Improving the Supply of Medicines to Cardiff and Vale University Health Board (UHB) Outpatients

Abstract

Failings at Mid Staffordshire Hospital prompted the recommendation in the Berwick Report to "Place the quality of patient care, especially patient safety, above all other aims". This study considered what could be done to ensure that patients attending hospital outpatient clinics have access to safe, high quality dispensing services in the face of increasing demand and diminishing resources. Two change interventions were implemented, with the support of prescribers, and evaluated using service improvement methodology. The limited use of WP10(HP) prescriptions allowed analysis of generic prescribing rates, formulary compliance and comparative costs in addition to moving work from the hospital dispensaries. Referral to GPs for prescribing appropriate medicines may have also reduced the workload. Further work is required to measure the effect of the changes on waiting times for outpatients and satisfaction with the service.

Introduction

The publication of the Report of the Mid Staffordshire NHS Foundation Trust Public Inquiry focussed attention on failings within the NHS. In the executive summary of the report, Francis stated that

> Savings in staff costs were being made in an organisation which was already identified as having serious problems in delivering a service of adequate quality, and complying with minimum standards. Yet no thought seems to have been given in any part of the system…to the potential impact on patient safety and quality. (2013:42)

Following the publication of the Francis Report, a National Advisory Group on the Safety of Patients in England, led by Don Berwick, was set up to distil the lessons learned, and to specify the changes that are needed. One of the key recommendations of the advisory group is to "Place the quality of patient care, especially patient safety, above all other aims" (2013:4).

This dissertation will explore what measures are being taken to meet patients' increasing needs for a safe, high quality dispensing services. It will consider the alternatives, the context for change and justify taking forward two change interventions within Cardiff and Vale UHB. The impact of the change interventions will be analysed to consider whether these warrant further roll out. The approach being adopted is the use of service improvement methodology to implement and evaluate small tests of change.

Alternative routes for medication supply to hospital outpatients are being studied to ensure the health board is able to continue to provide safe services that meet patients' needs in an environment of constrained resources. It is expected that this work will provide useful information both for the health board and other providers of dispensing services facing similar pressures. The study is confined to two hospitals within a health board in Wales and may not be applicable to other environments.

This dissertation will explain why this study is being undertaken at this time, will review the literature on the provision of safe, high quality services, focussing on the provision of medicines for hospital outpatients.
The methodology used to undertake the study will be described, the findings explained and discussed, conclusions drawn and recommendations made.
This project seeks to address this issue through an examination of the supply routes that may be used to satisfy the demand for medicines for patients attending hospital out-patient clinics within a health board in Wales.

Context

The Welsh Government's vision for the NHS in Wales is to "…create a modern NHS delivering high quality care" (2011:1). Whilst such an aim is laudable, health services in the U.K. are facing rising demand at a time of decreasing investment. The challenges facing NHS Wales in increasing the quality and safety of services are even greater than those faced elsewhere, as noted in a recent review.

> Wales now faces a period of financial retrenchment greater than in other parts of the United Kingdom as a result of the Welsh Government's

> decision not to afford the same degree of protection to health spending as that granted elsewhere (Longley, M. et al 2012:xvi).

The development of new medicines and increasing demand for treatment has resulted in increasing expenditure in this area. Total NHS expenditure on medicines in the UK was over £13,581 million in 2011 and this is predicted to increase to over £15,500 million in 2015 (O'Neill et al, 2013:20). In turn, this is increasing the workload for the pharmacies that dispense the medicines,

> between 2002-03 and 2012-13 the number of prescription items dispensed in primary care in Wales increased by 52.3% from 48.8 to 74.2 million; Wales dispensed the highest number of prescription items per head of population – 24.3 compared to 20.8 in Northern Ireland, 18.7 in England and 18.6 in Scotland (Welsh Government, 2013b:1).

Data from the Medusa data warehouse, which collates information from Welsh hospital pharmacy computer systems, shows that expenditure on medicines by Welsh hospitals increased by 133% over the last decade from £85 million in 2002-3 to over £198 million in 2012-13. An estimated additional £21 million was spent by the hospitals within Cardiff and Vale UHB on medicines supplied directly by homecare companies (Homecare Subgroup of All Wales Medicines Strategy Group, 2013:6).

The aging population, new technologies and patients' expectations all contribute to the demand for more, higher quality services. The dilemma for those seeking to meet government requirements and patients' needs is how to do so with fewer resources.

Cardiff and Vale University Health Board (C&VUHB) was formed in 2009, as part of NHS reorganisation in Wales, from the merger of the former Cardiff and Vale NHS Trust with the Cardiff and Vale of Glamorgan Local Health Boards. Since April 2012 the organisation has been undergoing internal restructuring, following the appointment of a new Chair and Chief Executive, resulting in the creation of eight new clinical boards. The health board is forecasting that it will overspend in 2013-14 and has an agreed plan which delivers savings of £61.4m in the current financial year. This plan includes reductions in staff numbers as well as savings on medicines.

The NHS Wales Delivery Framework 2013-14 holds Health Boards accountable for the delivery and improvement of services and meeting statutory targets. Five quality domains have been identified within the framework, one of which is "Quality and Safety – Are services safe? Are standards improving?" (Welsh Government 2013f:1).

Total out-patient attendances (thousands) at hospitals in Wales increased from 2,842.5 in 2002-3 to 3,100.3 in 2011-12 (Welsh Government, 2013d: chart 7d). The number of prescription items dispensed for outpatients attending the health board's main dispensaries increased by 25% in the last three years. Over this period the hospital pharmacy staff establishment has decreased by 17%, putting the service under pressure.

A satisfaction survey of patients attending one of the health board's hospital pharmacies showed that more than 93% of patients would like to wait less than 15 minutes for their prescription to be dispensed (Hodson et al, 2011:2). In an audit undertaken in 2005-6 no patients had to wait longer than 30 minutes for their outpatient medicines (Wales Audit Office, 2007:19). However more recent analysis of waiting times, at the largest hospital pharmacy in the health board, showed that only 12.5% of outpatients' prescriptions were completed within 20 minutes in March 2013, compared with 23% in November 2012 and 51% in February 2012.

In addition to the health board receiving complaints about waiting times for prescriptions, dispensing error rates have recently exceeded the key performance indicator rate of less than 17 per 100,000 items (0.017%). A small number of reported errors have resulted in harm to patients. This situation is unacceptable in an organisation required to provide high quality care for patients.

