



Professional Health Care in Your Own Environment

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APAC CLINICAL GUIDELINES for HOME INTRAVENOUS ANTIBIOTIC THERAPY for CELLULITIS

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

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Cellulitis - Clinical Guidelines for Home Intravenous Antibiotic Therapy

APAC Contact Numbers

NORTHERN SYDNEY

Hospital In-patients:

Monday to Friday 8.00am – 5.00pm

- **(02 9926 7292)**

Monday to Friday 5.00pm – 11.00pm.

Weekends and Public Holidays

- **(02 9926 7111)** ask for APAC Nurse to be Paged

APAC/GP Shared Care Program Patients:

7 days a week, including Weekends and Public Holidays

- **(0421 582 997)**
7.00am – 11.00pm

CENTRAL COAST

7 days a week, including Weekends and Public Holidays

- **Phone: (02) 4320 3482**
7.00am – 11.00pm
- **Fax: (02) 4320 3555**

Referrals Taken: 7.00am – 11.00pm Daily

Clinical Guideline Statement

APAC NSCCH Clinical Guidelines for Home Intravenous Antibiotic Therapy for Cellulitis are evidence based and have been developed through close consultation with the Infectious Diseases Consultants.

A patient who is diagnosed with cellulitis, which is severe enough to require intravenous antibiotics, may be considered for home antibiotic therapy by APAC (*Grayson et al, 2002, 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 (*Corwin, et al, 2005*).

Background

APAC NSCCH recommends the home treatment of cellulitis through the following two options:

- The use of 2gms intravenous Cephazolin twice per day – Option 1.
- The use of oral Probenecid and 2gms intravenous Cephazolin daily – Option 2.

Probenecid has been used successfully to elevate and prolong serum concentrations of penicillin and those cephalosporin-type antibiotics, which are secreted by the renal tubule. Patients will be subject to specific criteria when Probenecid is to be used (*Spina & Dillon, 2003, Verhagen et al, 1994*).

Scope of Practice

Administration of First Dose of Intravenous Antibiotic

- First dose intravenous antibiotic should be administered either within a Hospital facility or by/in the presence of the General practitioner.

Administration of 2nd and Consecutive Doses of Intravenous Medications

- Accredited Registered Nurses able to administer 2nd and consecutive doses of intravenous medications.

Expected Outcomes

The patients' cellulitis will resolve through treatment at the patients' home setting delivered by the APAC NSCCH service (*Corwin et al, 2005, Donald et al, 2005*).

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 either the use of intravenous cephazolin 2gms twice per day (Option 1) (*Donald et al, 2005, Howden et al, 2002, Howe & Jones, 2004, Howden & Grayson, 2002 and Swartz, 2004*) or the use of oral probenecid and intravenous cephazolin 2gms daily (Option 2). (*Brown et al, 1996, Cox & Zed, 2004, Donald et al, 2005, Garton et al, 1997, Grayson et al, 2002, Howden & Grayson, 2002, Spina & Dillon, 2003 and Verhagen et al, 1994*)

Definitions

Cellulitis – Inflammation and infection of the soft tissue (*Mosby, 1998*).

Infection – Invasion of the body caused by pathogenic micro-organisms (*Mosby, 1998*).

Creatinine Clearance – Is an indication of a patient's renal function (*Mosby, 1998*).

GP – General Practitioner

ID – Infectious Diseases

SMS – Senior Medical Officer/Consultant

VMO – Visiting Medical Officer/Consultant

CCH – Central Coast Health Sector

NSH – Northern Sydney Health Sector

NSCCH – Northern Sydney Central Coast Health

Hospital Facility 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 Patient/VMO or GP designations. To be admitted to APAC NSCCH the patient should fulfil the APAC Assessment Criteria (*Donald et al, 2005, Grayson et al, 2002, Howden & Grayson, 2002*).

