Author's response to reviews

Title: Moderate sensitivity and high specificity of emergency department administrative data for transient ischemic attacks

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Author’s response to reviews:

We have included below our point-by-point responses. These same responses have also been uploaded as a supplementary file.

Andrew Costa (Reviewer 1): The manuscript, "Moderate sensitivity and high specificity of emergency department administrative data for transient ischemic attacks" is an evaluation of the diagnostic performance of the ICD-10 data on the National Ambulatory Care Reporting System for TIA. The objectives are clear, and justified. The methods are well described, simple, and complete. My specific comments are below:

Discretionary Revisions

*I think you should keep your description to NACRS (National Ambulatory Care Reporting System) not the 'Canadian National ambulatory administrative database'*

We agree that NACRS should be used consistently. We have made the changes in the Introduction (page 4) and Methods (page 4).

*Pg 3, line 47: Maybe say 'more sparse' vs 'sparser'*

Thank you, this term has been revised.
Minor Essential Revisions

*You don't list a hypothesis

We have revised to specify a hypothesis in the last paragraph of the Introduction (page 4): “We hypothesized that coding for the diagnosis of TIA has lower accuracy in the ED compared to coding after inpatient hospitalization and that ED administrative data codes reflect the ED diagnosis more accurately than the 90-day diagnosis.”

*Naming algorithms as 1,2,3 etc. reduces clarity. I suggest you use a descriptive shorthand label.

Thank you for the comment. We agree and have re-labelled the algorithms as MP (main position), AP (any position), MP+Q (main position with or without querying prefix), and AP+Q (any position with or without querying prefix) throughout the text. In addition, in the discussions, we spelled out the definitions of the important algorithms to improve clarity. (Changes throughout text)

*Column labels for Table 1 do not show % in the brackets, describe ABCD2 as a footnote.

For clarity, we removed n(%) from the title of Table 1 and inserted it in the labels. We described ABCD2 as a footnote (page 16).

Major Compulsory Revisions

*Your interobserver agreement was only moderate for TIA diagnosis by chart review and its accuracy with the 90-days diagnosis is not particularly good. Why would you include it as a reference standard? Naturally information found in the chart will tend to corroborate ICD coding done by the clinical team, or by medical coders who are reviewing the chart, so it is biased toward better diagnostic accuracy. I am not sure what the comparison adds beyond to the comparison with the 90-day diagnosis. Suggest that Table 2 and 4 are not valuable as the chart review diagnoses are flawed. It only adds confusion.

Thank you for raising this concern and the opportunity to discuss. The diagnosis of TIA is clinical and not based on any biologic endpoint. Therefore, we expect that the inter-observer agreement to be moderate (references 18-20). We also expect that the ED diagnosis to have inaccuracies compared to the final diagnosis, as previously reported (reference 37) and as we experience daily working in the Stroke Prevention Clinic. Clinically, after 90 days, new information emerges, such as investigation results or evolution of symptoms, which may change the final diagnosis. This information is not available at the time of the ED visit and hence not part of the NACRS coding. These observations are why we think it is important to keep both reference standards.

As part of our Discussions (page 9), we explain that including both reference standards when evaluating administrative data accuracy is novel and provides proof of concept that ED administrative data codes must be validated separately from the inpatient administrative data
codes for TIA and possibly for other conditions (angina/myocardial infarction or single seizure/epilepsy). Reporting two sets of sensitivity, specificity, PPV, and NPV has implications on the use of administrative data for research. As we write in our discussions (page 9) “The most inclusive algorithm AP+Q has moderate sensitivity 64% and PPV 69% and may be useful to evaluate patterns of healthcare utilization in suspected acute TIA or to determine adherence rates to secondary stroke prevention guidelines.” (E.g. If one is interested in studying how many suspected TIAs are seen in the ED, how many are discharged/admitted, how many underwent a CT scan, administrative data may be a good resource). “However, because coding is less accurate when compared to the 90-day diagnosis, if administrative data were used to select a cohort of suspected TIAs for a prospective study to determine outcomes of interest, such as rates of stroke recurrence or mortality after TIA, misclassification errors must be addressed by chart review or other case ascertainment method.” (E.g. If one is interested in finding out how many patients with TIA have a recurrent stroke in the following week, one wants to exclude the TIA mimics. Administrative data may not be a good resource if used alone for this type of study.)

