Improved Management of Patients with Severe Chronic Respiratory Disease & Severe Chronic Cardiac Disease in the Community

July 2010
Note:

This proposal is subject to comment, change and endorsement from the peak clinical bodies in NSW; the Chronic Cardiac Clinical Expert Reference Group and the ACI Respiratory Network Steering Committee.

Additionally, the Australian Heart Foundation is developing a position statement on chronic heart failure. The statement is scheduled for release in August 2010. The developers of this proposal have been advised that the position statement is highly compatible with the proposal. Nonetheless, the proposal remains open to further change, in accordance with the position statement on chronic heart failure.
CONTENTS

ACKNOWLEDGEMENTS ............................................................................................................................... 5
GLOSSARY OF TERMS .................................................................................................................................. 6
PROPOSAL AIMS ........................................................................................................................................... 7
EXECUTIVE SUMMARY ............................................................................................................................... 8
KEY RECOMMENDATIONS ........................................................................................................................... 10
1. CONTEXT .................................................................................................................................................. 11
2. BACKGROUND ......................................................................................................................................... 16
   2.1 Burden of Chronic Respiratory and Cardiac Disease ............................................................................. 16
   2.2 An Increasing Problem ......................................................................................................................... 19
   2.3 Current Services and Management Practices ....................................................................................... 21
3. PROPOSAL FOR A SEVERE CHRONIC RESPIRATORY & CARDIAC DISEASE PROGRAM ................. 24
   3.1 Introduction - Towards an Improved Model of Care .............................................................................. 24
   3.2 Aims of a Severe Chronic Respiratory & Cardiac Care Program (SCRCCP) ........................................ 25
   3.3 Severe Chronic Respiratory & Cardiac Care Program (SCRCCP) ........................................................ 26
       3.3.1 Key Strategies: R-E-M-E-D-I-A-L ................................................................................................. 26
       3.3.2 Key Features ................................................................................................................................ 27
       3.3.3 Key Performance Indicators .......................................................................................................... 31
   3.4 SCRCCP Experience - Existing 'SCRCCP-type' Services in NSW ....................................................... 32
       3.4.1 The Respiratory Coordinated Care Program at St George Hospital, Kogarah NSW ....................... 32
   3.5 Cost-Benefit Analysis .......................................................................................................................... 34
       3.5.1 Savings ......................................................................................................................................... 34
       3.5.2 Costs ............................................................................................................................................ 35
       3.5.3 Cost-Savings Equation .................................................................................................................... 36
   3.6 Workforce Education and Training .................................................................................................... 38
   3.7 Implementation .................................................................................................................................. 39
       3.7.1 Specialist Services ......................................................................................................................... 39
       3.7.2 Combined Care and Shared Care Services .................................................................................... 39
       3.7.3 Implementation of New Services .................................................................................................. 40
       3.7.4 Virtual Units ................................................................................................................................. 40
4. CONCLUSION ............................................................................................................................................ 41
5. REFERENCES ............................................................................................................................................. 42
6. APPENDICES ............................................................................................................................................ 46
   APPENDIX A: SCRCCP-Eligible Diagnosis Related Groups (DRGs) ......................................................... 46
   APPENDIX B: Admissions and Cost-Savings Analysis: Data and Calculations by Hospital .................... 47
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This second version of the proposal has been developed by the Respiratory and Cardiac Working Group, a joint working group of the ACI and the NSW Department of Health’s Severe Chronic Disease Management Program (SDMP), reporting to the Chronic Clinical Expert Reference Group (CERG) and the ACI. Version two builds on the accomplishments of the ACI’s respiratory working groups by including Chronic Heart Failure into the model of care.

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GLOSSARY OF TERMS

ACAT Aged Care Assessment Team
ACI Agency for Clinical Innovation
ALOS Average Length of Stay
CAPAC Community Acute/Post-Acute Care
CCF Chronic Cardiac Failure
CDMP Chronic Disease Management Program
CERG Clinical Expert Reference Group
CHF Congestive Heart Failure
CLINICIAN A professionally qualified, registered healthcare worker with direct patient contact.
COPD Chronic Obstructive Pulmonary Disease
DALYS Disability-Adjusted Life Years
DRG Diagnosis-Related Group
ECG Electro-Cardio Graph
ED Emergency Department
GMCT Greater Metropolitan Clinical Taskforce
HF Heart Failure
MAU Medical Assessment Unit
PPH Potentially Preventable Hospitalisation
RACF Retirement and Aged Care Facility
RCCP Respiratory Coordinated Care Program
SCDMP Severe Chronic Disease Management Program
SCRCCP Severe Chronic Respiratory & Cardiac Care Program
SRG Service-Related Group
PROPOSAL AIMS

The aims of this proposal are:

1. To provide best-practice advice on improved management of patients with severe chronic respiratory disease and severe chronic cardiac disease in the community.

2. To make specific recommendations to the NSW Department of Health for funding to augment existing services and, where unmet need and potential staffing capacity can be identified, to facilitate the development of new services across NSW.

3. To provide advice on the method by which the recommendations and adaptable model of care detailed in the proposal should be implemented in various healthcare settings across NSW.

4. To demonstrate the potential for return on investment, should the proposal be implemented.
EXECUTIVE SUMMARY

Chronic respiratory and cardiac diseases are responsible for over 25% of the total burden of disease and injury in Australia. In terms of the burden on hospitals, respiratory and cardiac illnesses consumed the third and fourth highest number of public hospital bed days in NSW in 2007-08, with over 700,000 patient days attributed to in-patient management of people with cardiopulmonary disease.

In spite of many improvements in disease management by primary care physicians and modest reductions in hospital length of stay, the burden of chronic respiratory and cardiac illnesses on the healthcare system is increasing.

Further, notwithstanding the identification of progressive chronic disease, current management practices of patients with these illnesses are often focussed on ‘last-minute’ treatment of inevitable acute-on-chronic symptomatology. In this regard our proposal aligns with the advice of successive healthcare reviews, which recommend that healthcare settings of all configurations move away from reactive medicine, and towards an anticipatory and innovative paradigm of disease management. Significant reductions in hospital admissions and associated costs will require the introduction of progressive management practices and service models of care. For patients with chronic and complex cardiac and respiratory disease the evidence demonstrates that such reform should involve a fundamental shift towards regular, community-based monitoring of patients with known progressive illness, facilitating early detection of disease deterioration and proactive intervention.

The Severe Chronic Respiratory & Cardiac Care Program (SCRCCP) detailed in this proposal aims to deliver such reform. An implemented SCRCCP has the potential to improve patient outcomes, significantly reduce presentations to hospital emergency departments, reduce hospital admissions, reduce the length of stay for those who are admitted to hospital, and achieve substantial savings in both bed days and overall costs. The program points to a more productive approach in the determination to find a balance between specialist and generalist services.

The goal of this proposal is to offer an evidence-based solution to improve patient outcomes and reduce the burden of severe chronic respiratory and severe chronic cardiac disease to the NSW healthcare system by using a range of coordinated strategies encompassed in the SCRCCP. These strategies comprise a seamless interface between in-patient and community services with links to existing services wherever possible.

The aims of a Severe Chronic Respiratory & Cardiac Care Program are:
- to improve equity of access to, and outcome from, best practice healthcare to patients in NSW with severe chronic respiratory and cardiac disease
- to reduce of the burden of severe chronic respiratory and cardiac disease on patients, carers and the NSW healthcare system
- to optimise patient well-being and quality of life by delivering the right care in the right place at the right time
- to reduce the number of emergency department presentations, hospital admissions and readmissions, and length of stay in hospital where appropriate
- to reduce access block by improving patient flow between the community and the hospital
- to augment existing services managing patients with severe chronic respiratory and cardiac disease and transfer, where appropriate, specialist clinical care from the hospital to the community

A Severe Chronic Respiratory & Cardiac Care Program provides evidence-based, coordinated, patient-centred care, to people with chronic and complex respiratory disease. Services are provided in the community with equivalent medical outcomes, improved quality of life and improved measures of patient satisfaction compared to those achieved in hospital.

The Program is delivered by a multidisciplinary team of specialist respiratory & cardiac clinicians - or generalist clinicians with a special interest in respiratory or cardiac medicine - including the patient’s general practitioner.
The Severe Chronic Respiratory & Cardiac Care Program adopts key clinical and service-related strategies that may be summarised in the acronym ‘REMEDIAL’:

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|R|Risk & Review|Risk assessment and care level stratification / triage (to supported self-management, case management, hospital-in-the-home etc)
Access to express medical review|
|E|Educate & Enrol|Educate patients on self-management
Enrol patients into pulmonary and cardiac rehabilitation programs and smoking cessation counselling|
|M|Monitor|Routine home / community monitoring of moderate to high-risk patients|
|E|Early detection|Early detection of the deteriorating patient|
|D|Direct communication|Direct communication between patients and their local clinical teams via a rapid-advice telephone line|
|I|Intervention|Evidence-based, multi-disciplinary intervention including supported self-management, case management, hospital-in-the-home, planned hospital admission|
|A|Assessment|Assessment and evaluation of the Program (SCRCCP)|
|L|Links|Establish links to existing services wherever possible including primary and community healthcare (General Practise, CAPAC services, aboriginal services, ‘co-morbidity’ services etc)
- For rural and regional programs in particular, the establishment of links with centres of excellence will provide clinical support and training, to maximise skills transfer and service sustainability.|

ACI proposes the development and implementation of a new program of care for patients with severe chronic respiratory and cardiac disease, based on a revised model of care as described in this document. We recommend the establishment of a line of funding to enable the development of local SCRCCPs in clinical settings across NSW.

Should it be implemented, the clinical program detailed within this proposal will be accommodated by the existing NSW Clinical Service Frameworks for Chronic Respiratory Disease and Heart Failure and facilitate the implementation of the Frameworks’ accompanying Practice Guides for the Optimal Treatment of Chronic Respiratory Disease and Heart Failure.

This proposal builds on the successes of the NSW Chronic Care Program by serving as an adaptable implementation tool, or model of care, for the treatment of people with severe chronic respiratory and cardiac disease. The model we present recognises and accepts wide variation in resources and programs across clinical settings in NSW and is, therefore, flexible so that it may be adapted by local clinical teams to suit existing service configurations and population need.

The proposal detailed in this document presents the evidence for an adaptable model of care for patients with severe chronic respiratory and cardiac disease. The model seeks to promote integrated hospital and community care, and strong links between specialist and generalist clinical teams. The model recommends the transfer, where appropriate, of the care of patients with severe chronic respiratory and cardiac disease out of hospital and into the community.
KEY RECOMMENDATIONS

ACI proposes the development and implementation of a new program of healthcare in NSW for patients with severe chronic respiratory disease and severe chronic cardiac disease, based on the adaptable model of care described in this document.

1. That NSW Health (Chronic Disease Management Program) accepts and adopts this proposal as the best-practice model of care for the management of patients with severe chronic respiratory disease and severe chronic cardiac disease in the community.*

   *This proposal is subject to comment, change and endorsement from the peak clinical bodies in NSW; the Chronic Cardiac Clinical Expert Reference Group and the ACI Respiratory Network Steering Committee.

