Community Intravenous Therapy

Audit of Prescribing and Administration

Report prepared by Eileen Callaghan, Project lead pharmacist, on behalf of Medicines Use and Safety Division of the East and South East England Specialist Pharmacy Services

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Community IV Audit Report Vs.1.1 May 13 (EC)
Summary

This audit of prescribing and administration of intravenous (IV) medicines in the community setting was carried out in 22 community services across 16 NHS provider organisations over 4 weeks during December and November of 2011. The results provide benchmarking data that can be used to review service delivery with the aim of improving patient safety and reducing organisational risk. The main themes that emerged from the results were the following:

- When patients were referred to the participating community IV services there were often important patient and therapy details omitted from the documentation. This resulted in an unnecessary risk to patients and valuable staff time wasted trying to obtain the full information required to administer the IV therapy safely.

- The allergy status of the patient was not documented in almost 20% of the IV administrations audited

- The administration of community IV therapy was delayed in 11% of referrals because supplies of the medicine or the equipment necessary for community IV administration were not available to community nurses

- Community staff did not always have access to information about the medicines and compatibility with diluents and flushes and the results indicated that some staff did not know how to use the information resources that were available to them.

- The majority of services were designed to facilitate early discharge from hospital and only a small number of services were configured to avoid hospital admissions. The audit demonstrated that there was a wide variation in levels of activity with the full potential of community IV therapy not being realised in some services.

Recommendations

Patient Safety

1. Priority must be given to ensuring that prescriptions issued for community IV therapy always include the allergy status of the patient. Staff must not administer an IV antimicrobial without first confirming the allergy status of the patient.

2. Policies and procedures should be reviewed to ensure that all the required information and authorisations are provided at referral to allow the safe and timely administration of community IV therapy.

3. The mechanism for supplies of the medicines and the associated administration equipment should be reviewed and processes put in place so that community staff have immediate access when required.
4. Competencies of community staff delivering IV therapy should include the use of relevant information sources and an understanding of the legal framework under which they are working under when administering IV therapy in the community

5. Consider how pharmaceutical support can be included in the care pathway to improve patient safety such as a pharmacist providing a clinical check when IV medicines are dispensed and pharmacist involvement in regular multidisciplinary reviews of community IV patients.

Service developments

6. Community IV services should be in line with best practice i.e. a multidisciplinary approach to care, equivalent to that received in the hospital setting. This will require additional funding for the majority of existing services but these costs could be offset by an increase in the utilisation of community IV services and avoiding the cost of a hospital stay.

7. Organisations should consider the development of care pathways that utilise community IV therapy to avoid hospital admissions as well as facilitate early discharge from hospital. There is more to be gained in terms of financial savings and prevention of hospital acquired infections if admission to hospital can be avoided.

Acknowledgement: This work was co-ordinated by the Medicine Use and Safety Division of the East and South East England Specialist Pharmacy Service and we are immensely grateful to all who took part and shared their data.

Data input was carried out by Christine Masterson, Medicine Use and Safety Division of the East and South East of England Specialist Pharmacy Services and Ruth Eager, QIPP Manager at NHS South West London, Wandsworth Borough Team completed the data analysis.
Prescriptions for injectable medicines should include the following:

- the allergy status of the patient
- the approved name of the injectable medication (in full and not abbreviated)
- the dose and frequency (ensuring, where necessary, that recent parameters have been used to calculate dose, for example, weight and laboratory test results)
- the route of administration
- date and time for re-assessment of the prescription
- start and finish date/time or maximum number of doses
This multicentre audit was designed to examine the prescribing and administration of intravenous medication in the community setting. It was offered to community nursing services across East and South East England including London which meant that data could be pooled. The results offer the scope for benchmarking safety standards of administration of intravenous therapies, as well as providing a local picture of current issues for each participating organisation.

**Objectives**

- to audit the quality of information and directions that are provided to administer intravenous therapy to adults in the community setting
- to explore issues with respect to the supply of medicines and other consumables and the advice and support available for ongoing monitoring and therapy review.

**Method**

Audit data collection forms were developed by the Medicines Use and Safety Division of the East and South East England Specialist Pharmacy Services. Following comment from specialist pharmacists and nurses working in several community trusts, the forms were piloted in a community trust in South East Coast SHA area. Organisations across the Specialist Pharmacy Services geography were invited to participate via presentations and emails to community services pharmacy networks and leads. The audit was completed against the following standards:

**Standards**

1. There is a written authorisation for administration of the IV therapy which includes the correct full name, dose and route of medicine to be administered
2. Sufficient and appropriate supplies of all medicines and other materials for the administration of IV therapy are available in the community setting
3. There is the necessary level of information and advice on treatment available to the community practitioner
The audit captured data for the intravenous administration of medicines to adults in the community i.e. those being delivered through an intravenous route such as a peripheral cannula or central venous access device. Administration of parenteral therapy to children or parenteral therapy by other routes was excluded e.g. subcutaneous syringe drivers.

Data was collected over a four week period during November and December, 2011. The community nurses were asked to complete data collection once for every adult patient referred to the community service who required administration of an intravenous therapy, during the selected 4 week period. They were asked to complete one form for each medicine administered to each patient. Staff also completed a form if the referral was for sodium chloride 0.9% or heparin sodium injection to be used as a flush to maintain the patency of established IV lines even when the patient was not on active therapy. The intention was that the initial information received on the referral was used to complete the data collection form.

