



REVIEW OF NON-INPATIENT MODELS OF CARE FOR ADULT PATIENTS WITH HAEMATOLOGICAL MALIGNANCIES

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FINAL REPORT

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Abbreviations

ACU	Ambulatory Care Unit
AIP	Ambulatory infusion pumps
ALL	acute lymphoblastic leukaemia
AlloHSCT	allogeneic haematopoietic stem cell transplant
AML	acute myeloid leukaemia
APAIS	Australian Public Affairs Information Service
APL	acute promyelocytic leukaemia
AutoHSCT	autologous haematopoietic stem cell transplant
BC	British Columbia
BMH	bone marrow harvest
BMT	bone marrow transplant
BMTN	Bone Marrow Transplant Network
BSI	blood stream infection
BU	busulfan
CI NSW	Cancer Institute NSW
CINAHL	Cumulative Index to Nursing and Allied Health Literature
CML	chronic myeloid leukaemia
CNC	clinical nurse consultant
CNS	clinical nurse specialist
COT	Cancer Outreach Team
COST	Cancer Outreach Service Team
CSDM	Cancer Service Development Managers
CTS	Chronic transfusion service
CVC	central venous catheter
DACS	Director of Area Cancer Services
DUMC	Duke University Medical Centre
ED	Emergency department
EN	Enrolled nurse
FTE	Full-time equivalent
GCN	General community nurses
G-CSF	granulocyte colony-stimulating factor
GP	General practitioner
HITH	hospital in the home
HLA	human leukocyte antigen
HMA	Healthcare Management Advisors
HNEAHS	Hunter New England Area Health Service

HSCT	haematopoietic stem cell transplant
ICU	intensive care unit
IPOP	inpatient/outpatient
L/BMT	leukaemia/bone marrow transplant
MBS	Medicare Benefits Schedule
MDT	multidisciplinary team
NICE	National Institute for Clinical Excellence (UK)
NP	Nurse Practitioner
NSW CEC	New South Wales Clinical Excellence Commission
NUM	Nurse Unit Manager
OOS	Outpatient occasions of service
PAC	Post acute care
PBS	Pharmaceutical benefits scheme
PPP	Public private partnership
QOL	Quality of Life
RMO	Resident Medical Officer
RN	Registered Nurse
RNSH	Royal North Shore Hospital
SESAHS	South East Sydney & Illawarra Area Health Service
SHNS	Sydney Home Nursing Service
TBI	Total Body Irradiation
VPN	Virtual Private Network

Executive Summary

INTRODUCTION

The ultimate aim of this project was to document evidence-based models of care that have effectively shifted haematology inpatient care to the non-inpatient setting, and identify corresponding measurement indices of the success of these shifts in service provision.

METHODOLOGY

The project comprised the following stages:

- a literature review of international experience of the shift from inpatient to non-inpatient models of care for adult patients with haematological malignancies and the effectiveness of this shift;
- development of a survey tool using input from agreed scoping units to identify models of care that have explored inpatient to non-inpatient management in NSW;
- survey of specialist haematology units in NSW regarding models of care that have effectively shifted malignant haematology inpatient care to the non-inpatient setting;
- case study of three services providing non-inpatient care as identified by CI NSW; and
- documentation of the survey and case study findings alongside findings from international literature.

This report documents the evolving models of care and the patient types and treatments that have been, and are still, shifting to non-inpatient models in NSW. It describes models of care in NSW and approaches taken to manage the shift to non-inpatient models, and identifies key barriers and facilitators to change, as reported by NSW haematology units.

Options for setting key evaluation questions and indicators to assist units in monitoring the success of shifts in models of care are also discussed, and core questions common to any new initiative are proposed.

Guiding principles for the successful shift of services from in-patient to non-inpatient models of care and options for future improvement projects have also been identified.

KEY FINDINGS

The shift to non-inpatient care

Background information about the evolving areas of non-inpatient care was found in the literature and through scoping visits and consultation. These areas were confirmed in the e-survey and units were asked to provide standardised responses that would indicate the status of the shift i.e. had shifted, not planning to, would if we had the resources. Drivers of change and the year in which units began shifting services were also documented. The key findings in relation to evolving areas of non-inpatient care were:

- F.1 Suitability for management as an inpatient or non-inpatient depends on several factors including disease severity; intervention required; patient health status and existence of co-morbidities; and the patient's ability to manage without requiring admission.
- F.2 Treatment regimens can have complex and lengthy pathways, however an inpatient/outpatient (IPOP) model of care is suitable for many patients.
- F.3 Evolving approaches in the literature included non-inpatient provision of aspects of care for suitable patients including:
 - (a) HSCT (autologous and / or allogeneic);
 - (b) Management of patients with acute leukaemia or high-grade lymphoma; and
 - (c) Management of febrile neutropenia.

- F.4 Key drivers in shifting care to non-inpatient models in the literature were: improving quality of life and convenience; reducing hospital acquired infection; reducing costs; technological advances; managing current and future demand for inpatient beds; and reducing waiting times.
- F.5 Factors identified as facilitators for successful shift included:
- (a) Technological advances;
 - (b) Supportive care and delivery systems particularly those with the toxicity associated with stem cell transplants;
 - (c) Advances in the availability of new anti-emetics and antimicrobial prophylaxis.
 - (d) Funding;
 - (e) Registrar cover;
 - (f) Team communication;
 - (g) Skilled in-home care;
 - (h) Suitable IT;
 - (i) ED bypass procedures.

Evolving models of care

In examining models of care, key aspects arising from the literature, scoping visits and consultation were explored in the review through the e-survey case study process. These key aspects included patient suitability, service relationships and organisation, unit structure, services and workforce structure. Each unit's facilities and systems to support care were also documented. The key findings in relation to models of care were:

- F.6 Most units (66.7%) in NSW are haematology/oncology units and are also treating patients with solid tumour cancers and other non-malignant haematological conditions.
- F.7 While patient suitability is assessed through individual clinical assessment, initiating new models of non-inpatient care can be prompted by formal processes with established criteria, or informal mechanisms, or a prompt from a particularly motivated patient.
- F.8 Lack of an informal carer is a common reason for lack of patient suitability for non-inpatient care.
- F.9 Day to day, certain patients need to be managed seamlessly across inpatient and outpatient settings so the distinction between inpatient and outpatient care can be artificial for both patients and clinicians. Therefore, co-location with other components of care, sharing/cross training staff across settings, and sharing systems across settings can promote seamless care.
- F.10 Like inpatient care, non-inpatient care needs to be multidisciplinary, but with the ability to schedule and deliver interventions within shorter opening hours. This can have implications for the traditional prioritisation processes in acute hospitals that give inpatients higher priority than outpatients.
- F.11 Extended opening hours or outreach teams may be able to reduce ED presentations.
- F.12 While some units have developed ED bypass processes, some are adhoc arrangements without formal pathways and limited to business hours.
- F.13 While teamwork is generally multidisciplinary, formal processes of care-coordination post discharge or across care settings can be inconsistent.
- F.14 Space for family and patient counselling and nurse consultation was identified as a common need for most units.
- F.15 Typically, IT systems do not adequately support record keeping across inpatient and non-inpatient settings.
- F.16 Non-inpatient care models are largely developed locally, as part of the continuous improvement process.
- F.17 A variety of approaches to managing change seem to be used. However improved supportive care and good teamwork and communication processes were considered of high importance when facilitating change.
- F.18 Difficulties in the change process were identified as lack of appropriately trained nursing and allied health staff, establishing processes for emergency admission, and establishing a clear point of contact for patients should complications arise.

F.19 Few e-survey respondents (2 units) confirmed they had evaluated the impacts of change.

Non-inpatient care models, guiding principles and opportunities

F.20 Different models of non-inpatient care are available at different cancer centres or units, with a shift to these different models of care dependent not only on the individual treatment centre, but also on patient types and disease characteristics.

F.21 Integration of services between inpatient and hospital-based non-inpatient settings, as well as community-based settings, varies.

F.22 However, guiding principles underpinning these models include:

- (a) Procedures for unscheduled and emergency patient contact;
- (b) Coordination of care along the patient pathway;
- (c) Patient records available to support all care requirements;
- (d) Facilities and services available to support care requirements; and
- (e) A planned approach to managing change.

F.23 Opportunities exist for movement to non-inpatient care models, both hospital-based and community or home-based, but should address guiding principles, ensure assessment of patient suitability to receive care on a non-inpatient basis and acknowledge the integrated nature of care required for patients with haematological malignancies.

F.24 Two possible approaches to measuring the effectiveness a shift could be one based on evidence-based recommendations such as the UK NICE Guidance on Cancer Services, or broadly measuring the feasibility, safety, effectiveness and / or cost-effectiveness of a shift from inpatient to non-inpatient models of care, however a combination of the two is likely to be useful.

F.25 Common evaluation questions related to the key drivers identified in the review of a) improving patient quality of life and patient convenience b) reducing demand and meeting current demand and c) reducing waiting times could be considered core questions.

F.26 In addition to this, initiative specific questions would need to be established based on the particular treatment regimen, patient group or the element of care being shifted to provide a reasonably complete picture of the effect of the shift and maximise learning.

CONCLUSION

While fairly high level, the findings of this report provide a useful description of the current state of play. The types of services that have shifted, and are shifting, to non-inpatient care for adult patients with haematological malignancies have been explored. Haematology/oncology units in NSW have very similar drivers for change as those found in the literature. However the e-survey suggests local variation in what components of care are provided on a non-inpatient basis. This is likely to be due to variations in facilities, resourcing, leadership and how recently units have commenced the process of shifting, as services evolve through time as part of continuous improvement processes.

While two of the top three key drivers for shift (i.e. patient demand and reducing waiting lists) prompt services to attempt to relieve pressure, the shift to non-inpatient models can give rise to a new set of service pressures such as managing care within specified opening hours, dealing with emergency re-admissions and the challenge of co-ordinating multidisciplinary care across various service settings. This is particularly true when systems and facilities were designed to support old models of care.

Pragmatic approaches to measuring or evaluating the success of shifting services have the potential to accelerate learning and equip service teams with information to attract appropriate resources for future service delivery.

Opportunities for new business improvement projects were found in most areas explored, however now need to be considered for feasibility and prioritisation based on their potential usefulness to the sector as a whole. Any projects designed to shift care of haematological malignancies from an inpatient to non-inpatient setting, hospital-based, community-based or home-based, should give consideration to the guiding principles identified as underpinning successful non-inpatient services, and the highly integrated nature of haematology patient care.

1 Introduction

Haematological malignancies are cancers affecting the cells of the blood or lymphatic system.

In 2007 haematological cancers, including non Hodgkin's lymphoma, leukaemia, myelodysplasia and multiple myeloma, were ranked as the 8th, 12th, 19th and 20th most common newly diagnosed cancers in NSW respectively. They comprise a diverse group of cancers with a wide variety of treatment needs and together represent 8% of new cases of cancer in NSW but account for 20% of hospital admissions¹. With advances in outpatient care and increased pressure on hospital bed usage, the effectiveness of a shift in some units to the use of non-inpatient care for specific groups of haematology patients has been identified as important to measure and understand as a potential model for future service planning and delivery.

The Cancer Institute NSW (CI NSW) engaged HMA to undertake this project to identify and document evidence-based models of care that have effectively shifted haematology inpatient care to the non-inpatient setting, and identify corresponding measurement indices of the success of these shifts in service provision setting.

The project was overseen by the Cancer Institute NSW Haematology Inpatient/Non-inpatient Review Working Party ("the working party"). A list of the working party members is provided in Appendix A.

1.1 PROJECT DESCRIPTION

The project comprised the following stages:

- (1) A literature review of international experience of the shift from inpatient to non-inpatient models of care for adult patients with haematological malignancies and the effectiveness of this shift.
- (2) Development of a survey tool using input from agreed scoping units to identify models of care that have explored inpatient to non-inpatient management in NSW.
- (3) Survey of specialist haematology units in NSW regarding models of care that have effectively shifted malignant haematology inpatient care to the non-inpatient setting.
- (4) Case studies of three services providing non-inpatient care in NSW.
- (5) Documentation of the survey and case study findings alongside findings from international literature.

1.2 SCOPE OF THIS REPORT

The scope of the project encompassed the shift to non-inpatient models of care for adult patients with haematological malignancies. The following factors were considered in the process of defining that scope:

- (1) **Management of patients with non-malignant haematological diseases.** Haematology Units and haematologists not only care for patients with haematological cancers, but also for patients with non-malignant haematological diseases. These may include disorders of bleeding or clotting, anaemia including thalassaemia, white cell or platelet disorders, and management of autoimmune diseases. While the focus of this report is on the management of malignant haematological conditions, the management of non-malignant haematological conditions was considered as relevant to understanding any relationships to treating haematological cancers.
- (2) **The definition of a non-inpatient setting.** Patient care occurs along a continuum, with frequent movement between settings from inpatient, ambulatory or short stay settings, outpatient and community settings. For the purpose of this report, the setting of interest was defined as 'non-inpatient'. As such, a variety of settings were considered as within the scope of this report, where the use of these services have, or could be, an alternative to a longer inpatient stay. These included:
 - ambulatory care wards – where patients do not stay overnight;

- short stay or day stay wards – where patients are usually seen on a same day basis, however may have some patients stay for a night or two before transferring to an inpatient ward or being discharged;
 - outpatient services – clinic settings where consultants, specialist nurses and/or allied health practitioners provide care to ambulatory patients; and
 - community services – in this review community care was defined as care in a patient's home rather than at a community health service centre.
- (3) **Models rather than protocols of treatment.** This report focussed on understanding models of care (i.e. the way in which a service was organised and delivered) rather than specific treatment protocols.
- (4) **Definition of a unit.** For the purposes of this report, a unit is a department or service in a hospital or a single institute operating across hospital sites (e.g. North Coast Cancer Institute).

1.3 PROJECT METHODOLOGY

The project methodology included three key components:

- (1) **Literature scan.** A scan of the academic literature concerning non-inpatient treatment of adults with malignant haematological conditions was undertaken for published literature using specified criteria. Also included is information gathered from a general scan of grey and secondary research literature related to previous systematic reviews, evidence based guidelines and government reports. The literature review is included in its entirety as Appendix I.
- (2) **E-survey tool.** An electronic survey (e-survey) was developed and titled *CI NSW Outpatient Haematology Care Survey* (referred to as the 'e-survey' in this report). The e-survey is provided as part of the results in Appendix C. The development of the e-survey questions was informed by initial visits to two units and through input and advice from the working party. The draft survey was circulated to six scoping units for review and feedback. A total of 19 units were invited to complete the e-survey, which included a request for information of interest to the review, such as documented protocols, publications or evaluation reports. Fifteen responses were received to the e-survey, one of which covered two of the 19 invited units. A list of the 15 respondents is provided in the Appendices.
- (3) **Case studies.** Three case studies were conducted to obtain more detailed information about models of non-inpatient care and the inter-relationship between inpatient and non-inpatient service delivery. These were conducted for an Ambulatory Care Unit (ACU), a Regional Haematology Service and a Cancer Outreach Team (COT). A summary of each case study is provided in the Appendices. All three units agreed to make these available as part of this final report, however the case studies have been de-identified.

1.4 STRUCTURE OF THIS REPORT

The remainder of this document is structured as follows:

- **Chapter 2:** The Shift to Non-Inpatient Care;
- **Chapter 3:** Evolving Models of Care;
- **Chapter 4:** Non-Inpatient Care Models, Guiding Principles and Opportunities; and
- **Appendices.** Relevant appendices to the project including case study reports.

2 The Shift to Non-Inpatient Care

This chapter provides information about the types of haematological malignancies and treatments that have more recently shifted to non-inpatient management. It highlights the drivers of change identified in both the literature and NSW sites, and how the shift in evolving areas of non-inpatient management has occurred.

2.1 OVERALL FINDINGS: THE SHIFT TO NON-IMPATIENT CARE

- F.1 Suitability for management as an inpatient or non-inpatient depends on several factors including disease severity; intervention required; patient health status and existence of co-morbidities; and the patient's ability to manage without requiring admission.
- F.2 Treatment regimens can have complex and lengthy pathways, however an inpatient/outpatient (IPOP) model of care is suitable for many patients.
- F.3 Evolving areas in the literature included non-inpatient provision of aspects of care for suitable patients undergoing:
- (a) HSCT (autologous and / or allogeneic);
 - (b) Management of patients with acute leukaemia or high-grade lymphoma; and
 - (c) Management of febrile neutropenia.
- F.4 Key drivers in shifting care to non-inpatient models were: improving quality of life and convenience; reducing hospital acquired infection; reducing costs; technological advances; managing current and future demand for inpatient beds; and reducing waiting times.
- F.5 Factors identified as facilitators for successful shift included:
- (a) Technological advances;
 - (b) Supportive care and delivery systems particularly those with the toxicity associated with stem cell transplants;
 - (c) Advances in the availability of new anti-emetics and antimicrobial prophylaxis;
 - (d) Funding;
 - (e) Registrar cover;
 - (f) Team communication;
 - (g) Skilled in-home care;
 - (h) Suitable IT;
 - (i) ED bypass procedures.

2.2 STANDARD MANAGEMENT

Haematological malignancies comprise a wide range of disorders, requiring a variety of different interventions. Some of these interventions have been routinely available or administered on a non-inpatient basis for many years in some centres, and others have only more recently become available on a non-inpatient basis. These are described more fully in the literature scan (Appendix I). In all cases, management as an inpatient or non-inpatient depends on several factors including:

- disease severity;
- intervention required;
- patient health status and existence of co-morbidities; and
- the patient's ability to manage without requiring admission.

Non-inpatient management

For patients with 'less severe' types of haematological malignancies, where standard or low-dose chemotherapy, radiation therapy or blood transfusions may be the primary intervention, management may chiefly occur on a non-inpatient basis.

Standard or low dose chemotherapy for conditions such as chronic leukaemia, non high grade lymphoma, multiple myeloma, myelodysplastic syndromes or myeloproliferative disorders can either

be taken by patients at home, or administered in oncology day centres and/or specialised haematology day units.

Patients requiring blood transfusions or supportive care, including antibiotics, antiemetics or bisphosphonates, are also routinely managed on a non-inpatient basis, unless other complicating factors require hospital admission.

Inpatient management

Inpatient management has been more routinely provided for aspects of care for patients with more severe types of haematological malignancies including acute leukaemia, high grade lymphoma, patients requiring haematopoietic stem cell transplant (HSCT), either autologous (AutoHSCT) or allogeneic (AlloHSCT), and for patients with febrile neutropenia. Patients receiving induction or consolidation stages of chemotherapy for acute leukaemia, or high-dose chemotherapy for other conditions, or in preparation for HSCT, have been more routinely hospitalised due to the severely mucotoxic nature of the regimen and subsequent risk of infection.

This project considers which aspects of care for these 'more severe' conditions are able to be shifted to a non-inpatient basis for suitable patients, and also any emerging changes in non-inpatient models of care for 'less severe' conditions (e.g. shift from hospital-based non-inpatient care to home or community-based care).

2.3 SHIFT TO NON-INPATIENT CARE FOR SUITABLE PATIENTS

Advances in chemotherapy options, supportive care and delivery systems have made the shift to non-inpatient care possible for suitable patients. The availability of interventions on an inpatient or non-inpatient basis, and the drivers of change towards non-inpatient care, are described in this section.

2.3.1 What is a 'suitable patient'?

Patient suitability to receive care on a non-inpatient basis is primarily based on patient health status and the type of intervention being administered. While the former can negate the availability of non-inpatient care as an option, the latter does not necessarily do so. For example, in some cases it has been reported that the shift to non-inpatient management involved no change in actual chemotherapy administered², and in other cases, where units aimed to manage febrile neutropenia on an outpatient basis, the availability of a specific non-inpatient care protocol for management of febrile neutropenia was considered important in reducing readmission rates³.

For patients undergoing HSCT or high-dose chemotherapy, published literature consistently reports specific criteria that must be considered in assessing patient suitability to receive varying stages of these interventions on a non-inpatient basis. These criteria include:

- patient compliance and desire to participate;
- clinical stability;
- absence of serious co-morbidities;
- 24 hour carer availability and suitability; and
- suitable accommodation within 30-60 minutes of hospital taking into account local traffic conditions.

These criteria become very important in determining the extent of a possible shift to non-inpatient management of HSCT in particular. For example, some studies report that lack of a suitable caregiver prevented almost half of otherwise suitable patients being shifted to non-inpatient care⁴.

The case studies demonstrated that, although these types of considerations are taken into account when undertaking a clinical assessment of the suitability of each individual patient, some units operated without explicitly documented criteria. Patient motivation, and desire or personal situation of specific patients, can also prompt clinicians to consider outpatient procedures not previously performed on an outpatient basis. This acts as a trigger for clinicians to re-consider how care is delivered, and provides the opportunity to trial a new approach.

