

- Title** Barcode Medication Administration System
- Agency** HTA Malaysia, Health Technology Assessment Section, Medical Development Division, Ministry of Health Malaysia  
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- Reference** Technology Review Report - 005/2016, online:  
[http://www.moh.gov.my/index.php/database\\_stores/store\\_view\\_page/30/284](http://www.moh.gov.my/index.php/database_stores/store_view_page/30/284)

### Aim

To evaluate the evidence on effectiveness, safety and cost-effectiveness of barcode administration system, in reducing medication errors.

### Conclusions and results

There were 29 articles included in this review: one HTA report, 15 pre and post intervention studies, 11 cross sectional studies, one cost-benefit analysis and one cost-consequences analysis. There was no randomised controlled trial retrieved.

There was sufficient fair level of retrievable evidence that examined the effectiveness of barcode medication administration system in reducing medication error. There was however limited low to fair level of retrievable evidence on the safety and cost-effectiveness of barcode medication administration system in reducing medication error.

The evidence suggested that the use of barcode for medication dispensing as well as medication administration reduced the risk of medication errors. While some studies demonstrated a statistically significant reduction in medication administration errors after the implementation of BCMA, the results were inconsistent and varied in the level of reduction.

In terms of the safety aspect of the BCMA, workaround strategies were frequently used by the medical staff as a result of the shortcomings in the design and implementation of the technology as well as workflow integration. This incorrect use of BCMA and technology-related errors may in turn, negate the benefits of BCMA systems altogether.

The implementation of BCMA in the hospitals was found to be effective, potentially cost-saving for preventing the harm and costs associated with medication errors. The cost of implementing and operating BCMA including electronic pharmacy management and drug repackaging over five years was USD40,000 (range: USD35,600 to USD54,600) per BCMA-enabled bed and USD2000 (range: USD1800 to USD2600) per harmful error prevented.

The evidence also suggested that the errors intercepted by barcode technology had non-clinically significant implications on patient safety. While a stand-alone BCMA system was found to increase the number of dispensing steps and dispensing time, the duration in administering medications using a combination of BCMA with other health technologies remained unchanged or reduced following BCMA implementation. The BCMA was found to be feasible to use and has led to improved data quality. There was an increase in the use of Work-station on Wheels (WOW) usage at the bedside for medication administration and real-time documentation post BCMA implementation. The pharmacists and the nurses were generally satisfied and perceived the system positively although some regarded it as burdensome.

### Recommendations

BCMA is not recommended to be used in Ministry of Health (Malaysia) facilities due to variation in effectiveness, safety issues and high implementation and operational cost.

### Methods

Electronic databases were searched through the Ovid interface; MEDLINE(R) In-Process and Other Non-Indexed Citations and Ovid MEDLINE (R) 1946 to present, EBM Reviews - Cochrane Database of Systematic Reviews 2005 to April 20, 2016, EBM Reviews - ACP Journal Club 1991 to April 2016, EBM Reviews - Database of Abstracts of Reviews of Effects 1st Quarter 2016, EBM Reviews - Cochrane Central Register of Controlled Trials March 2016, EBM Reviews - Cochrane Methodology Register 3rd Quarter 2012, EBM Reviews - Health Technology Assessment 1st Quarter 2016, EBM Reviews - NHS Economic Evaluation Database 1st Quarter 2016. Other databases used include PubMed and Embase. Search was also conducted through some official websites such as U.S. Food and Drug Administration (FDA) and INAHTA. General database such as Google was used to search for additional web-based materials and information. Additional articles retrieved from reviewing the references of retrieved articles. The search was limited to articles on human.

### Written by

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