   Additionally, the Australian Heart Foundation is developing a position statement on chronic heart failure. The statement is scheduled for release in August 2010. The developers of this proposal have been advised that the position statement is highly compatible with the proposal. Nonetheless, the proposal remains open to further change, in accordance with the position statement on chronic heart failure.

2. That NSW Health (Chronic Disease Management Program) recognises the potential for a substantial return on investment, should the proposal be implemented.

3. That a line of funding is established to augment existing services* and, where unmet need and potential staffing capacity can be identified, to facilitate the development and implementation (see Implementation section 3.7) of new services across NSW, in accordance with the proposed model of care as detailed in this document.

   * Specialist Services: Existing services operating successfully as single-specialty entities (that is, as respiratory or cardiac services alone) should be encouraged to continue unchanged and, if insufficiently resourced, remain eligible for enhancement funding that may ensue from this submission. Whilst combined care (cardiac + respiratory) and shared care (specialist + generalist) models may be suitable for patients with lower-level acuity illness, patients with severe and complex disease - particularly those enrolled in hospital outreach programs - are ideally managed by, or in close conjunction with, specialist clinical teams.

   Combined Care and Shared Care Services: The model recognises and accepts wide variation in resources and clinical care across NSW and is, therefore, flexible so that it may be adapted by local clinical teams to suit existing service configurations and population need. In practise this will mean different things in different clinical settings. In some settings, synergies and efficiencies may be achieved by funding and delivering respiratory and cardiac failure services 'together'; that is, side-by-side. Joint models may help to avoid duplication of services and allow sharing of common resources such as, for example, occupational therapy, dietetics, clerical staff etc. In some sites gym space and equipment might be shared. Variations of the model will have potential application in settings where the majority of patient care is provided by generalist clinicians, such as in much of non-metropolitan NSW.
1. **CONTEXT**

This proposal aligns with the seven strategic directions\(^1\) of the *NSW State Health Plan* to:

1. Make prevention everybody’s business
2. Create better experiences for people using health services
3. Strengthen primary health and continuing care in the community
4. Build regional and other partnerships for health
5. Make smart choices about the costs and benefits of health services
6. Build a sustainable health workforce
7. Be ready for new risks and opportunities

Additionally, the recommendations in this proposal address many of the concerns detailed by Commissioner Peter Garling SC in his *Report of the Special Commission of Inquiry into Acute Care Services in NSW Public Hospitals (November 2008)* including the deficiencies in present models of care in public hospitals, the ageing of the population, the expansion in numbers of people with chronic and complex illnesses, and the challenges of healthcare service provision in non-metropolitan NSW\(^2\).

Commissioner Garling’s solutions to these challenges include the development and implementation of innovative models of patient care to manage this large and costly group of patients in the community and home setting, rather than in acute hospital beds.

> “My recommendations…are designed to encourage models of care which enable the delivery of as much care as possible in the home and not in the hospital…”

> “…it is a necessary part of the overall strategy to control demand for acute care beds by treating patients wherever possible in the community.”

> “…the best solution for delivery of community health (as it relates to demand upon the public hospital system) is to employ the concept of ‘the virtual hospital’. This would require organisation of community health along the lines of admission-treatment-discharge as used in a public hospital, but without the building. Those in need of care for chronic, complex diseases (which almost inevitably lead to periodic admissions to acute care hospitals) would be admitted to care by the general practitioner or a designated community based nurse and assigned to a virtual ward of up to say 50 other patients. The treatment protocols for any one disease would be where possible standardised. The actual care would be delivered by an extension of the hospital to the home. Where needed, teams including if necessary a specialist, would be available to visit the patient at home or in the aged care facility. The patient’s progress would be recorded in the electronic medical record available to the general practitioner and at-home treating teams. Community health would thus become a structure which could make sure that all of the things which are good about hospital care can be replicated in the community.”

Peter Garling SC, 2008

This proposal pertains in particular to Recommendations 3, 4, 7 and 67 in the *Garling Report*, as supported by the New South Wales Government, in its response\(^3\) to the Inquiry; *Caring Together - The Health Action Plan for NSW*:

**Recommendation 3:**

*NSW Health’s Severe Chronic Disease Management Program should be implemented and expanded to include all very high risk and high risk patients over the age of 18.*

**Recommendation 4:**

*NSW Health should consider and develop a comprehensive plan for the expansion of Hospital-in-the-Home programs of care for chronic and complex patients. The program should be implemented throughout NSW hospitals within 18 months.*
Recommendation 7:

The Clinical Innovation and Enhancement Agency should as a matter of priority develop a model of care:

(a) that allows identification of those elderly patients for whom a hospital stay in the event of deterioration would be likely to result in adverse health outcomes; and

(b) which outlines the appropriate treatment modalities for such patients out of hospital.

Recommendation 67 (2a & b):

[Regarding the roles and purposes of] the Clinical Innovation and Enhancement Agency...

...use the existing clinical network model to involve clinicians and patient representations in continuous clinical redesign to deliver safer and better patient care;

...identify, review and enhance or else to research and prepare standard evidence based protocols or models of care guidelines for every unexceptional surgical intervention, and the common disease or syndrome treatment modalities encountered in NSW public hospitals;

...investigate, identify, design, cost and recommend for implementation changes in patient care by way of enhancements or improvements in clinical practice, including the content and method of such practice, in order to ensure, on an ongoing state-wide basis, better, safer, more efficient and more cost-effective patient care;

...provide advice to NSW Health, or any Area, or functional Health Service, on any matter relating to the enhancement or improvement of clinical practice.

Regarding Recommendation 7 this proposal advises a substantial extension to the stated preference for out-of-hospital treatment in the likelihood of an adverse outcome in hospital: Given the strong evidence for equivalent medical outcomes between in-hospital and out-of-hospital care\(^4\)\(^{-19}\) patients, for whom a hospital stay is likely to result in equivalent outcomes to treatment in the community, should also be managed out of hospital.

An implemented program dedicated to addressing severe chronic respiratory and cardiac disease will assist to overcome similar challenges echoed in the Report of the National Health and Hospitals Reform Commission (June 2009) including the growing pressures of population change, increases in demand for and expenditure on health care, unacceptable inequities in health outcomes and access to services, growing concerns about safety and quality, workforce shortages, inefficiencies and service fragmentation\(^20\). The program will meet the aims of fundamental clinical redesign outlined in the Report, namely:

2. to embed prevention and early intervention including, in particular, early identification of the deteriorating patient,

3. to connect and integrate health and aged care services by:
   - bringing together and integrating multidisciplinary health care services,
   - improving access to a more comprehensive and multidisciplinary range of primary health care and specialist services in the community,
   - encouraging better continuity and coordinated care for people with more complex health problems,
   - promoting better use of specialists in the community, recognising the central role of specialists in the shared management of care for patients with complex and chronic health needs.

The NHHRC Report argues strongly for “the need to create ‘hospitals of the future’ and to expand specialty services in the community as part of connecting and integrating health care”, a key feature of our proposal.

Specific recommendations in the NHHRC Report to which this proposal pertains include:

Recommendation 20:

We recommend improving the way in which general practitioners, primary health care professionals, and medical and other specialists manage the care of people with chronic and complex conditions through shared care arrangements in a community setting. These arrangements should promote good communication and the vital role of primary health care professionals in the ongoing management and support of people with chronic and complex conditions in partnership with specialist medical consultants and teams who provide assessment, complex care planning and advice.”
Recommendation 31:

We recommend that all hospitals review provision of ambulatory services (outpatients) to ensure they are designed around patients’ needs and, where possible, located in community settings.

Recommendation 37:

The visibility of, and access to, sub-acute care services must be increased for people to have the best opportunity to recover from injury or illness and to be restored to independent living. To do this, we recommend:

- funding must be more directly linked to the delivery and growth of sub-acute services;
- a priority focus should be the development of activity-based funding models for sub-acute services (including the cost of capital), supported by improvements in national data and definitions for sub-acute services; and
- the use of activity-based funding complemented by incentive payments related to improving outcomes for patients.

Recommendation 38:

We recommend that clear targets to increase provision of sub-acute services be introduced by June 2010. These targets should cover both inpatient and community-based services and should link the demand for sub-acute services to the expected flow of patients from acute services and other settings. Incentive funding under the National Partnership Payments could be used to drive this expansion in sub-acute services.

Recommendation 39:

We recommend that investment in sub-acute services infrastructure be one of the top priorities for the Health and Hospitals Infrastructure Fund.

Recommendation 40:

We recommend planning and action to ensure that we have the right workforce available and trained to deliver the growing demand for sub-acute services, including in the community. Accordingly, we support the need for better data on the size, skill mix and distribution of this workforce, including rehabilitation medicine specialists, geriatricians and allied health staff.

Recommendation 41:

We recognise the vital role of equipment, aids and other devices in helping people to improve health functioning and to live as independently as possible in the community. We recommend affordable access to such equipment should be considered under reforms to integrated safety net arrangements.

Recommendation 66:

Care for people in remote and rural locations necessarily involves bringing care to the person or the person to the care. To achieve this, we recommend:

- networks of primary health care services, including Aboriginal and Torres Strait Islander Community Controlled Services, within naturally defined regions;
- expansion of specialist outreach services – for example, medical specialists, midwives, allied health, pharmacy and dental/oral health services;
- telehealth services including practitioner-to-practitioner consultations, practitioner-to-specialist consultations, teleradiology and other specialties and services;
- referral and advice networks for remote and rural practitioners that support and improve the quality of care, such as maternity care, chronic and complex disease care planning and review, chronic wound management, and palliative care; and
- ‘on-call’ 24-hour telephone and internet consultations and advice, and retrieval services for urgent consultations staffed by remote medical practitioners.

Further, we recommend that funding mechanisms be developed to support all these elements.

Despite the strong evidence for out-of-hospital care\(^{4-19}\), the Report of NSW Community Health Review, 2008 (Part 2) identified a relative decline in the in the overall expenditure on community health as a percentage of total expenditure from 18.0% to 14.5% over the period 2004/05 to 2006/07.

Further, with admitted patient services excluded, community health has been receiving a smaller proportion of funding allocated to non-admitted services, with funding for community health declining by 5.8% relative to other non-admitted services\(^{21}\).
"Short-term hospital demand management services have been increasing at the expense of other services in the community, particularly prevention and early intervention."


The Report of NSW Community Health Review (Part 3) identified a number of existing “Models of Good Practice” in NSW which “illustrate a commitment to service improvement” at the local level\(^{(22)}\). The list included the ACI model of consumer and community participation in specialist clinical networks and the Respiratory Coordinated Care Program (SCRCCP) at St George Hospital, upon which a considerable proportion of this proposal is based.