Literature Review

In the Welsh Government's response to the Francis Report it promises that

> We will put the patient, the family, the citizen, the community at the centre of all our work. We will listen to those who use our services, we will engage with them as we plan improvements, we will address their concerns and we will respond to their personal as well as clinical needs. Our vision is of a Welsh NHS which is safe and compassionate (2013:9).

In their recently published plan for delivering local healthcare, the Welsh Government stated that they wanted people to "only receive hospital care when that is the right option, and not because other more appropriate services are not available" (2013e:5). As long ago as 2001 The Audit Commission, in a report on medicines management in hospitals, noted that:

> Workload pressures are mounting at a time when medicines are becoming ever-more powerful and complex. This means that the risk of medication errors is increasing, and there are longer delays in supplying medicines. This scenario increases staff stress and turnover, creating a downward spiral that makes significant service improvement a challenge too far. (2001:5)

The report made recommendations for improving medicines management in hospitals, including support for proposals made in a report from Wales,

> …the practice of outpatient dispensing by hospitals should be questioned, and indeed has been challenged by the *Report of the Task and Finish Group for Prescribing in Wales*…There is a logic that says hospitals should dispense only to those outpatients in immediate need, or where the medication is particularly specialised. All other outpatients are their GP's responsibility, with whom the prescribing decision should reside, with advice following the outpatient consultation. Such arrangements would eliminate much of the confusion that is commonly generated when two doctors are prescribing to the same patient (2001:30).

Another recommendation of the report was that governments should consider the provision of funding to introduce automated dispensing systems for trusts. The Welsh Assembly Government responded positively to this by financing the implementation and evaluation of such systems at three hospitals in Wales. These have now been installed in all acute hospitals in Wales. In a follow up study to determine the impact of automation on workload and dispensing errors in a Welsh hospital pharmacy, James et al found that

> Median dispensary workload was significantly lower pre-automation (9.20 items/person/h) compared to post-automation (13.1items/person/h, *P* < 0.001). Rate of prevented dispensing incidents was significantly lower post automation (0.28%) than pre-automation (0.64%, *P* < 0.0001) (2013:92). Prevented dispensing incidents (near-misses) are dispensing errors detected during dispensing before the medication has left the pharmacy (2013:93).

Incidents involving medicines was the third largest group (nine per cent) of all incidents in England and Wales reported to the National Patient Safety Agency (NPSA) in 2007, including five deaths and eleven incidents of severe harm during preparation/dispensing of medicines (National Patient Safety Agency, 2009:18).

In a review of the published evidence on workload in the hospital pharmacy setting in the UK, findings suggested that "Pharmacists' physical and mental well-being are being affected by their workload" and that "High workload is associated with an increase in medication errors" (Willis et al, 2011a:4). This is borne out by study of dispensing errors in a hospital pharmacy,

> A total of 106 error producing conditions were reported, representing a mean of 3.8 per interview. Being busy, short-staffed, subject to time-constraints and the physical condition of the individual (feeling tired or unwell) were those most commonly reported (Beso et al, 2005:186)

A UK report on skill mix in the pharmacy work force found "There is some evidence that substitution of technicians for pharmacists can reduce costs and improve efficiency and quality." (Willis et al, 2011:15). The NHS in Wales has continually devolved appropriate dispensing work to pharmacy technicians and assistants for over ten years. A study to benchmark the rate of dispensing in Welsh hospital pharmacies showed that in all 17 hospitals, dispensary skill mix had a higher percentage of technicians than pharmacists and that all except two included assistants. (Hiom, 2003: Table 1)

In a review of medicines management in acute and specialist trusts, five methods of supplying medicines to outpatients were described:

1. Hospital prescription that can only be dispensed by the hospital
2. Requesting the patient's GP to prescribe

3. Hospital FP10 prescription
4. Healthcare delivery company
5. Using a pre-pack

The review went on to reiterate the need to limit dispensing for hospital outpatients on patient safety grounds

> *A spoonful of sugar* recommended that primary and secondary care organisations work together to limit the practice of dispensing by outpatient departments…The only initiative that could potentially conflict with this message may be the choice offered to patients. The risks to patients are minimised when they are prescribed medicines by one person (the GP), who has a complete record of their history. Barriers such as increased costs for primary care, poor communication and increased workload on GPs are not sufficient reason to hinder this practice. (Commission for Healthcare Audit and Inspection, 2007:46).

Out patient prescription/recommendation forms had been introduced in 2006 within Cardiff and Vale NHS Trust in response to a request from the Local Medical Committee, in line with Welsh Assembly Guidance stating that "Hospital outpatients should only receive their initial supply of medication from the hospital when there is an urgent clinical need" (Welsh Assembly Government, 2002:5). This initiative temporarily halted the growth in prescription items dispensed by the hospital pharmacies, but the effect has not been sustained. Since then a number of alternative methods of supplying medicines to hospital outpatients have grown, largely because of different VAT guidance for hospitals and community pharmacies.

> Hospitals pay VAT on medicines, but primary care does not. It would therefore appear to cost the NHS more to prescribe from hospitals, but as they can gain volume discounts, this can lessen the VAT effect. From a patient's perspective having medicines dispensed on site allows them to complete their care in one place. However, if the hospital is unable to fully dispense their prescription this may lead to more inconvenience (Commission for Healthcare Audit and Inspection, 2007:46).

The alternatives to dispensing by hospital pharmacies include hospital prescribers using NHS prescriptions, called WP10(HP) in Wales, that can be dispensed by local community pharmacies; sending prescriptions to healthcare delivery providers, who deliver a restricted range of high cost medicines to patients' homes, and may also provide training and administration of the medicines; or referring patients back to their GP for

prescribing, which is dependent on them accepting this responsibility in Wales and England. “In Scotland the GP always retains this: the outpatient is referred to the hospital only for a consultation, so prescription on GP10 forms is the norm” (Stephens, 2011:51).

A more recent development, in England, has been the outsourcing of hospital pharmacy outpatient dispensing (OPD) services, “…using a commercial provider e.g. community pharmacy or developing a wholly owned in house subsidiary company of a Foundation Trust” (Pate and Anderson, 2012:4). This latter option may not be allowable in Wales where such services are provided by local health boards, not NHS foundation trusts which “have powers (under income generation) to establish companies” (Pate and Anderson, 2012:33).

