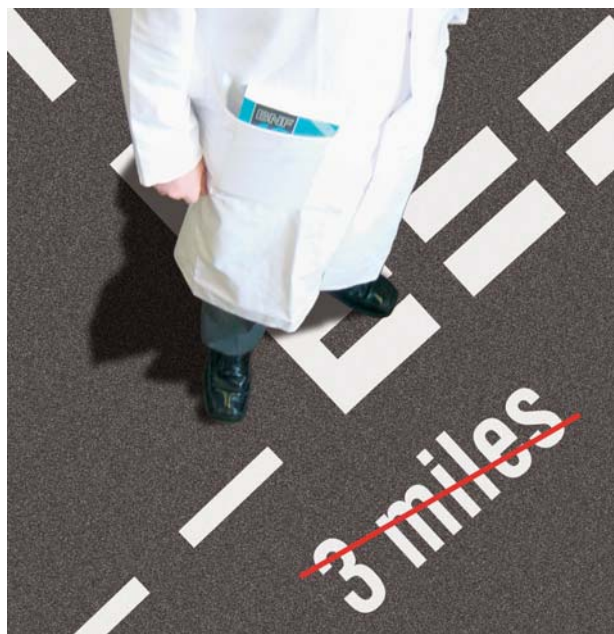


AUTOMATED DISPENSING

– *developing a business case to support investment*

By RAY FITZPATRICK, MRPHARMS, PhD

Introducing automated dispensing into hospital pharmacies is expensive. This second article in the “automated dispensing” series, sets out arguments that can be used to support investment in automation and considers some different approaches to funding the investment



Staff walk three miles less per day when automation is introduced

Taking steps to introduce automation into hospital pharmacies is part of the recent medicines management performance framework set out by the Department of Health.¹ This follows the message to hospital pharmacy managers to re-engineer services in “Pharmacy in the future”,² and the Audit Commission’s report on medicines management in hospitals, “A spoonful of sugar”,³ which contained practical examples of how hospital pharmacy staff are modernising their work practices, including using automation.

However, automation requires a significant investment. Most acute NHS trusts struggle to balance their finances at the end of each year and the budget for capital investment in the hospital is usually over-committed. Simply quoting Government documents is not generally enough to convince trust senior management to invest in this new technology — a sound business argument, based on an understanding of the benefits that can be realised and the costs involved, also needs to be developed.

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BENEFITS OF AUTOMATION

Automating aspects of the dispensing process offers the potential for better service delivery in three key areas:

- Improved efficiency
- Enhanced safety
- Improved use of space

Efficiency The systems currently available in the UK contain a mechanical device that is able to pick a medicine in under 10 seconds, and deliver it to a dispensing station either directly or using a conveyor belt. This is faster than a human being can undertake the same task — a human needs to walk to the storage shelf, locate the stock, pick the medicine and then return with it to the work station.

Figure 1 (p110) shows how automated dispensing reduces the number of steps in the workflow. It has been estimated that pharmacy technician time in the dispensary can be reduced by 30 per cent following the introduction of automation.⁴ The most simplistic argument could be that money previously spent on staff could contribute towards the cost of the machine. However, if effective skill mix has been undertaken the absolute resource saving may not be great since the staff group whose work is most affected by automation may be assistant

technical officer grade (see Figure 1, p110). In addition, this can be a demoralising argument and may make staff feel threatened by the new technology.

A better argument is that staff time released from dispensing can then be used to deliver more patient-centred activities, such as developing patients’ own drugs and self-administration schemes. Linking an investment in automation with a service development that can speed up the discharge process⁵ should attract the attention of hospital managers, since shortage of hospital beds, particularly in winter, presents a real challenge to most acute hospital trusts.

At the New Cross Hospital, Wolverhampton, it has been estimated that each dispensary staff member walks about three miles less per day as a result of the introduction of automation. Three miles is equivalent to one hours working time.

Safety Clearly there is the potential for any member of staff to select the wrong medicine during the dispensing process, especially where packages look the same, and at times of high workload. According to the US National Academy of Sciences, over 78 per cent of dispensing errors could be avoided by using automated dispensing systems⁶ In the UK the introduction of automation in one hospital reduced dispensing errors by half.⁴

The importance of the safety argument in persuading trusts managers to invest in automation will depend on the absolute numbers of dispensing errors made in a department, where in the process those errors occur and how high risk management is on the trust's agenda. The Department of Health's own document "Organisation with a memory", which sets a target of reducing by 40 per cent the number of serious errors in the use of prescribed drugs⁷ raises the profile of risk management. Dispensing errors may represent only a small part of the overall medication error problem, but a part none the less, as recognised in the recent "Building a safer NHS for patients: improving medication".⁸

In addition, introducing automation makes for a much calmer working environment (mainly because staff move around less — see above) in dispensaries, which in turn facilitates safer working.

