National community pharmacy audit of hydration messages to prevent acute kidney injury

The first stop for professional medicines advice

Summary

- An audit of hydration advice provided to people with urinary symptoms was made available to all community pharmacies in England. The audit could be used to meet contractual audit requirements and was linked to the prevention of acute kidney injury (AKI), an NHS priority.
- The audit included two groups: i) Patients attending the pharmacy with prescriptions for certain antibiotics used to treat urinary tract infections and ii) Patients who request advice about urinary symptoms, such as cystitis.
- In the nine months to July 2016, almost one in every 10 pharmacies (962) recorded audit data electronically via the PharmOutcomes system for 14,908 patients. Coverage across England was good, with at least 75 pharmacies reporting from each NHS region, and representation from 176 of the 211 Clinical Commissioning Group areas.
- During the audit, 13,980 (94%) patients received hydration advice from community pharmacies. Advice provision was slightly higher for patients requesting over-the-counter advice (97%) than for patients with a prescription (93%).
- The majority of patients (91%) had prescriptions for antibiotics, most commonly trimethoprim (59%) and then nitrofurantoin (39%), despite national guidance suggesting nitrofurantoin should be first-line. In addition, the duration of treatment was often not aligned with national guidance. These issues need to be addressed to deliver the antimicrobial resistance agenda.
- One third of the sample was taking other medicines which have the potential to impair renal function, with over 10% taking two or more. For patients aged 65 or over, more than half were on these medicines. Community pharmacists are well placed to target advice to particular patient groups at increased risk of AKI.
- Community pharmacies can play a significant part in the provision of hydration advice to key patient groups, such as those with urinary symptoms. However, additional strategies are needed to support some particularly vulnerable groups such as older housebound patients and those in residential care.
- The success of the audit demonstrates how collaborative working across national pharmacy bodies can drive engagement with individual community pharmacies to support national health priorities. The audit facilitates implementation of the 2016 Patient Safety Alert on AKI, providing a practical way of raising community pharmacists' awareness of the AKI agenda and relevant resources.

Contents

Background

NHS England in partnership with the UK Renal Registry has established a three year national programme to prevent avoidable harm caused by acute kidney injury (AKI). The programme is called 'Think Kidneys'[1] and has a Programme Board which reports to the NHS England Patient Safety Steering Group. NHS England has used financial incentives in 2015/16 and 2016/17 to support AKI diagnosis in hospital, treatment and follow-up post discharge. Medicines are often implicated in the development of AKI and a distance learning programme on AKI was made available to all pharmacists and pharmacy technicians in England by the Centre for Pharmacy Postgraduate Education (CPPE) in September 2015[2]. Following a successful collaboration between CPPE and the NHS Specialist Pharmacy Service (SPS) to improve safety for patients taking non-steroidal anti-inflammatory Drugs (NSAIDs) in 2014[3], this audit was proposed; it is a collaboration between SPS and various national pharmacy organisations and aims to support the AKI programme.

In 2009 the National Confidential Enquiry into Patient Outcome and Death (NCEPOD) reported on the large number of adult patients who died from AKI[4]. Only half were reported to have received 'good' care and 14% of cases were considered potentially preventable. Following this report, the National Institute for Health and Care Excellence (NICE) was commissioned to develop a guideline on AKI – Clinical Guideline 169 Acute Kidney Injury 2013[5]. Since then two national Patient Safety Alerts on AKI have been issued (June 2014[6] and August 2016[7]). The first concerned standardisation of the early identification of AKI in hospitals and the second was to further raise awareness of AKI amongst health professionals in all care settings, including GPs and community pharmacists.

AKI is seen in 5-15%[7] of people admitted to hospital and many cases start in primary care. AKI is a sudden deterioration in a patient's renal function over hours or days and is often asymptomatic. Older people (aged over 65) are the group at highest risk of AKI. Other underlying risk factors for AKI include diabetes, vascular disease, liver disease, heart failure and dementia. AKI can be triggered by infections or sepsis, hypovolaemia (dehydration, bleeding), hypotension and certain medicines (eg NSAIDs).

Older people may reduce their fluid intake to avoid frequent toilet visits and can be prone to dehydration. Similarly, people with a urinary tract infection (UTI) may reduce their fluid intake because urination is painful. Salford CCG, a pathfinder site for AKI prevention, has conducted an audit of hospital admissions for community-acquired AKI and noted an association with a recent UTI[2]. Anyone with a UTI should be given advice on maintaining fluid intake, but this may be critical for older people to maintain kidney health.

