A Report Assessing the Impact of an Automated Dispensing System (ADS) at King’s College Hospital NHS Trust

Nigel Brinklow
Deputy Director of Pharmacy – Patient Services
May 2006
EXECUTIVE SUMMARY

The aim of this report is to assess the impact of the Automated Dispensing System [ADS] at King’s College Hospital and to compare the actual benefits with the anticipated benefits that were outlined in the original Business Case submitted to the Trust Business Resource & Strategy Group (BRSG).

1. **Reduce agency expenditure**  
   **Achieved**  
   Saved £128K

2. **Reduce dispensing errors**  
   **Achieved**  
   Reduced by 65%

3. **Reduce the dispensing times for patients**  
   **Achieved**  
   - Outpatient reduced by average of **15 mins**  
   - TTAs reduced by average of **27 mins**

4. **Release staff to support direct patient care**  
   **Achieved**  
   Pharmacists no longer involved in routine supply process

5. **Facilitate the implementation of original pack dispensing**  
   **Achieved**  
   Supply policy launched in **Nov 2004**.

6. **Help facilitate one-stop dispensing, use of Patients Own Drugs (PODs) and self-administration**  
   **Achieved**  
   One-stop dispensing and PODs used extensively & first-line throughout the Trust.

7. **Improve the reliability of service**  
   **Achieved**  
   99.7% “up-time”

8. **Improve stock control**  
   **Achieved**  
   Reduced stock holding by £534K as a one-off saving

9. **Reduce expired drug expenditure**  
   **Achieved**  
   Saved £50K

The implementation of ADS has had a positive impact on the way that pharmacy services are delivered at King’s College Hospital NHS Trust. All of the benefits detailed in the original business case have been realised.

Nigel Brinklow  
Deputy Director of Pharmacy – Patient Services  
May 2006
INTRODUCTION

The pharmacy department ADS went live at 9am on the 15th of November 2004. The aim of this report is to assess the impact of ADS and to compare the actual benefits with the anticipated benefits that were outlined in the Business Case [version 2.1 Created Date: 22nd May 2002 Amended Date: 26th March 2003] submitted to the Trust Business Resource & Strategy Group (BRSG) and approved in 2003.

The main benefits that we were looking for were:

- To reduce agency expenditure
- To reduce dispensing errors
- To reduce the dispensing times for patients
- To be able to release staff to support direct patient care
- To facilitate the implementation of original pack dispensing
- To help facilitate one-stop dispensing, use of patients own drugs and self-administration
- To help improve the reliability of service
- To help improve stock control
- To help reduce expired drug expenditure

This report also aims to summarise some of the audits that were undertaken by pharmacy staff to assess the impact of ADS on the provision of pharmacy services and ensuing benefits to the Trust, patients and the public.
REDUCE AGENCY EXPENDITUTE

SAVED = £128,210

The business case for implementing ADS stated that agency expenditure would be reduced. We were able to achieve this against a backdrop of increased activity at King’s.

“ADS reduce the demand for staff in the Dispensary. In the past year Pharmacy at King’s has spent over £ 230,000 on agency staff to accommodate an 11% increase in workload, primarily in the Dispensary. If installed an ADS would reduce our requirement for agency staff and reduce our agency expenditure by approximately £100,000 p.a. ” - excerpt taken from the Business Case.

Total Agency Spend pre & post ADS Implementation:

<table>
<thead>
<tr>
<th></th>
<th>Total Agency Spend</th>
</tr>
</thead>
<tbody>
<tr>
<td>04-05</td>
<td>£262,278</td>
</tr>
<tr>
<td>05-06</td>
<td>£134,068</td>
</tr>
</tbody>
</table>

Source: Data submitted to finance

Activity:

<table>
<thead>
<tr>
<th></th>
<th>03-04</th>
<th>04-05</th>
<th>05-06</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>KCH (incl. Dulwich)</td>
<td>297,752</td>
<td>316,582</td>
<td>320,044</td>
<td>+ 7%</td>
</tr>
<tr>
<td>Caldecot</td>
<td>46,627</td>
<td>44,548</td>
<td>38,749</td>
<td>- 20%</td>
</tr>
<tr>
<td>Total</td>
<td>344,379</td>
<td>361,130</td>
<td>358,793</td>
<td>+ 4%</td>
</tr>
</tbody>
</table>

