

Nurse Practitioner

Health Management Protocol

for the

Management of adult patients within the Metro North Health Service District diagnosed with

Chronic Heart Failure

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Description of Health Service

Northside Health Service District

Service Overview

The Prince Charles Hospital is the major tertiary and quaternary level cardiothoracic referral hospital for Queensland, the largest such unit in Australia and one of the largest services of its type in the world.

The Advanced Heart Failure Unit

Role & functions

The Advanced Heart Failure and Cardiac Transplant Unit lies within the Cardiology Program which provides quaternary and tertiary level cardiology services for interventional cardiology, electrophysiology & pacing and clinical cardiology including advanced heart failure and transplantation.

The Unit provides consultative and management services for referred patients with either a new diagnosis of Heart Failure, advanced Heart Failure or people with highly complex heart failure. The Unit provides leadership for the state wide Heart Failure Service, which includes mentoring, education and consultation to other health practitioners.

The Unit provides the full spectrum of care for patients with Heart Failure from initial diagnosis to medical management and for selected patients artificial support or cardiac transplantation, and for those patients at the end stage of their disease a collaborative Heart Failure palliation service is provided.

Catchment

The catchment area for adult cardiology program is primarily the Northside Health Service District. However referrals for complex care and state wide services extends the catchment area to include Northern and Southern Queensland patients as well as Northern New South Wales. Occasionally other states and territories will refer for specialist consultation.

Background

Chronic heart failure (CHF) is a major public health problem and affects 1% of the general population, 10% of the population over 65 years and 50% of the population over 85 years.¹ CHF is one of the most common reasons for general practitioner (GP) consultation in people aged 70 and older and constitutes a significant public health burden with recurrent hospital admissions.¹ It is estimated that 2/3 of the total health costs of CHF are directly related to hospitalisations. A large proportion of readmissions are

potentially avoidable by providing specialised follow up and improved non-pharmacological and pharmacological management.

Model of Care

The population that present to The Prince Charles Hospital constitutes many patients with advanced and complex heart failure which requires specialist treatment and consideration of multiple co-morbidities. The treatment choices for this population are also complex and can include mechanical circulatory support, implantable devices, transplant and palliation.

Utilising Chronic Disease Management and case management principles this service aims to optimise quality of life for people who are experiencing complex heart failure, by promoting self management and providing partnership and support in ongoing treatment choices. The Service provides timely, evidenced based care to optimise the best possible outcomes for our patients.

The nurse practitioner (NP) role collaborates with the multi-disciplinary team and patients' GPs to optimize management of CHF according to the National Heart Foundation of Australia CHF guidelines¹ and the National Prescribing Service, Improving drug use in Heart Failure, Background Materials.²

This includes:

- Individualised delivery and co-ordination of care utilizing evidence based clinical practice guidelines^{1,2}
- A supportive team approach to the integration of care from hospital to the community including liaison with community services
- Promoting self management of CHF through patient education, ongoing monitoring and support
- Reduction of recurrent hospitalisations thereby reducing the burden on the public health system
- Measurement of patient and organisational outcomes to evaluate the effectiveness of the NP role
- Facilitation of patient related communication between internal and external health professionals

Collaborative relationships

The nurse practitioner is responsible for maintaining professional development at an expert level and initiating consultation when indicated. The nurse practitioner has daily access to a Specialist Cardiologist at The Prince Charles Hospital to support this role and established relationships with other cardiologists at The Prince Charles Hospital. Internal relationships with Allied Health and Clinical Support Services are maintained as part of routine service delivery. External relationships with GPs and other community providers are also an important part of the ongoing collaborative care for this population.

Scope of Practice

The nurse practitioner is responsible and accountable for making professional judgements about when the patient's condition is beyond their scope of practice and for initiating consultation with a medical officer or other member of the health care team.

Target population

It is recognised that this presenting population has complex heart failure. The HMP allows for the nurse practitioner to work autonomously when managing stable patients. Patients that are experiencing destabilisation are referred for collaborative management.

The nurse practitioner provides appropriate timely care to CHF patients, primarily in outpatient clinics but may be inpatient consultation or telephone consultation with patient, GP or other health care provider as part of a multidisciplinary health professional team working to achieve optimal management of CHF.

This occurs in a varied environment which includes but is not limited to:

- TPCH
- Outpatient clinics within TPCH
- Telephone consultations

The nurse practitioner works within a multidisciplinary team inclusive of medical, nursing and allied health staff, GPs and other health care professionals.

