PA PQC Virtual Session
March 20, 2025

Continuing Education Information

In support of improving patient care, this activity has been planned and implemented by the University of Pittsburgh and The Jewish Healthcare Foundation. The University of Pittsburgh is jointly accredited by the **Accreditation Council for Continuing Medical Education (ACCME)** and the **American Nurses Credentialing Center (ANCC)**, to provide continuing education for the healthcare team. **1.0 hours are approved for this course.**

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Learning Objectives

- Define and distinguish screenings from confirmatory toxicology tests

- Identify the limitations and nuances inherent in toxicology tests

- Review and discuss the implications of documented inequitable toxicology testing practices, including bias and stigma, impact on care, and disparities in testing

Milestone #1: Changing for 2025
Engage With PA PQC Coach

- Milestone 1 will no longer be tied to virtual session attendance

- Engage meaningfully with your PA PQC QI coach **at least** once per quarter

- Examples of engagement might include:
  - Reciprocal interaction between Healthcare Team and QI coach
    - Incorporating your coach into your Healthcare Team meeting
    - 1-on-1 meeting with your coach
  - Other engagement opportunities as agreed upon by your team and your coach

- What doesn't count?
  - Email updates to QI coach
  - One-sided communications

Agenda

1. **Welcome** – Sara Nelis, RN, Program Manager, Jewish Healthcare Foundation

2. **Dangers of Universal Urine Drug Testing** – Dr. Laurie Halmo, MD, FAAP, Assistant Professor of Pediatrics and Medical Toxicologist, University of Colorado School of Medicine

3. **Q & A** – Facilitated by Dr. Laurie Halmo, MD, FAAP

4. **Wrap-up & Next Steps** – Sara Nelis, RN

Dangers of Universal Urine Drug Testing

DR. LAURIE HALMO, MD, FAAP, ASSISTANT PROFESSOR OF PEDIATRICS AND MEDICAL TOXICOLOGIST

Meaningful and Equitable Perinatal Toxicology Testing

Laurie Seidel Halmo, MD, FAAP

Assistant Professor of Pediatrics

University of Colorado School of Medicine

Volunteer Faculty, Rocky Mountain Poison and Drug Safety

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Disclosures

None

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What can tox testing tell you?

A tox test MIGHT tell you if a patient was exposed to a substance or a class of substances

A tox test WILL NOT tell you:
- Who administered the drug
- The route of administration
- How much drug was administered
- When the exposure occurred
- Whether, and to what degree, a person was impaired/intoxicated
- **Whether a person was/is fit to parent or is a safe caregiver**

Percent of Children Removed with Parental Alcohol or Drug Abuse as an Identified Condition of Removal by Age, 2019