Source: Activity Scorecard

REDUCTION IN DISPENSING ERRORS

We were able to demonstrate a 65% reduction in reported errors based on the findings an internal audit conducted in October 2004 (pre-ADS implementation) and December 2004 (post-ADS implementation). The errors were picked up by dispensing and checking staff through the dispensing or checking stages and did not leave the department.

“Whilst ADS do not stop all medication errors, they do significantly reduce dispensing errors and this will have an impact on the financial costs associated with medication errors" - excerpt taken from the Business Case.

Pre-ADS Implementation

Average of 12.85 reported errors per day (0.8% average error rate/day)

Post-ADS Implementation

Average of 4.52 reported errors per day (0.2% average error rate/day)
The dispensing time for patients was reduced following the implementation of ADS. There was an average reduction of 15 minutes for outpatients and 27 minutes for TTAs when the data for one-year pre-implementation was compared with the data one-year post-implementation of ADS.

"Drug selection is the most time consuming part of the dispensing process when done manually. It also takes longer the busier the department is as more staff are trying to select drugs from relatively confined and overloaded shelves" - excerpt taken from the Business Case.
RELEASE STAFF TO SUPPORT DIRECT PATIENT CARE

**ACHIEVED**

All ward dispensing is now undertaken by dispensary based staff, freeing up a minimum of one hour per day for each ward pharmacist. This has alleviated pharmacists from the task of supply to focus on clinical activities such as further input to ward rounds and increased medicines management at ward level [e.g. drug history taking & assessment of Patient’s Own Drugs].

IMPLEMENT ORIGINAL PACK DISPENSING

**ACHIEVED**

A supply policy was introduced in November 2004. The policy states that original patient-packs are to be supplied wherever possible as “dispensed for discharge” on admission. This means that an original patient-pack with full administration directions will be dispensed when a patient is admitted into hospital ready for them to take home with them on discharge without the need to have another supply made, thus speeding up the discharge process.

FACILITATION OF ONE-STOP DISPENSING, USE OF PATIENTS OWN DRUGS AND SELF-ADMINISTRATION

**ACHIEVED**

Patients own drugs (PODs) are now used extensively throughout all specialities at King’s (except Paeds and Neuro – for the time being). The service is also supported by assistants from Stores & Distribution through more frequent visits as a “pop-in” service outside of normal “top-up” days to replenish “stock” drugs.

At the time of writing the business case it was estimated that full implementation of a PODs usage scheme would save up to £315K p.a. Although this was not formally audited as part of the implementation of ADS, the pharmacy department plays an active role in ensuring that the use of PODs during an inpatient stay remains a top priority for ward-based pharmacy teams as well as for ward staff.

A recent awareness campaign in collaboration with Southwark, Lewisham and Lambeth PCTs, as well as Lewisham Hospital and Guy’s and St Thomas’s Hospital resulted in posters being distributed to every GP surgery and community pharmacy in the area. The posters ask patients to take their medication into hospital with them so that we can continue to use them.
IMPROVE THE RELIABILITY OF SERVICE

ACHIEVED

On a monthly average, the ADS is operational and available for use 99.7% of the time. The 0.3% “down time” is triggered when routine maintenance and “house-keeping” duties necessary to keep the system fully functional are undertaken. The ADS is routinely serviced by ARX Ltd and a “Robot Coordinator” ensures that there are written procedures in place and that all pharmacy staff are fully trained.

Source: ARX Service Engineer Data.

IMPROVE STOCK CONTROL

ACHIEVED

The implementation of ADS in November 2004 has allowed Pharmacy to reduce our drug stock holding by £534K as a ‘one off’ saving. Less stock in the department combined with better stock rotation and effective product storage & selection within the ADS has resulted in improved stock control.

