



Professional Health Care in Your Own Environment

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# CLINICAL GUIDELINES FOR HOME INTRAVENOUS MANAGEMENT URINARY TRACT INFECTIONS

ACUTE/POST ACUTE CARE (APAC)  
NORTHERN SYDNEY CENTRAL COAST  
HEALTH

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# URINARY TRACT INFECTION CLINICAL GUIDELINES FOR HOME INTRAVENOUS MANAGEMENT

## APAC Contact Numbers

<p><b>NORTHERN SYDNEY</b> <i>Hospital In-patients:</i></p> <p>Monday to Friday 8.00am – 5.00pm</p> <ul style="list-style-type: none"><li>• <b>(02) 9926 7292</b></li></ul> <p>Monday to Friday 5.00pm – 11.00pm. Weekends and Public Holidays</p> <ul style="list-style-type: none"><li>• <b>(02) 9926 7111</b> ask for APAC Nurse to be Paged</li></ul> <p><b>APAC/GP Shared Care Program Patients:</b> 7 days a week, including Weekends and Public Holidays</p> <ul style="list-style-type: none"><li>• <b>0421 582 997</b> 7.00am – 11.00pm</li></ul>
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<p><b>CENTRAL COAST</b> 7 days a week, including Weekends and Public Holidays</p> <ul style="list-style-type: none"><li>• <b>Phone: (02) 4320 3482</b> 7.00am – 11.00pm</li><li>• <b>Fax: (02) 4320 3555</b></li></ul>
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**Referrals Taken:** 7.00am – 11.00pm Daily

## Clinical Guideline Statement

APAC provide a comprehensive and evidence based treatment through a multi-disciplinary team, who operate according to agreed clinical guidelines. This model of care is supported by data from the Therapeutic Guidelines: Antibiotic 2006 in the prevention/reduction of hospitalisation for patients who would otherwise need treatment as an in-patient.

Patient's who present with an acute definitive diagnosis of Urinary Tract Infection who have not responded to oral therapy or require intravenous antibiotics, may be considered for clinical management with home antibiotic therapy by APAC (*Howden & Grayson, 2002*). The patient must give verbal/written consent to home therapy, meet all the APAC criteria and be able to be safely managed at home.

## Background

Urinary tract infections (UTI) are one of the most commonly diagnosed infectious diseases and they are particularly prevalent in women. Prior to the introduction of the first antibiotics in the late 1930's, medical texts abounded with remedies for urinary diseases. (*Nickel, 2005 Pt 1*)

The most prevalent organism in UTIs is *E Coli* which accounts for almost 80% of infections. *Staphylococcus saprophyticus*, *Klebsiella* species and *Proteus mirabilis*

account for most of the remaining infections (*Stamm & Hooton, 1993*) Infection may occur anywhere in the urinary tract ie urethra, bladder and kidneys. Acute uncomplicated pyelonephritis can be caused by the introduction of bacteria from a colonised vagina and/or perineum via the urethra and bladder to the kidney(s)

Complicated UTIs can occur with impairment of urinary tract structures. Anatomical abnormalities, neurogenic dysfunction, calculi and catheterisation account for the incidence of most UTIs. Although obstruction alone does not cause UTI, its presence predisposes to UTI and makes UTI more difficult to eradicate with medical therapy (*Merck Manual, 2005*)

Pregnant females, immunosuppressed patients and diabetics are more at risk than the general population of contracting UTIs. (*Hoepelman et al, 2003*)

## Scope of Practice

- **First Dose of Intravenous Antibiotic** should be administered either within a Hospital facility or by/in the presence of the General Practitioner.
- Accredited Registered Nurses –patient assessment and monitoring and education. **Administration of 2<sup>nd</sup> and consecutive doses of IV antibiotics.**
- Medical practitioners – patient diagnosis, clinical management plan and review.
- Physiotherapist – patient assessment and physiotherapy.
- Occupational Therapist – patient and environment assessment and education.
- Pharmacists – medication review and patient education.
- Social Worker - liaise, assess and provide the patient with appropriate assistance and support.

