Agreement between Patient at Home (P@H) and Community Nurses for the Prescription, Administration and Monitoring of Intravenous Antibiotics in the Community

Referral Criteria

- These guidelines are for patients over 16 years of age.
- Shared Care is only appropriate if it provides the optimum solution for the patient.
- Clinical and prescribing responsibility will remain with the Patient at Home (P@H) doctor or the referring specialist consultant.
- Safe prescribing must be accompanied by effective monitoring.
- The intravenous (IV) antibiotics are Teicoplanin, Ceftriaxone and Ertapenem.
- When the referral is accepted, the patient will be given a supply of the IV antibiotic sufficient for 1 week.
- Thereafter the IV antibiotic will be supplied in weekly instalments by the P@H pharmacist for the duration of the treatment.
- **The doctor who prescribes the medication has the clinical responsibility for the medicine and the consequences of its use.**

RESPONSIBILITIES

Consultant

1. Undertake the necessary testing to confirm a diagnosis for which the IV antibiotic treatment is recommended.
2. Ensure that the patient's concurrent drug therapy is stabilised and there are no contra-indications to treatment with the IV antibiotic.
3. Ensure that the patient is aware of risks and benefits of the medication and has read the appropriate information leaflet.
4. Perform baseline tests (see Monitoring section).
5. Follow up patient in an out-patient clinic once the course of the IV antibiotic is complete or sooner if the community nurses report any problems.
6. Inform the P@H doctor of the treatment plan once the patient has been reviewed in the out-patient clinic.

P@H Doctor

1. Ensure that the patient's concurrent drug therapy is stabilised and there are no contra-indications to treatment with the IV antibiotic.
2. Ensure that the patient is aware of risks and benefits of the IV antibiotic and has read the appropriate information leaflet.
3. Ensure that the patient understands the shared care agreement between the community nursing team and P@H.
4. Perform baseline tests (see Monitoring section) if not already done.
5. Request and print out weekly blood test forms for FBC, U+E, Creatinine, LFT, CRP and Teicoplanin levels where appropriate.
6. Prescribe the IV antibiotic, sodium chloride 0.9% flushes, enoxaparin (if indicated) and any other oral antibiotic required for the treatment of the condition (e.g. sodium fusidate, rifampicin).
7. Give the patient the P@H information letter (Appendix 1) and explain that it should be taken to any outpatient appointment and shown to the consultant.
8. Refer to the community nurses for administration of the IV antibiotic and weekly blood tests.
9. Send a copy of the discharge summary to the GP informing them of the agreement between the community nurses and P@H for this patient for the duration of the IV antibiotic therapy. The discharge summary should clearly state that P@H will assume clinical responsibility for prescribing, supplying and monitoring of medication required to treat the condition.
10. Evaluate any adverse effects reported by P@H pharmacist, community nurses or patient.
11. Evaluate any abnormal blood test results when alerted by the P@H pharmacist.
12. Adjust the dose as advised by the specialist/microbiologist.
13. Ensure that backup advice is available at all times. (see Contacts section)

14. Ensure that the patient has a follow up appointment with the specialist consultant once the course of the IV antibiotic is complete or sooner if there are any concerns about the patient.
15. To report any adverse events to the MHRA (teicoplanin is black triangle and therefore subject to intensive monitoring) https://yellowcard.mhra.gov.uk/

General Practitioner (GP)

1. The **GP is NOT responsible** for prescribing or monitoring the IV antibiotic or any associated oral antibiotic therapy.
2. Monitor patient's overall health and well-being.
3. Ensure compatibility with other concomitant medication.
4. GPs are to be informed of any abnormal blood results, P@H will action.
5. Add the IV antibiotic or any associated oral antibiotic therapy to the Primary Care Patient Record as prescribed by hospital only with duration of treatment using method below:

Adding a Hospital only medication to patient's Primary Care Medical Record	
EMIS • Select the Medication page on the patients record • Add the medication in the usual way • When you have completed this click on "issue" • Select the option "Change all" • A list appears select "Record Hospital(no print)" • Select "Approve and Complete"	**SystmOne** • Select the patient • Select the medication screen • On the tool bar below "Medication (All Medication) select **"?"** • This will allow you to record non printable dental or hospital medication • Select the medication to be added • By clicking on the green flag and adding the 'clinical indication'