The Report mentions that one issue contributing to service gaps is the “trend to establish more tightly defined micro programs, each with their own eligibility criteria and narrowly targeted recipients that limit the capacity of community health services to flexibly respond to local needs”\(^{(22)}\). The program detailed in this proposal does not fall within that category, with potential application over a patient population which accounts for six percent of total inpatient costs in NSW\(^{(23)}\) and eight percent of all hospital bed days in NSW\(^{(23)}\).

Additionally, the Report points to a more productive approach in the determination to find a balance between specialist and generalist services, suggesting that there need be “no conflict at all between generalist and specialist models”. Instead, Eager et al suggest that a number of factors\(^{(22)}\) should be taken into consideration:

1. the requirement for local and ongoing analysis of the best mix of outputs to meet the health needs of a population (a combination of allocative and dynamic efficiency),
2. the availability of existing and projected resources, and
3. the strength of the interface between specialist community health programs and key partners such as general practitioners.

To this end the Report highlighted text from two particular submissions:

‘the local community health centre could provide a very valuable ongoing support service to people with high support needs and significantly improve their health care and quality of life… A health worker in each community health centre with a special interest …could develop some expertise in these areas, network with primary and tertiary health providers, provide some case work and run support groups.’

Submission from Dr Carolyn West, Director Spina Bifida Unit, The Children’s Hospital at Westmead

‘This is not an argument for the separate identity and provision of community based healthcare, but for resetting the balance between hospital and community components of integrated health services, and shifting the centre of gravity of such services towards more accessible community health services.’

Submission from Alan Rosen, Roger Gurr & Paul Fanning

As the Report states: “many of the key issues of the future are grouped around the strategies that promote effective linkages within and beyond health”\(^{(22)}\). In this regard the integration of services based on this proposal with other clinical services is paramount. Indeed, the establishment of effective links with existing services and clinical teams is critical to the sustainability of any program, service or model of care that is based on our proposal. However, we reiterate the Report’s reminder of Leutz’s Laws of Service Integration which state:

1. You can integrate some of the services for all the people, and all the services for some of the people, but you can’t integrate all of the services for all of the people.
2. Integration costs before it pays.
3. Your integration is my fragmentation.
4. You can’t integrate a square peg and a round hole.
5. The one who integrates calls the tune.
6. All integration is local.
Should it be implemented, the clinical program detailed within this proposal will be accommodated by the existing *NSW Clinical Service Frameworks for Chronic Respiratory Disease*\(^{(24)}\) and *Heart Failure*\(^{(25)}\) and facilitate the implementation of the Frameworks’ accompanying *Practice Guides for the Optimal Treatment of Chronic Respiratory Disease*\(^{(26)}\) and *Heart Failure*\(^{(27)}\).

This proposal builds on the successes of the *NSW Chronic Care Program*\(^{(28)}\) by serving as an adaptable implementation tool, or model of care, for the treatment of people with severe chronic respiratory and cardiac disease. The model we present recognises and accepts wide variation in resources and programs across clinical settings in NSW and is, therefore, flexible so that it may be adapted by local clinical teams to suit existing service configurations and population need.

The proposal detailed in this document presents the evidence for an adaptable model of care for patients with severe chronic respiratory and cardiac disease. The model seeks to promote integrated hospital and community care, and strong links between specialist and generalist clinical teams. The model recommends the transfer, where appropriate, of the care of patients with severe chronic respiratory and cardiac disease out of hospital and into the community.
2. BACKGROUND

2.1 Burden of Chronic Respiratory and Cardiac Disease

Australian Institute for Health and Welfare (AIHW) population data indicates that in 2007 chronic respiratory and cardiovascular diseases were responsible for twenty five percent of the total burden of disease and injury in Australia\(^{29}\).

Chronic obstructive pulmonary disease (COPD) and asthma accounted for 46% and 34% of the chronic respiratory burden respectively\(^{29}\).

**Figure 1: Burden of Chronic Respiratory and Cardio-vascular Disease in Australia**


Australian data on the incidence and prevalence of heart failure in the Australian population is limited. However, the National Heart Foundation & Cardiac Society of Australia & NZ (2010) report that at least 300,000 Australians (or about 4% of the population aged 45 or more) have chronic heart failure (CHF), with 30,000 new cases diagnosed each year\(^{30}\). The point prevalence of CHF is approximately 10% in people aged 65 years or more, and over 50% in people aged 85 years or more\(^{31}\).

**Figure 1(c) Cardiovascular burden (DALYS) by specific cause**


The prevalence of Chronic Heart Failure among Australians aged 65 years or more is at least 10%\(^{31}\).
Impact on Hospital Resources

In terms of the burden on hospitals, respiratory and cardiac illnesses consumed the third and fourth highest number of public hospital bed days in NSW in 2007-08, with over 700,000 patient days attributed to in-patient management of people with respiratory and cardiac disease\(^{(23)}\).

**Figure 2:** Hospital Bed Days by Service Related Group, Public Hospitals NSW, 2007-08
(Excludes Mental Health and Obstetrics)

The diagnosis related groups (DRGs) of particular relevance to this proposal (full list Appendix A) including COPD (E65A&B) Respiratory Infection/Inflammation (E62B&C), Heart Failure and Shock (F62B) and Bronchitis & Asthma (E69C), account for eight percent of the total number of public hospital bed days\(^{(23)}\) (Fig 3). In NSW in 2007-08 this amounted to 399,103 bed days\(^{(23)}\).

**Figure 3:** Top DRGs by Overnight Bed Days, Public Hospitals, Australia 2007-08:
(Excludes Mental Health and Obstetrics)
Translated into costs, the DRGs related to this proposal account for six percent of all public hospital inpatient costs (Fig 4)\(^{(23)}\). In NSW in 2007-08 this amounted to $357 million\(^{(23)}\).

**Figure 4: Top DRGs by Cost* - Overnight Admissions, Public Hospitals, Australia 2007-08:**
(Excludes Mental Health and Obstetrics)

* Based on the 2006–07 AR-DRG version 5.1 estimated public cost weights

The total burden of chronic disease, however, is much higher than that attributable to direct healthcare expenditure. An assessment of the economic impact of COPD alone by Access Economics (2008) puts the financial cost of COPD at $8.8 billion\(^{(32)}\). Of this:

- $6.8 billion (76.6%) was productivity lost due to lower employment, absenteeism and premature death of Australians with COPD;
- $0.9 billion (9.7%) was direct health system expenditure;
- $0.9 billion (10.0%) was the deadweight losses (DWLs) from transfers including welfare payments and taxation forgone; and
- $0.3 billion (3.6%) was other indirect costs such as aids and home modifications and the bring-forward of funeral costs\(^{(32)}\).
2.2 An Increasing Problem

In spite of many improvements in management by primary care physicians and a reduction in hospital length of stay\(^{(23)}\), the burden of chronic respiratory and cardiac disease on the healthcare system is increasing\(^{(23)}\). The successful Chronic Care Program (commenced 1999) led to improvements in management of COPD and heart failure in many areas of the state but resources were limited and demand for services has increased steadily over the past 10 years. This might explain the decrease in separations and bed days between 1999 and 2003 but a steady increase since then. The present trends are unsustainable without new models of care for these diseases (Figures 5 and 7).

**Figure 5:** Rising Annual Burden of Respiratory Diseases on Public Hospitals by number of patient days\(^{(a)}\), separations\(^{(b)}\), cost\(^{(c)}\) and ALOS\(^{(d)}\) in Australia over the decade 1998-2008

The prevalence of COPD, itself responsible for the largest proportion of the total burden of all respiratory diseases at approximately 40%, is projected to double over the period 2008 to 2050 (Figure 6)(32). Such increases in respiratory disease are likely to continue with the ageing of the population(33, 34).

**Figure 6: Projected Prevalence of COPD by Gender, 2008 - 2050**

Note: The ‘kink’ in the chart reflects that the first time interval is two years (2008 to 2010) while the other intervals represent a decade (2010 to 2020 etc). The chart outlines the projected prevalence of COPD in the total population on the basis of demographic ageing only, not taking into account any changes in age-gender prevalence rates in the future (ie, assuming the same impacts of smoking in the future as currently).

The incidence and prevalence of Chronic Heart Failure is also increasing(17, 25, 35, 36). In countries such as Australia, New Zealand, the United States and the United Kingdom the occurrence of CHF is increasing faster than any other cardiovascular disorder and projections suggest that the prevalence will double over the 30-year period from 1996 to 2026(25). Both incidence and prevalence are increasing in parallel with the age-adjusted decline in mortality from coronary disease in these countries(25).

**Figure 7: Rising Annual Burden of Chronic Heart Failure on Public Hospitals by number of patient days** and cost in NSW over the decade 1998-2008
2.3 Current Services and Management Practices

Historically, health systems in Australia have been oriented towards ‘last-minute’ treatment of acute diseases, or acute exacerbations of chronic diseases, dominated by a reactive, episodic model of care. However, the challenges posed by the increasing burden of chronic diseases on health systems require the development of healthcare service models that have a fundamentally different orientation towards anticipatory and proactive care in addition to acute reactive care.

The Australian Institute of Health and Welfare lists many of the hospitalisations due to chronic respiratory and cardiac disease as potentially preventable hospitalisations (PPHs). The definition of PPHs are “those conditions where hospitalisation is thought to be avoidable if timely and adequate non-hospital care had been provided”\(^{(23)}\). In 2007-08, there were 20,082 PPHs of COPD and 14,956 PPHs of congestive cardiac failure\(^{(23)}\). The Institute notes that “these conditions may be preventable through behaviour modification and lifestyle change, but they can also be managed effectively through timely care (usually non-hospital) to prevent deterioration and hospitalisation”\(^{(23)}\). This proposal aims to facilitate the provision of such care.

At present, however, there is insufficient coordination in the approach to chronic cardiac and respiratory disease and wide variance in management practices including evidence-based protocols, models of care, antibiotic choices, length of stay and post-discharge support etc\(^{(37-39)}\).

Additionally, there is inequitable access to best practice patient care. For patients with respiratory disease, gaps in service access have been identified in early intervention following spirometry, non-invasive ventilation (NIV) for acute-on-chronic respiratory failure, home NIV support, long term oxygen therapy, pulmonary rehabilitation, smoking cessation and patient education services to improve self care, exacerbation management and disease control\(^{(37-39)}\). For patients with chronic cardiac failure the gaps in care are most notable in the use of evidence-based drug therapies, such as angiotensin-converting enzyme (ACE) inhibitors and β-blockers, that reduce symptoms and hospital admissions and improve survival\(^{(40)}\). Further gaps for CHF patients have been identified in access to echocardiography, rapid access to cardiology advice, access to specialised multi-disciplinary cardiac teams, and 24-hour telephone triage\(^{(40)}\). Such services are currently available to less than 10% of those needing them\(^{(40)}\).