1. APAC NSCCH Admission Criteria

The patient is required to fulfil the following:

- 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 (*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. Assessment Requirements

- Assess the patient, establish/accept ongoing clinical responsibility for Cellulitis 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 (*Brown et al, 1996*)
- 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

3. APAC Exclusion Criteria for Cellulitis (unless the Infectious Diseases have allowed eligibility)

- Cellulitis which comes from a suspected bite or certain watery injury (alternative antibiotic therapy may be required, Contact APAC Clinical Co-ordinator)(*Swartz,2004*)
- Bone or joint involvement considered likely (*Grayson et al, 2002*)

- Complicated by diabetic foot infections (Contact APAC Clinical Co-ordinator) (*Corwin et al, 2005*)
- Ischaemic extremities
- Critical vital signs in the 24 hours prior to referral to APAC:
 - Temp >38.5°C
 - Pulse rate >100/minute
 - Hypotension (100/50mm Hg or 30mm Hg, < 'normal' BP) (*Micheal et al, 2006*)
- Lymphoedema
- Bariatric patients (Contact APAC Clinical Co-ordinator) (*Corwin, P. et al, 2005*)
- Confusion or syncope
- Vomiting more than once in the past 12 hours or unable to tolerate oral fluids
- White cell count <4.0 or >20.0 x 10⁹/L (Contact APAC Co-ordinator)
- Biochemical evidence of severe systemic illness:
 - Blood glucose >15 mmol/L
 - Creatinine >1.5 x normal
 - ALT > 200 IU/L
- Allergy to cephalosporins. Caution required in those patients allergic to penicillin (*Brown et al, 1996, Grayson et al, 2002*).
- Patient less than 16 years old, unless guardian/parent consents

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 (*Grayson et al, 2002, Howe & Jones, 2004*)
- b) If temperature constantly >38°C or vital signs are abnormal, blood cultures may be required (*Grayson et al, 2002*)
- c) If skin defect, ulcer or bullae present, swab for culture, microscopy and sensitivities
- d) The border of cellulitis should be marked at the beginning of therapy (*Brown et al, 1996, Corwin, et al, 2005*)
- e) Patients with cellulitis of the foot/leg should rest and elevate the leg
- f) Wound are managed according to wound management guidelines

General Care

1. APAC

- Patients with cellulitis of the foot/leg should rest and elevate leg (*Swartz,2004*)
- 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)
 - 2) Cellulitis is not extending
- 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.

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

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 in-patient

Surgical review is required for:

- Ischaemic extremities (*Swartz,2004*)
- Infections of the hand (Hand Surgeon)
- Infection complicating a significant trauma
- Penetrating injury where a foreign body is not excluded
- Severe facial and/or those close to or involving the peri-orbital region (*Howe & Jones, 2004*)

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
- Extension of cellulitis, particularly after 48 hours. Some extension can be expected during the first 24-48 hours and does not require a change in therapy if the patient is otherwise doing well.
- Extensive skin breakdown, or wet/sloughy areas > 3-4cm suggesting a collection.
- 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

First dose of IV antibiotic to be administered in hospital or by/in the presence of a GP.

OPTION 1 – The Use of 2gms Intravenous Cephazolin Twice Per Day

- If patients' creatinine clearance is 10–55mL/minute, dosage reduction of cephazolin may be required (500mgs – 1gm 12 hourly) (*AMH, 2007*)
- If patients' creatinine clearance is <10mL/minute, dosage and frequency should be reduced (500mgs – 1gm 24 hourly) (*AMH, 2007*)

NOTE: Another antibiotic may be prescribed only if it is recommended by the Infectious Diseases team and approved for use by APAC.

OPTION 2 - The Use of 1gm Oral Probenecid and 2gms Intravenous Cephazolin Per Daily

Patients who are appropriate for *APAC-NSCCH Intravenous Antibiotics for Cellulitis: Clinical Guidelines* can be treated with cephazolin/probenecid if they are not listed under the exclusion criteria (*Brown et al, 1996, Grayson et al, 2002, Spina & Dillon, 2003*).