Clinical condition

Patients with CHF may be referred and accepted for management by the nurse practitioner when there is:

- A diagnosis confirmed by a cardiologist or physician of CHF. This is usually *systolic heart failure*, based on LV ejection fraction <40% on transthoracic echocardiogram but may be *diastolic heart failure* (preserved ejection fraction)
- A current treatment plan for pharmaceutical therapy which may be mutually negotiated and require titration/adjustment/monitoring based on initial or subsequent review by a cardiologist or physician. This will not include initiation of medications not previously prescribed without consultation with a Medical Officer

Assessment and Management framework

Assessment:

- Previous medical history and reason for presentation
- Electrocardiograph (ECG) and comparison with previous ECG
- Review and monitor of daily weights
- Assessment of current level of dyspnoea and exercise/activity level (New York Heart Association [NYHA] level) and chest pain^{1,2}
- Assessment of pulse, heart rate, postural blood pressure, skin turgor and peripheral perfusion, jugular venous pressure (JVP), heart & lung sounds, hepatomegaly, ascites and peripheral oedema
- Assess patient for possible adverse effects of therapy^{1,2}

In the history and clinical examination the following heart failure parameters need to be reviewed:

- Assessment of signs and symptoms of volume overload (i.e., worsening exertional dyspnoea, orthopnoea or paroxysmal nocturnal dyspnoea, abdominal ascites, hepatomegaly and peripheral oedema)^{1,2,3}
- Assessment of signs and symptoms of dehydration (i.e., significant weight loss of more than 1 kilogram (kg) from dry weight, increase in blood urea, postural hypotension, cool peripheries, dizziness)³
- Assessment of low cardiac output; low BP, fatigue / weakness, decreased peripheral circulation, decreased urine output, confusion²
- Review of potential causes of heart failure decompensation;¹
 - chest pain / ischemia
 - non-compliance with salt and fluid restriction
 - non-compliance with medication regimen / use of deleterious medications, eg nonsteroidal anti-inflammatory drugs (NSAIDs)
 - intercurrent non-cardiac illness
 - anaemia
- Review of risk factor status, smoking, alcohol, illicit drug consumption¹

Investigations:

- Baseline electrolyte and renal function - for diuretic therapy, repeated every 5-7 days during up-titration, then every 3 months.^{2,3} Renal function and serum potassium - for Angiotensin Converting Enzyme Inhibitor (ACE-I) or Angiotensin Receptor Blocker (ARB) therapy monitoring at initiation, 1-2 weeks afterwards and at similar intervals after each dose increase, and then at least annually³
- Serum potassium monitoring - essential in Spironolactone therapy, particularly in the setting of ACE-I/ARB therapy and/or renal impairment.²

(Weekly for the first month, then monthly for two months, then every three months)

- Plasma digoxin levels - for suspected digoxin toxicity, significant changes in renal function or when other medications or dose of digoxin changes² (taking into account time to steady state of one week in normal renal function, 2-3 weeks in renal impairment)
- Liver and thyroid function tests every three months⁴ during amiodarone therapy or six months² if clinically indicated
- Baseline full blood count, then at least annually. Anaemia is associated with poor prognosis and severe anaemia may be the cause of a heart failure decompensation¹
- Lipid measurements, perhexiline levels, blood glucose levels and HbA1C on basis of clinical need, with results and any action taken forwarded to the patient's cardiologist and GP

Management:

For management of CHF the nurse practitioner is guided by the National Heart Foundation of Australia CHF guidelines¹ and the National Prescribing Service, "Improving drug use in Heart Failure, Background Materials."²

Management may include;

- Initiate and increase existing loop diuretic therapy if patient has clinical signs of fluid retention²
- Monitor and correct electrolyte imbalance as indicated. Initiate or titrate potassium as indicated²
- Advise patient of hyperkalemia monitoring and to stop or reduce dose of supplements when diuretic therapy is reduced²
- Decrease or suspend diuretic therapy if required for patients with mild dehydration² or consult if symptoms more compromising as some patients may need admission
- Titrate ACE-I/ARB dose at intervals of 1 - 2 weeks if indicated to target dose or highest dose tolerated. Advise patient of potential side effects of ACE-I/ARB therapy^{2,3}
- Patients may require titration of existing therapy with agents not available on the Queensland Hospital Standard Drug List eg. ACE Trandolopril, which should be continued and managed as other drugs from the same class (ACE-I). Combination therapies eg. with thiazide diuretics may be titrated according to management principles applicable to individual agents included in this HMP
- Titrate aldosterone antagonist as indicated: spironolactone, eplerenone. Advise patient of hyperkalaemia monitoring and potential side effects²

