

Inclusion Criteria:

- NICU infants ≥ 34 0/7 weeks GA at birth being treated with inhaled Nitric Oxide for PPHN
- Refer to PPHN guidelines for optimization of Respiratory Management

Exclusion Criteria:

- BPD
- CDH
- Pulmonary HTN team is consulted

FiO₂ weaning parameters:

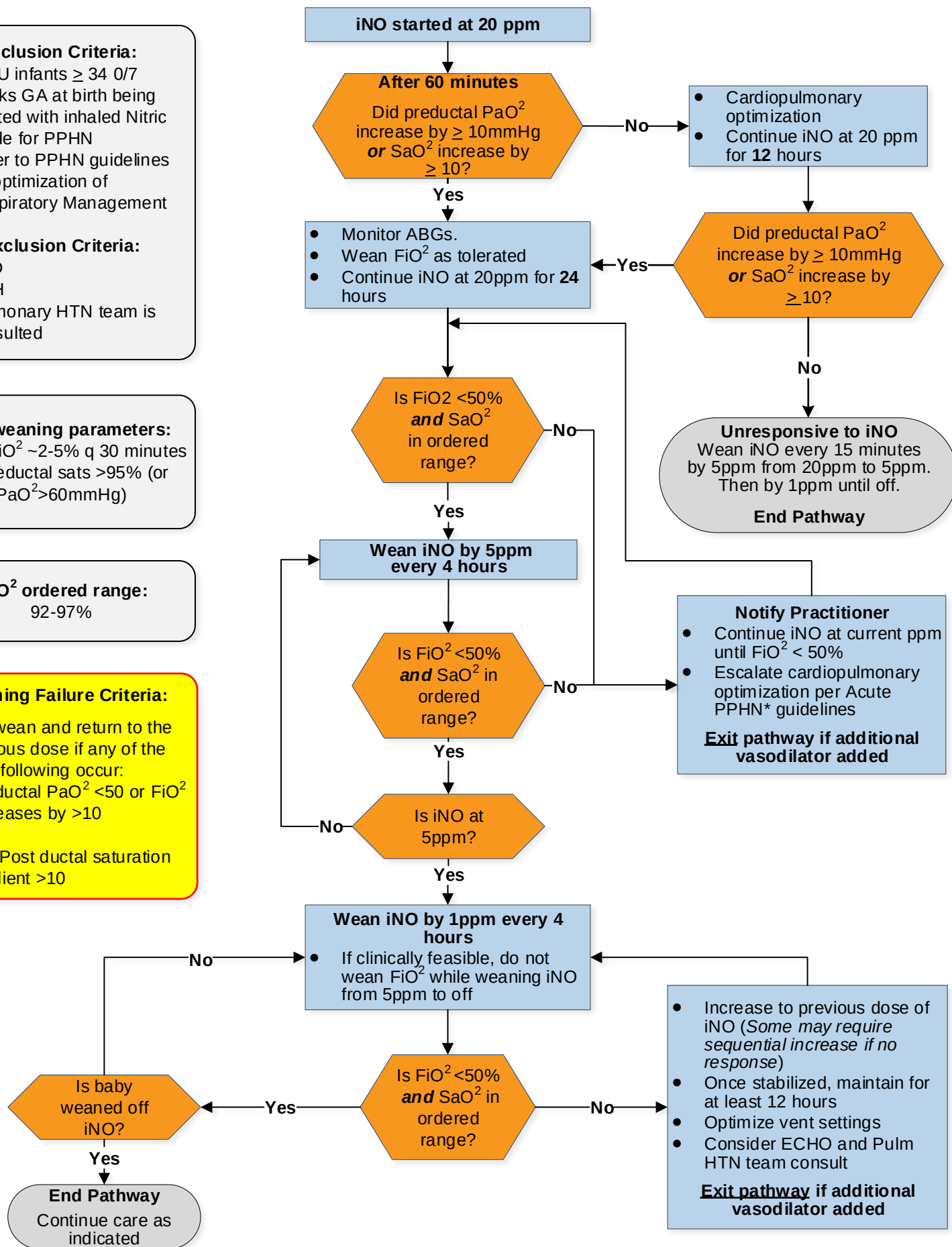
Wean FiO₂ ~2-5% q 30 minutes for preductal sats >95% (or PaO₂ >60mmHg)

