NATIONAL PBM BULLETIN

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DEPARTMENT OF VETERANS AFFAIRS - VETERANS HEALTH ADMINISTRATION (VHA)
PHARMACY BENEFITS MANAGEMENT SERVICES (PBM), MEDICAL ADVISORY PANEL (MAP), AND
CENTER FOR MEDICATION SAFETY PSCI (VA MedSAFE)

"CONCENTRATION CONFUSION" WITH CONCENTRATED OPIOID SOLUTIONS

I. Issue

An alert from the Institute for Safe Medication Practices warns about potentially fatal errors that can occur with opioid concentrated oral solutions (See FDA Patient Safety News, Preventing Medical Errors, **Tragic Events with Concentrated Opiate Oral Solutions**.)

II. Background

Methadone, morphine, and oxycodone oral solutions come in regular and concentrated strengths.

Opioids with Regular and Concentrated Oral Solutions

Drug	Regular Solution	Concentrated Solution
Methadone	5 mg / 5 ml	50 mg / 5 ml†
	10 mg / 5 ml	
Morphine	10 mg / 5 ml	100 mg / 5 ml
	20 mg / 5 ml	
Oxycodone	5 mg / 5 ml	100 mg / 5 ml

† Methadone concentrated solution is FDA-approved for Medication Substitution Therapy for opioid dependence only (not for pain).

Opioid overdose may occur when the concentrated oral solution opioids are confused with the regular concentrations. Many factors can contribute to the "concentration confusion." For example, pharmacies may store concentrated products near the regular products; ordering screens may express concentrations in various terms (e.g., 20 mg / ml or 100 mg / 5 ml); and physicians may prescribe oral solutions in milliliters instead of milligrams.

III. Recommendations

- Consider nonopioid analgesics (e.g., acetaminophen, nonsteroidal anti-inflammatory drugs), co-analgesic medications (e.g., antidepressants, and antiepileptics) and, when appropriate, nondrug therapies such as pain procedures (e.g., nerve blocks and ablations) to enhance pain relief with opioids.
- Avoid sedatives such as benzodiazepines that might interact with opioids to increase risk for respiratory depression.
- As recommended by ISMP:
    - Reserve concentrated solutions for patients who either need higher than usual doses because of severe chronic pain, or who can't swallow larger volumes of liquid.
    - Always prescribe and dispense liquid medications with the dose specified in milligrams.
    - Build alerts into computer order entry systems to warn about potential mix-ups between various concentrations of oral opioid solutions.
    - Consider adding the word "concentrated" immediately after the drug name on computer screens to better differentiate concentrated products from other concentrations.
    - Use barcode scanning to verify that the right product was selected. When the concentrated formulation is scanned, a hard stop alert should require pharmacist documentation.
    - Purchase and dispense concentrated solutions in dropper bottles. This can help prevent dose-measurement errors and to differentiate the concentrated solution from other non-concentrated strength solutions.
    - And finally, counsel all patients or their caregivers about how to use oral opioid solutions safely. To check their understanding, have them repeat back this information and demonstrate how to measure the dose. Advise them to question any change in product appearance, because this could signal an error in prescribing or dispensing the drug.
- Provide the patient with a clearly and simply written instructional handout for liquid opioids.
- PBM will modify drug names on order screens to clarify the concentrated solutions of methadone, morphine, and oxycodone.
- **Report any cases of opioid overdose related to confusion between the regular and concentrated strengths of opioid oral liquids to the VA ADERS program.**

IV. Reference

ISMP Medication Safety Alert! Community/Ambulatory Care Edition. Tragic Events with Concentrated Opiate Oral Solutions. Volume 7, Issue 7. July 2008. http://www.ismp.org/Newsletters/ambulatory/archives/200807-1.asp .