- Titrate beta-blocker therapy as indicated. Advise patient of potential side effects of beta-blocker therapy and monitoring required.^{2,3} Consider if Beta₁ selective beta-blocker indicated
- Manage mild hypotension as indicated² or consult if symptoms more compromising
- Manage worsening renal function in collaboration with cardiologist or treating practitioner
- Monitor requested plasma digoxin levels when digoxin toxicity is suspected, renal function significantly changes or when other medications or dose of digoxin changes²
- Consider if cardiac co-morbidities are optimally managed, eg hypertension, hyperlipidaemia and consult with cardiologist / GP if changes to therapy are required or patient is not close to therapeutic targets
- If indicated refer patient to the GP for improved management of coexisting co-morbidities eg diabetes
- Reinforce non-pharmacological management of heart failure¹

Follow up:

- The NP utilises clinic as well as telephone follow up to monitor patient's response to therapy, and/or make changes in therapy as well as assess suitability to continue with drug titration
- Actions taken by the NP are documented and communicated to the GP and/or cardiologist who may follow up patient
- Variance from expected outcome is communicated to the relevant medical officer for collaborative management

REFERRAL

The nurse practitioner role includes assessment and management of clients using nursing knowledge and skills and may include but is not limited to:

- The direct referral of clients to other health care professionals
- Titration/adjustment/monitoring of prescribed medications
- Requesting diagnostic investigations

Currently in Australia nurse practitioners do not have access to a medicare provider number. Consequently until this changes a referral from a nurse practitioner may cause financial disadvantage for the patient. To ensure that patients are not financially disadvantaged arrangements for referral would be:

- By the external primary health care provider (GP) or by a referring specialist within the service

The nurse practitioner should consider referral to a medical officer when there is significant change from baseline parameters including but not limited to the following situations:

- Persistent signs and symptoms despite treatment
- Symptomatic or laboratory evidence of previously unidentified decreased or decreasing function of any vital organ or system
- Signs of recurrent or persistent infection
- Any atypical presentation of a common illness or unusual response to treatment
- All potentially life threatening situations
- When a patients condition deteriorates unexpectedly
- The NP will refer patients for cardiologist/physician review when there are adverse effects of therapy or worsening of heart failure symptoms, which do not respond to the treatment strategies outlined in the HMP
- The NP will refer patients for cardiologist/physician review when there is low cardiac output, cool extremities and / or systolic BP $<90^{2,6}$ or if systolic BP >180 or diastolic BP $>110^1$
- Poor blood glucose control (based on HBA1C result) requires liaison with Diabetes educator or GP by NP
- The NP provides timely referral to appropriate health care providers in case of worsening symptomatology

DRUG THERAPY PROTOCOL

Choice of pharmacological therapy must be guided by the Therapeutic Guidelines and the Australian Medicines Handbook, within the parameters of the Standard Drug List for Queensland Hospitals.

The Consultant/General Practitioner is the lead clinician for the co ordination of the patients care and thus any new medications, titration of medications and recommended discontinuation of medications must be communicated to them.

The nurse practitioner must verify that the choice of drug is suitable for the patient after carefully considering the following individualised patient information, such as;

- Age
- Previous allergies,
- Adverse drug reactions,
- Co-morbidities such as renal and hepatic dysfunction
- Concomitant medications for potential drug interactions
- Pregnant and or lactating women

The Queensland Health Safe Medication Practice Unit has identified specific medications and patient groups where extra precautions are necessary. These groups are listed below and must be considered carefully when selecting drug treatment to avoid adverse medication events.

High Risk Medications

- Drugs with a narrow therapeutic range i.e. digoxin, lithium
- Drugs requiring specialised monitoring or interpretation i.e. therapeutic dose monitoring
- Anticoagulants
- Cytotoxics
- NSAIDS or COX-2 Inhibitors
- Opiate analgesics
- Aminoglycosides
- Anti-epileptics
- Insulin
- IV Electrolyte supplementation
- Weekly dosing regimens i.e. methotrexate

High Risk Patient Groups

- Renally impaired
- Cardiac disease
- Liver disease
- Transplantation
- Mental Health problems
- Cancer
- Paediatrics
- Elderly
- Pregnant and Breastfeeding

Currently in Australia nurse practitioners do not have access to the pharmaceutical benefits scheme. Consequently until this change occurs, a prescription from a nurse practitioner may cause financial disadvantage for the patient. To ensure that patients are not financially disadvantaged arrangements for dispensing of the nurse practitioner prescription are as follows:

- In line with the notion of primary provision of health care the service will request new prescriptions via timely and adequate communication to the GP

A copy of the approved HMP/DTP must be available in the pharmacy for identification and signatory purposes and on The Prince Charles Hospital website.