2.3.2 What has shifted?

Some interventions for haematological malignancies are routinely offered on a non-inpatient basis, and shifted in a majority of units more than ten years ago. Other interventions have traditionally been

available on an inpatient basis only, and are more recently evolving to allow non-inpatient care in some units. Published academic literature focuses on the latter and includes:

- non-inpatient delivery of HSCT (autologous and/or allogeneic);
- management of patients with acute leukaemia or high-grade lymphoma; and
- management of febrile neutropenia.

The more recent shift of these areas to non-inpatient management in suitable patients is also supported by the e-survey and case studies in NSW. These are discussed below:

Haematopoietic stem cell transplant (HSCT)

Components of HSCT have been shifted to non-inpatient care both internationally and in NSW. Traditionally, HSCT involved an inpatient admission to complete the process of conditioning therapy, followed by stem cell reinfusion, and about 30-40 days of inpatient care after transplantation⁵. Recent developments in less mucotoxic preparative regimens, improvements in supportive care (i.e. antibiotics, antiemetics and transfusion protocols), and the use of peripheral blood rather than bone marrow stem cells, have facilitated a shift to outpatient models of care for patients undergoing HSCT⁶.

Some examples of centres that have published about the shift of particular patients to non-inpatient care models include:

- Loyola University Medical Centre, Maywood Illinois, USA – totally outpatient HSCT program for suitable patients including those patients undergoing severely mucotoxic regimens, with an estimated cost saving of US\$16,000 per outpatient transplant and similar patient and caregiver quality of life to inpatients;
- Ottawa Hospital Blood and Bone Marrow Transplant Program, Canada – outpatient total body irradiation (TBI) reduced inpatient length of stay for patients requiring stem cell transplant;
- Oncology Centre, Johns Hopkins University, Baltimore, USA – outpatient based stem cell transplant resulted in significantly less inpatient bed days with similar rates of complications to inpatients;
- Newcastle Mater Hospital Haematology Unit - preliminary experience of hospital in the home (HITH) management following AutoHSCT for patients with multiple myeloma or lymphoma suggested that with adequate infrastructure support and rigorous patient selection this model of care is both safe and feasible.

In NSW units responding to the survey, half the units had shifted both the conditioning/transplant and post-transplant care for suitable patients undergoing allogeneic transplant to non-inpatient care. For patients receiving autologous transplants, over half had shifted post-transplant care to a non-inpatient basis where suitable, and just under half had shifted conditioning/transplant stage to non-inpatient (see Section 2.3.3 below).

Acute leukaemia and high grade lymphoma

Non-inpatient provision of induction and consolidation phase chemotherapy for patients with acute leukaemia or high-grade lymphoma is being reported in recent literature and evidenced from the NSW survey. Patients receiving induction and consolidation phase chemotherapy have traditionally been hospitalised for the duration of the chemotherapy, until count recovery, as treatment leads to prolonged severe neutropenia during which patients are highly susceptible to infection^{2,7}. More recently, an increasing number of institutions have begun implementing early discharge and outpatient management in selected patients in response to pressure on inpatient bed numbers and nosocomial infection rates. In NSW, the majority of units offering treatment for these patients had shifted to non-inpatient care where possible (see Section 2.3.3 below).

Management of febrile neutropenia

Febrile neutropenia is a complication of cytotoxic therapies for haematological malignancies². It is second only to chemotherapy administration as a cause of hospital admission during treatment for cancer⁸. Antibiotic therapy for febrile neutropenia has undergone a steady evolution in the past 25 years. Research has been conducted into the identification and management of patients with febrile neutropenia *at low risk of life threatening complications*, in whom duration of hospitalisation and

intensity of therapy can be safely reduced⁸. However, much of this research has been conducted in patients with non-haematologic malignancies.

Results from the survey of NSW sites indicates that the majority of units still routinely manage patients with febrile neutropenia on an inpatient basis, and are not intending to shift this to non-inpatient care (see Section 2.3.3 below).

2.3.3 Shifting Specific Patient/Treatments in NSW

When designing one of the e-survey questions (Q13), a list of specific patients/treatments of interest was developed based on the findings of the literature scan, through consultation with the working party, and the scoping units. Results of survey responses to this question are presented in this section.

In the e-survey, units were asked to identify whether specific patients/treatments:

- had shifted to a non-inpatient basis for suitable patients;
- would shift if they had the resources;
- were not planning to move it to non-inpatient basis; or
- felt the item was simply not applicable to their unit.

If respondents indicated the item was 'not applicable' it has been assumed that this treatment item was not offered in that centre/unit. The full responses are detailed in the Appendices, however a summary is discussed below.

Shifting of 'high-risk' interventions

The question was complex and as a result not all respondents completed all parts of the question. It should also be noted that for some services, the volume of patients for which non-inpatient care is offered may also be very low, depending on the suitability of individual patients. This survey question was not able to identify exactly which *aspects or sub-components of care* within an item had shifted, so in some cases not all of a component of service will have shifted, and not for all patients.

On face value, the survey demonstrated that for most units, shifts to non-inpatient services for suitable patients had occurred in:

- **AML supportive care.** Of the ten providing AML supportive care, eight had shifted to a non-inpatient basis, one was not planning to shift, and one would if they had the resources;
- **ALL supportive care.** Of the nine providing ALL supportive care, eight had shifted to a non-inpatient basis, no others were planning to, and one would if they had the resources; and
- **High grade lymphoma.** Of the nine providing HGL care, five had shifted to a non-inpatient basis, three were not planning to move and one would shift if they had the resources.

Components where the results indicated that half or less had shifted were:

- **AML administration, induction and chemotherapy.** Of the eight conducting AML administration, induction and chemotherapy three had shifted to a non-inpatient basis and five were not planning to shift;
- **ALL administration, induction and chemotherapy.** Of the seven conducting ALL administration, induction and chemotherapy, three had shifted to non-inpatient basis and four were not planning to shift;
- **Allogeneic stem cell transplant.** Of the four NSW units offering allogeneic stem cell transplant, two are providing elements of this intervention (usually pre-conditioning and post-transplant care) on a non-inpatient basis for suitable patients and the other two are not planning to shift;
- **Autologous stem cell transplant.** Of the five NSW units offering autologous stem cell transplants, two have shifted the conditioning/transplant component in suitable patients, with an additional two indicating they would shift this if they had the resources and one unit not planning to shift. Of the seven NSW units offering post-transplant care for patients undergoing autologous stem cell transplant, four had shifted this care to non-inpatient basis, two indicated they would shift if they had the resources, and one was not planning to shift; and
- **Febrile neutropenia.** Of the 10 respondents, two had shifted to a non-inpatient basis and seven were not planning to shift.

Looking specifically at components units would shift if resources were available, the following is a summary in order of priority. The number of respondents who selected the item is in parenthesis:

- AutoHSCT– post transplant care (2 units);
- AutoHSCT– conditioning/transplant (2 units);
- Management of fever from neutropenia (1 unit);
- High grade lymphoma (1 unit);
- Stem cell mobilisation (1 unit);
- AML – supportive care (1 unit); and
- ALL – supportive care (1 unit).

Shift of other ‘less high-risk’ interventions

In addition to the items above, some of the other responses the e-survey captured were:

- (1) **Supportive care (e.g. bisphosphonates, immunoglobulin).** Of 13 respondents, all were providing care on a non-inpatient basis;
- (2) **Blood transfusions.** Of 12 respondents, all were providing on a non-inpatient basis;
- (3) **Antibody therapy.** Of 10 respondents providing this, all were providing on a non-inpatient basis;
- (4) **Management of other side effects and complications of treatment.** Of 12 respondents, 10 were providing on a non-inpatient basis and two were not planning to shift;
- (5) **Apheresis/plasmapheresis.** Of the eight respondents providing this, all were able to provide on a non-inpatient basis;
- (6) **Radiation therapy.** Of the seven respondents providing this, all were able to provide on a non-inpatient basis;
- (7) **Stem cell mobilisation (including chemotherapy).** Of the eight respondents providing this, five were offering on a non-inpatient basis, one would shift if they had the resources, and two were not planning to shift to non-inpatient;
- (8) **Cryopreservation of stem cells.** Of four respondents offering this, all were providing on a non-inpatient basis; and
- (9) **Bone marrow harvest.** Of the six respondents providing this, one had shifted to a non-inpatient basis but five were not planning to shift.

2.3.4 Year of shifting to non-inpatient models

The e-survey also asked respondents to identify the year when they first commenced shifting services to a non-inpatient basis. While the responses do not show what proportion of suitable patients have shifted, it does show that a lot of movement towards non-inpatient models of care occurred between the years 1995-2000 and again in recent years.

- (1) **HSCT.** Aspects of the HSCT process have shifted to availability on a non-inpatient basis at varying times. Pre-2001, three units reported shifting stem cell mobilisation and four units reported shifting apheresis/plasmapheresis. Two other units had shifted stem cell mobilisation post-2005. Bone marrow harvest had only shifted to non-inpatient care in one unit and this occurred in 2006-7. Post transplant care shifted in three units for AutoHSCT and one unit for AlloHSCT pre-2001. Other shifts to non-inpatient HSCT, including conditioning/transplant for autologous and allogeneic HSCT, had only occurred in two units post-2005, with one of these units only shifting in 2009.
- (2) **Acute leukaemia or high grade lymphoma.** The majority of units shifting to non-inpatient care for suitable patients with acute leukaemia or high grade lymphoma had commenced this shift pre-2001. This had most commonly occurred for supportive care management of patients with acute leukaemia. Only two units reported shifting to non-inpatient management of some patients with febrile neutropenia and these had both shifted between 2006 and 2008.
- (3) **Blood transfusions and supportive care.** The majority of units reporting a shift to non-inpatient provision of blood transfusions, supportive care such as bisphosphonates and

immunoglobulin, antibody therapy, and management of other side effects or complications of treatment had commenced this shift pre-2001, with some also shifting these services more recently in 2006-7.

The e-survey results support available patient literature, and publications in academic journals, indicating that the majority of interventions currently available on a non-inpatient basis for haematological malignancies are for less-severe conditions with lower risk of complications. The e-survey results also show that where a shift has occurred in NSW sites, it commenced most often pre-2001, even with the more severe conditions or interventions.

2.4 SHIFT TO COMMUNITY SETTINGS

Several units have shifted non-inpatient care for some suitable patients with haematological malignancies to home or community based care.

The following models of care emerged from the case study sites as examples of approaches to home or community based care, these are outlined in detail in the Case Studies in the Appendices:

- Cancer Outreach Teams – there are currently two hospitals in NSW that provide mobile outreach specialist nursing care for haematology and oncology patients in a local area health service.
- Chronic Transfusion Service- Case Study 2 describes a Chronic Transfusion Service where bloods are collected according to required frequency in the community via the home collection service or local pathology collection centre, and sent to the haematology day ward nurse coordinator for review against pre-determined clinical parameters.
- Hospital in the Home (HITH) - also in Case Study 2, this service is staffed by generalist nurses who are supported by established haematology patient assessment and care protocols. They follow-up patients at home, including some patients whose daily monitoring alternates between HITH and a day ward, so that they do not have to come to the hospital every day.

2.5 DRIVERS OF CHANGE

The review of the literature and the e-survey revealed some key drivers stimulating this shift of services from inpatient to non-inpatient models of care. These drivers fell into four main areas:

- (1) **Dealing with inpatient bed pressure (87%).** Shifts to a non-inpatient model of care can sometimes be part of a planned response by administrators or services to deal with expected bed closures. It can also occur to accommodate increasing patient numbers. Reducing demand for inpatient beds was rated by 13 out of 15 responding units (87%) as a highly important driver. Reducing waiting times for treatment was also rated as highly important by 11 of 14 respondents (79%). One of the case studies revealed that in the face of increasing patient demand *and* the lack of space on the existing hospital site to physically expand they had no alternative but to develop an outreach model.
- (2) **Improving patient quality of life (93%).** A desire to improve quality of life for patients and/or carers was a key driver identified in both the literature and e-survey. 13 out of 14 responding units (93%) rated this driver as highly important. Similarly, improved patient convenience was rated as a highly important driver by 10 of 14 respondents (71%) and of medium importance by the other 4 units (29%). From the literature, an inpatient-outpatient (IPOP) model of care (as distinct from an inpatient only model of care) for patients with haematological malignancies undergoing either autologous or allogeneic bone marrow transplant has been shown to be less emotionally distressing and better meet the needs of family caregivers⁹. Specific implications for outpatient care models include the importance of caregiver education regarding patient care, and the need for assessment and intervention to address caregiver psychological needs.
- (3) **Cost reduction (30%).** Several studies have highlighted intended cost savings from movement to outpatient care^{4,10}. Cost reduction was only reported as a highly important driver in five out of 15 responding units in NSW, of medium importance in five units, and of low or no importance in the other five units.

- (4) **Reducing hospital acquired infection (27%).** Reducing patient exposure to severe multi-resistant hospital acquired (nosocomial) infections is considered particularly important in the immuno-compromised patient. For example, a study into outpatient management of acute promyelocytic leukaemia after intensive consolidation chemotherapy, reported a reduced risk of developing hospital acquired infections in those treated as outpatients¹¹. Seven of 14 respondents in the NSW survey rated this as a driver of medium importance, with four (27%) rating it as highly important.

A full list of key drivers and their importance rating from the e-survey is contained in the Appendices.

2.5.1 Factors facilitating a successful shift

Both the e-survey and literature also identified some key facilitators which allowed a shift from inpatient to non-inpatient care to occur. These included:

- technological advances in chemotherapy;
- supportive care and delivery systems, particularly those dealing with the toxicity associated with stem cell transplants; and
- advances in the availability of new antiemetics and antimicrobial prophylaxis^{4,12}.

The case studies also highlighted some organisational factors as important facilitators of non-inpatient care:

- (1) **Funding.** For example, additional funding to implement a cancer outreach service or establish an ambulatory unit.
- (2) **The ability to deal with patients within opening hours.** Haematology registrar cover was provided as one example of how ambulatory or day ward services facilitate fast assessment and review of diagnostic information within day ward opening hours.
- (3) **Good Communication.** Open and regular multidisciplinary team communication such as a weekly team meeting and/or including the cancer outreach nurse in daily ward rounds. Ideally this would facilitate communication across the patient pathway.
- (4) **Skilled in-home care.** In-home care services staffed or established by specialist haematology nurses, working in close consultation with haematologists and the inpatient and ambulatory service/day ward nurse manager/s.
- (5) **Suitable IT.** An example was the suitable IT system to support a Chronic Transfusion Service.
- (6) **ED Bypass processes.** Systems to reduce the time between presentation and definitive care for patients such as Emergency Department bypass procedures, a patient wallet card with instructions for the attending ED doctor, or a cancer outreach nurse with ability triage in the patient's home.
- (7) **Strong leadership (clinical or other).** This was rated as medium-high importance by 12 of 14 respondents; and
- (8) **Improvements in staff expertise.** This was rated as medium-high importance by 11 of 14 respondents.

2.6 SUMMARY OF INPATIENT AND NON-INPATIENT CARE

As outlined in preceding sections, some aspects of care for patients with haematological malignancies have less commonly shifted to non-inpatient care due to the severity or risk of infection associated with conditions or interventions (i.e. HSCT, management of acute leukaemia and high-grade lymphomas, and management of febrile neutropenia). Other aspects of care have been routinely available on a non-inpatient basis for many years (e.g. low-dose chemotherapy, blood transfusions, bisphosphonates) and are shifting in some units from hospital outpatient based care, such as day wards or clinics, to community/home based care. This is reflected in Table 2.1, which outlines the availability of various interventions on an inpatient or non-inpatient basis. It must be kept in mind that each of these interventions is dependent on individual patient suitability as outlined earlier in this section.

Table 2.1: Availability of inpatient and non-inpatient care for patients with haematological malignancies based on published literature and NSW Survey responses in parentheses.**

Patient or Intervention	Inpatient based care	Non-Inpatient based care	
		Hospital non-inpatient based care (*)	Community/home based care (#)
HSCT			
Stem cell mobilisation	Yes	Yes (5/8)	Yes (1)
Bone marrow harvest	Yes	Yes (1/6)	
Apheresis	Yes	Yes (8/8)	Yes (1)
Cryopreservation	Yes	Yes (4/4)	Yes (1)
Pre-transplant work-up		Yes	
Conditioning / transplant (autologous)	Yes	Yes (2/5)	
Conditioning / transplant (allogeneic)	Yes	Yes (2/4)	
Pre-engraftment	Yes	Yes	
Post transplant care (autologous)	Yes	Yes (4/7)	Yes (1)
Post transplant care (allogeneic)	Yes	Yes (2/4)	
Acute leukaemia			
Induction chemotherapy	Yes	Yes (3/9)	Yes (1)
Consolidation/maintenance chemotherapy	Yes	Yes	Yes
Supportive care	Yes	Yes (8/10)	Yes (1 – based on written comments from unit)
Radiotherapy		Yes	
High Grade Lymphoma			
Chemotherapy	Yes	Yes (5/9)	Yes (1)
Surgery	Yes		
Radiotherapy		Yes	
Other conditions or interventions (i.e. chronic leukaemia, non high grade lymphoma, myeloma, MDS, MPD)			
Chemotherapy	Yes	Yes	
Antibody therapy	Yes	Yes (10/10)	
Steroid therapy	Yes	Yes	
Radioactive isotopes/Interferon		Yes	Yes
Radio immunotherapy	Yes	Yes (1/3)	
Blood transfusions	Yes	Yes (12/12)	Yes
Febrile neutropenia	Yes	Yes (2/10)	Yes (1)
Management of side effects or complications e.g. mucositis, antibiotics, antiemetics)	Yes	Yes (10/12)	Yes
Bisphosphonates		Yes (13/13)	Yes (1 – based on written comments from unit)

*Parentheses = (No. of NSW units indicating availability as non-inpatient) / (No. of NSW units indicating availability of intervention at unit). Note that where responses are not provided in parentheses, this question was not specifically asked in the NSW survey and is based on published journal and patient literature only.

#Parentheses = No. of NSW units indicating availability as community or home based care. Note that all these units also offered this intervention as hospital-based non-inpatient care.

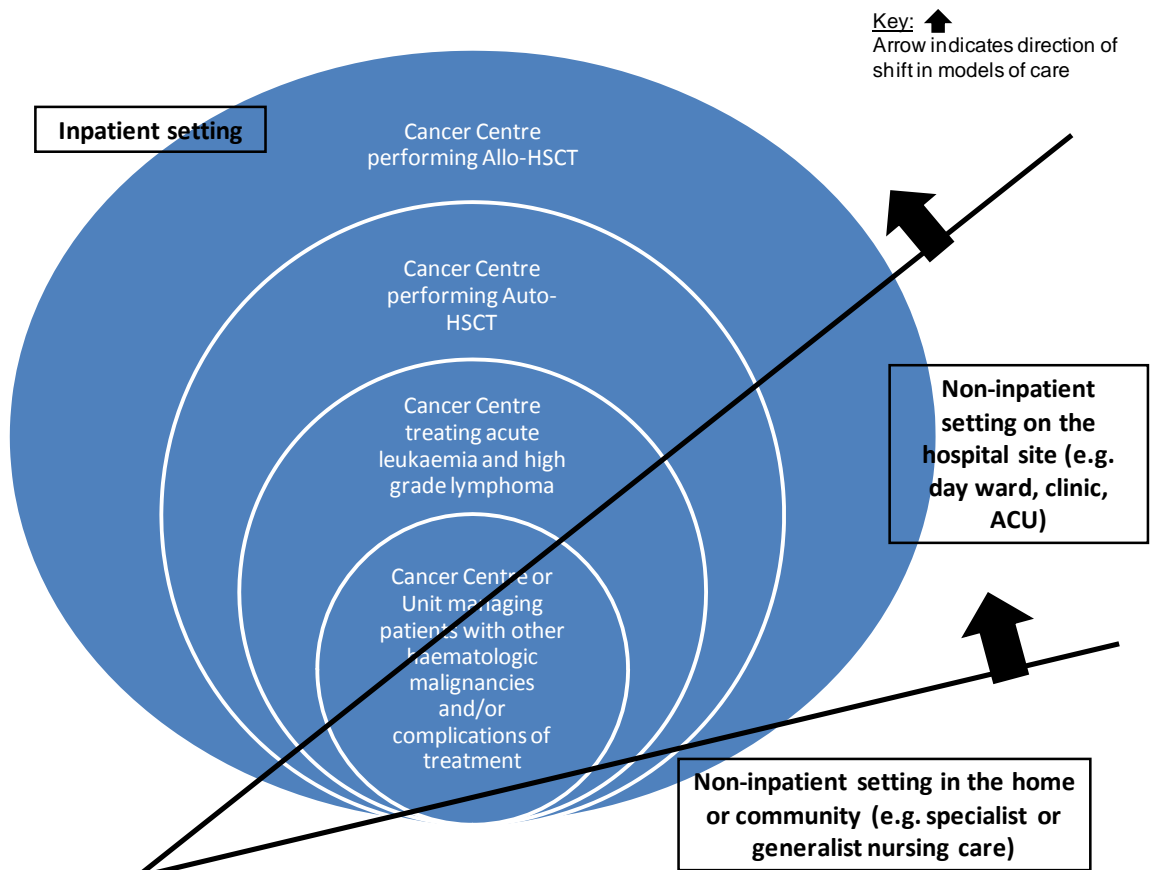
The management of patients on a non-inpatient basis, either hospital or community based, depends not only on the patient's condition and intervention required, but also on the proximity of the patient's residence or alternative accommodation to haematology services. Management of haematological malignancies may therefore be variously available in tertiary or secondary referral centres, or primary care centres, depending on treatment required and patient location. For example, only four Cancer

Centres in NSW are accredited to perform allogeneic HSCT, despite many city and regional hospitals having Cancer Units which offer the more traditional non-inpatient care services. Patients requiring HSCT, must have access to suitable accommodation within 30-60 minutes of one of these centres if non-inpatient management is to be considered for conditioning, transplant and post transplant care, particularly prior to engraftment.