Under Age 1
National Average 50.7%

N = 675,936
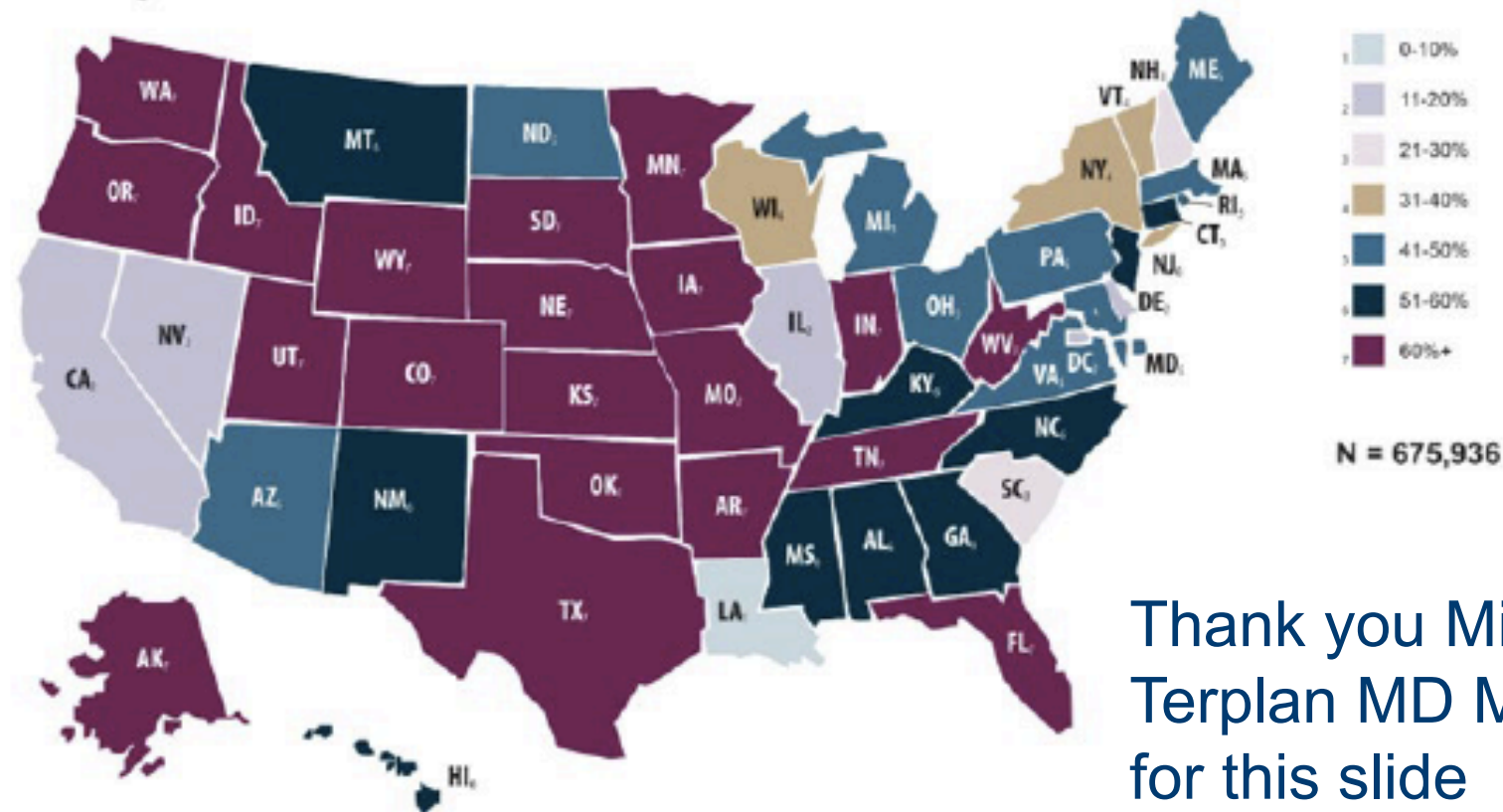
Thank you Mishka Terplan MD MPH for this slide

HRW, 2022, www.hrw.org/report/2022/11/17/if-i-wasnt-poor-i-wouldnt-be-unfit/family-separation-crisis-us-child-welfare

Confusing words

Screening:

- Process of gathering information from patient about substance use
- Use clinician-administered or self-administered validated tool
- ALL PREGNANT AND BIRTHING PEOPLE should be screened for substance use

Testing:

- Collection of a biological sample that assesses for the presence of a substance and/or its metabolite
- A positive SCREEN does not always necessitate a toxicology TEST

Screening Tests vs. Confirmatory Tests

Screening tests:

- Usually immunoassays

- Usually qualitative

- Riddled with false positives and false negatives

- Inexpensive

- Fast

- Readily available

Confirmatory tests:

- Usually HPLC, GC/MS or LC/MS (or similar)

- Quantitative

- Highly accurate and precise

- Expensive

- Slow

- Usually requires "sending out"

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Nuances of urine drug screening tests

What you find depends on what you look for and where you look for it

Cross reactivity is a major problem for immunoassays

There is a "threshold" or minimum amount necessary to make the test read "positive"

What you find depends on what you look for

Hospital 1:
- Amphetamines
- Benzodiazepines
- Cocaine metabolites
- Methadone
- Opiates

Hospital 2:
- Amphetamines
- Barbiturates
- Benzodiazepines
- Cannabinoids
- Cocaine metabolites
- Ethanol
- Opiates
- Phencyclidine

Hospital 3:
- Amphetamines
- Barbiturates
- Benzodiazepines
- Cannabinoids
- Cocaine metabolites
- Methadone
- Methamphetamine
- Opiates
- Oxycodone
- Phencyclidine
- Propoxyphene
- Tricyclic antidepressants
- Buprenorphine

Comparison of umbilical cord tissue and meconium for the confirmation of in utero drug exposure