Community pharmacists will dispense prescriptions for patients prescribed antibiotics for a UTI. They also see people wanting advice about urinary symptoms who may not visit their GP. Antibiotic prescribing guidance for a UTI includes three antibiotics not widely used for other infections[8], so patients prescribed these antibiotics or seeking advice about urinary symptoms were the target group for hydration messages in this audit.

Methods

Purpose

To support and audit provision of information in community pharmacies which can help patients with urinary symptoms avoid dehydration and AKI.

Audit time frame

Under the Community Pharmacy Contractual Framework, community pharmacies are expected to complete a clinical audit each year (as well as an audit on a topic determined by NHS England) which should take up to five days' work in total. This includes developing the audit, data collection, analysing the data and identifying improvements. To collect a useful sample for this audit, the suggested data period was approximately two weeks, to include a minimum of 15 patients. To be included in this report, audit data could be collected at any time between 1st November 1st 2015 and 31st July 2016. However, the audit tools will remain in place through 2016-17, so further data may be available later in 2017.

Audit sample

All patients who present prescriptions for: trimethoprim, nitrofurantoin or pivmecillinam, and all patients who request advice about urinary symptoms.

Data collection

Data collection forms are available here LINK. To be included in the national audit results, data was submitted electronically via the PharmOutcomes system[9].

Audit standards

1) Advice for patients prescribed antibiotics for UTI

All patients (or patients' representatives) prescribed trimethoprim, nitrofurantoin or pivmecillinam for a UTI are given verbal and/or written advice on preventing dehydration.

2) Advice for patients with urinary symptoms

All patients (or patients' representatives) requesting advice about urinary symptoms are given verbal and/or written advice on preventing dehydration.

Development and implementation

SPS led the development of the audit protocol which was supported by an expert group with input from national bodies including CPPE, NHS England, Think Kidneys and the Pharmaceutical Services Negotiating Committee (PSNC). After piloting in three pharmacies, the audit was revised and then launched in November 2015. The audit was publicised on the SPS website, via the CPPE AKI programme, on the PSNC website and to various pharmacy networks.

Results

Audit dates: 1st November 2015 to 31st July 2016

- Patients 14,908
- Pharmacies 962
- Clinical Commissioning Groups (CCGs)^ 176

^ CCGs determined from the pharmacy postcode mapped geographically to the CCG footprint

Pharmacies from all 4 NHS England regions undertook the audit. Most pharmacies audited 10-15 patients, but there were 4 pharmacies with more than 50 patients (Table 1). Pharmacies in 176 of the 211 CCG geographies took part.

Table 1 Pharmacy participation and patient numbers by NHS Region

Region	Patients	Pharmacies	No of pharmacies reporting < 5 Patients	No of pharmacies reporting >50 Patients (highest value)
South	14.7% (2,191)	15.4% (148)	10	0 (44)
Midlands & East	38.1% (5,674)	36.8% (354)	28	3 (118)
North	40.2% (5,991)	39.6% (381)	14	1 (55)
London	7.0% (1,052)	8.2% (79)	9	0 (39)

More than 80% of patients were female. Half the sample were in the age range 18-64, 5% were under 18 and 44% were 65 or over (table 2). One in 20 patients were care home residents.

