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Correction

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'Diagnosing Asthma in General Practice with Portable Exhaled Nitric Oxide Measurement – Results of a Prospective Diagnostic Study: FENO \leq 16 ppb better than FENO \leq 12 ppb to rule out mild and moderate to severe asthma

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Correction

In our study to evaluate the diagnostic accuracy of FENO measurement with NioxMino® for the diagnosis of asthma in general practice, we found the cut-off at FENO \leq 12 ppb to rule out mild and moderate to severe asthma with a negative predictive value of 81% (95%CI 64–91%) [1]. We oriented ourselves at the already established value of 12 ppb [2]. However, we overlooked in the ROC analysis that the overall diagnostic accuracy improves slightly when the cut-off is chosen at FENO \leq 6 ppb (revised table two) [see table 1]. Negative likelihood ratio was 0.38 (95%CI 0.22–0.64) and positive likelihood ratio was 1.76 (95%CI 1.37–2.26) using the 16 ppb cut-off (revised table three) [see Table 2].

In patients with unsuspected spirometric results (n = 101; not in table) there was no improvement of diagnostic accuracy. The best cut-off point was at FENO \leq 16 ppb again. In this diagnostic group sensitivity was 78% (95%CI 63–89%), specificity was 45% (95%CI 34–57%), PPV was 45% (95%CI 34–57%) and NPV was 78% (95%CI 63–89%).

Table two [see Table 1 below] illustrates that the patient group with correctly excluded asthma by FENO measurement increases at FENO \leq 6 ppb; and the range of the confidence interval narrows. Thus three patients need to be diagnosed for excluding asthma in order to save one bronchial provocation test when FENO \leq 16 ppb is used as the cut-off point. With FENO \leq 12 ppb five patients need to be tested in order to exclude asthma in one of them. Therefore, we suggest choosing FENO \leq 6 ppb to rule out mild and moderate to severe asthma. This improves diagnostic efficiency compared to the \leq 12 ppb cut-off point.

We would like to correct the following points in the manuscript:

In the **Results** section of the **Abstract** lines 6–7 should read as:

"16 ppb (n = 68; 42.5%), sensitivity was 79% (95%CI 67–88), specificity 55% (95%CI 45–64), PPV 50% (95%CI 40–60), NPV 82% (95%CI 72–90)".

Also in line 7, "Three" should say "Two".

Table 1: Sensitivity (sens), specificity (spec), positive predictive value (PPV) and negative predictive value (NPV) at different cut-off points (n = 160); unit of FENO is parts per billion

Asthma diagnoses	FENO	sens [%] (95%CI)	spec [%] (95%CI)	PPV [%] (95%CI)	NPV [%] (95%CI)	n
Borderline BHR mild BHR moderate to severe BHR positive bronchodilator reversibility (n = 75)*	> 12	85 (76–92)	24 (16–34)	50 (41–58)	65 (47–79)	126
	> 16	69 (58–79)	53 (42–63)	57 (46–66)	66 (54–76)	92
	> 20	64 (53–74)	58 (47–77)	57 (47–67)	65 (53–74)	82
	> 35	32 (25–42)	84 (74–90)	63 (47–77)	58 (49–67)	38
	> 46	32 (23–43)	93 (85–97)	80 (63–91)	61 (52–69)	30
	> 76	13 (7–23)	100 (96–100)	100 (72–100)	57 (49–65)	11
Mild BHR moderate to severe BHR positive bronchodilator reversibility (n = 58)§	> 12	90 (79–95)	25 (17–34)	40 (32–49)	81 (64–91)	126
	> 16	79 (67–88)	55 (45–64)	50 (40–60)	82 (72–90)	92
	> 20	67 (54–78)	62 (52–71)	50 (39–61)	77 (67–85)	82
	> 35	36 (25–49)	83 (75–89)	55 (40–70)	70 (61–77)	38
	> 46	36 (25–49)	91 (84–95)	70 (52–83)	72 (63–79)	30
	> 76	17 (10–29)	100 (96–100)	100 (72–100)	68 (60–75)	11

*prevalence of asthma = 46.9%, prevalence of 'no asthma' = 53.1%

§ prevalence of asthma = 36.3%, prevalence of 'no asthma' = 63.7%

In the **Conclusion** section of the **Abstract**, in line 2, "FENO \leq 12 ppb" should say "FENO \leq 16 ppb".

