PhenX Pediatric Development Working Group
Neonatal Abstinence Syndrome

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Neonatal Abstinence Syndrome (NAS)

• Definition
  – Clinical syndrome resulting from the abrupt discontinuation of fetal exposure to addictive substances (Kocherlakota, 2014)
  – Develops in 55-94% of infants exposed in utero to opioids, sedatives, barbiurates, anti-depressant medications, or alcohol (Tierney, 2013)

• Concepts
  – Diagnosis is based on regular assessment for physical signs of withdrawal in an otherwise healthy infant

• Considerations
  – Withdrawal symptoms typically present 24-72 hours after birth and continue up to 39 days or more
  – Syndrome varies based on single or poly-substance use, duration, dose, etc.
Existing measurement protocols in PhenX Toolkit

- All appropriate for *maternal* assessment
  - Duration of Abstinence – Alcohol / Substance Use
  - Substances – 30-Day Frequency
  - Substance Abuse and Dependence – Alcohol / Drugs
  - Medication Inventory

- No Existing Measure of Neonatal Withdrawal
Description of measurement protocols in PhenX Toolkit

- There are no existing measures of NAS
Missing elements

- Assessment of NAS based on infant signs
- Objectivity of measure
- Ease of assessment / special training
Filling in the gaps

• Finnegan Neonatal Abstinence Severity Score (NASS)
  – 32 items, weighted for potential for clinical significance
  – Infants scored at 2hr of life, then q4h x 5 days or until symptoms abate
  – Treatment (medication dosing) based on scoring parameters
  – NAS scoring reduces drug treatment compared to non-use
  – Inter-rater reliability 0.75 - 0.96

• Modified Finnegan Neonatal Abstinence Severity Score (mNASS)
  – NASS abbreviated to 21 items
  – Used extensively, but not validated
  – Good existing support for training/use (http://neoadvances.com)
Filling in the gaps

- **Neonatal Drug Withdrawal Scoring System, AKA “the Lipsitz”**
  - 11 equally-weighted clinical symptoms are scored twice daily
  - Included in the 1998 AAP statement on NAS
  - The only validation study is 30 yrs old
  - Inter-rater reliability 0.92 with 77% sensitivity

- **Neonatal Narcotic Withdrawal Index (NNWI)**
  - 7 weighted indicators are scored
  - Developed primarily to measure methadone withdrawal
  - Inter-rater agreement of 0.71 for individual items, 0.90 for total score
Filling in the gaps

- **Neonatal Withdrawal Inventory (NWI)**
  - 7 weighted signs are scored
  - Compared to NASS (Finnegan), inter-rater reliability superior to that (0.89-0.98 vs 0.70-0.88) and sensitivity and specificity 100% at syndrome detection and treatment threshold levels

- **Withdrawal Assessment Tool – 1**
  - 11-item weighted scale of withdrawal signs/symptoms scored
  - Designed for use in the PICU (pediatric patients 7mo – 10 yrs) following hospital-exposure to opioids and benzodiazepines
  - Concurrent validity sensitivity 0.872; specificity 0.880
Recommendations to the WG

- Modified Finnegan Neonatal Abstinence Severity Score (mNASS)
  - Widely used and widely considered the “gold standard”
  - Low concern about lack of validation study

- Neonatal Withdrawal Inventory (NWI)
  - Shorter than mNASS with good performance

- Continue review for emerging measures (?NASCORE)