- Currently a regimen of IV 2g cephazolin and oral 1g probenecid daily is approved by the Therapeutic Guidelines: Antibiotics 13th Edition 2006

NOTE: If patients' creatinine clearance is < 30-50mL/minute, the use of probenecid is contraindicated and a 12 hourly dose of cephazolin should be considered. (*AMH, 2007, Grayson et al, 2002*)

3. Reconstitution and Administration of Cephazolin

1gm Cephazolin – reconstitute with 20mLs water for Injection.
Administer over 3-5 minutes.

2gm Cephazolin – reconstitute in 10mLs water for injection.
Add cephazolin to 100mL bag 0.9% Sodium Chloride.
Administer via infusion set over 15 minutes. (*MIMS, Therapeutic Guidelines – Antibiotics, 2006, AMH, 2007*). To minimise the risk of speed shock and/or anaphylaxis, APAC NSCCH recommends the infusion time of 20-30minutes.

4. Patient Exclusions for using Probenecid/Cephazolin

- Patients with reduced renal function (serum creatinine > 0.25) and/or reduced hepatic function (*Brown et al, 1996, Grayson et al, 2002*).
- Patients taking multiple medications particularly those which are excreted via the kidneys or liver as many of these drugs interact with probenecid eg methotrexate, aspirin and NSAIDS (*Micromedex Drug Reax, Brown et al, 1996, Grayson et al, 2002*).
- Use caution in patients with multiple co-morbidities.
- Use caution when patient over the age of 65.
- Confusion and/or syncope
- Patients suffering from gout
- Diabetic patients, as Probenecid may result in a falsely positive urine glucose measurement due to assay interference.
- Patients with blood dyscrasias
- Patients with gout
- Probenecid is a prohibited substance in sport as it acts as a masking agent
- Less than 16 years old unless guardian/parent consents
- Allergy to cephalosporins or probenecid. Caution required in those patients allergic to penicillin (*Brown et al, 1996, Grayson et al, 2002*).
- Patients that do not meet APAC- NSCCH admission criteria (*Grayson et al, 2002*)

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.

If there is a need for medical advice, contact:

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Infectious Diseases Team OnCall

Page via Switch – RNS, Hornsby, Mona Vale, Manly & Ryde Hospitals.

Dr George Kotsiou

Page 41200 - RNS, Mona Vale & Manly Hospitals

Dr Bernie Hudson

Page 41200 - RNS, Mona Vale & Manly Hospitals

Dr Robyn Hardiman

Page 41200 - RNS & Ryde Hospitals

Dr Ross Bradbury

Page Hornsby Hospital Switch for Hornsby Patients

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Infectious Diseases Team OnCall