The existence of comprehensive networks of care for patients with haematological malignancies is therefore extremely important, and whilst a consideration of cancer network structures is beyond the scope of this report, it is understood they are currently in development in NSW.

Whilst the actual split between episodes of care or occasions of service provided on an inpatient versus non-inpatient basis was not collected in the e-survey, case study site discussions and published literature suggest a representative split in services as indicated in the figure below.

Figure 2.1: Suggested representative split of services by delivery setting



This diagrammatic representation indicates that the majority of interventions for patients undergoing HSCT, or with acute leukaemia or high-grade lymphoma, appear to still be occurring on an inpatient basis, although some non-inpatient care (primarily hospital-based) is now available. For patients with 'less severe' conditions, a large proportion of other care is already available on a non-inpatient basis for suitable patients, with shift occurring to not only increase this proportion, but to move some of these patients from hospital to community-based non-inpatient care where possible.

3 Evolving Models of Care

This chapter describes factors identified as important in a shift from inpatient to non-inpatient models of care, based on findings of the literature review, the e-survey and the three NSW case studies.

3.1 OVERALL FINDINGS: EVOLVING MODELS OF CARE

- | |
|--|
| <p>F.6 Most units (66.7%) in NSW are haematology/oncology units and are also treating patients with solid tumour cancers and other non-malignant haematological conditions.</p> <p>F.7 While patient suitability is assessed through individual clinical assessment, initiating new models of non-inpatient care can be prompted by formal processes with established criteria, informal mechanisms, or a prompt from a particularly motivated patient.</p> <p>F.8 Lack of an informal carer is a common reason for lack of patient suitability for non-inpatient care.</p> <p>F.9 Day to day, certain patients need to be managed seamlessly across inpatient and outpatient settings, so the distinction between inpatient and outpatient care can be artificial for both patients and clinicians. Therefore, co-location with other components of care, sharing/cross training staff across settings, and sharing systems across settings can promote seamless care.</p> <p>F.10 Like inpatient care, non-inpatient care needs to be multidisciplinary, but with the ability to schedule and deliver interventions within shorter opening hours. This can have implications for the traditional prioritisation processes in acute hospitals that give inpatients higher priority than outpatients.</p> <p>F.11 Extended opening hours or outreach teams may be able to reduce ED presentations.</p> <p>F.12 While some units have developed ED bypass processes, some are adhoc arrangements without formal pathways and are limited to business hours.</p> <p>F.13 While teamwork is generally multidisciplinary, formal processes of care-coordination post discharge or across care settings can be inconsistent.</p> <p>F.14 Space for family and patient counselling and nurse consultation was identified as a common need for most units.</p> <p>F.15 Typically, IT systems do not adequately support record keeping across inpatient and non-inpatient settings.</p> <p>F.16 Non-inpatient care models are largely developed locally, as part of the continuous improvement process.</p> <p>F.17 A variety of approaches to managing change seem to be used. However, improved supportive care, good teamwork and communication processes were considered of high importance when facilitating change.</p> <p>F.18 Difficulties in the change process were identified as a lack of appropriately trained nursing and allied health staff, establishing processes for emergency admission, and establishing a clear point of contact for patients should complications arise.</p> <p>F.19 Few e-survey respondents (2 units) confirmed they had evaluated the impacts of change.</p> |
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Research into non-inpatient care for patients with haematological malignancies has primarily considered the impact of non-inpatient management on treatment outcomes and patient safety. Factors influencing these outcomes, particularly in the emerging areas of non-inpatient care including HSCT and acute leukaemia, were identified as:

- the selection of suitable patients to receive non-inpatient management (or elements of care on a non-inpatient basis);
- service relationships and their organisation;
- unit structure, services and their workforce; and
- facilities and systems in place to support these care models.

Various approaches to non-inpatient care have been described in the literature and identified in the e-survey and case studies. They generally show similarities in terms of patient eligibility, but differences

in terms of service organisation, unit structure, systems and to some extent, workforce. Each of these is discussed below.

3.2 PATIENT SUITABILITY

Consideration of non-inpatient care, particularly for patients at high risk of infection, requires an assessment of patient suitability. Factors involved in assessment of patient suitability were discussed in Section 2.3.1.

The case studies demonstrated that, although these factors are taken into account when undertaking a clinical assessment of the suitability of each individual patient, some units operated without explicitly documented criteria. Patient motivation, and the desire of specific patients for outpatient treatment, may also act as a trigger for clinicians to reconsider how care is delivered, and to then trial a new approach.

The suitability of the home environment, and the availability of carers, is a factor that is assessed through discussion with patients at the time of assessment, or in the discharge planning process. However, suitable patients may not necessarily do equally well at home. It was noteworthy that in the COT case study it was found that occasionally what patients report, and what the clinician finds in the home, can differ from what was discussed on discharge or reported to nurses through telephone monitoring.

The role of the caregiver is crucial in non-inpatient management of patients with some haematological malignancies^{4, 10}. Patients receiving non-inpatient HSCT in particular rely on 24 hour caregivers who can be responsible for administration of intravenous antibiotics and oral medications, monitoring temperature, blood pressure, pulse, fluid intake and output readings.

Importantly, the caregiver and patient need to be clear on when to seek advice, assistance or emergency treatment, and know how to maintain oral hydration and an appropriate diet. Literature supports a clear role for nurses in the provision of education to patients and caregivers to facilitate non-inpatient care. In shifting services to an outpatient model, consideration must be given to how and when nurses or other members of the healthcare team can provide education and support to the patient and their families or caregivers. It has been found that nurses have had to modify their time with patients to overlap the delivery of medication with education and supportive counselling¹⁰.

3.3 SERVICE RELATIONSHIPS AND ORGANISATION

Prior to consideration of models of non-inpatient care, the context and organisation of the services into which these non-inpatient models fit must be considered. This section presents this context which encompasses both inpatient and non-inpatient services.

3.3.1 Patient management across settings

Although the scope of this report is limited to the shift to non-inpatient management for adult patients with haematological malignancies, many services for these patients do not exist in isolation. In fact, often the distinction between inpatient and ambulatory/outpatient services may appear artificial.

This group of patients encompasses a diverse range of illnesses, with a wide variety of treatment needs¹³. Services for these patients may need to be integrated with other oncology services and/or services for patients with non-malignant haematological disorders, as clinical staff and facilities may be shared. It must be recognised that comprehensive planning of service organisation, including staffing, facilities and laboratory services across each of these patient groups may be important for optimal service delivery.

This was particularly apparent from the case studies. For example, in all cases, patients shifted often between settings. At the regional case study, some team members worked across both ambulatory and inpatient units. The COT CNC worked on a mobile basis in the community, and also performed regular ward rounds with the consultant within the hospital. Similarly, in Case Study 2, the HITH nurses are in daily telephone contact with the unit NUM providing patient updates, or with the consultant discussing concerns about particular patients as they arise.

3.4 UNIT STRUCTURE, SERVICES AND WORKFORCE

The structure of units offering non-inpatient treatment facilities for adult patients with haematological malignancies varies according to several factors. These include 'housing' of the unit within broader haematology or oncology services, relationship with inpatient facilities and other services, numbers of patients, opening hours, after-hours access to services and relationship with emergency department, and staffing structure and resources. These are discussed below.

3.4.1 Haematology/oncology service structure

Various models have been used both in Australia and overseas in the establishment of haematology units. These largely fall into four areas:

- a haematology/oncology unit also treating patients with solid tumour cancers and other non-malignant haematological conditions;
- a dedicated haematology unit also treating patients with non-malignant haematological conditions;
- a dedicated haematology unit only treating patients with malignant haematological conditions; and
- an oncology unit also treating patients with solid tumour cancers.

In NSW, the e-survey identified that the majority of services (66.7%) were provided within haematology/oncology units that were also treating patients with solid tumour cancers and other non-malignant haematological conditions. A summary of the four types and survey results are provided in the table below.

Table 3.1: Unit types responding to the survey (Q2)

Type of unit	Response %	Response Count
Within a haematology/oncology unit also treating patients with solid tumour cancers and other non-malignant haematological conditions <ul style="list-style-type: none"> • Albury Base Hospital • Cancer Services - Westmead • Cancer Services Central Coast • Cancer Therapy Centre - Liverpool Hospital • Dubbo Base Cancer Centre • HOAC, St Vincent's Hospital Sydney • North Coast Cancer Institute • St George Hospital • SWCN Nepean Hospital • Tamworth Hospital 	66.7%	10
Within a dedicated haematology unit also treating patients with non-malignant haematological conditions <ul style="list-style-type: none"> • Ambulatory Care Unit, RNSH • Hunter Haematology Unit, CMNH • Prince of Wales Hospital 	20.0%	3
Within a dedicated haematology unit only treating patients with malignant haematological conditions <ul style="list-style-type: none"> • RPAH Haematology 	6.65%	1
Within an oncology unit also treating patients with solid tumour cancers <ul style="list-style-type: none"> • Sutherland Oncology Clinic 	6.65%	1

Not every component of service provided to patients with haematological malignancies may be offered within a unit, and sometimes small numbers of other types of patients may also be treated within the unit e.g. rheumatology patients. The types of services offered outside a unit or at another accredited hospital were identified in the e-survey (see Appendix C Table C 2) and the case studies as follows:

- chemotherapy and blood transfusions - which may be performed in a general oncology day unit or as an admitted patient;

- home nursing services – which is usually delivered by generalist community nursing or HITH teams;
- stem cell harvest and start-up of initial chemotherapy – performed in one of the major accredited hospitals; and
- insertion of central venous catheters/devices – which may occur in the hospital recovery department.

3.4.2 Collocation with other service components

The physical location of non-inpatient haematological cancer services may be driven by tangible requirements or demands, as well as by philosophical beliefs as to the ideal service. Facilities may be established as part of haematology units, haematology/oncology units or as separate facilities, for example a facility offering outpatient bone marrow transplant, depending on patient numbers, historical unit structure, patterns of ward closure, available resources and clinician and/or administrator vision for change, amongst other factors.

The benefit of locating non-inpatient services alongside, or within, inpatient facilities for haematological conditions, is the easier provision of an IPOP model of care. Patients are able to be moved relatively smoothly between inpatient and outpatient care. The establishment of a separate outpatient unit can be considered where numbers of patients are large. The unit can be housed either in the same facility as inpatient wards, or in a separate building. Services such as laboratory, radiology suite and chemotherapy pharmacy have also been described as ideally located on-site.

During the review scoping visits, it was identified that physical location of services was considered important to support good communication across multidisciplinary teams and to be able to provide services within the designated opening hours. The e-survey (see Appendix C Table C 3) showed that most facilities were considered conveniently co-located. However, the items which particular services stated they would relocate if they had the resources are listed below, with the number of units giving this response identified in parenthesis:

- PET scan (4);
- inpatient oncology/haematology beds (2);
- clinical trials offices (2);
- apheresis (2);
- cryopreservation and storage (2); and
- patient transport pick-up and drop off (1).

Collocation of services can speed up access, and allow patients to be dealt with between opening hours. However, where services are shared with other hospital patients, there can still be difficulties. This can mean that other services such as pharmacy or radiology may need to consider some non-inpatients a higher priority than inpatients. This is the reverse of the traditional practice in Australian hospitals of prioritising inpatients before outpatients.

“Given that we now have the ability to deal with more acute patients on an ambulatory or outpatient basis, an ambulatory ward usually needs the same or similar multidisciplinary staffing models as an inpatient ward plus the ability to deal with patients between business hours.

This means diagnostic and support services need to consider non-inpatients a higher priority than an inpatient.”

Comment from a Haematology Clinical Director

3.4.3 Opening hours

Given the intensity and frequency of treatment regimens for some patients, non-inpatient services are ideally provided in a facility operating extended hours including evenings, weekends and public

holidays. Most services discussed in the literature offer services between 7am and 7pm, 7 days per week, for both scheduled and unscheduled patients. The NSW e-survey identified that:

- 11 out of 15 units were opened Monday to Friday, during normal business hours (i.e. for up to 9 hours a day, opening at either 8am or 9am and closing at either 4pm or 5pm);
- one unit was open extended hours until 7pm Monday to Friday; and
- two units were open 7 days per week, during normal business hours.

Table 3.2: Opening hours (Q5)

Between what hours do you offer non-inpatient care?			
Mon-Fri	No. of hours	Sat/Sun/Pub Hols	Number of units with these hours
8-5	9		4
9-5	8		4
8-4	8		3
7-7	12		1
7.30-5.30	10	7-7	1
8-6	10	8-4	1
not reported			1
Total Responses			15
<p>Other (please describe):</p> <ul style="list-style-type: none"> • “On weekends and public holidays the ward is used for urgent outpatient cases, staffed by Haematology ward staff (which is next door).” • “We are open Mon to Fri 0730 hrs to 1730 hrs. Closed on weekends and public holidays.” • “The above figures are slightly misleading - only really apply to the general hospital ambulatory care unit. Others are 9 am-5 pm Mon to Fri. Drop in patients, for 2 hours/day.” • “8-5 each day, except weekend and public holidays.” • “Weekend service opening on 1st August 2009.” • “Monday to Friday during working hours - Cancer Outreach Service at home; Monday to Saturday - non-inpatient transfusion service only.” 			

3.4.4 Unscheduled assessment and consultation

The e-survey found that 11 units allow for unscheduled assessment or consultation in person, and 10 units also indicated that they undertook these over the telephone. However, this is usually limited to regular opening hours, or a time period within the regular opening hours. Some relevant comments from the e-survey are detailed in the Appendices and show a variety of approaches to unscheduled assessment.

3.4.5 Emergency bypass and after hours procedures

Generally, the ‘usual care’ for patients attending a major public hospital emergency department (ED) is a process whereby, at time of presentation, the patient is triaged and then seen by the attending doctor. If admitted, identification of a suitable bed is usually coordinated by a hospital bed manager. At times, this may require a patient to be initially admitted to a ward that is rostered to admit, e.g. ‘on-take’, and then transferred to a speciality ward as part of their definitive care.

The review found that some hospitals have processes in place to allow specific patients to bypass assessment in the emergency department.

Critical to services with an ED bypass process is a clear contact number and procedure for patients to access services after-hours. It has been recommended that planning of cancer centres and units must consider the infrastructure needs in ambulatory programs for these patients, who often require supportive care and urgent assessment¹³. Review of these patients in emergency departments may not be appropriate, due to lack of isolation facilities (as these patients are often immuno-compromised) and lack of staff familiarity or expertise with specific treatment algorithms.

An emergency unit specifically dedicated to people attending with haematological conditions was described in one facility in the literature¹¹. This emergency unit is dedicated to people with haematologic conditions requiring immediate clinical evaluation, therapeutic intervention and hospitalisation. Most facilities describe a clear process for emergency presentation, which is communicated to patients and carers. For example, contact numbers may be provided for the physician on call, who can then advise patients to attend the emergency department if required.

Case Study 2 used a medical alert patient wallet card as a support tool for patients and clinicians. The card included a checklist for the patient of the indicators for ED presentation and a checklist for the attending doctor of mandatory protocols for management.

The detailed results of all units in the e-survey are provided in the Appendices and summarised below. Generally, the results of the e-survey were mixed, however most units offered a procedure for emergency bypass during unit opening hours.

Table 3.3: Units with an ED bypass process (Q9)

Do you offer a process where patients can bypass the Emergency Department? If so, can you please describe how this works?		
Answer Options	Response Percent	Response Count
Yes	60.0%	9
No	26.7%	4
Would if we had the resources	13.3%	2
Planning to	0.0%	0
	Total	15

3.4.6 NSW health professional roles

Various staffing models for non-inpatient units have been reported in the literature. These include nurse-managed chemotherapy clinics¹⁴, physician run units, and nursing care units with physician oversight⁶. In some cases, where the outpatient unit was located alongside the inpatient unit in the same physical location, the same multidisciplinary team cared for both inpatients and outpatients. This was reported as an important factor contributing to the success of one outpatient HSCT program¹⁰.

Both the UK NICE Guidelines¹⁵ and WA Models of Care report¹³ (see a summary in Appendix H) recommend that care for every patient with haematological cancer be provided by a multidisciplinary team with expertise in the particular form of haematological cancer, and at a site considered appropriate to the intensity of the treatment to be administered and particular patient variables. This is true for non-inpatients as well as inpatients. The WA report recommends that Cancer Centre ambulatory facilities be designed to accommodate a multidisciplinary model of service provision. The e-survey identified a range of workforce roles within each unit in NSW. While the exact arrangement and type of workforce roles varied between units, some key roles that were identified as being particularly valuable to the teams included:

- an 'on-site' pharmacist – to make up chemotherapy and be on hand for rapid advice and participation in medication review;
- a nurse coordinator – involved in managing small or large parts of a patient's treatment or care pathway;
- clinical nurse consultants – including BMT Co-ordinators and cancer outreach workers; and
- social workers – providing practical and emotional support and information.

The UK NICE Guidelines¹⁵ also recommend that palliative care specialists should play a central role in the treatment of patients with haematological malignancies. While NSW palliative care teams generally operate independently to haematology teams, they will usually have close working relationships. An example of this was found in Case Study 2, where the palliative care consultants attended the weekly ward meetings to discuss patients and their care needs.

The Case Study 3 COT also worked in partnership with the palliative care home nursing service, the COT CNC often visiting patients together with the palliative care nurse.

Case Study 1 also commented that having a specific team member available, such as a dedicated haematology registrar, helped to improve patient turnover and therefore made the service more sustainable.

Bone marrow transplant coordinators

BMT coordinators generally operate in inpatient or ambulatory care units in hospitals accredited to provide allogeneic and autologous transplants. There is currently one BMT coordinator located at a regional hospital who is responsible for organising monthly clinics for patients discharged from Westmead Hospital. This clinic is run by a consultant haematologist from Westmead as an outpatient outreach clinic. A more detailed description of the role of BMT coordinator is provided in the Appendices.

Physician assistant

At the Case Study 1 site, there was also a physician assistant (PA) role, which was vacant at the time of writing. When last filled, it was a senior nursing position, and is described in detail in Appendix D. This role directly supported the work of the unit's Director, with a focus on care management and a diverse set of high level support activities.

The PA role involved performing test ordering, completing authority prescriptions for the director of the unit, carrying out operational and clinical research, preparing ethics submissions, undertaking revenue-generating projects such as drug chart audits, and coordinating MBS and PBS charging. The PA also led special projects such as e-health record implementation and new practice implementation or evidence based practice projects.

Cancer outreach service, clinical nurse consultant

The COT in Case Study 3 was being coordinated by a CNC, supported by a CNS. The CNC and CNS participated in the palliative care meeting, the haematology ward rounds and the medical oncology rounds on a weekly basis. The typical day to day activities of the COT nurses included:

- adhoc triage and assessment of patients as required;
- five day/week contact with the Haematology multidisciplinary team (MDT) regarding individual patient needs;
- attending haematology and medical oncology ward rounds with the MDT to identify people suitable for home follow-up and assist in the preparations for discharge;
- collecting blood and interpreting blood tests based on individual patient parameters i.e. patient specific parameters set by the haematologist that would trigger a decision to admit for transfusion;
- managing symptoms and treatment of side effects;
- venous device care;
- patient and carer education and reassurance;
- chemotherapy and bisphosphonate infusions;
- working with the palliative care team to provide support with blood tests and symptom management; and
- simple dressings requiring no more than once a week care (dressings requiring more regular care are referred to the GCN service).

