

**Short abstract title**

**Abbreviation defined  
before first use**

Title: Testing a major haemorrhage protocol using in situ simulation

Background: The major haemorrhage protocol (MHP) is a series of linked events which are meant to prevent death from exsanguination in the hospital setting. As with a number of other protocols and guidelines, the “work as imagined” in terms of how the events detailed in the protocol will play out is often different from the “work as done” [1]. The aim of this study was to optimise the MHP by running in situ simulations which would reveal problems and following the simulations with debriefs which would suggest solutions.

Method: We used Failure Mode and Effect Analysis (FMEA) [2] to help us focus on the likely problems with the MHP. We then ran ten in situ simulations and debriefs focused on these likely problems, with an understanding that additional unexpected problems might occur and would be debriefed as appropriate.

Results: We identified twenty-seven problems with the existing MHP. We instituted changes in language, display, design and processes to avoid, trap, and mitigate these problems.

Conclusion: In situ simulation is a powerful tool for improving protocols and guidelines. We recommend the use of in situ simulation to test other protocols and procedures.

**Reference number in  
square brackets  
inside punctuation**

**Vancouver format  
Minimum of 1  
reference**

References:

- 1) Shorrock S. The varieties of human work. *Humanistic Systems*. Weblog. Available from: <https://humanisticsystems.com/2016/12/05/the-varieties-of-human-work/> [Accessed 4th March 2022].
- 2) Mikulak RJ, McDermott R, Beauregard M. *The basics of FMEA*. New York: CRC Press; 2017.

**<400 words**  
**No trade names**  
**No spelling or grammatical  
errors**  
**No author names**  
**Nothing to identify authors  
or place of work/study**