# Over-The-Counter Dextromethorphan Overdoses

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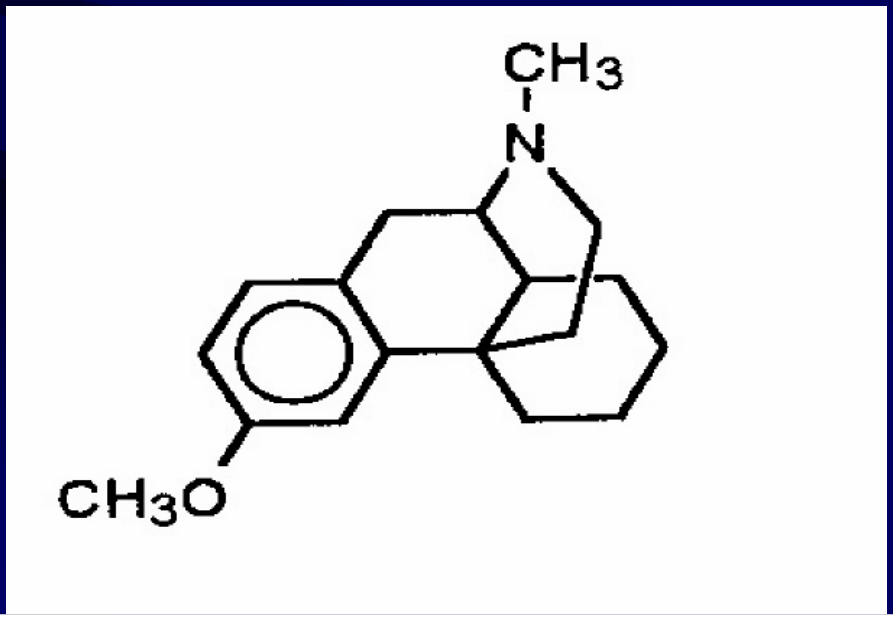
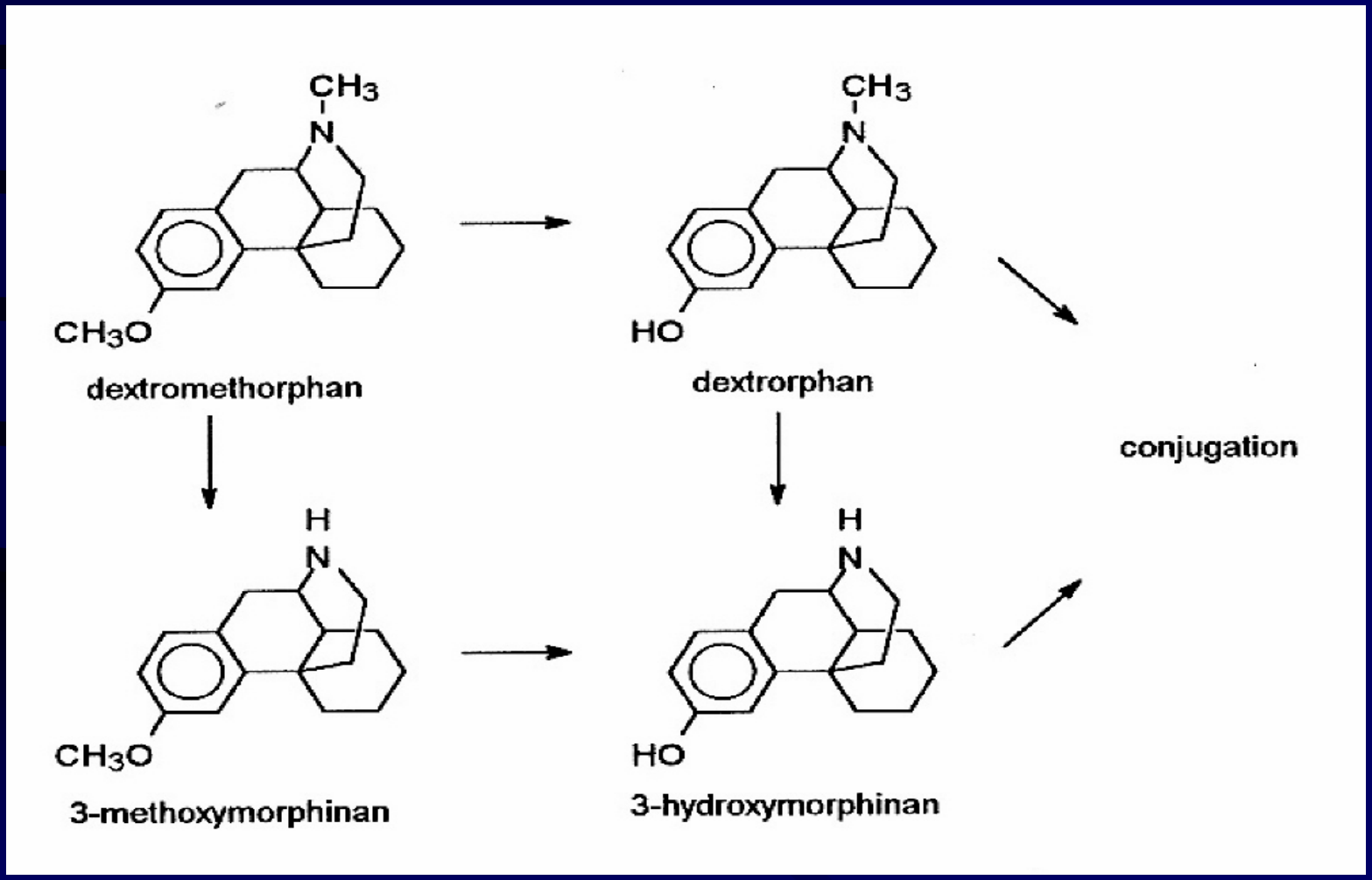
# Dextromethorphan (Romilar)

