Reviewer’s report

Title: Patient characteristics, triage utilisation, level of care, and outcomes in an unselected adult patient population seen by the emergency medical services: a prospective observational study

Version: 0 Date: 18 Dec 2019

Reviewer: Joel Levis

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Title: Patient characteristics, triage utilisation, level of care, and outcomes in an unselected adult patient population seen by the emergency medical services: a prospective observational study.

Reviewer Comments:

In general, this was a very thoroughly developed, researched and written manuscript on an important topic that will be of significant interest to ED physicians and EMS prehospital providers. I recommend acceptance and publication of the manuscript with some revisions to consider as described below.

Lines 17 and 18: Read "Crowding in the emergency department (ED) is a safety concern, and pathways to bypass the ED have been introduced to reduce the time to definitive care. Several low-acuity patients were assessed by the emergency medical services as requiring a lower level of care." It is not clear what the second sentence here is referring to, does the author mean to state "pathways" instead of "patients"?

Line 23: Consider changing the term "non-conveyance" to "non-transport." The primary decision in the manuscript is whether or not a patient requires to be transported to the ED (transport vs non-transport). Authors should consider simply stating transport vs non-transport rather than "conveyance vs non-conveyance" and this could be changed throughout the manuscript.

Line 27: Please provide a succinct definition of what is meant by "a circulatory diagnosis." Does this refer primarily to cardiac, or stroke and cardiac, chf exacerbation, aortic dissection, syncope?
Line 29: Consider changing "mental disorders" to "psychiatric disorders" here and throughout the manuscript.

Lines 30-31: "Of the non-conveyed patients, 126 (9.6%) were admitted to the ED within 72 hours and 12 (10.4%) were diagnosed with a time-critical condition." The statement "12 (10.4%) were diagnosed with a time critical condition" is misleading as clearly the authors are referring to the 126 patients admitted as 12 being diagnosed with a time-critical condition. This would be 10.4% of 126, but only 0.9% of the 1,312 patients not transported to the ED. Either state "12 (0.9%) of the 1,312 patients not transported were later admitted with time-critical conditions," or "12 (10.4%) of the 126 patients admitted were diagnosed with a time-critical condition."

Line 49: Consider changing "manned by" to "staffed by." Similarly consider changing "manned" to "staffed" throughout the manuscript.

Lines 150-152: "The most common DMI, 'chest pain/cardiac disease', was more common in the non-conveyance group (18.7%). On the other hand, the DMIs 'extremity/wound/trauma' and 'abdominal/urinary tract' was more common in patients initially assessed as requiring hospital care." These results seem contradictory as one would expect a patient with suspected chest pain or cardiac disease would require evaluation in the ED (ECG, serial cardiac biomarker testing, risk stratification for ACS), while patients with abdominal pain or urinary tract symptoms would be more common in the non-transported group.

All Cause Mortality Results Section (Lines 226-232): It is difficult to determine from this paragraph what percentage of ED 72 patients died within 7 days and 30 days, can you clarify this in the paragraph (as 30 day mortality following an ED visit is important data)? There is later more data/information in the discussion section of all cause mortality that does not seem to be conveyed earlier in the results section (shouldn't it be in the results section first? - see my later comments).
Line 259 Discussion: "For instance, almost 12% of patients triaged with 'chest pain' remained at the scene, with more males assessed as requiring hospital care." Did these patients all receive a screening ECG? What was the average age of these patients? This percentage for these chief completes appears quite high and it is not clear why this is so from the discussion, can the authors add a sentence or two to explain this high percentage (aside from the sex discrepancy which they explain).

Lines 320 - 322 Discussion: "This indicates that not one single deviating VS but rather a combination of VS deviating from normal is of importance when it comes to the early identification of candidates for deterioration." I would disagree here, what about missing body temperature in a septic patient, missing pulse in a patient with SVT, Vtach, or missing oxygen saturation in a patient with dyspnea (from chf, pulmonary embolism, etc). Authors may want to edit this sentence to indicate importance of not missing a single vital sign in cases as I described.

Line 348 Discussion All Cause Mortality: This is a good discussion with results I was looking for in the results section (what percentage of patients in ED72 died within 7 days). It would be very helpful to include 30 day mortality here, as many ED clinical scores (e.g., Heart Score) utilize a 30 day mortality rate to determine the safety of discharging a patient home from the ED based upon a particular score.

Line 359 Strengths and Limitations: Wouldn't it be fair to state that another limitation is that "a consecutive sample was collected over the course of one year (2016) from the first 1,000 assignments each month." What about missing the remaining assignments each month that were not reviewed, could this have resulted in some level of selection bias?

Finally, in the United States (US) in most EMS systems, a significant majority of all patients who call our EMS system ("call 911") are transported to the ED without consideration of triage to a lower level or care in the prehospital setting - although there are some systems currently testing this excellent strategy out. Some of this certainly can be driven by medical-legal considerations in the US, but I was hoping the authors could perhaps comment briefly on these differences between our systems, and in light of their current data, does their data point out that their system is still safe despite their findings, or should all patients who call EMS be transported to the ED so we don't "miss anything."
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?
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