Source: Drug Expenditure Report 2004/05

REDUCE COST OF EXPIRED DRUGS

ACHIEVED

SAVED = £50,000

“The improved stock control, which an ADS provides, would reduce the costs of expired drugs by £40,000 p.a.” - excerpt taken from the Business Case.

Prior to the implementation of ADS the value of expired drugs ran at 0.5% of the value of drug issues. Through better stock control, the percentage value of expired drugs was reduced to 0.3% (£91K).

Had the value of expired drugs continued at the 0.5% rate, the value of expired drugs would have been £141K.

<table>
<thead>
<tr>
<th></th>
<th>% expired stock</th>
<th>Value of drug issues</th>
<th>Value of Expired Stock</th>
</tr>
</thead>
<tbody>
<tr>
<td>02/03</td>
<td>0.5%</td>
<td>£20,368,242</td>
<td>£101,726</td>
</tr>
<tr>
<td>03/04</td>
<td>0.5%</td>
<td>£23,721,870</td>
<td>£122,572</td>
</tr>
<tr>
<td>04/05</td>
<td>0.5%</td>
<td>£25,956,249</td>
<td>£123,586</td>
</tr>
<tr>
<td>05/06</td>
<td>0.3%</td>
<td>£28,341,552</td>
<td>£90,926</td>
</tr>
<tr>
<td></td>
<td>For illustration purposes 0.5%</td>
<td>£28,341,552</td>
<td>£141,700</td>
</tr>
</tbody>
</table>

Source: Ascribe EOM data
AUDITS ASSESSING THE IMPACT OF ADS

As part of the implementation process, pharmacy staff were encouraged to audit the impact of ADS. A summary of these audits can be viewed in the corresponding appendices of this report:

- **THE IMPACT OF AN AUTOMATED DISPENSING SYSTEM ON DISPENSARY ACTIVITY** (appendix 1)
- **THE IMPACT OF AN AUTOMATED DISPENSING SYSTEM ON THE BUSYNESS OF A DISPENSARY** (appendix 2)
- **AUDIT OF “TO-FOLLOWs” FROM THE DISPENSARY** (appendix 3)
- **PHARMACY STAFF ATTITUDE SURVEY** (appendix 4)

CONCLUSION

The implementation of ADS has had a positive impact on the way that pharmacy services are delivered at King’s College Hospital NHS Trust. All of the benefits detailed in the original business case have been realised.

Accuracy of dispensing has improved and waiting times have reduced both for outpatients and inpatients. Whilst the system took time to “bed-in” [appendix 4] the benefits of ADS were soon felt.

In addition to being able to reduce agency costs and wastage, the implementation of ADS has helped facilitate the alteration of skill mix and this has been most noticeable within the dispensary where technicians now spend more time checking than prior to the implementation of automation. This observation was supported by audits assessing the business of the dispensary and activity within [appendices 1 & 2]. Pharmacists are no longer involved in the routine supply of medicines and therefore are able to spend more time on the ward for patient-focused activities.

There is certainly need for increased capacity of the ADS at King’s. Currently there are two picking heads that facilitate the majority of dispensing and stock supply and it is clear that a second stage of ADS needs to be considered and developed.

FUTHER CONSIDERATION

The ADS can be used 24 hours a day. Currently, the system is used 13 hours a day and on an ad-hoc basis by the on-call pharmacist. There is the potential to utilise the ADS further outside of the traditional opening hours of the department.
RECOMMENDATIONS

FIRST PRIORITY – ADD A THIRD SPEEDCASE

Estimated Cost: £115K (plus VAT) + any enabling costs

Why:
- We are currently running at 85-90% capacity (around 20% more than recommended)
- Space within the ADS is not used effectively
- Stock is left on trolleys outside of the ADS and means that dispensary staff have to leave the dispensary to get these packs from the basement when they are needed
- Optimal stock control of these items is not maintained
- It’s unlikely that there will by sufficient capacity to respond to increases in workload