Improved use of space Stock which is stored on traditional shelving or drawer systems, needs space between shelves for the operator to access the stock. In automated systems, the mechanical picking head does not require as much space, which means a greater amount of stock can be stored efficiently. This leads to a better, less cluttered working environment, adding to the safety argument. Conventional shelving can store

approximately 1,650 items/m², whereas the automated system at the New Cross Hospital, Wolverhampton, can store approximately 3,333 items/m². This means the same amount of stock can be stored in half the space.

In most hospital pharmacies, space is at a premium and is becoming more so as workload increases with increasing activity, and more medicines are used per head of population each year.⁹ Investment in automation may be a more attractive alternative to extending the pharmacy, particularly on a crowded hospital site. It should be remembered that NHS trusts are levied a "capital charge" based on the space occupied by buildings. Therefore, large pharmacy departments cost more in capital charges. Investing in automation may be an alternative to investing capital in large premises and not attract additional capital charges. This argument becomes especially powerful if the department is part of a private finance initiative (PFI) redevelopment, because space is money to any commercial developer.

Investing for the future If the hospital plans to implement computerised prescribing and electronic health records, automating the dispensing processes will help maximise the use of electronic prescribing. Computerised prescribing has been shown to reduce medication errors,¹⁰ and is

an important part of the government's information for health strategy. Computerised prescribing linked to automated dispensing would provide the infrastructure for pharmacists to undertake the clinical checking of prescriptions on the ward (or better still, prescribe directly) and send an electronic order to the pharmacy, with the items being picked automatically. The only manual intervention would be the assembly and technical check, thus reducing the number of transcriptions and manual interventions, where errors can be made. This really would make the vision of "A pharmacy without walls" a reality.

CAPITAL VERSUS REVENUE

Preparing a business case for automation tends to focus on securing capital investment from what is usually an over committed budget. However, leasing a machine should also be considered as a real alternative. There is a precedent for this arrangement in the NHS — the whole ethos of any new hospital built under PFI is that the hospital does not actually own the building but rents it on a long term lease. Therefore, leasing a machine is an approach that will find favour with some finance directors, already familiar with this type of set up.

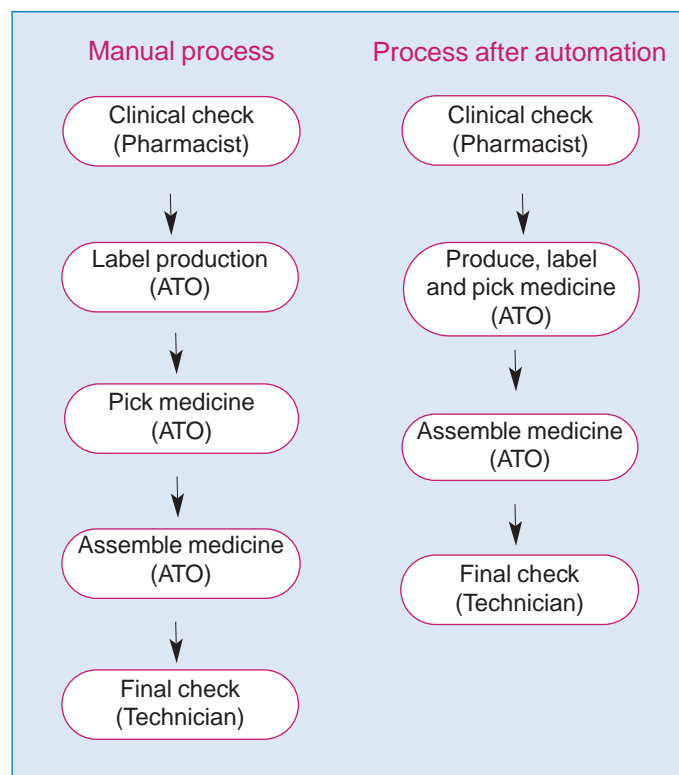


Figure 1. Diagram showing the impact of automation on the dispensing process. "ATO" means assistant technical officer.

