Common Urine Drug Screen Misinterpretations

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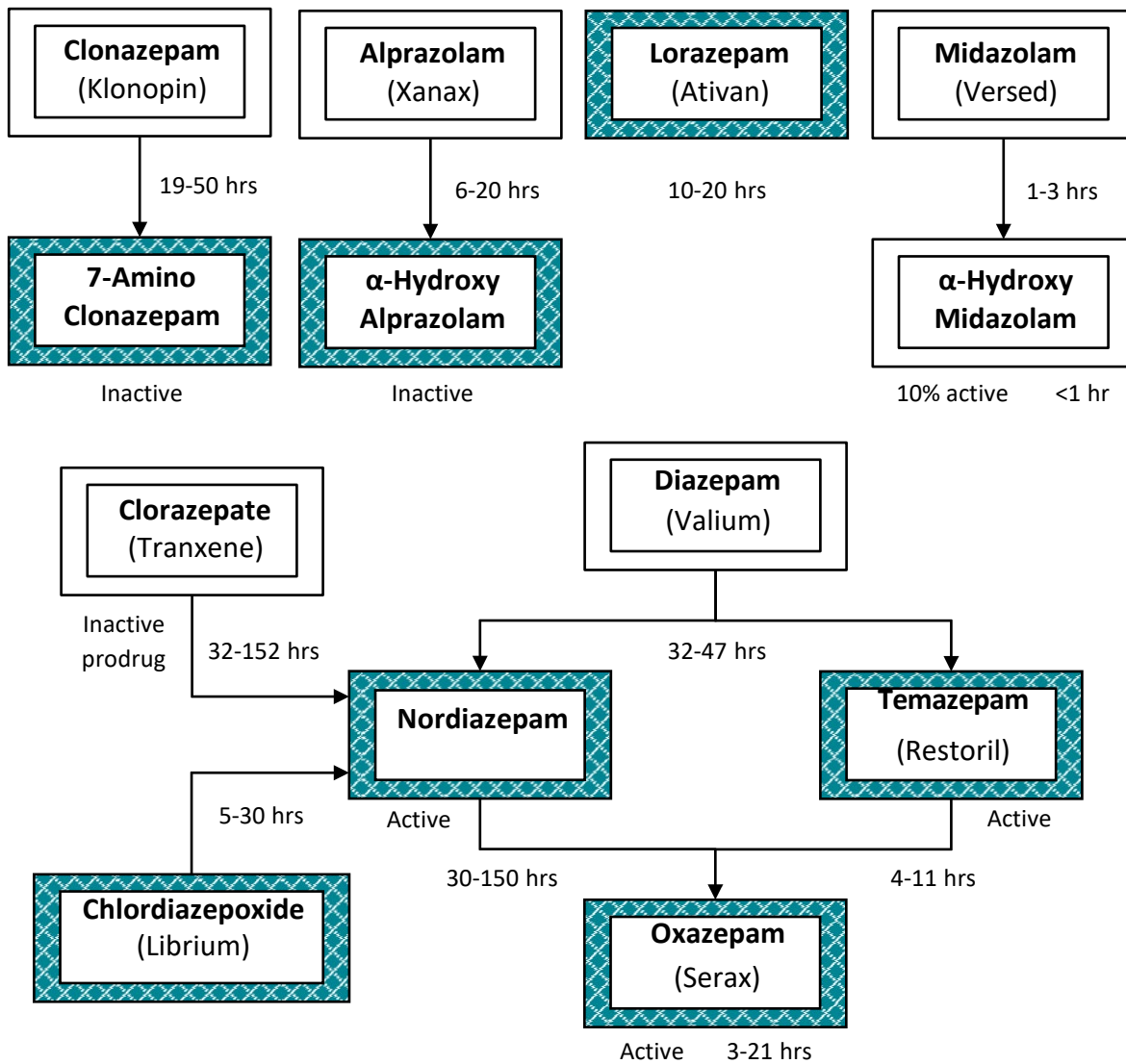
Background:

Urine drug screening has become more prominent in clinical practice with NMMB regulations and best practice. With this increased use of the screening, many providers find themselves in a position such that clinical decisions are made based on results of this screening. However, as with any test, there is a margin of error in interpretation. This is a guide to aid in the interpretation of benzodiazepine and opioid assays, which are commonly misinterpreted assays.