P@H Pharmacist

1. Ensure compatibility with other concomitant medication.
2. Supply the IV antibiotic, other oral antibiotics, sodium chloride 0.9% flushes and Enoxaparin (if indicated) against a valid prescription.
3. Ensure that the patient is given the Patient Information Leaflet (PIL) for the IV antibiotic and any other antibiotic they may have been prescribed. Also ensure that patient is given the letter explaining the agreement between P@H and community nurses (Appendix 2).
4. Give the patient the P@H information letter (Appendix 1) and explain that it should be taken to any outpatient appointment and shown to the consultant (if not already done by the P@H doctor).
5. Email the GP informing them of the IV antibiotic therapy in the community using the template letter in Appendix 3.
6. Evaluate any adverse effects reported by community nurses or patient.
7. Monitor U&E, Creatinine, FBC, LFTs and Teicoplanin levels (where appropriate) at recommended frequencies (see monitoring section).
8. Refer any abnormal results to the P@H doctor and/or the microbiologist.
9. Act as the liaison between the community nurses, patient and the P@H team.
10. Inform the community nurses of changes to the IV antibiotic dose.
11. Send a new medication authorisation form to the community nurses when the dose of the IV antibiotic changes.

P@H Nurses

1. Facilitate the patient's referral to the community nurses.
2. Arrange insertion of a midline or PICC line before patient is discharged to community nurses.
3. Deliver medication, letters and blood test forms to patient's home.
4. Liaise with the community nurses should any problem arise with patient's venous access.
5. Unblock PICC/ Midline or refer to vascular access nurse where appropriate.
6. Remove PICC/ Midline when IV treatment is complete.
7. Refer any other query to the P@H doctors or pharmacists.

Community Nurses

1. Monitor patient's overall health and well-being.

2. Respond to the request for administration of the IV antibiotic as soon as practicable. If there are concerns regarding the referral, urgently contact the P@H team.
3. Take bloods weekly as requested by P@H team.
4. Stop treatment on advice of P@H or specialist or immediately if any urgent need to stop treatment arises (see monitoring section).
5. Report any adverse events to P@H and MHRA as required http://www.mhra.gov.uk/Safetyinformation/Howwemonitorthesafetyofproducts/Medicines/TheYellowCardScheme/Informationforhealthcareprofessionals/index.htm
6. Inform P@H of any change in the medical condition of the patient which may have an effect on the disease/medication.
7. Refer to P@H nurses if patient needs cannulation (only if not able to be done in community).
8. Refer to P@H nurses if midline or PICC line is blocked.
9. Refer to P@H nurses if midline or PICC line needs to be re-inserted or removed.

Patient

1. Report to the community nurses, P@H, or specialist consultant if there is not a clear understanding of their treatment and discuss any concerns in relation to treatment.
2. Report any adverse effects to the community nurses and/or P@H Dr whilst on the IV antibiotic, especially worsening of condition being treated, diarrhoea, fever and flu-like symptoms.
3. Agree to have weekly blood tests.
4. Report any changes in disease symptoms or wound changes to community nurses whilst on the IV antibiotic.
5. Report any problems with the PICC or midline to the community nurses.
6. Alert community nurse to any changes of circumstance which could affect management of disease
7. Inform community nurse or P@H pharmacist of any new medicines being taken including over-the-counter products.
8. Attend for reviews with referring consultant or P@H doctor as required.
9. Hand the P@H information letter to the consultant in the out – patient clinic (See Appendix 1)
10. Inform P@H doctor, nurse or pharmacist if the treatment plan changes after the consultant appointment.

CONTACT NUMBERS FOR ADVICE AND SUPPORT

Princess Alexandra Hospital NHS Trust – Patient at Home	
Patient at Home Consultant or Doctor or Pharmacist	01279 827633 01279 444455 Ext 2428

Princess Alexandra Hospital NHS Trust - Microbiology	
Consultant Microbiologist	01279 827138

Princess Alexandra Hospital NHS Trust - Pharmacy	
Medicines Information (for medicines related queries)	01279 827054

Ceftriaxone[1] - Therapeutic Summary

Therapeutic indications:
Community-acquired pneumonia, Hospital acquired pneumonia, Intra-abdominal infections, Complicated UTIs, Acute exacerbation of COPD, Complicated skin and soft tissue infections, Infections of bones and joints, Bacterial meningitis and endocarditis.

Contraindications:
Hypersensitivity to Ceftriaxone or any of the excipients listed in the Summary of Product Characteristics.
History of severe hypersensitivity (e.g. anaphylactic reaction) to any other type of beta-lactam antibacterial agent (penicillins, monobactams and carbapenems).

Ceftriaxone - Dose and Route of Administration

Usual dosing regimen: 1-2g ONCE DAILY

Dosage in severe infections: 2-4g ONCE DAILY or 2g BD (meningitis)

Reconstitution and Administration: 1g dose can be administered as a bolus. Reconstitute with 10ml water for injection. Inject by slow IV injection over 5 minutes.
For doses 2g and above – Reconstitute each 1g vial with 10ml water for injection. Add to 100ml Sodium Chloride 0.9% and infuse over 30 minutes.