There are several interactions between chronic respiratory and cardiac diseases that would benefit from a collaborative approach to management. Many patients with heart failure also have respiratory disease with cigarette smoking a common risk factor in both diseases. Respiratory failure leads to right heart failure. Sleep apnoea is a frequent complication of both diseases. Many patients with heart failure benefit from nocturnal ventilatory assistance (eg with CPAP or supplemental oxygen. Beta-blockers are relatively contra-indicated in some respiratory disorders but often can be administered safely with appropriate specialist monitoring. Many components of comprehensive pulmonary rehabilitation are beneficial for patients with chronic heart failure. The present proposal has the potential to resolve many of the issues and gaps listed above.
ACI (GMCT) Survey of Respiratory Services in NSW Hospitals (2007)

Survey Part 1: Respiratory Infection, Outreach and Acute Respiratory Failure

Hospitals (N=35) in NSW with over 300 annual admissions for respiratory infection + COPD were surveyed, including 11 principal referring hospitals, 13 major hospitals, and 3 district hospitals. Responses were received from 27 hospitals, a response rate of 77%. The survey revealed the following data on respiratory services provided in those facilities:

Acute Respiratory Infection Services

- 42% (11 / 26) of surveyed hospitals do not have a pneumonia severity scoring system to assist decision making in the management of community acquired pneumonia.
- 68% (17 / 25) of hospitals do not have a pathway to promote the expedient delivery of antibiotics to a patient recognised as having moderate and severe pneumonia.
- 80% (20 / 25) of hospitals are without guidelines to enable early switch of intravenous to oral antibiotics to facilitate early discharge of patients admitted with community acquired pneumonia.
- 50% (13 / 26) of facilities surveyed do not have a pathway for early discharge from hospital.

Respiratory Outreach Services

- 63% (17 / 27) of hospitals do not have a respiratory-specific outreach service.
- Of these 17 hospitals, 3 major metropolitan hospitals have no access to a generic outreach service. They therefore have no access to either respiratory or generic outreach services.
- Of the 10 hospitals with a respiratory-specific outreach service, only two facilities have more than 1.0 FTE nurse staffing the service. And only 29% (6 / 21) provide Non-Invasive Ventilation (NIV) / Continuous Positive Airway Pressure (CPAP) follow up.
- 70% (14 / 20) of hospitals do not have a case management model for chronic patients.

Acute Respiratory Failure Services

- 4 hospitals (3 principal referring and 1 major metropolitan) do not have access to NIPPV on their respiratory wards. Respondents for these facilities indicated that nursing staff levels are insufficient to set up an NIV unit.
- 40% (10 / 25) of hospitals do not have an after hours on-call service for acute respiratory failure patients.
- 60% (9 / 15) of hospitals who have NIV machines indicated that they are reliant on funding other than general hospital funds (SP&T or donations) to purchase this equipment. Of these 9 hospitals, 4 (3 principal referring and 1 major metropolitan) indicated that they are totally reliant on external funding sources to finance the purchase of NIV equipment.
Survey Part 2: Pulmonary Rehabilitation Services

Hospitals (N=38) in NSW with over 300 annual admissions for respiratory disease were surveyed. Responses were received from 38 hospitals, a response rate of 100%. The survey revealed the following data on pulmonary rehabilitation services provided in those facilities:

- 5-10% of patients with moderate to severe COPD have accessed pulmonary rehabilitation
- 77% of programs have a waiting period of greater than 4 weeks
- 37% of programs have a waiting period of greater than 8 weeks
- 11 out of 30 programs are able to assess and admit more than 100 patients per year to pulmonary rehabilitation
- 26% of programs do not accept referrals from general practitioners
- 44% of programs do not accept referrals from allied health professionals
- 48% of programs do not accept referrals from nursing professionals
- 15% of programs conduct the gold standard program of three supervised exercise sessions per week
- 60% of programs are unable to offer maintenance exercise programs and follow-up assessment and care

Survey Part 3: Respiratory Education Services

Hospitals (N=38) in NSW with over 300 annual admissions for respiratory disease were surveyed. Responses were received from 35 hospitals, a response rate of 92%. The survey revealed the following data on airways education services provided in those facilities:

- Over half of the hospitals surveyed (19 out of 35, 54%) have no airways educators or formal airways education service.
- Airways education services in NSW are inequitable, with a range of resource capacity stretching from 0FTE (in the 19 hospitals mentioned above) to 7FTE (in one principal referring hospital alone).

These figures highlight the need to reform and reallocate respiratory services in line with our recommendations.
3. PROPOSAL FOR A SEVERE CHRONIC RESPIRATORY & CARDIAC DISEASE PROGRAM

3.1 Introduction - Towards an Improved Model of Care

Notwithstanding the identification of progressive chronic disease, current management practices of patients with these illnesses are often focussed on reactive treatment of inevitable acute-on-chronic symptomatology at the 'last-minute'\(^\text{(12, 4, 8, 9, 15, 16, 18-20, 22, 38-42)}\). Healthcare settings of all configurations are being encouraged to move away from the reactive mind-set towards an anticipatory and innovative paradigm of healthcare delivery. Significant reductions in hospital admissions and associated costs will require the introduction of progressive management practices and service models of care\(^\text{(2, 4-20, 22, 31, 38-58)}\). For patients with chronic and complex cardiac and respiratory disease the evidence demonstrates that such reform should involve a fundamental shift towards regular, community-based monitoring of patients with known progressive disease, facilitating early detection of disease deterioration and proactive intervention\(^\text{(2, 4-20, 22, 31, 38-58)}\).

In NSW there are examples of respiratory and heart failure services which have successfully reformed their management practices so that these patients are treated in a more anticipatory fashion. These services include established Respiratory and Heart Failure programs (operating as separate services) at St George Hospital. Similar - though newer - respiratory services operate out of Westmead-Auburn-Blacktown Hospitals, Prince of Wales Hospital, Royal Prince Alfred Hospital, Sutherland Hospital and Bathurst and Orange Hospitals. Other heart failure services include Fairfield, North Sydney and North Coast. These services have demonstrated reductions in presentations to emergency departments, reductions in admissions, reductions in length of stay in hospital and reductions in overall costs.

Evidence from a 2004 systematic review of randomised trials of multidisciplinary strategies for the management of patients with heart failure at high risk for admission showed that programs that incorporate follow-up by a specialised multidisciplinary team (in either a clinic or a non-clinic setting) reduce mortality, heart failure hospitalisations and all-cause hospitalisations\(^\text{(15)}\). Since then several authors have detailed the evidence for community-based monitoring and intervention over in-hospital management practices \(^\text{(13, 14, 16-19, 40, 48, 50, 51, 53-58)}\).

However, clinical reform of this type has been carried out in an ad-hoc fashion in NSW by a small minority of services. Notwithstanding the potential for considerable long-term savings, such programs remain largely unsupported by those who are unwilling to make prudent short term investments in innovative clinical reform. If nothing is done, we can expect an increasing number of admissions to hospital of patients with complex conditions who are unable to cope in the community because of chronic cardiac and respiratory disease.

The model of care detailed in this proposal aims to facilitate progressive healthcare reform for healthcare services in NSW that manage patients with severe chronic cardiac and respiratory illness. The model is adaptable to the particular clinical setting but maintains a particular focus on patients with severe chronic disease.

An implemented Severe Chronic Respiratory & Cardiac Care Program (SCRCCP) has the potential to improve patient outcomes, significantly reduce presentations to hospital emergency departments, reduce hospital admissions, reduce the length of stay for those who are admitted to hospital, and achieve substantial savings in both bed days and overall costs.
3.2 Aims of a Severe Chronic Respiratory & Cardiac Care Program (SCRCCP)

The goal of this proposal is to offer an evidence-based, cost-effective and adaptable solution to improve patient outcomes and reduce the burden of severe chronic respiratory and cardiac disease to the NSW healthcare system. This will be achieved by using a range of coordinated, community-focussed strategies encompassed in the Severe Chronic Respiratory & Cardiac Care Program (SCRCCP) as detailed in this paper. These strategies comprise a seamless interface between in-patient and community services with links to existing services wherever possible.

The aims of a Severe Chronic Respiratory & Cardiac Care Program (SCRCCP) are:

- to improve equity of access to, and outcome from, best practice healthcare to patients in NSW with severe chronic respiratory and cardiac disease
- to reduce the burden of severe chronic respiratory and cardiac disease on patients, carers and the NSW healthcare system
- to optimise patient well-being and quality of life by delivering the right care in the right place at the right time
- to reduce the number of emergency department presentations, hospital admissions and readmissions, and length of stay in hospital where appropriate
- to reduce access block by improving patient flow between the community and the hospital
- to augment existing services managing patients with severe chronic respiratory and cardiac disease and, where unmet need and potential staffing capacity can be identified, to facilitate the development and implementation of new services across NSW in accordance with the proposed model of care detailed in this document
- To transfer, where appropriate, specialist clinical care from the hospital to the community
3.3 Severe Chronic Respiratory & Cardiac Care Program (SCRCCP)

A Severe Chronic Respiratory & Cardiac Care Program (SCRCCP) provides evidence-based\(^{(4-7, 11-19, 25, 27, 30, 31, 34, 35, 38-62)}\), coordinated, patient-centred care, to people with chronic and complex respiratory and cardiac disease. Services are provided in the community with equivalent (or better) medical outcomes, at equivalent or better cost, and with improved quality of life and improved measures of patient satisfaction than those achieved in hospital\(^{(4-9, 11-19, 34, 38, 42-47, 51, 53-58, 60, 61)}\).

The Program is delivered by a multidisciplinary team of specialist clinicians - or generalist clinicians with a special interest in respiratory or cardiac medicine - including the patient’s general practitioner.

3.3.1 Key Strategies: R-E-M-E-D-I-A-L

The Severe Chronic Respiratory & Cardiac Care Program adopts key clinical and service-related strategies that may be summarised in the acronym ‘REMEDIAL’:

<table>
<thead>
<tr>
<th>R</th>
<th>Risk Assessment &amp; Review</th>
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<tr>
<td></td>
<td>Risk assessment and care level stratification / triage (to supported self-management, case management, hospital-in-the-home etc)</td>
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<td>Access to express medical review</td>
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<tr>
<th>E</th>
<th>Educate &amp; Enrol</th>
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<tbody>
<tr>
<td></td>
<td>Educate patients on self-management</td>
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<td></td>
<td>Enrol patients into pulmonary and cardiac rehabilitation programs and smoking cessation counselling</td>
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<tr>
<th>M</th>
<th>Monitor</th>
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<tr>
<td></td>
<td>Routine home / community monitoring of moderate to high-risk patients</td>
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<tr>
<th>E</th>
<th>Early detection</th>
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<td>Early detection of the deteriorating patient</td>
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<tr>
<th>D</th>
<th>Direct communication</th>
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<tr>
<td></td>
<td>Direct communication between patients and their local clinical teams via a rapid-advice telephone line</td>
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<th>I</th>
<th>Intervention</th>
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<td></td>
<td>Evidence-based, multi-disciplinary intervention including supported self-management, case management, hospital-in-the-home, planned hospital admission</td>
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<th>A</th>
<th>Assessment</th>
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<td>Assessment and evaluation of the Program (SCRCCP)</td>
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<tr>
<th>L</th>
<th>Links</th>
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<tr>
<td></td>
<td>Establish links to existing services wherever possible including primary and community healthcare (General Practise, CAPAC services, aboriginal services, ‘co-morbidity’ services etc)</td>
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<tr>
<td></td>
<td>- For rural Programs: links with established centres of excellence will provide clinical support and training to maximise skills transfer and service sustainability</td>
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3.3.2 Key Features

Risk Assessment & Review
Patients enrolled in an SCRCCP will undergo comprehensive risk assessment, including functional and psycho-social evaluation, at the time of their enrolment to facilitate care level stratification (triage).