Table 2 Demographics

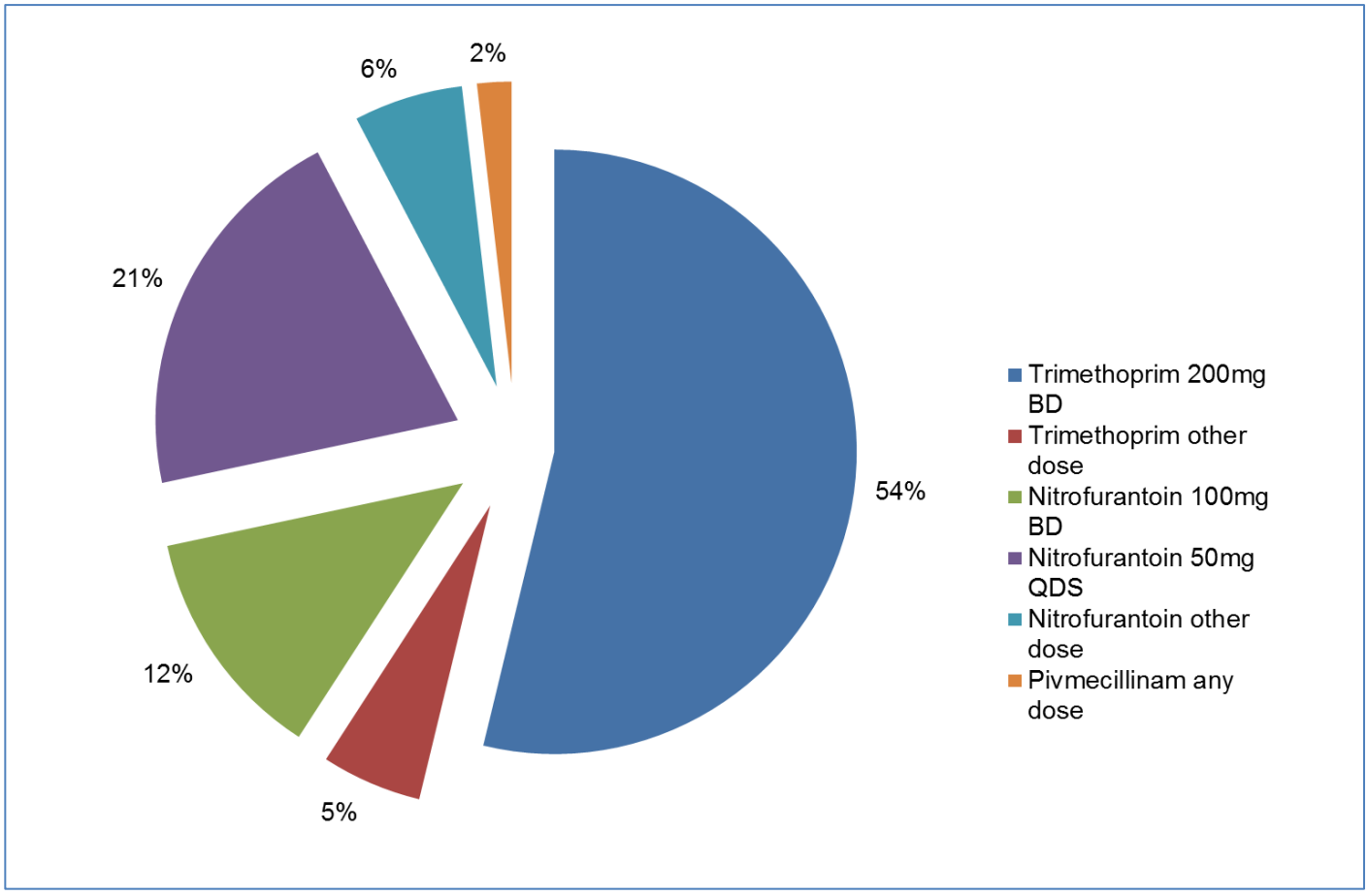
Gender	Under 18	18-64	65-79	80 or over	Total
Female	5.2% (640)	53.7% (6,580)	26.1% (3,196)	15.0% (1,837)	82.2% (12,253)
Male	4.2% (111)	37.2% (988)	36.3% (964)	22.3% (592)	17.8% (2,655)
Total	5.0% (751)	50.8% (7,568)	27.9% (4,160)	16.3% (2,429)	100% (14,908)

- 91% (13,610) of patients attended the pharmacy with an antibiotic prescription
- 9% (1,298) of patients requested advice about urinary symptoms

a) Patients prescribed antibiotics for a UTI

13,610 patients were prescribed antibiotics. Of these, 59% (8,049) were prescribed trimethoprim, 39% (5,311) nitrofurantoin and 2% (250) pivmecillinam (Figure 1).