The Royal Liverpool and Broadgreen University Hospitals NHS Trust awarded a contract to a community pharmacy chain which then opened an outpatient pharmacy at the Royal Liverpool Hospital in 2010. The Chief Pharmacist is quoted as saying “I had to find an innovative way to improve patient care, save money and develop my clinical services with no additional funding” and continued “Outpatient dispensing was something we wanted to redesign because patients were experiencing long waits…”(Wright, 2010:78). Prior to outsourcing the service, they had conducted a successful pilot using a local community pharmacy to dispense for outpatients attending one clinic.

Since then “…outsourcing has been flagged as a potential way to deliver efficiencies in line with the “quality, innovation, productivity and prevention” (QIPP) agenda…” (Towers, 2011:321). This encouraged Trusts in England to consider this option and outsourcing is now widespread there.

University Hospitals Birmingham NHS Foundation Trust has taken a different route, establishing a subsidiary company which is responsible for dispensing outpatient prescriptions within the trust. “Like other private providers the limited company does not have to pay VAT on the medicines it dispenses” (Towers, 2011:321). As the trust has a wholesaler dealer licence it is able to sell medicines to the limited company at NHS contract prices, because it is providing a service wholly to the NHS. Another benefit of the separate

outpatient dispensing service is that waiting times for outpatient prescriptions have reduced from over 45 minutes to less than 10 minutes.

Published evidence of the benefits of outsourcing outpatient dispensing services is lacking. Although reduction in outpatient waiting times and financial benefits from savings in VAT on medicines and NHS contracts are given as the drivers for making the change, quantifiable benefits have not yet been shared in the public domain.

To date, outsourcing of outpatient dispensing hasn't been pursued in Wales, but it is clear that change is required to ensure outpatient dispensing services remain safe and meet patients' needs. A report by the Bevan Commission, which was established by the Minister for Health and Social Services, as an independent advisory body, concluded that

> Circumstances will not allow the status quo to be maintained in NHS Wales. Long-term demographic change and the immediacy of financial pressures could both force that change (2011:19).

In considering what to change, Balogan and Hope Hailey warn that

> …change cannot be reduced to prescriptive recipes and neat linear processes. The content of change (what is actually changed), and the process or the way change is implemented, need to be determined by the context of change – both the internal organisational context, which includes the culture, capabilities, resources and politics of an organisation, and the broader external competitive context (2008:6).

They go on to list the eight contextual features that require analysis; time, scope, preservation, diversity, capability, capacity, readiness for change and power (2008:64). These will be considered further in deciding what changes to implement within this project.

In Together for Health, the Welsh Government's five year vision for the NHS in Wales, it advocates patient engagement and ongoing improvement

> Past successes and continuing improvement mean people's expectations will continue to rise. Although sometimes those run ahead of what the NHS can, as yet, achieve, the Government and NHS welcome high expectations and the active engagement of the public and service users as a spur to continued improvement (2011:5).

Satisfaction surveys of outpatients attending the health board hospital pharmacies were undertaken in 2010 and 2012. A number of actions taken in response to patients' replies after the 2010 survey have shown improvement in the 2012 survey. Further action is needed in a number of areas, including reducing waiting times for outpatient prescriptions. Patients question the need to wait at the hospital pharmacy, as demonstrated in the latest satisfaction survey,

> I always feel obliged to use the pharmacy each time I require drugs. Why not give the patient the option to use a normal prescription for use at any chemist and the form for the doctor as usual? This would save time and money (Chaumeau, 2012:13).

Improving Quality Together (IQT) is a framework of core skills which has been developed to provide a consistent approach to improving the quality of services in organisations across NHS Wales. It is designed to meet the aims of the Welsh Government's Quality Delivery Plan, which requires Health Boards and Trusts to "train 25 percent of their…workforce in quality improvement methodology…by the end of March 2014" (Welsh Government 2012:8). The training available within Cardiff and Vale UHB draws on the Skills 4 Change programmes previously delivered by the National Leadership and Innovation Agency for Health (NLIAH), which includes continuous improvement methodologies such as Lean and Six Sigma. In the current financial climate, as Young and McClean point out:

> With global healthcare expenditure soaring above $3.2 trillion, and with healthcare systems increasingly challenged to deliver better care to more people using less resource, the quest to explore the promises of Lean Thinking is compelling (2008: 382).

In 2006, the NHS Confederation commissioned a report in which they "…asked the Lean Enterprise Academy to look at how Toyota's approach to production could be applied to healthcare." (Jones and Mitchell 2006:2). The report explains that,

> One of the key principles of the Toyota system on which Lean is based is respect for people and society. Lean is not about headcount reductions. It is about being able to do more – improve patient care – with existing resources. Lean often means the same things can be achieved using fewer people. This means people and resources can be redeployed to create even more value. The purpose of Lean is not to make staff redundant. It is to deliver better healthcare at lower overall cost. (Jones and Mitchell, 2006: 6)

The statement that lean is not about headcount reductions is important, as recognised by the leadership of the Virginia Mason Medical Centre (VMMC) in Seattle following visits to see the Toyota Production System (TPS) in Japan:

> VMMC formally adopted TPS as a model for its management system and began to train all of its staffers in its philosophy, principles, and tools. That included a public commitment to retain all full-time employees so that people would not feel that they were expected to improve themselves out of a job. (Spear 2005:91)

The fact that Cardiff and Vale UHB are planning to reduce numbers of staff would appear to be at odds with this approach to service improvement.

A consideration of the changes that could be made to improve the dispensing service for outpatients was undertaken using Balogan and Hope Hailey's contextual model. Time was limited due to both the impending staff reductions and the submission date for the project, scope of change would need to increase over time with increasing demand, while it would be important to preserve a safe service. Diversity of staff groups, especially prescribers and pharmacy staff, would need to be managed. Capability of the organisation to manage change is perceived to be limited, because of the ongoing restructuring process and capacity restrained by staff and financial resources. Readiness for change was high amongst pharmacy staff who were under increasing pressure, but low amongst prescribers who were largely unaware of the need for change. The power to change lay with the prescribers, who would need to be influenced by the pharmacy staff and management to make the desired changes.

Options for change considered were

- Increasing the use of WP10(HP) prescriptions for patients to take to community pharmacies

- Referring patients to their GP for prescribing
- Outsourcing the outpatient dispensing service

Outsourcing was ruled out at this stage, as it would require a tendering process that would take longer than the study period, would require considerable resource and capability, and would not relieve the pressure on the service in the short term.