3.5 FACILITIES AND SYSTEMS TO SUPPORT CARE

A range of tools and systems have been developed which increase the efficiency of non-inpatient cancer services, improve workflows and reduce strain upon staff and patients. Much research in this area has not been specific to patients with haematologic malignancies, although common factors identified in the literature for consideration in outpatient management are likely to include^{14, 16}:

- patient flow and scheduling;
- complexity of treatment regimens;
- time required for preparation and delivery of treatment regimens;
- physical facilities and space restraints; and

- staff resourcing.

A recent action research project conducted in the Haematology/Oncology Day Unit of the Gold Coast Hospital, Queensland¹⁷, provides a good example of the types of common issues encountered by services. A summary of the issues explored, the workplace changes initiated and the project outcomes are summarised in the table below.

Table 3.4: Example of systems for support service delivery

Unit/Facility	Issues	Changes as a result of study & outcomes
Haematology/Oncology Day Unit of the Gold Coast Hospital, Queensland	<ul style="list-style-type: none"> • extent of and solutions to patient waiting lists • the time patients had to wait on treatment days • patient symptom management, patient education • the identification and management of chemotherapy complications 	<ul style="list-style-type: none"> • chemotherapy protocol manual (multidisciplinary) • common system of medical records • redesigned appointment sheets to spread appointments • allocate day-long procedures to beginning of the day • allocate a nurse primary care giver to each patient for the day • specific review clinic for those not requiring treatment on that visit • implementation of a computer-based chart request system • improved waiting times, patient management and patient satisfaction

3.5.1 Physical facilities and support services

The e-survey (Q20) asked units to identify what systems of support and facilities they had available to support non-inpatient services, and those they would like to develop if they had the resources. While most services seem to have quite comprehensive facilities available (see the full results in Appendix C Table D16), the top three items identified as desirable in the future if resources were available were:

- dedicated family conferencing and counselling rooms (7);
- on-site residential accommodation for non-local patients and their carers (7); and
- nursing consultation rooms (4).

This result is worth noting in light of the results of the *NSW Cancer Patient Satisfaction Survey 2008*¹⁸, which highlighted emotional support and accompanying relevant information as the two main areas of lower satisfaction across NSW cancer outpatient services in the last two surveys.

The issue of available space for patient and family counselling was also raised in two of the three case studies. At the Case Study 2 site, the day ward is very much at capacity. Chairs and equipment are positioned almost arm to arm, without space for visitor/carer chairs and with little room to manoeuvre when assisting patients in and out of the chairs. At the COT case study site, the lack of available space was cited as the primary reason for developing a cancer outreach service.

It is likely that the requirement for nursing consultation rooms is closely related to the need for family conferencing and counselling rooms.

Access to services also requires additional consideration for non-local patients. In most facilities reported in the literature, access to local accommodation was available for these patients as it is a requirement that patients are within 30-60 minutes of the facility when receiving certain treatments as an outpatient. Accommodation ranges from access to local motels with transport available to the treatment facility, on-site accommodation in a separate facility, or in some cases on-site accommodation in closed hospital wards which have been converted to accommodate patients and carers.

3.5.2 Information technology and administrative systems

Although the availability of electronic patient information systems did not emerge in the literature as a key issue affecting successful implementation of non-inpatient models of care, it has certainly been highlighted as a critical factor in overall models of care for patients with haematological

malignancies¹³. A well designed and complete electronic record containing real-time clinical, diagnostic and treatment information will greatly facilitate models of patient care and safety. Electronic prescribing and treatment records are the priority in initial development of electronic records.

While clinical management systems were identified in the e-survey as already in place for most respondents, there were three units that identified IT systems as an area for future development.

From the case studies it was clear that, while units usually had components of electronic medical record (EMR) systems (e.g. e-pathology and/or e-chair booking systems), none of the three units had a truly integrated IT system that would allow records to be viewed across inpatient and outpatient treatment settings by all members of the multidisciplinary team.

A good example of this was the COT case study site where, although the hospital had provided the outreach team with VPN access to view inpatient records, in reality the VPN access was too slow to be able to be viewed offsite. At the same time, consultants were still keeping manual records in their rooms.

At the ACU case study site, consultants used an electronic clinical management system to record patient notes, produce referral letters and so on, however at this stage only medical staff were able to access the information.

3.6 THE 'SHIFT' PROCESS

Chapter 2 discussed the drivers of change toward provision of non-inpatient care, the interventions that have more recently shifted to non-inpatient management in suitable patients, and the structure and arrangement of services where aspects of non-inpatient care have been implemented. When considering the process of shifting services, it is also worthwhile understanding:

- various approaches to the management of change;
- facilitators of, and barriers to, change; and
- evaluation of the impacts.

These issues are discussed below, and facilitators and barriers identified in the e-survey are described.

3.6.1 Facilitators and barriers

The NSW e-survey asked respondents to identify the most important key facilitators and barriers to shifting care to non-inpatient models. The full survey results are represented in Appendix C, Table C 17 and 18. The top three facilitating factors identified in the e-survey as being of high importance were:

- improved supportive care post-chemotherapy treatment;
- unit team work; and
- good communication processes.

The case studies supported this finding. It was apparent that, while processes for managing patients were important, equally important was the ability of the team to trust each other, and to have good quality, frequent communication to ensure that multidisciplinary team work actually occurred. At two sites, the Directors described regular weekly or bi-weekly team meetings as being essential to the effective management of all patients, both ambulatory and inpatients. When discussing the weekly multidisciplinary team meetings, the Director of one of the case study units commented that this communication was critical and without it, service would fall apart.

The top three barriers/difficulties in transitioning services were described as:

- sufficient, appropriately trained nursing and allied health staff;
- establishing a process for emergency admission; and
- establishing a clear point of contact for patients should complications arise.

The case studies highlighted the importance not just of having enough nursing and allied health staff, but also of recruiting and developing the right, qualified and experienced staff, with a professional interest in haematology patients.

As described earlier in this chapter, the Case Study 2 site developed a clear process for emergency admission with a patient wallet card, a tool for the patient to determine when it was appropriate to come to the ED, and what the mandatory action should be by the attending doctor when they arrived.

With the COT, a different process was in place during service hours, as the mobile outreach worker was usually able to visit the patient at home and conduct an assessment. If needed, she would then consult with the haematologist and NUM remotely to directly initiate an admission to the short stay ward. While generally this worked well for both patients and clinicians, there were times when their unit beds were full, and therefore patients needed to be admitted as outliers to other wards.

At the ACU case study site, the Director reported that they actually had few after-hours admissions. This is most likely because the unit had extended opening hours, and patients could make direct contact with the ACU during opening hours for assessment and telephone consultation. If needed, and if beds were available, the patient could be subsequently admitted to the ACU or inpatient ward via the hospital bed manager. However, the ability to respond quickly to this ad hoc demand can at times be limited by the other scheduled demands placed on medical staff on the day.

3.6.2 Impacts and evaluation

While few respondents (2 units) confirmed that they had evaluated the impacts of the changes, the e-survey asked respondents what they felt the financial and staffing impacts had been of the changes.

In relation to financial impacts, 38% of respondents felt there had been an overall cost saving to cancer care and/or haematology cancer patient care, and 15% felt there had been other in-kind cost savings.

However, given the fact that the most important key drivers described earlier related to dealing with patient demand, the overall cost of services would not have been expected to decrease. Logically, the cost per patient *may* have decreased, depending on the cost of any changes to treatment protocols (e.g the cost of an individual outpatient service may well be lower than an inpatient delivered service). However, detailed analysis of this issue was outside the scope of this review.

In terms of impact on staff, respondents felt the changes had affected them through:

- increased skills/professional development opportunities;
- increased morale; and
- better job opportunities in the future.

A large group (33%) also selected 'unknown' regarding the impact of change on staff. This could be because, while in general the change was reported as a positive process, in reality the impact on staff had brought both new opportunities and new challenges for the management of the overall service. This was evidenced in the 'Other (please describe)' section of the response, where cancer services described staff impacts as both positive and negative depending on where you worked. The following impacts were described:

- an increase in skills within the day treatment centre, for example nurses learning to do apheresis, but a decrease in skills for nurses in the inpatient ward setting;
- staff in non-inpatient wards tend to work more regular hours, with no night duty and no weekend shifts. This has a financial impact on staff due to loss of penalty rates, but is usually seen as a positive and has assisted nurse recruitment; and
- registrars see a broad range of care across the inpatient and outpatient setting, and are therefore able to develop broader scope of practice.

In addition to these impacts, one site with a COT had identified improved patient care and avoidance of admission to hospital. As part of their evaluation, they completed a patient satisfaction survey in 2006 and found that patients were typically responding positively to the change.

4 Non-Inpatient Care Models, Guiding Principles and Opportunities

The extent of shift from inpatient to non-inpatient management of patients with haematological malignancies, and the degree of management or episodes of care occurring as a non-inpatient, varies according to disease severity and patient health status. As a consequence, emerging models of care have been considered separately in this chapter for patients with 'more severe' conditions to those with 'less severe' conditions. The guiding principles underpinning a shift to non-inpatient care for all patients with haematological malignancies, and the opportunities emerging from the findings of this review, are also discussed.

4.1 OVERALL FINDINGS: NON-INPATIENT CARE MODELS, GUIDING PRINCIPLES AND OPPORTUNITIES

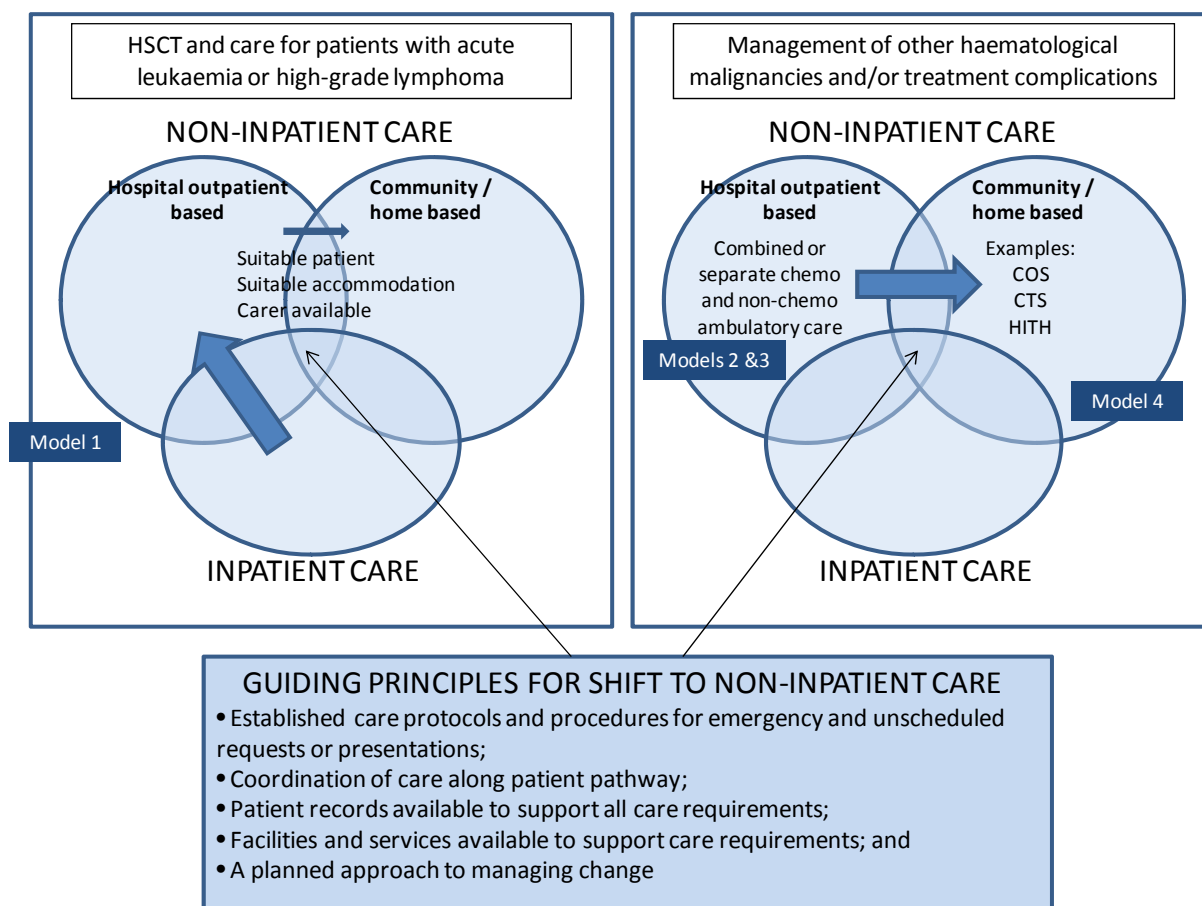
- F.20 Different models of non-inpatient care are variously available at different cancer centres or units, with a shift to these different models of care dependent not only on the individual treatment centre but also on patient types and disease characteristics.
- F.21 Integration of services between inpatient and hospital-based non-inpatient settings, as well as community-based settings, varies.
- F.22 However, guiding principles underpinning these models include:
- (a) Procedures for unscheduled and emergency patient contact;
 - (b) Coordination of care along the patient pathway;
 - (c) Patient records available to support all care requirements;
 - (d) Facilities and services available to support care requirements; and
 - (e) A planned approach to managing change.
- F.23 Opportunities exist for movement to non-inpatient care models both hospital-based and community or home-based, but should address guiding principles, ensure assessment of patient suitability to receive care on a non-inpatient basis and acknowledge the integrated nature of care required for patients with haematological malignancies.
- F.21 Two possible approaches to measuring the effectiveness a shift could be one based on evidence-based recommendations such as the UK NICE Guidance on Cancer Services, or broadly measuring the feasibility, safety, effectiveness and / or cost-effectiveness of a shift from inpatient to non-inpatient models of care, however a combination of the two is likely to be useful.
- F.22 Common evaluation questions related to the key drivers identified in the review of a) improving patient quality of life and patient convenience b) reducing demand and meeting current demand and c) reducing waiting times could be considered core questions.
- F.23 In addition to this, initiative specific questions would need to be established based on the particular treatment regimen, patient group or the element of care being shifted to provide a reasonably complete picture of the effect of the shift and maximise learning.

4.2 OUTLINE OF CARE MODELS AND GUIDING PRINCIPLES

Different models of non-inpatient care are variously available at different cancer centres or units. Shift to these different models of care depends not only on the individual treatment centre, but also on patient and disease characteristics. Care for patients with 'more severe' conditions (i.e. HSCT, acute leukaemia, high grade lymphoma) has shifted to the non-inpatient setting in some centres. Primarily, shift has occurred in ambulatory care hospital-based settings, with a shift to in-home or community settings identified in few or only one centre. Care for patients with 'less severe' conditions, or less high-risk interventions, has been available on a non-inpatient basis in some centres for over a decade. More recent shift was reported from ambulatory hospital-based non-inpatient care to home or community-based non-inpatient care.

In order to manage the patient caseload, not only in inpatient wards but also in non-inpatient ambulatory care units and other non-inpatient services, some units have explored community based models of care. Figure 4.1 summarises the shift in care for patients with varying haematological malignancies and presents the guiding principles for a shift to non-inpatient care. The models of care supporting these shifts and the guiding principles underpinning them are discussed in the following sections.

Figure 4.1: Models of care and guiding principles for shifting to non-inpatient care of patients with haematological malignancies



4.3 GUIDING PRINCIPLES

Any movement from inpatient to non-inpatient care, or from hospital-based to home or community-based care or outreach care, must recognise that whilst patient care requirements may still be the same, they must be accommodated within fewer available patient contact hours and may still require the same or similar multidisciplinary staffing model. In order to ensure that patient outcomes, safety and quality of care are not compromised by a shift to non-inpatient care, and to allow potential enhancement of outcomes by this shift, it is recommended that the following guiding principles be considered in any emerging models of care:

- (1) Established care protocols and procedures for emergency and unscheduled requests or presentations;
- (2) Coordination of care along patient pathway;
- (3) Patient records available to support all care requirements;
- (4) Facilities and services available to support care requirements; and
- (5) A planned approach to managing change.

Each of these is discussed below.

4.3.1 Established care protocols and procedures for emergency and unscheduled requests or presentations

Patients with haematological malignancies are, by the nature of their disease and intervention, often at high risk of infection and other complications. When moving to non-inpatient models of care, protocols and procedures should be established to ensure that patient safety is not compromised by exposure to potential infection risks in emergency departments, and also to ensure quality and appropriate care is received, by staff qualified to meet the specific needs of these patients.

Some examples of options developed by cancer units to address these requirements are:

- procedures for unscheduled requests for advice or patient presentations to the ambulatory care unit during opening hours – these may include telephone triage and counselling, patient presentation at any time, or patient presentation at certain times of day;
- extended unit opening hours, including weekends and public holidays, during which patients can contact or present at the unit;
- telephone triage and home assessment service by a mobile cancer outreach service (e.g. haematology trained clinical nurse consultant) during unit opening hours;
- consultant and registrar on-call service for patients to contact outside the unit opening hours;
- wallet card with procedure for both the patient requiring emergency assessment or advice and staff in ED regarding specific management of the individual patient; and
- established emergency admission procedure to either the haematology ward or a unit where care can be received by appropriately qualified staff.

4.3.2 Coordination of care along patient pathway

Many patients with haematological malignancies will move between inpatient and non-inpatient management during their treatment and care pathway. Not all units are able to provide co-location of all inpatient and non-inpatient hospital care. This issue can be addressed by developing clear procedures to ensure coordination of care along the patient pathway, particularly as this pathway may also involve outreach or home-based care.

Some key components identified in coordinated care approaches were the following:

- (1) **Multidisciplinary teams (MDTs)** which meet regularly (e.g. once or twice weekly), involve all staff involved in patient care including palliative care, and review all patients including inpatients, patients receiving hospital-based non-inpatient care and patients receiving home or community-based care.
- (2) **Allocation of a care coordinator** to each patient for the duration of their patient journey, and/or allocation of nursing staff to particular patients to ensure familiarity with patient condition, circumstances and intervention requirements. Care coordinators can contact patients post treatment and intervene at an earlier stage for patients suffering side effects or complications of treatment, lessening the need for hospital admission.
- (3) **Specialised Care.** For patients requiring specialised care during the bone marrow transplant process for example, allocation of a bone marrow transplant coordinator to each patient for the duration of the patient journey, including procedures or facilities for outreach follow-up if required.
- (4) **Staff education and awareness** regarding the entire patient pathway – this may involve staff rotation through inpatient and non-inpatient care units including community care, or at a minimum, allocation of time to educate staff regarding different aspects of care the patient may experience.

4.3.3 Patient records available to support all care requirements

Availability of up-to-date patient records for all team members involved in patient care is essential for quality patient care. This would ideally be a computerised paperless information system, encompassing all settings including inpatient, hospital-based non-inpatient and community or outreach services.

4.3.4 Facilities and services available to support care requirements

To date, facilities and services providing non-inpatient care for patients with haematological malignancies have largely developed opportunistically over time. This development occurs primarily in response to increasing demand for services and pressure on inpatient beds, rather than as a result of a planned approach to forecast capacity requirements. As a consequence, different models of care have emerged which reflect the physical space and service structures available at different sites at the time of shift. These are discussed below. Whether non-inpatient services continue to develop opportunistically or as a planned approach, certain guiding principles emerge for consideration in design of facilities and services:

- **Physical space requirements**, not only for provision of treatment or interventions (including isolation facilities) but also for patient assessment, patient and family counselling, waiting areas, and staff desks and offices;
- **Allocation of time** for patient and carer education;
- **Communication with and access to other services** such as pharmacy, PET scan, apheresis and/or inpatient wards if not co-located;
- **Access to services for regional or non-local patients** including access to accommodation if patients/carers have to travel to a tertiary centre, or development of regional services such as public radiotherapy, dedicated cancer units and networks, and satellite outreach treatment centres and clinics;
- **Patient access to haematology-trained staff** which may include consideration of haematology training for general or cancer specific community nurses, haematology training for all nursing staff in haematology ambulatory care units if they are not already qualified/trained, appointment of a registrar to ambulatory care units, after-hours access to haematology staff; and video-conferencing for training of staff in rural or remote communities.

4.3.5 A planned approach to managing change

It is well accepted in the patient safety literature¹⁹ that many interacting factors affect the design and function of the healthcare system, and make implementing change challenging. Attempts to fix one section of the health system, without reference to other parts, are inappropriate because its components are complex, dynamic and interdependent. This was evidenced at the Case Study 2 site, where they felt that in trying to address one problem (excess inpatient bed demand) they had created another one (excess non-inpatient service demand) with similar 'beyond-capacity' issue and risks.

The nature of change means that its implementation is unlikely to ever go completely to plan. It is therefore important for services to consider in advance the potential problems that might emerge. This particularly requires the input of clinicians, as they may be the only people with the necessary insight into underlying problems.