- Synthetic analogue of Codeine
- Not classified as a narcotic
- Used for its antitussive effects



# Dextromethophan Metabolism



# Dextromethorphan Metabolism, cont.

- 43% of Oral Dose Excreted in Urine Unchanged
- Major metabolite = Dextrorphan (d-isomer of Dromoran), an active antitussive
- Levorphanol (l-isomer of Dromoran) - synthetic compound having 4-5 times the analgesic potency of morphine
- Genetic Polymorphism has profound effects on metabolism
- CYP2D6 is specific P-450 enzyme
  - Fast metabolizers = 84 % of population (1/2 life of 1 hour)
  - Intermediate metabolizers = 6.8 % of population (1/2 life of 4 hours)
  - Poor metabolizers = 5 % of population (1/2 life of 12-16 hours) Very small amounts of Dextrorphan formed.

# Elimination of Dose

- Dextromethorphan and metabolites are excreted via the kidney
- The amount of Parent compound excreted depends on the type of metabolic phenotype

# TOXICODYNAMICS

- Complete actions are not known
- Dextromethorphan enhances serotonin activity by inhibiting the reuptake of serotonin
- Specific non-opioid binding sites are present in the CNS which mediate the antitussive effect. This site is separate from Codiene and other opiods.
- Dextromethorphan and metabolites do not have analgesic or addictive properties.

# Specifics about Abuse

- Common ingredient in OTC cough and cold medicines
- Primary abusers - Adolescents (13-19 yrs)
- OTC meds are percieved as “no risk” in abusing drug
- Slang terms: DM, Robo, Rojo, Velvet, Triple C, Skittles, Dex, Tussin, and Vitamin D.
- Slang terms for DXM intoxication: Robo Tripping, Skittling, and Dexing
- Most abusers ingest orally - some snort the pure powder
- Therapeutic Dose = 30 mg/6-8 hrs
- Abusers = 250 -1500 mg in one dose

# Abuse Specifics, Cont.

- OTC meds often contain Acetaminophen, Chlorpheniramine, and guaifenesin
- Large doses of acetaminophen can cause liver damage
  Chlorpeniramine - increased heart rate, lack of coordination, seizures, and coma
  guaifenesin - vomiting
- 1st time users may quit after side effects (esp.- vomiting)
- "Robo Shake" - term for ingesting large amount of cough syrup and force vomit = enough DXM, few side effects
- Experienced users extract DXM from cough meds to avoid side effects.

# Abuse Specifics, Cont.

- Acute Toxic Doses can cause:
  - blurred vision
  - body itching
  - rash
  - sweating
  - fever
  - hypertension
  - shallow respiration
  - diarrhea
  - toxic psychosis: floating, Hallucinations, paranoia, disoriented

- Coma
- increased heart rate
- increased blood pressure
- increased body temperature

# Abuser Specifics, Cont.

- Acute Toxic Dose - can cause violent behavior
- Acute Toxic Dose - Deaths are rare, but at least 7 known
- Long Term Effects: learning and/or memory impairment
- DXM Addiction: Questionable, many users describe cravings
- Poison Control Centers report calls for DXM Abuse increasing since 2000
  - 2000 1623 teenagers 900 others
  - 2001 2276 1107
  - 2002 2881 1139
  - 2003 3271 1111

# DXM Experience - Four Plateaus

- Abusers ingest increasing amounts to reach plateaus
- Reported effects at each Plateau:
  - 1st - Mild  inebriation
  - 2nd - similar to alcohol intoxication, maybe mild hallucinations. Speech slurred, short-term memory temporarily impaired.
  - 3rd - altered state of consciousness. Senses (vision) impaired
  - 4th - Mind & body dissociation (out-of-body). Loss of all or some contact with senses. Effects are comparable to PCP or ketamine.