Methods

The Quality Improvement Guides published by 1000 Lives Plus, the national improvement programme for healthcare in Wales, advocate the use of the Model for Improvement as a framework to structure improvement efforts. The model is based on three key questions:-

1. What are we trying to accomplish?
2. How will we know that a change is an improvement?
3. What change can we make that will result in improvement? (2012:14)

These questions are then used with Plan-Do-Study-Act cycles (PDSA) as small-scale trials of change which can be adapted, adopted or abandoned after each cycle. Improvement results from a series of cycles building on previous results. According to Cumming "The model is ideally suited to introducing change in a complex clinical environment…" (2007:191).

The aim of this study is to reduce the number of prescription items dispensed by hospital pharmacies, by changing prescribers' behaviour, in order to provide a safer, high quality service to patients. This change would be expected to reduce the length of time that outpatients wait at the pharmacies and the risk of errors being made in dispensing their prescriptions. Measurement of the number of items dispensed will be obtained from the hospital pharmacy computer system, which is used to generate a label for each item. Prescription turnaround times are measured periodically, but are labour intensive to undertake as a paper exercise. A new prescription tracking system is being implemented that will allow this information to be captured as part of the process in future. All dispensing errors are recorded and the incidence calculated per 100,000 items dispensed to allow comparisons. The

patient satisfaction survey is due to be repeated in 2014, therefore the results will not be available during the timescale of this study.

In consultation with one of the new clinical boards it was agreed to test the first option for change in one clinic on one hospital site. From April 2013 prescribers were to prescribe medicines that were not required urgently, and which could be obtained from community pharmacies, on WP10(HP) prescriptions. A list of medicines suitable for dispensing in primary care was compiled, based on those in the Cardiff and Vale UHB formulary that were designated 1st line, 2nd line or specialist initiated.

The study of the clinic's change in prescribing would allow investigation of a number of concerns that were raised in meetings with prescribers about more widespread adoption of such a change:-

1. A risk of loss of control of generic and formulary prescribing if prescriptions were not dispensed by the hospital pharmacies
2. The difference in the prices of medicines between hospitals, which purchase at contract prices and pay VAT, and community pharmacies who are reimbursed at drug tariff prices, but don't incur VAT
3. Loss of financial control, because it takes up to three months for prescriptions dispensed in primary care to be priced.
4. Possible delays in patients collecting their medicines and starting treatment

To determine whether concerns about the use of WP10(HP) prescriptions were realised, prescriptions issued by the clinic from April to June 2013 were analysed using the hospital forms analysis, available to authorised users within Welsh health boards, located on the Primary Care Services website of NHS Wales Shared Services Partnership. This provides numbers and prices of prescription items dispensed in primary care for all health boards in Wales. Organisations are permitted access to their own data down to individual prescription level, including the scanned image of the prescription. Numbers of prescription items dispensed, generic prescribing rate, formulary

compliance, time between prescribing and dispensing and cost of medicines dispensed were obtained from this source.

In order to compare the prices in primary care with those in hospitals all prescription items dispensed in primary care were also booked out on the training module of the pharmacy computer system. This holds current hospital prices, but avoids the issues being included in the financial recharges made using the live system. Each item dispensed was checked against the online version of the Cardiff and Vale UHB prescribing formulary during October 2013, to determine whether they were included in the formulary and if so, the formulary category.

In recognition of the urgent need to reduce the pharmacy workload in line with a reduction in pharmacy staffing, the Clinical Board Directors agreed to implement the second option for change by promoting the appropriate use of the outpatient prescription/recommendation form to refer patients to their GPs for prescribing from July 2013. In order to facilitate this approach, posters were produced for prescribers and for patients explaining the appropriate use of the forms.

To monitor whether this was effective in reducing the pharmacy workload, the number of prescription items dispensed each week by the hospital pharmacies from 1st July 2013 was compared with the number dispensed each week from April to June 2013, using data from the hospital pharmacy computer system. An analysis of a two week sample of the prescriptions dispensed at one of the health board's two main hospital pharmacies during July was also undertaken to give an indication of the proportion of items that could be obtained from community pharmacies were not being referred to GPs for prescribing, using the list of medicines suitable for dispensing in primary care.

Data (Findings) and Explanation

Analysis of WP10(HP) prescriptions issued by the hospital clinic from April to June 2013 found that over the three months 587 prescriptions were dispensed

for 688 items. 592 (86%) were for medicines recommended for first line use, 65 (9.4%) recommended as second line, 22 (3.2%) for initiation by a specialist, five (0.7%) for hospital use only and four (0.6%) were not included in the health board formulary. 601 items (87%) were prescribed generically and 87 (13%) by brand name.

For April 2013, the time in days between the date the prescription was written by the prescriber and the date on which it was dispensed, was also analysed using the online images of the prescriptions. Of the 114 prescriptions written, 38 (33.3%) were dispensed the same day, 27 (23.7%) on the following day and 16 (14%) the day after that. 20 (17.5%) were dispensed between 3 and 7 days after being written and 4 (3.5%) between 8 and 11 days, while 1 (0.9%) was not dispensed for 15 days. 8 (7%) prescriptions were excluded from the analysis as the date of dispensing was illegible or missing.

Table 1 shows the net ingredient cost (basic price – discount) of items dispensed on WP10(HP) prescriptions compared with the average prices paid for the nearest pack size available on the hospital pharmacy computer system.

