Reviewer’s report

Title: Age-specific incidence of allergic and non-allergic asthma

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Reviewer: Stefania La Grutta

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It is an interesting manuscript aiming at assessing the incidence of allergic and non-allergic asthma in relation to age from a cross-sectional sample of Finnish individuals aged 20-69 years. The Authors should address some issues as suggested below. Please note that this Reviewer will mention the page numbers (upper left) and the line numbers added by the authors (1 to 488) when referring to the text.

Title

Actually, the Authors do not assess the "Age at asthma diagnosis in subjects with and without allergy", but rather the "Age at diagnosis in asthmatic subjects with and without allergy". Indeed, all the individuals reported in Table 2 had an asthma diagnosis. Conversely, what is assessed over all individuals (not only asthmatics) is the incidence of allergic and non-allergic asthma in relation to age. The Authors may choose what they want to give a greater emphasis in the title: "Age at diagnosis in asthmatic subjects with and without allergy" (present title modified) or "Age-specific incidence of allergic and non-allergic asthma" (alternative title). Indeed, they are two ways of conveying a similar message.

Abstract

Page 2, line 39: as for the title, please reword the aim: "The purpose of the study was to assess the proportion and incidence of allergic and non-allergic asthma in adulthood in relation to the age at asthma diagnosis".

Page 3, line 55: "most new" → "most of the new".

Background

Page 4, line 62: "Background" → "Background".
Pages 4-5, lines 82-85: please reword the aim as for the abstract; "in a population-based postal questionnaire study conducted in Finland" can be retained. In addition, this Reviewer would avoid the term "concomitant", since the time at the diagnosis of rhinitis is not known.

Methods

Page 5, line 96: what do the authors mean by "normal" age and gender distribution?

Page 5, lines 98-103: please describe Figure 1 more strictly (for example 7942 is not reported in Figure 1), and say "actual" (rather than "corrected") only for the final sample size used for the analyses (3967).

Page 5, line 103: please report the approval number.

Page 6, line 112: "which is a modified from version of the Swedish version translation of".

Page 6, line 113: "consists of"→ "includes".

Page 6, line 124: what do the Authors mean by "primarily"?

Page 7, lines 128-145: please move to "statistical analysis". The methodology used for estimating age-specific incidence from cross-sectional data looks correct, despite it has some drawbacks as pointed out by the Authors in the discussion (generational effect). However, this Reviewer had some difficulties to understand its description. It seems that longitudinal data were retrospectively reconstructed from the answers to the questionnaire, like if the 3967 subjects were actually a cohort of new-borns recruited starting from 69 years ago until 20 years ago. Strictly speaking, a "time-to-event" (actually an "age-to-event") was recorded for each individual, and the population at risk at each time (age) was updated according to standard, survival analysis methodology, i.e. both events (subjects reporting asthma diagnosed at younger age than the age for which the population at risk was calculated) and censorships (asthma-naïve responders younger than the age for which population at risk was calculated) were subtracted from time to time. Please make an effort for improving clearness.

Statistical analysis

Page 7 line 149: "continuous variables".

Results

Page 8, line 159: "In addition"→"More in detail".

Page 8, line 163: "cohort"→ "sample".
Pages 8-9, lines 182-198: difficult to follow. Please describe Tables and Figures sequentially and one by one (avoid switching repeatedly from Figure 2 to Figure 3). Moreover, try to be consistent with the abstract: where did you report that "Among subjects with asthma diagnosis at ages 0-19, 20-39, 40-49 and 50-69 years, 67%, 55%, 38% and 23%, respectively, were allergic"?

Page 10, line 193: "Accordingly"→ "Therefore".

Page 11, line 194: "distinctly"→ "markedly".

Page 11, lines 206 to 212 (from "When calculating..." to "... 40 years"): please move to statistical analysis.

Page 11, line 208: "Since different age cohorts have also different overall incidence of atopy": did the Authors check that?

Page 11, line 209: "relative proportion".

Page 11, line 211: "age cohorts"→ "age groups".

Page 11, line 212: "before the age of 40 years"→ actually, it seems that the Authors compare three age groups: <40, 40-60 (not simply "older than 40") and >60.

Table 1: Would it be worth creating a unique "allergy" variable with the following categories? 1=no; 2=pollen only; 3=non-pollen only; 4="both" (percentages will then sum up to 100). Same for Table 2.

Table 2: Would it be worth highlighting that non-allergic asthmatics were more frequently ex-smokers? Why do the authors report three p-values for smoking? Moreover, how do you define ex-smokers? Did you also ask about "passive smoking"?

Figure 2 and Additional File 2: please replace "Age at asthma diagnosis" simply with "Age group" in the x axis label (do the Authors agree?).

Discussion

Page 12, line 224: "accepted"→ "recognized".

Page 12, lines 229-230: "total incidence of asthma": do the authors refer to the sum of the incidence rates of allergic and non-allergic asthma?

Page 12, lines 232-235: which studies are the Authors referring to?

Page 12, line 235: "onset ages"→ "onset age classes".

Page 13, line 242: "prevalence"→ "proportion".
Page 13, line 245: "Many" → "Several".

Page 13, line 245: "have also reported".

Page 13, lines 249-251: "A cluster of…been reported": unclear.

Page 14, line 264: "prevalence" → "proportion".

Page 14, line 264: "The reason for the decline in the prevalence of atopy with increasing age at asthma diagnosis…": better to say "The reason for the decline in the incidence of allergic asthma with increasing age..."

Page 14, line 266: "may be related to cumulative exposure to irritating factors": may the higher proportion of ex-smokers among non-allergic asthmatics (Table 2) confirm this hypothesis?

Page 14, lines 267-269: "Another phenomenon that may affect the results of cross-sectional studies estimating incidence is cohort effect" → "Another reason may be the cohort effect that may affect incidence when estimated from cross-sectional data".

Page 14, line 271: "Moreover, according to population-based studies, …".

Page 14, lines 271-273: "According to population-based studies, the prevalence of allergic sensitization in general decreases with increasing age due to low incidence and higher remission": the Authors then reported evidence from several studies; did the Authors check the overall prevalence of allergy by age group in their own dataset?

Pages 14-15, lines 284-287: "Consequently...main finding": unclear.

Page 15, line 285-286: "the slight increase of prevalence in the proportion".

Page 16, line 319: why only "specificity"? What about "sensitivity"?

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

Yes

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Yes

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

Yes
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If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I am able to assess the statistics

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