# Where Do Teens Get DXM Information?

- In the 1990's a new generation of drugs became available - MDMA, GHB, & Ketamine
- Simultaneously the club drug revolution and the World wide web hit the scenes.
- Internet web pages that Inform and Teach about DXM:
  - www.erowid.org - www.lycaeum.org
  - www.thirdplataeu.com - www.clubdrugs.org

# Analytical Detection of Corricidin (Dextromethorphan & Chlorpheniramine)

- Common immunoassays do not detect
- GC/MS, LC/MS/MS, or TLC
- Comprehensive Toxicology Panel by GC/MS
  - Agilent Technologies - 6890N/MSD
  - HP column: HP - 5MS
  - Retention Index Time: DXM = 1.36 0.94
    Chlorphen = 1.29 0.89
  - LOD = 1 ng/ml
- Screen for 120 drugs and metabolites
- EMH Positives for DXM (15 months) = 15
- Abuse of DXM (mostly Corididing) = 7

# Case History #1

- 18 yr. Old Male Causcasian admitted at 11:06 AM
- Occupation - full-time student
- Elmhurst fire department called to high school
- Pt. Found trying to climb a hall wall
- Taken to nurse office and EMT called
- Admitted to ED with “heart racing” and shaky, trouble standing or sitting
- On admission: HR = 131  BP = 135/89  R = 18 Temp = 99  Oriented x3  alert and distress = mild

# Case #1, cont.

- Orders - Chest Xray = no acute pathology
  Labs - CBC, BMP, UA = normal, Sal = <4,
  Acetamin = <10, Alcohol = Neg, DAB = none
  Comp Tox = Chlorpheniramine,
  Dextromethorphan, and caffeine
- EKG - sinus tach
- Known meds = Wellbutin for degpression
- Tx = saline IV and monitor vitals
- 3 hrs later HR and BP back to normal and pt.
  Discharged into Behavioral Health for treatment.

# Case #2

- 16 yr old male admitted 4/16/2005 at 0415
- Parents witnessed Pt having generalized Tonic/Clonic seizure at home
- Paramedics called and gave Narcan, taken to ED
- Bp, HR, R = normal, Alert x3, Temp = 98.6
- Labs: BMP, CBC, UA = normal
- Sal = <4, Acetamin = none, Alcohol = none
- Comp Tox Scr = Cafeine, cotinine, Chlorpheniramine, DXM, and Levorphenol

# Case #2, cont.

- Pt admitted to taking 17 Coricidin tablets
- Pt abusing Coricidin for 5 months
- Pt released from treatment facility (32 days) just 1 week ago
- Pt stated “I just want to get high”
- Parents think Pt started on drugs in 8th grade.
- Pt expelled from high school
- Pt on house arrest for 1) stealing car, 2) purse snatching - assault/robbery
- Pt believes he relapsed because ran out of Paxil

# Case #2, cont.

- Pt admits to taking 32 Coricidin while on Paxil
- Pt denies halucinations
- Pt denies other drug abuse
- Pt discharged on 4/18 to Police, taken back to juvenile hall for probation violation of drugs
- Pt lacks insight and motivation for Treatment
- Pt cannot accept the consequences of his actions

# Case #3

- 13 yr old female admitted to ED on 7/28/2005 at 0330
- Bought to ED by police who found Pt disoriented, confused, unsteady attempting to walk on street
- Pt run-away from home (Milwaukee) with 17 yr old female friend
- Phys Exam = unremarkable,
- BP = 160/110, HR = 122, R = 18, Temp = 97.6, Pain = absent
- Labs: Preg = neg, Alcohol = 155 mg/dl, Comp Tox = Cotinine, DXM, Chlorpheniramine, THC = +; Chlamydia and Gonorr = +
- Genital Culture = Gonorr 2+ growth
- Pt unsteady, agitated, and disoriented to place and time on admission - 3 hours later improved

# Case #3, cont.

- Pt attended downtown Chicago club (unknown name)
- Met two males and agreed to oral and vaginal sex for $500.
- Went in car into suburbs - Pt engaged in oral and vaginal sex
- Pt was given alcohol, Weed, and Pills to swallow
- Pt left on side of road after getting agitated and combative - Pt not feeling good, heart racing
- Pt treated for sexual assault and maintain vital signs
- Pt discharged to Police and Wisconsin DCFS

# Conclusions:

- Most stories similar - troubled teenagers/ depressed
- Looking to escape; “to get high”
- DXM abuse among adolescents likely to increase as drug is OTC and inexpensive
- Adolescents perceive the risk of abuse to be low.
- Immunoassays cannot identify DXM ingestion
- Decreasing DXM abuse will require
  - increased public awareness
  - increased awareness of risks of abusing
  - increased diligence of parents, educators, healthcare providers, & law enforcement