Patients will then be assigned to an appropriate management plan incorporating a clear action plan for occasions of disease exacerbation. Management plans of all levels may involve components of community shared care as required.

Additionally, SCRCCP-enrolled patients will have access to express (no delay) medical review.

Educate & Enrol
Pulmonary and Cardiac Rehabilitation
All eligible patients\(^{(34)}\) are enrolled in comprehensive pulmonary or cardiac rehabilitation which includes physical and psychological disease management and self-management support interventions, followed by on-going maintenance exercise programs.

A 2009 Cochrane review\(^{(43)}\) demonstrates that pulmonary rehabilitation after acute exacerbation of COPD substantially reduces the risk of hospital admission and mortality and improves health-related quality of life. In the control group 57% of patients had admission to hospital, compared to 14% for the pulmonary rehabilitation group\(^{(43)}\).

Similarly, recent reviews\(^{(62, 63)}\) of exercise-based cardiac rehabilitation demonstrate significant benefits in terms of clinical outcomes and costs.

Respiratory and Cardiac Education and Disease Management Support
SCRCCP patients and carers are provided with a comprehensive understanding of their disease, how it is investigated, and how it is managed. The aim is to maximise the patient’s capability in self-surveillance, early symptom recognition and self-management practices at home in order to reduce the need for unplanned admissions to hospital and to slow the progression of the disease through early treatment. Action plans are developed with patients and carers to mitigate episodes of disease relapse or exacerbation.

Educators provide advice on the proper use of medication delivery devices, oxygen, ventilators and other equipment. They are well placed to coordinate and monitor oxygen and respiratory equipment, communicating with the patient’s clinical team, equipment providers and Enable NSW (PADP).

A 2007 Cochrane review\(^{(44)}\) systematically evaluated the impact of self-management education for patients with COPD compared to usual care. The review demonstrated “a significant reduction in the probability of at least one hospital admission among patients receiving self-management education compared to those receiving usual care”\(^{(44)}\).

Where appropriate, Educators facilitate discussion on advanced care planning.

Additionally, the roles and responsibilities of specialist Educators include the provision of education and training for staff in hospitals and the community, including retirement and aged care facilities, thereby building specialist capacity in clinical settings.

Smoking Cessation
SCRCCP patients are provided with specialist smoking cessation counselling and medication support services.

Reviews of the evidence demonstrate the significant value of individual behavioural counselling and NRT for smoking cessation\(^{(64-68)}\)

Monitor
Moderate to high-risk patients are routinely monitored in the home / community to prevent avoidable disease exacerbation and facilitate early detection of the deteriorating patient.
Figure 8: Schematic Representation of an SCRCCP Model of Care

Severe Chronic Respiratory & Cardiac Care Program Model of Care

EARLY IDENTIFICATION  |  ASSESSMENT & RISK STRATIFICATION  |  STRATIFIED COMMUNITY MANAGEMENT

SITES
- General Practice
- Community nursing
- CAPAC Services
- Aged Care teams
- Other Community Healthcare

Components of a Severe Chronic Respiratory & Cardiac Care Service

- Monitoring & Early Detection
- Express Medical Review
- Pulmonary & Cardiac Rehabilitation
- Self-Mx Support & Education
- Smoking Cessation
- Early Discharge
- Direct Phone Line Support

Very High Risk
High Risk
Moderate / Lower Risk
At Risk / Undiagnosed Population

Hospital in the Home
Case Management
Supported Self-Management
Primary & Shared Care
Early Detection

Early detection of the deteriorating patient facilitates early intervention by the SCRCCP team. Patients and carers are encouraged to telephone the on-call team member. Early intervention may avoid the need for a triple-0 call*, an emergency department presentation via ambulance, and an unplanned hospital admission.

Alternatively, early detection will facilitate planned clinical assessment and/or review and/or admission.

* Early detection strategies do not replace the need for triple-0 / emergency ambulance services.

Direct Communication

SCRCCP-enrolled patients are provided with direct telephone communication to their local clinical teams via a rapid-advice phone line, providing anxious and/or breathless patients with an alternative option to a triple-0 call*.

In a significant proportion of cases it is possible for an experienced specialist clinician (allied health practitioner, nurse or doctor) to provide remedial on-call advice over the telephone to an anxious and/or breathless patient, thereby obviating the need for a triple-0 call*.

There are certain requirements for the success of rapid advice phone line services, some of which are listed below:

1. The patient must be known to the clinical team.
2. The clinical team must be known to the patient.
3. Advice line calls from patients must go directly to the patient’s local clinical team. The call can then be answered in person, by an on-call team member, with whom the patient is familiar.
4. To attract patient referrals to the clinical team, the referring clinician must have confidence in all members of the team.

* Rapid advice lines do not replace the need for triple-0 / emergency ambulance services.

Intervention

SCRCCP interventions are variable and multi-faceted according to the stage and acuity of disease. They encompass the above strategies in an overall program that is early and anticipatory rather than last-minute and reactionary.

Interventions are evidence-based and multi-disciplinary and include: supported self-management, smoking cessation counselling, case management, hospital-in-the-home, pulmonary or cardiac rehabilitation and planned hospital admission where required.

The use of existing treatment guidelines (34, 39, 59, 69), and the development of clinical protocols and other decision support tools, adapted at the local level to suit local resources, will facilitate:

- best clinical practice in the provision of medical services such as administration of intravenous antibiotics, lung assessment, spirometry, oxygen saturation, ECG, daily weight monitoring for signs of early fluid retention, surveillance for pulmonary and hepatic congestion and peripheral oedema, and assessments of nutritional and psychosocial status
- event-driven hospital discharge with transitional support into the community
- planned admissions where an admission to hospital is necessary.

Care plans, developed by the multidisciplinary team using, if necessary, ‘telehealth’ or virtual case conferencing incorporate regular medical review and action planning.

Action plans will facilitate organised, rapid responses to exacerbations by the patient’s local clinical team with management in the community as an alternative, where appropriate, to admission via ED.
**Respiratory Toolkit**
The ACI Rural Respiratory Advisory Group has suggested the development of an evidence-based ‘Respiratory Toolkit’ comprising a set of clinical tools/forms/protocols/flow charts to aid the delivery of specialist respiratory care in non-metropolitan healthcare settings or those managed predominantly by generalist clinicians.

The toolkit will include standardised information on patient assessment, treatment, risk factor management, event-driven discharge, care planning and patient information.

Existing tools such as the COPD-X Guidelines, the Pulmonary Rehabilitation Standards, the Pulmonary Rehabilitation Toolkit, and patient booklets developed by the Australian Lung Foundation will be used.

**Heart Failure Guidelines**
The Heart Foundation is developing a position statement on chronic heart failure.

The developers of this proposal have been advised that the position statement is highly compatible with the proposal.

The statement is scheduled for release in August 2010.

**Assessment**
Local SCRCCPs would undergo continuous outcomes assessment facilitated by routine collection and analysis of a minimum data set.

[See Key Performance Indicators, following page]

**Links**
Wherever possible, links are established with existing services including:

- General Practice (general practitioners and GP practice nurses)
- ACAT and aged care teams
- CAPAC / PACS
- ComPacks
- Community nursing
- Emergency Departments
- Medical Assessment Units (MAUs)
- Care Coordinators
- Retirement and Aged Care Facilities (RACFs)
- Exercise maintenance programs such as ‘Lungs in Action’ and ‘Heart Moves’ following pulmonary and cardiac rehabilitation.
- Care organisations and NGOs
- Meals on Wheels

SCRCCP teams provide both clinical services to patients and training to other clinicians. A requirement for information sharing and skills transfer between clinical teams has the potential to boost overall services capacity and assist with integration of clinical services.

Skills transfer from specialist SCRCCP teams to generalist clinicians facilitates, where appropriate, shared care options and is important for SCRCCP service sustainability.

To maximise service quality local SCRCCP teams develop strong links with established centres of excellence which provide specialist clinical support and training. This may include a program of rotational staff training between the hospital and community sectors.
3.3.3 Key Performance Indicators

- **Reduced Hospital Admissions**
  KPI: 1. % reduction in chronic respiratory and heart failure admissions (target: 25% reduction)

- **Reduced Length of Stay in Hospital**
  KPI: 1. % reduction in ALOS for the DRGs E62, E65 and F62 (target: 20% reduction)
  2. Reduction in variance in ALOS between peer sites (target: <10% variance)

- **Equivalent Medical Outcomes**
  KPI: Equivalent mortality rates from COPD, pneumonia and heart failure for patients participating in the program (being treated at home) to those non-program patients being treated in hospital.

- **Improved Patient Quality of Life**
  Improved patient quality of life as measured by pre- and post-program administrations of the St George’s (UK) Respiratory Questionnaire\(^{16}\) or Minnesota Quality of Life Questionnaire
  KPI: Improvement in quality of life as determined by a comparison of scores pre- and post-entry to the SCRCCP program.

- **Pulmonary Rehabilitation**
  Increase in proportion of SCRCCP-eligible patients offered pulmonary rehabilitation and an increase in completion rates of pulmonary rehabilitation programs
  KPI: % increase in the number of patients attending and completing pulmonary rehabilitation
  (targets: 100% of SCRCCP-eligible patients, who have not completed a rehabilitation program within the last 18 months, to be offered pulmonary rehabilitation
  30% of SCRCCP-eligible patients to commence pulmonary rehabilitation
  70% of commencing patients to complete their program

- **Cardiac Rehabilitation**
  Increase in proportion of SCRCCP-eligible patients offered cardiac rehabilitation and an increase in completion rates of cardiac rehabilitation programs
  KPI: % increase in the number of patients attending and completing cardiac rehabilitation
  (targets: 100% of SCRCCP-eligible patients, who have not completed a rehabilitation program within the last 18 months, to be offered cardiac rehabilitation
  60% of SCRCCP-eligible patients to commence cardiac rehabilitation
  70% of commencing patients to complete their program

- **Education and Smoking Cessation**
  Increase in proportion of SCRCCP-eligible patients offered respiratory or cardiac education including smoking cessation support.
  KPI: % increase in the number of SCRCCP-eligible patients receiving education and smoking cessation support
  (target: 75% of SCRCCP-enrolled patients to receive self-management education).
3.4 SCRCCP Experience - Existing ‘SCRCCP-type’ Services in NSW

In NSW there are a handful of existing ‘SCRCCP-type’ services - developing and established - which are similar in their objectives, methods and outcomes. These services have developed independently in different healthcare settings, driven by local teams to suit local environments.

