

Article details: 2015-0060	
Title	Validity and utility of ICD-10 administrative health data for identifying ST- and non ST-elevation Myocardial Infarction based on physician chart review
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Reviewer 1	Dr. Christopher M.B. Fernandes,
Institution	Hamilton Health Sciences/McMaster University, Hamilton, Ont.
General comments (author response in bold)	<p>This paper examines the agreement of standard and ECG definitions of STEMI and NSTEMI with clinician chart reviews. The authors achieve their purposes for the most part.</p> <p>Major comments</p> <ol style="list-style-type: none"> <li>The authors do not expound on the key question posed by their paper--"So what?" It would be useful for readers to know what possibilities are opened up by the examination of these definitions and their validity.</li> </ol> <p><b>We appreciate the reviewer's comment. In response we have added an implication statement, i.e., that our findings are relevant for the development of future versions of ICD, to both the abstract and the conclusions section of the manuscript.</b></p> <ol style="list-style-type: none"> <li>I would suggest referencing standardized guidelines on chart reviews e.g. Gilbert et al, Ann Emerg Med.1996;27:305-308.</li> </ol> <p><b>We have added this reference to the methods section.</b></p> <ol style="list-style-type: none"> <li>As such, the authors used trained abstractors, with clear case selection and definition of variables. However, it is unclear from the paper as to whether the abstraction forms were standardized, whether there were periodic meetings to resolve disputes, monitoring and blinding of abstractors, and most importantly, testing of inter-rater agreement. These deficiencies affect the readers' viewpoint on the validity of the data.</li> </ol> <p><b>We apologize for the lack of detail. In response to the reviewer's comment, we have modified the Methods section of the manuscript to include the following:</b>  <b>To validate the standardized chart abstraction process and confirm appropriate patient selection, charts from the three major hospitals in VHR were obtained. Patients with a diagnosis of AMI were independently abstracted to obtain an approximately equal sample of patients defined as STEMI and NSTEMI. The ECGs were then blinded. Subsequently, two experienced clinicians (SS and WT) interpreted the 12-lead ECG and reviewed peak myocardial enzymes to determine the clinical diagnosis of NSTEMI vs. STEMI. If the two physicians disagreed on the diagnosis, a third physician then read the ECG to determine STEMI vs. NSTEMI. The AMI sub-type classification based on clinician chart reviews was used as the reference standard.</b></p> <p><b>We have also added the following to the Results section of the manuscript:</b>  <b>Between April 1, and June 30, two physicians reviewed 319 charts of patients with a primary diagnosis of AMI (Figure 1). The two physicians disagreed on the classification of the AMI as STEMI or NSTEMI in 0.9% (n=3) of the cases. A third physician then read these ECGs to determine the final classification of patients into the two categories.</b></p> <p>Minor points</p> <ol style="list-style-type: none"> <li>The results section should expound on the missing patients (p.7, line 17). This gap was better explained in Fig 1.</li> </ol> <p><b>We apologize, but we cannot find what the reviewer is referring to. We have described the reasons for missing patients in the second paragraph of the Results section.</b></p> <ol style="list-style-type: none"> <li>A short discussion on future studies would be helpful after the section on limitations.</li> </ol> <p><b>We appreciate the reviewer's comment. In response, we have added the following statement to the limitations section: Future studies, based on a random sample of all patients admitted to several acute care hospitals in Alberta, would be useful in obtaining these measures.</b></p>
Reviewer 2	Dr. Richard Birtwhistle
Institution	Family Medicine, Queen's University, Kingston, Ont.
General comments (author response in bold)	<p>This paper presents a study to identify ST elevated (STEMI) and non ST elevated myocardial infarction (NSTEMI) in administrative data. The objective was to evaluate the agreement of the standard definition using ICD-10 codes with the ECG definition based on a further ECG coding subset. These case definitions for STEMI and NSTEMI were compared to assess differences in in-hospital mortality estimates between the case definitions. Hospital discharge data (DAD) for patients with MI from April</p>

	<p>to June 2007 from 3 Edmonton hospitals was linked with patient chart data extracted by 2 experienced clinicians identifying type of MI. The clinician MI classification was compared with the standard case definition and the ECG definition in the DAD. The subtype definitions were then applied to a dataset of all patients admitted to hospital with AMI in Alberta from April 1 2007 to March 31, 2010.</p> <p>The findings were that there was slightly higher % agreement overall using the standard definition vs. the ECG definition to the chart review diagnosis of MI. However it was lower in women and in patients over 65 years of age. As well there was a misclassification rate of 7.7% of STEMI patients classified as NSTEMI and no one with NSTEMI was misclassified as STEMI. In the larger dataset there was similar estimates of in-hospital mortality regardless of the case definition for MI that was used.</p> <p>Assessment This is a nicely done study which demonstrates that using the standard coding for subtypes of MI is a valid approach for population based outcome studies using hospital data.</p> <p>1. There was no STROBE checklist. [Ed. note: Please include a completed STARD checklist with your resubmission]</p> <p><b>We have now included the STARD checklist requested by the editor.</b></p> <p>2. I was surprised that the REB did not review this study given that although some of the study could be considered QI it also has a research component and reporting of mortality rates for AMI. Also the authors are interested in publishing the results.</p> <p><b>We did discuss the study with the University of Alberta's REB and were told that because the VHR was considered a quality improvement/quality assurance initiative, the study did not require ethics approval.</b></p> <p>3. I am not sure why the authors did not use Kappa as their agreement statistic. Also they do not report confidence intervals for their agreement to assess significance. As mentioned in our response to the Editors comment #4, we cannot calculate the Kappa because we are already starting with an AMI cohort.</p>
<b>Reviewer 3</b>	Dr. Jean-Pierre Pellerin
Institution	Centre Hospitalier de Verdun, Unité de médecine familiale
General comments	<p>This paper is a retrospective analysis about the validity and the use of two coding classification to correctly classify acute myocardial infarction (AMI) as ST-elevation myocardial infarction (STEMI) or Non ST-elevation myocardial infarction (NSTEMI). The two systems are the International classification disease version 10 and a secondary diagnosis system of codes for cardiovascular functions based on the electrocardiogram ECG. The goal of the study is to compare the accuracy of each other to correctly identify STEMI and NSTEMI, which is not known to date.</p> <p>The sampling of patients with AMI is large (more than 15,000 patients between 2007 and 2010). The rules to includes and excludes patients are clear. Each chart include in the study is review and confirm by two experienced clinicians and each chart is then compared with the standard (ICD-10) and the ECG definitions.</p> <p>The agreement between the two systems is very high and the score calculated are virtually the same. Little variation is certainly explained by natural variation in the diagnosis process. Any of the two classification system is associate with mortality. The rate of mortality is the same between the two coding systems whatever is the comparison variable in table 2 (female, male, &lt; 65 years, &gt; 65 years). That is reflecting the real issue expected in the case of STEMI or NSTEMI. The mortality risk is higher in the case of STEMI.</p> <p>The fact that the sampling is issue from a restricted area in Canada does not invalidate the results, a cardiac trouble is a cardiac trouble and this paper illustrate that the diagnosis coding system are in agreement.</p>