## Expected Outcomes

The patients' UTI will resolve through treatment at the patients' home setting delivered by the APAC NSCCH service (*Therapeutic Guidelines: Antibiotics, 2006*).

The patient will be admitted through either the in-patient, Emergency Department, VMO (Visiting Medical Officer)/SMS (Senior Medical Officer) or directly via the GP (General Practitioner) route. The treatment plan will be by the use of various intravenous antibiotics set out further on in this clinical guideline. (*Howden & Grayson, 2002*)

## Definitions

**UTI** – (Urinary Tract Infection) an infection of one or more structure in the urinary system (*Mosby, 2002*).

**Infection** – Invasion of the body caused by pathogenic micro-organisms (*Mosby, 2002*).

**Creatinine Clearance** – a diagnostic test for kidney/renal function (*Mosby, 2002*).

**GP** – General Practitioner

**ID** – Infectious Diseases

**SMS** – Senior Medical Officer/Consultant

**VMO** – Visiting Medical Officer/Consultant

**NSCCH** – Northern Sydney Central Coast Health

**Hospital Facility In-patient** – A patient who has been admitted to APAC through the hospital facility either from the **Wards, Emergency** or **EMU** departments.

**Mode of Referral** – Refers to the form of medical health professional who is referring a patient, e.g. SMS/VMO, GP, Nursing or Allied Health Worker.

**Clinical Management** – Refers to the medical responsibility and management of a patient, this will be either the SMS or GP.

**APAC /GP Shared Care Program (GP Direct Referrals)** - The APAC/GP Shared Care program is an extension of the APAC service that enables GPs to **directly refer** and access the APAC service. It enables GPs to determine and **initiate** the clinical management of their patient before referring the patient to APAC for them to perform the clinical treatment. The APAC program aims to avoid unnecessary hospital presentations.

## Referral to APAC NSCCH

APAC NSCCH has two main modes of referral designations, either Hospital Facility In-patient/VMO or GP designations.

### 1. APAC NSCCH Admission Criteria

To be admitted to APAC NSCCH the patient should fulfil the APAC Assessment Criteria (*Howden & Grayson, 2002*):

- Lives within the Northern Sydney Central Coast Area Health Service
- Patient and/or carer/guardian consents to APAC service (*Corwin et al, 2005*)
- Have access to a phone/fax (*Corwin et al, 2005*)
- Able to have treatment delivered in a safe environment (*Howden & Grayson, 2002*)
- Has designated Medical responsibility for the clinical management of the patient, for the duration of treatment from the APAC service
- Is able to be reviewed by Medical management either by returning to hospital or within the home (or designated safe environment).
- Patient is clinically stable (*Howden & Grayson, 2002*).

**Patients residing outside the NSCCH Local Government Areas** who no longer meet the criteria for APAC, will be transferred to appropriate services in consultation with the GP/Medical team.

**Planned/Unplanned Leave** – If the GP/Medical team has patients under their care and has to take planned or unplanned leave, they have to either:

- Arrange an accredited APAC/GP Shared Care Locum or alternate Medical Management (when hospital team) to take over the patients' clinical management. OR
- Organise for the patient to be transferred to a hospital management team.

### 2. APAC referral criteria for urinary tract infections

- At APAC, only those UTI's which have not responded to oral therapy, are treated.

- Once definitive diagnosis has been made, refer to APAC for ongoing treatment and monitoring.
- Patients who fulfil APAC admission criteria may be referred to the service ie live within NCCSH area and are medically stable.
- Patients may be excluded from APAC if critical vital signs in the 24 hours prior to referral to APAC:
  - Temp >38.5°C
  - Pulse rate >100/minute
  - Hypotension ( $\leq 100/50$ mm Hg or 30mm Hg < 'normal' BP) (Micheal et al, 2006)

