CONFERENCE ABSTRACTS

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NAPP PHARMACEUTICALS LTD PAIN AWARD 2012

Safer use of NSAIDs in primary care

Livingstone C*, Patel C†, Sinha R†, Greensmith S*
*Medicines Use and Safety, NHS East and South East England Specialist Pharmacy Services; †NHS Crawley Clinical Commissioning Group

Non-steroidal anti-inflammatory drugs (NSAIDs) are widely used for both their analgesic and their anti-inflammatory properties. However, they are also known to have a range of serious side effects. Each year in the UK, NSAIDs cause about 3,500 hospitalisations for and 400 deaths from ulcer bleeding in patients aged 60 years or above.[1] Studies of medicine-related hospital admissions have reported that NSAIDs are a common cause of admissions classed as potentially preventable.[2] Problems included inadequate renal monitoring, inappropriate self-medication and, most frequently, inadequate gastrointestinal (GI) prophylaxis.[2] Current guidance from the National Institute for Health and Clinical Excellence (for osteoarthritis, rheumatoid arthritis and people aged over 45 with chronic low back pain) is that GI prophylaxis should be co-prescribed for all patients treated with NSAIDs (including cyclo-oxygenase-2 selective inhibitors).

The pharmacy medicines use review (MUR) service is intended to improve patients' knowledge and use of medicines, but the value of the service is unclear. Three key areas of NSAID safety identified in studies of preventable admissions could be addressed by MURs: co-prescription of GI prophylaxis, adherence with prophylaxis and self-medication with NSAIDs. Prior to this work, pilot prescription surveys confirmed there were ongoing problems with co-prescription and adherence to GI prophylaxis. A recent survey of patients with osteoarthritis also reported that 43% were not offered gastroprotective medication.[3]

OBJECTIVE

To evaluate whether the existing community pharmacy MUR service could be specifically targeted to improve NSAID safety in primary care, potentially preventing NSAID-related hospital admissions.

METHOD

Two groups at particular risk from regular NSAID use were identified: patients with inadequate GI prophylaxis and all patients aged over 55 years. Community pharmacists targeted these patients for MURs. The MUR included checking appropriate GI prophylaxis was in place, confirming patient understanding and adherence to GI prophylaxis, and discussing the risk of taking non-prescribed NSAIDs concurrently. For each MUR, pharmacists completed an anonymous data collection form. Seventeen pharmacies in Sussex and Hampshire took part, recruiting patients from January 2011 to March 2012. Ethics approval was not required.[4]

RESULTS

142 patients on regular NSAIDs were reported, including nine who did not receive an MUR but were still followed up by the pharmacists because of safety concerns. The average patient age was 64 (range 20–90). One patient was prescribed two NSAIDs and six were taking both prescribed and non-prescribed NSAIDs prior to the MUR. Eighty-six patients were reported with inadequate GI prophylaxis: four were non-adherent and 82 had no prophylaxis prescribed (see Table 1). Post-MUR follow-up was completed for 51 patients in this group: 23 had GI prophylaxis initiated, six discontinued NSAID treatment, four had a reduced NSAID dose, one was prescribed an alternative NSAID, eight had therapy reviewed but the prescriber/patient decided not to make any changes, and nine had no known review/changes. For the older patient group (56) with adequate GI prophylaxis, one patient was referred for a renal function check and one subsequently discontinued NSAID treatment.

Table 1: Patients prescribed NSAIDs with inadequate gastro-intestinal prophylaxis (n=86)

Age (years)	Under 55	55-75	Over 75	Total
Number of patients	22	53	11	86
Patients with additional drug-related gastro-intestinal risk factors	3	1	2	6
GI prophylaxis non-adherence	0	3	1	4
GI prophylaxis not prescribed	22	50	10	82
Post-MUR follow up completed	15	27	9	51

DISCUSSION

Unintentional harms from medicines contribute to many hospital admissions with serious consequences for both patients and health resources. This work has demonstrated how MURs can contribute to the safe use of one commonly prescribed class of analgesic. Patients prescribed NSAIDs are now included within the national target MUR "high risk drug" group. Results from this study indicate that these MURs can make a significant contribution to medicines safety.

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NAPP PHARMACEUTICALS LTD ASTHMA AWARD 2012

An evaluation of practice by pharmacist independent prescribers working in asthma/COPD clinics in primary and secondary care

Butt M*, Khachi H†, Nicholls J*
*East & South East England Specialist Pharmacy Services, London; †Barts Health NHS Trust, London

In 2000, the Department of Health policy objectives for the development of non-medical prescribing (NMP) were to improve patient care, choice, access and patient safety through better use of health professionals' skills and more flexible team working across the NHS. Since 2006, pharmacists and nurses have been able to train to become independent prescribers. A recent evaluation indicates that, overall, nurse and pharmacist prescribing is safe and clinically appropriate. It is becoming a well integrated and established means of managing

a patient's condition and giving him/her access to medicines.[1] There is currently no published evidence on how effectively pharmacists are able to prescribe and manage patients with respiratory disease. This quality improvement project was developed to support pharmacist prescribers to review this practice.

AIM

To develop and test a tool that enabled pharmacist independent prescribers (PIPs) to examine their practice in relation to perceived best practice.

OBJECTIVES

- To agree and test with the pharmacist prescribers a dataset for asthma/chronic obstructive pulmonary disease (COPD) patients that would allow the PIPs to undertake self-audit and peer review.
- To analyse data to review the patients' management by PIPs in line with agreed best practice.

