology results among 10 overdose deaths of suspected illicit drug users that had occurred during March 7–April 11, 2013. An enzyme-linked immunosorbent assay (ELISA) for fentanyl in blood was positive for fentanyl in all 10 cases, but confirmatory gas chromatography/mass spectrometry (GC/MS) did not detect fentanyl. The mass spectrum was instead consistent with acetyl fentanyl, a fentanyl analog. Acetyl fentanyl, a synthetic opioid, has not been documented in illicit drug use or overdose deaths, and is not available as a prescription drug anywhere. Animal studies suggest that acetyl fentanyl is up to five times more potent than heroin as an analgesic (1).

During May 14–21, 2013, CDC and Rhode Island public health officials conducted a field investigation to determine whether this cluster of 10 deaths represented an increase in the typical number of overdose deaths and what role might have been played by acetyl fentanyl. Data on illicit drug (cocaine,
A County (pop. 352,000) EMS system in Central Florida, plagued with a recently arrived highly potent form of Heroin, utilized $4,800 worth of Naloxone in a three day period over the 4th of July weekend 2015.

According to the County’s EMS Medical Director, doses up to 8 mg were required to restore spontaneous breathing in these patients.

Over 300 deaths in the County due to Opioid overdose as of July 2015

The bad news- $84 per 2 mg VIAL

The good news- at least Naloxone is not currently on the FDA medication shortage list!
- Prescription Opiates
- GHB, MDMA, Methamphetamine, Cocaine
- Spice, K2, FLAKKA, “Bath Salts”,
Opioid Prescriptions Dispensed by Retail Pharmacies—United States, 1991–2011

Number of Prescriptions (in millions)

Year

Crushing Percocet and Injecting

Courtesy Sharon S. Kelley, MS, PhD
Methamphetamine

Courtesy Sharon S. Kelley, MS, PhD
Popular as club drug and for drug-facilitated sexual assault

- Sold as liquid, powder, or gel, usually ingested as liquid
- Precursors GBL and 1,4 butanediol are sold/abused and metabolized to GHB in the human body
- Metabolized by TCA cycle to CO₂ and eliminated by respiration
- Clinical Effects in Overdose: disinhibition followed by sedation in 15-20 minutes
- CNS and respiratory depression, often comatose, myoclonus, rarely seizure
- Sudden waking is common, often during intubation attempt
- EMS Management: supportive care, airway management, benzodiazepine for agitation or seizures
3,4 Methylenedioxymethamphetamine (MDMA, Ecstasy)

- Sold as tablet or capsule for ingestion, crushed/snorted, or dissolved/injected
- Pharmacology: enhances neuronal release and inhibits reuptake of serotonin and other catecholamines
- Clinical Effects in Overdose: (dose related)
- Nausea, perceptual distortions, delusions, paranoia, sympathomimetic toxidrome
- Bruxism (jaw clenching) is common with abuse
- Severe cases often involve seizures, hyperthermia, rhabdomyolysis
- Hyponatremia from SIADH, volume loss (dancing/sweating), and water ingestion
- EMS Management: supportive care, airway management, benzodiazepines for agitation/seizures,
- Aggressive temperature control with chemical paralysis as needed
SYNTHETIC “DESIGNER” DRUGS

• Cannabinoids (K2, Spice)

• Cathinones (Bath Salts, Flakka)
Your Stupidity

Is my job security
Synthetic Cannabinoids

- Synthetic Cannabinoids
  Laboratory synthesized chemical compounds that bind to cannabinoid receptor sites in the body (i.e. JWH-018)

Courtesy Sharon S. Kelley, MS, PhD
John W. Huffman, PhD (JWH)
Clemson University

- First synthesized cannabinoid in 1995
- Published formula for JWH – 018 in Bioorganic and Medicinal Chemistry
- Research read by “underground” chemists in 2004
- Synthesized over 400 synthetic cannabinoids, none patented
- Retired in 2008
“SPICE” – MANUFACTURING METHOD

Powder form of cannabinoid (e.g. HU-210, HU-211, JWH-018, JWH-073, JWH-250, etc.)

