

CLINICAL GUIDE TO INTERPRETATION OF FeNO VALUES¹⁻³

MANAGEMENT OF PATIENTS DIAGNOSED WITH ASTHMA, TREATED WITH ICS OR COMBINATION THERAPY

	LOW	INTERMEDIATE	HIGH
FeNO value (ppb), patients ≥12 years of age	<25	25-50	>50
FeNO value (ppb), patients <12 years of age	<20	20-35	>35
	In the case of a >40% increase from previously stable levels, interpret as high FeNO.		
Consider as significant increase in FeNO	Increase >10 ppb from last measurement		Increase >20% from last measurement
Consider as response to ICS	Decrease >10 ppb from last measurement		Decrease ≥20% from last measurement
CONSIDERATIONS FOR THERAPY	Symptomatic	<ul style="list-style-type: none"> Possible inadequate ICS treatment <ol style="list-style-type: none"> Check adherence Check for poor inhaler technique Consider adding other therapy apart from ICS (eg, LABA) Consider ICS dose increase 	<ul style="list-style-type: none"> Inadequate ICS treatment <ol style="list-style-type: none"> Check adherence Check for poor inhaler technique Consider ICS dose increase Risk for exacerbation may be increased, especially if patient is not on an ICS Consider steroid resistance (rare)
	Asymptomatic	<ul style="list-style-type: none"> Implies patient is adherent to treatment Consider dose reduction, or in case of current low ICS dose, consider ICS withdrawal altogether (repeat FeNO 4 weeks later to confirm this judgement; if it remains low, relapse is unlikely) 	<ul style="list-style-type: none"> No change in ICS dose if FeNO trend is stable over time Check adherence Check for poor inhaler technique
ALSO CONSIDER	Additional or alternative diagnoses to consider in symptomatic patients	<ul style="list-style-type: none"> Anxiety/Hyperventilation Cardiac disease COPD GERD Noneosinophilic asthma Rhinosinusitis Vocal cord dysfunction Cystic fibrosis Primary ciliary dyskinesia (FeNO <5 ppb) 	<ul style="list-style-type: none"> High levels of allergen exposure Infection as a reason for worsening symptoms
	<p>Smoking has been shown to reduce FeNO levels.</p>		<ul style="list-style-type: none"> High levels of allergen exposure Infection as a reason for worsening symptoms

COPD = chronic obstructive pulmonary disease; FeNO = fractional exhaled nitric oxide; GERD = gastroesophageal reflux disease; ICS = inhaled corticosteroid; LABA = long-acting beta agonist.

FeNO tests using NIOX MINO® are reimbursable: **CPT 95012**



CLINICAL GUIDE TO INTERPRETATION OF FeNO VALUES¹⁻³

MANAGEMENT OF PATIENTS WITH ONGOING OR RECENT ASTHMA-LIKE SYMPTOMS, NOT TREATED WITH ICS OR COMBINATION THERAPY

	LOW	INTERMEDIATE	HIGH
FeNO value (ppb), patients ≥12 years of age	<25	25-50	>50
FeNO value (ppb), patients <12 years of age	<20	20-35	>35
	In the case of a >40% increase from previously stable levels, interpret as high FeNO.		
Consider as significant increase in FeNO	Increase >10 ppb from last measurement		Increase >20% from last measurement
Interpretation with respect to steroid response*	Unlikely to respond to corticosteroids	May respond to corticosteroids (interpret cautiously in clinical context)	Highly likely to respond to corticosteroids
POSSIBLE ALTERNATE DIAGNOSES	Other causes to consider	<ul style="list-style-type: none"> • High levels of allergen exposure • Infection as a reason for worsening symptoms 	<ul style="list-style-type: none"> • Atopic asthma • High-levels of allergen exposure • Infection as a reason for worsening symptoms • COPD with mixed inflammatory phenotype • Eosinophilic bronchitis
	<ul style="list-style-type: none"> • Anxiety/Hyperventilation • Cardiac disease • COPD • GERD • Noneosinophilic asthma • Rhinosinusitis • Vocal cord dysfunction • Cystic fibrosis • Primary ciliary dyskinesia (FeNO <5 ppb) <p>Smoking has been shown to reduce FeNO levels.</p>		

COPD = chronic obstructive pulmonary disease; FeNO = fractional exhaled nitric oxide; GERD = gastroesophageal reflux disease; ICS = inhaled corticosteroid.

*Interpretations of levels based on patient having symptoms (cough and/or wheeze and/or shortness of breath) present during the past 6+ weeks.

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References: 1. Dweik RA, Boggs PB, Erzurum SC, et al; on behalf of the American Thoracic Society Committee on Interpretation of Exhaled Nitric Oxide Levels (FeNO) for Clinical Applications. An official ATS clinical practice guideline: interpretation of exhaled nitric oxide levels (FeNO) for clinical applications. *Am J Respir Crit Care Med.* 2011;184:602-615. 2. Taylor DR, Pijnenburg MW, Smith AD, Jongste JCD. Exhaled nitric oxide measurements: clinical application and interpretation. *Thorax.* 2006;61:817-827. 3. Boggs P, Jain N, Lanz M, et al. Consensus statement on the use of fractional exhaled nitric oxide (FeNO) in the clinical management of asthma. White paper from: Consensus Meeting at National Jewish Health; July 20, 2009; Denver, CO. http://www.nationaljewish.org/pdf/PROED_FENO_ClinicalManagementAsthma.pdf. Published December 2009. Accessed January 17, 2012.

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