METHOD

All primary care trust and chief pharmacists in the South East of England were contacted to help identify practising pharmacist independent prescribers. PIPs working in respiratory clinics were approached and asked to participate on a voluntary basis. The project lead worked collaboratively with the volunteers to agree a dataset specific to asthma/COPD patients. Minor amendments were made following a two-week pilot. All patients with asthma and stable COPD seen in each clinic session were included in the data collection. Data were collected prospectively over six months. Individuals agreed to review their own practice in line with the mutually agreed final dataset by a process of peer review. Patient assessment had to be manageable within the clinic time available.

RESULTS

Four PIPs were recruited (three working in primary care settings and one in secondary care). Following the pilot the dataset was reviewed and amended by the practitioners. Between October 2011 and March 2012, data were collected for a total of 168 patients: 96 with asthma and 72 with COPD.

Of the asthma patients, 36% were at BTS step 4 or 5 and 66% with an asthma control test (ACT) of <19, indicating poorly controlled asthma.[2] Of the COPD patients, 38% were defined as severe or very severe based on forced expiratory volume (FEV1) rating. In the previous 12 months, 27% of the asthma patients and 24% of COPD patients had had three or more acute exacerbations. Table 1 outlines the findings. Data were provided for most of the agreed parameters. Inhaler technique was discussed with 86% of asthma patients and 88% of COPD patients, with inhaler technique assessed in 75% of asthma patients and 78% of COPD patients. General adherence issues were also discussed in 67–69% of patients. Based on severity of airways disease and patient symptoms, the PIPs reviewed whether the drug therapy was appropriate. In 41% of asthma patients and 19% of COPD patients, it was assessed as not appropriate and changes to therapy were made. A large proportion of these were stepping down or stopping therapy, in line with QIPP (quality, innovation, productivity and prevention) standard targets (of reducing inappropriate high dose inhaled corticosteroid use).[3]

Access to rescue packs was checked in 85–86% of eligible patients. The flu/pneumococcal status were ascertained in 92% and 99% of asthma and COPD patients, respectively, and referral made in most cases where appropriate. The 75% of asthma patients and 93% of COPD patients identified as smokers were offered smoking cessation.

Table 1: Results of advice given to patients

Advice	Asthma (n=96)	Data not provided	COPD (n=72)	Data not provided
Inhaler technique discussed	83 (86%)	7	63 (88%)	3
Inhaler technique assessment undertaken	72 (75%)	–	56 (78%)	–
General adherence issues discussed and guidance provided	64 (67%)	1	50 (69%)	1
Drug therapy inappropriate* and amended	39 (41%)	1	14 (19%)	3
Eligible for rescue packs	33	0	29	0
Access to rescue packs checked	29 (85%)	0	25 (86%)	0
Flu/pneumococcal vaccination status checked	88 (92%)	0	71 (99%)	0
Referral for vaccination offered where applicable	14/15	0	10/11	0
Smoking cessation offered where appropriate	6/8 (75%)	1	27/29 (93%)	0

*according to severity of airways disease, national guidelines and patient symptoms

DISCUSSION

The process of agreeing a dataset prior to data collection allowed individual practitioners to review their practice with respect to national guidance and their peers. Patient assessment and recording of data were found to be manageable within the clinic time available. The results show that PIPs are managing respiratory patients, including those with severe disease and those who are traditionally referred to hospital outpatients. Within the limits imposed by self-audit, they show that PIPs undertake a thorough assessment of patients and amend drug therapy where necessary to improve disease management in line with evidence-based national standards.

Research also demonstrates that up to 50% of patients do not take their prescribed medicines as intended.[4] As experts in drug therapy, PIPs can bring value-added prescribing services to respiratory management, by ensuring that inhaler techniques and general adherence issues are addressed and are well placed to manage patients with co-morbidities. The frequency of patient attendance and the time available for data collection meant that data were only collected once for each patient. Future work would be to extend the data collection period to allow patients' management to be measured over time.

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NOVARTIS ANTIMICROBIAL MANAGEMENT AWARD 2012

Improving antimicrobial prescribing using rapid serial audits and feedback

Talpaert M, Acosta N, Fife A, Onatade R
King's College Hospital NHS Foundation Trust, London

Between 2003 and 2009, this trust performed annual point prevalence studies (PPS) to examine trends in antibiotic prescribing and adherence to prescribing policies. The 7th and 8th annual PPS conducted in November 2008 and 2009 highlighted three main issues needing to be addressed. In 2009, 33% of the antimicrobial agents prescribed had an indication clearly documented on the drug chart, compared to 34% in 2008. The ratio of patients on intravenous (IV) compared to oral (PO) antimicrobials in 2009 was 51:49 compared to 47:53 in 2008. 21% of prescriptions in 2009 had the duration specified (29% in 2008). In 2010, it was decided to see if more frequent "mini-audits" and regular feedback to individual teams could help improve prescribing. This methodology has been shown to modify prescriber behaviour.[1]

OBJECTIVES

- To use a system of targeted serial audits with rapid feedback to improve compliance to local antimicrobial guidelines and prescribing policies
- To achieve the following standards by the end of the audit period:
  - 90% of patients receiving antimicrobial treatment should be treated according to trust policies and guidelines.
  - 90% of antimicrobials prescribed should have the indication recorded
  - 90% of antimicrobials prescribed should have the duration of treatment recorded
  - 95% of patients suitable for IV to PO switch should have switched

METHOD

Drug charts on 17 wards (445 beds) were audited four times between October 2010 and May 2011. The period between cycles was approximately six weeks.