Benefits:
- Faster dispensing leading to reduced waiting times for discharge and outpatients
- Further improved stock control
- Allow use of part-packs, which will in turn reduce wastage through more effective use of returns and recycling of medicines
- Redeploy staff to help facilitate a speedy discharge process

SECOND PRIORITY – INCREASE CAPACITY FOR DISPENSING

Estimated Cost: £4K (plus VAT) + approx. £2K for 2 x PCs, label printers & seating

Why:
- In the dispensary there are only five PCs with links to the ADS and four output points, therefore only five people can dispense at a time
- The bulk of pharmacy stock is now housed in the ADS and can only be obtained through one of the five dispensary PCs, which are constantly in use
- There is limited flexibility in responding to workload pressures
- Staff often have to wait in line for a PC to become free

Benefits:
- Two additional output points would allow more flexibility to respond to workload
- “One-off” emergency items can be dispensed quickly
- Staff time is used more effectively
- Speed up the dispensing of prescriptions and reduce waiting times for patients

THIRD PRIORITY – AUTOMATE FILLING THE ROBOT

Estimated Cost: £45K (plus VAT)

Why:
- All individual packs of medicines have to be scanned separately into the ADS and this is a time consuming and repetitive task
- With over 50,000 items being input each month this represents a substantial amount of staff time taken up in carrying out this task
- It costs around £6.5K per year in staff overtime to ensure ADS filled

Benefits:
- Reduction in overtime costs
- More effective use of ADS, as automated process can run overnight
- More effective user of staff time and will facilitate the release of staff to more direct patient care
The impact of an automated dispensing system on dispensary activity
Adenike Fabiyi, Gillian Cavell. Pharmacy Department, King’s College Hospital.

Introduction
Many hospitals are implementing robotic dispensing to increase accuracy, efficiency and speed of the dispensing process. Three types of automated dispensing systems (ADS) are available. These include unit-dose repackaging systems, ward-based automated drug dispensing systems and pharmacy based original pack dispensers, some of which are also used for ward-stock box picking. 1,2

In November 2004 a pharmacy-based, original pack dispensing system (Rowa Speedcase®) was installed in the Pharmacy Department at King’s College Hospital. This system automates original pack storage and dispensing in the pharmacy using bar-code technology. Medicines selected against a prescription are delivered directly to the dispensing area by the ADS where they are labelled and checked prior to issue. The reduction in time spent by dispensary staff obtaining stock from shelves should improve the efficiency of the dispensing process. Automation may therefore provide the opportunity to effectively utilise the skills of pharmacy staff and improve the overall efficiency of the pharmacy service. This project aims to identify the impact of implementation of ADS on dispensing activities of different grades of pharmacy staff.

Objectives
To quantify the time spent by pharmacy staff on dispensary functions before and after implementation of an automated dispensing system.
To compare effective utilisation of skills pre and post implementation of ADS.

Method
A list of dispensary functions was defined. This included dispensing activities and administrative duties carried out by dispensary staff. Dispensary-based staff were observed every 30 minutes, between the hours of 9 am and 5:30 pm for 5 days (Monday – Friday), before, and 15 weeks after implementation of the ADS. The observer recorded the dispensary function each member of staff was performing at each observation. The number of occasions each member of staff was observed performing a particular function over the 5-day period was counted. These were then totalled for each grade of staff.

Results
Seventeen observations were made on each of the 5 observation days. Pre ADS implementation pharmacists were observed on 833 occasions, accredited checking technicians (ACTs) on 221 occasions, technicians (MTOs) on 442 occasions, pre-registration pharmacists on 68 occasions, student technicians on 204 occasions and pharmacy assistants (ATOs) on 374 occasions. Post ADS implementation pharmacists were observed on 510 occasions, accredited checking technicians (ACTs) on 272 occasions,
Technicians (MTOs) on 493 occasions, pre-registration pharmacists (PRs) on 153 occasions, student technicians on 102 occasions and pharmacy assistants (ATOs) on 377 occasions.