Jennifer M. Colby

…and where you look for it
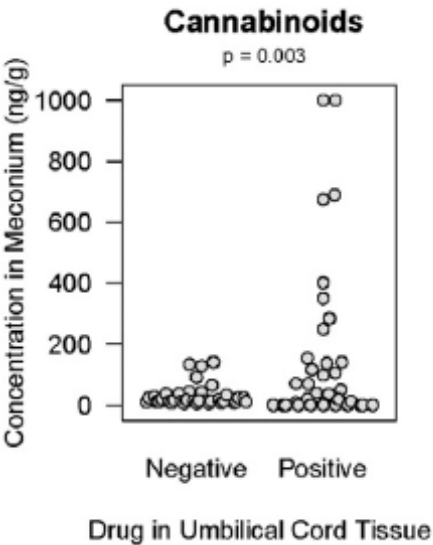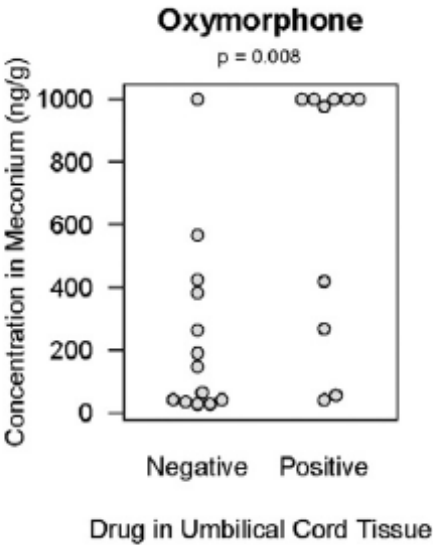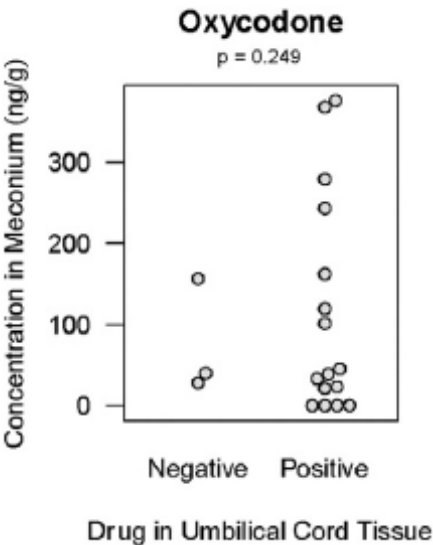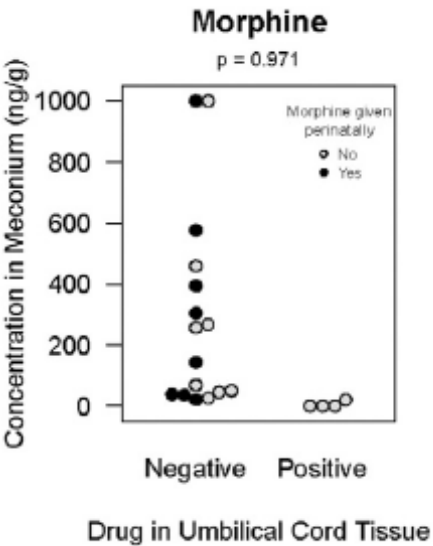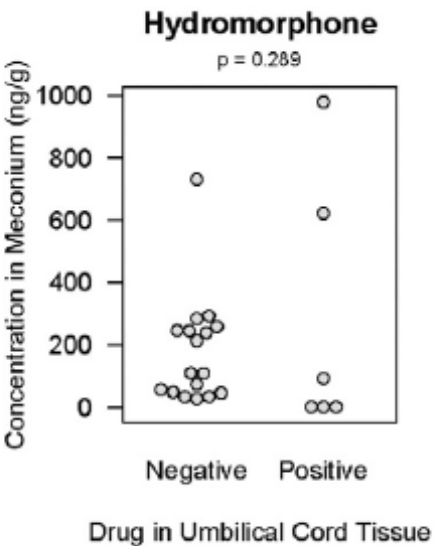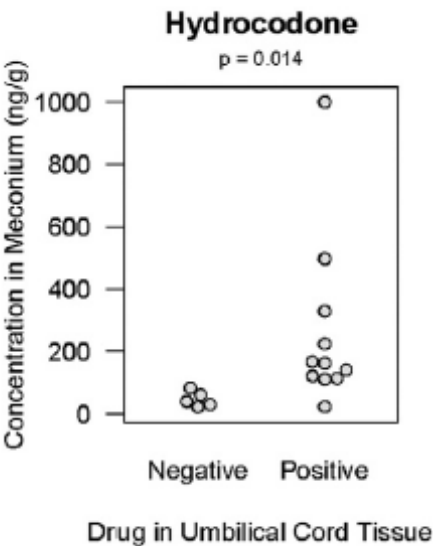
Cross Reactivity (and lack thereof)
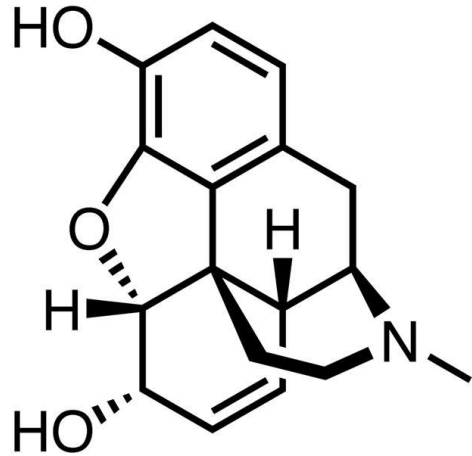
Morphine
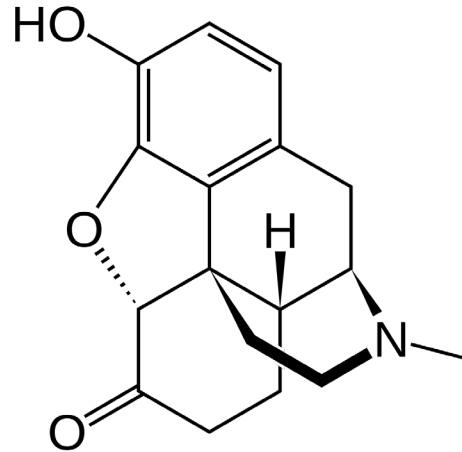
Hydromorphone
(Dilaudid)
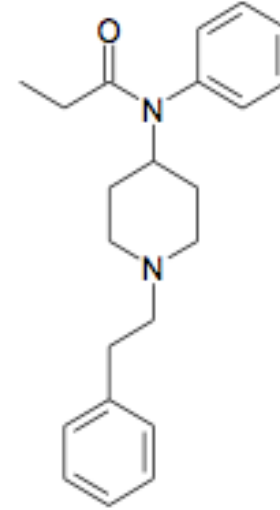
Fentanyl