Benzodiazepine Testing Tips

Ordered Test	Will detect Positive result	Does NOT detect Negative result	May or may not be positive
UDATR- rapid UDM Also Quick Tox- POC in clinic	Diazepam Oxazepam Temazepam Librium	Clonazepam Lorazepam	Alprazolam
UDM basic	Diazepam Oxazepam Temazepam Librium	Clonazepam Lorazepam	Alprazolam
UDM Pain	Diazepam Oxazepam Temazepam Librium	Clonazepam Lorazepam	Alprazolam
Confirmatory testing (MBENZ)	Diazepam Oxazepam Temazepam Librium Clonazepam Lorazepam Alprazolam		

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BENZODIAZEPINE METABOLISM

Teal outline indicates compounds that are confirmed at TriCore Reference Laboratories with test code MBENZ. Times are elimination half-lives.

Clonazepam (Klonopin)	**Alprazolam** (Xanax)	**Lorazepam** (Ativan)	**Midazolam** (Versed)

19-50 hrs   6-20 hrs   10-20 hrs   1-3 hrs

7-Amino Clonazepam	**α-Hydroxy Alprazolam**		**α-Hydroxy Midazolam**

Inactive   Inactive   10% active   <1 hr

Clorazepate (Tranxene)

Diazepam (Valium)

Inactive prodrug   32-152 hrs   32-47 hrs

Nordiazepam   **Temazepam** (Restoril)

5-30 hrs   Active   Active

30-150 hrs   4-11 hrs

Chlordiazepoxide (Librium)

Oxazepam (Serax)

Active   3-21 hrs

Screen cut-off: 200 ng/mL

LC-MS/MS Confirmation cut-off: 10 ng/mL for all compounds

Notes

- The UBENZ test code screen is not sensitive to 7-Aminoclonazepam, and does not detect metabolic glucuronide forms of Lorazepam or Oxazepam.
- Therapeutic doses of oxaprozin (DAYPRO) may cause a false positive result.
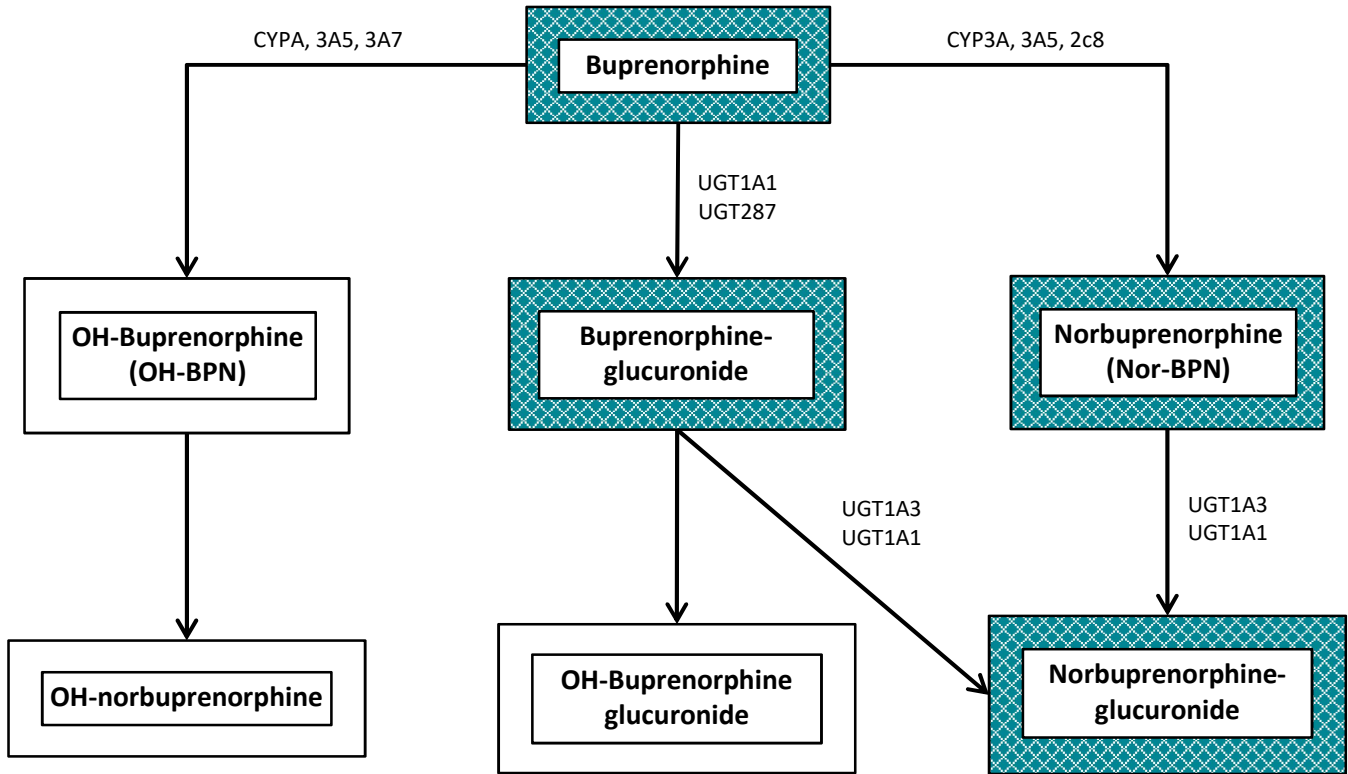
Opioid Testing Tips