Pharmacists were observed labelling, dispensing and checking on 2%, 2% and 35% occasions pre ADS implementation and 2%, 0.4% and 32% occasions post ADS. ACTs were labelling, dispensing and checking on 10%, 4% and 4% occasions pre ADS and 14%, 1% and 16% occasions post ADS. ACTs were involved in ‘other’ dispensary functions (which primarily included general administration) on 42% occasions pre ADS and 17% occasions post ADS. MTOs were labelling, dispensing and obtaining stock on 35%, 11% and 2% occasions pre ADS and 33%, 28% and 1% occasions post ADS. PRs were dispensing and obtaining stock on 40% and 10% occasions pre ADS and 31% and 0.7% occasions post ADS. Student technicians were dispensing and obtaining stock on 39% and 7% occasions pre ADS and 57% and 4% occasions post ADS. Pharmacy assistants were labelling, dispensing and obtaining stock on 5%, 29% and 3.5% occasions pre ADS and 15%, 27% and 2% post ADS.

Table 1: Observed functions of dispensary staff by grade (%)

<table>
<thead>
<tr>
<th></th>
<th>St. Techs</th>
<th>ATOs</th>
<th>Pre-reg</th>
<th>MTOs</th>
<th>ACTs</th>
<th>Pharms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>Pre</td>
<td>Post</td>
<td>Pre</td>
<td>Post</td>
</tr>
<tr>
<td>Occasions Observed</td>
<td>204</td>
<td>102</td>
<td>374</td>
<td>377</td>
<td>68</td>
<td>153</td>
</tr>
<tr>
<td>Labelling %</td>
<td>4</td>
<td>0</td>
<td>5</td>
<td>15</td>
<td>0</td>
<td>3</td>
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<tr>
<td>Obtaining stock %</td>
<td>7</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Dispensing %</td>
<td>39</td>
<td>57</td>
<td>29</td>
<td>27</td>
<td>40</td>
<td>31</td>
</tr>
<tr>
<td>Checking %</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Other %</td>
<td>14</td>
<td>35</td>
<td>27</td>
<td>27</td>
<td>7</td>
<td>6</td>
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<td>Absence %</td>
<td>36</td>
<td>4</td>
<td>36</td>
<td>29</td>
<td>43</td>
<td>59</td>
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</tbody>
</table>

Discussion
The results show that the implementation of the automated dispensing system has changed activity of dispensary staff. The most notable change is in the role of the ACT. Before implementation of the ADS, ACT skills were under-utilised and much time appeared to be spent on non-dispensing activities.
Following ADS implementation the number of occasions ACTs were observed labelling and checking prescriptions increased by 50% and almost 300%.
This increase is also supported by local dispensary workload statistics which indicate increasing numbers of dispensed items being checked by ACTs.3 ACT dispensing reduced by 73%, in contrast to the number of occasions student technicians and technicians were observed dispensing which increased by 47% and 154% respectively.

Because the robot delivers drugs directly to the dispensing area there was a reduction in the number of observations involving retrieving stock from shelves by all grades of staff. This was particularly noticeable for PRs and MTOs who did the most dispensing pre ADS.
Post ADS, student technicians and ATOs were absent less from the dispensary possibly as the need to go to the basement store to get stock for the dispensary is reduced. The time gained appears to be reflected in an increase in labelling and dispensing. Pharmacists and PRs were observed less often in the dispensary post ADS implementation suggesting that more time is available for non-dispensary functions including ward-based medicines management activities.

**Conclusion**

The implementation of an automated dispensing system has promoted effective use of the skills of dispensary staff by reducing time spent on stock related functions. A further study is planned now the ADS is well established within the department.

**References**

1. Derek Swanson; Automated Dispensing – an overview of the types of systems available; Hospital Pharmacist 2004;11:66-68
3. Local data on file
APPENDIX 2

The impact of an automated dispensing system on the busyness of a dispensary
Adenike Fabiyi, Gillian Cavell. Pharmacy Department, King’s College Hospital.