Table 1: Results of all four audit cycles

	1st cycle (Oct/Nov)	2nd cycle (Nov/Dec)	3rd cycle (Jan/Feb)	4th cycle (April/May)	p-value
Total patients	139/445	120/445	124/442	112/443	
Total antimicrobials	183	153	170	165	
Restricted antimicrobials	59/183	59/153	52/170	42/165	
Clinical indication documented on drug chart					
Overall	42.4% (59/139)	48.3% (58/120)	73.4% (91/124)	82.1% (92/112)	p<0.0005
Specialty results for documentation of clinical indication (total number of charts)					
Neurosciences	35% (20)	60% (15)	100%*(18)	64% (14)	
Clinical gerontology	64% (31)	68% (30)	100%* (27)	90%* (29)	
Surgery	37% (35)	14% (35)	32% (34)	60% (35)	
Acute medicine	22%	55%	77% (22)	94%* (17)	
Medical admissions	57% (21)	55% (22)	78% (23)	88% (17)	
Stop/review date (course length) documented on drug chart					
Overall	43.9% (61/139)	51.7% (62/120)	51.6% (64/124)	60.7% (68/112)	p= 0.0006
Specialty results for stop/review date (as a proportion of charts in that specialism)					
Neurosciences	70%	80%	61%	71%	
Clinical gerontology	58%	60%	63%	79%	
Surgery	37%	43%	27%	26%	
Acute medicine	34%	67%	41%	71%	
Medical admissions	23%	23%	78%	94%*	
Restricted antimicrobials not prescribed as per trust guidelines and unclear/inappropriate					
Overall	16.9% (10/59)	6.8% (4/59)	5.8%* (3/52)	4.8%* (2/42)	p = 0.001
Non-restricted antimicrobials not prescribed as per trust guidelines and unclear/inappropriate					
Overall	23.4% (29/124)	21.3% (20/94)	9.3%* (11/118)	0.8%* (1/123)	p<0.0005 p<0.0005
IV to PO switch overdue					
Overall	3.6%* (5/139)	2.5%* (3/120)	0.8%* (1/124)	0.9%* (1/112)	NS, p=0.13

*audit standard met

Wards were chosen based on the results of the 2009 PPS. Each cycle was a snapshot audit on one day. Pharmacy screened all antimicrobial prescriptions for compliance with the standards. Data collected included: ward, name of antimicrobial and whether it was classified as restricted or not, presence or absence of indication and course length on the drug chart or in the notes, and whether the IV/PO switch was overdue according to our criteria. Sensitivities and any advice from medical microbiology were also recorded. After each audit, pharmacy and medical microbiology fed back the results (overall and specialism-specific) to staff in a variety of ways — direct to consultants, pharmacists, infection control leads and clinical governance leads and at clinical directors' meetings. Consultants were asked to make sure that the information reached their juniors. The chi-squared statistic was used to determine the significance of the improvements between Cycle 1 and Cycle 4. Because these were audits, ethics approval was not required.

RESULTS

Results of all four cycles are displayed in Table 1. The IV/PO switch was within target at the beginning of the audits and stayed that way. The only other targets that were reached overall were the prescriptions of antimicrobials according to guidelines or medical microbiology advice. However, performance on all targets except IV/PO switch increased significantly between the first and fourth cycles.

DISCUSSION

Although most of the standards did not reach their targets, regular, focused auditing with rapid feedback before the next audit cycle significantly improved antimicrobial prescribing. Some specialisms improved more than others. The success of this work led to the adoption of three antimicrobial stewardship key performance indicators (KPIs) onto the trust scorecard — IV/PO switch not overdue, documentation of the stop or review date and documentation of the clinical indication. Data on the KPIs is now collected by junior doctors monthly. The trust and specialism-specific results appear on the scorecard monthly and are discussed at clinical governance and infection control meetings. The improvements have been sustained and now routinely reach target levels.

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SANOFI DIABETES AWARD 2012

Development of e-prescribing to improve safety of insulin and anti-diabetic medications

Jacques N*, Hellawell T*, Link K*, Holmes C†, Dyer P†
*Pharmacy Department, Heart of England Foundation Trust (HEFT), Birmingham; †Diabetes Department, HEFT

Errors relating to diabetic medication errors are high profile locally and nationally for a number of reasons. National drivers are: the NPSA rapid response alert on safer administration of insulin;[1] the Think Glucose campaign; and the national inpatient diabetic audit.[2] Local drivers are: a local serious untoward incident relating to insulin that resulted in a coroner's case; incident reports of hypoglycaemia relating to sulfonylurea, biphasic and rapid acting insulin administration after 10pm; lack of knowledge from medical and nursing staff about insulins and oral anti-diabetes medications; and the trust was set a Commissioning for Quality and Innovation target to demonstrate a 5% reduction in insulin and other diabetic medication errors

In response to the local and national drivers HEFT established a trust-wide multidisciplinary group called DECIDE (Delivering Excellent Care to Inpatients with DiabEtes). A decision was made to use the electronic prescribing system that is available across the trust on approximately 80% of the available 1,500 beds to help improve insulin and oral anti-diabetes medication safety.

AIM

To improve patient safety with improved electronic prescribing of insulin and oral anti-diabetes medications.

OBJECTIVES

To demonstrate a 5% reduction in insulin and other diabetic medication errors compared with baseline data from quarter 3 of 2009/2010.

METHOD

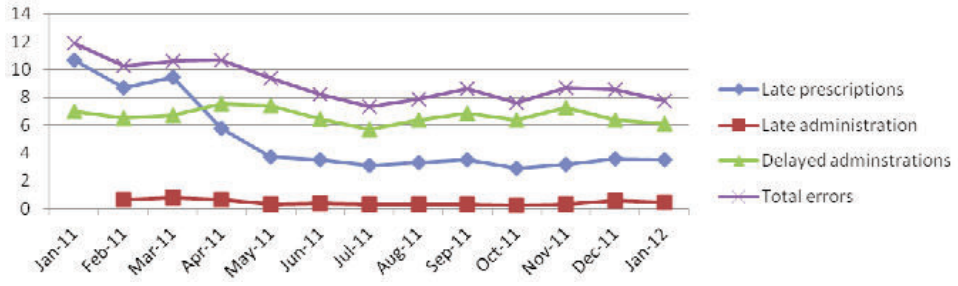
A baseline audit using data collected from the electronic prescribing system was undertaken by the DECIDE group. This highlighted three main categories of diabetic medication (insulins and oral antidiabetes medications) errors: *late prescription* — insulin or oral antidiabetes medication prescribed to be administered after 10pm and before 6am (intermediate and long acting insulins were excluded); *late administration* — diabetic medication administered between 11pm and 6am; and *delayed administration* — diabetic medication administered more than 120 minutes after the time it was prescribed to be administered.