Table 1. Comparison of WP10(HP) and Hospital Prices April – June 2013

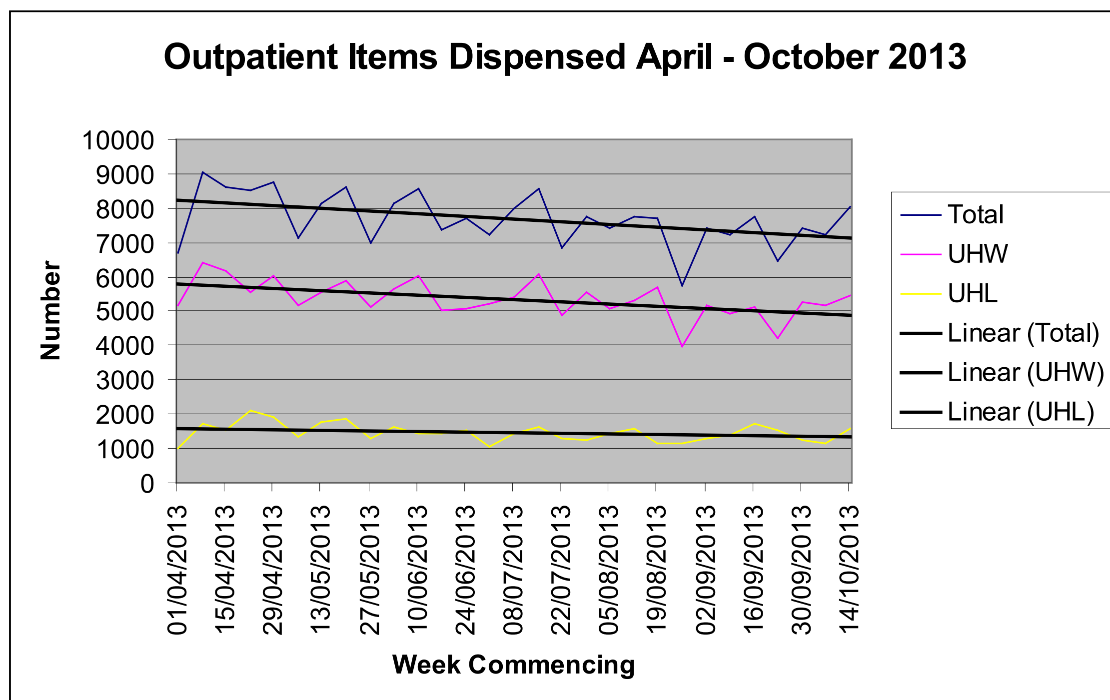
Month	Number of Items	WP10(HP) Basic price (£)	Discount (£)	Net Ingredient cost (£)	Hospital average Price (£)	Price difference (£)
April	134	608	- 49	559	324	235
May	255	1,069	- 86	983	845	138
June	299	1,414	- 113	1301	1080	221
Total	688	3,091	- 248	2,843	2,249	594

In April, 134 items were dispensed with a total difference in price of £235 from the hospital price. £203 of this was accounted for by five items (Clexane injection, ondansetron tablets, nitrofurantoin tablets , ursodeoxycolic acid capsules and codeine phosphate tablets), which were significantly more expensive on WP10(HP) prescription than at hospital average prices.

In May, 255 items were dispensed at a difference in price of £138. Similarly to April, three items accounted for most of the difference in price; Clexane, nitrofurantoin and cefalexin tablets. In June, 299 items were dispensed at a price difference of £221. In this month Clexane, ondansetron, ursodeoxycolic acid, and nitrofurantoin again accounted for a large proportion of the difference in cost. However the prices of most medicines were similar when provided from the hospital or the community pharmacy.

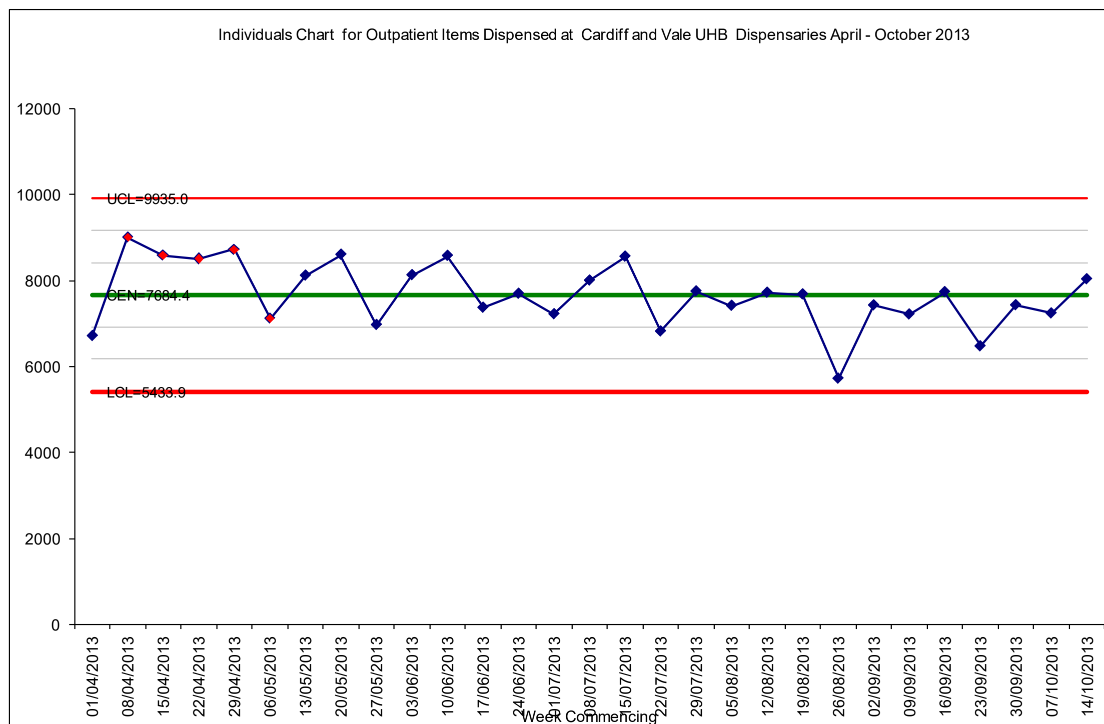
Figure 1 shows the total number of outpatient prescription items dispensed each week by all hospital dispensaries within Cardiff and Vale UHB from April 2013 and the numbers dispensed at the largest dispensaries at the University Hospital of Wales (UHW) and University Hospital Llandough (UHL). The trend lines appear to show a decrease in numbers with time.

Figure 1. Outpatient Prescription Items Dispensed Each Week at Cardiff and Vale UHB Hospital Dispensaries from April – October 2013