Ordered Test	Will detect Positive Result	Does NOT detect Negative result	May or may not be positive
UDATR- rapid UDM in hospital	Codeine Morphine Hydrocodone Hydromorphone Heroin Methadone- own line	Oxycodone Fentanyl Buprenorphine Tramadol	Very high doses of oxycodone may cause + opiate
Quick Tox- POC in clinic	Codeine Morphine Hydrocodone Hydromorphone Heroin Methadone- own line Oxycodone- own line	Buprenorphine Tramadol Fentanyl	Very high doses of oxycodone may cause + opiate
UDM basic	Codeine Morphine Hydrocodone Hydromorphone Heroin	Oxycodone Fentanyl Tramadol Buprenorphine Methadone	Very high doses of oxycodone may cause + opiate
UDM Pain	Codeine Morphine Hydrocodone Hydromorphone Heroin Meperidine Methadone Oxycodone Fentanyl Tramadol	Buprenorphine	Very high doses of oxycodone may cause + opiate as well as oxycodone
Confirmatory Testing (MXOPIT)	Codeine Morphine 6-MAM (heroin) Hydrocodone Hydromorphone Oxycodone Oxymorphone	Buprenorphine Tramadol Fentanyl Methadone	
Specific confirmatory tests	Buprenorphine= MBUP Methadone= MMTDN Fentanyl= MFEN Tramadol= MTRAM Meperidine = MMEP		

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Teal outline indicates compounds that are confirmed at TriCore Reference Laboratories with test code MXOPIT.

Major Metabolite — Minor Metabolite — Manufacturing Impurity — * Forms Glucuronide Metabolites

Screen cut-off: 300 ng/mL

Confirmation cut-off: 50 ng/mL for all compounds, except 6-MAM at 5 ng/mL

Notes

- The UOPIT test code screen is not sensitive to oxycodone and oxymorphone; instead, use the UOXYC test code.
- Therapeutic doses of ofloxacin (Floxin) or levofloxacin (Levaquin) may cause a false positive screen result.
- Ingestion of poppy seed products can cause a positive result.

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Teal outline indicates compounds that are confirmed at TriCore Reference Laboratories with test code MBUP.

Metabolism: CYP3A4 and 3A5 (65%), CYP2C8 (30%), and with less active CYP2C9, CYP2C18, and CYP2C19.
Norbuprenorphine is the active metabolite

CYPA, 3A5, 3A7

Buprenorphine

CYP3A, 3A5, 2c8

UGT1A1
UGT287

OH-Buprenorphine (OH-BPN)

Buprenorphine-glucuronide

Norbuprenorphine (Nor-BPN)

UGT1A3
UGT1A1

UGT1A3
UGT1A1

OH-norbuprenorphine

OH-Buprenorphine glucuronide

Norbuprenorphine-glucuronide

Parent compound and metabolites	Typical Normal (ng/mL)	Typical Inconsistent (ng/mL)
Buprenorphine	<2 to 100	>200
Buprenorphine-glucuronide	Positive	<2
Norbuprenorphine	Positive	<2 to 100
Norbuprenorphine- glucuronide	Positive	<2

Notes
- There are various reasons for an inconsistent result (e.g. genetics, pill shaving, manufacturer impurities, etc.)
- Clinical judgment and patient history should be taking into account in addition to test results when evaluating a patient case