Examples of the elements that could be considered as a minimum in a pragmatic approach to planning change are:

- a clear statement of the desired benefits and expected outcomes for all types of patients affected by the change;
- consideration of unintended consequence, effects and risks;
- relevant base-line data sources and the expected post-implementation shift - such as a forecast of patient numbers requiring various aspects of care across both inpatient and non-inpatient settings, and/or patient satisfaction benchmarks;
- staff education and development needs; and
- facility and equipment needs.

A useful change model developed by Queensland Health¹⁷ provides a more comprehensive example of the elements that could be considered in planning to change a model of care. This model suggests four phases which could be applied to future planning of non-inpatient malignant haematology services:

- (1) **Definition of the problem:** define current care delivery process and referral patterns including inpatient, ambulatory and residential care settings (e.g. flow chart of current process for patient care); current patient outcomes in terms of safety, equity of access, patient satisfaction; current

staffing profile and levels of satisfaction; current communication structures between staff per se and between staff and patients; and current cost of service delivery.

- (2) **Community profile:** current and forecasted needs analysis of the population group for whom health care services are delivered.
- (3) **Project plan and implementation:** objectives; implications; workforce and industrial issues; budget; legislative or policy implications; health outcome implications; and communication.
- (4) **Evaluation:** to allow assessment of the impact of change.

4.4 NON-IMPATIENT CARE MODELS

Whilst the above guiding principles can be applied to the design and implementation of shifts to non-inpatient care models for all patients with haematological malignancies in various service settings, specific models of care have also been developed which may be more applicable to patients with specific treatment needs. These are discussed below.

4.4.1 Model 1: Non-inpatient care for patients with 'more severe' conditions

When designing and implementing models of non-inpatient care for patients with 'more severe' haematological malignancies, or those at greater risk of infection or treatment complications (e.g. acute leukaemia, high grade lymphoma, HSCT, febrile neutropenia), the above guiding principles are extremely important.

Assessment of patient suitability to receive non-inpatient care is also essential and may require each of the following to be present for some or all stages of patient care:

- patient compliance and desire to participate;
- clinical stability;
- absence of serious co-morbidities;
- 24 hour carer availability and suitability; and
- suitable accommodation within 30-60 minutes of hospital taking into account local traffic conditions.

Various approaches to the implementation of guiding principles, and the suitability of patients to receive non-inpatient care, have resulted in slightly different models of care being developed for these patients. These models of care include:

- co-location of inpatient and non-inpatient units, including geographically and/or cross staffing;
- ability to conduct entire transplant procedure on non-inpatient basis, or tailored non-inpatient episodes of care at specific stages of the process to suit patient needs;
- existence of a regional bone marrow coordinator, allowing early discharge of suitable non-local patients post transplant; and/or
- provision of hospital on-site or local accommodation for non-local patients.

It should be noted that, although 24 hour carer availability was reported as essential for many of these patients to allow non-inpatient care to be provided, no NSW units or published literature reported how this could be made available if it could not be provided by the patient's relatives or friends. As this was reported to disallow up to half of the potential participants in non-inpatient HSCT programs for example, there may be an opportunity for developing models of care to address this need.

4.4.2 Model 2: Hospital-based non-inpatient care – integrated services

Services for patients requiring hospital-based non-inpatient care may be integrated in one location (with or separate to inpatient services) or provided as specialised services in a different location. An example of the latter approach is where patients with haematological malignancies requiring standard or low-dose chemotherapy receive this in the oncology day unit, whilst patients requiring blood transfusions or other supportive care may be seen in the haematology day unit.

The benefit of an integrated approach is the specialised understanding by staff of patients with haematological malignancies, and the ability for staff to more easily communicate with other members of the care team located in the same facility. This approach was reported as optimal by several NSW

sites. For example, when asked to comment on the ideal service for non-inpatient management of adult patients with haematological malignancies, one unit director commented:

"I would like to see all of the below components of service integrated both geographically and with cross staffing:

- Haematology Oncology Day Centre (elective chemotherapy for haematology and oncology patients);*
- Apheresis service (haematology/oncology nursing staff);*
- Ambulatory Care Unit (blood transfusions, other infusions, hourly slot for patient review);*
- Community Outreach Program (haematology/oncology nursing staff who review patients and take bloods);*
- Outpatients clinic; and*
- Inpatient area."*

Comment by a Cancer Unit Director

4.4.3 Model 3: Hospital-based non-inpatient care – specialised services

Some services reported non-inpatient models of care which separated provision of chemotherapy for haematology patients requiring standard or low-dose chemotherapy from provision of supportive care services, including blood transfusions and other infusions. Chemotherapy for these patients is generally provided in an oncology day centre or ward, where chemotherapy is also provided for patients with solid tumour cancers. Patients requiring blood transfusions and other supportive care are generally seen in haematology ambulatory care units, which also provide non-inpatient care to patients with 'more severe' haematological malignancies, or other haematological disorders. These units may or may not be co-located with inpatient facilities.

Whilst no units reported this model of care as the ideal approach, it had developed in some services as a way of meeting patient demand within limited space and staff availability. The other benefit of this approach indicated in published literature was the ability of staff to specialise in a particular treatment area (e.g. chemotherapy administration, blood transfusions). With respect to the latter though, it should be noted that some NSW units reported that having geographically integrated rather than separated haematology services, allowed staff including nurses, allied health and registrars to expand skills in all aspects of haematology patient care.

4.4.4 Model 4: Home or community-based non-inpatient care

Several units have shifted non-inpatient care for some patients with haematological malignancies to home or community based care. Once again, assessment of patient suitability to receive care at home, rather than in the hospital environment, is critical.

The following models of care emerged from the case study sites as examples of approaches to home or community based care:

- **Cancer Outreach Service.** This service is staffed by a clinical nurse consultant and a clinical nurse specialist, who provide mobile outreach care for haematology and oncology patients in the local area health service. Their role includes ad-hoc triage and assessment of patients, 5-day per week contact with the haematology multidisciplinary team to discuss patient needs, managing patient symptoms and treatment of side effects, patient and carer education and reassurance, and chemotherapy and bisphosphonate infusions.
- **Chronic Transfusion Service.** This service is run by a haematology day ward for around 80 patients in the community. Requirements for each patient, including blood collection frequency and results parameters, are kept on electronic record. Bloods are collected in the community via the home collection service or local pathology collection centre, and sent to haematology day ward coordinator for review. If required, the day ward coordinator organises for the patient to attend the unit to receive a blood transfusion. This process avoids unnecessary monthly clinic visits for blood tests/review, and aims to avoid emergency admissions for blood transfusions.
- **Hospital in the Home (HITH).** This is a seven day per week service which operates in conjunction with a haematology day ward. The service is staffed by generalist nurses, supported by established haematology patient assessment and care protocols. HITH is able to follow-up patients at home,

including those who have received high dose chemotherapy or stem cell transplant, provide consolidation chemotherapy, and manage some severely neutropenic patients. Some patients requiring daily monitoring can be managed between HITH and the day ward, so they do not have to attend the hospital every day.

4.5 EVALUATING THE SHIFT

This section presents options for establishing indicators suitable for evaluating the shift of services from inpatient to non-inpatient models. While some key evaluation questions could be common to all haematology services, others will be unique to the specific initiative or element of care being shifted.

Common evaluation questions related to the key drivers identified in the review of a) improving patient quality of life and patient convenience b) reducing demand and meeting current demand and c) reducing waiting times could be considered core questions when evaluating shift. In addition to this, initiative specific questions would need to be established based on the particular treatment regimen, patient group or the element of care being shifted to provide a reasonably complete picture of the effect of the shift and maximise learning.

In the Case Study 2 interview some specific indicators were highlighted as possibilities for evaluating shift:

- patient throughput;
- haematology specific scheduled admission rates – the current NSW Health admission rate parameters have been designed around surgical re-admission rates (i.e. 30 days is not sensitive enough);
- blood stream infections rates - central venous catheter related;
- unplanned phone calls – relating to HITH patients;
- unplanned visits – to HITH patients;
- adverse patient events;
- occupational health and safety – incidents/near miss reporting;
- number of outliers;
- square metres per chemotherapy chair; and
- day ward staff to patient ratio.

4.6 OPPORTUNITIES

In the *NSW Cancer Plan 2007-2010, Accelerating the Control of Cancer*²⁰ the goals of the Cancer Institute NSW are stated as increasing cancer survival, reducing cancer incidence, improving the quality of life of cancer patients and their carers, and providing expert advice to patients, the public and health care professionals. A shift in care for patients with haematological malignancies from an inpatient to non-inpatient basis where possible, has the potential to increase quality of life for these patients and their carers, and reduce their exposure to potentially life-threatening nosocomial infections.

As all aspects of care for patients with haematological malignancies have been offered on a non-inpatient basis for suitable patients in one or more units both in NSW and overseas, opportunities exist for other units to introduce or expand non-inpatient models of care.

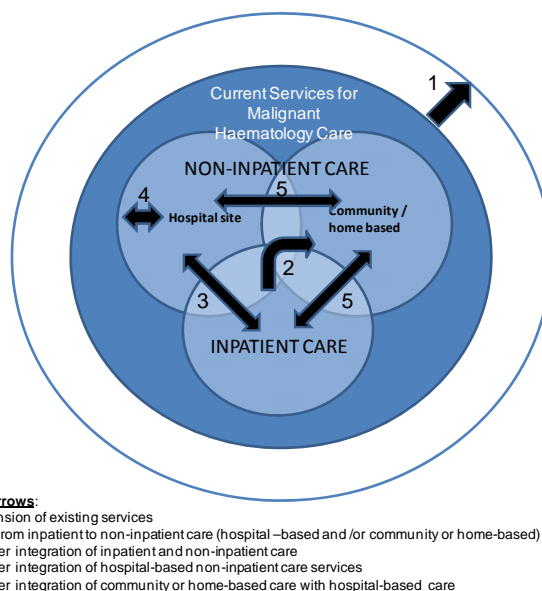
These may involve, but should not be restricted to, one of more of the following opportunities which are represented in Figure 4.2 below:

- (1) An expansion of existing services where units are at or beyond capacity;
- (2) A movement from inpatient to hospital-based non-inpatient care and/or from hospital-based to community or home-based non-inpatient care;
- (3) Greater integration of inpatient and non-inpatient care services, either geographically or using cross-staffing models, care coordination models, and/or improved communication models;
- (4) Greater integration of non-inpatient hospital-based care services for patients requiring chemotherapy and/or supportive care either geographically or using cross-staffing models, care coordination models, and/or improved communication models; and/or

- (5) Greater integration of community or home-based care services for patients with haematological malignancies with inpatient and other non-inpatient care services.

In all cases, consideration should be given to the guiding principles discussed earlier and an assessment of patient suitability to receive care on a non-inpatient basis. These opportunities are represented in the diagram below, which indicates the three primary settings and the linkages or direction of the shift.

Figure 4.2: Opportunities to introduce or expand non-inpatient models of care for patients with haematological malignancies.



4.6.1 Examples of specific projects

Given the integrated nature of haematology care and the variety of settings and service delivery models that constitute non-inpatient care, the types of business improvement projects that would be relevant to supporting a greater shift to non-inpatient models could be diverse.

Some examples of specific projects that might fall within the scope of the areas furthering the shift towards greater provision of non-inpatient services have been provided below, not as a definitive list but as a simple stimulus for further consideration of opportunities. Some examples of the diversity of projects might include:

- the further development of a state-wide group of nurse pathway coordinators or cancer outreach nurses;
- other strategies to improve integration and /or formalise processes of care-coordination across key specialities such as palliative care, pharmacy, generalist community nursing services and allied health. This may also give consideration to informal carers.
- conducting a training needs analysis of mobile community nurses caring for people with haematological malignancies;
- developing competency standards or training programs for generalist community nurses caring for patients with haematological malignancies;
- the development of an integrated clinical information IT system that supports clinical work across the entire patient pathway within a clinical speciality and supports the full multidisciplinary team across all settings;
- further analysis of the barriers and facilitating factors for informal carers;
- developing and piloting a planning and evaluation methodology that would provide a structured model for supporting change management for haematology services. This would provide a potential template for future change projects;
- identifying and evaluating new products and / or technologies that may furthering facilitate the next wave of shift;

- further analysis of ED bypass processes, including waiting times and bed management approaches;
- developing state-wide ED bypass procedures or ED fast-track procedures for the purpose of reducing time to definitive care;
- BMT comparative length of stay and costing studies – between inpatient and non-inpatient models;
- further development and evaluation of chronic transfusion services; and
- piloting and evaluating extended opening hours.

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APPENDIX A WORKING PARTY MEMBERSHIP

Haematology Inpatient/Non-Inpatient Review Working Party

Dr Cynthia Lean, Manager, Research and Evaluation, CI NSW

Ms Penny Adams, Manager, Models of Care Program, CI NSW

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Ms Ann Schiller, NSW Leukaemia Foundation

Ms Julia Adolphs, Project Coordinator, CI NSW

Ms Sue Sinclair, Director, CI NSW

APPENDIX B LIST OF HAEMATOLOGY UNITS SURVEYED

Service	Hospital	Area Health Service	Respondent
Hunter Haematology Service	Calvary Mater Newcastle	Hunter New England Area AHS	Michael Seldon
Haematology Oncology Ambulatory Care	St Vincent's Hospital	South Eastern Sydney & Illawarra AHS	Debbie Wall-Smith
South West Cancer Network	Nepean Hospital	Sydney West AHS	Jenny O'Baugh
Haematology Department	St George Hospital	South Eastern Sydney & Illawarra AHS	Michael Harvey
North Coast Cancer Institute	Macquarie Base Hospital	North Coast AHS	Maureen McGovern
Albury Base Hospital	Albury Base Hospital	Greater Southern AHS	Jenny Commins
Oncology/Haematology Day Unit	Tamworth Hospital	Hunter New England AHS	Carmel Raymond
Dubbo Base Cancer Centre	Dubbo Base Hospital	Greater Western AHS	Margaret Ross
Sutherland Oncology Clinic	Sutherland Hospital	South Eastern Sydney & Illawarra AHS	Kim Rigg
Cancer Services Central Coast	Gosford Hospital	Northern Sydney & Central Coast AHS	Morag McPherson
Cancer Therapy Centre	Liverpool Hospital	Sydney South West AHS	Lenore Knapman
Cancer Services	Westmead Hospital	Sydney West AHS	Kate Hackett
Haematology Department	Royal Prince Alfred Hospital	Sydney South West AHS	Simon Kuzyl
Ambulatory Care Unit	Royal North Shore Hospital	Northern Sydney & Central Coast AHS	Chris Arthur
Haematology Department	Prince of Wales Hospital	South Eastern Sydney & Illawarra AHS	Rob Lindeman

APPENDIX C CI NSW OUTPATIENT HAEMATOLOGY CARE SURVEY RESULTS

The survey results and comments provided by respondents are presented in the tables below. Apart from some minor editing, comments and descriptive text has been presented as provided by the respondents. However, some words may have been added to clarify meaning and these have been identified in [square parenthesis]. Where possible, comments have also been de-identified and generic terms such as [the unit] or [the service] have been inserted.

Question 1 has not been presented as it was the service identifier.

Table C 1 Unit types responding to the survey (Q2)

Type of unit	Response %	Response Count
Within a haematology/oncology unit - also treating patients with solid tumour cancers and other non-malignant haematological conditions	66.7%	10
Within a dedicated haematology unit - also treating patients with non-malignant haematological conditions	20.0%	3
Within a dedicated haematology unit - only treating patients with malignant haematological conditions	6.7%	1

Table C 2 Components of service routinely delivered outside the unit (Q3)

Are there components of your service/treatments routinely delivered by other departments/services, or in the home? If so could you please list them below.			
In home/community	In a general short stay ward/Medical ambulatory care/outlier wards/other cancer treatment service	Other hospitals	Other
cancer nursing outreach service	chemotherapy		
community nursing service			
	chemotherapy		
some antibiotics			
some CADD pumps	when no appointment slots available might treat in Medical Ambulatory Care		
	Some Packed Cell transfusion, Intragam infusion		
cancer nursing outreach service			
	some blood transfusions, bisphosphonates		
			No services elsewhere
		All stem cell harvest, start up of initial chemotherapy	
	a little bit of chemotherapy		
cancer nursing outreach service			No services elsewhere
blood collection; CVAD management			
some pathology home blood collection			insertion of CVC/PICC/Vascular catheter in recovery
general nursing outreach service			

Table C 3 Location of other services and functions (Q4)

Is your non-inpatient unit conveniently located near any of these other services and functions? By conveniently located, we mean either in the same unit or close enough to easily support communication and patient care.						
Answer Options	Yes, conveniently located	We are planning to	Would if we had the resources	No, but not seeking change	Not applicable	Response Count
PET scan	4	1	4	2	3	14
inpatient oncology/haematology beds	11	0	2	1	1	15
clinical trials offices	11	0	2	1	1	15
apheresis	10	0	2	1	2	15
cryopreservation and storage	7	0	2	2	4	15
patient transport pick up and drop off	14	0	1	0	0	15
pharmacy services	13	0	1	1	0	15
nuclear medicine	10	0	1	2	2	15
other medical imaging services	13	0	0	1	1	15
pathology	12	0	0	2	1	15
radiotherapy	8	1	0	4	2	15
Other (please describe): "Pathology and radiology, two sites have and two don't. Cryopreservation – [we] have some limited." "Chemotherapy is at present administered to patients as admitted patients."						

Table C 4 Opening hours (Q5)

Between what hours do you offer non-inpatient care?			
Mon-Fri	No. of hours	Sat/Sun/Pub Hols	Number of units with these hours
8-5	9		4
9-5	8		4
8-4	8		3
7-7	12		1
7.30-5.30	10	7-7	1
8-6	10	8-4	1
n/a			1
Total Responses			15
Other (please describe):			
<ul style="list-style-type: none"> • "On weekends and public holidays the ward is used for urgent outpatient cases, staffed by Haematology ward staff (which is next door)." • "Please note we are open Mon to Fri 0730 hrs to 1730 hrs. We are closed on weekends and public holidays." • "The above figures are slightly misleading - only really apply to the general hospital ambulatory care unit. Others are 9 am-5 pm Mon to Fri. Drop in patients, only for 2 hours per day." • "8-5 each day, except weekend and public holidays." • "Weekend service opening on 1st August." 			

- “7 day, 7 until 7 or early close if no patients, including public holidays.”
- “Monday to Friday during working hours - Cancer Outreach Service at home; Monday to Saturday - non-inpatient transfusion service only.”

Table C 5 Plans to extend opening hours (Q6)

Can you please indicate if you have any plans to extend opening hours in the future? If so, could you please describe what your plan is?		
Answer Options	Response Percent	Response Count
Would do so, if we had the resources	46.7%	7
No	40.0%	6
Unsure	13.3%	2
Yes	0.0%	0
		15
Other (please describe): <ul style="list-style-type: none"> • “Longer afternoon service as required.” • “If there is an increase in activity then we would extend our opening times and consider providing a weekend service.” • “Ideally need a more integrated arrangement i.e. haematology/oncology day centre which: <ul style="list-style-type: none"> – does all the infusions/transfusions; – apheresis; – located in a ward area so can do weekend apheresis with backup; and – has a “drop in” facility so sick patients can be reviewed in the same area.” • “A business plan has been submitted to increase hours of operation to include weekends with the aim of transferring some inpatients to the outpatient setting.” • “Extending hours until 1900hrs Monday to Friday.” • “Would open on a Saturday morning, but due to its location and financial limitations, this is not possible.” 		