To overcome these problems the DECIDE group and the electronic prescribing team undertook a comprehensive review of all diabetic medication prescribing. Diabetic medication protocols were developed to assist prescribers in selecting appropriate meal based timing of administration of diabetic medicines and to help nurses to understand that insulins and oral anti-diabetes medications should be given at meal-times. The insulin device was removed from the prescribing selection list as this was frequently prescribed incorrectly. The pharmacy team as part of the drug history were asked to add a note to the insulin specifying the correct insulin device.

Three new meal based frequencies were introduced to the e-prescribing system, which were breakfast, lunch and evening meal.

Each protocol had a consistent naming convention and was assigned a default administration time in line with one of the new meal based frequencies.

Figure 1: Monthly diabetic medication errors (%)



Key: late prescriptions = insulin or oral anti-diabetes medication prescribed to be administered after 10pm and before 6am (intermediate and long acting insulins were excluded); late administration = diabetic medication administered between 11pm and 6am; delayed administration = diabetic medication administered more than 120 minutes after the time it was prescribed to be administered

Table 1: Summary of total diabetic medication errors per quarter (%)

Diabetic medication errors	Q3 09/10	Q3 10/11	Q4 10/11	Q1* 11/12	Q2 11/12	Q3 11/12
Number of total errors	10,810	7,273	6,267	5,617	4,827	4,802
Number of total administrations	54,599	61,132	57,279	59,553	60,798	57,832
Percentage of errors	19.8%	11.9%	10.94%	9.4%	7.94%	8.3%

*E-prescribing diabetic protocols introduced

An "unknown insulin" option and free-text prescription was made available should the protocol required not be on the e-prescribing system.

To assist with the change in practice, the training was provided to prescribers by the pharmacy and diabetes teams on how to prescribe diabetic protocols on the trust e-prescribing system. In addition, quick guides were produced for medical staff with how to use these protocols and basic information was also included on duration of action of the different groups of insulins, mechanism of action of oral antidiabetes medicines and key prescribing points.

A report to obtain the data from the e-prescribing system was written to collect the three types of error at monthly intervals. Ethics approval was not required as the data obtained in the reports were anonymous. A number of actions had already been undertaken by the DECIDE group in 2009–10 so it was decided to use January 2011 as the baseline to establish the error rate. Each month the data were collated, analysed and reported at the monthly DECIDE meetings and HEFT drugs and therapeutics committee.

RESULTS

The baseline data obtained in January 2011 showed trust activity of approximately 2,000 prescriptions and 20,000 administrations of diabetic medications per month, with 11.9% of prescriptions having a diabetic medication error. The e-prescribing diabetic protocols were introduced in early April 2011 (quarter 1) and from the results in Table 1 there was a sustained reduction in the number of total errors (defined as late prescription, late administration and delayed administration). Figure 1 demonstrates there was a significant reduction in "late prescriptions". The numbers of late or delayed administration has remained consistent and demonstrates no change since the introduction of the diabetic protocols.

DISCUSSION

The introduction of diabetic protocols on the trust e-prescribing system showed a significant reduction in the total number of diabetic errors. In particular there has been a sustained improvement in more appropriate prescribing times for insulins and oral anti-diabetes medications. This in turn has helped the trust to demonstrate how it has met the challenge of a diabetic focused CQUIN target.

A weekly report has also been generated which provides the DECIDE group with details of which prescribers have prescribed "off protocol". This has enabled the diabetes team to provide direct feedback and learning to individual doctors.

During this process the trust DECIDE group was working on a number of projects to make diabetes and diabetic medicines high profile within the trust, increasing awareness of the condition and the need for safe prescribing. This additional work could have helped to contribute in part to the large reduction in diabetic errors over the year.

Although the diabetic protocols have helped resolve inappropriate timing of insulins and oral antidiabetes medications, there is more work to be undertaken to resolve the issues of delayed administration of these medications.

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UKCPA EDUCATION AND TRAINING AWARD 2012

A collaborative approach to taking e-learning forward in CPPE: Repurposing resources for the online synchronous environment

Wright E, Cutts C
Centre for Pharmacy Postgraduate Education (CPPE), University of Manchester, UK

The Centre for Pharmacy Postgraduate Education (CPPE) employs 80 tutors nationwide to deliver four different types of face-to-face evening workshops to the pharmacy workforce. The pedagogy of these events is founded on the construction of knowledge within a group, or social constructivism.[1] Time and travel are still major challenges facing pharmacists and pharmacy technicians to access this face-to-face resource. To increase the accessibility to this type of postgraduate education, a group of six CPPE tutors (project tutors) embraced the challenge to repurpose,[2] or to give a "new purpose to", a CPPE focal point (FP) workshop to the online environment.

Participatory action research (PAR) is a collaborative research method, popular in educational research, which also embraces social constructivist epistemology. This congruence meant it was a method of choice for the repurposing of both the project tutors and the CPPE FP workshop material to the online environment. In addition to the construction of knowledge within a group, PAR must also empower participants to use their knowledge.[3] WebEx is the online platform used for this project.