In the **Sensitivity analyses** section, in line 2 of the third paragraph, "FENO \leq 12 ppb" should say "FENO \leq 16 ppb", "81% (95% CI 64–91)" should say "82% (95% CI 72–90)" and "34" should say "68". In line 3, "FENO \leq 12 ppb" should say "FENO \leq 16 ppb" and "five" should say "three". In line 4 "12 ppb" should say "16 ppb". The sentence starting in line 5 and ending in line 6 should read: "Sensitivity was 78% (95%CI 63–89), specificity was 45% (95%CI 34–57), PPV was 45% (95%CI 34–57), NPV was 78 (95%CI 63–89)". In line 6, "16 (15.8%)" should say "37 (36.6%)", "FENO \leq 12 ppb" should say "FENO \leq 16

ppb" and "increased up to 82% (95%CI 64–92)" should say "was 77% (95%CI 61–88)".

In the **Discussion** section, in line 4, "81%" should say "82%" and in line 5, "FENO \leq 12" should say "FENO \leq 16"

In the second paragraph, in line 1, "five" should say "three". In line 5, "16 patients had FENO \leq 12 ppb" should say "37 patients had FENO \leq 16 ppb". Also in line 5, "three" should say "two" and in lines 11 and 12 "FENO \leq 12 ppb" should say "FENO \leq 16 ppb" and "12 ppb < FENO" should say "16 ppb < FENO".

In the third line of the third paragraph "12 to 46 ppb" should say "16 to 46 ppb" and in the seventh line, the sec-

Table 2: Likelihood ratio at different cut-off points (n = 160); unit of FENO is parts per billion; LR+ is positive likelihood ratio, LR- is negative likelihood ratio

Asthma diagnoses	FENO	LR+ (95%CI)	LR- (95%CI)
Borderline BHR, mild BHR, moderate to severe BHR, positive bronchodilator reversibility (n = 75)	> 12	1.12 (0.96–1.30)	0.62 (0.32–1.21)
	> 16	1.47 (1.12–1.93)	0.58 (0.39–0.86)
	> 20	1.55 (1.12–2.14)	0.65 (0.47–0.91)
	> 35	1.94 (1.09–3.48)	0.81 (0.68–0.98)
	> 46	4.53 (1.96–10.49)	0.73 (0.62–0.86)
	> 76	not calculable	not calculable
Mild BHR, moderate to severe BHR, positive bronchodilator reversibility (n = 58)	> 12	1.19 (1.03–1.37)	0.42 (0.18–0.97)
	> 16	1.76 (1.37–2.26)	0.38 (0.22–0.64)
	> 20	1.76 (1.30–2.39)	0.53 (0.36–0.79)
	> 35	2.17 (1.25–3.77)	0.77 (0.62–0.95)
	> 46	4.10 (2.02–8.36)	0.70 (0.57–0.86)
	> 76	not calculable	not calculable

ond half of the sentence that reads "and the difference of the 95%CI (-9.8 ppb) and 20 ppb is close to our best cut-off point (12 ppb) to rule out asthma" should not be there.

In the **conclusion** section, in line 3 "FENO \leq 12 ppb" should say "'FENO \leq 16 ppb" and "three" should say "two".

References

1. Schneider A, Tilemann L, Schermer T, Gindner L, Laux G, Szecsenyi J, Meyer FJ: **Diagnosing asthma in general practice with portable exhaled nitric oxide measurement – results of a prospective diagnostic study.** *Respir Res* 2009, **10**:15.
2. Menzies D, Nair A, Lipworth BJ: **Portable exhaled nitric oxide measurement: Comparison with the "gold standard" technique.** *Chest* 2007, **131**:410-414.

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