Table C 6 Attending to unscheduled patients (Q7& 10)

If your service has a particular time when unscheduled patients can present, can you please identify these times below? This might be for treatment, enquiry, triage and/or for admission through the Emergency Department or directly. Please describe how this service operates.		
Mon-Fri	Sat/Sun/Pub Hols	Comments
n/a		<ul style="list-style-type: none"> • Patients tend to be referred to our Short-Stay ward by the Cancer Outreach Service or by consultants who have seen patients elsewhere if there is space. • They occasionally present unwell for assessment (self-referral) during working hours.
n/a		<ul style="list-style-type: none"> • No drop in facility
8-1		<ul style="list-style-type: none"> • If the patient is unwell, the haematology care coordinator (who runs the unit) is contacted. • Depending on resources and the patient's presenting issues, the patient will be directed either to the 'step down' unit or directly to the emergency department. The medical team or the emergency department are informed of the patient's arrival. • Once in the unit, a nursing assessment is undertaken and then the patient is medically reviewed.
8-3		<ul style="list-style-type: none"> • Patients just come to ED if [they have] any issues after-hours.
8-4		<ul style="list-style-type: none"> • Patients either ring the centre or present. They are reviewed by nursing staff . The patient is then reviewed by either the ward basic [medical] trainee or the Advanced [medical] trainee • Treatment is then initiated and patient is either discharged, admitted directly to a ward or sent to ED.
limited	n/a	<ul style="list-style-type: none"> • A limited service is provided with limitations based on the scheduled work load on a Monday-Friday basis only. There are no dedicated resources to support this.
n/a		<ul style="list-style-type: none"> • No, if the clinic is closed patients are advised to attend emergency
n/a		<ul style="list-style-type: none"> • No, encouraged to ring or come in if an when they need to
n/a		<ul style="list-style-type: none"> • There is no formal process in place for this type of presentation but all patients are aware of our opening hours and are advised they can contact our clinic if they need to. • Some patients will phone and others will present in person. • Patients who present during normal hours Monday to Friday 0900 - 1700hrs and have access to nursing staff for advice. If the nursing staff feel that they need further medical advice they will contact the RMO or Registrar if appropriate or refer the patient to their own GP. • On occasions some patients presenting are unwell and require admission. We will arrange admission directly to a ward booking them in with the Bed Manager and the physician on call for the day therefore bypassing the ED. • If the patient is extremely unwell and requires a more thorough medical assessment they will be taken to the ED for further assessment by a senior physician. • Our Consultant Haematologist works part time 2x days per week so is unavailable at other times.
n/a		<ul style="list-style-type: none"> • No, see at any time.
8-5		<ul style="list-style-type: none"> • Unscheduled can present at any time we are open.
12-2	12-1	<ul style="list-style-type: none"> • We have an open arrangement though the Ambulatory Care Unit with a 2 hour a day slot where patients can come and be reviewed at short notice. It is also used for an ambulatory deep venous thrombosis program.
8-4		<ul style="list-style-type: none"> • Patient can contact care coordinator and she will review and triage

		<ul style="list-style-type: none"> One of our ED avoidance strategies is for Cancer patients to present to HOAC or call should they require assistance. However if the patient is acutely unwell we advise they go directly to ED. We also request patients come to HOAC prior to 4pm should they not have an appointment.
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Table C 7 Methods of unscheduled assessment (Q8)

Could you please indicate by which method unscheduled assessment or consultation is undertaken or if you have plans to introduce in the future?						
Answer Options	Yes, we have this	We are planning to	We would if we had the resources	No, but not seeking to establish	Not applicable	Response Count
In person	11	0	2	1	0	14
By phone	10	1	2	1	0	14
Video conference	0	0	2	7	3	12
Other (please describe):						
<ul style="list-style-type: none"> “... [this] happens on an ad hoc basis with no formal pathway. If we had more resources this would then become a more formalised process...a full-time haematologist and registrar could facilitate more outpatient services and troubleshooting for unscheduled patient presentations.” “This is a limited service.” “[Patients] can attend anywhere, through the pilot CANET program.” “The Cancer Outreach Service is able to be contacted by patients by phone - patients can also be visited at reasonably short notice. They can be reviewed in our Short Stay Ward if required or contact ward staff by telephone for advice.” 						

Table C 8 Units with an ED bypass process (Q9)

Do you offer a process where patients can bypass the Emergency Department? If so, can you please describe how this works?		
Answer Options	Response Percent	Response Count
Yes	60.0%	9
No	26.7%	4
Would if we had the resources	13.3%	2
Planning to	0.0%	0
Total		15
<p>Other (please describe):</p> <p>Units responding “yes – we have this”:</p> <ul style="list-style-type: none"> • “Patients are able to bypass the Emergency Department, but offering this service frequently results in our ward exceeding the available staff and space.” • “In hours only (0800 to 1500) patients can drop-in to the [centre]. After hours [is] only through ED.” • “Patients either ring the centre or present. They are reviewed by nursing staff. The patient is then reviewed by either the ward basic [medical] trainee or the advanced [medical registrar] trainee. Treatment is then initiated and patient is either discharged, admitted directly to a ward or sent to ED.” • “This is an informal process whereby Medical or senior nursing staff identify a patient requiring admission between the hours of 8am-2pm Monday- Friday. This is limited by the availability of ward medical staff to review the patient, availability of resources in the outpatient treatment area and inpatient bed availability in a haematology/oncology ward.” • “Patients can be assessed in the clinic but this varies as often there is no medical cover to assess the patient, therefore patients are advised to ring clinic if unwell, if no cover they are sent to emergency.” • “...can be reviewed in unit and admitted directly to the ward, during opening hours 8 -5.” • “...the care coordinator can organise direct admission if required.” • “During our opening hours patients can present to [ambulatory care centre] for assessment and review and if a bed is required this is facilitated by the bed manager.” <p>Units responding “no – but not seeking to establish”:</p> <ul style="list-style-type: none"> • “Ward Ambulatory Care Registrar – can be seen by them, but can go via bed manager to find a bed in the ward. Dependent on beds being available. Ad hoc not a rigid system, [and is] for existing patients.” <p>Units responding “would if we had the resources”:</p> <ul style="list-style-type: none"> • “... we would like to introduce more Registrar clinic time for patient reviews. Haematology Care Coordinator and Nurse Practitioner positions. More scheduled clinics for review of patients undergoing treatment for malignancy. Nurse Practitioner could manage cytotoxic side effects. Care Coordinator could contact patients post treatment and intervene at an earlier stage for patients suffering side effects or complications lessening the need for hospital admissions. Models of care utilising telephone and video linkages would be explored as well.” • “In some cases can arrange for patients to come to the [unit] or be admitted direct to the ward if there are beds.” 		

Note: Q10 has been incorporated into Table C 6.

Table C 9 Process for emergency department bypass (Q11)

If you have a process for Emergency Department bypass, who assesses patients?		
Answer Options	Response Percent	Response Count
Haematology Registrar	77.8%	7
Resident medical officer	55.6%	5
Senior haematology registrar	33.3%	3
Consultant haematologist	22.2%	2
Other (please describe) <ul style="list-style-type: none"> • "Nurse care coordinator." • "Haematology clinical nurse consultant/care coordinator." • "Nursing staff who may then contact RMO or Registrar if they are available. Sometimes the patient is referred to their GP." • Haematology/oncology registrar • "Whoever is available first." • "Depending on where they are in their training, but [we] don't distinguish." 		7

Table C 10 Year commencing ED bypass (Q12)

What year did you commence this process for Emergency bypass?	
Year	
1995	(1)
2000	(1)
2005	(5)
2006	(1)
2008	(1)

Table C 11(a) Patients/treatments analysis (Q13)

Could you please indicate whether you have shifted any of the following patients/treatment interventions to a non-inpatient model, when, the setting and sector; or if you have plans for shifting to non-inpatient provision in the future, when, the setting and sector?					
Answer Options	Have shifted to a non-inpatient basis for suitable patients	We would shift to non-inpatient if we had the resources	Not planning to move to non-inpatient	n/a	Response Count
autologous stem cell transplant - post-transplant care	40.0% (4)	20.0% (2)	10.0% (1)	30.0% (3)	10
autologous stem cell transplant - conditioning/transplant	20.0% (2)	20.0% (2)	10.0% (1)	50.0% (5)	10
management of fever from neutropenia	20.0% (2)	10.0% (1)	70.0% (7)	0.0% (0)	10
high grade lymphoma	45.5% (5)	9.1% (1)	27.3% (3)	18.2% (2)	11
stem cell mobilisation (including chemotherapy)	45.5% (5)	9.1% (1)	18.2% (2)	27.3% (3)	11
acute myeloid leukaemia - supportive care	72.7% (8)	9.1% (1)	9.1% (1)	9.1% (1)	11
acute lymphoblastic leukaemia - supportive care	72.7% (8)	9.1% (1)	0.0% (0)	18.2% (2)	11
acute myeloid leukaemia - administration, induction, chemotherapy	27.3% (3)	0.0% (0)	45.5% (5)	27.3% (3)	11
bone marrow harvest	9.1% (1)	0.0% (0)	45.5% (5)	45.5% (5)	11
acute lymphoblastic leukaemia - administration, induction, chemotherapy	27.3% (3)	0.0% (0)	36.4% (4)	36.4% (4)	11
allogeneic stem cell transplant - conditioning/transplant	20.0% (2)	0.0% (0)	20.0% (2)	60.0% (6)	10
allogeneic stem cell transplant - post-transplant care	20.0% (2)	0.0% (0)	20.0% (2)	60.0% (6)	10
radio-immunotherapy	10.0% (1)	0.0% (0)	20.0% (2)	70.0% (7)	10
management of other side effects or complications of treatment	83.3% (10)	0.0% (0)	16.7% (2)	0.0% (0)	12
supportive care i.e. bisphosphonates,immunoglobulin	100.0% (13)	0.0% (0)	0.0% (0)	0.0% (0)	13
blood transfusion	100.0% (12)	0.0% (0)	0.0% (0)	0.0% (0)	12
antibody therapy	83.3% (10)	0.0% (0)	0.0% (0)	16.7% (2)	12
apheresis/plasmapheresis	66.7% (8)	0.0% (0)	0.0% (0)	33.3% (4)	12
radiation therapy	58.3% (7)	0.0% (0)	0.0% (0)	41.7% (5)	12
cryopreservation of stem cells	33.3% (4)	0.0% (0)	0.0% (0)	66.7% (8)	12

Could you please indicate whether you have shifted any of the following patients/treatment interventions to a non-inpatient model, when, the setting and sector; or if you have plans for shifting to non-inpatient provision in the future, when, the setting and sector?

Other (please describe)

- “We have always had outpatient cancer day ward for some chemo, supportive therapies etc for cancer patients in general, radiotherapy patients [are] generally outpatients.”
- “Don’t have the community infrastructure to shift neutropenic patients.”
- “The three services mentioned above are also attended in rural outreach settings in smaller hospitals within our health service.”
- “AML supportive care - only managed in community if not located close to centre
 - HGL, n/a as generally go to Sydney;
 - ALL, n/a as generally go to Sydney;
 - Post transplant and supportive care, usually in Sydney/metro for most of care; and
 - Stem cell transplants - usually in Sydney/metro for most of care.”
- “[Our hospital] treats the majority of Haematology patients.”
- “Apheresis, transfusion, bisphosphonates have predominately been given as outpatients. No public radiotherapy service is available.”
- “Very few but some are suitable:
 - AML - administration
 - ASCT
 - AIISCT
 - Management of fever from neutropenia”
- “Transfusions and apheresis are performed as outpatient procedures; and bisphosphonates are given in the community.”

Table C 11 (b) Patient/treatment interventions by service setting – no. of sites (Q13)

Answer Options	Service setting (if non-inpatient)						n/a	Response Count
	A) Ambulatory/outpatient	B) In-home/community	C) Both A and B	D) Rural outreach	E) All settings	F) Other		
acute myeloid leukaemia - administration, induction, chemotherapy	2	0	1	0	0	0	0	3
acute myeloid leukaemia - supportive care	5	0	0	1	1	0	0	7
high grade lymphoma	4	0	1	0	0	0	0	5
acute lymphoblastic leukaemia - administration, induction, chemotherapy	2	0	1	0	0	0	0	3
acute lymphoblastic leukaemia - supportive care	5	0	0	0	1	0	0	6
stem cell mobilisation (including chemotherapy)	3	0	1	0	0	0	0	4
bone marrow harvest	1	0	0	0	0	0	0	1
cryopreservation of stem cells	1	0	1	0	0	0	0	2
apheresis/plasmapheresis	3	0	1	0	0	0	0	4
autologous stem cell transplant - conditioning/transplant	2	0	0	0	0	0	0	2
autologous stem cell transplant - post-transplant care	4	0	1	0	0	0	0	5
allogeneic stem cell transplant - conditioning/transplant	1	0	0	0	0	0	0	1
allogeneic stem cell transplant - post-transplant care	2	0	0	0	0	0	0	2
radiation therapy	3	0	0	0	0	0	0	3
radio-immunotherapy	0	0	0	0	0	0	0	0
antibody therapy	6	0	0	0	1	0	0	7
blood transfusion	8	0	0	0	1	0	0	9
management of fever from neutropenia	2	0	1	0	0	0	0	3
management of other side effects or complications of treatment	6	0	1	0	1	0	0	8
supportive care i.e. bisphosphonates, immunoglobulin	8	0	0	0	1	0	0	9

Table C 11 (c) Patient/treatment interventions by sector – no. of sites (Q13)

Answer Options	Sector			Response Count
	Public only	Private only	Both public and private	
acute myeloid leukaemia - administration, induction, chemotherapy	2	0	2	4
acute myeloid leukaemia - supportive care	6	0	1	7
high grade lymphoma	4	0	1	5
acute lymphoblastic leukaemia - administration, induction, chemotherapy	2	0	1	3
acute lymphoblastic leukaemia - supportive care	5	0	1	6
stem cell mobilisation (including chemotherapy)	3	0	0	3
bone marrow harvest	1	0	0	1
cryopreservation of stem cells	1	0	1	2
apheresis/plasmapheresis	2	0	2	4
autologous stem cell transplant - conditioning/transplant	0	0	1	1
autologous stem cell transplant - post-transplant care	2	0	2	4
allogeneic stem cell transplant - conditioning/transplant	0	0	0	0
allogeneic stem cell transplant - post-transplant care	1	0	0	1
radiation therapy	1	0	1	2
radio-immunotherapy	0	0	0	0
antibody therapy	4	0	2	6
blood transfusion	5	0	3	8
management of fever from neutropenia	1	0	1	2
management of other side effects or complications of treatment	4	0	3	7
supportive care i.e. bisphosphonates, immunoglobulin	5	0	3	8

Table C 11 (d) Patient/treatment and year of shift – no. of sites (Q13)

Answer Options	Year (if shifted, or planning to) pre 1995	Year (if shifted, or planning to) 1995-2000	Year (if shifted, or planning to) 2001-2005	Year (if shifted, or planning to) 2006-2007	Year (if shifted, or planning to) 2008	Year (if shifted, or planning to) 2009	Year (if shifted, or planning to) 2010	Year (if shifted, or planning to) 2011-2015	Year (if shifted, or planning to) 2015+	Year (if shifted, or planning to) Haven't decided when	Year (if shifted, or planning to) n/a	Year (if shifted, or planning to) Response Count
acute myeloid leukaemia - administration, induction, chemotherapy	1	1	0	1	0	0	0	0	0	0	0	3
acute myeloid leukaemia - supportive care	1	4	0	2	0	0	0	0	0	0	0	7
high grade lymphoma	1	3	0	1	0	0	0	0	0	0	0	5
acute lymphoblastic leukaemia - administration, induction, chemotherapy	1	2	0	0	0	0	0	0	0	0	0	3
acute lymphoblastic leukaemia - supportive care	1	3	1	1	0	0	0	0	0	0	0	6
stem cell mobilisation (including chemotherapy)	1	2	0	1	0	1	0	0	0	0	0	5
bone marrow harvest	0	0	0	1	0	0	0	0	0	0	0	1
cryopreservation of stem cells	2	1	0	0	0	0	0	0	0	0	0	3
apheresis/plasmapheresis	2	2	1	0	0	0	0	0	0	0	0	5
autologous stem cell transplant - conditioning/transplant	0	0	0	1	0	1	0	0	0	0	0	2
autologous stem cell transplant - post-transplant care	1	2	0	1	0	0	0	0	0	0	0	4
allogeneic stem cell transplant - conditioning/transplant	0	0	0	1	0	1	0	0	0	0	0	2
allogeneic stem cell transplant - post-transplant care	0	1	0	1	0	0	0	0	0	0	0	2
radiation therapy	1	1	1	0	1	0	0	0	0	0	0	4
radio-immunotherapy	0	0	0	0	0	0	0	0	0	0	0	0

	Year (if shifted, or planning to)	Year (if shifted, or planning to)	Year (if shifted, or planning to)	Year (if shifted, or planning to)	Year (if shifted, or planning to)	Year (if shifted, or planning to)	Year (if shifted, or planning to)	Year (if shifted, or planning to)	Year (if shifted, or planning to)	Year (if shifted, or planning to)	Year (if shifted, or planning to)	Year (if shifted, or planning to)
Answer Options	pre 1995	1995-2000	2001-2005	2006-2007	2008	2009	2010	2011-2015	2015+	Haven't decided when	n/a	Response Count
antibody therapy	2	3	0	2	1	0	0	0	0	0	0	8
blood transfusion	1	5	0	3	0	0	0	0	0	0	0	9
management of fever from neutropenia	0	0	0	1	1	0	0	0	0	0	0	2
management of other side effects or complications of treatment	3	3	0	2	1	0	0	0	0	0	0	9
supportive care i.e. bisphosphonates, immunoglobulin	4	3	1	1	1	0	0	0	0	0	0	10

Table C 12 Staffing roles supporting care (Q14)

Could you please identify what staffing roles support your non-inpatient services?						
Answer Options	Haematology trained	Haemo or oncology trained	Oncology trained	Generalist	Other	Response Count
consultant/specialist	12	3	4	0	0	14
senior registrar	9	2	2	0	0	11
registrar	4	1	0	9	1	13
resident medical officer	0	0	0	9	0	9
medical intern	0	0	0	7	0	7
pharmacist	5	5	0	4	0	13
nurse unit manager	4	5	2	2	0	13
clinical nurse consultant	9	5	2	0	0	13
nurse practitioner	1	0	1	0	1	3
nurse co-ordinator	8	3	1	1	0	12
nurse	7	6	5	2	0	15
community nurse	1	2	1	8	0	11
dietician	1	3	2	9	0	14
social worker	4	2	3	6	0	15
occupational therapist	1	0	0	8	1	10
physiotherapist	1	0	0	8	1	10
psychologist	2	4	1	4	0	11
complimentary therapy practitioner	0	0	0	0	1	1
secretary/administrative	2	0	0	10	0	12
practice manager	0	0	0	1	1	2
clinical researcher	3	4	1	3	0	11
other project officer	0	0	0	0	1	1
Other (please describe):						
<ul style="list-style-type: none"> • “Physician Assistant - haematology trained.” • “CNC in an area role- not at the site.” • “As component of multidisciplinary cancer service.” • “Registrar undertaking post graduate studies in oncology.” • “Blended FTE - inpatient, non-malignant work etc.” 						

Note: Q15 relating to FTE numbers for each staffing category has not been presented in this appendix as the response data was unclear.

Table C 13 Summary non-inpatient chair and bed numbers (Q16 & 17)

How many chairs or non-inpatient beds do you have, public and private?				Of these, how many are in single rooms?			
Public chairs	Public non-inpatient beds	Private chairs	Private non-inpatient beds	Public chairs	Public non-inpatient beds	Private chairs	Private non-inpatient beds
164	46	19	0	13	25	0	0
Total patient places (beds and chairs)			229	7.9%	54%	0	0

Table C 14 Estimated current OOS across respondent group (Q18)

Could you please provide an estimate of the number of occasions of service provided each week on a non-inpatient basis?				
Estimated occasions per week - non-inpatient	Estimated occasions per week - in-home	Estimate occasions per week - telephone triage	Estimated occasions per week - other	Total All Types
865	22	474	10	1,371

Table C 15 Estimated OOS in five years time (Q19)

Could you please provide an estimate of the number of occasions of service per week you expect to be providing in 5 years time, on a non-inpatient basis? We expect this will be indicative only.				
Estimated occasions per week, in 5 years time - non-inpatient	Estimated occasions per week, in 5 years time - telephone triage	Estimated occasions per week, in 5 years time - in-home	Estimated occasions per week, in 5 years time - other	Total All Types
1,070	380	295	20	1,765*

* 28/7% increase on current estimate

Table C 16 Facilities and support services available (Q20)

Can you please identify which of the following facilities and other support services you have available for patients in a non-inpatient setting.						
Answer Options	Yes, we have this	We are planning to	We would if we had the resources	No, but not seeking to establish	Not applicable	Response Count
dedicated family conferencing and counselling rooms	40.0% (6)	0.0% (0)	46.7% (7)	6.7% (1)	6.7% (1)	15
on-site residential accommodation for non-local patients and their carers	40.0% (6)	0.0% (0)	46.7% (7)	6.7% (1)	6.7% (1)	15
nursing consultation rooms	53.3% (8)	0.0% (0)	40.0% (6)	0.0% (0)	6.7% (1)	15
off-site residential accommodation for non-local patients and their carers	38.5% (5)	0.0% (0)	38.5% (5)	7.7% (1)	15.4% (2)	13
on-call nurse or physician after hours telephone access	40.0% (6)	0.0% (0)	33.3% (5)	13.3% (2)	13.3% (2)	15
medical offices - to work from when not seeing patients	66.7% (10)	0.0% (0)	26.7% (4)	0.0% (0)	6.7% (1)	15
allied health consultation rooms	53.3% (8)	0.0% (0)	26.7% (4)	13.3% (2)	6.7% (1)	15
family and patient lounge area	64.3% (9)	0.0% (0)	21.4% (3)	7.1% (1)	7.1% (1)	14
clinical management system - cancer specific	46.7% (7)	20.0% (3)	20.0% (3)	6.7% (1)	6.7% (1)	15
clinical management system - generic	33.3% (5)	20.0% (3)	20.0% (3)	6.7% (1)	20.0% (3)	15
medical research facilities	53.8% (7)	7.7% (1)	15.4% (2)	0.0% (0)	23.1% (3)	13
dedicated public entrance to the unit	78.6% (11)	7.1% (1)	14.3% (2)	0.0% (0)	0.0% (0)	14
medical consultation rooms	86.7% (13)	0.0% (0)	13.3% (2)	0.0% (0)	0.0% (0)	15
electronic chemotherapy chair booking system	60.0% (9)	20.0% (3)	13.3% (2)	0.0% (0)	6.7% (1)	15
on-site/satellite pharmacy for chemotherapy preparation	60.0% (9)	0.0% (0)	6.7% (1)	26.7% (4)	6.7% (1)	15
staff meeting rooms suitable for case conferencing	86.7% (13)	0.0% (0)	6.7% (1)	0.0% (0)	6.7% (1)	15
patient drop off area	80.0% (12)	6.7% (1)	6.7% (1)	0.0% (0)	6.7% (1)	15
patient waiting area	93.3% (14)	0.0% (0)	6.7% (1)	0.0% (0)	0.0% (0)	15
other research facilities	53.8% (7)	7.7% (1)	7.7% (1)	0.0% (0)	30.8% (4)	13
access to community transport if required	100.0% (15)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	

other (please describe)

- “We have a data manager support for clinical trials.”
- “Accommodation is only very short term, limited to two rooms.”