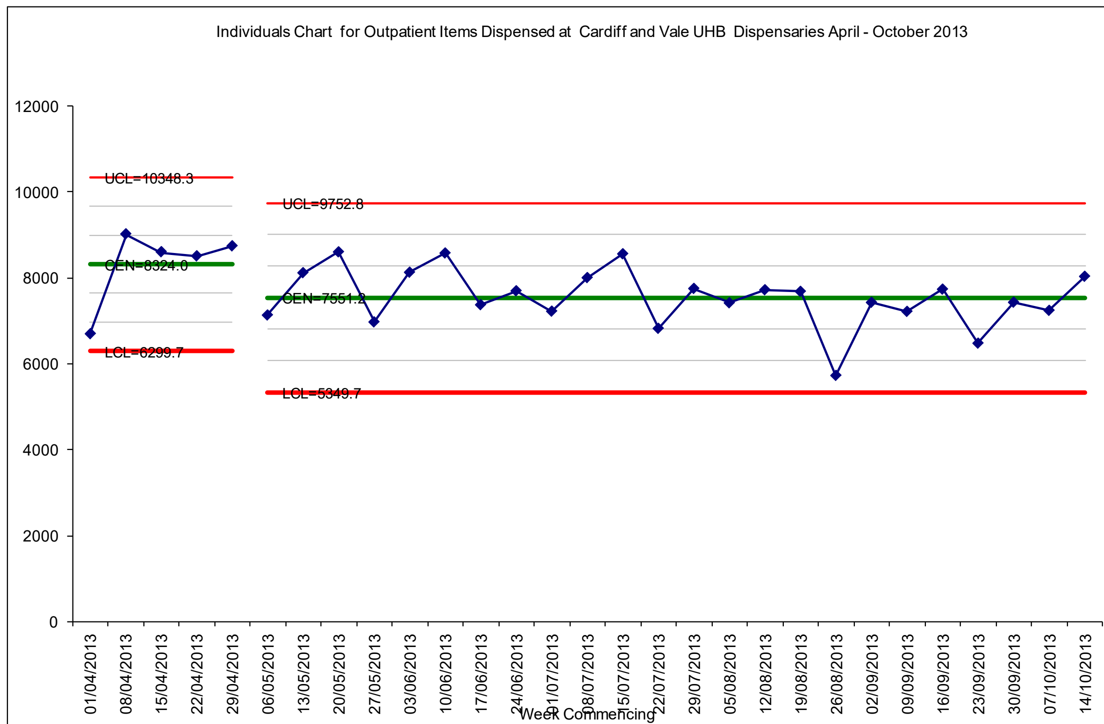
In order to analyse the results further, the results were confirmed to be normally distributed, and control charts (Individuals charts) were produced using SPC XL. These show the mean and the upper and lower control limits for the process, each control limit being 3 standard deviations from the mean. Figure 2, which shows the number of outpatient prescription items dispensed each week by all Cardiff and Vale UHB hospital dispensaries, has four out of five consecutive points beyond one standard deviation from the mean, on the same side of the mean, in April, indicating a shift in the process from May.

Figure 2. Control Chart for Outpatient Prescription Items Dispensed by Cardiff and Vale UHB hospital dispensaries



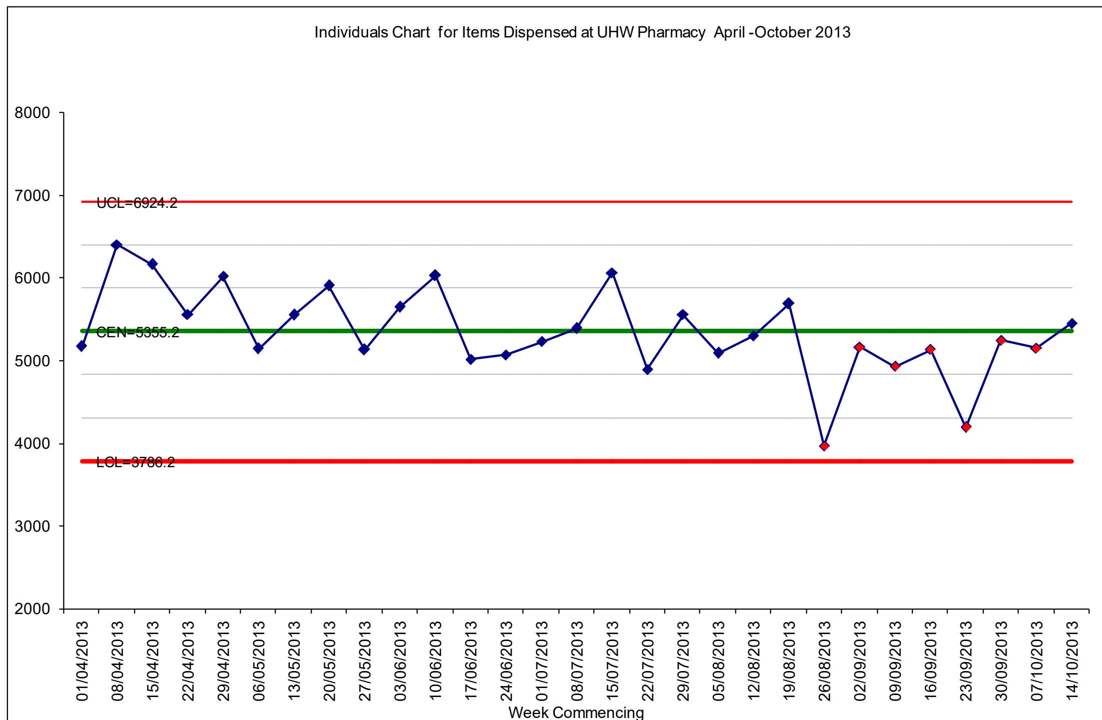
The control limits are calculated from all the data points and will be incorrect if there is a clear shift in the process. It is therefore necessary to split the chart when the process started to shift and recalculate using split control limits, as in Figure 3.

Figure 3. Split Control Chart for Outpatient Prescription Items Dispensed by Cardiff and Vale UHB hospital dispensaries



The split indicates where the change occurred. New means and control limits have been calculated. The mean number of prescription items dispensed per week decreased from May 2013, whilst the variation did not changed significantly.

Figure 4. Control Chart for Outpatient Prescription Items Dispensed at UHW Dispensary April – October 2013



The control chart for UHW dispensary has seven consecutive points in a row below the centre line. Eight consecutive points in a row below or above the centre line indicates a process change, so more data will need to be collected and the control chart recalculated to see whether a change has taken place.