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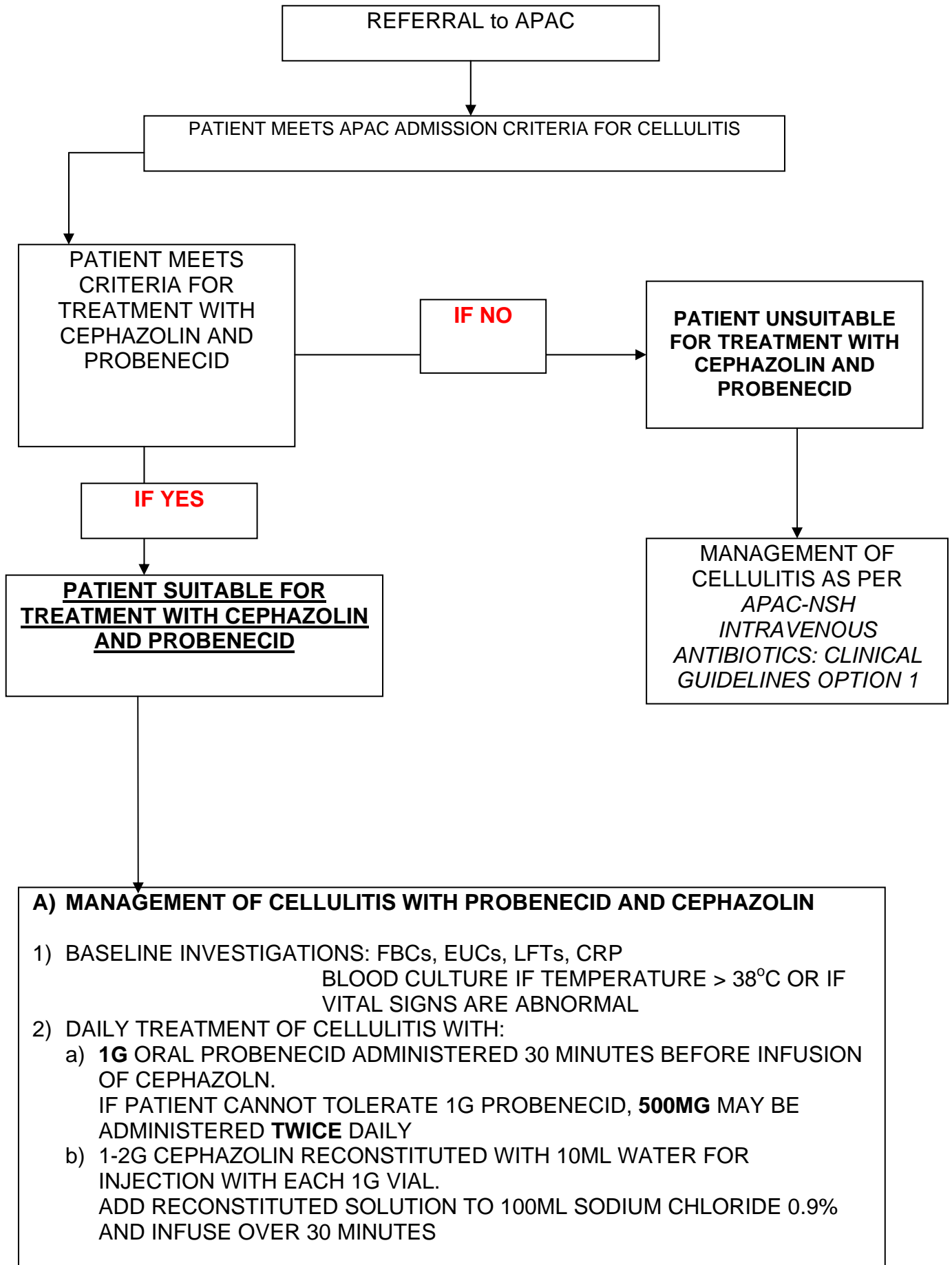
Dr Deo deWit

