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## Randomised controlled trial

## Medication errors may be reduced by double-checking method

10.1136/eb-2018-102901

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**Commentary on:** Douglass AM, Elder J, Watson RA, *et al.* Randomized Controlled Trial on the Effect of a Double Check on the Detection of Medication Errors. *Ann Emerg Med.* 2018 Jan;71(1):74–82.e1.

## Implications for practice and research

- ▶ Double-checking is used in many hospitals and seems to be effective, but more evaluations are needed.
- ▶ Simulation studies allow the testing of interventions prior to implementation in practice.
- ▶ Administration error rates remain high, and new studies, with higher statistical power, are needed.

## Context

Administration errors can be caused by prescription mistakes (dose errors) and/or dispensing errors (storage mistakes).<sup>1</sup> Several interventions have been developed to reduce medication errors, such as barcode-assisted medication administration (BCMA) systems<sup>2</sup> and the double-check. Double-checking requires two qualified health professionals to check the medication. The majority of publications focused on professionals' beliefs concerning double-check effect. A systematic review published in 2012 did not find enough evidence to confirm the impact of double-check on reducing medication errors.<sup>3</sup> However, some countries recommend this practice when dealing with defined 'high-alert' drugs (chemotherapy) or vulnerable patients, such as children.

## Methods

Douglass *et al*<sup>4</sup> evaluated the frequency of double-check use by nurses, its effect on medication error detection and explored the qualitative factors associated with the double-check. The study used a randomised, blinded, controlled simulated design that incorporated 43 pairs of emergency department and intensive care unit nurses. The pairs of nurses were randomised either to the 'single-check' group, exposed to errors linked to a non-high-alert medication (midazolam), or to the 'double-check' group, exposed to errors linked to a high-alert medication (insulin). The observer, a medical student, used the disguised observation technique to record information. Medication error detection rates were compared using Fisher's exact test. Data were analysed according to intention-to-treat principle and as-treated principle as secondary analysis.

## Findings

In the 'single-check' group, four pairs (18%) used the double-check, whereas all 21 pairs used the double-check in the 'double-check' group. The detection of weight-based errors was more frequent in the 'double-check' group (33%, n=7/21 vs 9%, n=2/22). All pairs in the 'double-check' group detected the wrong vial errors compared with 54% (n=7/13) in the 'single-check' group. The error detection rates between the groups were not significantly different (OR=5 (0.9–27.7) and 19.9 (1–408.5)). None of the weight-based dosage errors and 54% of wrong vial errors were identified by the first nurse and, respectively, 67% and 31% by the second nurse.

## Commentary

Many nurses believe double-check practice is an effective way of minimising drug errors.<sup>5</sup>

However, no confirmative results were obtained. Double-checking is costly and time consuming. Therefore, the results of Douglass *et al*'s<sup>4</sup> study add to our knowledge in this area finding an increase in the rate of errors detection when using double-checking. The simulation scenario provides a controlled environment, where nurses repeat the same tasks under identical circumstances. This allows the investigation of medication errors at reasonable costs and the testing of interventions prior to implementation in practice.<sup>6</sup> Furthermore, it permits to study the human factors associated with errors.

Among the limitations discussed by the authors, the main one was that the two groups were not really comparable, since the drugs analysed differed between the group. In addition, the choice of one observer limits the interobserver variability in data recorded. Nor is any information about the observer's training with senior specialists, before the start of the study, provided. Furthermore, the disguised observation technique cannot manage the Hawthorne effect. Maybe the nurses in the 'single-check' group paid more attention and decreased the difference between the two groups. Finally, the design was underpowered to detect a significant reduction in error detection due to the protocol modification. Longer simulations, with more scenarios evaluating exogenous and endogenous errors, are necessary to simulate real-life situations, where nurses work together in parallel. Other types of administration errors according to international medication errors classifications could also be studied.

Even when using the double-check, the second nurse can mislead the first nurse and provide false reassurance (three cases in this study). Double-checking alone is not sufficient to prevent drug errors. Other interventions, such as the error awareness training or BCMA, should be combined with double-checking.

**Competing interests** None declared.

**Provenance and peer review** Commissioned; internally peer reviewed.

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