Author's response to reviews

Title: House officer procedure documentation using a personal digital assistant: a longitudinal study

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Author's response to reviews: see over
Dear Editor:

We would like to thank the reviewers’ for their comments on our manuscript “House officer procedure documentation using a personal digital assistant: a longitudinal study.” Below we have addressed each concern of the reviewers’ and have made appropriate changes within the manuscript.

Reviewer 1

1. “Regarding the study data, is it possible that the authors could include more dimensions such as the completeness or correctiveness of data entered by using PDA vs index card? It would be more interesting to see some qualitative data, instead of the current quantitative data only.”

Reviewer 1 questions the acceptance of the PDA tool by residents. The corresponding author had previously questioned another group of residents who had transitioned from a handwritten to a PDA procedure log during residency (after using each method for one year) about their experience and satisfaction with the PDA, but did not provide those data in the initial submission. Data are now provided detailing this, and other, queries. Eleven of twelve residents were questioned regarding the PDA vs handwritten system: All eleven responded for a response rate of 100%. Using a 5-point Likert scale, 10/11 residents preferred the PDA procedure log (mean score of 1.6 ± 0.9).

Within the text we now address the advantage of the PDA with regards to erroneous or incomplete data entry. The PDA form was constructed to remind the user when any data entry field was incomplete (such as medical record number, gender, diagnosis, etc.). The resident could enter no other data if any field was left incomplete.

2. “It is unclear that what measure the authors use for this study. What do the numbers in Table 1 mean?”

We have reworded the legend to Table 1 to make it clear that the table represents the mean number of procedures per resident over the entire three-year study. Similar wording has been retained in the manuscript. Data regarding the completeness of data entry from both the handwritten and PDA cohorts are now provided. To summarize, 100/100 of reviewed PDA data entries were deemed complete and accurate by two reviewers. In comparison, 91/100 of handwritten entries were deemed complete and accurate, including 4 entries that were not completely legible.

Reviewer 2

1. “The authors state that the handheld computer documentation did not significantly change resident documentation of resident procedure or patient resuscitation documentation over a three-year period, however, they do note statistically significant increases in documentation of three procedures (conscious sedation, thoracentesis, and ED ultrasound). This seems somewhat inconsistent to me. What is considered a
“significant difference in residency documentation”? Would it be possible to compare total documentation of all procedures between groups? Alternatively, could this somehow be addressed prospectively (e.g. randomized) to handheld or paper-based?

2. “The authors state that differences between the two groups likely represent alterations in the standard of ED care over time. More detailed elaboration of these changes in standards and other possible confounders should be noted in the manuscript, or this unsubstantiated claim should be omitted.”

Reviewer 2 raises a question regarding our statement that there was no significant difference in residency documentation over a three-year period, with the exception of conscious sedation, thoracentesis, and ultrasound use. These three procedures have just recently entered the routine, commonplace domain of emergency medicine – at least in our institution. The reasons for this are severalfold: we now have two excellent ultrasounds in the ED at all times as opposed to one usually-broken machine of inferior quality as the handwritten cohort had. Patients are also now in the ED longer awaiting admission to the hospital. Therefore, thoracentesis is most often performed in the ED (with ultrasound assistance) as opposed to on the hospital ward or in radiology. We cannot really speculate why so few conscious sedations were documented in the retrospective cohort. Regardless, other than these three entities, no other procedure documentation was statistically different between the two cohorts. Overall there were 20% more procedures and patient encounters recorded in the handwritten cohort (~1500 vs ~1200). Nearly all of this difference is comprised of unstable adult patient encounters and unstable pediatric medical patients. Given that the ED annual volume increased by approximately 30% during the documentation period of the two cohorts (while total physician coverage – that is, person-hours per day working in the ED, on average) had increased by roughly 20%, it is difficult to imagine that these numbers represent a genuine decrease in unstable patient encounters. Rather, it may be a reflection of a fundamental change in perception of what an unstable patient really is, or subtle differences in the instructions given to residents as to what should be documented with regards to unstable patients. Regardless, given the ubiquitous presence of PDAs in the residency, a prospective, randomized, trial of handheld vs paper-based system is not feasible. We feel that our data support our conclusions without the need to resort to a prospective randomized trial. These points are now made in the manuscript.

3. “Addressing both these items above, is it possible to obtain historical ER billing documentation to control for #’s of procedures captured in this manner, and then control for # documented.”

The archaic billing structure of our ED and hospital preclude meaningful data mining of billing records to obtain accurate numbers of procedures performed in the ED during either cohort. The reviewer’s suggestion was considered early in the data analysis, but rejected on these grounds. In fact, only at the initiation of the PDA cohort were invasive procedures routinely documented and billed from the ED.

1. “House officer is misspelled in the "Background" section of the Abstract.”

Corrected.
2. “In the "Background" section of the main manuscript, the authors state that procedures documentation was historically achieved by looking at handwritten logbooks or index card systems. Did they find any evidence that this may have been done using billing systems in any settings?”

Despite an extensive literature search, the authors were not able to find any publication that used coding or billing systems to track resident procedures. If the authors failed to find one or two examples of this, that would further support the rarity of the practice.

3. “The references listed in the background to support widespread use of handhelds in medical care might benefit from the addition of . . .”

The authors appreciate the additional references provided by the reviewer. These references have been reviewed and included as appropriate within the manuscript.

4. “It would be helpful if the authors described in more detail what the traditional handwritten index cards looked like. Did they have the 20 procedures pre-listed? Was there room for write-ins? Etc. How closely did the PDA version resemble the original cards? I think knowing this would be helpful to distinguish any possible confounding that might occur due to the design of the form or the PDA database.”

The style of the handwritten system and its resemblance to the PDA version is included in the manuscript. To summarize, the PDA version closely resembled the handwritten version and both included a free-text or “write-in” area.

5. “On page 10, the cost for licensing fees is listed as $500-1500 USD per year. Please clarify if this cost is "per program" or "per resident." Alternatively, it would be helpful to know the "per resident" fee so that different-sized residencies could determine these costs more accurately.”

This section of the manuscript has been revised as suggested.

6. “The choice of statistical tests and because Excel was used for statistical analysis would make it important to check results using a statistician and appropriate statistical software (e.g. SPSS, SAS, etc.).”

As the reviewer recommended, the statistics have been redone using GB STAT in place of Microsoft Excel.

Thank you, in advance, for your consideration of this revised manuscript.

Sincerely,

Steven B. Bird, MD