Figure 5. Control Chart for Outpatient Prescription Items Dispensed at UHL Dispensary April – October 2013

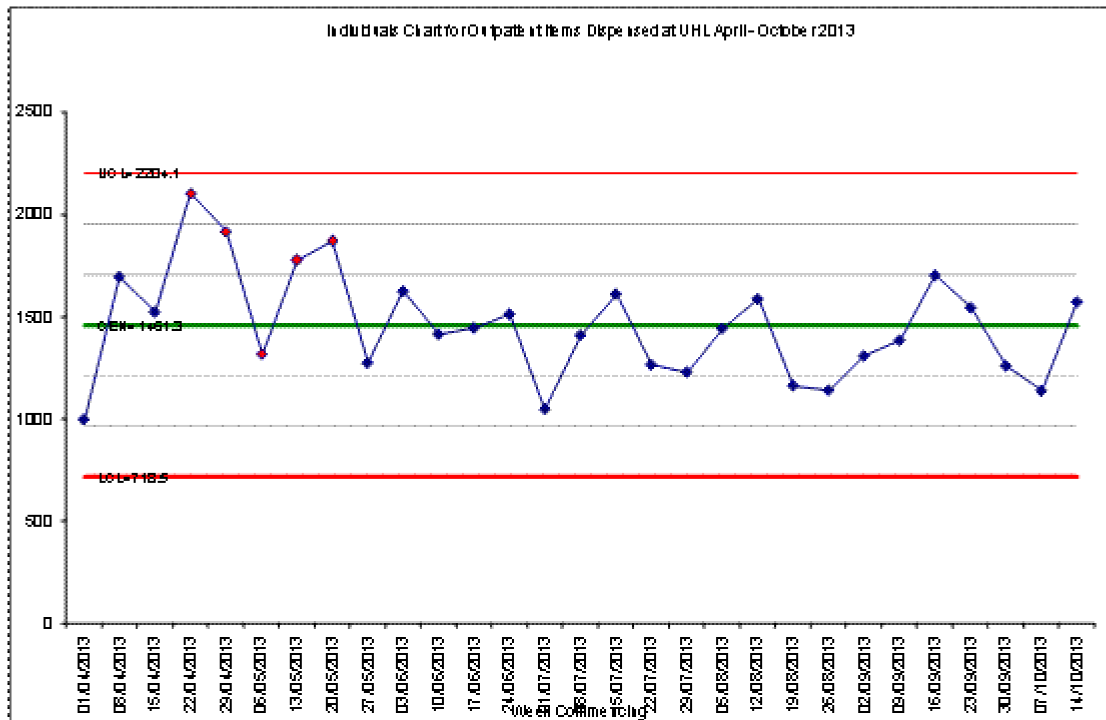
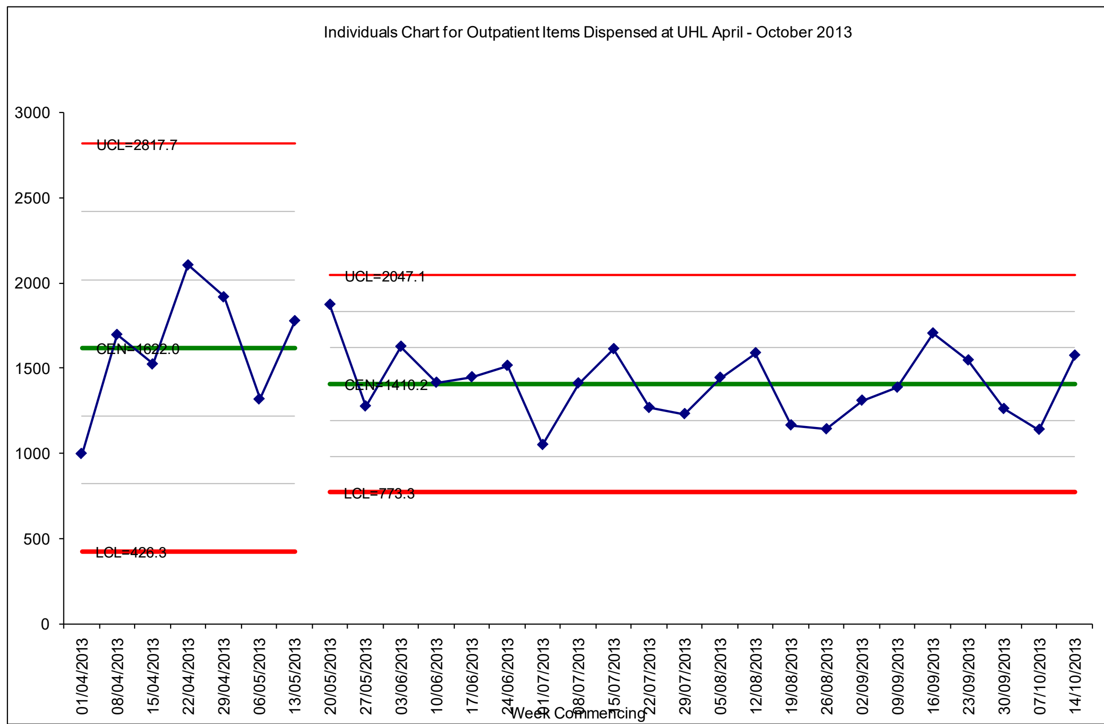


Figure 5 shows the control chart for UHL dispensary. It shows four out of five consecutive points beyond one standard deviation on the same side of the centre line which indicates a shift in the process. Again the control chart needs to be split to recalculate the new mean and control limits, as in shown in Figure 6.

Figure 6. Split Control Chart for Outpatient Items Dispensed at UHL Dispensary April – October 2013



Splitting the control chart demonstrates that since May the mean number of outpatient items and the variation have reduced.

Figure 7. Comparison of Hospital Only Prescription items, with Items available in for Dispensing in Primary Care, Dispensed at UHL Pharmacy July 1st-12th 2013

