Context-sensitive mandatory data-entry fields for data completeness and accuracy in anesthesia information management systems

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To the Editor,

We read with interest the paper by Wanderer *et al.*¹ Accuracy and completeness are definitely the primary goals of anesthesia information management systems (AIMS). There are also clear benefits of the meaningful use of electronic health records, as defined in the incentive programs of the United States Centers for Medicare & Medicaid Services.² The improved system described in this study uses visual colour-coded feedback to inform users of the completeness of the data entry forms. Despite this feature, data can still be missing, and the accuracy and completeness of the anesthesia record is determined by the anesthesiologist remembering to complete the missing data before closing the AIMS record. The use of context-sensitive mandatory data-entry fields, as described in our recently published study,³ allows a user-friendly form of design, facilitates correcting erroneous data entry, and assures that all mandatory data (depending on the clinical context) are entered before the data-entry form can be saved. We observed 99.6% completeness of records (12,241 of 12,290 anesthesia records) with high data concordance (98.7–99.9%) one year after installation of the AIMS. No scrolling is required in the data forms we developed (using the built-in VBScript features of the AIMS [MetaVision®, iMDsoft, Tel-Aviv, Israel]), which improves usability of the AIMS. Every new user receives a short live introduction to the system and is usually at ease with the process after the first day of use. Other techniques have been described to achieve completeness of mandatory

data in AIMS (e.g., pager-messages⁴ and E-mail reminders).⁵ Those techniques improved completeness of single missing items, but they are clearly unsuitable to assure completeness of multiple absolute and context-sensitive mandatory data points in real time. Completeness and accuracy of data entry are among the objectives of many commercially available AIMS. Unfortunately, recent studies on the completeness and accuracy of other systems are lacking. The future of AIMS and their use for quality management, medico-legal purposes, billing, and research can be greatly enhanced with user-friendly software using context-sensitive mandatory fields that ensure completeness and accuracy.

Competing interests None declared.

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Reply

We sincerely thank Dr. Avidan *et al.* for their interesting comments regarding our recently published manuscript.¹ As the authors point out, accuracy and completeness of documentation are critical aspects of effective utilization of anesthesia information management systems (AIMS), and the focus of prior work has been on improving completeness.² Our work was motivated by the importance of ensuring usability in AIMS implementations. To that end, we concentrated on highlighting incomplete documentation in a user-friendly manner and did not include hard stops, such as mandatory completion forms, which have been associated with unanticipated consequences through disruption of clinical workflow.³ While we appreciate that the utilization of context-sensitive mandatory data-entry fields is one approach to facilitating data completeness within AIMS, it is our view that a combination of modalities is likely to strike the most effective balance between usability and accuracy. That being said, we would urge all AIMS developers and other informatics teams working on these systems to employ usability testing approaches, such as

those described in our manuscript,¹ to understand the relative merits of the specific choices made in any given local implementation.

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