OBJECTIVES

- To repurpose CPPE resources, namely CPPE tutors and a CPPE FP workshop, to the online synchronous environment
- To determine CPPE tutors' perception of e-workshops, namely advantages of this mode of learning

METHOD

On 7 February 2011, the tutor group designed a collaborative five-month project plan that involved the design and implementation of an online workshop. To align with the pedagogy of CPPE workshops, interaction between participants was considered to be a key feature of the online event. To facilitate the collaborative PAR process, a wiki (shared internet site) was used to host the iterative reflective process within the group. The five-month project was divided into two stages: stage 1 involved training in WebEx, review of CPPE learning materials and a WebEx meeting to design outline of e-workshop; stage 2 comprised three trial events run within the project tutor group, three pilot events each attended by three CPPE tutors external to the project tutors, and a focus group gathering reflections from the project tutors.

Ethical approval for this research process was sought and granted from the University of Leeds.

Table 1: Essential characteristics of e-workshops

Characteristic	Percentage (n=44)
Flexible timing (eg, weekends, daytime)	50%
Interaction between participants	45%
Nationally run (signposting to local issues)	36%
Run by specialist webinar tutors	27%
Have the opportunity to role play	23%

RESULTS

A CPPE asthma FP online workshop was created and underwent a trial and pilot phase. Four e-workshop taster sessions were subsequently run at the CPPE national conference in October 2011 to present the e-workshop outline and recruit a potential e-tutor cohort. The 44 tutors attending the sessions were surveyed to determine their perception of e-workshops. As tutors chose to attend the session, it was perhaps unsurprising that 98% of the surveyed tutors agreed that CPPE should have live online learning as part of its learning portfolio. It was interesting to note that the top five areas that the tutors considered essential were congruent with the repurposed workshop (Table 1).

The top five potential audience categories for e-workshops were ranked as the following: technology-minded individuals 77%; "younger" pharmacists/technicians (newly qualified) 75%; preregistration pharmacists 64%; pharmacists/technicians in rural areas 55%; anyone with family commitments in the evening 52%.

The momentum created by this project led to CPPE trialling five interactive "e-workshops" for the postgraduate pharmacy workforce throughout February and March 2012.

DISCUSSION

Throughout this project there were key learning points that are transferable to other areas of research in pharmacy education:

- The experience of practitioners can be harnessed through the collaboration to create innovative educational solutions
- To successfully repurpose learning material to another environment, it is essential that the underlying pedagogy of the event is considered
- Participatory action research appears to be an excellent method to empower participants, create knowledge and provide momentum for new initiatives
- Interactive online workshops appear to be an educational solution that can increase the accessibility of postgraduate education within the pharmacy workforce

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HAMELN ORAL COMMUNICATION AWARD

The impact of including a heart failure specialist pharmacist on the inpatient heart failure service: a pilot study

Bateman J, Green CF
Pharmacy Department, Countess of Chester Hospital NHS Foundation Trust

Approximately 900,000 people in the UK have heart failure (HF): almost as many have damaged hearts but, as yet, no symptoms. HF accounts for approximately one million inpatient bed days, 2% of all NHS inpatient bed days and 5% of all emergency admissions.[1] The total annual cost to the NHS is around 2% of the total NHS budget, with 70% of this due to the costs of hospital admission,[2,3] and readmissions are common.[4]

At the Countess of Chester Hospital NHS Foundation Trust (COCH), the inpatient heart failure service was reviewed and redesigned in order to improve the management of this patient group. The service was supported by developing a heart failure specialist pharmacist (HFSP) role in addition to the existing specialist nurse role (HFSN). The redesign aimed to develop the service from one that focused on patient counselling, to a more proactive service which included clinical assessment and prescribing by the specialist nurse and pharmacist leading the service. The HFSP also provided clinical advice to the Community Heart Failure team.

OBJECTIVES

The aim of the project was to improve the care of heart failure patients and improve a number of measures to demonstrate this. The objectives of the service redesign were to evaluate the impact of the service redesign on: length of stay and associated costs and saving; readmission rate; the number of patients counselled about their heart failure medication; and follow-up and prescribing for patients during their inpatient stay.

METHOD

Baseline data collection established current rates of patient length of stay (LOS) and readmissions which were then compared to a post-implementation period. The HFSP and HFSN underwent training as independent prescribers and the HFSP also undertook a clinical examination course. The comparative data assessed patients with left ventricular systolic dysfunction (LVSD) who were referred to the heart failure service from October 2010 to June 2011 and following service redesign in October 2011 to June 2012. Data were collated from the hospital information system (Meditech) and analysed by a trust information analyst. Data on prescribing, interventions, visit numbers and counselling were obtained from data captured in the Heart Failure Care Plan on Meditech.

RESULTS

The number of patients referred to the heart failure team with LVSD was 252 in 2010–11 compared to 187 in 2011–12 and the mean LOS remained unchanged at 16 days. However, there was significant variation in the LOS between patients, probably due to the complexity of their condition. The patients seen in 2011–12 had a larger cohort of elderly (80–89 years) patients than those seen in 2010–11 (35.7% of patients in 2010–11, compared to 42.8% in 2011–12). Overall, readmissions were reduced; 15% were readmitted in 2010–11 compared to 11% in 2011–12 (Table 1).

With regard to the HFSP prescribing role, the number of new drug initiations for the HFSP and HFSN increased over the 9 months as confidence and experience grew. Of prescriptions written by the HFSP and HFSN, the HFSP was responsible for 64% of initiations and 63% of dose adjustments during this time. Compliance with the trust's "Advancing quality" patient counselling targets was achieved in 2011–12 with improved rates compared to 2010–11.