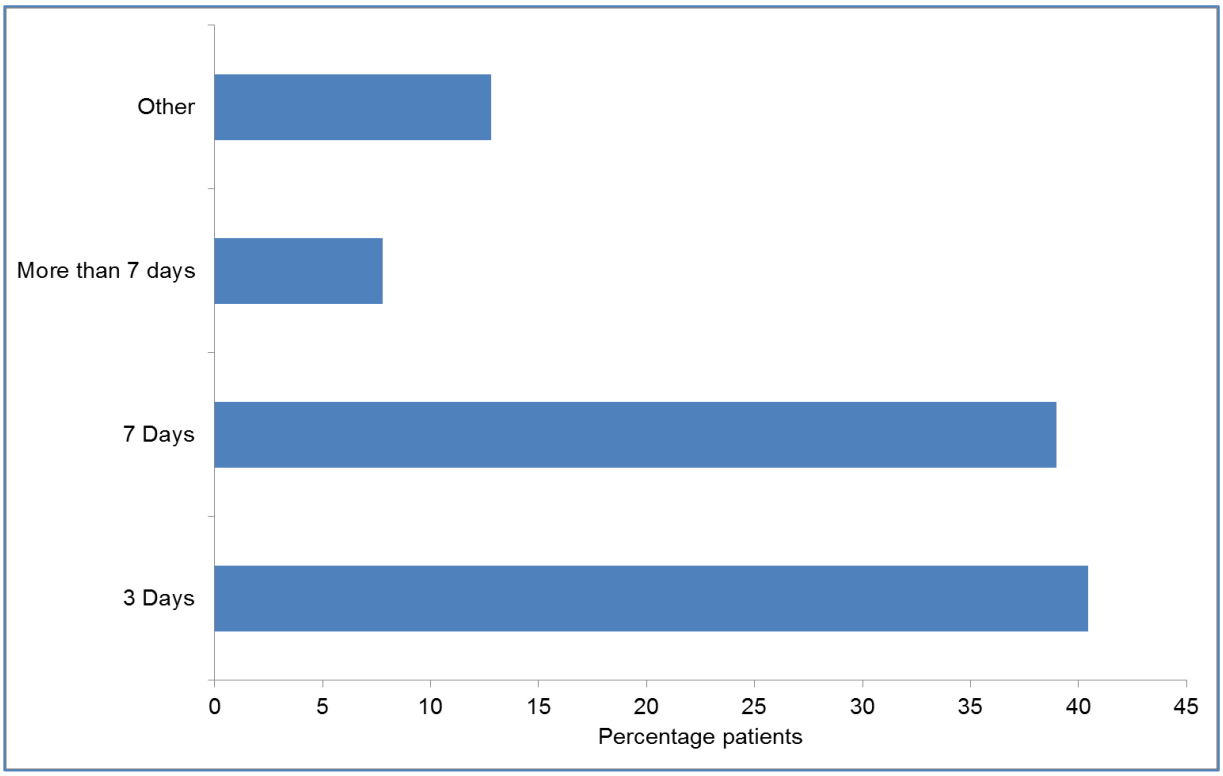
Figure 1 Antibiotic regimen (n=13,610)



There were 12,917 adults receiving a prescribed antibiotic (and 693 children/young people aged under 18). For adults, 7,029 (54%) were prescribed trimethoprim 200mg twice daily, 4,409 (34%) were prescribed nitrofurantoin 100mg twice daily or 50mg four times a day, and 249 (2%) were prescribed pivmecillinam at any dose. 82% (10,570) of adults in this group were women, with 57% prescribed trimethoprim, 41% nitrofurantoin and 2% pivmecillinam. For adult men (2,347) 64% were prescribed trimethoprim, 34% were prescribed nitrofurantoin and 2% pivmecillinam.

Figure 2 shows the duration of treatment. The overall use of 7 day and 3 day courses of treatment were similar. For trimethoprim (8,049), 45% (3,624) received a 3 day course and 35% (2,831) a 7 day course; for nitrofurantoin (5,311), 33% (1,755) received a 3 day course and 45% (2,414) a 7 day course; and for pivmecillinam (250), 50% (126) received a 3 day course and 24% (60) a 7 day course. Other treatment regimens were largely low doses for long term prophylaxis eg nitrofurantoin 50 mg at night or trimethoprim 100mg daily.

Figure 2 Duration of antibiotic treatment (n=13,610)



Course duration by gender for adults (aged 18 or over) is given in table 3. For women (10,570), 46% (4,912) received a 3 day course and 34% (3,586) received a 7 day course. For men (2,347), 12% (288) received a 3 day course and 65% (1,515) received a 7 day course.