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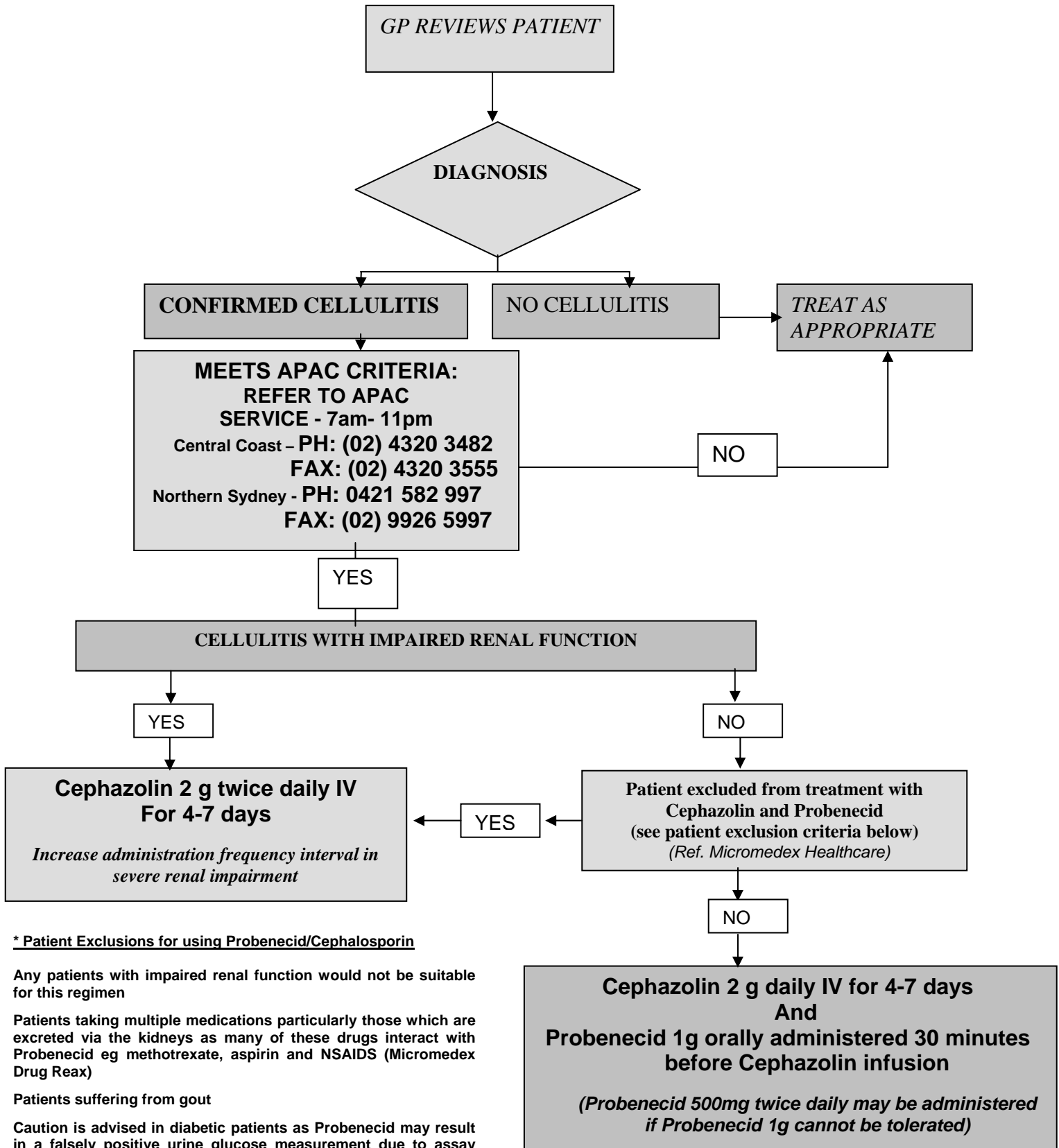
Dr Maria Yates

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GUIDELINES for the MANAGEMENT of CELLULITIS



APAC/GP Shared Care Cellulitis Flow Chart



*** Patient Exclusions for using Probenecid/Cephalosporin**

Any patients with impaired renal function would not be suitable for this regimen

Patients taking multiple medications particularly those which are excreted via the kidneys as many of these drugs interact with Probenecid eg methotrexate, aspirin and NSAIDS (Micromedex Drug Reax)

Patients suffering from gout

Caution is advised in diabetic patients as Probenecid may result in a falsely positive urine glucose measurement due to assay interference.

Patients with blood dyscrasias

Probenecid is a prohibited substance in sport as it acts as a masking agent

Less than 16 years old unless guardian/parent consents

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

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For Drug Interactions: Drug Reax Interactive Drug Interactions, Micromedex Healthcare Series. (via CIAP)

For Drugs in sport: The Australian Sports Drug Agency (www.asda.org.au)

Acknowledgments:

Prince of Wales Hospital Randwick	Cellulitis requiring IV Antibiotics Post Acute Care Services
Pegasus Health Community Care, Christchurch, New Zealand	Regime for once daily cephazolin
APAC NSCCHS	Clinical Guidelines For The Home Management of Cellulitis - 2006
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