The community services participating in the audit are labelled in the report as A, B, C etc. to maintain their anonymity. The services received an individual report highlighting key areas to consider within their own organisation.
Results

Audit Participation

Following transformation and re-organisation, new NHS provider organisations are still in the process of fully integrating their community health services and within one organisation there are sometimes separate services delivering IV therapy in the community. Twenty-two community services across 16 NHS provider organisations in the East and the South East of England participated in the audit. Appendix B lists the participating Trusts and Community Health Services. Figure 1 below show the geographical spread of the organisations by Strategic Health Authority (SHAs).

Figure 1: Participating community health services by SHA

A total of 238 audit forms were completed during the four week audit period. 14 forms were considered void and not included in the final data analysis, due to inappropriateness (e.g. one form was completed for an oral treatment) or data forms being illegible. The remaining 224 forms were used for the data analysis.

Table 1 shows the numbers of forms returned for community services within each SHA. Some patients received more than one medicine. Data on the number of patients was not collected.

Table 1: Number of forms returned by SHA

<table>
<thead>
<tr>
<th>SHA</th>
<th>No of Community Services</th>
<th>Audit forms returned</th>
<th>Average no. of forms per service</th>
</tr>
</thead>
<tbody>
<tr>
<td>East of England</td>
<td>6</td>
<td>99</td>
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<td>London</td>
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<tr>
<td>Total</td>
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<td>224</td>
<td>10</td>
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</table>

Figure 2 shows the variation between numbers of forms received from each of the participating organisations. In London SHA, five providers completed less than 5 forms over the 4 week audit period compared to one community service that completed 33 forms. For those providers with less than 5 forms the project lead contacted the audit co-ordinators to query if the low level of administrations reflected the actual activity levels of the service for IV therapy and was assured by them all that this was the case.
Figure 2: Number of audit forms returned by community service

Hospital Avoidance and Discharge facilitation

Facilitation of discharge from hospital was recorded as the greatest reason for the delivery of community intravenous therapy (60%) whilst avoiding hospital admission was recorded on 28% of administrations. There were 10 administrations where ‘other’ was recorded on this section. Of those, 7 were for the administration of a solution to maintain the patency of the IV line (see medicines administered section below) and these would have avoided the patient attending or being admitted to a hospital. Discharge from an acute hospital to a community hospital was facilitated for another patient and the remaining two patients had problems that required hospital re-admission. One of these developed sepsis and the other had a drug allergy to the medicine prescribed and was referred back to the hospital.

For a small number of IV administrations (<10) staff recorded the impact of community IV therapy as both hospital avoidance and discharge facilitation. These were included in the analysis as ‘facilitation of discharge’ because the patient’s treatment was initiated in the hospital setting. Figure 3 shows the breakdown of the outcomes of service delivery.

Figure 3: Effect of delivery of a community intravenous therapy service
**Treatment Initiation**

In almost 90% of audited administrations the treatment was initiated by a hospital doctor. There were two organisations where more than 5 community IV treatments were initiated by a GP and three organisations that had one GP initiation each. It is not known if this was the patient’s own GP or a GP with a specialist interest covering a service area. Nurse prescribers initiated the treatment in 3 cases.

The person initiating treatment was recorded as ‘not known’ on three forms: two of these were for the administration of solutions to maintain IV patency (see medicines administered section below) and 1 was for the administration of a drug. The patient was recorded as having initiated treatment for 1 referral. However, it was apparent from the comments section that it was the patient herself that had informed the community service that home IV administration was required but the treatment had been initiated by a hospital doctor.

*Figure 4: Treatment initiation*

The name of the discharging Trust was included on 88 (39%) of the audit forms. Although the data was incomplete it could be ascertained that almost all community services were receiving referrals from two or more different acute centres and one community service had received referrals from 8 different acute organisations including private and NHS organisations over a wide geography.

**Medicines administered**

Community staff were asked to complete an audit form for each patient referred to their service for administration of intravenous therapy. The administration of sodium chloride 0.9% or heparin sodium injections for maintenance of IV line patency accounted for 58 (26%) of all forms and the remaining 166 (74%) of the audit forms were for the administration of therapeutic treatment.

The majority of drugs administered intravenously in the community were antimicrobials (99%). Figure 5 shows the breakdown of drugs administered on more than 7 occasions. Seventy-five per cent of the antimicrobial drug administrations audited were for four drugs: teicoplanin, ceftriaxone, ertapenem and gentamicin, all administered once daily. The condition being treated was not recorded as part of this audit so it is not possible to comment on appropriateness of the therapies.

*Community Nurse Comment*

“We are unable to take patient on because the IV drug prescribed (gentamicin) is not used in this service. The referrer was informed by DN team the patient does not fulfil our criteria”
Figure 5: Treatment administered (n=166)

![Pie chart showing the distribution of treatments administered.]

**Other:**
- Aciclovir
- Cefuroxime
- Ceftazidime
- Co-amoxiclav
- Daptomycin
- Furosemide
- Gentamicin
- Metronidazole
- Vancomycin

Apart from sodium chloride 0.9% and heparin sodium, furosemide was the only non-antimicrobial drug administered intravenously during the audit period.