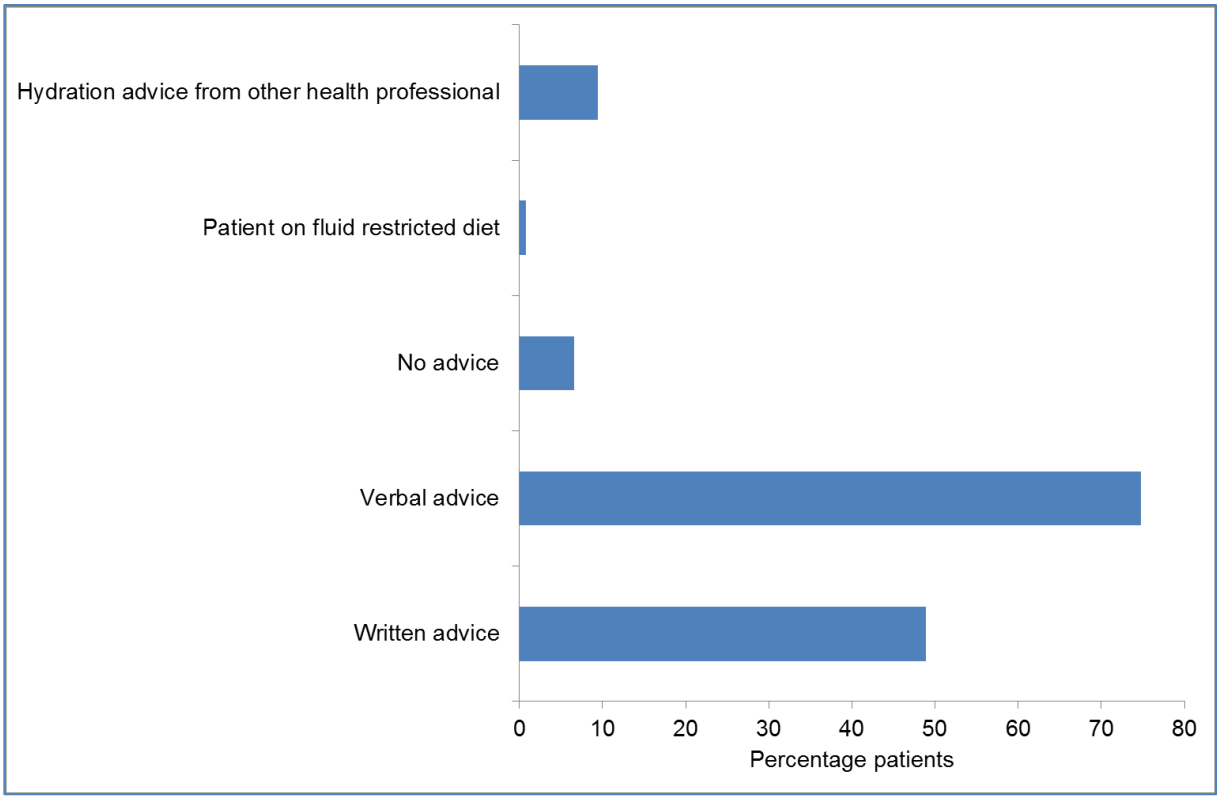
Table 3 Antibiotic course duration and patient gender (adults)

Antibiotic regimen	Women (n=10,570)	Men (n=2,347)	Total (n=12,917)
Trimethoprim 3 days	3,191 (30%)	189 (8%)	3,380 (26%)
Trimethoprim 7 days	1,714 (16%)	961 (41%)	2,675 (21%)
Trimethoprim other	1,102 (10%)	346 (15%)	1,448 (11%)
Nitrofurantoin 3 days	1,613 (15%)	82 (3%)	1,695 (13%)
Nitrofurantoin 7 days	1,832 (17%)	534 (23%)	2,366 (18%)
Nitrofurantoin other	925 (9%)	179 (8%)	1,104 (9%)
Pivmecillinam 3 days	108 (1%)	17 (1%)	125 (1%)
Pivmecillinam 7 days	40 (<0.5%)	20 (1%)	60 (1%)
Pivmecillinam other	45 (<0.5%)	19 (1%)	64 (1%)

Hydration advice provided to all patients (ie adults and children) receiving a prescription is shown in figure 3. Verbal advice was provided most frequently. Written and verbal advice was provided to 31% (4,287) of patients.