Janet Bray (Reviewer 2): This well written paper examines the validity of a Canadian emergency department administrative dataset to identify TIA cases. The study used ED diagnosis and 90-day neurological diagnosis as the gold standard on cases recruited in two trials. The major issues with the study are the use of non-consecutive cases and the retrospective determination of the ED diagnosis. More detail is required about the data sources to determine the impact of this on the study.

1. The two trials are not well described. What were the inclusion and exclusion criteria? How many were excluded?

To further describe the TIA and minor stroke studies, we have added the following clarification:

“SPECTRA aims to identify a blood biomarker to differentiate TIA and minor strokes from mimics and enrolls patients within 24 hours after symptom onset. DOUBT is a neuroimaging study of patients with TIA, minor strokes, and stroke mimics and enrolls patients within 7 days after symptom onset. Both studies prospectively enroll consenting patients and require a clinical evaluation by a neurologist at least once between symptom onset and 90 days. Study inclusion and exclusion criteria are outlined in Supplemental Table 1.” (Methods, page 5) The trials do not keep a log of patients who were screened but excluded.

In addition, we clarified in the limitations: “SPECTRA and DOUBT prospectively enrolled patients who consented to participation, resulting in a sample of non-consecutive patients presenting to the ED with acute neurological symptoms.” (Discussions, page 11)

We have added in the Results (page 7) “Among 417 patients included (n=375 from SPECTRA and n=42 from DOUBT)…”

2. Who performs the NACRS coding -do they have health professional qualifications?
Thank you for the opportunity to clarify. In Canada, ICD codes are assigned by non-health professional health records technicians who undergo a 2-year technical degree training. Coding is performed according to Canadian standards published and updated by the Canadian Institute for Health Information. (Methods, page 4).

3. **Methods** - suggest removing "initial" from ED diagnosis as the whole ED admission seems to have been used.

We agree with this suggestion and have removed “initial” from ED diagnosis in the text.

4. The determination of ED diagnosis is unclear. The methods suggest the abstractor determined the ED diagnosis rather the simply abstracting the ED diagnosis as recorded by physicians at the time. Please clarify and state this in the abstract, methods and discussion.

You are correct, the abstractor determined the ED diagnosis. We revised the following sentences:

“Two reference standards were used 1) the emergency department clinical diagnosis determined by chart abstractors and 2) the 90-day final diagnosis, both obtained by stroke neurologists.” (Abstract, page 2).

“A stroke neurologist (AY) performed chart abstractions to retrospectively adjudicate an ED diagnosis, the first reference standard.” (Methods, page 6)

5. Any retrospective derivation of ED diagnosis is subject to bias -this need to be described as a limitation if this was performed.

Thank you for this helpful comment. We added in the limitations (Discussions, page 11), “Finally, although chart abstractors were blinded to NACRS codes and the 90-day diagnosis, the retrospective derivation of the ED diagnosis may be subject to residual bias.”

6. It would be useful to know the accuracy of coding and of the derived diagnosis against the actual final ED diagnosis -but this data may not be available.

Thank you for this great comment. During the process of chart abstraction, we observed that a significant number of charts did not have a clear final diagnosis documented. In fact, there were 78 (18.7%) charts with documented uncertain diagnosis without a clear working diagnosis (e.g. seizure versus TIA or migraine versus stroke without an indication on which was the most likely diagnosis) and 73 (17.5%) charts had no definite diagnosis, but rather a constellation of symptoms or a radiologic finding (e.g. left-sided numbness x 2 hours, resolved, admit for MRI; carotid dissection, admit for observation – without clarification on whether the dissection was a chance discovery or was there a concern that a TIA/stroke had occurred). Although diagnosis adjudications were influenced by the documentation of the treating physicians, the study adjudicator, a stroke neurologist, often had to infer the treating physician’s diagnostic impressions. These observations are discussed in a separate publication titled “A cohort study on
physician documentation and the accuracy of administrative data coding to improve passive surveillance of transient ischemic attacks,” currently in press in BMJ Open.