Substance Abuse and Mental Health Services Administration

SAMHSA

www.samhsa.gov • 1-877-SAMHSA-7 (1-877-726-4727)

Behavioral Health is Essential To Health

Prevention Works

Treatment is Effective

People Recover

Substance Abuse and Mental Health Services Administration
SAMHSA
www.samhsa.gov • 1-877-SAMHSA-7 (1-877-726-4727)

NLCP Opioid Qualifying PT Results

Cynthia Lewallen, M.S.
RTI International

DEPARTMENT OF HEALTH & HUMAN SERVICES · USA

Timeline for Qualifying PT Activities

- January 23, 2017 - Revisions to the Urine Mandatory Guidelines published with effective date of October 1, 2017
  - Addition of four new analytes
  - Addition of MDA as an initial test analyte
  - Raising pH cutoff for reporting as adulterated from 3.0 to 4.0
- March 7, 2017 - NLCP sent 18 practice samples to laboratories
  - Identified with the single analyte, target concentration, and mean concentration from 5 laboratories
  - Verify performance of immunoassay and confirmation methods
  - Not required to report results

Timeline for Qualifying PT Activities (cont'd)

- May 1, 2017 - Set 1 of Qualifying PT samples shipped
- June 12, 2017 - Set 2 shipped
- July 24, 2017 - Set 3 shipped
- October 9, 2017 - First Maintenance PT set incorporating the new opioids and pH adulteration change will be shipped to all NLCP laboratories
  - **One time total of 40 PT samples with an additional week for testing**

New Analytes and Cutoffs

Analyte	Initial Cutoff (ng/mL)	Confirmatory Cutoff (ng/mL)
Hydrocodone (HYC)	300	100
Hydromorphone (HYM)	300	100
Oxycodone (OXYC)	100	100
Oxymorphone (OXYM)	100	100

Opioid Confirmatory Instrumentation

Analyte	GC-MS	LC-MS/MS
COD, MOR (before revised Guidelines)	26	1
COD, MOR	18	9
HYC, HYM, OXYC, OXYM	14	13

Qualifying PT Design

- Initial and confirmatory test for all analytes on all samples
- Analyte concentrations range from 0.4 to 20 times the confirmatory cutoff
- Potential interferents
- Hydrolysis efficiency
- MDA initial test
- pH challenges

Opioid PT Design

Purpose	Set 1	Set 2	Set 3
Initial test challenge (0.5x cutoff)		X	
Initial test challenge (at cutoff)			X
Initial test challenge (1.25x cutoff)	X		
Initial test challenge (1.5x cutoff)		X	
Initial test challenge (2x cutoff)	X		
40% of conf. cutoff (no interferences)	X	X	X
Interferences with analytes at 40% of conf. cutoff	X	X	X
Hydrolysis challenge	X	X	
Various conf. quantitation challenges	X	X	X

Set 1 - Immunoassay Performance

Single Analyte Per Sample	Confirm Group Mean (ng/mL)	Thermo-fisher DRI (Pos/Labs)	Siemens EMIT (Pos/Labs)	Lin-Zhi (Pos/Labs)
HYC	388	28/28		
HYM	380	28/28		
OXYC	131	23/23	4/4	1/1
OXYM	131	23/23	4/4	1/1

Glucuronide samples

Analyte	Target Glucur-onide (Free) (ng/mL)	Hydrolyzed Confirm Group Mean Free (ng/mL)	Thermo-fisher DRI (Pos/Labs)	Siemens EMIT (Pos/Labs)	Lin-Zhi (Pos/ Labs)
HYM gluc	1,215 (736)	772	28/28		
OXYM gluc	403 (250)	250	23/23	0/4	1/1

Set 2 - Performance at the Cutoff

Analyte	Mean (ng/mL)	Acceptable range	Minor errors
HYC	105	83 – 127	2
HYM	101	81 – 121	1
OXYC	103	81 – 125	2
OXYM	102	78 – 126	1

- Each opioid at the confirmation cutoff
- Only minor errors
  - One lab – all four analytes
  - One lab HYC and OXYC only

Opioid Minor Errors

Analytes	Quantitative Errors		
	Minor >20% from mean		
	Set 1	Set 2	Set 3
HYC	4	4	1
HYM	7	3	
OXYC	4	4	5[a]
OXYM	3	3	5[a]
Total errors (%total results)	**18** (2.7%)	**14** (2.0%)	**11** (1.5%)

a: single lab with 9 of 10 errors

Opioid Major Errors

Analytes	Quantitative Errors		
	Major >50% from mean		
	Set 1	Set 2	Set 3
HYC			1[b]
HYM			
OXYC			
OXYM			
Total errors (%total results)			**1** (0.1%)

b: norhydrocodone present = 4,000 ng/mL

Confirmation False Negatives

Analytes	Confirmation False Negatives		
	Set 1	Set 2	Set 3
HYC	4[c]		
HYM	3[c]		
OXYC	3[c]		2[d]
OXYM	3[c]		
Total errors (%total results)	**13** (1.9%)		**2** (0.3%)

c: all but 1 false negative due to interference from codeine=39,041 and morphine=39,566 ng/mL

d: noroxycodone and noroxymorphone present = 1,000 ng/mL each

Set 1 Remedials

- Most common error: confirmation false negative
  - Interference from high levels of morphine and codeine with opioids at 40% of the cutoff
  - Integration and/or ion ratio errors
- One lab changed from GC-MS to LC-MS/MS
- Another lab validated an alternate GC-MS method
- Other labs revised methods

Set 2 Remedials

- Only minor quantitation errors (outside +/- 20%)

Set 3 Remedials

- Confirmation false negative for OXYC
  - Integration error – staff training
  - Ion ratio errors – method modifications
- Quantitation errors (11 minor, 1 major)
  - One lab with 9 minor quantitation errors due to degradation of OXYC and OXYM calibrator
    - Purchase calibrator from commercial source
    - May change from GC-MS to LC-MS/MS
  - One major quantitation error due to interference from norhydrocodone
    - Developed alternate method

Summary of Qualifying PT Sets

- No false negative immunoassay results for the new opioids at 1.25x the cutoff
- Confirmatory quantitative challenges for the new opioids had minor error rates similar to the current analytes
- All required remedial actions for PT errors will be completed by October 1
- Method validations and qualifying PT data reviewed at inspections starting in September