**Source of stocks of medicines**

Figure 6 shows the source of medicines administered by the community IV teams participating in the audit. The majority of stock came from a hospital pharmacy (70%) but there were some supplies through community pharmacy (16%) and a fewer number from community unit stock (4%).

Figure 6: Source of medicines administered (n=224)

![Pie chart showing the source of medicines.]

Some stock was sourced from private hospitals but it is not known whether it was for private or NHS patients. In one community service there were also a number of medicines sourced from a homecare company for administration by the community nursing team.
Directions for administration

Drug

Two referrals in two different community services had all the prescription details missing and staff reported having to contact the referring organisation to obtain the details. The full name of the drug was not provided in a further 2 referrals. Three of the 4 referrals that did not contain the full name were for teicoplanin and the strength and the dose were also omitted on these administration requests.

Almost 20% of audited referrals for administration of IV therapy did not include the patient’s allergy status.

Table 2: Prescriptions details omitted for active drug administrations

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<th>Community Service</th>
<th>Full Drug Name</th>
<th>Drug Strength</th>
<th>Dose</th>
<th>Route of Administration</th>
<th>Times per day</th>
<th>Time of Administration</th>
<th>Duration of administration</th>
<th>Finish Date</th>
<th>Documented Allergy Status</th>
<th>Total no. of drug administrations</th>
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Community Nurse Comments

“No paperwork received. Initial referral only via RIO requesting antibiotic injection for 6 weeks. It was only on contacting the ward that it was established which drug to be given and route was through a PICC line”

“Pre initial visit - several telephone calls to ward discharging patient due to incorrect or inadequate referral/completion of IV care plan. No documentation or pre/post flush. Incorrect suggested dose/frequency of Hepsal - initially prescribed daily not weekly”

“Initially prescribed too high dose - gave little notice of administration and reluctant to forward details to nurses (Friday late pm)”
Diluent

This section of the audit form was often not completed correctly and it is difficult to interpret this data further. However, it is evident that the diluent for dilution and reconstitution were mainly prescribed by the initial prescriber. A PGD was reported to be used by 4 community services to authorise administration of the diluent and the use of a local protocol was reported by a further 5 community services.

Flush

The majority of forms for active therapy also included a ‘flushing solution’; sodium chloride 0.9% or heparin sodium. Figure 7 shows how the flush was prescribed or authorised. Staff reported using a local protocol in 9 services across 8 organisations and 2 organisations used PGDs to authorise the administration of the flush.

Figure 7: How the flush was prescribed/authorised (n=224)

Figure 8 shows the quality of directions that staff received for administration of the flush. There were 8 community services where all administration requests received contained complete directions for the administrations of the flush.

Figure 8: Directions provided for flush administration
Pharmacist check

Community staff were asked if there was evidence that a pharmacist had checked the prescription and they reported that there was evidence of a pharmacy check for 56% of the administration requests audited. Only one community service consistently reported evidence of a pharmacy check; there was variation within all other participating services as to whether they knew that a pharmacist had checked the prescription or not.

Patient review

Staff indicated that a review date for therapy had been set in 80% of audit forms. Figure 9 shows the range of people carrying out the review. As expected, the services that had treatment initiated by a GP were more likely to use a GP to review the treatment.

**Figure 9: Person conducting review**

![Figure 9: Person conducting review](chart.png)

Monitoring

This section on the audit form was intended to check if plasma or serum concentrations were being monitored for medicines such as gentamicin and vancomycin. However, staff reported that drug monitoring was required for a whole range of medicines which would suggest that the question may have been ambiguous and the results were not included in the analysis.

Contact for advice

Community staff reported having a contact for advice during normal working hours, for 86% of the administration requests audited. There was a less availability of a contact for advice ‘out of hours’ (67%) and in two cases this was recorded as not applicable.

Authorisation and Transcribing

95% of IV treatments requested had been authorised e.g. on a signed administration request form or a drug chart signed by a prescriber. However there were three records (two for teicoplanin, one for ceftriaxone) where authorisation for administration was reported as not having been received and two records (one for teicoplanin and one for tazocin) where authorisation was reported as being not applicable.
The original prescription had been transcribed onto a drug administration record for 53% of all the administration records audited. Figure 10 shows comparative data on the levels of transcribing.

**Figure 10: Percentage of prescriptions transcribed onto drug administration records**

Supply problems

Staff reported on 28 (12%) of the audit forms that there were delays in the administration of the first dose of community IV therapy due to lack of supplies of medicines or equipment.

Where the initial referral was a GP there were no problems anticipated with supplies of the diluent, needles and giving sets, sharps bin or other consumables. There were however some problems anticipated with supplies of the medicine and the flush. Where the initial referral originated in the hospital there some problems reported with the medicines and equipment listed.

*Community nurse comment*  
"Supply of equipment (e.g. giving sets, PICC line and end-caps, etc.) during long term therapy is a problem. Talking to a different nurse on the ward each time we phone and having to re-explain our requests for stock and who pays for its delivery"

*Community nurse comment*  
"We had adequate stock as ICS supply all stock"

*Community Nurse Comment*  
"Hospital does not supply sharps bins syringes, needles, gloves, handwash, chlorapreps (some sterets were supplied)"
Figure 11 shows the level of supply problems that caused delays in administration of therapy during the audit period, across all community services.