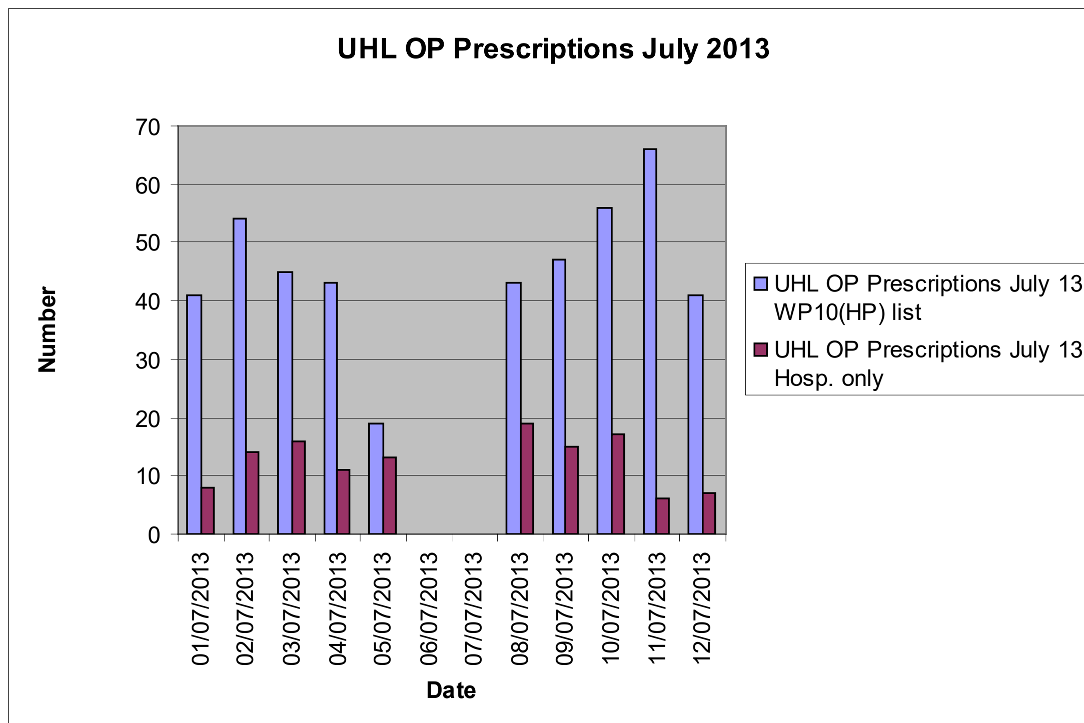


Figure 7 compares the number of outpatient prescription items dispensed each weekday for the first two weeks of July 2013 broken down to hospital only medicines (dark red) and items that could have been referred to the GP for prescribing (blue) as they are available from community pharmacies. Combining the data for all the days showed that 22% of the items prescribed were only obtainable from hospital pharmacies.

Analysis and Discussion

The analysis of WP10(HP) prescriptions showed that of the 688 items dispensed, 87% were written generically, which compares favourably with the 83.4% of prescriptions written generically by GPs in Wales in 2012-13 (Welsh Government, 2013b:Table 5.10). 98.6% of the items prescribed were appropriate for dispensing in primary care, according to the list complied for this purpose. The sole hospital only item prescribed was Clexane, a low molecular weight heparin. This was one of the items prescribed by its brand name, although there is no generic version available currently, so the cost

would be the same. It was prescribed by hospital prescribers, but because the prescriptions were dispensed by community pharmacies the cost was considerably greater than if they had been dispensed by a hospital pharmacy. Four items were prescribed that were not included in the formulary. These results do not indicate a loss of control of generic or formulary prescribing, as feared.

71% of the prescriptions written in April were dispensed within two days, 82.5% within a week and 86% within two weeks of being written. 7% couldn't be analysed. We did not collect similar data for prescriptions for patients to take to the hospital pharmacy, so comparisons cannot be made. This could be addressed in future work if prescribers consider that the delays in obtaining prescriptions, in some cases, is of concern.

The comparative costing of items dispensed on WP10(HP) with hospital average prices showed a difference in price of £594 for 688 prescription items. Large differences in price were seen for six prescription items

- Clexane injection
- Ondansetron tablets
- Nitrofurantoin tablets
- Ursodeoxycolic acid capsules
- Codeine phosphate tablets
- Cefalexin tablets

The health board could avoid these extra costs by ensuring these items are not prescribed on WP10(HP) prescriptions. This information will be of use in future to support prescribers in out-patient clinics to use the most cost effective supply route for prescribing. However the comparable prices between hospital and community for most medicines supports the suggestion from the Commission for Healthcare Audit and Improvement that hospital discounts can lessen the VAT effect in community pharmacies (2007:46).

The use of the WP10(HP) prescriptions helped to reduce the workload in the hospital pharmacy, as without these prescriptions the items would have had to

have been dispensed by the hospital pharmacy. The number of items dispensed on WP10(HP) prescriptions increased each month from April to June. If this growth continued it would be expected to have a significant beneficial effect on hospital pharmacy workload and patient waiting times.

Analysis of hospital dispensary outpatient items dispensed each week indicated that a change in the number of outpatient items dispensed occurred in May at UHL and this was reflected in the combined chart for all hospital dispensaries. A change was expected to happen from July, when the use of the out-patient prescription/recommendation forms for referral to GPs was promoted. The forms have been available for use in the out-patient clinics since 2006, and there had been discussions with clinical boards and clinical directorates about making this change since April, so the results may be explained by prescribers deciding to use the forms for this purpose earlier than expected.

Although there appears to be a downward trend in prescription items dispensed at UHW pharmacy, the control chart does not yet indicate that a change has occurred. The figures can therefore be explained by common cause variation.

The analysis of the prescriptions dispensed at UHL during the first two weeks of July show that prescribers were prescribing many items that could be obtained in the community on hospital prescriptions. Some of these medicines would have been required urgently, when using the hospital prescription is appropriate. However it would appear that more could be done to promote referral to GPs for non-urgent items. This analysis was only performed on a small sample of prescriptions at one hospital. Repeating this work now that prescribers have had time to get used to the forms is recommended to see whether the proportion of hospital only medicines dispensed in the hospitals has changed.

It has not been possible, in the timescale of this study, to measure turnaround times for prescriptions in the dispensaries, which would be of value to show

whether the changes have made a difference to outpatient waiting times. This will be monitored continuously in future by the prescription tracking system. Neither has it been possible to repeat the outpatient satisfaction survey yet, although this is planned for 2014 and will be of value in finding out whether the changes have made any difference to the people for whom we aim to improve the service.

Conclusions

Both the use of WP10(HP) prescriptions and the appropriate use of the outpatient prescription/recommendation form appear to have contributed to a reduction in the number of prescription items dispensed by the hospital pharmacies.

The results obtained from the analysis of WP10(HP) prescriptions should provide reassurance that the use of this route for supply to outpatients does not lead to non-formulary or brand name prescribing and that, if a restricted list of medicines is avoided, there would not be additional costs incurred.

Recommendations

Outpatient prescription turnaround times should be measured to see if the changes have reduced waiting times for outpatients.

The results of the study should be reported back to clinical boards and directorates

In Conclusion

This study has evaluated two change interventions to improve the supply of medicines to Cardiff and Vale UHB outpatients. Both the use of WP10(HP) prescriptions and appropriate referral to GPs for prescribing have demonstrated benefit in reducing hospital pharmacy workload. The use of WP10(HP) prescriptions did not lead to non-formulary compliance or reduced generic prescribing rates. The price for most medicines was similar in primary care and hospitals, with a few exceptions.

In the time available it has not been possible to measure the effect of the changes on outpatient waiting times for prescriptions or patient satisfaction with the service.

There is a lack of evaluation of alternative routes of medicine supply to outpatients in the literature, which given the amount spent on medicines, needs to be addressed.

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