Duration of treatment: The duration of treatment should be decided based on the clinical response. Variable – from 3 days to 6 weeks depending on indication.

Supply from Secondary care: The IV antibiotic and any other antibiotic or infusion fluid required (e.g. sodium fusidate, rifampicin, clindamycin, sodium chloride 0.9%) will be supplied and monitored by P@H for the duration of the treatment on a weekly basis.

Renal Impairment: In patients with impaired renal function, there is no need to reduce the dosage of ceftriaxone provided hepatic function is not impaired. Only in cases of preterminal renal failure (creatinine clearance < 10 ml/min) should the ceftriaxone dosage not exceed 2 g daily.
In patients undergoing dialysis no additional supplementary dosing is required following the dialysis. Ceftriaxone is not removed by peritoneal or haemodialysis. Close clinical monitoring for safety and efficacy is advised.

Ceftriaxone special warnings and precautions for use:

Hypersensitivity reactions	Serious and occasionally fatal hypersensitivity reactions have been reported with ceftriaxone Severe cutaneous adverse reactions (Stevens Johnson syndrome or Lyell's syndrome/toxic epidermal necrolysis) have been reported.	For severe reactions, treatment with ceftriaxone must be discontinued immediately and adequate emergency measures must be initiated. Before beginning treatment, establish whether the patient has a history of severe hypersensitivity reactions to ceftriaxone, to other cephalosporins or to any other type of beta-lactam agent. Caution should be used if ceftriaxone is given to patients with a history of non-severe hypersensitivity to other beta-lactam agents.
Interaction with calcium containing products		Ceftriaxone must not be mixed or administered simultaneously with any calcium-containing intravenous solutions, even via different infusion lines or at different infusion sites.
Immune mediated haemolytic anaemia	Severe cases of haemolytic anaemia, including fatalities, have been reported.	If a patient develops anaemia while on ceftriaxone, the diagnosis of a cephalosporin-associated anaemia should be considered and ceftriaxone discontinued until the aetiology is determined. During prolonged treatment complete blood count should be performed at regular intervals.
Colitis/Overgrowth of non-susceptible	Antibacterial agent-associated colitis and pseudo-membranous colitis have been reported	Discontinuation of therapy with ceftriaxone and the administration of specific treatment for *Clostridium*

microorganisms	with nearly all antibacterial agents, including ceftriaxone, and may range in severity from mild to life-threatening. Therefore, it is important to consider this diagnosis in patients who present with diarrhoea during or subsequent to the administration of ceftriaxone.	*difficile* should be considered. Medicinal products that inhibit peristalsis should not be given.
Biliary lithiasis & Biliary stasis	There is a possibility of precipitates of calcium ceftriaxone. It occurs more frequently at ceftriaxone doses of 1 g per day and above Cases of pancreatitis, possibly of biliary obstruction aetiology, have been reported in patients treated with ceftriaxone. Most patients presented with risk factors for biliary stasis and biliary sludge e.g. preceding major therapy, severe illness and total parenteral nutrition.	In symptomatic cases, conservative nonsurgical management is recommended and discontinuation of ceftriaxone treatment should be considered by the physician based on specific benefit risk assessment.
Renal lithiasis	Cases of renal lithiasis have been reported, which is reversible upon discontinuation of ceftriaxone.	Use in patients with history of renal lithiasis or with hypercalciuria should be considered by the physician based on specific benefit risk assessment.

Ceftriaxone - Adverse Effects and Management

Adverse effects	Symptoms/signs	Actions
Pseudomembranous colitis	Diarrhoea	Stop ceftriaxone. Take stool sample. Appropriate fluid and electrolyte management should be instituted. Contact P@H.
Thrombocytopenia, Anaemia, Haemolytic anaemia Agranulocytosis	Bruising, bleeding, tiredness, sore throat, sudden fever and chills	Check FBC, Contact P@H – may need to reduce dose or stop.
Nervous system disorders	Convulsion	Stop ceftriaxone, seek immediate medical advice.
Skin and subcutaneous tissue disorders	Rash, Pruritus, Urticaria, Stevens Johnson Syndrome	Contact P@H for advice.
General disorders and administration site conditions	Phlebitis Injection site pain Pyrexia	Check PICC/Midline – Refer to P@H for new line where appropriate.