The HFSP recorded 57 clinical interventions in the evaluation period, including stopping of contraindicated medications, dealing with adverse drug reactions, incorrect dosing and drug interactions. In addition, HFSP referred several acutely unwell patients to a cardiologist, many of which resulted in transfers to a cardiology ward for specialist treatment.

DISCUSSION

Patient numbers were lower in 2011–12, which may be partly explained by fewer patients being readmitted during that time. Although there was an overall reduction in readmissions, those within 30 days of discharge showed a small increase which requires further investigation. The LOS remained largely unchanged, which, given that the 2011–12 cohort had a greater proportion of older patients, could be viewed as a positive development. Work is needed to investigate this further in order to exclude social and non-HF related extensions in LOS. The clinical interventions show the additional benefit of a cardiology pharmacist in the HF team as these might not otherwise have been identified by more generalist staff.

Table 1: Variation in length of stay and readmission rates

	2010	2011
Length of stay (days)		
25th percentile (1st quartile)	6.64	7.89
50th percentile (median)	11.10	11.94
75th percentile	21.28	20.41
95th percentile	47.27	43.18
Readmissions (as % of total)		
Readmission over 30 days	11.11%	5.88%
Readmission within 30 days	4.37%	5.35%
Grand total	15.48%	11.23%

Further evaluation is required to increase the robustness of the conclusions drawn from the data thus far and to challenge the assumption that prescribing results in a corresponding improvement in the patient's condition. A more detailed audit using individual case analysis would help to clarify this assumption.

The service redesign generated an advanced model of practice in which a pharmacist has stepped out of their traditional role, and taken on new prescribing and physical examination skills in a complex patient group. This project demonstrates an advance that is good for patients, good for the trust and good for the development of individual practitioners and their colleagues. Following the success of this work, the pharmacist's role will be extended to provide an OPD clinic for the initial assessment of suspected HF patients from primary care, supporting NICE recommendations.

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HAMELN BEST POSTER AWARD

The standard of prescribing on the medical investigations day unit

Lal R, Burgess C, Graves A

Heatherwood and Wexham Park NHS Foundation Trust, Slough

The medical investigations day unit (MIDU) is an outpatient department, where patients are admitted as a day case for the administration of intravenous therapy. Pharmacists found that prescribing standards were poor on drug charts from MIDU while screening them in the pharmacy department. This issue was discussed in the hospital's medicines and safety committee in early 2011, where it was concluded that better prescribing standards needed to be enforced.

The National Patient Safety Agency (NPSA) released a patient safety alert in 2007 titled "Promoting safer use of injectable medicines" which highlighted risks of incorrect prescribing of injectable medication and set out action plans to minimise risks regarding all injectable products.[1] Studies have suggested that medication prescribing errors are one of the recognised contributors to the overall problem of medication errors.[2] This audit will be able to determine the current standard of prescribing of day case medications on MIDU according to trust policy and procedure (TPP) 107.[3]

OBJECTIVES

- To determine the proportion of legal prescriptions
- To determine the proportion of prescriptions with appropriate clinical information
- To assess if the prescriptions are clear and legible to allow safe administration of medication

Table 1: Most common contributors that resulted in poor compliance to the standards

Standard	n Value	Percentage compliance (number)
Legality		
In date	91	83% (75)
Patient's address	91	37% (34)
Clinical information		
Weight if required to determine dose	37	59% (22)
Allergy status complete	91	78% (71)
Approved drug name	91	49% (45)
Legibility and clarity		
Appropriate cross-referencing of drug charts	10	30% (3)
Appropriate discontinuation of drugs	26	35% (9)
Other issues		
Medication prescribed on current drug chart	91	78% (71)
Medication prescribed on correct section of the drug chart	91	14% (13)

STANDARDS

- 100% of prescriptions should be legal. This includes the following requirements: patient's full name, address, age if less than 16, date of birth, doctor's signature, written in indelible ink and dated within six months.
- 100% of clinical information should be complete. This includes the following requirements: patient's current weight if less than 16 years, approved medicine name/specific brand, the dose and frequency of administration, the date and route of administration, and allergy status.
- 100% of prescriptions should be legible and clear. This includes the following requirements: units written in full, appropriate use of decimal places, cross referencing of drug charts, clear discontinuation of drugs, and new prescriptions for changed dose/route.

METHOD

The audit was prospective and carried out over a two-week period in June 2011; data were collected by the author only. A data collection form was used to collect the data and results were collated manually and then entered into a Microsoft Excel spreadsheet for analysis. All the drug charts available at the time of data collection were used for the audit and all the drug charts were only audited once. The most recent prescription or the one where the last supply was made was audited; therefore all other previous prescriptions if on the same drug chart were excluded from the audit. Prior to data collection a pilot was undertaken on 10 drug charts. Ethical approval was not required for this audit to be completed.

RESULTS

In total 91 charts were audited over the total data collection period. Of these 25% (n=23) were legal; 22% (n=20) were clinically complete and 80% (n=73) were legible and clear. Table 1 illustrates the most common contributors that resulted in poor compliance to the three standards.

DISCUSSION

The audit found that the standard of prescribing of medications on MIDU was poor and did not follow the trust policy and procedure. None of the three standards had 100% compliance. This could lead to potential errors and compromises safety.

Prescriptions being out of date means that the pharmacist screening does not know if the dose or treatment is still appropriate for the patient, while charts missing addressographs could potentially lead to the wrong patient receiving the medication. Often referral letters attached to the drug chart containing some patient details were used to help identify the patient; this is an unsatisfactory practice. Without the weight of the patient, a pharmacist screening the drug chart would be unable to determine if the dose is correct for that patient, and hence be unable to clinically check the prescription. An incomplete allergy status is of great potential risk to the patient, as this could potentially harm the patient if the patient does have a true allergy and this is not documented. Not having the correct approved name of the medication or brand specified could possibly compromise patient safety as the incorrect medication could be administered to the patient. The most up-to-date trust-

approved version of the drug chart should be used to ensure safety to the patient and correct prescribing. Prescriptions were incorrectly being prescribed in the wrong section of the drug chart, which resulted in clinical information being missing from the prescription, leaving the prescription incomplete and ambiguous.