SaO₂ ordered range:
92-97%

Weaning Failure Criteria:

Stop wean and return to the previous dose if any of the following occur:

- Preductal PaO₂ <50 or FiO₂ increases by >10
OR
- Pre/Post ductal saturation gradient >10



Inclusion & Exclusion Criteria

Inclusion Criteria

- NICU infants ≥ 34 0/7 weeks at birth being treated with inhaled Nitric Oxide for PPHN

Exclusion Criteria

- BPD
- CDH
- Premature infants < 34 weeks
- If Pulmonary HTN team is consulted

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Assessment & Monitoring

- Frequent Monitoring of Blood gases, preferably arterial
- Frequent calculation of OI with every blood gas
- Weaning FiO2 per parameters
- Ensure Cardiopulmonary optimization
- It is suggested that the lowest effective doses of iNO and O2 be used, to avoid excessive exposure to NO, Nitric dioxide (NO2), and methemoglobin (MetHb).
 - Check metHgb q 24 hours. If a patient is on iNO for 2 weeks, then the labs are spaced out to q.o.d
 - If metHgb > 5%, wean iNO if possible; if metHgb > 10%, treat with methylene blue, ascorbic acid after discussion with pharmacy.
- Nitric dioxide (NO2) alarm set NO2 alarm at 1 ppm.

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Treatments Not Recommended

- Doses greater than 20 ppm are not recommended
- Continuation of the pathway if additional vasodilator added
- Continuation of the pathway if no response as per the algorithm

[iNO Algorithm](#)

Risk Awareness & Zero Hero

Harmful impact on continuing iNO in the patient cohort that does not respond to iNO

[iNO Algorithm](#)

Key References

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- Stenger, Michael R., et al. "Hospital variation in nitric oxide use for premature infants." Pediatrics 129.4 (2012): e945-e951.
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- DiBlasi, Robert M., Timothy R. Myers, and Dean R. Hess. "Evidence-based clinical practice guideline: inhaled nitric oxide for neonates with acute hypoxic respiratory failure." Respiratory care 55, no. 12 (2010): 1717-1745.
- Finer, N. N. (2001). Sun JW, Rich W, Knodel E, and Barrington KJ. Randomized, prospective study of low-dose versus high-dose inhaled nitric oxide in the neonate with hypoxic respiratory failure. Pediatrics, 108, 949-955.
- Thomas, C. A., & Valentine, K. (2018). Utility of routine methemoglobin laboratory assays in critically ill pediatric subjects receiving inhaled nitric oxide. Journal of Critical Care, 48, 63-65.

[iNO Algorithm](#)

Quality Measures & Clinical Support Tools

Goals

1. Wean iNO appropriately and in a timely manner
2. Limit excessive use of iNO
3. Discontinue iNO when no response

Potential Areas of Research

Incidence of late responders and non-responders

Quality Measures

Outcome Measure

iNO utilization in number of hours

Process Measures

Process Measure 1: Utilization of the order set amongst those eligible (Was the order set used Yes No)

Process Measure 2: For patients where FiO_2 remains $< 50\%$ for 30 hours,

1. Was the iNO wean started (defined as any decrease in iNO)?
2. Was iNO discontinued during that timeframe of 30 hours?

Balancing Measure

1. Number of patients where iNO was restarted within 24 hours of discontinuation.
2. Rate of Methemoglobin level $>10\%$ in any patient on iNO

[iNO Algorithm](#)

Pathway Team & Process

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Advisory Committee Date: September, 2022

Origination Date: *September, 2022*

Next Revision Date: *September, 2025*

Clinical Pathway Development

This clinical pathway was developed using the process described in the NCH Clinical Pathway Development Manual Version 6, 2022. Clinical Pathways at Nationwide Children's Hospital (NCH) are standards which provide general guidance to clinicians. Patient choice, clinician judgment, and other relevant factors in diagnosing and treating patients remain central to the selection of diagnostic tests and therapy. The ordering provider assumes all risks associated with care decisions. NCH assumes no responsibility for any adverse consequences, errors, or omissions that may arise from the use or reliance on these guidelines. NCH's clinical pathways are reviewed periodically for consistency with new evidence; however, new developments may not be represented, and NCH makes no guarantees, representations, or warranties with respect to the information provided in this clinical pathway.

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