To date all commenced services have made significant inroads in terms of their common goals to improve patient care and reduce the burden on the hospitals in their areas. Together they provide a track record of demonstrated success.

The salient features and outcomes of these programs are highlighted in brief below.

3.4.1 The Respiratory Coordinated Care Program at St George Hospital, Kogarah NSW

*Description*

Established over a decade ago (1997) and enhanced by the Chronic Care Program in 2000, the St George Respiratory Coordinated Care Program (RCCP) comprises a multi-disciplinary team of specialist respiratory clinicians. The team is based in St George hospital but delivers over 95% of it's services to patients in the community.\(^{(70)}\)

Offsetting the costs of RCCP staff, whose positions were re-allocated from the respiratory ward to the RCCP, the hospital closed five inpatient beds over the three months of summer and did not require winter surge beds.

The service has two components:

1. An acute component facilitating early, protocol-driven discharge with follow-up care delivered in the home by a specialist multidisciplinary outreach team.
2. A chronic component consisting of coordinated case management delivered in the home by the specialist outreach team, featuring action plans and home management rather than ED attendance and hospital admission.

*Outcomes*

The service has been an outstanding success.\(^{(70)}\) The average number of admissions per patient per annum for the pool of chronic and complex patients in the program has decreased from over four (average = 3.11) per annum to less than one (average = 0.63) per annum (see Figure 9), giving an estimated annual saving of 3373 bed days\(^*\) or 9.2 beds.

*Figure 9: Average admissions (chronic patients) / year pre- and post-RCCP enrolment*

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\* Av adm rate 3.11 – 0.63 = 2.48 admissions saved per patient per year x av 200 patients/yr x NSW ALOS of 6.8 = 3373 bed days saved.
The readmission rate for acute patients in the acute program is virtually nil\(^7\). With an average number of patients of 140 per year, this confers a further saving of approximately 364 bed days\(^\Delta\).

The average length of stay (ALOS) for the acute component of the program (commenced 2001) to 2008 is 4.2 days\(^7\) compared with a state average of 6.8 days (see Figure 10) giving a further saving of 270 bed days\(^\Delta\).

**Figure 10: Average Length of Stay: Acute / Early Discharge Component**

![Figure 10: Average Length of Stay: Acute / Early Discharge Component](image)

In total, the reductions in hospital admissions and length of stay for both the acute and chronic components of the program confer an average annual savings of approximately 3966 bed days, or 10.8 inpatient beds.

### Approximate savings, St George RCCP

<table>
<thead>
<tr>
<th>Program Component</th>
<th>Approx No. Bed Days Saved (average / yr)</th>
<th>Approx No. Inpatient Beds Saved (average / yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic</td>
<td>3332</td>
<td>9.1</td>
</tr>
<tr>
<td>Acute</td>
<td>(364 + 270) = 634</td>
<td>1.7</td>
</tr>
<tr>
<td><strong>Total Savings</strong></td>
<td><strong>3966</strong></td>
<td><strong>10.8</strong></td>
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The St George RCCP has influenced the development of similar - though newer - programs and pilot services in NSW including the RCCP based at Prince of Wales Hospital, the Sutherland RCCP, the Orange/Bathurst RCCP, and the ‘Respire’ program based at Royal Prince Alfred Hospital. A similar service, the Respiratory Ambulatory Care Service, has been commenced at Westmead-Blacktown-Mt Druitt Hospitals. The early outcomes of these services demonstrate reductions in presentations to emergency departments, reductions in admissions, reductions in length of stay in hospital and reductions in overall costs.

\(\Delta\) State ALOS of 6.8 – St George RCCP ALOS (2006) of 4.2 = saving of 2.6 days per stay x 140 patients = 364 bed days

\(\Delta\) 6.8 (Av State ALOS for peer DRGs) - 4.2 (RCCP ALOS) = 2.6 x 104 patients = 270 bed days
3.5 Cost-Benefit Analysis

3.5.1 Savings

Table 1 below demonstrates that full implementation of this program at an institution with no existing comparable service and approximately 1500 SCRCCP-eligible admissions per annum would result in potential gross savings (before costs) of approximately 15 inpatient beds. It is acknowledged that there may be some overlap of benefit inherent across component estimations. Nonetheless, care has been taken to provide conservative estimates of overall benefit.

Table 1: Potential Savings (gross / before costs) for a hospital with approximately 1500 SCRCCP-eligible admissions* per year

<table>
<thead>
<tr>
<th>Intervention Strategy</th>
<th>Target Outcomes</th>
<th>Bed Day Savings /yr</th>
<th>No. Inpatient Beds Saved</th>
<th>Savings ($)</th>
<th>Level of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Discharge with Transitional Support</td>
<td>Reduced ALOS by 1.0 day for one third of SCRCCP-eligible admissions</td>
<td>615 †</td>
<td>1.7</td>
<td>615,000</td>
<td>II</td>
</tr>
<tr>
<td></td>
<td>(St George RCCP reduced ALOS by 2.6 days/adm - data on file 1998 - 2008)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stratified Hospital in the Home / Case Management</td>
<td>Respiratory Patients Reduced admission rates for a group of 250 case-managed</td>
<td>1750 †</td>
<td>4.8</td>
<td>1,750,000</td>
<td>II</td>
</tr>
<tr>
<td></td>
<td>patients by at least 1.0 admission/pat/yr (St George RCCP reduced adm rates by 2.5 adm/pat/yr - data on file 1998 - 2008)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Heart Failure Patients Reduced admission rates for a group of 100 (St George HF Service) case-managed patients by at least 1.0 adm/pat/yr (McAlister et al 2004 &amp; Taylor et al 2005)</td>
<td>800 ¥</td>
<td>2.2</td>
<td>800,000</td>
<td>I</td>
</tr>
<tr>
<td>Pulmonary Rehabilitation</td>
<td>Increase in the number patients completing PR from 5% to 20% (an overall factor of 15%)</td>
<td>1181</td>
<td>3.2</td>
<td>1,181,000</td>
<td>I</td>
</tr>
<tr>
<td>Cardiac Rehabilitation</td>
<td>Increase in the number patients completing CR from 25% to 40% (an overall factor of 15%)</td>
<td>450</td>
<td>1.2</td>
<td>450,000</td>
<td>I</td>
</tr>
<tr>
<td>Self-Management Education and Smoking Cessation Counselling</td>
<td>75% of SCRCCP-enrolled patients receiving education (and, where necessary, smoking cessation intervention)</td>
<td>969</td>
<td>2.7</td>
<td>969,000</td>
<td>I</td>
</tr>
</tbody>
</table>

Total Gross Savings 5765 15.8 5,765,000

* A list of SCRCCP-eligible admissions (DRGs) is given in Appendix A. For full details of the following calculations refer to spreadsheets (Appendix B).

† 33.3% of 1850 admissions = 615 bed days

‡ 250 respiratory patients x ALOS of 7.0 (actual 7.68) = 1750 bed days

¥ 100 heart failure patients x ALOS of 8 (actual 8.8) = 800 bed days

◊ Standard medical bed cost (POWH Finance Dept) = $800 + $220 for path etc = $1020 /day or $372,300 /yr (a figure of $1000/day has been used in the above calculations)
3.5.2 Costs

**Staffing Costs**

Medical specialist involvement is required to provide dedicated support to the service, establish an ambulatory clinic for rapid and appropriate medical review and undertake home visits if required.

Nurses and allied health staff with experience in managing patients with severe and complex disease are required to cope with specialised testing and equipment (e.g., spirometry, NIV, CPAP, oxygen, ECG analysis, auscultation of heart and lung sounds etc).

The RCCP at St George monitors about 250 chronic patients and provides an early discharge program for both acute and chronic patients. It operates 7 days a week (0800 - 1630 hrs). Current staffing for this patient load is as follows:

<table>
<thead>
<tr>
<th>FTE</th>
<th>Position</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>Nurse Unit Manager</td>
<td></td>
</tr>
<tr>
<td>1.9</td>
<td>Clinical Nurse Specialists</td>
<td></td>
</tr>
<tr>
<td>1.2</td>
<td>Physiotherapists</td>
<td></td>
</tr>
<tr>
<td>4.1</td>
<td>Total</td>
<td></td>
</tr>
</tbody>
</table>

However, given the increasing disease burden, the St George RCCP is under-resourced and unsustainable. New patients are not admitted to the service until a vacancy arises; usually through the death of an existing patient (the death rate for this high acuity group is about 25% per annum). Services such as this require augmentation if they are to remain safe and effective alternatives to in-hospital care.

Table 2 indicates the staffing and equipment levels required for a 5 day-a-week service with no current staff / equipment available for deployment. As discussed above, most institutions have a small nucleus of staff running their Chronic Care Program. Most of these units would need additional funds to reach the level of staffing listed below, which is required to provide a sustainable service. The staff budget listed below would enable most institutions to run a seven day service. The full time equivalent (FTE) staffing rates have been estimated according to the patient volume associated with the SCRCCP-eligible diagnosis related groups.

**Table 2: Cost of a 5 day per week service for a hospital with approximately 1500 admissions per year with no current staff / equipment available for deployment (or a 7 day service for those services with existing resources)**

<table>
<thead>
<tr>
<th>Position</th>
<th>Resp FTE</th>
<th>Cardiac FTE</th>
<th>Total FTE</th>
<th>Award ($)</th>
<th>Award +18% on-costs</th>
<th>Costs (Resp + Cardiac)</th>
<th>Revenue</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physician** (specialist or general with interest), GP, CMO or registrar with interest</td>
<td>0.6</td>
<td>0.2</td>
<td>0.8</td>
<td>185,000</td>
<td>218,300</td>
<td>174,640</td>
<td>64,000</td>
<td>110,640</td>
</tr>
<tr>
<td>Nurse Unit Manager / CNC or Nurse Practitioner (add $10,000)</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>95,000</td>
<td>112,100</td>
<td>224,200</td>
<td>0</td>
<td>224,200</td>
</tr>
<tr>
<td>Clinical Nurse Specialist</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>80,000</td>
<td>94,400</td>
<td>188,800</td>
<td>0</td>
<td>188,800</td>
</tr>
<tr>
<td>Registered Nurse (&gt;8th year)</td>
<td>2.4</td>
<td>1</td>
<td>3.4</td>
<td>69,000</td>
<td>81,420</td>
<td>276,828</td>
<td>0</td>
<td>276,828</td>
</tr>
<tr>
<td>Physiotherapist* (outreach, level 4)</td>
<td>2.5</td>
<td>1</td>
<td>3.5</td>
<td>106,000</td>
<td>125,080</td>
<td>437,780</td>
<td>0</td>
<td>437,780</td>
</tr>
<tr>
<td>Occupational Therapist (level 4)</td>
<td>0.6</td>
<td>0.2</td>
<td>0.8</td>
<td>106,000</td>
<td>125,080</td>
<td>100,064</td>
<td>0</td>
<td>100,064</td>
</tr>
<tr>
<td>Clinical Psychologist</td>
<td>0.4</td>
<td>0.2</td>
<td>0.6</td>
<td>101,000</td>
<td>119,180</td>
<td>71,508</td>
<td>0</td>
<td>71,508</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>8.5</strong></td>
<td><strong>4.6</strong></td>
<td><strong>13.1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>$1,409,820</strong></td>
</tr>
</tbody>
</table>

* In some settings - particularly non-metropolitan NSW - certain allied health disciplines (e.g., physiotherapy) may not be represented in the local clinical team. Instead, a generic allied health equivalent is recommended in these situations.