### 3. Assessment Requirements

- Urinary tract infections may be diagnosed by quantitative cultures of urine specimens. In uncomplicated cystitis, urine cultures may not be necessary, but in severe urinary tract infections urine culture is mandatory. (*McBryde & Redington, 2001*)
- Close monitoring is required for asymptomatic bacteriuria especially in **pregnant women**. If present, the infection should be treated to prevent acute pyelonephritis.
- In **males**, eliminate any underlying cause eg structural abnormality or underlying focus of infection. Prostatitis is the most frequent UTI in adult males. Other urinary tract infections usually do not appear until old age
- For patients whose symptoms do not rapidly resolve (48-72 hours), radiological imaging should be used to eliminate anatomical abnormalities. (*Roberts JA. 1999*)
- Assess the patient, establish/accept ongoing clinical responsibility for UTI and be available for the duration of the treatment with the APAC service
- Complete in-patient medication chart with five to seven days orders for IV antibiotics. GP's complete the medication authority and fax to APAC together with and relevant pathology results (the original go home with the patient).
- Give prescription to patient for oral antibiotics (or any other relevant oral medications to be administered by APAC), if required
- If IV antibiotic therapy chosen is not from the APAC Clinical Guidelines, Ensure that it has been approved for use by the Infectious Diseases team used by the APAC service

## Patient Diagnosis and Assessment Requirements

1. **Baseline Investigations** (to be taken before patient begins intravenous antibiotics, if results already known)
  - a) FBC, ESR, EUC, LFT, CRP, blood glucose (*Howe & Jones, 2004*)
  - b) If temperature constantly >38°C or vital signs are abnormal, blood cultures may be required
  - c) **GP directed care** - the initiation and continuation of antibiotics after review of symptoms and laboratory results (MSU).
  - d) Gentamicin levels should be attended before 2<sup>nd</sup> dosing if renal function is unknown.

## General Care

### 1. APAC

- Encourage patients to drink at least 1,5L per day unless contraindicated by co-morbidities
- Monitoring of medical condition and potential complications
- Clinical response means:
  - 1) Temperature < 37.8°C for 24 hours (if greater than this at admission)
- Education re. self-management strategies.
- Assessment of precipitating factors for admission to hospital and implementation of strategies to prevent re-admissions.
- Communication with Medical Officers as required
- Allied Health services, Occupational Therapy, Physiotherapy, Pharmacy and Social Work advice (*Howden & Grayson, 2002*).
- If an in-patient, APAC Registered Nurse should complete the APAC Admission prior to discharge. If patient is referred from GP, APAC staff member will complete the APAC admission on the first home visit to the patient.
- Catheter associated UTIs may often be caused by a blockage. This problem can often be managed with non- pharmacological methods. *Candida albicans* may be associated with indwelling catheters and does not necessarily indicate UTI infection.

Once referral and admission are confirmed with APAC, the first home visit will be conducted within 24 hours.

#### APAC Multi-disciplinary team:

- Physiotherapists.
- Occupational Therapists.
- Respiratory Clinical Nurse Specialist.
- Pharmacist.
- Registered Nurses.
- Community Care Aids.
- Social Worker
- Access to a Clinical Psychologist

### 2. SMS/GP Clinical Management

- Establish good IV access for in-patients. Inform APAC, patient requires IV access if patient is referred from GP.
- Complete Hospital discharge letter if patient an Hospital Facility In-patient.

#### Medical Review

- Regular review every 2-3 days (at least)

- Re-ordering of medications on appropriate medication chart by attending Medical team/GP. Updating of treatment care plan in the patient's APAC health care file.

### 3. Criteria for Transfer to the Emergency Department or GP Review

- Vital signs indicate severe illness
- Unresolved blood / pus in the urine, urinary frequency and burning pain with voiding
- Unresolved back pain
- Any new problem needing prompt medical assessment.
- Drug reaction so review of antibiotic therapy is required.

NOTE: If a patient needs to transfer to the Emergency Department, the treating Medical team or GP should be contacted after the review by Emergency Staff.

## Treatment Options

### GP Directed Care

#### 1. Urinary Tract Infection

The general practitioner may wish to treat some patient with minor systemic symptoms at home or nursing home: in such cases an MSU must be collected and thereafter one of the following regimens can be used:

- **Ceftriaxone 1g** given as a single daily dose (**ceftriaxone** pregnancy Category B1)

or

- **Gentamicin** alone as a single daily dose is also an option for APAC patients. Dose according to renal function. Monitor aminoglycoside levels. Ensure that organisms is sensitive to gentamicin and that gentamicin is administered for a maximum of 7 days.