**Figure 11: The number of referrals where a lack of supplies caused a delay in the administration of the first dose**

The range of sources of information used by the community staff when administering an active drug, is shown in Figure 12. The main sources of information were the local IV policy, the manufacturer’s information SPC and the BNF. Medusa (IV monograph database) was available to staff for 37% administrations audited. In some community services staff reported that they obtained information from a hospital pharmacist or the IV specialist nurse.

**Figure 12: Sources of Information**
There were a total of 16/224 (10%) of audit forms where staff reported not having information on the medicine and 23/166 (14%) therapeutic drug administrations where staff reported not having information to check the dose. However, on seven forms conflicting information was given because the BNF and SPC were also reported as being available to staff.

There were four administrations where staff reported that neither the BNF, SPC nor Medusa were available to the person administering the IV therapy.

**Table 3: The types of information reported as being unavailable to the person administering the IV therapy**

<table>
<thead>
<tr>
<th>Community Service</th>
<th>Information on medicine e.g. mode of action, ADRs</th>
<th>Information that allows the dose to be checked</th>
<th>Information on compatibility of diluents</th>
<th>Information on compatibility of flush</th>
</tr>
</thead>
<tbody>
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<td>V</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total no. of administrations</strong></td>
<td><strong>16</strong></td>
<td><strong>23</strong></td>
<td><strong>28</strong></td>
<td><strong>33</strong></td>
</tr>
</tbody>
</table>

**Cannulation**

Issues around cannulation were not explored in this audit. However, there were comments added to 10 of the audit forms regarding difficulties with cannulation. Some were patient specific e.g. “Nurses and ECP have previously been unable to cannulate so patient attended hospital for re-cannulation” and some comments referred to staff competency e.g. “not enough IVs to practice cannulation” and “delays in administration due to lack of community staff confident in cannulation”.

There were three additional comments about lack of availability of skilled staff in the community and in one case the patient missed the first three doses of their therapy due to lack of available skilled staff to deliver community IV therapy.
Discussion

Risk to Patient Safety

Directions

The Medicine Act 1968 prevents a person administering a parenteral POM to another person unless they are acting in accordance with the directions of an appropriate practitioner which should be in writing either as a prescription, a Patient Specific Direction or a Patient Group Direction. The audit results indicate that written authorisation to administer IV treatment was not obtained for 5% of the administrations audited. In exceptional circumstances POMs can be administered with a verbal instruction accompanied by a fax or email and should be followed up with a signed prescription within 24 hours. However, as community IV administration carries potentially higher risk than inpatient care the organisations should risk assess and review practice in line with the NMC Standards for Medicine Management and the NPSA Alert 20 on Promoting safer use of injectable medicines. Where possible, mechanisms should be created to enable a copy of the original prescription or drug authorisation to be used for administration.

Clear communication is required between the initial prescriber and the community staff administering IV therapy to ensure that practice is safe and staff are supported to work within the required legal and professional frameworks. Omissions of prescription details increase the risk of an error occurring that may result in patient harm and also contravenes the professional standards that staff should be working to. Staff reported that valuable time was wasted in having to contact the referring organisation to obtain the correct and full prescription details.

All organisations where prescription details were omitted from the referral should escalate the audit results through an appropriate governance route and agree actions with all stakeholders to minimise this risk to patient safety.

Immediate action is required in the three organisations, where the full drug name, drug strength, dose and other directions were omitted from referrals, to improve the quality of information received by the community team to administer IV therapy. Although these omissions were in a low number of referrals they waste valuable staff time in ‘chasing’ up the required information and pose a serious risk to patient safety if not communicated in a full and timely manner.

Documentation of allergy status

In hospitals, reports of patients being given a medicine to which they are allergic most commonly involved antibiotics. The report from the NPSA’s National Learning and Reporting Service (June 2007) identified that almost 5 per cent of medication incidents that resulted in severe harm involved patients receiving a medicine to which they were known to be allergic.

The allergy status of the patient should be documented on all prescriptions and charts used for administering medicines. The audit results show that the allergy status of the patient was not documented in 20% of the
administrations audited. Standard 8 of the NMC Standards for Medicine Management state that ‘you must check that the patient is not allergic to the medicine before administering it’.11 This risk is particularly high for community IV services as the majority of drugs administered are antibiotics. Community staff should not administer an IV medicine if they have not received this information on the referral.

A comment on one of the audit forms clearly illustrates this risk where a nurse reported that the patient’s allergy status had not been stated on the referral documentation. However, on checking the patient’s medical history it became apparent that they had a previous adverse reaction to the medicine involving swelling of the airways. Fortunately, the community nurse had checked the patient records and in this case the patient received the medicine in an outpatient setting where immediate emergency treatment was available if required.

It is every healthcare professional’s responsibility to ensure that the allergy status has been accurately documented.14 This risk should be noted and escalated through the relevant clinical governance groups for action by the 13 organisations where this information was omitted from the patient’s records.