Cross Reactivity
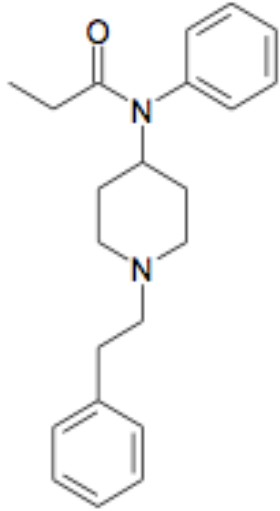
Fentanyl
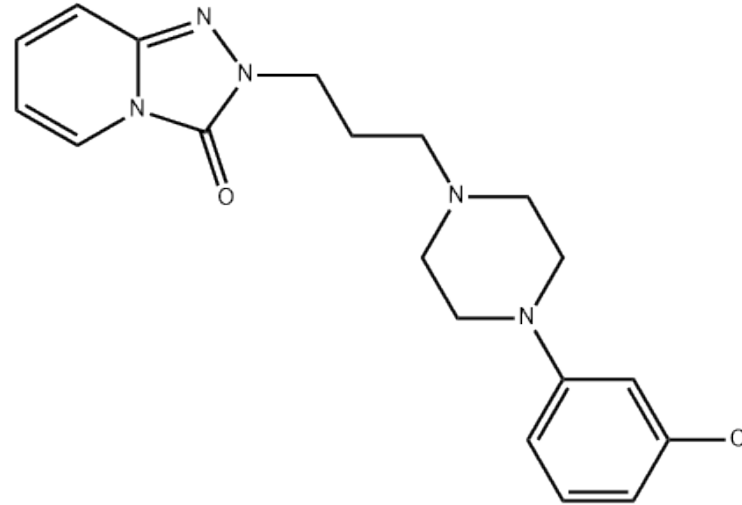
Trazodone
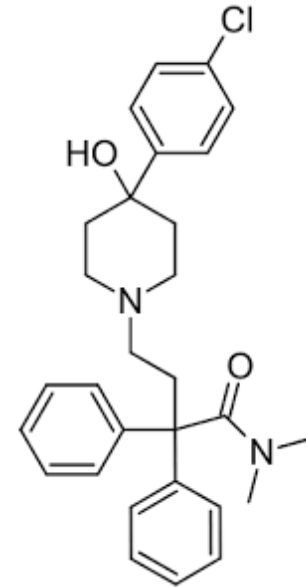
Loperamide

Documented causes of fentanyl false + UDS

Loperamide (Geno 2022)

Risperidone (Shroitman 2021)

Ziprasidone (Waters 2003)

Labetalol (Wanar 2022) **btw this pt was pregnant

Methamphetamine (Abbott 2022)

Haloperidol (Wang 2024)

Trazodone (Wang 2024)

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Performance of Two Fentanyl Immunoassays against a Liquid Chromatography–Tandem Mass Spectrometry Method