#### Aminoglycoside starting doses for patients with normal renal function

Age	Starting dose * (gentamicin)
10–29 years	6 mg/kg/day
30–60 years	5 mg/kg/day
>60 years	4 mg/kg/day
* Use ideal body weight if actual weight is >20% over ideal body weight	

Ref: (Therapeutic Guidelines: Antibiotic, Updated 2006)

NB: Reduce starting dose if patient's renal function is impaired.

- As soon as identification and susceptibility testing is available and/or symptoms have settled the patient can be changed to another IV antibiotic or changed to orals.
- Catheterised patients should be regarded as having a complicated UTI. Such patients usually have leucocytes and bacteria in their urine and therefore a diagnosis of UTI has to be made on clinical grounds, particularly in the presence of systemic symptoms eg fever, confusion, and shock. Such patients should always be treated in hospital and a urine sample must be taken for examination. If these symptoms are absent there is usually no need for any antibiotic treatment or for examination of urine.

**NB: Ceftriaxone - PBS RESTRICTED BENEFIT: ("Infections where positive bacteriological evidence confirms that this antibiotic is an appropriate therapeutic agent.")**

## 2. Pyelonephritis

An MSU must be taken prior to commencement of antibiotic therapy. Mild to moderate cases can be treated with oral therapy. For severe infection parenteral therapy is indicated. Hospitalisation is usually indicated but the general practitioner may decide to treat less severe cases at home. In such cases the following regimens are suggested:

- **Ceftriaxone 1g** given as a single daily dose (**ceftriaxone** pregnancy Category B1). Treatment can be continued for a total of 10 to 14 days or changed to orals if clinically indicated.
- or
- **Gentamicin** alone as a single daily dose followed by ciprofloxacin (po) depending on the clinical response and susceptibility testing. Dose according to renal function. Monitor aminoglycoside levels. Ensure that organisms is sensitive to gentamicin and that gentamicin is administered for a maximum of 7 days.

## In-patient, SMS/VMO Directed Care

### 1. Uncomplicated urinary tract infections

These are treated with oral antibiotics.

### 2. Acute cystitis (Non-pregnant women)

- **Trimethoprim 300mg** for 3 days
- **Cephalexin 500mg** twice daily for 5 days
- **Amoxicillin + Clavulanate 500/125mg** twice daily for 5 days
- **Nitrofurantoin 50mg** four times daily for 5 days

- Oral **Norfloxacin 400mg** twice daily for 3 days is reserved for those infections which do not respond to one of the above treatment regimens. (*Therapeutic Guidelines: Antibiotic, 2006*)

For pregnant women, Trimethoprim is not recommended. Oral treatment for Cephalexin or Amoxicillin/Clavulanate or Nitrofurantoin should continue for 10 days.

### 3. Acute pyelonephritis (Mild to moderate cases)

- **Cephalexin 500mg** four times daily for 10 days
- **Amoxicillin + Clavulanate 500/125mg** twice daily for 10 days
- **Trimethoprim 300mg** daily for 10 days
- If resistance to all the above drugs is proven or the causative organism is *Pseudomonas aeruginosa*, use **Ciprofloxacin 500mg** orally twice daily. (*Therapeutic Guidelines: Antibiotic, 2006*)