Introduction
Automated dispensing systems are being installed across many hospitals in the UK in order to improve the efficiency and speed of the dispensing process. Three types of automated dispensing systems (ADS) are available. These include unit-dose repackaging systems; ward-based automated drug dispensing systems and pharmacy based original pack dispensers, some of which are also used for ward-stock box picking.¹ ²

In November 2004 a pharmacy based original pack dispensing system (Rowa Speedcase) was installed in the pharmacy department at King’s College Hospital. This system automates drug storage in the pharmacy and product selection during the dispensing process. Because medicines to be dispensed are delivered directly to the dispensing area by the ADS the need for staff to move around the dispensary to select products from stationary storage locations is reduced. It has been suggested that automated dispensing results in a calmer working environment.³ The aim of this audit is to assess the impact of the installation of an automated dispensing system on the busyness of a dispensary.

Objectives
To measure the extent to which staff move around the dispensary before and after implementation of an automated dispensing system.

Method
A grid was drawn on a floor plan of the dispensary dividing it into squares which were given reference numbers A-E and 1-7. Dispensary-based staff were observed every 30 minutes between the hours of 9 am and 5:30 pm for 5 days (Monday – Friday). The observer recorded their position in the dispensary as a grid reference according to the dispensary floor plan. Observations were recorded before and after the implementation of the ADS. Staff movement was measured by counting the number of squares on the dispensary grid a member of staff had moved over between two consecutive observations. If a member of staff was observed to be absent a movement of 0 from the previous recorded observation was noted. The extent to which a member of staff moved around the dispensary was represented by a movement factor which equalled the movement divided by the number of occasions (excluding absences).

\[ \text{Movement Factor} = \frac{\text{Total movement}}{\text{Occasions}} \]

The lower the movement factor the less that member of staff moved around the dispensary.
Results
Seventeen observations were made on each of the 5 days. Pre ADS implementation pharmacists were observed on 833 occasions, accredited checking technicians (ACTs) on 221 occasions, technicians (MTOs) on 442 occasions, pre-registration pharmacists on 68 occasions, student technicians (StTech) on 204 occasions and pharmacy assistants (ATOs) on 374 occasions. Post ADS implementation pharmacists were observed on 510 occasions accredited checking technicians (ACTs) on 272 occasions, technicians (MTOs) on 493 occasions, pre-registration pharmacists (PRs) on 153 occasions, student technicians on 102 occasions and pharmacy assistants (ATOs) on 377 occasions.

Movement of student technicians, Pre-registration pharmacists, MTOs and ACTs were all reduced following implementation of ADS. Movement of student technicians and ACTs were reduced by 86% and 62% respectively. Movement of pre-registration pharmacists and MTOs were reduced by 11% and 40% respectively. Only pharmacists and ATOs moved around the dispensary more following ADS implementation with 3% and 15% increases.

Table 1. Movement of dispensary staff before and after implementation of automated dispensing

<table>
<thead>
<tr>
<th></th>
<th>St Tech</th>
<th>ATO</th>
<th>Pre-reg</th>
<th>MTO</th>
<th>ACT</th>
<th>Pharmacist</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>Pre</td>
<td>Post</td>
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<td>Post</td>
</tr>
<tr>
<td>Monday</td>
<td>0.55</td>
<td>0</td>
<td>1.23</td>
<td>1.26</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Tuesday</td>
<td>0.84</td>
<td>0.50</td>
<td>0.85</td>
<td>1.49</td>
<td>0</td>
<td>0.15</td>
</tr>
<tr>
<td>Wednesday</td>
<td>0.87</td>
<td>0</td>
<td>1.05</td>
<td>1.35</td>
<td>1.1</td>
<td>0.23</td>
</tr>
<tr>
<td>Thursday</td>
<td>0.93</td>
<td>0</td>
<td>1.75</td>
<td>1.61</td>
<td>0.23</td>
<td>0.3</td>
</tr>
<tr>
<td>Friday</td>
<td>0.46</td>
<td>0</td>
<td>0.96</td>
<td>1.08</td>
<td>0.75</td>
<td>0.6</td>
</tr>
<tr>
<td>Average</td>
<td>0.73</td>
<td>0.10</td>
<td>1.17</td>
<td>1.35</td>
<td>0.52</td>
<td>0.46</td>
</tr>
</tbody>
</table>

Discussion
The implementation of ADS appears to have had a profound effect on the movement of staff. There was a reduction in the movement factor of all staff groups apart from ATOs and pharmacists.