Sheng Feng, Theodore J. Rutledge, Maureen Manzoni, Thuan Le, JoAnn Gardiner, Michael Milone, Leslie Shaw and Ping Wang*

Immunoassay		LC–MS-MS	
		Positive	Negative
ARK	Positive	57	8
	Negative	0	217
SEFRIA	Positive	54	44[a]
	Negative	3	181

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Performance of Fentanyl Immunoassays in an ED Patient Population

Catherine M. Mills,[a] Parker C. Dryja,[a,b] Elizabeth Champion-Lyons,[a] Charles Keppler,[a] and Nikolina Babic [a,*]

		Fentanyl present[a]	Fentanyl absent[b]	Total
ARK II	Detected	19	2	21
	Not detected	1	188	189
	Total	20	190	210
SEFRIA	Detected	19	5	24
	Not detected	1	185	186
	Total	20	190	210

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8/65 positives were false + (12.3%)

2/21 positives were false + (9.5%)

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Common causes of false positives

Drug Classification	Potential Interference
Amphetamines	ADHD medications Decongestants Bupropion Ephedrine (Ma Huang)
Methadone	Diphenhydramine Doxylamine Vortioxetine Quetiapine
Phencyclidine	Dextromethorphan Ketamine Diphenhydramine
TCA	Diphenhydramine Quetiapine Cyclobenzaprine

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Cross reactivity across brands

Drug	Company 1	Company 2	Company 3
l-Amphetamine	1	101	100
d.l-Amphetamine	88	58	100
Methamphetamine	100	100	100
d,l-Methamphetamine	77	65	100
MDA	116	2	100
MDMA	196	69	30
Ephedrine	1	1	50
Fenfluramine	1	1	10
Pseudoephedrine	1	1	100

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DOT thresholds for positivity (aka cut offs)

Initial Test Analyte	Initial test cutoff	Confirmatory analyte	Confirmatory test cutoff concentration
Marijuana Metabolites (THCA)	50 ng/m	THCA	15 ng/mL
Cocaine Metabolite (Benzoylecgonine)	150 ng/mL	Benzoylecgonine	100 ng/mL
Phencyclidine (PCP)	25 ng/mL	Phencyclidine (PCP)	25 ng/mL
Amphetamine			
Amphetamine	500 ng/m	Amphetamine	250 ng/mL
Methamphetamine	500 ng/mL	Methamphetamine	250 ng/mL
MDMA/MDA	500 ng/mL	MDMA/MDA	250 ng/mL
Opioids			
Codeine/Morphine	2000 ng/mL	Codeine/Morphine	2000 ng/mL
6-Acetylmorphine (6AM or Heroin)	10 ng/mL	6-Acetylmorphine (6AM or Heroin)	10 ng/mL
Hydrocodone	300 ng/mL	Hydrocodone	100 ng/mL
Hydromorphone	300 ng/mL	Oxymorphone	100 ng/mL
Oxymorphone	100 ng/mL	Oxymorphone	100 ng/mL
Oxycodone	100 ng/mL	Oxycodone	100 ng/mL

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Take home point #1: toxicology testing is much more nuanced, complex, and limited than most healthcare providers appreciate

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True or False: the prevalence of substance use during pregnancy is higher among Black individuals than among white individuals

False

Table 1: Last Month Prevalence of Any Drug Use or NMU by Demographic or Other Characteristics Among Pregnant Women Ages 18-49 Years

	Last Month Any Drug Use/NMU[a] Prevalence % (95% CI)	p-value[b]
Race[c]		
White	9.01 (5.16, 12.87)	0.7382
Black	10.83 (0.78, 20.88)	0.7355
Other	Suppressed	–

Seidel Halmo L, Rockhill K, Black JC, Dart RC, Iwanicki JL (2019). Prevalence of illicit drug use and non-medical prescription drug use among pregnant women in the United States. RADARS® System Technical Report, 2019-Q4.

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White	9.01 (5.16, 12.87)	0.7382
Black	10.83 (0.78, 20.88)	0.7355
Other	Suppressed	–
Marital Status		
Married	7.41 (3.39, 11.42)	0.1401
Divorced/Separated/Widowed	7.49 (0.44, 14.53)	
Never Married	15.15 (5.81, 24.49)	
Education		
High School or Less	11.12 (3.05, 19.20)	0.7423
Some College	10.25 (3.38, 17.12)	
Bachelor's Degree or Higher, Trade School	7.89 (3.16, 12.62)	
Household Annual Income		
<$50,000	11.12 (5.35, 16.90)	0.5093
$50,000-99,999	6.72 (2.51, 10.92)	
≥$100,000	9.29 (0.32, 18.25)	

Seidel Halmo L, Rockhill K, Black JC, Dart RC, Iwanicki JL (2019). Prevalence of illicit drug use and non-medical prescription drug use among pregnant women in the United States. RADARS® System Technical Report, 2019-Q4.