Patient review

The DH guidance on antimicrobial stewardship stipulates that all antibiotic prescriptions should include an expected duration of therapy or a review date and this was not the case for a significant proportion of the audit results. Regular review of intravenous therapy allows the rapid switch to oral therapy, when appropriate.15

The nurse is accountable for evaluating and monitoring the effectiveness of prescribed therapy. However, community staff without specialist training may not have an in-depth understanding of the disease progression and the potential impact on physiological systems. There should be a multidisciplinary approach to the review with contributions from an infection specialist, IV specialist and a pharmacist.8 Details of when and how the follow-up and review will take place should be agreed and documented at the point of referral to the service.

Pharmacist clinical check of prescription

One of the clinical skills of a pharmacist when supplying medicines to patients is to perform a fundamental clinical assessment or clinical check of the medicine to be supplied. Pharmacists should check that the drug, the dose, the frequency and the strength of the prescribed medicine are appropriate.12 The British Society for Antimicrobial Chemotherapy ‘Good practice recommendations for outpatient parenteral antimicrobial therapy (OPAT)’ states that an important principle of OPAT is that pharmaceutical care should be equivalent to that expected for hospitalised patients. It recommends that a clinical antimicrobial pharmacist should be part of the multidisciplinary team caring for the patient.8

Where the community IV medicines are supplied through an FP10 prescription dispensed in a community pharmacy the pharmacist is not likely to have access to the patient’s medical records and therefore cannot provide the same clinical screen as a hospital pharmacist. However, systems could be set up in primary care that allows a GP and community pharmacist to work collaboratively with the community IV team to provide multidisciplinary care to the patient.
It must be noted that it may not be easily evident to community staff whether or not a pharmacist has checked the prescription. However, it is undesirable if stocks of antimicrobial medicines are obtained from a source other than a pharmacy (e.g. ward stock) and systems must be in place to ensure appropriate pharmaceutical care is provided for community IV patients.

**Transcribing**

It is common practice that a prescription is transcribed onto the medicine administration record (MAR) by a competent person, to allow recording of administration in a new care setting (e.g. patient’s home). However, because of risk of error, the guidance on Standard 3 on transcribing from the NMC Standards for Medicine management states that this should only be used in exceptional circumstances and not become routine practice. The prescription was transcribed onto a MAR chart in just over half of all the administrations audited and the variation between services ranged from 100% transcribing to 0%.

NMC Standards for Medicine management states that ‘Any transcription must include the patient’s full name, date of birth, drug, dosage, strength, timing, frequency and route of administration’. It is evident from the omissions on some of the administration requests received during this audit that it would be difficult for nursing staff to fulfil this requirement. Where possible, mechanisms should be created to enable a copy of the original prescription or drug authorisation to be used as the administration record without the need for transcription.

Transcribing was reported to have been used in all but one of the organisations partaking in this audit. A risk assessment of the transcribing process should have been developed by these organisations and an organisational policy in place to support the safe and appropriate use of transcribing. The Medicine Use and Safety Division of the East and South East England Specialist Pharmacy Service have produced guidance and tools to support transcribing of medicines information for the purpose of recording administration of medicines.

**PGDs/Local protocols**

Water for injection, sodium chloride 0.9% injection and heparin sodium injection used for reconstituting injectable medicines or ‘flushing’ intravenous lines are all Prescription Only Medicines (POMs) and should be administered in accordance with the directions of an appropriate practitioner which should be in writing either as a prescription, a Patient Specific Direction or a Patient Group Direction (PGD).

There was some evidence that staff did not fully understand the legal framework they were working under. For example, staff reporting working under a PGD for the administration of a flush but also reported that the full name, strength and volume of the flush was not provided.

Organisations should explore the different mechanisms for supply and administration of the diluents and flushes taking into account the safety, legality, convenience, cost-effectiveness and sustainability of the possible routes for authorisation and supply. Staff competencies should include understanding of the legal framework being used to authorise the supply and administration of these POMs.

**Information sources**

Community IV Audit Report Vs.1.1 May 13 (EC)
Compliance with the NPSA, Patient Safety Alert 20 Promoting safer use of injectable medicines requires organisations to ensure staff have access to up to date technical information of injectable medicines to enable injectable medicines to be administered safely.\textsuperscript{10} The main sources of information used by community staff are the British National Formulary (BNF), Parenteral Drugs Guide for IV monographs (Medusa), the manufacturer’s information - Summary of Product Characteristics (SPC), local specialists and policies. The results of this audit are conflicting in that some staff reported that they did not have access to information to allow them to check the dose whilst at the same time reporting that they had access to the BNF and the manufacturer’s information (SPC). This would suggest that not all staff may be aware of how to use the information available to them to find the information they require.

Staff must have access to technical information for the safe administration of injectable therapy.\textsuperscript{8,9,10} Where this is not the case, the potential risk should be escalated up through the governance routes of those organisations and actions taken to ensure up to date information and training on use of the information sources is made available to staff.

\textit{Contact for advice}

The OPAT best practice guidelines recommend that there should be a mechanism in place for urgent discussion and review of emergent clinical problems during therapy. There should be a clear pathway for 24hr immediate access to advice/review and admission agreed with the referring clinician.\textsuperscript{8} The results of this audit indicate that this support is not always provided and needs to be factored into the design of a community IV service.

