Dispensary automation

Can a sound business case be made for pharmacy robotic dispensing units?

Michael Ryan

Director, PharmConsult
PharmConsult is Australasia’s leading hospital pharmacy consultancy advising hospitals on the operational, financial, professional, service, risk and legislative issues associated with hospital pharmacy services.

P: 03 9813 0580
W: pharmconsult.com.au

The answer quite simply is, yes. As with most complex analyses, the ability to arrive at a positive business case depends on the criteria against which automated dispensing machines (ADMs) or as they are also known, pharmacy robotic dispensing units or robotic dispensing, are assessed.

Background

In an earlier article in the December 2013 edition of Private Hospital, the benefits of ADMs were described. A reasonable next step is to produce a business case for pharmacy-based robotic dispensing.

Evidence from a number of UK hospitals over the last 10 years has shown that the introduction of pharmacy robotic dispensing has resulted in fewer dispensing errors, faster dispensing requiring fewer staff, less expired stock and reduced stock holdings. But can these benefits justify the large capital investment required for robotic dispensing?

In their November 2010 review of robotic dispensing, Deloitte made the point that to make a business case for robotic dispensing, savings must exceed both the equipment and other associated and ongoing costs. They also highlighted that although the financial benefits and process efficiencies can be quantified in terms of inventory, turnover and staff savings, there is also a need to assign measurement to risk minimisation, space utilisation and staff morale. In addition, to quantify the capital cost of the robots, other costs including enabling work, infrastructure, interfaces, hardware, project management, overtime and contingency plans need to be considered.

Quantification of benefits

The following measures of benefits resulting from ADM implementation are drawn from a number of primary and secondary sources including:

• a report on the impact of robotic dispensing in a hospital pharmacy department published by the King’s College Hospital (KCH); 2
• the Deloitte paper entitled Robotic dispensing. Automation in pharmacy; and
• a review conducted for the Australian Commission on Safety & Quality in Healthcare in June 2013 entitled Automated Dispensing Systems and published as part of its Evidence Briefings on Interventions to Improve Medication Safety. 3

Cost savings

The main areas for savings in costs associated with the implementation of robotic dispensing in pharmacy include:

a) reduction in pharmacy dispensary staff: KCH reduced pharmacy dispensary staff expenditure by 51%, i.e. reduced costs from £262,278 to £134,068 pa over 12 months;

b) reduction in stock holding: KCH reduced stock holding by £534,000 as a one-off saving [for reference, the value of drugs issued by KCH Pharmacy in the year of the analysis was approx. £28.3million (or $A53.2m)];

c) reduction in expired stock: KCH reduced expired stock from 0.5% of the value of drug issues to 0.3% (with actual savings in the order $100,000 pa in the first three years).
In addition, through automation of the picking process, a number of UK hospitals have reduced employment costs by shifting the skill mix towards lower paid staff without increasing error rates, whilst enabling reductions in overtime and the use of agency staff despite increases in dispensing activity.

**Reduction in dispensing errors**

Observational studies following implementation of ADMs in UK hospital pharmacies have shown significant decreases in dispensing error rates from 0.64% to 0.28% in one study and from 1.2% to 0.6% and 2.7% to 1.0% in another multisite study. KCH observed a reduction from an average of 12.85 reported errors per day to 4.52 reported errors per day. In contrast, other studies have found non-significant reductions in dispensing errors following implementation of ADMs.

**Increasing dispensing efficiency**

A number of improvements in the dispensing process have been reported including:

- a) at KCH – reducing the waiting time for patients for discharge medication by 27 minutes (from 131 minutes to 104 minutes) and for outpatients by an average of 15 mins (49 minutes to 34 minutes);
- b) reducing the average time to dispense a prescription from 8.44 minutes to 5.37 minutes.

Although there are reports of non-significant reductions in the time taken to dispense medications, the majority of studies show that dispensing robots reduce both dispensing and patient waiting time.

**Other factors**

Additional benefits found by KCH in their post ADM-implementation analysis, included:

- a) the release of pharmacists, no longer involved in routine supply processes, to support direct patient care;
- b) the implementation of original pack dispensing (i.e. the dispensing, on admission, of an original pack with full administration directions so that it is ready to take home at discharge without the need for another supply to be made);
- c) less occupied drug storage space and increased storage capacity in the order of 23% compared to traditional storage methods; and
- d) improvements in staff morale after ADM implementation, through the creation of a calmer environment with less staff movement in the dispensary, which, in turn, may improve the concentration of staff and reduce errors.

**Conclusion**

In summary, costs include the ADM, infrastructure and installation costs, interfaces, project management and allowance for overtime. Savings include reduction in stock holding (one-off), staffing costs, drug expiry and out-of-hours recalls.

The ROI figure must also incorporate the harder to quantify benefits. When considered together these benefits outweigh the costs and create a business case supporting pharmacy robotics in busy pharmacy departments.

---

2. Brinklow N. A report assessing the impact of an automated dispensing system (ADS) at King’s college Hospital NHS Trust. Available at media.dh.gov.uk