** Costed at the level of Consultant Physician (Senior Staff Specialist)
### Ancillary Costs

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 Leased cars (including running costs for 12 months)</td>
<td>90,000</td>
</tr>
<tr>
<td>Mobile phones (purchase + running costs for 12 months) @ $100/m x 12 FTE</td>
<td>14,400</td>
</tr>
<tr>
<td>Computers / printer / fax / equipment @ $3,000 x 12 FTE</td>
<td>36,000</td>
</tr>
<tr>
<td>Medical equipment (O2 monitors, portable spirometer, PEP devices, cardiac stethoscopes, ECG machine, blood glucose monitors, portable weighing scales etc)</td>
<td>20,000</td>
</tr>
<tr>
<td>Consumables/stationery/etc</td>
<td>4,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$164,400</strong></td>
</tr>
</tbody>
</table>

**Total Staffing and Ancillary Costs for a hospital with approx 1500 admissions per year:**

<table>
<thead>
<tr>
<th>Total Staffing</th>
<th>1,409,820</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Ancillary</td>
<td>164,400</td>
</tr>
<tr>
<td><strong>TOTAL COST</strong></td>
<td><strong>$1,574,220</strong></td>
</tr>
</tbody>
</table>

### 3.5.3 Cost-Savings Equation

A comparison of the total annual costs and potential savings of a fully funded SCRCCP at a hospital with approx 1500 SCRCCP-eligible admissions per year is provided in Table 3. Conservative calculations suggest that a properly funded and staffed Severe Chronic Respiratory & Cardiac Care Program has the potential for substantial net savings.

**Table 3:** Financial equation for a hospital with approx 1500 chronic SCRCCP-eligible admissions per year:

<table>
<thead>
<tr>
<th>TOTAL COSTS</th>
<th>1,574,220</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL (POTENTIAL) SAVINGS*</td>
<td>5,765,000</td>
</tr>
<tr>
<td><strong>NET GAIN</strong></td>
<td><strong>$4,190,780</strong></td>
</tr>
</tbody>
</table>

* It is acknowledged that potential savings only become actual savings when the costs of providing prior services are removed from the overall budget of a hospital / health service. The costs of the Respiratory Coordinated Care Program at St George Hospital were met by closing 5 inpatient beds over the summer months.

The experience of the St George RCCP, and other more recently established services in NSW, is that projected savings are realised within 6 to 12 months of program implementation. This assumes recruitment of all staff and full service deployment within that timeframe.

An estimation of the potential financial impact on individual hospitals in NSW, according to their current admission rates, is provided in Table 4 below.
Table 4: Financial Equation for Severe Chronic Respiratory & Cardiac Care Program for NSW Public Hospitals with the Top 40 number of SCRCCP-Eligible Admissions*

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Number of Separations</th>
<th>Bed Days Saved</th>
<th>Number of Beds Saved</th>
<th>Total Gross Savings ($)</th>
<th>Total Costs ($) (Sep weighted)</th>
<th>Potential Net Savings ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gosford</td>
<td>1791</td>
<td>6,883</td>
<td>18.9</td>
<td>6,883,253</td>
<td>1,879,619</td>
<td>5,003,635</td>
</tr>
<tr>
<td>Theoretical Hospital (1500 adm / yr)</td>
<td>1500</td>
<td>5,765</td>
<td>15.8</td>
<td>5,764,869</td>
<td>1,574,220</td>
<td>4,190,649</td>
</tr>
<tr>
<td>St. George</td>
<td>1488</td>
<td>5,719</td>
<td>15.7</td>
<td>5,718,750</td>
<td>1,561,626</td>
<td>4,157,124</td>
</tr>
<tr>
<td>Royal Prince Alfred</td>
<td>1452</td>
<td>5,580</td>
<td>15.3</td>
<td>5,580,393</td>
<td>1,523,845</td>
<td>4,056,548</td>
</tr>
<tr>
<td>Blacktown</td>
<td>1441</td>
<td>5,538</td>
<td>15.2</td>
<td>5,538,117</td>
<td>1,512,301</td>
<td>4,025,817</td>
</tr>
<tr>
<td>Westmead (all)</td>
<td>1384</td>
<td>5,319</td>
<td>14.6</td>
<td>5,319,052</td>
<td>1,452,480</td>
<td>3,866,572</td>
</tr>
<tr>
<td>Prince of Wales</td>
<td>1216</td>
<td>4,673</td>
<td>12.8</td>
<td>4,673,387</td>
<td>1,276,168</td>
<td>3,397,219</td>
</tr>
<tr>
<td>Wyong</td>
<td>1215</td>
<td>4,670</td>
<td>12.8</td>
<td>4,669,544</td>
<td>1,275,118</td>
<td>3,392,426</td>
</tr>
<tr>
<td>Wollongong</td>
<td>1183</td>
<td>4,547</td>
<td>12.5</td>
<td>4,546,560</td>
<td>1,241,535</td>
<td>3,305,025</td>
</tr>
<tr>
<td>Liverpool</td>
<td>1173</td>
<td>4,508</td>
<td>12.4</td>
<td>4,508,127</td>
<td>1,231,040</td>
<td>3,277,087</td>
</tr>
<tr>
<td>John Hunter</td>
<td>1138</td>
<td>4,374</td>
<td>12.0</td>
<td>4,373,614</td>
<td>1,194,308</td>
<td>3,179,306</td>
</tr>
<tr>
<td>Nepean</td>
<td>1109</td>
<td>4,262</td>
<td>11.7</td>
<td>4,262,160</td>
<td>1,163,873</td>
<td>3,098,286</td>
</tr>
<tr>
<td>Bankstown/Lidcombe</td>
<td>1014</td>
<td>3,897</td>
<td>10.7</td>
<td>3,897,051</td>
<td>1,064,173</td>
<td>2,832,879</td>
</tr>
<tr>
<td>Campbelltown</td>
<td>1014</td>
<td>3,897</td>
<td>10.7</td>
<td>3,897,051</td>
<td>1,064,173</td>
<td>2,832,879</td>
</tr>
<tr>
<td>Theoretical Hospital (1000 adm / yr)</td>
<td>1000</td>
<td>3,843</td>
<td>10.5</td>
<td>3,843,246</td>
<td>1,049,480</td>
<td>2,793,766</td>
</tr>
<tr>
<td>Concord</td>
<td>955</td>
<td>3,670</td>
<td>10.1</td>
<td>3,670,300</td>
<td>1,002,253</td>
<td>2,668,046</td>
</tr>
<tr>
<td>Royal North Shore</td>
<td>929</td>
<td>3,570</td>
<td>9.8</td>
<td>3,570,375</td>
<td>974,967</td>
<td>2,595,409</td>
</tr>
<tr>
<td>Newcastle Mater</td>
<td>805</td>
<td>3,094</td>
<td>8.5</td>
<td>3,093,813</td>
<td>844,831</td>
<td>2,249,982</td>
</tr>
<tr>
<td>Mount Druitt</td>
<td>761</td>
<td>2,925</td>
<td>8.0</td>
<td>2,924,710</td>
<td>798,654</td>
<td>2,126,056</td>
</tr>
<tr>
<td>St. Vincents - Public</td>
<td>751</td>
<td>2,886</td>
<td>7.9</td>
<td>2,886,278</td>
<td>788,159</td>
<td>2,098,118</td>
</tr>
<tr>
<td>Tweed Heads</td>
<td>729</td>
<td>2,802</td>
<td>7.7</td>
<td>2,801,726</td>
<td>765,071</td>
<td>2,036,655</td>
</tr>
<tr>
<td>Canterbury</td>
<td>695</td>
<td>2,671</td>
<td>7.3</td>
<td>2,671,056</td>
<td>729,389</td>
<td>1,941,667</td>
</tr>
<tr>
<td>Sutherland</td>
<td>688</td>
<td>2,644</td>
<td>7.2</td>
<td>2,644,153</td>
<td>722,042</td>
<td>1,922,111</td>
</tr>
<tr>
<td>Fairfield</td>
<td>681</td>
<td>2,617</td>
<td>7.2</td>
<td>2,617,250</td>
<td>714,696</td>
<td>1,902,555</td>
</tr>
<tr>
<td>Shellharbour</td>
<td>626</td>
<td>2,406</td>
<td>6.6</td>
<td>2,405,872</td>
<td>656,974</td>
<td>1,748,897</td>
</tr>
<tr>
<td>Shoalhaven</td>
<td>617</td>
<td>2,371</td>
<td>6.5</td>
<td>2,371,283</td>
<td>647,529</td>
<td>1,723,754</td>
</tr>
<tr>
<td>Coffs Harbour</td>
<td>613</td>
<td>2,356</td>
<td>6.5</td>
<td>2,355,910</td>
<td>643,331</td>
<td>1,712,578</td>
</tr>
<tr>
<td>Ryde</td>
<td>607</td>
<td>2,333</td>
<td>6.4</td>
<td>2,332,850</td>
<td>637,034</td>
<td>1,695,816</td>
</tr>
<tr>
<td>Mona Vale</td>
<td>606</td>
<td>2,329</td>
<td>6.4</td>
<td>2,329,007</td>
<td>635,985</td>
<td>1,693,022</td>
</tr>
<tr>
<td>Wagga Wagga</td>
<td>591</td>
<td>2,271</td>
<td>6.2</td>
<td>2,271,358</td>
<td>620,243</td>
<td>1,651,116</td>
</tr>
<tr>
<td>Hornsby</td>
<td>583</td>
<td>2,241</td>
<td>6.1</td>
<td>2,240,612</td>
<td>611,847</td>
<td>1,628,766</td>
</tr>
<tr>
<td>Dubbo</td>
<td>576</td>
<td>2,214</td>
<td>6.1</td>
<td>2,213,710</td>
<td>604,500</td>
<td>1,609,209</td>
</tr>
<tr>
<td>Tamworth</td>
<td>553</td>
<td>2,125</td>
<td>5.8</td>
<td>2,125,315</td>
<td>580,362</td>
<td>1,544,953</td>
</tr>
<tr>
<td>Manly</td>
<td>538</td>
<td>2,068</td>
<td>5.7</td>
<td>2,067,666</td>
<td>564,620</td>
<td>1,503,046</td>
</tr>
<tr>
<td>Children's Hospital Westmead</td>
<td>537</td>
<td>2,064</td>
<td>5.7</td>
<td>2,063,823</td>
<td>563,571</td>
<td>1,500,252</td>
</tr>
<tr>
<td>Lismore</td>
<td>517</td>
<td>1,987</td>
<td>5.4</td>
<td>1,986,958</td>
<td>542,581</td>
<td>1,444,377</td>
</tr>
<tr>
<td>Port Macquarie</td>
<td>501</td>
<td>1,925</td>
<td>5.3</td>
<td>1,925,466</td>
<td>525,789</td>
<td>1,399,677</td>
</tr>
<tr>
<td>Theoretical Hospital (500 adm / yr)</td>
<td>500</td>
<td>1,922</td>
<td>5.3</td>
<td>1,921,623</td>
<td>524,740</td>
<td>1,396,883</td>
</tr>
<tr>
<td>Manning</td>
<td>484</td>
<td>1,860</td>
<td>5.1</td>
<td>1,860,131</td>
<td>507,948</td>
<td>1,352,183</td>
</tr>
<tr>
<td>Maitland</td>
<td>473</td>
<td>1,818</td>
<td>5.0</td>
<td>1,817,855</td>
<td>496,404</td>
<td>1,321,451</td>
</tr>
<tr>
<td>Orange</td>
<td>447</td>
<td>1,718</td>
<td>4.7</td>
<td>1,717,931</td>
<td>469,118</td>
<td>1,248,813</td>
</tr>
<tr>
<td>Auburn</td>
<td>441</td>
<td>1,695</td>
<td>4.6</td>
<td>1,694,871</td>
<td>462,821</td>
<td>1,232,051</td>
</tr>
<tr>
<td>Bowral</td>
<td>438</td>
<td>1,683</td>
<td>4.6</td>
<td>1,683,342</td>
<td>459,672</td>
<td>1,223,669</td>
</tr>
</tbody>
</table>