\textbf{Models of care}

There is plenty of evidence of the benefits to patients of a community intravenous service which includes increased patient satisfaction with the ability to return to normal daily life more quickly. Patient recovery is enhanced in their own home and the risk of hospital acquired infections is reduced.\textsuperscript{4,5,6,7} There are also benefits in terms of cost avoidance and efficiencies in terms of reduced hospital stays. Recent developments in community IV therapy services include walk-in IV clinics. Because patients are treated in one place, these clinics reduce travel time and costs for community nurses.\textsuperscript{5} As well as being time and cost effective, this type of service gives patients more independence as they are not waiting at home for the community nurse to visit.\textsuperscript{4}

A recent survey of community IV services carried out by the Medicine Use and Safety Division found that patients received the first doses of their IV therapy in the acute Trust prior to being referred to the community IV service.\textsuperscript{17} The results of this audit also indicate that the majority of services appear to be set up to facilitate early discharge from hospitals. This model provides a more controlled and manageable starting point to setting up a service than seeking to prevent hospital admissions.\textsuperscript{4} Preventing admissions requires a more intensive infrastructure in terms of nursing and clinical input because the need for vascular access and IV therapy is immediate. It also requires a GP with a special interest who is willing to prescribe the therapy, cannulate and then monitor the patient.\textsuperscript{5} However, there are examples of nurse-led services where the nurses are independent prescribers with advanced clinical practice training who can diagnose and prescribe in the community.
Bridgewater Community Health Services in Warrington offer a nurse-led ‘admissions avoidance’ service where patients are seen in either a community IV clinic or in their own home. Patients are referred from a variety of sources mostly using defined care pathways – GP, A&E, outpatient and inpatient settings. Of the 751 patients treated by the service between September 2005 and November 2008, only 27 had to be admitted to hospital – just 3.6% of the total number of patients referred to the service during that time. This resulted in an estimation of over 7,000 bed days saved, at a cost of around £2,353 per patient for IV therapy treatment in hospital compared to just £886 for patients using the IV service. This equated to almost £1,500 cost avoidance per patient admitted to the service.

Activity

The audit participants were instructed to complete one audit form for each medicine administered to a patient that was referred to their service during the audit period. However, it is possible that there was some duplication of data, due to staff rotation and different staff completing audit forms for the same referral and treatment. A few patients had more than one medicine administered so the number of audit forms is a reflection of the number of administrations rather than the number of referrals however it the data represents a reasonable indicator of activity.

There was a wide variation seen in the levels of activity between the participating organisations (ranging between 1 and 33 IV administrations during the 4 week audit period). Implementation of a community IV service involves considerable investment in development of local policies and protocols, staff training and equipment. For those services with low activity you would expect that there are many missed opportunity costs in not delivering a higher level of activity. However, from the comments section it does appear that one of the barriers is lack of appropriately trained workforce in the community to support the service.

It is well documented that having a lead nurse with experience in IV therapy is pivotal to the success of any community IV service. The specialist nurse promotes appropriate patient selection for community IV therapy and supports the community team with delivery of the service. The OPAT good practice recommendations advise that for the administration of antimicrobials, the OPAT multidisciplinary team should also include a medically qualified infection specialist and a pharmacist, although it acknowledges that this team may have to meet on a so-called ‘virtual ward round’ due to time and resource constraints.

Further investment in specialist staff and training for community teams would be required to realise the real potential of quality improvement and productivity from a community IV service. This additional cost could be offset by increasing the number of care pathways involving community IV therapy and hence avoiding the cost of hospital care.

Another consideration is that of maintaining staff competency if they are doing very few administrations. This was highlighted by a comment on one audit form that the nurse found it difficult to maintain competence in cannulation.
Drugs administered

The majority of medicines administered were once daily. There were a small number of antibiotics administered by staff in one organisation that required administration more than four times a day. This is quite a drain on community staff resources and following discussion with a microbiologist an appropriate alternative agent for some treatments may have been identified that could have been administered once a day. However, this will not always be possible and the choice of the most effective agent may outweigh the inconvenience and cost of multiple daily administrations in the community.

Supplies

The majority of medicines supplied for community intravenous therapy were obtained from a hospital pharmacy and there were a number of comments made regarding difficulties with obtaining supplies of equipment and consumables from the referring hospital. Where the community service involved a GP initiating referrals there were no reports of problems obtaining immediate stocks of the diluent, giving sets and other consumables. It may be that these were stocked by the community service and staff were not relying on another organisation to provide these supplies. However there were some delays reported in obtaining the medicines for GP initiated referrals.

When FP10s prescriptions are issued in the community, there can be a delay of up to 24 hours for the medication to be obtained and dispensed to the patient which may be a problem when an acute condition needs immediate treatment to avoid a hospital admission. This delay could be avoided if there was an agreement with a local community pharmacy to stock a limited list of medicines for intravenous therapy.

One community service used a commercial homecare company to supply ‘ready to administer’ medicines for NHS community staff to administer. The project co-ordinator reported that this source was selected for medicines that were identified as being high risk to prepare in the community following the NPSA Alert 20 risk assessment of injectable medicines.\(^\text{10}\) The does incur an additional cost and the additional funding has been agreed directly with the commissioners.