This only lists the key important Adverse Drug Reactions (ADRs)-For comprehensive information on cautions, contra-indications and interactions please refer to the current British National Formulary and Summary of Product Characteristics. https://www.bnf.org www.medicines.org.uk/emc

Ceftriaxone - Pregnancy and Lactation

Pregnancy:
Ceftriaxone crosses the placental barrier. There are limited amounts of data from the use of ceftriaxone in pregnant women. Animal studies do not indicate direct or indirect harmful effects with respect to embryonal/foetal, perinatal and postnatal development. Ceftriaxone should only be administered during pregnancy and in particular in the first trimester of pregnancy if the benefit outweighs the risk.

Breast-feeding:
Ceftriaxone is excreted into human milk in low concentrations but at therapeutic doses of ceftriaxone no effects on the breastfed infants are anticipated. However, a risk of diarrhoea and fungal infection of the mucous membranes cannot be excluded. The possibility of sensitisation should be taken into account. A decision must be made whether to discontinue breast-feeding or to discontinue/abstain from ceftriaxone therapy, taking into account the benefit of breast feeding for the child and the benefit of therapy for the woman.

For comprehensive information please refer to the current British National Formulary www.bnf.org.uk and the Summary of Product Characteristics (www.medicines.org.uk/emc).

Ceftriaxone - Monitoring

Monitoring by Secondary Care Provider (PAH)

Surgical and medical patients:

- Baseline FBC, CRP, coagulation screen, U & E / Creatinine & LFT.
- FBC, LFT, CRP and U & E to be checked weekly during treatment.

Monitoring by Community Nursing Team

- Monitor patient's overall health and wellbeing.
- Advise patient to report changes in urine output and bowel movements.
- Advise patient to report any sore throat, sudden fever or chills.
- Monitor for signs of infection i.e. not responding to therapy and escalate accordingly.
- Check for rashes, unusual bruising, bleeding or temperature.
- Discontinue treatment if patient is experiencing severe side effects and P@H is not contactable.

Ceftriaxone - Supply from Secondary Care

Ceftriaxone and any other antibiotic or infusion fluid required (e.g. sodium fusidate, rifampicin, clindamycin, sodium chloride 0.9%) will be supplied and monitored by P@H for the duration of the treatment on a weekly basis.

Ertapenem[2] - Therapeutic Summary

Therapeutic Indications:
Ertapenem is indicated in adults for the treatment of the following infections when caused by bacteria known or very likely to be susceptible to Ertapenem and when parenteral therapy is required:
• Intra-abdominal infections
• Community acquired pneumonia
• Acute gynaecological infections
• Diabetic foot infections of the skin and soft tissue

Contraindications:
• Hypersensitivity to the active substance or to any of the excipients listed in the Summary of Product Characteristics (SPC).
• Hypersensitivity to any other carbapenem antibacterial agent.
• Severe hypersensitivity (e.g. anaphylactic reaction, severe skin reaction) to any other type of beta-lactam antibacterial agent (e.g. penicillins or cephalosporins).

Ertapenem - Dose and Route of Administration

Usual dosing regimen: 1g ONCE DAILY

Reconstitution and Administration: Reconstitute the contents of a 1 g vial of Ertapenem with 10 ml of water for injection or sodium chloride 0.9 % solution to yield a reconstituted solution of approximately 100 mg/ml. Shake well to dissolve. For a 1 g dose, immediately transfer contents of the reconstituted vial to a 50 - 100 ml bag of sodium chloride 0.9 % solution. Infuse over a period of 30 minutes.

Duration of treatment: The duration of treatment should be decided based on the clinical response. Variable – from 7 days to 6 weeks depending on indication.

Renal impairment: Ertapenem may be used for the treatment of infections in adult patients with mild to moderate renal impairment. In patients whose creatinine clearance is > 30 ml/min, no dosage adjustment is necessary.
For Creatinine Clearance (GFR) 10 – 30ml/min: 500mg ONCE DAILY can be prescribed (unlicensed dose). The UK manufacturer does not recommend its use in renal impairment, but the US data sheet does recommend this dose[3]. The patient's U + E and Creatinine will be monitored weekly for any deterioration in renal function.

Haemodialysis: The UK manufacturer does not recommend using Ertapenem in haemodialysis. However there is data supporting its use. Approximately 30% of the dose is dialysed after a 4 hour haemodialysis session. The Renal Handbook recommends 500mg once daily or 1g three times a week in haemodialysis patients (unlicensed dose). Give at least 6 hours before haemodialysis session if unable to give post dialysis[3].

Hepatic impairment: No dosage adjustment is recommended in patients with impaired hepatic function.