The following recommendations are made to improve compliance to TPP 107:

- Educate doctors, nurses and pharmacists about the policy and NPSA alert
- Devise a drug chart to allow for a prescription to be valid for only six months, as well as reformatting the drug chart specific for this clinical area to allow for all legal and clinical information to be completed
- Re-audit annually to see if the prescribing standards have improved in MIDU

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HAMELN BEST POSTER AWARD

An audit of vancomycin levels in paediatric medical and oncology patients

Wilson F, Collins S and Duffy L
Leeds Teaching Hospitals

Complex pharmacokinetics, coupled with its use in severe infections, warrants careful prescribing and close monitoring of intravenous vancomycin. Achieving target vancomycin levels promptly is important to avoid the risks associated with subtherapeutic levels, including untreated infection, emergence of resistance and increased hospital stay. The British National Formulary for Children (BNFC) recommends an initial dosing regimen of 15mg/kg three times daily (*tds*), then doses adjusted to reach a plasma concentration of 10–15mg/L or 15–20 mg/L.[1] Levels that are very low, under 5mg/L, have been associated with emergence of resistance and risk of relapse[2] and therefore may be related to poor therapeutic outcome. This evidence, in combination with anecdotal reports of under-dosing, has prompted the emergence of numerous guidelines across UK hospital trusts.

OBJECTIVES

The aim of the audit was to monitor compliance with 15mg/kg *tds* dosing as per current guidelines and to assess whether current practice yields satisfactory target vancomycin levels.

METHODS

The audit sample included paediatric (one month to 16 years) medicine and oncology patients on intravenous vancomycin at Leeds Teaching Hospitals Trust (LTHT) between January 2010 and December 2011. Patients with an estimated glomerular filtration rate (eGFR) under 60ml/min were excluded, as were those in whom levels were not taken immediately before the third dose. Patients were identified using central computer server records. Data were collected retrospectively using a standardised form from information in the patient's medical records and the computerised results server. Ethical approval was not required; however, work was carried out within an ethical framework and care taken to protect patient confidentiality.

RESULTS

The audit sample included a total of 31 courses in 29 patients, in which 73 pre-dose vancomycin levels were taken throughout the treatment courses. Twenty-nine (94%) intravenous vancomycin prescriptions complied with current dosing guideline of an initial dose regimen of 15mg/kg *tds*. Two (7%) of these 29 courses achieved therapeutic target level with these current dosing guidelines (see Table 1). In six courses with subtherapeutic levels, the frequency remained at *tds* but the dosage was increased to an average of 17.2mg/kg. This led to therapeutic levels in two courses and led to one supratherapeutic level. In nine courses with subtherapeutic levels the frequency was increased to four times a day (*qds*) while keeping the dose at 15mg/kg. This led to a therapeutic level in three courses. In six of the original courses with subtherapeutic levels, both the frequency was increased to *qds* and the dose increased to a mean of 18.3mg/kg: this led to one having therapeutic levels and one supratherapeutic level. Six of the original courses that did not reach therapeutic levels on 15mg/kg *tds* were stopped after a single level. Two patients started at 15mg/kg *qds* (in each case, previous courses of vancomycin had required more than the standard 15mg/kg *tds*); one of these achieved therapeutic levels at this dose, the other required a dose increase to 26mg/kg *qds* to achieve therapeutic levels.

Table 1: Summary of initial vancomycin levels and levels after first dose increase

Dose	Number of courses	Number of pre-dose plasma levels <10 mg/L	10–15 mg/L	15–20 mg/L	>20 mg/L
Initial dose 15mg/kg *tds*	29	27	2	0	0
After low vancomycin level and then frequency adjusted to 15mg/kg *qds*	9	6	2	1	0
After low vancomycin level and then mg/kg dose increased — remaining *tds*	6	3	2	0	1
After low vancomycin level both dose (mg/kg) and frequency increased to *qds*	6	4	1	0	1

Only 15 full length treatment courses reached therapeutic levels (other courses either did not reach therapeutic levels or were stopped early and alternative therapy initiated). Of the 15 that reached therapeutic levels, five (33%) required two or more levels and dose adjustments. The doses that achieved therapeutic levels ranged from 45 to 117mg/kg/day, with a mean of 71mg/kg/day.

CONCLUSION

It is recommended that pre-dose vancomycin levels be maintained above 10mg/L to prevent the emergence of resistant bacteria.[2] However, the literature suggests that 40% of patients are at risk of underdosing when current guidelines are followed.[3] Other literature suggests patients are at risk of underdosing from regimes providing 40–45mg/kg/day vancomycin.[4] Our experience in paediatric patients (with eGFR >60ml/min) suggests even fewer patients achieve therapeutic levels at a dose of 15mg/kg *tds*. Considerable adjustment of dosage was required to achieve target levels and in many patients it was necessary to increase the frequency of administration. Initial subtherapeutic levels and length of time to reach target increase the likelihood of resistance, which increases length of hospital stay, cost of healthcare and risk to the patient. Supratherapeutic levels were infrequent and no significant increase in supratherapeutic levels was found when the frequency of administration was increased. This agrees with the study by Frymoyer,[2] which reported that a hospital-wide increase in vancomycin dosing from 45mg/kg/day to 60mg/kg/day did not significantly increase the number of supratherapeutic levels. We plan to introduce initial dosing at 15mg/kg *qds* and to re-audit. The data could be combined with data from other trusts across the country and used to generate a large enough sample size in order to challenge the BNFC dosing schedule.

