Author's response to reviews

Title: Further Validation that Claims Data are a Useful Tool for Epidemiologic Research on Hypertension

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Version: 2 Date: 18 November 2012

Author's response to reviews: see over
November 18, 2012

Natalie Pafitis, Editor-in-Chief
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To Ms. Pafitis:

Thank you for the thoughtful review of our manuscript “Further Evidence that Claims Data are a Useful Tool for Etiologic Research on Hypertension”. Below please find our responses to the concerns raised by the referee.

Major compulsory revisions

1. Definition for hypertension in health screening data: the hypertension status (standard) was only defined using blood pressure reading. For diagnosed hypertension with antihypertensive medication, I concerned the blood pressure readings are normal due to controlled hypertension. This means the diagnosed hypertension, but controlled with medication are missing. Except for the medication, the history of hypertension, physician’s notes etc. should be included for the hypertension definition. Although the author discussed this issue, such as the medications are used for other condition, not for hypertension, providing the sensitivity analysis results will be a support for this.

   - We have amended the Data Sources section to reflect the scope of available data. Specifically, we have detailed that we do not have access to any physician notes regarding diagnosis or the medical encounter.

   - We have included the results of the sensitivity analysis in the discussion section. These results address the referee’s concerns regarding the inclusion of normotensives on antihypertensive medications: “All analyses were conducted regardless of whether or not the employee was using prescription medication for lowering blood pressure, an obvious reason for a false positive. Because these medications are commonly used for conditions not associated with high blood pressure, removing those employees from the analysis would have limited impact. Indeed in a sensitivity analysis where we eliminated normotensives on blood pressure lowering medications, our results did not change substantively for the ≥1 and ≥2 medical claim algorithms: sensitivity values remained unchanged, specificity values increased to 95.51% and 98.44%, positive predictive values increased to 97.55% and 98.96%, and negative predictive values decreased modestly to 36.41% and 33.38% respectively. With nearly 70% of false positives using blood
pressure lowering medications, the specificity rates reflected in this study are likely lower than previously found because of this phenomenon.”

2. Definition for hypertension in administrative data: physician billings and/or hospitalization using ICD-9 coding. Please clarify how many diagnosis codes for physician billings, for hospitalization admissions. The hypertension was identified using first(primary) diagnosis code or all possible diagnosis. For the definition “at least two separate medical claims” do you have any time gap requirement for the two claims for example, two claims time gap is less than 1 years, or 2 years, etc.

- We have added the percentage of admissions claims vs physician visit claims in the results section: “Less than 1% of all the medical claims for hypertension were in the form of hospital admissions, the vast majority being physician visits.”

- We have clarified that we used the primary diagnosis code from the claims database in the study sample subsection.

- We have added information stating that we did not require a time gap between measurements or claims, also in the study sample subsection.

3. Please clarify how many times(round) for the health screening were performed during study period, and how many round health screening data were used for the analyzing.

- The results section has been amended to include details on the average number of screenings per employee: “The mean number of clinic encounters per employee where a blood pressure measurement was recorded was 2.6, with 30% of employees having more than 3 encounters within the study period.”

Minor Essential Revisions

1. For Monte Carlo logistic regression, the hypertension was identified using claims; please clarify which definition you use for hypertension: 1)at least one medical claims; or 2) at least two separate medical claims.

- We have specified that the logistic regression was conducted using the algorithm for at least one medical claim.

2. For restrictive cases definition, please clarify how to define “consistently normal or hypertensive”, what’s the operational definition for “consistently”, such as time periods and time gap for 2nd and 3rd reading, etc.

- This paragraph has also been revised for the sake of clarity: “In an attempt to avoid inaccurate classification of cases due to blood pressure variability,” we conducted a
subanalysis of our cohort using a more restrictive case definition. Only employees who had two or more consistent blood pressure readings during this period, i.e. their blood pressure measurements were persistently normal or hypertensive, were included (n=1766). For example, if employees had three readings and only the 2nd and 3rd readings were categorized as high, that employee was not included in the cohort. Similar to the Monte Carlo, no time gap was required between measurements. Table 4 shows these results.

Discretionary Revisions

1. Emphasize the issue for the hypertension missing claims as comorbidities, such as the diabetes with hypertension, and the physicians billings only claims diabetes,

- The discussion has been updated to reflect this limitation. The following has been added: “Lastly, inherent in the use of claims data is the potential for missing claims due to physician preference in choosing a diagnostic code for patients with comorbidities. In this study, the frequency of hypertension claims suggests that such a bias is not likely leading to an underestimation of disease.”

2. Narrow down the methods section “study company”

- The study company paragraph has been shortened.

3. I am not clear the cohesion of “etiologic research on hypertension” to this paper, please clarify.

- The title of the manuscript has been altered to specify “epidemiologic research”, rather than “etiologic research”.

Thank you very much for the opportunity to revise this manuscript, and I look forward to hearing from you.

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