Racial differences in indications for obstetrical toxicology testing and relationship of indications to test results

Nicola C. Perlman MD; David E. Cantonwine PhD MPH; Nicole A. Smith MD MPH

TABLE
Characteristics of mothers with and without toxicology testing

Characteristic	Mothers without toxicologic testing: 2015 2018 (n=19,723)	Mothers with toxicologic testing: 2015 2018 (n=551)	value[a]
Race			
White	11,104 (56.3)	201 (36.6)	.001
Black	2702 (13.7)	172 (31.2)	
Asian	2110 (10.7)	8 (1.4)	
Hispanic	1972 (10.0)	76 (13.9)	
American Indian	39 (0.2)	6 (1.1)	
Other	1400 (7.1)	56 (10.1)	
Unknown	414 (2.1)	32 (5.8)	

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Racial differences in indications for obstetrical toxicology testing and relationship of indications to test results

Nicola C. Perlman MD; David E. Cantonwine PhD MPH; Nicole A. Smith MD MPH

Marital status	Not tested	Tested	
Single	5049 (25.6)	344 (62.5)	.001
Married	13,964 (70.8)	153 (27.7)	
Legally separated	99 (0.5)	16 (2.8)	
Unknown	256 (1.3)	17 (3.0)	
Divorced	138 (0.7)	10 (1.9)	
Life partner	118 (0.6)	9 (1.7)	
Other	99 (0.5)	2 (0.4)	
Mean yearly income by residential ZIP code			
57,917	5818 (29.5)	296 (53.8)	.001
57,918 82,442	4635 (23.5)	139 (25.2)	
82,443 100,788	4714 (23.9)	80 (14.5)	
> 100,789	4556 (23.1)	36 (6.5)	

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What are common indications for sending a perinatal toxicology test at your institution?

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Perlman et al 2021
PMID 34373267

TABLE 3 Maternal and Neonatal Indications for Testing.

Indication	Total ($N = 86$), n (%)
Placental abruption	5 (5.8)
Preterm premature rupture of membranes	1 (1.2)
Preterm labor	2 (2.3)
Multiple indications	4 (4.7)
None	9 (10.5)
History of substance use disorder	33 (38.4)
Reports use	1 (1.2)
Maternal marijuana use	21 (24.4)
Limited prenatal care	5 (5.8)
Neonatal examination findings	6 (7.0)

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Maternal marijuana use	21 (24.4)
Limited prenatal care	5 (5.8)
Neonatal examination findings	6 (7.0)

Koenigs et al 2022
PMID 35354087
Maternal indications for tox testing

Maternal complications 20%

Nonprescribed substance use excluding cannabis 23%

Maternal cannabis use 33%

Retrospective analysis of the diagnostic yield of newborn drug testing

Kelly E Wood[1*], Lori L Sinclair[2], Carolyn D Rysgaard[2], Frederick G Strathmann[3,4], Gwendolyn A McMillin[3,4] and Matthew D Krasowski[2]

Table 3 Most common risk factor indications for newborn drug testing

History of maternal non-medical drug use[2]

Inadequate Prenatal care

Maternal/Family Social risk factors

History of domestic violence by partner

History of child abuse/protective services involvement

Incarceration

Other factors

Unexplained placental abruption

Unexplained maternal HBV, HCV, or HIV infection[4]

Unexplained infant seizures, stroke, brain infarction

Congenital malformations in newborn

Maternal age < 18 years old

Untreated maternal psychiatric illness[3]

Unexplained prematurity

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Take home point #2: Black birthing parents are tox tested more often than their white counterparts, even though the prevalence of substance use during pregnancy is the same in both groups.

This is in part due to the indications used to trigger a tox test, many of which (e.g. various pregnancy complications) which occur more often in Black birthing individuals

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Which of the following has been shown to be associated with a positive toxicology test in the medical literature?

A. Placental abruption

B. Preterm labor

C. Congenital malformations in a newborn

D. Intrauterine growth restriction

E. Tobacco use during pregnancy

F. All of the above

Which of the following has been shown to be associated with a positive toxicology test in the medical literature?