Ertapenem - Special warnings and precautions for use:

Hypersensitivity reactions	Serious and occasionally fatal hypersensitivity (anaphylactic) reactions have been reported in patients receiving therapy with beta-lactams. These reactions are more likely to occur in individuals with a history of sensitivity to multiple allergens. Before initiating therapy with Ertapenem, careful inquiry should be made concerning previous hypersensitivity reactions to penicillins, cephalosporins, other beta-lactams and other allergens.	If an allergic reaction to Ertapenem occurs discontinue the therapy immediately. **Serious anaphylactic reactions require immediate emergency treatment.**
Superinfection	Prolonged use of Ertapenem may result in overgrowth of non-susceptible organisms. Repeated evaluation of the patient's condition is essential.	If superinfection occurs during therapy, appropriate measures should be taken.
Antibiotic-associated colitis	Antibiotic-associated colitis and pseudomembranous colitis have been reported with Ertapenem and may range in severity from mild to life-threatening. Therefore, it is important to consider this diagnosis in patients who present with diarrhoea subsequent to the administration of antibacterial agents.	Discontinuation of therapy with Ertapenem and the administration of specific treatment for *Clostridium difficile* should be considered. Medicinal products that inhibit peristalsis should not be given. .
Seizures	Seizures have been reported during clinical investigation in adult patients treated with Ertapenem (1 g once a day) during therapy or in the 14-day follow-up period. Seizures occurred most commonly in elderly patients and those with pre-existing central nervous system (CNS) disorders (e.g. brain lesions or history of seizures) and/or compromised renal function.	The concomitant use of Ertapenem and valproic acid/sodium valproate is not recommended.

Ertapenem - Adverse Effects and Management

Adverse effects	Symptoms/signs	Actions
Infections and infestations	pseudomembranous enterocolitis	Stop Ertapenem – seek advice from P@H doctors.
Blood and lymphatic system disorders	Neutropenia, thrombocytopenia	Seek advice from P@H.
Immune system disorders	Allergy, anaphylaxis	Stop Ertapenem – seek immediate medical advice.
Psychiatric disorders	Insomnia, confusion, agitation, anxiety, depression	Seek advice from P@H.
Nervous system disorders	Headache, Dizziness, somnolence, taste perversion, seizure	Seek advice from P@H.
Cardiac disorders	Sinus bradycardia, Arrhythmia, tachycardia	Seek advice from P@H.
Gastrointestinal disorders	Diarrhoea, nausea, vomiting Constipation, acid regurgitation, dry mouth, dyspepsia, abdominal pain	Take a stool sample where indicated. Contact P@H for advice.
Hepato-biliary disorders	Cholecystitis, jaundice, liver disorder	Seek advice from P@H.
Skin and subcutaneous tissue disorders	Rash, pruritus Erythema, urticaria	Seek advice from P@H.
Renal and urinary disorders	Renal insufficiency, acute renal insufficiency	Seek advice from P@H.
General disorders and administration site conditions	Extravasation, asthenia/fatigue, fever, oedema/swelling, chest pain	Seek advice from P@H.

This only lists the key important Adverse Drug Reactions (ADRs)-For comprehensive information on cautions, contra-indications and interactions please refer to the current British National Formulary and Summary of Product Characteristics. https://www.bnf.org www.medicines.org.uk/emc

Ertapenem - Pregnancy and Lactation

Pregnancy:
Adequate and well-controlled studies have not been performed in pregnant women. Animal studies do not indicate direct or indirect harmful effects with respect to pregnancy, embryo-foetal development, parturition or post-natal development. However, Ertapenem should not be used during pregnancy unless the potential benefit outweighs the possible risk to the foetus.

Breast-feeding:
Ertapenem is excreted in human milk. Because of the potential for adverse reactions on the infant, mothers should not breast-feed their infants while receiving Ertapenem

Ertapenem - Monitoring

Monitoring by Secondary Care Provider (P@H)

Surgical and medical patients:

- Baseline FBC, CRP, coagulation screen, U & E / Creatinine & LFTs
- FBC, LFT, CRP and U & E to be checked weekly during treatment.

Monitoring by Community Nursing Team

- Monitor patient's overall health and wellbeing.
- Advise patient to report changes in urine output and bowel movements.
- Monitor for signs of infection i.e. not responding to therapy and escalate accordingly.
- Check for jaundice, rashes, unusual bruising, bleeding or temperature.
- Discontinue treatment if patient is experiencing severe side effects and P@H is not contactable.

Ertapenem - Supply from Secondary Care

Ertapenem and any other medicine or infusion fluid required (e.g. enoxaparin, sodium fusidate, rifampicin, clindamycin, sodium chloride 0.9%) will be supplied and monitored by P@H for the duration of the treatment on a weekly basis.

