



# The impact of different models of resident supervision on patient safety and resident education

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## Background

The level of supervision during graduate physicians training programme is critical to ensure both trainees learning and patient safety. The first call about patient safety was raised by the Bell Commission and the Institute of Medicine in 2008 [1, 2]. Since then, different studies have been published suggesting to increase residents supervision by attending physicians [3]. However, evidences are not conclusive [4].

## Summary: study design and outcomes

Finn et al. [5] conducted a randomized crossover clinical trial to evaluate the effect of increased resident supervision on both patient safety and resident education. The study was conducted at Massachusetts General Hospital (MGH), an academic medical centre with a well-established culture that emphasizes resident autonomy.

The control arm was standard supervision, and the intervention arm was increased supervision. In standard supervision, attending physicians joined residents for the presentation of newly admitted patients during the morning, while established patients cases were discussed with residents and interns in the afternoon; in increased supervision, attending physicians actively participated in the entire resident work round. Every attending physician involved in the study participated in both control and intervention arms, with a duration of 2 weeks each.

The primary safety outcome was the number of preventable errors in the process of care (adverse events and near misses). Five nurses reviewed the records of all patients

included in the study to identify medical errors; then, four physicians classified each failure as preventable adverse event, near miss or exclusion. Both nurses and physicians were blinded to study arm. Authors considered significant a 40% reduction in preventable medical errors in the intervention arm (110 vs. 66 errors every 1000 patient-days).

The secondary safety outcomes were mortality rate, intensive care unit (ICU) transfers and length of hospitalization.

They considered also educational outcomes: length of rounds and total speaking time of faculty, residents and interns and, as secondary educational outcomes, the number of radiology studies obtained, consultations called and written orders in the morning (during work rounds) and in the afternoon (following discussion with the attending physicians). At the end of each 2-week rotation, an online survey was filled out to collect interns', residents' and attending physicians' opinions and feelings on work rounds.

## Results

Twenty-two attending physicians were enrolled; 1259 patients were involved in the study, equally divided in standard and increased supervision (666 vs. 637, respectively, 44 crossovers). The two populations did not differ in mean age (61.1 vs. 60.9 years, *p* .89), sex, race and Charlson comorbidity index (2 vs. 2.3, *p* .06).

The incidence of preventable errors met the expectations in control arm (107.6 every 1000 patient-days; expected 110) but resulted higher than expected in the intervention arm (91.1 every 1000 patient-days; expected 66), without a statistically significant difference between standard and increased supervision (*p* .21). As expected by authors, most of the errors were minor in both groups (temporary harm to patient requiring intervention, 88.5% vs. 88.6%, respectively).

About secondary safety outcomes, there was no significant difference between the two groups in terms of median

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length of hospitalization (6 vs. 6 days,  $p$  .93), overall deaths (17 vs. 17,  $p$  .84) and transfers to ICU (13.2% vs. 15.9%,  $p$  .22).

About educational outcomes, the work rounds mean length was similar in the two arms (202 min in both groups); residents spoke for a similar amount of time, while interns spoke significantly less when attending physicians participated in work rounds.

The number of radiology studies obtained, consultations called and written orders was slightly higher in increased supervision arm both in the morning and in the afternoon, without statistically significant difference.

In the end, the analysis of the online survey outlined that residents and interns felt less efficient, less autonomous and had less ability to make independent decisions in the intervention arm; on the other hand, attending physicians believed that they knew better the team's plan of care, rated the quality of care higher, and felt more satisfied with the care provided when they participated in work rounds.

### Strengths of the study

The study addresses a relevant issue: it is one of the first studies to evaluate not only the impact of attending supervision on patient safety but also on resident education.

### Weakness of the study

- The study was conducted in an academic medical centre with an elevated number of internal medicine residents (188 residents per 1100 hospital beds) and with a well-established culture that emphasizes the autonomy of residents; in our opinion, these peculiar features significantly reduce the generalizability of results, as acknowledged by authors.
- The retrospective collection and analysis of medical error as primary safety outcome, even though shared with previous similar studies, represents an inaccurate method to define patient safety. The complexity of judging medical errors only by records is outlined by the low concordance between physician investigators about adverse event preventability ( $k$  statistic 0.47). We realize, however, that this limit is intrinsic in this kind of study and it is difficult to think to a possible alternative.
- The absence of the main admission and discharge diagnosis prevents a better understanding of the enrolled population.

### Question marks

- The authors considered statistically significant a 40% reduction in preventable medical errors between the two arms. Because the study deals with medical errors and patient safety, in our opinion, a lower reduction should have been considered significant. Although this would have meant a larger sample size, we wonder if the negative result of the trial reflects a true absence of difference between the study arms rather than the fact that the study is underpowered to detect smaller differences.
- Patients mean age and comorbidity index seem lower than the one of typical internal medicine population. Moreover, the median length of hospitalization and death rate are low, while the number of transfers to ICU is higher than what is usually observed in internal medicine departments. We wonder if this might mean that the more complex and unstable patients were more likely to be transferred to the ICU thus reducing the impact of increased supervision, as taking care of old patients with many comorbidities is more challenging for unsupervised young physicians.
- It would have been interesting to extend the survey to patients to investigate the quality of care they perceived.

### Clinical bottom line

Given the particular features of hospital organization and patients' characteristics and the poor reliability of the primary safety outcome, it is difficult to extend the results of this study to other contexts.

In conclusion, by now, there is still no answer whether increased resident supervision enhances patients' safety. On the other hand, attending physicians seem to prefer an increased supervision model, while residents and interns believe it may have negative effect on resident education.

### Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interest.

**Statement of human and animal rights** Study authors selected and consented attending physicians from a pool of physicians who regularly supervise residents. The study protocol was approved by MGH Institutional Review Board. No specific information about Human and animal rights statement were provided by study authors.

**Infomed consent** For this type of study, formal consent is not required.

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