Pre-ADS, student technicians were involved in the bulk of the dispensing which required them to move around the dispensary to retrieve stock from the shelves. Post ADS, most items are delivered directly to the dispensing area, therefore the need to travel to obtain stock is reduced. In addition, the implementation of the ADS has resulted in a change of the design of the dispensary area. The checking bench is much closer to the dispensing area; therefore the dispensers travel a shorter distance to pass dispensed prescriptions on for checking.

Before ADS implementation ACTs were mainly involved in non-dispensary administrative and managerial activities which required them to move around the dispensary more than the other staff groups. Post ADS, ACTs were more involved in checking resulting in them remaining in the vicinity of the checking bench for longer periods of time.
There was a negligible increase in the movement of pharmacists probably because the role of the pharmacist as checker has changed little post ADS implementation.

**Conclusion**
The implementation of an automated dispensing system has decreased the busyness of the dispensary. This supports the suggestion that ADS implementation results in a calmer working environment, which, in turn, may improve the concentration of staff and thus reduce the likelihood of medication errors.

**References**
4. Derek Swanson. Automated Dispensing – an overview of the types of systems available; Hospital Pharmacist 2004;11:66-68
APPENDIX 3

An Audit of “To-Follows” from the Dispensary
Yvonne Charles, Pharmacy Department, King’s College Hospital.

An audit was carried out assessing the impact of ADS on “to-follows”, where a full supply could not be made to outpatients due to insufficient stock being available.

The installation of ADS at King’s both reduced the number of items that were put on “to-follow” to outpatients and the time spent on processing them from 12 minutes per item to 9 minutes per item.
Pharmacy Staff Attitude Survey
Laura Harrison, Nigel Brinklow, Pharmacy Department, King’s College Hospital

Three staff satisfaction surveys were carried out to assess staff attitude towards ADS. The first survey was conducted one month pre-implementation, the second four months post-implementation and the last survey was carried out seven months post-implementation. The results of the surveys demonstrated:

- The ADS had no effect on job satisfaction.
- Fewer staff saw the ADS as an “opportunity” four months post-implementation, suggesting that the ADS concept had been “over-sold” and that staff expectations were high leading up to implementation. However, all respondents saw the ADS as an opportunity seven months after installation, suggesting that the ADS took some time to “bed in”.
- Initially, there was a dip in staff perception of an improvement of the pharmacy service to patients, but this recovered once the ADS had been in use for some time.
- The overwhelming majority of respondents saw a need for the pharmacy to have ADS, with a large swing from having an “opinion” to having a “strong” opinion about this.

Staff were also encouraged to express their views and concerns about ADS.

Pharmacists:
- Generally, pharmacists were concerned about perceived additional costs through the increased use of Patient Packs (pre & post installation).
- Pharmacists found the “Out of Hours” service more manageable, as drugs could be dispensed from the same location without the need for the pharmacist to leave the dispensary.

Technicians:
- Generally, technicians highlighted the benefits of reduced dispensing times for patients (pre & post installation).
- Technicians noted a change to their role after installation, presumably through the increased use of ACTs in the dispensary.

Assistants:
- Some indicated that their role was more varied (pre & post installation).
- Conversely, some feared that automation “stopped them using their brain”.

Assessing the Impact of ADS at King’s College Hospital
Nigel Brinklow. Deputy Director of Pharmacy.
May 2006
The robot will/has made my job easier

- **Strongly disagree**
- **Disagree**
- **Have no opinion**
- **Agree**
- **Strongly agree**

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I am/was worried about affect on job security

- **Strongly disagree**
- **Disagree**
- **Have no opinion**
- **Agree**
- **Strongly agree**

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The robot will/has helped us provide a better service to patients

I don’t/still don’t see the need for a robot in pharmacy