▼ Teicoplanin[4] - Therapeutic Summary

Therapeutic indications:
Teicoplanin is indicated to treat potentially serious Gram – positive infections including those which cannot be treated with other antimicrobial drugs e.g. Penicillins and cephalosporins:
• Complicated skin and soft tissue infections,
• Bone and joint infections,
• Hospital acquired pneumonia,
• Community acquired pneumonia,
• Complicated urinary tract infections,
• Infective endocarditis,
• Peritonitis associated with continuous ambulatory peritoneal dialysis (CAPD),
• Bacteremia that occurs in association with any of the indications listed above.

In severe infections such as septic arthritis, osteomyelitis and prosthetic implant-associated infections, high dose and a prolonged course of treatment is indicated to improve cure rates and decrease the emergence of resistance in bone and joint infections.

Contraindications:
Hypersensitivity to teicoplanin or to any of the excipients listed in the Summary of Product Characteristics (SPC).

▼Teicoplanin - Dose and Route of Administration

Usual dosing regimen: 400mg IV (6mg/kg if > 70kg) every 12 hours for 3 doses then continue with 400mg IV once daily (6mg/kg if > 70kg).

Dosage in severe infections: initially 10mg/kg IV every 12 hours for 3 doses then 10mg/kg once daily. Actual body weight is used to calculate the dose. The dose being prescribed and administered should be rounded to the nearest 200mg. Doses should be capped to a maximum of 1g (1000mg). Dose increases beyond this should be in response to teicoplanin levels only and on advice from microbiology.

Reconstitution and Administration: Reconstitute vial with the Water for Injection provided. The intravenous injection may be administered either as a bolus over 3-5 minutes or as a 30 minute infusion. To administer as an infusion further dilute the reconstituted injection in an appropriate volume (50-100ml) of suitable diluent (e.g. Sodium Chloride 0.9%). See manufacturer's product information enclosed with teicoplanin for a full list of compatible diluents.

Duration of treatment:
The duration of treatment should be decided based on the clinical response. For infective endocarditis a minimum of 21 days is usually considered appropriate. Osteomyelitis and prosthetic joint infections may require from 6 weeks up to 3 months treatment.

Renal Impairment:
Adults and elderly patients with impaired renal function
Dose adjustment is not required until the **fourth** day of treatment, at which time dosing should be adjusted to maintain a serum trough concentration of at least 10 mg/L.

After the fourth day of treatment:
• In mild and moderate renal insufficiency (Creatinine Clearance 30-80 ml/min): maintenance dose should be halved, either by administering the dose every two days or by administering half of this dose once a day.

• In severe renal insufficiency (Creatinine Clearance less than 30 ml/min) and in haemodialysed patients: dose should be one-third the usual dose, either by administering the initial unit dose every third day or by administering one-third of this dose once a day.

Teicoplanin is not removed by haemodialysis.

▼Teicoplanin - Special warnings and precautions for use:

Use teicoplanin with caution when it is co-administered with potentially nephrotoxic drugs.

Hypersensitivity reactions	Serious, life-threatening hypersensitivity reactions, sometimes fatal (e.g. anaphylactic shock)	Discontinue treatment immediately. Initiate appropriate emergency measures.
Hypersensitivity to vancomycin	Cross - hypersensitivity reactions, including fatal anaphylactic shock, may occur.	Teicoplanin must be administered with caution
Infusion related reactions	Rarely (even at the first dose), red man syndrome (a complex of symptoms including pruritus, urticaria, erythema, angioneurotic oedema, tachycardia, hypotension, dyspnoea)	Stop or slow the infusion. Administer the daily dose as a 30 minute infusion instead of a bolus.
Severe bullous reactions	Life-threatening or even fatal cutaneous reactions Stevens-Johnson syndrome (SJS) and Toxic Epidermal Necrolysis (TEN) (e.g. progressive skin rash often with blisters or mucosal lesions)	Discontinue teicoplanin treatment immediately. Seek medical advice.
Ototoxicity	Deafness, hearing loss, tinnitus and vestibular disorder	Assess whether the patient is on other ototoxic, nephrotoxic and neurotoxic drugs. Seek advice from P@H
Thrombocytopenia	Weekly FBC recommended	Seek advice from P@H
Nephrotoxicity	Teicoplanin is excreted renally and rarely can cause renal failure	Seek advice from P@H - the dose may need to be reduced.