Spray chemical on common plant material

Add flavor/scent (e.g. air freshener)

$5 - $40 / pkg

Courtesy Sharon S. Kelley, MS, PhD
MACROSCOPIC DIFFERENCES BETWEEN HERBAL INCENSE AND MARIJUANA

HERBAL INCENSE

MARIJUANA

Courtesy Sharon S. Kelley, MS, PhD
SYNTHETIC CANNABINOIDS ADMINISTRATION

- Snorting
- Smoking
- Injection
SYNTHETIC CATHINONES

Courtesy Sharon S. Kelley, MS, PhD
“Bath Salts”

- Mephedrone
- Methylone
- MDPV (Methylenedioxyxyropyrovalerone)

Courtesy Sharon S. Kelley, MS, PhD
“Flakka” aka “Gravel”
alpha-Pyrrolidinopentiophenone
(alpha-PVP / α-PVP)

• “Rock” form similar to that of “rock” cocaine
• Intense psychological response
SYNTHETIC CATHINONES PHARMACOLOGY

- CNS Stimulant
- Similar to methamphetamine, MDMA (Ecstasy), or cocaine
- Norepinephrine-dopamine reuptake inhibitor (NDRI)
- Avg dose: 5 to 20mg
SYNTHETIC CATHINONES
ADMINISTRATION

• Smoking
• Swallow
• Injection

Courtesy Sharon S. Kelley, MS, PhD
SYNTHETIC CANNABINOID / CATHINONES MANIFESTATIONS

• Effects: euphoria 3-4 hours, CNS stimulation 6-8 hours
• **Excited delirium**
• Heightened sense of alertness, anxiety, agitation, insomnia, anorexia
• CNS stimulation: tachycardia, hypertension, diaphoresis
• Seizures, anxiety, psychosis with high doses or regular usage

Danger to healthcare workers – potential for extremely violent behavior
Excited delirium, sometimes referred to as agitated or excited delirium

State of acute behavioral disinhibition manifested in a cluster of behaviors that may include bizarreness, aggressiveness, agitation, ranting, hyperactivity, paranoia, panic, violence, public disturbance, surprising physical strength, profuse sweating due to hyperthermia, respiratory arrest, and death.

Excited delirium is reported to result from substance intoxication, psychiatric illness, alcohol withdrawal, head trauma, or a combination of these.

Excited delirium involves behavioral and physical symptoms that are also observed in medical and psychiatric conditions such as rhabdomyolysis, neuroleptic malignant syndrome, and catatonia.

EVIDENCE FOR PREHOSPITAL KETAMINE FOR EXCITED DELIRIUM

- **Successful Management of Excited Delirium Syndrome with Prehospital Ketamine: Two Case Examples**
  - Jeffrey D. Ho, Stephen W. Smith, Paul C. Nystrom, Donald M. Dawes, Benjamin S. Orozco, Jon B. Cole, William G. Heegaard
  - *Prehospital Emergency Care* Vol. 17, Iss. 2, 2013

- **The Emergency Department Experience with Prehospital Ketamine: A Case Series of 13 Patients**
  - Aaron M. Burnett, Joshua G. Salzman, Kent R. Griffith, Brian Kroeger, Ralph J. Frascone
  - *Prehospital Emergency Care* Vol. 16, Iss. 4, 2012

- **The Use of Prehospital Ketamine for Control of Agitation in a Metropolitan Firefighter-based EMS System**
  - David Keseg, Eric Cortez, Douglas Rund, Jeffrey Caterino
  - *Prehospital Emergency Care* Vol. 19, Iss. 1, 2015

- **Prehospital use of IM ketamine for sedation of violent and agitated patients.**
  - Scheppke KA, Braghiroli J, Shalaby M, Chait R.
Dissociative anesthetic
Rapid onset of action: < 5 minutes
Highly Effective in single dose
Can give IM (through jeans)
Favorable Safety Profile
Supports heart rate and BP
Preserves respiratory drive
No hyperthermia
Laryngospasm

Nausea/Vomiting

Possible drug interactions:

- ETOH
- Opiates
- Benzodiazepines
- Psych Meds

Laryngospasm and Hypoxia After Intramuscular Administration of Ketamine to a Patient in Excited Delirium

Aaron M. Burnett, Benjamin J. Watters, Kelly W. Barringer, Kent R. Griffith, Ralph J. Frascone
Prehospital Emergency Care
Vol. 16, Iss. 3, 2012
Advantages of Ketamine for Excited Delerium

- Safety of IM administration to EMS personnel
- Onset of action IM 5 minutes
- Duration of action 20-30 minutes
- Keeps protective airway reflexes intact
- Rarely affects respiratory drive
- High minute ventilation buffers acidosis
- Adult Dose 4 mg/Kg IM; 2 mg/Kg IN; 1 mg/Kg IV
EMS is Challenged in the face of rising drug abuse case volume and evolving designer drugs.

Naloxone is increasingly available to EMT Basics, First Responders, Law enforcement, and the public.

New methods of Naloxone administration include auto injectors, nebulized, and Intra nasal routes.

Ketamine may be a successful treatment for the constellation of symptoms known as “Excited delirium”, which is increasing with new designer drugs such as Spice and FLAKKA.

CONCLUSION
THANK YOU!

JOE NELSON, DO
FLEMSMD@AOL.COM