There were 895 (7%) patients prescribed antibiotics who did not have hydration advice provided to them by the pharmacy team. Advice provision could be to the patient or the patient's representative. For this group not provided with advice, 4% (33) reported having advice provided by another professional and a few were on a fluid restricted diet. Patients with no advice provided were more likely to be aged 80 or over (26%) and/or care home residents (17%). General comments indicated that most patients who did not receive advice had their prescriptions delivered, were care home residents or the antibiotic was collected by a neighbour/other patient representative. Occasionally the antibiotic was being used for UTI prophylaxis or a different indication.

Figure 3 Hydration advice (n=13,610)



b) Advice for patients with urinary symptoms

The 1,298 people asking for symptom advice were largely female (1,094, 84%). They were most likely to be aged 18-64 (874, 67%) and unlikely to be aged 80 or over (66, 5%).

The following outcomes were reported:

Referred to GP	28.4% (368)
Medicines sale	57.1% (741)
No hydration advice provided	2.5% (33)
Verbal hydration advice provided	83.4% (1,083)
Written hydration advice provided	29.7% (386)
Patient on fluid restricted diet	<0.1% (7)

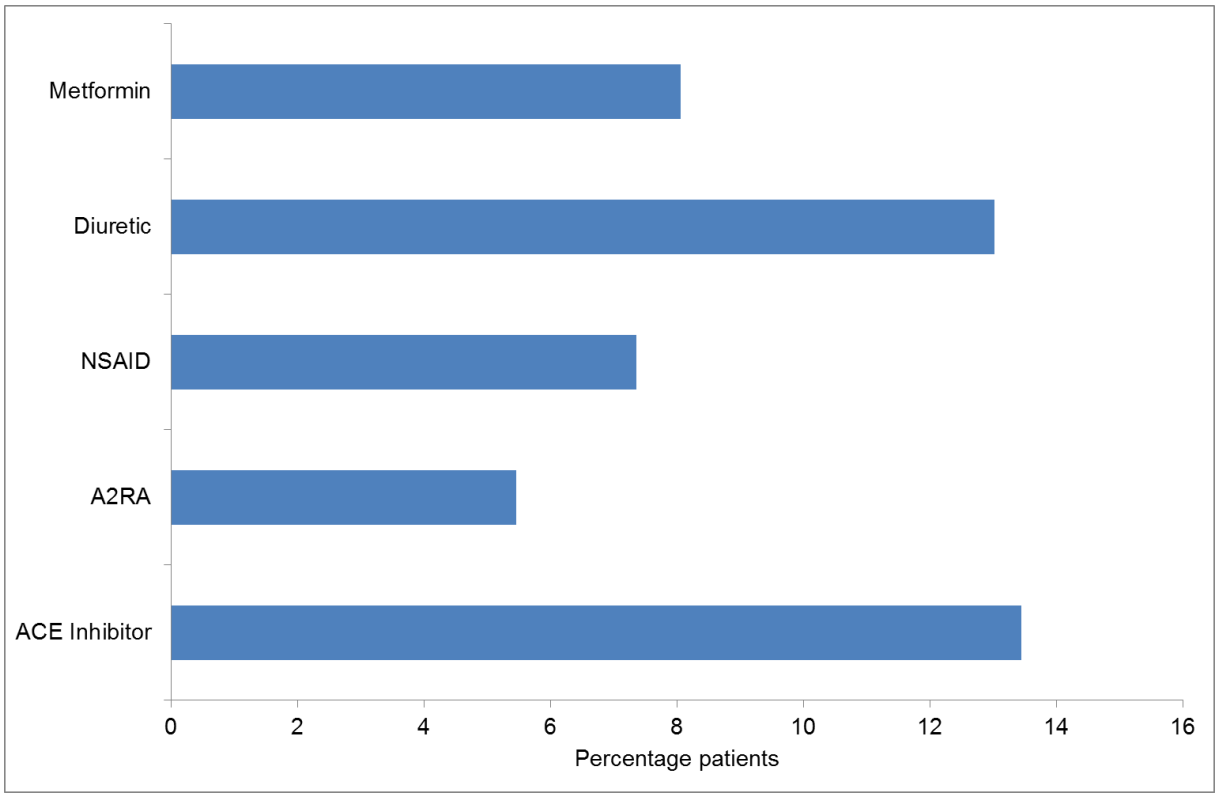
For people with no hydration advice provided (33), 9 were referred to the GP and 17 were sold a medicine. Patient numbers where no hydration advice was provided were too small for further analysis.

c) Current medication

Medicines regimens (other than the antibiotic if prescribed) were not known or not reported for 2,980 (20%) patients. For these patients, 90% were prescribed an antibiotic and 10% requested symptom advice.