▼Teicoplanin - Adverse Effects and Management

Adverse effects	Symptoms/signs	Actions
Leucopenia, thrombocytopenia, eosinophilia, agranulocytosis, neutropenia	Fever, severe chills, sore throat, mouth ulcers	Refer patient to P@H.
Deafness, hearing loss, tinnitus, vestibular disorder	Ringing in ears or feeling that things around patient are moving, dizziness	Refer to P@H.
Skin and subcutaneous tissue disorders	Rash, erythema, pruritus	Seek advice from P@H.
Renal and Urinary disorders	Blood Creatinine increased. May lead to acute kidney injury	Contact P@H.
Gastrointestinal	Diarrhoea, vomiting, nausea	Seek advice from P@H.
Injection site reactions	Thrombophlebitis- reddening of skin, pain or swelling	Check PICC/Midline – Refer to P@H for new line where appropriate.

This only lists the key important Adverse Drug Reactions (ADRs)-For comprehensive information on cautions, contra-indications and interactions please refer to the current British National Formulary and Summary of Product Characteristics. https://www.bnf.org www.medicines.org.uk/emc

▼ Teicoplanin - Pregnancy and Lactation

Pregnancy:
There is limited data from the use of teicoplanin in pregnant women. Studies in animals have shown reproductive toxicity at high doses. The potential risk for humans is unknown. Therefore, teicoplanin should not be used during pregnancy unless clearly necessary. A potential risk of inner ear and renal damage to the foetus cannot be excluded.

Breast-feeding:
It is unknown whether teicoplanin is excreted in human milk. There is no information on the excretion of teicoplanin in animal milk. A decision on whether to continue/discontinue breast-feeding or to continue/discontinue therapy with teicoplanin should be made taking into account the benefit of breast-feeding to the child and the benefit of teicoplanin therapy to the mother.
For comprehensive information please refer to the current British National Formulary www.bnf.org.uk and the Summary of Product Characteristics (www.medicines.org.uk/emc)

▼Teicoplanin - Monitoring

Secondary Care Provider (P@H)

- Baseline FBC, coagulation screen, U & E / Creatinine, CRP & LFTs
- Thereafter FBC, U&Es/Creatinine, CRP and LFTs will be monitored weekly
- Where indicated, for patients whose therapy will continue for more than 2 weeks, trough levels (pre – dose) of teicoplanin should be monitored weekly.
- The trough level should be taken just before the dose is due. Samples will be sent to Bristol or Cambridge for assay.
- Please ensure there is no delay in the next dose being given while awaiting this result as it will not be available on the same day as the sample being sent.

▼Teicoplanin - Indication	Expected Levels[6]	Re-assay Interval
Complicated skin and soft tissue infection/pneumonia/complicated urinary tract infection	Pre dose levels 15-60mg/L	Weekly in prolonged treatment
Bone and joint infection	Pre dose levels 20-60mg/L	Weekly in prolonged treatment

Monitoring by Community Nursing Team

- Monitor patient's overall health and wellbeing
- Advise patient to report changes in urine output and hearing.
- Monitor for signs of infection i.e. not responding to therapy and escalate accordingly
- Check for rashes, unusual bruising, bleeding or temperature.
- Discontinue treatment if patient is experiencing severe side effects and P@H is not contactable

▼Teicoplanin - Supply from Secondary care

Teicoplanin and any other antibiotic or infusion fluid required (e.g. sodium fusidate, rifampicin, clindamycin, sodium chloride 0.9%) will be supplied and monitored by P@H for the duration of the treatment on a weekly basis.

References

1. Electronic Medicines Compendium (April 2018), *Summary of product Characteristics for Ceftriaxone 1g Powder for Solution for Injection* https://www.medicines.org.uk/emc/product/1361/smpc [Accessed on 07/11/2018]

2. Electronic Medicines Compendium (May 2018), *Summary of product Characteristics for INVANZ 1g powder for concentrate for solution for infusion* https://www.medicines.org.uk/emc/product/1713 *[Accessed on 05/10/18]*

3. Electronic Medicines Compendium (February 2018), *Summary of product Characteristics for Targocid® 400mg Injection.* http://www.medicines.org.uk/emc/medicine/27321 *[Accessed on 07/11/2018]*

4. Ashley, C., & Dunleavy, A. The Renal Drug Handbook (4th ed., p. 356). London: Radcliffe Publishing; 2014

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Appendix 1: Information Letter to Consultant

Hamstel Road
Harlow
Essex
CM20 1QX
Tel: 01279 827633
E-mail: tpa-tr.patientathome@nhs.net

Date:

Information for Healthcare Professionals involved in this patient's care

Dear Colleague

Patient Name: _____ **Date of Birth:** _____

Hospital Number: _____

The above named patient is presently under the care of the community nurses and Patient @ Home at The Princess Alexandra Hospital NHS Trust. We understand that there is a follow up planned with your team in due course. If there are any changes to the treatment plan, kindly inform Patient @ Home on 01279 827633 or 01279 827132. Alternatively, you can send us an email at tpa-tr.patientathome@nhs.net with the proposed changes.