Data Sources:
Admissions data obtained from Health Information Exchange (HIE), May 2007\(^{(72)}\)
Bed costs obtained from POWH Finance Department
Data on average number of admissions / patient / yr (n=1.23) was obtained from the Health Round Table database\(^{(73)}\).

For full details of calculations refer to spreadsheets (Appendix B).

* SCRCCP-eligible admissions are listed in Appendix A.
3.6 Workforce Education and Training

There are several options available to assist with the training requirements of an enhanced SCRCCP workforce. Briefly, the existing training programs available include:

- Specialist education programs through the College of Nursing
- The College of Nursing also offers a dedicated distance education course for respiratory nursing, and a number of other respiratory-specific modules.
- The NSW Respiratory Nurses Special Interest Group offers hospital-based respiratory nursing courses and on-going education.
- The Cardiovascular Health & Rehabilitation Association of NSW and Australia provide on-going education and collaboration for all health professionals.
- The Australasian Cardiovascular Nursing College provides on-going education for nurses working in all settings of cardiac nursing in Australia.
- The Cardiac Society of Australia and New Zealand provides ongoing education for all health professionals working in cardiology areas.
- The National Heart Foundation of Australia provides on-going education such as workshops specific to understanding and managing depression in cardiac patients.
- The Smoking Research Unit of the Brain Mind Research Institute, University of Sydney, offers a three day training course for healthcare clinicians with an interest in smoking cessation, nicotine addiction and evidence based smoking cessation techniques.
- The Asthma and Respiratory Educators Association offers educational workshops
- The University of Sydney’s Discipline of Physiotherapy offers an undergraduate or graduate entry Masters program which includes cardiopulmonary components.
- Cardiorespiratory Physiotherapy Australia (Part of the Australian Physiotherapy Association) conducts on-going professional training and education
- The Thoracic Society of Australia and New Zealand offers educational workshops
- Charles Sturt University offers distance learning modules
- The Lung Health Promotion Centre conducts continuing education accreditation: CPD points with RACGP, CPE points with Pharmacy Assoc, CEP points with AAREA
- Through their ‘Lungs in Action’ and ‘Heart Moves’ programs the Australian Lung Foundation and the Australian Heart Foundation sponsor training and accreditation of local professional fitness instructors and exercise physiologists to offer community based exercise classes. Community based exercise programs are tailored for people with chronic disease and provide a local referral destination for patients to extend the benefits of pulmonary and cardiac rehabilitation by maintaining levels of physical activity.
3.7 Implementation

3.7.1 Specialist Services

Existing services operating successfully as single-specialty entities (that is, as respiratory or cardiac services alone) should be encouraged to continue unchanged and, if insufficiently resourced, remain eligible for enhancement funding that may ensue from this submission. Whilst combined care (cardiac + respiratory) and shared care (specialist + generalist) models may be suitable for patients with lower-level acuity illness, patients with severe and complex disease - particularly those enrolled in hospital outreach programs - are ideally managed by, or in close conjunction with, specialist clinical teams.

The implementation process can be achieved efficiently because most hospitals in the state have already established a nucleus of multidisciplinary respiratory and cardiac specialist clinicians as a result of the Chronic Care Program (CCP). The allocated funding for the CCP was sufficient for most institutions to employ one or two staff and to implement limited pulmonary rehabilitation services. However, such services are substantially under-resourced and unsustainable at current staffing levels.

Wherever possible, the proposed service enhancements outlined in this document would be undertaken by an expansion of the existing chronic care teams.

3.7.2 Combined Care and Shared Care Services

The model recognises and accepts wide variation in resources and clinical care across NSW and is, therefore, flexible so that it may be adapted by local clinical teams to suit existing service configurations and population need. In practice this will mean different things in different clinical settings. In some settings, synergies and efficiencies may be achieved by funding and delivering respiratory and cardiac failure services ‘together’; that is, side-by-side.

Joint models may help to avoid duplication of services and allow sharing of common resources such as, for example, occupational therapy, dietetics, clerical staff etc. In some sites gym space and equipment might be shared.

Variations of the model will have potential application in settings where the majority of patient care is provided by generalist clinicians, such as in much of non-metropolitan NSW.
3.7.3 Implementation of New Services

In settings where established respiratory and cardiac-specific services have not been developed, employment of a temporary project officer to assist with the development of local protocols, creation of links with centres of excellence, and organise training opportunities etc, in conjunction with local clinicians, may assist the set-up phases of program implementation.

For new services, local implementation could proceed according to the following phased approach:

Phase 1: Development, where necessary, of the following service prerequisites:

- local clinical protocols and tools (adapted from existing if feasible)
- links with established centres of excellence
- access to clinical training programs
- information management system to facilitate the collection, storage, and analysis and of program-related data

A temporary project officer - preferably a local clinician - could be seconded from their substantive clinical role to undertake these tasks.

Phase 2: Seeding funding for staffing and equipment to facilitate the commencement of local services across NSW

Phase 3: Program / local service evaluation after 12 months of operation

Phase 4: Outcomes-based program refinement

3.7.4 Virtual Units

It is envisaged that variations of the model will have potential application in settings where the majority of patient care is provided by generalist clinicians, such as in much of non-metropolitan NSW.

In this regard it is thought that, in some instances, SCRCCPs may function as ‘virtual units’, a concept introduced by commissioner Garling in his report\(^2\). Virtual respiratory units may consist of a multidisciplinary team of three to four clinicians, each based at different sites, rather than the traditional model of a physical unit in a fixed location with dedicated staffing and beds etc.

In these settings the development of local clinical tools and protocols is particularly important. Equally, strong links with established centres of excellence are necessary so that specialist and sub-specialist input can be provided or arranged as required. Additionally, improved access to clinical training programs for non-metropolitan and other generalist clinicians will be needed.
4. CONCLUSION

Chronic respiratory and cardiac diseases are responsible for a large and increasing burden of disease in NSW. To cope with this problem clinical management practices should become less reactive and more anticipatory.

This proposal provides best-practice advice to the NSW Department of Health and the NSW Area Health Services on an adaptable model of care; a Severe Chronic Respiratory & Cardiac Care Program (SCRCCP), as described in this paper. The proposal points to a more productive approach in the determination to find a balance between specialist and generalist services by promoting integrated hospital and community care, and integrated specialist and generalist clinical teams.

The SCRCCP model described in this proposal recommends the transfer, where appropriate, of specialist care out of hospital and into the community. The model shifts the management of patients with known progressive disease towards regular, community-based monitoring, facilitating early detection of disease deterioration and pre-emptive intervention strategies. A range of coordinated strategies encompassed in the SCRCCP comprise a seamless interface between in-patient and community services, linking with GPs and other services where appropriate.

The SCRCCP model recognises and accepts wide variation in resources and needs across clinical settings in NSW and is flexible in order that it may be adapted by local clinical teams to suit existing service configurations and population need.

An implemented SCRCCP has the potential to improve patient outcomes, significantly reduce presentations to hospital emergency departments, reduce hospital admissions, reduce the length of stay for those who are admitted to hospital, and achieve substantial savings in both bed days and overall costs.
5. REFERENCES

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# APPENDICES

**APPENDIX A: SCRCPP-Eligible Diagnosis Related Groups (DRGs)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>E40Z</td>
<td>Respiratory System Diagnosis W Ventilator Support</td>
</tr>
<tr>
<td>E60A</td>
<td>Cystic Fibrosis W Catastrophic or Severe CC</td>
</tr>
<tr>
<td>E60B</td>
<td>Cystic Fibrosis W/O Catastrophic or Severe CC</td>
</tr>
<tr>
<td>E62A</td>
<td>Respiratory Infections/Inflammations W Catastrophic CC</td>
</tr>
<tr>
<td>E62B</td>
<td>Respiratory Infections/Inflammations W Severe or Moderate CC</td>
</tr>
<tr>
<td>E62C</td>
<td>Respiratory Infections/Inflammations W/O CC</td>
</tr>
<tr>
<td>E65A</td>
<td>Chronic Obstructive Airways Disease W Catastrophic or Severe CC</td>
</tr>
<tr>
<td>E65B</td>
<td>Chronic Obstructive Airways Disease W/O Catastrophic or Severe CC</td>
</tr>
<tr>
<td>E69A</td>
<td>Bronchitis and Asthma Age &gt;49 W CC</td>
</tr>
<tr>
<td>E69B</td>
<td>Bronchitis and Asthma Age &gt;49 or W CC</td>
</tr>
<tr>
<td>E71A</td>
<td>Respiratory Neoplasms W Catastrophic CC</td>
</tr>
<tr>
<td>E71B</td>
<td>Respiratory Neoplasms W Severe or Moderate CC</td>
</tr>
<tr>
<td>E74A</td>
<td>Interstitial Lung Disease W Catastrophic CC</td>
</tr>
<tr>
<td>E74B</td>
<td>Interstitial Lung Disease W Severe CC</td>
</tr>
<tr>
<td>E74C</td>
<td>Interstitial Lung Disease W/O Catastrophic or Severe CC</td>
</tr>
<tr>
<td>F62A</td>
<td>Heart Failure &amp; Shock W Catastrophic or Severe CC</td>
</tr>
<tr>
<td>F62B</td>
<td>Heart Failure &amp; Shock W/O Catastrophic or Severe CC</td>
</tr>
</tbody>
</table>
APPENDIX B: Admissions and Cost-Savings Analysis: Data and Calculations by Hospital

[Data available on request: nwilcox@nscca.hs.health.nsw.gov.au]