A. Placental abruption
B. Preterm labor
C. Congenital malformations in a newborn
D. Intrauterine growth restriction
E. **Tobacco use during pregnancy**
F. All of the above

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Retrospective analysis of the diagnostic yield of newborn drug testing

Kelly E Wood[1*], Lori L Sinclair[2], Carolyn D Rysgaard[2], Frederick G Strathmann[3,4], Gwendolyn A McMillin[3,4] and Matthew D Krasowski[2]

	Results of meconium testing			
	Group A	Group B	Group C	Group D
	No drug(s) or metabolite(s) detected[1] (n = 1,916)	All findings explained by prescribed medication(s) (n = 283)	Non-medical drug use detected[2] (n = 229)	Unexplained drug(s) or metabolite(s) detected (n = 69)
Unexplained placental abruption	1.0%	3.9%	0.9%	2.9%
Unexplained infant seizures, stroke, brain infarction	0.5%	3.9%	0.4%	2.9%
Congenital malformations in newborn	5.5%	14.5%	1.3%	7.2%
Maternal age < 18 years old	3.7%	3.8%	0.8%	2.8%
Untreated maternal psychiatric illness[3]	22.5%	21.9%	20.5%	20.3%
Unexplained prematurity	26.5%	57.6%	22.3%	46.4%
History of domestic violence by partner	4.5%	2.8%	6.6%	4.5%
History of child abuse/protective services involvement	4.0%	3.9%	5.2%	2.9%

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Unexplained positive drug screen during pregnancy	1.5%	3.2%	14.0%***	2.9%
Maternal self-report of prior non-medical drug use	4.5%	4.9%	27.1%***	1.4%
Non-medical drug use in previous pregnancy	0.5%	0.4%	3.1%**	0.0%
Previous infant exposure to non-medical drug use	1.0%	0.0%	0.9%	0.0%
Documented prior history of non-medical drug use	16.0%	15.5%	52.4%***	17.4%
Tobacco use during current pregnancy	33.0%	24.0%	51.1%***	36.2%
Total maternal non-medical drug use including tobacco	43.5%	37.5%	90.8%***	50.7%

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Take home point #3: Many commonly used indications for tox testing are not, in fact, more likely to identify birthing parents with positive tox tests

Take home point #3: Many commonly used indications for tox testing are not, in fact, more likely to identify birthing parents with positive tox tests

Incidentally, many of these indications overlap with those that occur more often in non-white (especially Black) patients.

The indication that most reliably predicts a positive tox test result is a known history of substance use during pregnancy.

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Universal screening for alcohol and drug use and racial disparities in Child Protective Services reporting

Sarah C. M. Roberts[1,2] and **Amani Nuru-Jeter**[2]

Percent of all newborns in the county reported to CPS related to maternal AOD use 2005-2007

	Newborns reported n (%)	Total births n
White	121 (0.84)	14355
Black	124 (3.46) ***	3582
Hispanic/Latino	35 (0.24) ***	14485
Asian/Pacific Islander	27 (0.34) ***	7771

*** p<.001, Chi-square test compared to White

Reunification for young children of color with substance removals: An intersectional analysis of longitudinal national data

PMID **32799013**

0-4 years	Adjusted HR	95% CI	P-value
SUD POC	REF	REF	
SUD White	1.13	(1.02, 1.24)	<0.05
No SUD POC	1.62	(1.46, 1.80)	<0.001
No SUD White	1.47	(1.33, 1.62)	<0.001

In summary: tox testing can be harmful

Inappropriate interpretation

Racial/ethnic disparities in toxicology testing and in child welfare reporting specifically related to substance use

Damage to the therapeutic alliance during this and future healthcare encounters

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But also: tox testing can be beneficial

Diagnostic tool to guide medical management

Demonstrate abstinence or compliance with therapy

Help inform safety of breastmilk use

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Then when am I supposed to test?!?!

https://illuminatecolorado.org/supportcolorado/

Scroll down to where it says "Resources" (about 2/3 down the page)

Click "Toxicology Testing Resources" (or keep scrolling down and you'll get to the same place)

INDICATIONS FOR TOXICOLOGY TESTING
in Colorado Birthing Facilities

SuPPoRT
Colorado
Supporting Perinatal substance use Prevention,
Recovery, and Treatment in Colorado

Indications for tox testing: birthing parent

1) Signs and symptoms of intoxication, withdrawal, or altered mental status

2) If desired by the birthing person

3) Birthing person desires to chest/breastfeed, AND one or more of the following conditions exist:

- Report of substance use or positive urine toxicology test during last trimester of pregnancy.
- Birthing person has an active substance use disorder and is not engaged in treatment.