It is unacceptable risk to patients that administration of therapy is delayed due to difficulties in obtaining supplies of medicines and that the equipment to maintain infection control standards is not readily available to staff. The East and South East of England Specialist Pharmacy services have produced a Medicine in Commissioning toolkit to help identify and address medicine-related issues when designing a new service.\(^\text{19}\) The tool prompts providers to consider the options for supplies of medicines and equipment at the development stage of a service.

Where problems have been identified within an existing service with supplies of medicines and other equipment required for community intravenous therapy, organisations should review the possible supply routes available to them. Factors such as immediate accessibility and patient safety should inform the options appraisal of the various supply routes. Funding may be required for maintaining supplies in the community, if that was identified as the most appropriate route.
Consistency of Policy across organisations

Community staff accept referrals from a range of different organisations which would have different policies and procedures for IV therapy. In the Cheshire and Merseyside region one clinical guideline for use across community and acute Trusts was adopted to standardise the care that patients receive for IV therapy at home or in hospital. Organisational leads for IV therapy should consider a similar proposal for the region in which their organisation sits.

Further work

The results of this audit demonstrate that there are omissions in the referral information provided for the administration of community IV therapy and supply problems that resulted in delayed administration of doses in the community. To support organisations in delivering improvements in their services it would be useful to share examples of best practice for the following:

- Policies/Procedures for delivery of community IV therapy including examples of prescription charts and communication mechanisms that are successful in accurate and timely transfer of information to the community IV team
- Options appraisal and examples of SOPs for the supply of medicines and equipment to community IV services
- Examples of protocols and PGDs to authorise the supply and administration of the flush and diluent
- Sample training module medicine management elements of a community IV service, in particular on the use of information sources and the legal framework that staff are working under when delivering a community IV service.

These audit results will be used to amend and improve the data collection form and the revised version will be available on request to organisations wishing to repeat the audit.

The resourcing and configuration of community IV teams was not evaluated as part of this audit but the results show that there are wide variations in the levels of activity and the models of care used by the different organisations. It would be useful to develop a commissioning framework to establish a successful community IV service with details of the structures and skill mix required, the care pathways and a cost/benefit analysis to demonstrate the potential efficiencies and benefits a fully resourced service can deliver.
Conclusion

There are many different models for delivery of a community intravenous service and the wide variation between the activity levels in participating organisations indicates that there are further opportunities for service developments in many of the participating organisations. However, the results indicate that there is potential risk to patients where staff do not have access to the full and correct patient and prescription details on referral, and supplies of equipment and medicines can be difficult to obtain in the community.

Multidisciplinary collaboration across community services, acute providers, local GPs, community pharmacists and commissioners is required to develop a robust service model that delivers safe and effective IV therapy in the community.
References

4. Kayley J (2011) IV therapy in the community, Nursing Times 107; 19-20:15.18

19. The Medicine Use and Safety Division of the East and South East England Specialist Pharmacist Services Medicines in Commissioning Toolkit

[Link to document] (Accessed May 13)
Appendix A: Audit Forms

Collaborative baseline audit of intravenous therapy in the community setting – Data Collection Form

Name of organisation taking part in the audit

Please state Name of Drug to be administered:

<table>
<thead>
<tr>
<th>Today’s date:</th>
<th></th>
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</thead>
</table>

Person who initiated treatment: □Hospital doctor □GP □Independent non-medical prescriber □Other please specify ____________________ □ Not known

Medicine to be supplied from: □Hospital pharmacy □Community pharmacy □ Community unit □Other please specify ____________________ □ Not known

Are the following clearly stated?

<table>
<thead>
<tr>
<th>The patient allergy status?</th>
<th>□Yes □No □N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full name of the drug</td>
<td>□Yes □No □N/A</td>
</tr>
<tr>
<td>The strength of the ampoules/vials or other solution supplied</td>
<td>□Yes □No □N/A</td>
</tr>
<tr>
<td>Dose of the drug</td>
<td>□Yes □No □N/A</td>
</tr>
<tr>
<td>Route of administration</td>
<td>□Yes □No □N/A</td>
</tr>
<tr>
<td>How many times a day</td>
<td>□Yes □No □N/A</td>
</tr>
<tr>
<td>The time at which dose is to be given</td>
<td>□Yes □No □N/A</td>
</tr>
<tr>
<td>Over what period of time the drug is to be administered</td>
<td>□Yes □No □N/A</td>
</tr>
<tr>
<td>Finish date or maximum number of doses to be given</td>
<td>□Yes □No □N/A</td>
</tr>
</tbody>
</table>

Is a diluent required to reconstitute the drug? □Yes □No □N/A

Please state name of diluent:

How was the diluent prescribed/authorised? □By the initial prescriber □Local protocol □PGD □Other □Not Known

Are the following clearly stated?

<table>
<thead>
<tr>
<th>Name of diluent</th>
<th>□Yes □No □N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume of diluent</td>
<td>□Yes □No □N/A</td>
</tr>
</tbody>
</table>

Is a diluent required to dilute the drug once it is reconstituted? □Yes □No □N/A

Please state name of diluent:

How was the diluent prescribed/authorised? □By the initial prescriber □Local protocol □PGD □Other □Not Known

Are the following clearly stated?

<table>
<thead>
<tr>
<th>Name of diluent</th>
<th>□Yes □No □N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume of diluent</td>
<td>□Yes □No □N/A</td>
</tr>
</tbody>
</table>

Is a flush required? □Yes □No □N/A

Please state name of flush:

How was the flush prescribed/authorised? □By the initial prescriber □Local protocol □PGD □Other □Not Known

Are the following clearly stated?

