Man vs. machine in emergency medicine

Emergency medicine is characterised by a high patient flow where timely decisions are essential. Vital signs are of great importance for many decisions made by emergency physicians. Clinical decision support systems (CDSS) have the potential to assist in such decisions but will be dependent on the data quality in electronic health records which often is inadequate.

A new study explored the effect of automated documentation of vital signs on data quality and workload in emergency medicine, a context also identified with a mobile workflow. The study, conducted at an emergency department (ED) in one hospital in Stockholm, Sweden confirmed the earlier findings that increased digitalisation in the documentation at hospital wards may increase data quality and reduce workload.

Data quality has been described in three different categories: correctness, currency, and completeness. The factors affecting data quality have been described in previous studies suggesting that both factors relating to the care process and to information technology are important.

A significant challenge in emergency medicine is that information needed for decision support may not be present in the electronic health records (EHRs). Also, even if the information is present it may not be of adequate quality for the CDSS to work properly.

The current observational study of 50 patients and 200 vital sign measurements was conducted at one of the three largest EDs in Sweden. Data collection using questionnaires was performed to compare the workload on wards using manual or automatic documentation.

Key findings of the study include:

- With automation, "time to documentation" was reduced by 6.1 minutes (0.6 min vs. 7.7 min $p < 0.05$) and completeness increased (98% vs. 95%, $p < 0.05$).
- Regarding workflow, temporal demands were lower in the automatic documentation workflow compared to the manual group (50 vs. 23, $p < 0.05$). The same was true for frustration level (64 vs. 33, $p < 0.05$).
- The experienced reduction in temporal demands was in line with the anticipated change, whereas the experienced reduction in frustration was lower than what was anticipated (27 vs. 54, $p < 0.05$).

In this study, the gain in time to documentation was 6.1 minutes, but it is also worth noting the higher variability shown in the confidence intervals for the two different workflows. This indicates that the manual documentation practice is a workflow with much higher variability and in a standardised process, high variability is generally regarded as a quality problem.

The gain in data quality and reduced workload may be of importance for quality and patient safety as other studies have shown that reduced workload among the staff is associated with increased situation awareness. The increased data quality, according to researchers, may also be a prerequisite for further automation and introduction of CDSS in emergency medicine.

The researchers from the Health Informatics Centre at Karolinska Institutet, Stockholm, Sweden, went on to say that further automation may lead to increased team performance and thereby contribute to additional effects on quality and safety in healthcare.

The study has important limitations including the small number of participants and there was a low response rate in the questionnaire's data collection. The small number of patients included is ameliorated by the fact that a multiple of measurements was done for each patient. Still, the study may have been underpowered to show differences regarding correctness in the vital signs.

The findings could be transferrable to contexts where vital signs are manually measured and documented in the EHR, according to the research team.

Source: BMC Emergency Medicine
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Published on : Tue, 18 Dec 2018

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