DRUG THERAPY PROTOCOL

- 1. Angiotensin Converting Enzyme inhibitors**
- 2. Angiotensin II receptor antagonists**
- 3. Beta-blockers**
- 4. Aldosterone antagonists**
- 5. Diuretics**
- 6. Potassium replacement**
- 7. Cardiac glycoside**

1. Angiotensin Converting Enzyme inhibitors (ACE)

Generic Name	Form	Indication	Dose schedule	Duration
Enalapril maleate	Tablet (oral)	AMH section 6.4.4 Heart Failure	2.5mg daily up to 10-20mg (1 or 2 doses)	30 Tabs
Fosinopril sodium	Tablet (oral)	AMH section 6.4.4 Heart Failure	5mg daily up to 10-40mg daily	30 Tabs
Lisinopril dihydrate	Tablet (oral)	AMH section 6.4.4 Heart Failure	2.5mg daily up to 20mg daily	30 Tabs
Perindopril arginine	Tablet (oral)	AMH section 6.4.4 Heart Failure Therapeutic guidelines 3.1.2	2.5mg daily up to 5mg daily (Note:10mg for reduction cardiovascular risk is commonly used) 2.5mg up to 5-10mg daily or 10 mg bd (under specialist Heart Failure protocol)	30 Tabs
Quinapril hydrochloride	Tablet (oral)	AMH section 6.4.4 Heart Failure	2.5mg daily up to 20-40mg daily	30 Tabs
Ramipril	Tablet (oral)	AMH section 6.4.4 Heart Failure	1.25mg daily up to 5-10mg daily or 10 mg bd (under specialist Heart Failure protocol)	30 Tabs

2. Angiotensin II receptor antagonists

Generic Name	Form	Indication	Dose schedule	Duration
Candesartan cilexetil	Tablet (oral)	AMH section 6.4.5 Heart Failure	4mg daily up to 32 mg daily (1 or 2 doses)	30 Tabs

3. Beta-blockers

Generic Name	Form	Indication	Dose schedule	Duration
Carvedilol PBS Authority item	Tablet (oral)	AMH section 6.4.3 Heart Failure	3.125mg BD titrate up to 25mg BD (upto 50 mg bd in patients > 85 kg)	60 Tabs
Bisoprolol fumarate PBS Authority item	Tablet (oral)	AMH section 6.4.3 Heart Failure	1.25mg daily titrate up to 10mg daily	30 Tabs
Metoprolol succinate extended-release (Toprol XL) PBS Authority item	Tablet (oral)	AMH section 6.4.3 Heart Failure	23.75mg daily titrate up to 190mg daily	30 Tabs 15 Tabs (23.75 mg only)

4. Aldosterone antagonists

Generic Name	Form	Indication	Dose schedule	Duration
Spironolactone	Tablet (oral)	MIMs ⁷ Accepted: Severe heart failure	12.5-25mg daily	100 Tabs
Eplerenone PBS Authority item	Tablet (oral)	MIMs ⁷ CV death risk reduction in combination with standard therapy within 3-14 days postacute MI (limited prescribing due to restrictions)	12.5-50 mg daily	30 Tabs

5. Diuretics

Generic Name	Form	Indication	Dose schedule	Duration
Furosemide	Tablet (oral)	AMH section 6.1.1	20 – 40mg daily Max 250-500mg daily	100 Tabs
Ethacrynic acid	Tablet (oral)	AMH section 6.1.1	50mg daily Max 400mg daily	100 Tabs
Bumetanide Not on PBS	Tablet (oral)	AMH section 6.1.1	0.5mg-1mg daily Max 5-10mg daily	100 Tabs
Hydrochlorothiazide	Tablet (oral)	AMH section 6.4.1 Hypertension	25-50mg daily Max 75mg daily	100 Tabs

6. Potassium replacement

Generic Name	Form	Indication	Dose schedule	Duration
Potassium chloride	Tablet (oral)	AMH section 7.6.1	600-3600mg in divided daily doses as indicated by the clinical condition	100 tabs

7. Cardiac glycoside

Generic Name	Form	Indication	Dose schedule	Duration
Digoxin	Tablet (Oral)	AMH section 6.5.1	62.5 to 250mcg daily (125 mcg max in elderly or CRI – pending digoxin levels)	200 or 100 Tabs

Should an emergency arise in association with the use of any drugs listed in the HMP, the Nurse Practitioner has full access to the entire range of hospital services which includes emergency response and associated teams.