For the 80% (11,928) where medicines usage was reported, 61% (7,296) were taking other medicines and 39% (4,632) were not taking other medicines. Use of five specified drug classes relevant to AKI is shown in figure 4. The drug classes were angiotensin-converting enzyme (ACE) inhibitors, angiotensin II receptor antagonists (A2RA), diuretics, NSAIDs and metformin (the only available biguanide).

Figure 4 Known current medication (n=11,928)



2,680 (23%) were taking a medicine from one of the classes listed, 1,050 (9%) patients were taking medicines from two of the classes and 273 (2%) were taking medicines from at least 3.

For patients aged 65 or over with known current medication (5,468), 80% (4,368) were taking other medicines and 20% (1,100) were not taking other medicines. In this age group, 33% (1,829) were taking medicine in one of the classes listed above, 15% (805) were taking medicines from 2 classes and 4% (200) were taking medicines from at least 3 of the classes.

Discussion

There were a total of 11,688 community pharmacies in England as at 31 March 2016[10] and 962 (8%) participated in this audit. During a 9 month period, almost 14,000 people attending pharmacies received hydration advice aligned to AKI prevention. The success of the audit demonstrates how collaborative working across national pharmacy bodies can drive engagement with individual community pharmacies to support national health priorities. The 2016 Patient Safety Alert on AKI[4] specifically mentions signposting community pharmacists to resources available from Think Kidneys and raising awareness of AKI. The audit clearly supports this alert, providing a practical way of engaging many community pharmacists with AKI and relevant resources.

Audit sample

The audit was conducted by pharmacies located in all 4 regions of the NHS. Data collection per head population was greatest in the North and Midlands and East (0.40 and 0.35 per 1,000 population respectively) but lower in London and the South (0.13 and 0.16 per 1,000 population respectively)[11]. The reason for this different uptake is not clear, but might be linked to greater routine use of pharmacy data systems other than PharmOutcomes in London and the South. The audit method relies on a self-selected sample so, despite being a large sample, may not be representative of all pharmacies in England.

Audit standards

1) Advice for patients prescribed antibiotics for UTI

All patients (or patients' representatives) prescribed trimethoprim, nitrofurantoin or pivmecillinam for a UTI are given verbal and/or written advice on preventing dehydration.
Standard set - 100% Standard achieved - 93%

Advice provision to this group was generally good, with verbal hydration advice provided to more than 70% and written advice provided to almost 50%. For the 7% who did not receive any advice, a few reported having already been advised by another health professional, but many appeared to be patients not present in the pharmacy, some being very elderly (aged 80 or over). This should not prevent pharmacies providing written information about hydration. However, although some written patient information is available, there is no official recommendation on water intake because need varies greatly with circumstance (eg ambient temperature, exercise). Thus, providing hydration messages without an opportunity for patient interaction and feedback could be problematic. For people resident in care homes, pharmacies may assume that hydration support and advice is already in place. Overall there appears to be a small opportunity for improvement, by use of written information and possible telephone follow up to patients who are housebound. Whilst this could be seen as an unremunerated addition to the pharmacy service, these patients were all receiving a prescribed antibiotic and standard dispensing practice includes ensuring that patients understand how to take their medicines. Hydration messages could be a routine part of this interaction.

2) Advice for patients with urinary symptoms

All patients requesting advice about urinary symptoms are given verbal and/or written advice on preventing dehydration.

Standard set - 100% Standard achieved – 97%

This group was largely women aged 18-64. This is not unexpected as women are more prone to urinary symptoms than men. Women are also more likely than men to seek health advice in pharmacies[12]. A higher rate of advice provision was reported in this group, possibly because the request for information/help was made directly to pharmacy staff. Over half of these consultations resulted in the sale of a medicine, but data about the medicine provided was not sought. The 'NHS Choices' website suggests that painkillers such as paracetamol may help with pain in UTI. Alkalinising products are also available (eg potassium citrate) but efficacy is uncertain. For the small number of people not receiving hydration advice, almost one third were referred to the GP which could be a reason for not providing further advice. However, a medicine was sold to half of these patients, suggesting that there were a few occasions where hydration messages were missed.