It has been suggested that a continuous infusion optimises exposure of bacteria to levels of vancomycin above the minimum inhibitory concentration (MIC).[5] Although frequently used in the neonatal population, continuous infusions are not commonly employed in paediatric patients. Further work needs to be undertaken to establish the place of continuous infusions. A limitation of the audit was that, due to the small sample size, data could not be separated according to age group. Therefore, it has not been possible to determine how the changes in pharmacokinetics with age affect the achievement of target vancomycin levels for patients in the study.

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PFIZER BEST PREREGISTRATION POSTER AWARD

An audit to assess compliance to trust guidelines for the use of morphine and fentanyl IV patient controlled analgesia

Radford L (supervisor Lam A)
Barts Health NHS Trust

Patient-controlled analgesia (PCA) enables patients to titrate their own analgesic dose according to their level of pain. Using an intravenous opioid infusion, patients self-administer small bolus doses when required. PCA regimes individualise analgesia, improving pain control and outcomes post-operatively, as well as reduce nursing workload.[1]

A fentanyl PCA infusion bag costs nearly three times more than morphine, per millilitre. The Barts Health NHS Trust must continually provide excellent standards of patient care, with limited funds, therefore it is necessary to rationalise prescribing of fentanyl PCAs to facilitate efficient use of resources. The trust recently relaunched PCA usage guidelines, promoting morphine as the first-line opioid and fentanyl as the second-line, only for consideration in these specific circumstances: severe renal impairment; allergy or intolerance to morphine; morphine has been ineffective.

AIM

To assess the level of compliance to trust guidelines for use of morphine and fentanyl PCAs

OBJECTIVES

- To quantify prescribing of morphine and fentanyl PCAs
- To determine the number of patients who received a fentanyl PCA compliant with guidelines
- To determine the reasons for fentanyl PCA usage not compliant with guidelines
- To estimate the excess costs from non-compliant uses of fentanyl PCAs

STANDARDS

- 100% of patients receiving PCA should receive morphine except where: patient has severe renal impairment (creatinine clearance [CrCl] <30ml/min); patient has an allergy or intolerance to morphine; or morphine has been ineffective in managing pain (pain score 2+ for >1 hour)
- 100% of fentanyl PCA usages should be justified by one of the above reasons

METHOD

Prior to data collection, information governance approval was obtained. In November 2011, prospective data was captured on adult surgical wards over 10 days. Patients receiving PCA post-operatively were identified through liaison with ward pharmacists and nurses. Data was primarily collected in the afternoons to capture patients from morning surgery.

The opioid used was identified from the PCA prescription sticker on the drug chart. For patients receiving fentanyl, the reason for selection was identified from the notes, anaesthetic record, observation chart, allergy status or calculation of pre-operative renal function. Patients were followed while receiving PCA, and reasons for morphine to fentanyl switches recorded.

Table 1: Reasons for fentanyl PCA selections

Reason for fentanyl selection	Number of fentanyl PCAs
Severe renal impairment (CrCl <30ml/min)	2
Allergy or intolerance to morphine	3
Morphine has been ineffective	4
Reason non-compliant/unknown	15 (62.5%)

RESULTS

Fifty-seven patients prescribed PCA were audited; 33 (58%) received morphine and 24 (42%) received fentanyl. Of the 24 fentanyl PCAs, 19 patients were started on fentanyl and five were switched from morphine to fentanyl. Only nine of the 24 fentanyl PCAs (37.5%) were selected for reasons specified in the PCA usage guidelines, as summarised in Table 1. If morphine had been selected in all patients who received fentanyl not compliant with guidelines, over 10 days, cost savings of £95.25 were possible, projecting to annual savings of £3,500.

DISCUSSION

The guidelines state that fentanyl should be selected for patients with severe renal impairment, quantified in this audit as CrCl <30ml/min. In seven patients with mild to moderate renal impairment (CrCl 31–70ml/min), a fentanyl PCA was selected. These patients had sufficient renal function to safely initiate morphine and were considered inappropriate fentanyl uses. At such levels of renal function, lower morphine doses can be used to limit accumulation of the active morphine metabolite. However, prescribers may have been cautious in these patients, selecting fentanyl due to the possibility of a post-operative dip in renal function.

In three patients, oral morphine, administered prior to PCA, caused drowsiness, hence fentanyl was selected. Drowsiness is a side effect not limited to morphine, occurring across the opioid class and can be dose related.[2] This alone is not an appropriate reason for fentanyl selection and morphine should have been the preferred choice, starting at lower doses.

Fentanyl-containing epidurals dislodged in two patients, requiring initiation of PCA. Fentanyl was selected for continuation of therapy. However, fentanyl is the only epidural opioid used in the trust and morphine should still be considered first.

Mild hepatic impairment was the basis for fentanyl selection in one patient. Morphine and fentanyl are both subject to high levels of hepatic metabolism, therefore both may accumulate in impairment and as such, there is no consensus on the preferred opioid choice.[3]

One patient expressed a previous good experience with fentanyl PCA, so was selected again, outside of the guidelines. In another, no obvious reason for choice could be identified.

CONCLUSIONS

This audit highlighted that the use of fentanyl PCAs in post-operative pain does not comply 100% with trust guidelines. There is scope to improve compliance, to facilitate cost savings, without compromising patient care.

Trust guidelines could be improved by stating a CrCl below which fentanyl should be considered, by advising lower initial morphine doses in mild to moderate renal impairment and by considering the possibility of post-operative dips in renal function. Continued training should be provided to prescribers, including how to optimise morphine dosing. Re-audit is required to complete the audit cycle and to assess if improvements in compliance have occurred.

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