Table C 17 Unique practices or approaches (Q21)

Is there a particular practice or treatment approach that you feel might be unique to your service, or a 'first'? If so, would you please describe?
<ul style="list-style-type: none"> • “We run a nurse driven "chronic transfusion service". Approx 100 patients are followed by a nurse co-ordinator who follows their FBC and organises the transfusions. These pat are usually seen by Haematologist 1-2 x per year.” • “We are the only integrated cancer care service, outside metro NSW, providing a public radiotherapy service. Benefits - 1,322 patients treated locally that would have had to travel to Brisbane, Newcastle or Sydney, since August 2007 in Coffs Harbour, since October 2007 in Port Macquarie. Just started the building for Lismore, expected to be commissioned in March 2008.” • “We like to do our patient education on a separate day to their first treatment, so we can spend dedicated time with the patient.” • “The service aims to provide/ facilitate early discharge from the inpatient setting.” • “The philosophy of care coordination is applied so that patients can be followed up through their bone marrow suppression, post high dose chemotherapy / bone marrow transplantation” • “Our 7 day ambulatory care facility is relatively unique; outpatient allogeneic transplant is unique; a dedicated registrar, plus 7-day opening staffed by nurses means we can do more outpatient transplants and therapy than others can.” • “The Cancer Outreach Service was first established in this area, and has provided a greatly improved service - patients are able to be reviewed and treated at home, and many hospitalisations have been avoided.”

Table C 18 How models of care were established (Q22)

How were the models of non-inpatient care at your service established?		
Answer Options	Response Percent	Response Count
Developed locally over time, through continuous improvement	86.7%	13
Based on other Australian centre/model(s) - please specify below	13.3%	2
Based on centre/model(s) used overseas - please specify below	0.0%	0
Other (please describe):		
<ul style="list-style-type: none"> • “Introduction of GP VMO established due to need.” 		

Table C 19 Key drivers for shifting to non-inpatient models (Q23)

What are/were your key drivers for moving patients away from inpatient models of care? Please rate the level of importance.					
Key drivers	High importance	Medium importance	Low importance	Not important or not applicable	Response count
improve patient quality of life	92.9% (13)	7.1% (1)	0.0% (0)	0.0% (0)	14
reduce the demand for inpatient beds	86.7% (13)	13.3% (2)	0.0% (0)	0.0% (0)	15

What are/were your key drivers for moving patients away from inpatient models of care? Please rate the level of importance.					
Key drivers	High importance	Medium importance	Low importance	Not important or not applicable	Response count
reduce waiting times for treatment	78.6% (11)	14.3% (2)	7.1% (1)	0.0% (0)	14
improve patient convenience	71.4% (10)	28.6% (4)	0.0% (0)	0.0% (0)	14
to meet current patient demand	66.7% (10)	33.3% (5)	0.0% (0)	0.0% (0)	15
strong leadership (clinical or other)	64.3% (9)	21.4% (3)	7.1% (1)	7.1% (1)	14
improve staff expertise	42.9% (6)	35.7% (5)	21.4% (3)	0.0% (0)	14
reduce the overall cost of services	33.3% (5)	33.3% (5)	26.7% (4)	6.7% (1)	15
reduce infection rates	28.6% (4)	50.0% (7)	0.0% (0)	21.4% (3)	14
free up floor space and build more single rooms for cancer care	7.1% (1)	21.4% (3)	21.4% (3)	50.0% (7)	14
NSW Health initiative	7.1% (1)	21.4% (3)	7.1% (1)	64.3% (9)	14
funds were made available	7.1% (1)	35.7% (5)	0.0% (0)	57.1% (8)	14
free up floor space for another reason	0.0% (0)	0.0% (0)	28.6% (4)	71.4% (10)	14
Other: "The creation of the care coordinator role allowed for the development and continual running of the unit."					

Table C 17 Key facilitating factors for shifting care to non-inpatient models (Q24)

What are/were the most important factors facilitating change to non-inpatient models of care? Please rate their level of importance, or indicate whether they were not applicable.					
	High importance	Medium importance	Low importance	Not important or not applicable	Response Count
improved supportive care post chemotherapy treatment	85.7% (12)	14.3% (2)	0.0% (0)	0.0% (0)	14
unit team work	78.6% (11)	21.4% (3)	0.0% (0)	0.0% (0)	14
good communication processes	78.6% (11)	21.4% (3)	0.0% (0)	0.0% (0)	14
nursing management support	71.4% (10)	21.4% (3)	0.0% (0)	7.1% (1)	14
new treatment/drugs/drug delivery technology	71.4% (10)	14.3% (2)	7.1% (1)	7.1% (1)	14
haematologist(s) support	64.3% (9)	21.4% (3)	7.1% (1)	7.1% (1)	14
available space	61.5% (8)	15.4% (2)	7.7% (1)	15.4% (2)	13
clinical leadership	57.1% (8)	42.9% (6)	0.0% (0)	0.0% (0)	14
patient and carer attitudes	57.1% (8)	21.4% (3)	14.3% (2)	7.1% (1)	14
new or improved facilities	50.0% (7)	21.4% (3)	7.1% (1)	21.4% (3)	14
new published evidence	21.4% (3)	35.7% (5)	14.3% (2)	28.6% (4)	14
team work between senior clinicians and management	42.9% (6)	42.9% (6)	7.1% (1)	7.1% (1)	14
access to transition funding	35.7% (5)	28.6% (4)	7.1% (1)	28.6% (4)	14
other transition support e.g. project staffing	35.7% (5)	35.7% (5)	0.0% (0)	28.6% (4)	14
hospital leadership	21.4% (3)	42.9% (6)	14.3% (2)	21.4% (3)	14

one person's vision	7.1% (1)	35.7% (5)	14.3% (2)	42.9% (6)	14
NSW Health leadership	0.0% (0)	50.0% (7)	28.6% (4)	21.4% (3)	14
Other (please describe)					
<ul style="list-style-type: none"> • "Lack of space was a major driver." • "This all happened when modifying a ward, they closed another ward and created a small ward in a vacant ward. It was opportunistic based on an adjacent space being available." 					

Table C 18 Barriers/difficulties in transitioning services (Q25)

What are/were the barriers/difficulties when transitioning services away from inpatient models of care? Please rate their level of importance, or indicate whether they were not applicable.					
	High importance	Medium importance	Low importance	Not important or not applicable	Response Count
nursing and allied health staffing	71.4% (10)	7.1% (1)	7.1% (1)	14.3% (2)	14
establishing a process for emergency admission	71.4% (10)	7.1% (1)	7.1% (1)	14.3% (2)	14
establishing a clear point of contact for patients should complications arise	71.4% (10)	14.3% (2)	0.0% (0)	14.3% (2)	14
establishing supportive care protocols (i.e. anti emetics, antibiotics)	57.1% (8)	21.4% (3)	7.1% (1)	14.3% (2)	14
establishing a criteria for suitability	57.1% (8)	14.3% (2)	14.3% (2)	14.3% (2)	14
difficulties in managing treatment side effects or complications	57.1% (8)	21.4% (3)	14.3% (2)	7.1% (1)	14
the capacity of patients and carers to cope at home	50.0% (7)	35.7% (5)	0.0% (0)	14.3% (2)	14
medical staffing	50.0% (7)	14.3% (2)	7.1% (1)	28.6% (4)	14
funding	50.0% (7)	28.6% (4)	7.1% (1)	14.3% (2)	14
adequate time and space to educate patients	50.0% (7)	21.4% (3)	14.3% (2)	14.3% (2)	14
the need to modify treatment regimens	42.9% (6)	21.4% (3)	21.4% (3)	14.3% (2)	14
potentially toxic treatment regimens make it difficult for these patients to be managed on a non-inpatient basis	42.9% (6)	35.7% (5)	14.3% (2)	7.1% (1)	14
developing staff with adequate skills	42.9% (6)	42.9% (6)	0.0% (0)	14.3% (2)	14
provision of psychological or psychosocial supports for patients and carers	35.7% (5)	42.9% (6)	14.3% (2)	7.1% (1)	14
lack of a suitable home environment	35.7% (5)	42.9% (6)	7.1% (1)	14.3% (2)	14
implementing a process for assessing patients for suitability	35.7% (5)	28.6% (4)	14.3% (2)	21.4% (3)	14
establishing weekend staffing	35.7% (5)	14.3% (2)	7.1% (1)	42.9% (6)	14
establishing a consistent care team across both inpatient and non-patient settings	35.7% (5)	35.7% (5)	14.3% (2)	14.3% (2)	14
availability of patient transport	35.7% (5)	35.7% (5)	0.0% (0)	28.6% (4)	14
accessing subsidised accommodation for non-local patients and their carers	28.6% (4)	28.6% (4)	21.4% (3)	21.4% (3)	14
lack of adequately skilled staff	21.4% (3)	42.9% (6)	21.4% (3)	14.3% (2)	14
there is a lack of sufficient evidence base	14.3% (2)	7.1% (1)	42.9% (6)	35.7% (5)	14
lack of technical resources	14.3% (2)	35.7% (5)	7.1% (1)	42.9% (6)	14
lack of protocols and procedures	14.3% (2)	28.6% (4)	14.3% (2)	42.9% (6)	14
lack of medical support	14.3% (2)	35.7% (5)	7.1% (1)	42.9% (6)	14
lack of leadership	14.3% (2)	28.6% (4)	21.4% (3)	35.7% (5)	14
lack of nursing management support	7.1% (1)	42.9% (6)	14.3% (2)	35.7% (5)	14
industrial issues e.g. staff resistance to changes in rosters/custom/ practice	7.1% (1)	35.7% (5)	35.7% (5)	21.4% (3)	14
non-clinical support staffing e.g. security, cleaning etc.	0.0% (0)	42.9% (6)	35.7% (5)	21.4% (3)	14
dealing with staff that were/are disadvantaged	0.0% (0)	21.4% (3)	35.7% (5)	42.9% (6)	14

What are/were the barriers/difficulties when transitioning services away from inpatient models of care? Please rate their level of importance, or indicate whether they were not applicable.					
	High importance	Medium importance	Low importance	Not important or not applicable	Response Count
Other (please describe) :					
<ul style="list-style-type: none"> • “Main barriers are: <ul style="list-style-type: none"> – lack on an integrated chemotherapy/infusion/clinics/ward/short notice review structure (bringing all these together geographically I think is the key in Haematology and other sub-specialities); and – difficulty getting patients back into hospital if [they] develop complications (insufficient inpatient beds) is a major contributor of bias to keeping patients as inpatients.” 					

Table C 19 Shared comments about overcoming barriers (Q26)

Would you like to share some comments on a barrier/difficulty that was important for your service, and how you overcame this?
<ul style="list-style-type: none"> • “Having a service that stretches from one end of the area to another, distance is a challenge to get the service united.” • “Services have been available for 20 years, but the dedicated unit was available for 12 years. The lack of foresight and planning was the most frustrating e.g. only look at here and now needs, rather than what we might need in five years time, in terms of capacity. We did overcome this to some degree by garnering another grant from NSW Health to expand physical services but not nursing staff. Nursing staff succession planning is still the most difficult problem to overcome.” • “Biggest barrier was we didn’t have a dedicated registrar. Found we would start putting patients into ambulatory care setting, but they needed more care. It was more difficult for a consultant to care for them given the timing constraints. Used to be able to manage to the convenience of the consultant. It almost fell over as every time they put their head in the door of the unit they didn’t get out for 2 hours. Went to administration, presented that it is good for patient, saves patients getting admitted, but needs another registrar to generate funds, (can become chargeable as Medicare chemotherapy billing). Moved to be private referred outpatients. There may have been a trade-off e.g. it reduced some overtime.” • “Our haematology unit does not have the space to support services to allow us to provide a comprehensive non-inpatient service. We do not have space for assessment of patients, for counselling, waiting areas, toilet facilities, staff areas (nursing or clerical). We do not have sufficient clerical support for each service.”

Table C 20 Financial impact of the change (Q27)

What has been the financial impact of the change?		
Answer Options	Response Percent	Response Count
Overall cost savings to all cancer patient care	23.1%	3
Overall cost savings to haematology cancer patient care	15.4%	2
Other in-kind cost savings such as space or increased capacity	15.4%	2
No impact	7.7%	1
Unknown	61.5%	8

<p>Other (please describe)</p> <ul style="list-style-type: none"> • “Because budgeting is not delegated down to the "coal face" this does not enter my calculations at all (never see our "budget").” • “Have been billing for consultations, biggest billing item is chemotherapy. That revenue is in the order of \$100,000 per year. 50% of inpatients come in as public patients, when they become an outpatient, with a referral from GP, we can bulk bill and charge as a consultation. Billable for chemotherapy. A registrar can't bill as they are not specialists, so a lot of revenue goes missing. e.g. could possibly do a ward round of ambulatory care, for consultants to review and bill. Possibly scope for improvement there.” • “Not applicable to most of our patients.”
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Table C 21 Impact on staff of the change (Q28)

What has been the impact on staff of the change?		
Answer Options	Response Percent	Response Count
Increased skills/professional development opportunities	60.0%	9
Increased morale	40.0%	6
Better job opportunities in the future	33.3%	5
Unknown	26.7%	4
Loss of penalty rates	20.0%	3
Decreased skills/professional development opportunities	6.7%	1
Rostering changes - positively perceived	6.7%	1
Rostering changes - negatively perceived	6.7%	1
No impact	6.7%	1
Decreased morale	0.0%	0
<p>Other (please describe)</p> <ul style="list-style-type: none"> • “Sourcing enough outreach staff.” • “The changes from inpatient treatments for supportive haematology care e.g. blood transfusions, antibody therapy and bisphosphonate treatments etc have led to the increase in skills within the day treatment centre but a decrease in skills for the nurses in the inpatient ward setting. This has led to both a positive and negative aspect for nursing skills dependent on where you work. While there has been a financial impact due to loss of penalty rates for staff that have moved to the day treatment centre there has been a positive impact with more regular hours, no night duty and no weekend shifts. No staff here complaining - we love the hours.” • “Nurses like the more regular hours, has been more stable for nursing recruitment. Oncology nurses becoming more interested in haematology. Many nurses are learning to do apheresis and expand skills. Good for the registrar seeing broad range of care across inpatient and outpatient care, to see a better perspective, the holistic patient view. Allied health - e.g. dieticians have been able to expand their scope of practice e.g. there was a nutrition survey of outpatients which developed skills in managing outpatients. Constant loss of nurses from wards to ambulatory care [is an issue]. We had suggested a rotation.” 		

Table C 1 Most important things needed to create an ideal service (Q29)

Over the next 5-10 years, if you had the opportunity to create the ideal service for non-inpatient management of adult patients with haematological malignancies, what would be the most important things you would like to see happen or change?

- (1) "Increased space. Funding for nurse practitioners."
- (2) "Cancer specific community nurses that can do home visits and assessments with medical staff input. Improved access of allied health practitioners within the ambulatory setting (e.g. a dedicated physiotherapist, dietician, OT, pharmacist, exercise physiologist)."
- (3) "I would like to see all of the below components of service integrated both geographically and with cross staffing:
 - Haematology Oncology Day Centre (elective chemotherapy for haematology and oncology patients);
 - apheresis Service (Haematology/Oncology nursing staff);
 - Ambulatory Care Unit (blood transfusion, other infusions, hourly slot for patient review);
 - Community Outreach Program (Haematology/Oncology Nursing Staff who review patients and take bloods);
 - outpatients clinic; and
 - inpatient area."
- (4) "Ideally I would have an area of ~ 5 beds/10 chairs/2 apheresis machines at one end of the inpatient ward and close to Haematologist/CNC offices and use this same area to deliver all components of the service, including an area where sick outpatients could be rapidly reviewed."
- (5) "Under our current structure, fragmentation both geographically and of staffing is less than ideal. Using ambulatory services for patients with a high risk of readmission requires either "protected" beds in the ward or sufficient inpatient beds to ensure rapid re-admission."
- (6) "We would have outreach nurses, and medical staff available to support those people."
- (7) "Local haematologist."
- (8) "Appointment of a:
 - full-time haematologist for our hospital;
 - full-time haematology registrar;
 - haematology care coordinator attached to [the] Hospital and one dedicated to the outreach rural sites; and
 - haematology/oncology nurse practitioner.
 Training for generalist community nurses in haematology issues. More liaising with metropolitan specialty sites for all nurses for education and training for patients in the rural areas. More utilisation of video linkages for communication and education between doctors, health professionals and patients. More satellite outreach treatment centres in the rural sites. This could be combined with oncology. Availability of a haematologist to hold visiting clinics in rural sites. e.g. haematologist in [main regional site] to hold outreach clinics in [smaller regional] sites and treatment centres to be established in those sites."
- (9) "1) Ability to offer apheresis service - patient not having to travel to Sydney for something that isn't that complicated a procedure. 2) On-site haematologist or medical oncologist 3) More adequately trained nursing staff - staff who are interested in medical oncology and willing to dedicate the time and training to work here."
- (10) "Increase in hours of operation, increase in capacity, and increase in skilled staffing."
- (11) "[Would have]:
 - new Building - included as part of a comprehensive cancer centre, which means being closely located with inpatient wards. If designed from scratch would probably try and incorporate. Distinction between inpatient and outpatient care is often fabricated - patients could blend even more, a seamless interaction between what's inpatient, outpatient and in between. Would need to be built from the ground up.
 - Enhancements of the workface - with medical, run the ambulatory the same as inpatient e.g. have a resident, better organisation of results. To run more like a ward rather than a clinic. Need to be more like a team looking after a patient like a ward.
 - Top notch information systems - really good computerised paperless information system. All information readily available, combining notes for all settings - IP, OP, Community. All information in one source. Structure the way the team works e.g. nurses - ours a generic, haematology patients have long histories, so there is benefit to have the same nursing team e.g. nurses appoint a particular nurse to a patient, then a nurse would follow patient as an individual. So I would change that model to have team centred approach to a patient. They would get to know the patient intimately.
 - Better interaction with the community services - trying to do that with Directors role within the network. Could have rotations of working in the community and then back into the unit. Ambulatory care is in the middle [of the patient pathway] between inpatient and the community. Would have specialty units - currently mixed units for chemotherapy rather than speciality. Skills are best developed with

Over the next 5-10 years, if you had the opportunity to create the ideal service for non-inpatient management of adult patients with haematological malignancies, what would be the most important things you would like to see happen or change?

specialisation for medical and nursing staff. Would have haematology separated from solid tumour oncology."
 (12)“Correction of the deficiencies identified in question 26.”

Table C 2 Sharing of documented protocols (Q29)

Do you have any documented protocols that you would like to share with CI NSW?		
Answer Options	Response Percent	Response Count
Yes	7.1%	1
No	57.1%	8
Unsure	35.7%	5
Other (please describe)		
<ul style="list-style-type: none"> • “Already follow CI NSW protocols.” • “Our Cancer Outreach service as provided protocols to the Cancer Institute.” 		

Table C 3 Has the service been evaluated?

Has there been an evaluation of ambulatory services and/or patient outcomes of the change?		
Answer Options	Response Percent	Response Count
Yes	13.3%	2
No	60.0%	9
Unsure	26.7%	4
Other (please describe)		
<ul style="list-style-type: none"> • “We are seeking resources to implement change.” • “Evidence of improved patient care and avoidance of admissions to hospital.” 		

APPENDIX D CASE STUDY 1 – AN AMBULATORY CARE UNIT

This case study is of an ambulatory care unit (ACU) situated within a major public hospital.