Articles on automated dispensing

The next article in the *Hospital Pharmacist* automated dispensing series looks at issues surrounding system procurement

The main advantage of leasing a machine is that the pharmacy revenue budget can be used to fund the lease. Since most directors of pharmacy have flexibility in how the revenue budget is spent (provided it is kept in balance), then the business case is merely to justify moving the money from the salary section of the budget to the non-salary section, rather than convince trust management to allocate additional money, which is always a more difficult task. Leasing may also offer greater flexibility if there is a likelihood that workload might change significantly, for example, if there is a possibility of merger with another hospital or acute trust.

The disadvantage is that leasing is often perceived as an expensive option. Leasing directly from a machine supplier can cost in the region of 30 per cent of the capital cost of the machine per year. On a machine worth in excess of £200,000, this can be a large outlay each year, and does not seem to represent good value, because the machine could be bought outright for a little over three years' rental costs.

Alternatives include leasing a machine from a finance house. Since borrowing money is currently relatively cheap (ie, interest rates are low) and returns from stock market investments are generally poor, a number of companies are prepared to buy medical equipment and then lease it to health care organisations, in exchange for producing a guaranteed return. At the end of the lease period (eg, five years) the department can return the machine, re-negotiate the lease, or buy the machine for a final payment. This method of leasing tends to be relatively economical, because the NHS finance rules for such an arrangement state that the total value of the lease over the term of the lease (eg, five years) should not be more than 90 per cent of the capital value of the equipment. Using this approach, it should be possible to lease an automated machine with a value of say, £200,000 for less than £40,000 per year, making the whole enterprise affordable. For example, that senior pharmacist post which has remained vacant for the last nine months could fund an automated dispensing machine! Even better, if there is investment planned for pharmacy as a result of a clinical development this could be used and staff would not feel threatened.

Now that there are a number of major providers of automation,¹ the UK market is becoming more competitive and prices (for both a capital purchase and a lease arrangement) are generally falling.

ADDITIONAL COSTS

There are several additional costs that need to be considered when developing a business case for automation. These typically include the costs of:

- Developing a computer interface
- Carrying out enabling works
- Maintaining the equipment once it is installed

Computer interface In order for the automated dispensing machine to operate, it needs a message from the pharmacy labelling computer to pick an item and deliver it to the workstation. An interface program, allowing the two systems to "talk" to each other, therefore needs to be developed. Computer programming time does not come cheaply.

One part of the program will be written by the supplier of the automated dispensing machine. It is advisable to check with potential automated dispensing system suppliers whether their interface costs are included in the cost of the machine and, if they are not, try to get some idea of the additional costs.

The other part of the program will need to be written by the pharmacy computer system supplier. It can be more difficult to obtain an estimate for this work, because the pharmacy system supplier will generally need to talk to the machine supplier before giving a cost, but the identity of the machine supplier will most likely not be known until after the tendering process is complete. As a rough guide, it would be safe to add a contingency figure to the overall business case of up to £20,000 for interface costs.

Enabling works These typically include siting additional sockets. It can also be necessary to install an additional telephone line, together with a method of negotiating the trusts "firewall", if the system supplier is to deal with any software issues or update software remotely. (This set-up potentially reduces maintenance costs). If the machine is to connect to the pharmacy computer system through the trust's main network (as opposed to a local network set up in the

pharmacy department) then additional network points might need to be put in, or existing points might need to be relocated.

Other considerations are whether the ceiling height needs to be changed, especially if conveyors need to be installed, whether the floor needs strengthening, and whether some of the dispensary walls need to be moved. Clearly, the more additional work that needs to be carried out, the greater the cost that will need to be built into the business case.

Maintenance costs The various automated dispensing systems available in the UK have been constructed using different engineering approaches,¹¹ and so maintenance costs tend to vary, reflecting these differences.

Whether the machine is purchased or leased, these maintenance costs need to be considered. If purchased outright or leased through a third party, a maintenance agreement will need to be set up with the supplier. For lease agreements set up directly with the supplier, maintenance can be included in the main agreement or be covered by a separate contract.

SUMMARY

The above discussion has tried to identify the various arguments that could be used in a business case to secure resources for an automated dispensing machine. It has also tried to show alternative ways to own a machine, and point out some of the additional hidden costs associated with implementing automated dispensing. There is no single right way to draw up a business case, since the approach adopted will depend on, for example, the physical make up of the department, and the philosophy of the trust on issues such as risk, efficiency, and financial management. The key to success is to understand the big issues facing the trust and shape the business case to help address these.

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