This is to ensure effective communication between teams and better patient care.

Kind regards

Patient @ Home Team

Appendix 2: Information Letter to Patient

Hamstel Road
Harlow
Essex
CM20 1QX
Tel: 01279 827633
E-mail: tpa-tr.patientathome@nhs.net
Date:

Dear Mr/Mrs _____

You have been prescribed (Medicine name: _____ to treat your condition. We would be grateful if you would read this information as it will help us work with you to manage your condition and ensure safe prescribing of the specific medicine listed above.

You have been referred by us to the community nurses for the administration of the intravenous antibiotic named above. Your care will be shared between the community nurses and the Patient at Home team. Your consultant and GP are aware of this arrangement. You and your GP will receive a copy of your discharge summary from the hospital when you are transferred to the care of the community nurses.

The Patient at Home team will be responsible for prescribing, monitoring and supplying the medicine(s) named above. **Please do not request these medicines from your GP**. We will supply the medicines to you at weekly intervals. We will call you to arrange a suitable time to deliver the medicines. The community nurses will visit you to administer the intravenous antibiotics at the prescribed dose and frequency. They will monitor your general health and wellbeing. In addition, the nurses will take blood samples from you to monitor full blood count, kidney and liver function and blood levels of the antibiotic prescribed. Your consultant will review you in an outpatient clinic once the course of antibiotic is complete or sooner if you experience any problems. Please carry the “Information for Healthcare Professionals” letter with you to your appointment and show this letter to your consultant. This letter gives the consultant information on how to contact us, so that we can ensure you receive the appropriate care you require.

Your consultant should have informed you of the common side effects of the medicine. In addition, the patient information leaflet given to you explains the side effects and what to do if you experience them. If you think you may be having side effects from a medicine, please discuss this with the community nurse who visits you. If you need urgent medical advice, please contact the Patient at Home team on telephone number **01279 827633**. You can speak to the doctor or pharmacist on duty that will be able to deal with your query. Patient at Home will monitor the blood test results and will contact you if there are any problems.

Please report any changes in disease symptoms or circumstances that could affect the management of your condition to the community nurses. They will contact us if they have any concerns. If your GP prescribes any other medicine for you, please ask the GP to check that it is suitable to be taken with the above named antibiotic. Please inform the Patient at Home pharmacist if your GP starts you on any new medicine. Do not take any over the counter medicines until you have discussed this with the pharmacist or the Patient at Home team.

If you have any concerns or questions, please contact us on **01279 827633**.

Kind regards

The Patient at Home Team

Appendix 3: Information Letter to GP

The Princess Alexandra Hospital NHS Trust

Hamstel Road
Harlow
Essex
CM20 1 QX
Tel: 01279 827633
E-mail: tpa-tr.patientathome@nhs.net

Date:

In confidence

Recipient full title and full name

Recipient address

Dear <Recipient Name>

Re: <Patient Name>, DOB: <Date of birth>, NHS Number: <NHS number>

IV Antibiotic Intravenous injection for _____ <insert medical condition>

GP to kindly add to patient's Primary Care Medical Record - no prescribing required

The above named patient has been prescribed IV Antibiotic (and _____insert other antibiotic name) to treat _____ (insert medical condition). The course of treatment will end on _____ (insert date).

The Patient at Home (P@H) team at The Princess Alexandra Hospital will be responsible for prescribing, supplying and monitoring the treatment. The community nurses will be administering the intravenous antibiotic.

GP Action: Please ensure that there is a visible record made in the patient's Primary Care Medical Record (see below for guidance) to alert prescribers:

- That the patient is receiving IV Antibiotic and _____ (insert other antibiotic name) prescribed and monitored by secondary care only
- There may be potential for drug interactions with other / new drugs prescribed
- The patient may be at risk of renal impairment

Please contact the Patient at Home team on 01279 827633, should you have any queries about this patient and his/her treatment.

Yours sincerely

Thilo Pillay
Lead Pharmacist
Patient at Home

Cc. Email to GP/Practice Manager at <GP Details>

Adding a Hospital only medication to patient's Primary Care Medical Record	
EMIS ➢ Select the Medication page on the patients record ➢ Add the medication in the usual way ➢ When you have completed this click on "issue" ➢ Select the option "Change all" ➢ A list appears select "Record Hospital(no print)" ➢ Select "Approve and Complete"	**SystmOne** ➢ Select the patient ➢ Select the medication screen ➢ On the tool bar below "Medication (All Medication) select **"?"** ➢ This will allow you to record non printable dental or hospital medication ➢ Select the medication to be added ➢ By clicking on the green flag and adding the 'clinical indication'