### 4. Severe urinary tract infection

- The drug of first choice for APAC patients with **severe acute pyelonephritis** is **Ceftriaxone 1g** given as a single daily dose. Treatment should be continued for a total of 10 to 14 days part of which may consist of oral antibiotic therapy dependant on the causative organism. **Ceftriaxone** may also be used during pregnancy ().
- **Gentamicin** alone as a single daily dose is also an option for APAC patients. Dose according to renal function (Adult dose= **4 to 6mg/kg** IV daily) Monitor aminoglycoside levels. Organisms must be sensitive to gentamicin
- IV **Ciprofloxacin** is reserved for suspected or proven pseudomonal infections (*Australian Medicines Handbook, 2004*)
- Recently severe UTIs have been treated with **Ertapenem 1g** daily. It has a similar safety profile to that of Ceftriaxone. Ertapenem is active against many gram-positive and gram-negative bacteria (*Tomera et al, 2002*). Activity against *Pseudomonas aeruginosa* is limited. There fore it should not be used as monotherapy. (*Gesser et al, 2003*)
- If the patient has a penicillin allergy or the causative organism is resistant to the above regimen, **Vancomycin** should be considered. Dose = **1 to 2g** daily and should be adjusted for renal function. Monitor vancomycin levels. (*Roberts, 1999*) At APAC, Vancomycin is usually administered via a PICC line and an infusor bottle
- Catheter associated UTIs may often be caused by a blockage. This problem can often be managed with non-pharmacological methods.
- *Candida albicans* may be associated with indwelling catheters and does not necessarily indicate UTI infection. If severe systemic infection is present, **Amphotericin 0.5 to 1mg/kg** is indicated until specificity is confirmed. These patients are usually managed in a hospital setting
- When intravenous therapy is complete, patients will be discharged to their local medical officer or hospital medical specialist for ongoing follow up and/or treatment.
- Oral antibiotics for a minimum of 10 to 14 days should always follow intravenous treatment of severe urinary tract infection.
- Prevention of recurrent UTIs may be managed with oral antibiotics for a period of 3 to six months depending on the causative organism.

## **APAC Documentation**

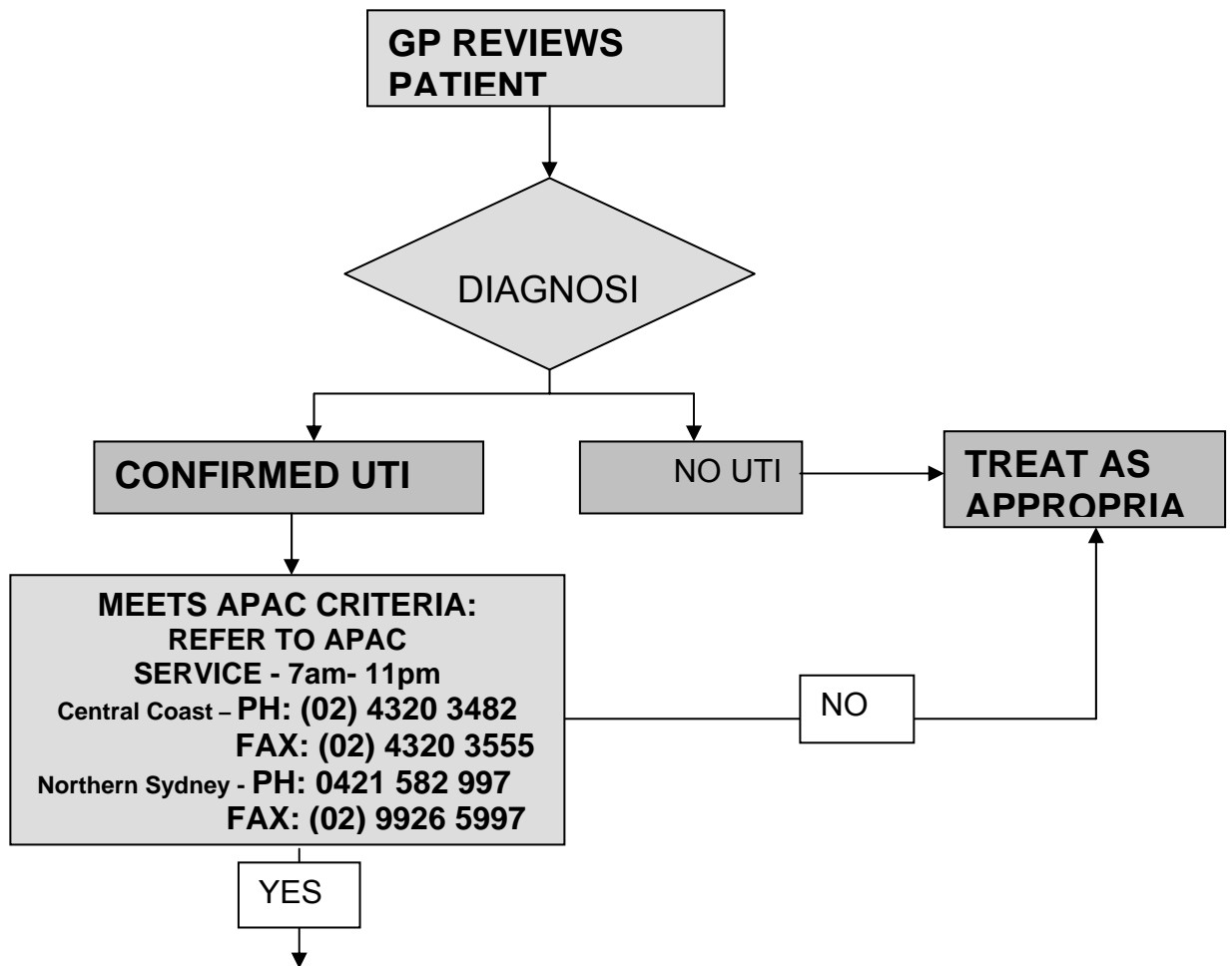
- A comprehensive record of all patient contact, direct and indirect, including communication with the patients SMS/GP or any other health representative, must be documented in the patients main and/or flow notes within 24hrs of the patient contact.
- Patients clinical condition at each visit must be documented
- Official APAC documentation should be used and completed as required
- Each page of documentation must be headed with the patient's name, date of birth and medical record number.
- Each entry into the patients medical records must be dated, timed, and have the attending health care workers signature, first initial and surname, and employee identifying number.