Antibiotic regimens

Antibiotic regimens for UTI are of particular interest in light of global and national concern about antimicrobial resistance (AMR). Current primary care guidance[8] for adults recommends use of nitrofurantoin 100mg modified release twice daily first line for UTI with no fever or flank pain. A 3 day course is used for women and a 7 day course for men. Other options include trimethoprim 200mg twice daily or pivmecillinam 200mg three times a day, both with the same course lengths as nitrofurantoin. Despite the recommendation that nitrofurantoin should be used first line, the most commonly used agent for men and women was trimethoprim. Course duration was often longer than that recommended, with frequent use of 7 day courses in women. Whilst there has been a significant overall reduction in primary care antibiotic prescribing in recent years, more action is needed to ensure prescribing practice for UTI is aligned to national guidance and the wider AMR agenda. The use of 3 day courses for men was not common (12%), but does raise concern about safe and effective use of antibiotics if the course length is inadequate.

Concurrent medicines and AKI

Certain medicines are known to trigger AKI in susceptible individuals. Careful review of such agents offers an important opportunity to prevent some cases of AKI, thus avoiding patient harm and unnecessary use of health resources. The agents most often reported to contribute to AKI include diuretics, agents acting on the renin–angiotensin system and anti-inflammatory drugs[13]. In many cases of AKI, patients are taking two or more such agents[13]. Responding to this, some geographies are routinely offering 'sick day rules' advice about use of certain medicines when patients are at risk of dehydration. The Scottish Patient Safety Programme has produced a 'Medicine Sick Day Rules' card that lists the medicines that should be temporarily stopped during illness that can result in dehydration (vomiting, diarrhoea and fever)[14]. In addition to the medicine classes listed above, patients are also advised to withhold metformin until they are eating and drinking normally again.

However, in response to concerns about withholding medicines that could in some cases be detrimental, in England Think Kidneys currently advises that '*investment in a systematic approach to increase uptake of 'sick day rules' by patients should only be undertaken in the*

context of a formal evaluation. In terms of medicines management, advice from the Think Kidneys Programme Board is that it is reasonable for clinicians to provide 'sick day Rules' guidance on temporary cessation of medicines to patients deemed at high risk of AKI based on an individual risk assessment.'[15]

Pharmacists reported other concurrent medication for 80% of patients, so would be able to advise about use of medicines relevant to AKI for most people. Amongst those with known medicine regimens, more than one third were taking one or more medicines from the classes included in 'sick day rules' advice. Older patients (aged 65 or over) are at greater risk of AKI and in this group over half were taking at least one such medicine and about one in five were taking two or more. Thus pharmacists are well placed to target hydration advice to particular at risk groups, including 'sick day rules' information if this receives national endorsement. Some community pharmacists have expressed concerns about advising patients to temporarily discontinue prescribed medicines without consulting their GP[2]. However, in trial areas such as NHS Salford CCG, a sick day guidance card will be administered by general practices and community pharmacists for some patients[16].

Other aspects

National guidelines do not include UTI as a risk factor or cause of AKI. Findings from a pathfinder site for AKI prevention indicated a possible association between hospital admissions for community acquired AKI and a recent UTI[2], but a literature search of Medline and EMBASE did not find further evidence to support this. The importance of UTI and dehydration linked to UTI as triggers for AKI requires further investigation.

The availability of the audit is currently on-going. A summary of the findings from November 2015-March 2016 with 10,117 patients was published in September 2016[17]. This report covers data submitted for 9 months to July 2016. As at 11 January 2017, 1034 pharmacies had contributed data on 16134 patients.

Conclusions

A nationally available audit tool provides a very successful means of enabling community pharmacies to contribute to national medicines optimisation priorities at scale. Hydration advice was provided to over 90% of patients in the audit sample, although follow up of patient outcomes was not possible. The data on antibiotic prescriptions for UTI provides some insight on current prescribing for particular patient groups and localities, relevant to the AMR agenda. Additional strategies are needed to reach people who do not attend the pharmacy, such as elderly housebound patients and those in residential care.

Acknowledgements

Grateful thanks are due to all the people who contributed to the development of this audit, and to all the pharmacists and their staff who undertook the work and submitted their data. Particular thanks to Gary Warner and Esther Harvey at Pinnacle Health Partnership (providers of PharmOutcomes) who gave their time and aid so willingly, and to Geraldine Flavell (Regional Manager, CPPE) and Elizabeth Beech (National Project Lead - Healthcare Acquired Infection and Antimicrobial Resistance) for their enthusiasm and support.

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