<table>
<thead>
<tr>
<th>Name of flush</th>
<th>□Yes □No □N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of flushing</td>
<td>□Yes □No □N/A</td>
</tr>
<tr>
<td>Volume of flush</td>
<td>□Yes □No □N/A</td>
</tr>
<tr>
<td>Question</td>
<td>Yes</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>-----</td>
</tr>
<tr>
<td>Is there any patient monitoring required (e.g. renal function tests)?</td>
<td></td>
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<tr>
<td>Has a date been set for reviewing the therapy?</td>
<td></td>
</tr>
<tr>
<td>Who is going to carry out this review?</td>
<td></td>
</tr>
<tr>
<td>Are prescription details transcribed onto the medicines administration record by someone other than the prescriber?</td>
<td></td>
</tr>
<tr>
<td>Has authorisation for administration been obtained e.g. a referral form or drug chart signed by a prescriber?</td>
<td></td>
</tr>
<tr>
<td>Has lack of <strong>supplies</strong> of any of the following delayed the administration of the first dose in the community?</td>
<td></td>
</tr>
<tr>
<td>Medicine</td>
<td></td>
</tr>
<tr>
<td>Diluents</td>
<td></td>
</tr>
<tr>
<td>Flush</td>
<td></td>
</tr>
<tr>
<td>Needles/giving sets</td>
<td></td>
</tr>
<tr>
<td>Other consumable materials such as alcohol wipes, gloves</td>
<td></td>
</tr>
<tr>
<td>Sharps bin for disposal of waste</td>
<td></td>
</tr>
<tr>
<td>Is there a contact for further advice during normal working hours?</td>
<td></td>
</tr>
<tr>
<td>Is there a contact for further advice 'out of hours'?</td>
<td></td>
</tr>
<tr>
<td>Will the following <strong>information</strong> be available to the practitioner administering the therapy?</td>
<td></td>
</tr>
<tr>
<td>Information on medicine e.g. mode of action, adverse drug reactions</td>
<td></td>
</tr>
<tr>
<td>Information on compatibility of diluents</td>
<td></td>
</tr>
<tr>
<td>Information on compatibility with flush</td>
<td></td>
</tr>
<tr>
<td>Information that allows the dose to be checked</td>
<td></td>
</tr>
<tr>
<td>Where will this information be sourced from? (you may tick more than one option)</td>
<td></td>
</tr>
<tr>
<td>Do you have confirmation that a pharmacist has checked the prescription?</td>
<td></td>
</tr>
<tr>
<td>Has this community I/V therapy: □Avoided this patient being admitted to hospital or</td>
<td></td>
</tr>
<tr>
<td>□Allowed this patient to be discharged from hospital. Please state name of hospital, if known:</td>
<td></td>
</tr>
<tr>
<td>Please describe any other issues or problems you anticipate with intravenous therapy administration for this patient</td>
<td></td>
</tr>
</tbody>
</table>
### Community Service

<table>
<thead>
<tr>
<th>Community Service</th>
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</thead>
<tbody>
<tr>
<td>Barts and the London NHS Trust</td>
</tr>
<tr>
<td>Berkshire Healthcare NHS Foundation Trust</td>
</tr>
<tr>
<td>Cambridgeshire Community Services NHS Trust - Luton Community Services</td>
</tr>
<tr>
<td>Cambridgeshire Community Services NHS Trust - Peterborough locality</td>
</tr>
<tr>
<td>Central and North West London NHS Foundation Trust - Camden Provider Services</td>
</tr>
<tr>
<td>Central and North West London NHS Foundation Trust - Hillingdon Community Health</td>
</tr>
<tr>
<td>Croydon Health Services NHS Trust</td>
</tr>
<tr>
<td>Ealing Hospital NHS Trust - Harrow District Nurses</td>
</tr>
<tr>
<td>Ealing Hospital NHS Trust - Brent District Nurses</td>
</tr>
<tr>
<td>East Sussex Healthcare NHS Trust</td>
</tr>
<tr>
<td>Hounslow and Richmond Community Healthcare NHS Trust</td>
</tr>
<tr>
<td>Norfolk Community Health and Care NHS Trust</td>
</tr>
<tr>
<td>North East London NHS Foundation Trust</td>
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<tr>
<td>North West London Hospitals NHS Trust - HART</td>
</tr>
<tr>
<td>North West London Hospitals NHS Trust - STARRS</td>
</tr>
<tr>
<td>Oxleas NHS Foundation Trust</td>
</tr>
<tr>
<td>The Royal Marsden NHS Foundation Trust - Sutton &amp; Merton Community Services</td>
</tr>
<tr>
<td>South Essex Partnership NHS Trust - Bedfordshire Community Health Services</td>
</tr>
<tr>
<td>South Essex Partnership NHS Trust - SE Essex Community Health Services</td>
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<tr>
<td>South Essex Partnership NHS Trust - West Essex Community Health Services</td>
</tr>
<tr>
<td>Sussex Community NHS Trust</td>
</tr>
<tr>
<td>Whittington Health NHS Trust</td>
</tr>
</tbody>
</table>