EVALUATION

The two levels of evaluation are:

- The efficacy of the HMP itself
- The role of the Nurse Practitioner at the individual and service level

HEALTH MANAGEMENT PROTOCOL

Due to the developmental nature of the NP role it is recognised that the HMP is a dynamic tool requiring continuous monitoring and evaluation. The HMP will be reviewed in three distinct levels.

- Continuously at unit level
- Formally evaluated at the Advanced Heart Failure and Cardiac Transplant Unit meetings six monthly unless otherwise indicated
- Bi-annually by The Prince Charles Hospital Nurse Practitioner Steering Committee.

NURSE PRACTITIONER

The Nurse Practitioner's service delivery will be monitored through activity reports, clinical efficacy audits, variance reporting and patient satisfaction surveys. The evaluation framework utilised for this role is based on the Australian Nursing and Midwifery Council Nurse Practitioner Standards.⁸

Standard	Timetable	Reporting To
1. Dynamic practice	Continuous	Clinical Director Advanced Heart Failure & Cardiac Transplant Unit
2. Professional efficacy	Six monthly	Cardiology Nursing Director
3. Clinical leadership	Six monthly	Clinical Director Advanced Heart Failure & Cardiac Transplant Unit and Cardiology Nursing Director

REFERENCES

¹National Heart Foundation of Australia and the Cardiac Society of Australia and New Zealand; Guidelines for the prevention, detection and management of chronic heart failure in Australia, 2006.

² O'Reilly, B. 2004. Improving drug use in Heart Failure. Background Materials. National Prescribing Service Limited.

³Blue, L., McMurray, J. 2005. How much responsibility should heart failure nurses take? The European Journal of heart Failure. 7 pp351-361

⁴Heart Failure Unit Protocol, The Prince Charles Hospital Health Services District.

⁵Therapeutic Guidelines Limited; 2006 Jan. Accessed 2007 December 21, www.tg.com.au/ip/complete/

⁶Australian Medicines Handbook. 2006. Online, <http://amh.hcn.net.au>

⁷MIMs Online 2008. <http://www.mims.com.au>

⁸Australian Nursing & Midwifery Council National Competency Standards for the Nurse Practitioner.
http://www.qnc.qld.gov.au/upload/pdfs/practice_standards/ANMC_National_Compentency_Standards_for_the_Nurse_Practitioner.pdf

ENDORSEMENT

HMP/DTP Developed by:

Name	Signature	Date
<i>Nurse Practitioner candidate</i>		
<i>Pharmacist</i>		
<i>Clinical Director Advanced Heart Failure & Cardiac Transplant Unit</i>		
<i>Cardiology Nursing Director</i>		

Endorsed by
EDON/Chair, District Nurse Practitioner Steering Committee

Signature: Date: / /

Endorsed by:
District Manager

Signature: Date: / /

FINAL APPROVAL
CHAIR, Queensland Nurse Practitioner Advisory Committee

Signature: Date: / /

Effective Date:	
Review Date:	
Reviewing Position:	

Nurse Practitioner competency Standards (ANMC 2008)

The nurse practitioner competency standards are:

Standard 1 Dynamic practice

Competencies

1. Conducts advanced, comprehensive and holistic health assessments relevant to a specialist field of nursing practice
2. Demonstrates a high level of confidence and clinical proficiency in carrying out a range of procedures, treatments and interventions that are evidence-based and informed by specialist knowledge
3. Has the capacity to use the knowledge and skills of extended practice competencies in complex and unfamiliar environments
4. Demonstrates skills in accessing established and evolving knowledge in clinical and social sciences, and the application of this knowledge to patient care and the education of others.

Standard 2 Professional efficacy

Competencies

5. Applies extended practice competencies within a nursing model of practice
6. Establishes therapeutic links with the patient/client/community that recognise and respect cultural identity and lifestyle choices
7. Is proactive in conducting a clinical service that is enhanced and extended by autonomous and accountable practice.

Standard 3 Clinical leadership

Competencies

8. Engages in and leads clinical collaboration that optimises outcomes for patients/clients/communities
9. Engages in and leads informed commentary and influence at the systems level of health care.

In summary, the nurse practitioner role is a model of extended practice that builds upon existing nursing codes and standards as well as the competencies of advanced practice nursing.