Note: If birthing person is involved in treatment, it is strongly recommended to consult with providers who have an ongoing relationship with the birthing person to assess the level of engagement with recovery

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Indications for tox testing: newborn

1) Newborn exhibits symptoms consistent with intoxication or withdrawal

2) Newborn's birthing parent meets criteria for toxicology testing, **AND** results would alter medical management of the newborn

3) Newborn with physical stigmata of FASD*

Tox test result comes back…

Informed consent

Opportunity to build/enhance the therapeutic alliance

Necessary before testing a birthing person unless the patient lacks capacity

Best practice in most cases of newborn testing. If consent is not obtained, testing should only be sent if there is a compelling medical need

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Common concerns

If I ask for consent, the parent will refuse

If I don't test someone/everyone, I might miss covert substance use

If I miss covert substance use, the baby will be in danger (and if something happens, it will be my fault)

Isn't it safest/best to just test/remove baby until we know for SURE that the household is safe?

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In summary

Tox testing is complicated

Tox testing can be harmful and can be beneficial

If you order a tox test, you should be able to articulate **precisely** how the results will change your <u>clinical</u> management and get consent first

If you have concerns about an infant or child's safety, you should make a report to child welfare, regardless of whether tox testing is planned or has been performed (and regardless of the results, if performed)

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Thank you!

Questions? Comments? Rude remarks?

Email me! Laurie.halmo@childrenscolorado.org

References included throughout, but I can email you a list if you'd like

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Wrap-Up

SARA NELIS, RN

Upcoming Virtual Sessions

APRIL 16

Preparing for Sustainment

11:00 a.m. – 12:00 p.m.

Zoom

JUNE 11

TBD

11:00 a.m. – 12:00 p.m.

Zoom

MAY

No virtual sessions this month – register and join us at our in-person Annual Meeting in Altoona!

Blair County Convention Center

One Convention Center Drive
Altoona, PA 16602

Annual Meeting

PA PQC

Pennsylvania Perinatal Quality Collaborati

Save the Date

05.21.25

Register today
deadline is 5/19!

The PA PQC
Annual Meeting is
an in-person
event, there
is no option to
attend virtually.

Learn about the Initiatives

Access Session Materials

https://www.papqc.org/

Updated Contact Info.

Upcoming changes to your email address? Haven't heard from us in a while?

→ Please reach out to your coach to provide them updated contact info. for anyone at your site who is involved in the PA PQC

→ If you haven't gotten a newsletter or PA PQC emails in a while, check to make sure you are subscribed to our newsletter with your updated email address

→ You can always reach us [here](#) →
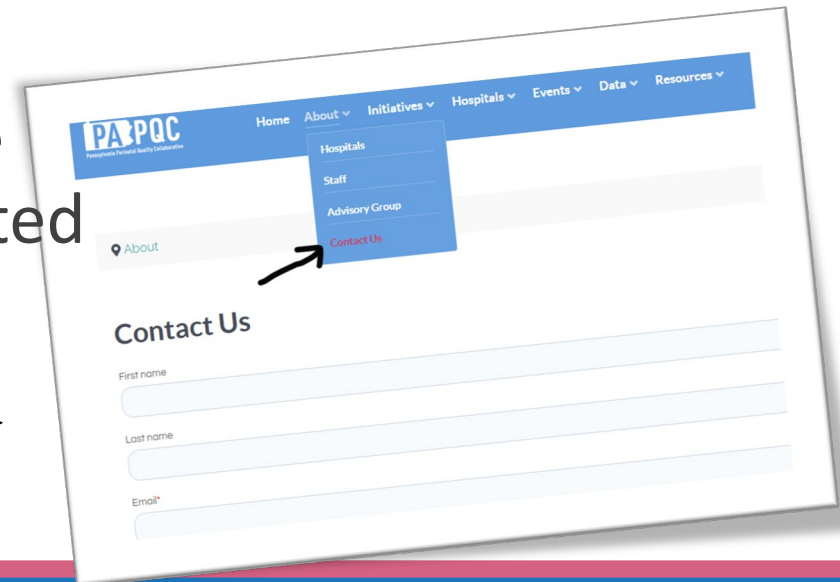
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Geisinger Health &
NEPaPQC

Maureen Saxon-Gioia,
MSHSA, BSN, RN

Nurse Project Manager,
Jewish Healthcare
Foundation

Credentialing Guidelines:

PLEASE complete the electronic evaluations by <u>Thursday, March 27th</u>:
https://www.surveymonkey.com/r/NZN3JZD

1. Please indicate on the evaluation which CEUs you are requesting: CME, CNE or Social Worker credits.

2. The UPMC Center for Continuing Education will follow up with you, via email, after <u>Thursday, March 27th</u> to notify you about how you can claim your credits.

    ❑ To prepare, we recommend you create an account with UPMC CCE via this website https://cce.upmc.com.

Thank You!

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