## **Discharge Process:**

For patient discharge from APAC there should be:

- Final medical review from the treating Clinical Management team either in the patients home/hostel/nursing home, doctors consultation rooms or hospital department.
- Improvement in clinical parameters, patient's condition, and if required laboratory /imaging results.
- Continuation and duration of oral antibiotic therapy is prescribed.
- Follow-up appointment with the treating Specialist or GP is made.
- If a patient has not been managed by the GP, they will be referred back to their GP, (regardless of their involvement in Clinical management while with APAC), with details of their APAC admission and ongoing medical needs.
- APAC discharge letter and documentation is to be completed.
- Patient is referred to community services as appropriate.

# APAC/GP Shared Care Urinary Tract Infection (U.T.I's) Flow Chart



- TREATMENT FOR PATIENTS WITH SEVERE ACUTE PYELONEPHRITIS AND SEVERE ACUTE CYSTITIS IS CEFTRIAZONE 1g GIVEN AS A SINGLE DAILY DOSE.
- TREATMENT SHOULD BE CONTINUED FOR A TOTAL OF 10 to 14 DAYS PART OF WHICH MAY CONSIST OF ORAL ANTIBIOTICS THERAPY DEPENDANT ON THE CAUSATIVE ORGANISM.
- A MSU MUST BE COLLECTED PRIOR TO COMMENCEMENT OF TREATMENT
- GENTAMICIN ALONE AS A SINGLE DAILY DOSE IS ALSO AN OPTION.
- DOSE ACCORDING TO RENAL FUNCTION AND AGE.

*Monitor trough levels on day 2 if renal function unknown. Organisms must be sensitive to gentamicin.*

***NB: Please refer to APAC GP Shared Care Clinical Guidelines for Home Management of UTIs***

## RECENT REFERENCES

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## Acknowledgments:

Dr Deo deWit	Central Coast Director of Pathology Services - Clinical Microbiologist
APAC NSCCHS	APAC-NSCCH guidelines for the intravenous Management of Urinary Tract Infections
Barbara Levin	APAC Pharmacist NSCCHS
Roseleen O'doherty	DUE Pharmacist, Royal North Shore Hospital
Manly Warringah Division of General Practice	
Central Coast Division Of General Practice	GP Consultant – GP Collaboration Unit
Nicholas Marlow	APAC Area Manager NSCCHS
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### Authorisation Stamp

Document Owner: - APAC NSH	Version: - 2	Document Number: -
Revised By:	Facility: - APAC NSH	Authorised by: - RNSH Drug Committee
Email: -	Phone: - 9926 7292	Last Modified: - 5 June 2007