Author's response to reviews

Title: WEARCON: Wearable home monitoring in children with asthma reveals a strong association with hospital based assessment of asthma control.

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Version: 2 **Date:** 22 Jul 2020

Author's response to reviews:

Reviewer reports:

Reviewer 1: The authors have responded nicely to a number of my comments.
There are still some issues

1. Point 1.1: within their data set, not the published literature, did their sophisticated monitoring outperform the GINA question?

Within our own data when you put the defined asthma control versus the asthma control based on the GINA questions, the following cross-table would appear.

	GINA uncontrolled	GINA controlled
Uncontrolled	14	13
Controlled	0	32

If you compare this with the outcomes of the multivariate model, the sophisticated monitoring did outperform the GINA questions.

	Multivariate model uncontrolled	Multivariate model controlled
Uncontrolled	24	3
Controlled	3	29

We included the information on the classification of the uncontrolled asthmatic children in the results under the subsection “asthma control classification” and refer back on it in the 7th paragraph of the discussion.

2. Point 1.6 the answer is fine, but I would like to see it summarised in the manuscript.

We included this in the discussion (paragraph 7).

3. Point 1.8 same as for 1.6

We added the information to the 5th paragraph of the discussion.

4. Point 1.9 apologies if I have overlooked this, but I cannot see any qualitative data on p12

Although we have no pure qualitative data (such as usability interview data), the fact that; >80% of the approached participants were eager to participate (much higher than we have in other trials), there was just one drop-out, and a good overall compliance to the monitoring was seen, suggests patients embrace this type of monitoring.

Reviewer 2: If the other reviewers feel you've adequately addressed their comments, I have no major comments.
A VERY minor comment is that a pet peeve of mine is when people use "compliant" rather than "adherent"

We scanned the document for compliant and compliance and altered it to adherent / adherence.

Reviewer 3: No new comments

Reviewer 4:
Minor editing/grammar comments:
- Abstract, last sentence of methods section: "Multiple logistic regression analysis was used to determine which diagnostic measures were associated WITH asthma control."
*adjusted

- Statistical analysis, first sentence: "… with median +- interquartile range (IQR) for NON-NORMALLY distributed variables."
*adjusted

- Statistical analysis, last sentence: Remove the word "calculate" ("… binary logistic regression was used to determine relevant diagnostic validity…").
*adjusted

- Sample size, sentence 2: This is a sentence fragment and needs to be updated to be grammatically correct ("This indicated that for a three parameter multiple regression model 60 (30/30) asthmatic children, assuming an equal distribution between the children with controlled and uncontrolled asthma").
*adjusted

- There are several other instances with small grammatical or typographical errors. Please thoroughly review the manuscript for these errors.
*We reviewed the manuscript thoroughly.

Additional minor comments:
- Statistical analysis, paragraph 1: It is mentioned several times that "variables were tested" using a particular test. You need to be clear about what exactly is being tested here. It is not the variables but the differences in these variables across the different asthma groups that is being tested.
*adjusted

- Discussion, paragraph beginning with "The GINA asthma strategy states…": The second sentence needs to be updated to reflect the effect size for the most recent analyses.
*adjusted

Tables 1 and 2: These tables are greatly improved, nice work.
- I would recommend only using subscripts "a" and "b" to show the pairwise differences. I do not believe that distinguishing between a p-value < 0.05 and < 0.01 for these comparisons is meaningful, since the most important information is whether the comparison is statistically significant.
*we removed the subscripts c and d.

- In the footnotes indicating which statistical test was used to determine the p-value use parenthesis around the statistical test as opposed to the less than symbol, like this: "Normally distributed (ANOVA)"
*adjusted

Description of multivariate analysis in "Statistical Analysis" section:
- It is now clear that the model was a binary logistic regression model. However, the rationale for why this model was used (as opposed to the multinomial model) is not clear. What is the reasoning for only predicting uncontrolled asthma, as compared to controlled asthma? Why present the information on non-asthmatics in the univariate analyses but not incorporate this into the multivariate analysis?

*The intended use of the model is not for diagnosing asthma but to assist the monitoring of children who are already diagnosed with asthma. Therefore, the multinomial model is not relevant, but the univariate information does provide a reference for normal values of children and how much do controlled and non-controlled asthmatic children deviate from this. We also summarized this statement in the manuscript. Page 10 par 2.

- Similarly, the explanation for why the sociodemographic/clinical characteristics were not included in the multivariate model should also be incorporated into the manuscript. The information provided by the authors in their response letter is a good place to start, but there should be a strong theoretical rationale for why these important potential confounders are not incorporated in the multivariate model.

*The model did not include potential other predictors (like age, gender etc) as only a limited amount of predictors could be included in the binary logistic regression model with the amount of subjects to prevent the risk of overfitting. Our choice was therefore to focus on the monitoring parameters only, because the primary aim of this study was to find the best combination of home-monitoring parameters that can be used to monitor asthma control. Moreover, it would be preferred if the model is widely applicable in daily practise, without having to correct for several sociodemographic/clinical characteristics. We included a summarized statement in the manuscript on page 10 par 2.

Description of multivariate analysis in "Results" section:
- Tables 3 and 4 should be switched to follow the order of appearance in the manuscript (currently Table 4 is referred to before Table 3)
*adjusted

- In the sentence describing the final model, "… were associated with higher odds of BEING IN the uncontrolled asthma group, compared to the controlled asthma group."
*adjusted

- Remove the "(1/0.948)" in the parenthetical following earlier wake-up time
*adjusted

- In the current Table 4, the row describing the constant can be removed from the table and the "significance" column should be changed to "p-value."
*adjusted

- The current reference to Figure 3 in the text does not seem justified. I would recommend adding a separate sentence describing what figure 3 shows and what it adds to the results.
*adjusted