Key findings:

- (1) The ambulatory care unit does not operate alone but is integrated within a wider service model.
- (2) Patients will often shift between care settings, during the course of their illness, or during the course of their stay.
- (3) Technological and treatment advances have facilitated the shift to ambulatory models of care, however patients still require a multidisciplinary care team with specialist skills.
- (4) Care shifted to an ambulatory service model is essentially inpatient care delivered within business hours for suitable patients, which puts pressure on inpatient diagnostic and support services to be able to meet a faster patient turnover.
- (5) Patient suitability is assessed at an individual level and factors include disease state, home carer availability, supports needed, proximity to these supports, patient psychology, and suitability of treatment protocol.
- (6) Future change activities could be prefaced by the conduct of a clinical audit to determine how many inpatients could have been cared for on a non-inpatient basis and what would be needed to shift these to non-inpatient care.

The physical facilities of the haematology service consist of:

- a haematology inpatient unit of 21-25 beds (which also houses renal patients); and
- the ambulatory care unit of 22-24 chairs.

The ambulatory care unit functions as a full ambulatory suite, caring for haematology, medical oncology and other patients requiring intense chemotherapy for non-malignant and non-haematological conditions such as rheumatoid arthritis and multiple sclerosis. Currently the patient profile of the unit comprises approximately 70% haematology/oncology patients with about half of these being haematology and half oncology.

While staff are generally allocated to work in either inpatient or outpatient areas, the two areas operate as one department with regular structured and unstructured communication. Some patients attending the ambulatory unit will not necessarily see a doctor if the treatment they are receiving is not complicated, or doesn't require medical assessment or involvement. Patient suitability is assessed at an individual level and factors include disease state, home carer availability, supports needed, proximity to these supports, patient psychology, and suitability of treatment protocol.

The haematology service performs around 60-70 autologous transplants and allogeneic transplants each year. Suitability for early discharge of non-metropolitan patients depends on the level of specialist care available in their region. For these patients, ongoing liaison by the haematology service with local clinicians and patients occurs via videoconference.

The table below summarises the main care settings by patient type:

Table 4.1: Summary of patients and main care setting

Inpatient (not planning to shift)	Inpatient (would shift resources and patient suitability permitting)	Non-inpatient (ambulatory/outpatient)
<ul style="list-style-type: none"> • AML/ALL induction • Bone marrow harvest • Radio-immunotherapy 	<ul style="list-style-type: none"> • Management of febrile neutropenia (suitable low risk patients) 	<ul style="list-style-type: none"> • AML/ALL administration, consolidation, supportive care • High grade lymphoma • Stem cell mobilisation, apheresis and cryopreservation • AutoHSCT and AlloHSCT conditioning, transplant, post-transplant care • Radiation therapy, antibody therapy • Blood transfusion • Supportive care

Examples of some of the technological advances that have been important in the shift of patients to non-inpatient settings have included:

- the ability to perform and manage more complex chemotherapy protocols and platelet transfusions on an outpatient basis; and
- CADD™ pumps for continuous therapies which involves using an intermittent pump which can be calibrated and set every two days to automatically administer a twice a day dose and
- Baxter™ pumps for continuous antibiotic infusions, which are maintained in the home by Acute/Post Acute Care (APAC) community nurses who change pumps each day.

The ambulatory care service now consists of:

- 22-24 chemotherapy chairs, 4 of which are within single rooms (which also have beds);
- two apheresis beds for stem cell collection;
- a three desk medical office 'hub' which is used as a base for writing notes and day to day referencing/researching;
- clinical research offices which are located downstairs adjacent to the Directors office;
- a satellite pharmacy to facilitate faster preparation and dispensing of chemotherapy drugs and provide consultancy services as part of the clinical team;
- a Director of ambulatory care (haematologist);
- clinical nurse specialist (CNS);and
- staff specialists and registrar roles.

Other services features are:

- Opening hours - 7am to 7pm, seven days per week, including public holidays (with minor variations from time to time);
- Weekend medical cover - one haematology registrar covers both the inpatient ward and ambulatory care unit;
- Unscheduled presentations – These are not common due to the 7 day, long opening hours. Unscheduled patients present via the emergency department. Existing patients are assessed by the haematology registrar and, if needed, can be admitted to the ward. However this is still done through the hospital bed manager;
- After hours - a haematology consultant is also rostered to provide after hours cover in the inpatient ward and ambulatory care unit to support the registrar;
- Home nursing service access (provided by a separate division);
- A graduate nurse role (currently piloting);

- IT systems in use were Practice Pro, an electronic booking system; and Audit 4/S4S a clinical management system for consultants used across the ambulatory and inpatient service.

Haematology services are delivered by a team consisting of both generalists and specialists, as described in the table below.

Table 4.2: The Haematology Team (inpatient, non-inpatient and non-malignant care)

Haematology or Haemo/oncology trained	Generalist
<ul style="list-style-type: none"> • Consultant/specialist (7) • Senior Registrar (4) • Pharmacist (1) • Nurse Unit Manager (1) • Nurse Coordinator - BMT (1) • Clinical Nurse Consultant (1) • Community Liaison CNC (1 shared with renal/haem/onco/rad) • Community Nurses (2 - estimate of average hours use of onco/haemo community nurses for haematology patients) • Dietitian (0.5) • Psychologist (0.5) • Nurse Practitioner (n/a) • Nurses (20) • Social worker (0.5) • Physician Assistant (1- vacant) 	<ul style="list-style-type: none"> • Registrar (2) • Resident Medical Officer (2) • Medical Intern (2) • Occupational Therapist (0.5) • Physiotherapist (0.5) • Complementary Therapy Practitioner (n/a) • Secretary/administrative (1.5) • Practice Manager (0.5)

Note: numbers in parenthesis are indicative FTE staffing, and may be spread across multiple positions, and from other departments.

Shifting to non-inpatient care models

The key drivers for the shift to non-inpatient models of care were a combination of:

- pressure on inpatient beds - the pressure to fit in new patients when there were no free inpatient beds;
- patient desire - patients being tired of being in hospital and asking to be at home, to improve their quality of life; and
- changes in care approaches and protocols - the development and evolution of new products and processes which allow greater outpatient management.

In addition to responding to the key drivers above, other benefits to shifting were:

- nursing staff – ambulatory services roles are highly valued due to the hours of operation and specialisation.
- medical registrars – are exposed to a broader range of patients, across both inpatient and outpatient settings, which helps to develop a holistic patient perspective; and
- allied health staff - have also been able to expand their scope of practice.

Future directions

Opportunities for future change or investigation that were highlighted:

- dealing with rapid throughput within the constraints of restricted operating hours (this can mean hospital diagnostic and support services need to prioritise ambulatory patients before inpatients);
- dealing with more complex patients and new patient types;
- ensuring safe, multidisciplinary care across the patient journey;
- having facilities and IT systems that support and promote seamless care across the patient journey and between care settings;
- extending opening hours to provide a longer afternoon service for patients;
- providing pathway coordination for BMT patients, including community care;

- greater use of infusion pumps;
- clinical speciality units i.e. a dedicated haematology chemotherapy unit; and
- change activities could be prefaced by the conduct of a clinical audit to determine how many inpatients could have been cared for on a non-inpatient basis and what would be needed to shift these to non-inpatient care.

APPENDIX E CASE STUDY 2– A REGIONAL HAEMATOLOGY UNIT

This case study is of a regional haematology unit. The units Chronic Transfusion Service (CTS) and Hospital in the Home (HITH) service are a focus of this case study.

Key findings:

- (1) A Chronic Transfusion Service involves patients getting their bloods monitored in the community and results reviewed by a nurse using individual patient parameters set by the consults.
- (2) For many patients this means they no longer need to present at a haematologist's clinic once a month, unless their condition changes or deteriorates, with routine haematologist review dropping to a 6 or 12 month basis.
- (3) This hospital in the home service provides in-home care by generalist nurses, using guidelines and procedures established by a specialist haematology nurse and consultant haematologists.

The unit is a dedicated haematology unit, which treats both malignant and non-malignant haematological conditions. The unit cares for patients from the wider region, along with a small number of patients from other regions. Consultation services are provided from the unit to all other hospitals within the wider region.

The provision of some complex chemotherapy regimens (and often the first cycle of treatment) is undertaken in the day ward, whilst most other chemotherapy is provided by a day treatment centre.

The unit consists of:

- an inpatient ward with 12 inpatient beds, consisting of one 4 bed bay and 8 single positive pressure rooms (although one bed is currently closed for budgetary reasons);
- located next door to the inpatient ward, a day ward (open Monday – Friday, 8am to 4pm) with 8 chairs in a shared area plus 2 trolley beds which are located in single rooms;
- an apheresis room with 2 chairs, running three days per week;
- up to 4 beds in an 'outlier' ward, when the inpatient ward is at 100% occupancy. Where possible, these patients are located in a medical ward near the haematology ward and managed by the Haematology NUM; and
- access to the day treatment centre, part of the hospital's general oncology service.

Due to some recent fundraising activity, all inpatient ward beds have laptops with a wireless connection for patient use.

The inpatient ward provides staffing cover for any weekend day ward admissions. Most haematology staff work across both areas. The day ward is staffed by a clinical nurse specialist coordinator and a registered nurse (RN). The day ward operates at capacity and aims to keep patients out of an inpatient bed wherever possible. For example, patients with AML who require consolidation therapy with 5-day continuous infusions are now seen as outpatients 15-20% of the time (8-9 patients in the last year).

Each week, approximately 100 non-inpatient occasions of service occur within the day ward, 40 telephone triage consultations and three home visits. It is estimated that this could expand over the next five years to around 150 non-inpatient occasions of service and 70 telephone triage consultations. Outpatient clinic consultations total approximately 9,000 per year, 1,000 of which are newly registered as patients in the last year. Over the last four years, number of new patients with acute leukaemia seen each year has vacillated between 20 and 40, with an average of 20-25.

Shifting to non-inpatient models of care has allowed the unit to remain with an average 16 inpatients a day, despite a 25% increase in patient load.

The unit estimates that around 10-20% of patients are able to stay out of hospital for their entire treatment or management. Around 80-90% patients will need to need to be re-admitted, however around 95% will have substantially reduced their overall inpatient length of stay.

Chronic Transfusion Service

The day ward runs a chronic transfusion service for around 80 patients in the community. Primarily for patients with myelodysplasia and other chronic haematological disorders, it also treats non-haematology patients, such as those with slow gastro-intestinal bleeds. Each patient seen by the service has individual clinical information available on requirements such as frequency of blood collection and results parameters. Once referred, patients have bloods collected in the community via the home collection service, or by presenting to the local pathology collection centre. Results are sent to the day ward coordinator, who maintains a computerised record of all patient information and results parameters. If required, the day ward coordinator organises for the patient to come into the unit for a transfusion as a day patient.

As a result of this service, patients avoid needing visit their haematologist each month, and don't wait until they are so ill that they require an emergency transfusion. If their condition doesn't deteriorate, they may only need to see a haematologist on a 6 or 12 month basis for routine review.

Hospital in the Home (HITH)

The HITH service operates 7 days per week. The service is staffed by generalist nurses, supported by haematology patient assessment and care protocols which were established by a haematology trained nurse working as part of the team, in close consultation with the consultant haematologist. Haematologists were initially reluctant to refer patients to this service, prior to the haematology-trained nurse working as part of HITH and establishing clear patient assessment and care protocols for haematology patients. It has now become a valuable service for haematologists in managing their patients beyond in-hospital care.

In addition to clinical condition and treatment regimen, the haematology unit uses criteria for determining if patients are suitable for HITH care, which are:

- accommodation within 45 minutes of hospital;
- 24 hour informal carer available;
- compliance with treatment regimen; and
- patient willing and able to return to hospital if needed.

The types of patients that are typically managed through the day ward and then seen by HITH include:

- patients with acute leukaemia or high grade lymphoma after high dose chemotherapy;
- patients with acute leukaemia receiving consolidation chemotherapy using CADD™ pumps at home;
- patients after receiving high dose chemotherapy and post-stem cell transplant (some patients are too unwell or do not meet the HITH criteria for management at home);
- patients with lymphoma or myeloma; and
- severely neutropenic patients with counts of zero (although patients come to hospital if febrile or with other complications such as severe dehydration or uncontrolled mucositis).

In 2008/2009 more chemotherapy for AML induction, and other regimes traditionally conducted in the inpatient setting, were conducted at home using CADD™ pumps.

HITH perform a home assessment prior to patient discharge from hospital. Some patients requiring daily monitoring are managed in both the home and the day ward. For example, on Monday, Wednesday and Friday, a patient may come to the day ward for bloods and to see a specialist nurse or haematologist, whilst on Tuesday, Thursday, Saturday and Sunday they may be seen and assessed by the HITH nurse in the home. In a typical visit, the HITH nurse might check for side effects, take bloods, check the central line and then report back to the day ward.

The HITH nurse will report on each patient daily, either in person or by telephone (e.g. from the patients home if they are concerned or have queries), to the day ward coordinator.

The inpatient, outpatient/day ward and HITH are currently on separate clinical IT systems. While some electronic records exist, there is still also a manual inpatient patient record.

Change Processes

Key drivers highlighted as important were:

- demand for inpatient beds - the pressure to fit in new patients when there were no free inpatient beds;
- patient desire – patients being tired of being in hospital and asking to be at home to improve their quality of life;
- improving staff expertise across the continuum of patient care;

Facilitating factors were described as:

- multidisciplinary team communication – including twice weekly meetings to discuss all patients across all settings, including those being managed in other neighbouring facilities;
- strong leadership, unit size and a stable workforce;
- the provision of specific program funding i.e. HITH, BMT network funding;
- the uptake of new technologies, such as CADD™ pumps;
- local innovation and partnership, such as partnership with the chronic transfusion service
- a focus on creating a trusted HITH service to support the work of the haematologists; and
- ‘piloting’ new models with suitable patients and very competent carers.

Future Directions

Areas of potential change to support a greater shift to non-inpatient models in the future were identified as:

- increasing the number of day ward chairs (which will need extra space);
- increased consultation and counselling space so chairs can be used for treatment, instead of consultation and counselling;¹
- using a nurse practitioner/care coordinator to help identify and manage suitable patients;
- specialised HITH nurses who could deal with more specialised patients; and
- an extended afternoon service.

¹This is consistent with the NSW Cancer Patient Satisfaction Survey 2007 which highlighted emotional support and accompanying relevant information as the two main areas of lower satisfaction across NSW cancer outpatient services

APPENDIX F CASE STUDY 3 – A CANCER OUTREACH TEAM

This case study is of a cancer outreach team (COT) which operates out of a major public hospital, functioning as a shared service for the haematology and oncology departments.

Key findings:

- (1) This Cancer Outreach Team provides in home specialist nursing care, and triage prior to admission.
- (2) Regular ward rounds, in-home visits and telephone follow-up allows the COT CNC or CNS to provide continuity across settings and along the patient pathway.
- (3) Good communication and linkages to other services, such as joint visitation with palliative care as required, can facilitate smooth patient transition.

The COT operates in an integrated way with the other haematology services which include a 10 bed inpatient unit operating 24/7 and a 4 bed/2 chair day ward operating business hours, Monday to Saturday.

The COT commenced in 2001 and is an in-home service funded under the NSW Health Chronic and Complex Care Program. It aims to decrease the amount of time patients need to spend in hospital and improve coordination. Referrals are accepted from two major public hospitals. The key impetus for expanding to an in-home service was the increasing patient demand and lack of available space on the hospital site to further develop ambulatory and outpatient services.

Service model

The COT was initially established in 2001 with 1 full time clinical nurse consultant (CNC), with the addition of a part-time (0.6 full time equivalent) clinical nurse specialist (CNS) in 2004.¹ The service cares for patients with malignant conditions through both face-to-face and telephone follow-up. Approximately 60% of patients receiving face-to-face service from COT are haematology patients, the remaining 40% being oncology patients. The telephone follow-up proportions are approximately 40% haematology and 60% oncology. At times, patients falling outside the geographic area may be offered telephone follow-up only.

The COT covers an area of over 30 suburbs and geographic boundaries of the service are very similar to those of the post acute care community nursing service (PAC) which is staffed with generalist community nurses (GCN).

The COT has approximately 100-120 active patients at any time. The majority of home visits occur in the morning, with telephone follow-up of patients occurring in the afternoon. Each nurse sees an average of four to seven people per day, with an ideal number of approximately five home visits per day plus 10 phone follow-ups.

To be eligible to be seen by the COT, a patient needs to live within the catchment area, have a malignant condition and:

- (1) be likely to comply with treatments at home;
- (2) be self caring or have a suitable carer available 24/7; and
- (3) have access to a telephone.

While most patients have been inpatients of the hospital, some cross-referral occurs for patients within the COT catchment suburbs.

Broadly, key functions of the COT are to:

- enhance the existing telephone and clinical review by providing routine in-home follow-up;
- coordinate the utilisation of resources and develop linkages to bridge the gap between acute care and established community services such as the GCNS of the PAC services, palliative care and general practitioners (GP's);
- provide specific cancer-related nursing expertise to the patients and their carers;
- educate and train the PAC nurses in haematology/oncology-related procedures to facilitate more specialised support by these generalist nurses;

- be available to conduct education sessions for oncology/haematology management issues for GP's organised through the GP liaison officer, and to be available to GP's on a consultative basis; and
- to develop treatment guidelines for both established and new practices.

Staffing model

The CNC works Monday to Friday, 8am to 5pm, and the CNS works three days, 8am to 5pm. While the patient load is shared, the CNC takes a leadership role for the service, and reports to the Director of Nursing, and the Clinical Program Manager, Oncology, Emergency & Medicine. However, on a day to day basis the CNC works with patients with the Haematology and Oncology multidisciplinary teams. While operationally the COT nurses work as an integral part of the haematology team, the COT roles are specialised with the CNC and CNS remaining permanently allocated to these positions.

Day to day activities

On a day to day basis, the service allows inpatients to be discharged sooner than they would have otherwise been, and allows triaging and monitoring within the home environment. The triaging of patients can often occur 'pre-emptively', with care problems being identified and resolved without the need to present to the emergency department, the ward or the outpatient clinic.

Typical day to day activities of the COT nurses include:

- adhoc triage and assessment of patients as required, and liaison with the haematology wards, therefore bypassing the emergency department;
- five day per week contact with the haematology multidisciplinary team (MDT) regarding individual patient needs;
- attending haematology and medical oncology ward rounds with the MDT to identify people suitable for home follow-up, and assisting in the preparations for patient discharge;
- collecting blood and interpreting blood tests based on individual patient parameters i.e. patient specific parameters set by the haematologist that would trigger a decision to admit for transfusion;
- managing symptoms and treatment of side effects;
- venous device care;
- patient and carer education and reassurance;
- chemotherapy and bisphosphonate infusions;
- working with the palliative care team to provide support with blood tests and symptom management;
- simple dressings requiring no more than once a week care (dressings requiring more regular care are referred to the GCN service).

The COT also participates in the palliative care meeting, the haematology ward rounds and the medical oncology rounds on a weekly basis.

To maintain a cost effective service, care delivered by the COT nurses is generally limited to those tasks that can be completed in less than one hour. Examples of the types of patients seen by the COT nurses include:

- patients receiving less complex chemotherapy;
- post-consolidation phase chemotherapy care;
- older patients with NHL or CML;
- patients with pancytopenia who (with their carer) are likely to be compliant with care;
- patients with myelodysplasia requiring regular blood tests and Hb monitoring;
- patients with nausea, diarrhoea and/or vomiting; and
- patients who may have had a long hospital admission and are reticent about leaving hospital and unsure if they can cope at home.

While referral of patients to the COT service is made by the haematology multidisciplinary team, the haematologist retains overall clinical responsibility for the patient. Referral may occur verbally, during ward rounds or via an email or telephone call.

The COT nurses also work in close consultation with the palliative care service, and may share patients or conduct joint patient visits with palliative care nurses to help introduce the patient and transition them to the care of the palliative team.

Leave relief and backfill for COT is provided by interested and qualified nursing staff from the medical oncology and haematology inpatients units.

Physical facilities and resources

In addition to staffing, resourcing for each nurse includes:

- a pool vehicle and car park;
- laptop & desktop computers;
- database;
- mobile phone;
- office space within the hospital; and
- an information leaflet with contact details to use to support communication with patients and other clinicians.

Clinical records are currently kept on separate systems not accessible electronically in each service setting (i.e. community, consultants' offices, inpatient unit), however the hospital is currently implementing the Mosaic program, which should provide a common electronic medical record system.

Change processes

While the COT was originally established to undertake a pathway coordination and community care role, the functions of triage and chemotherapy provision evolved over time as confidence grew between the consultants and COT nurses.

On reflection, the COT CNC's advice on the change process and setting up a successful outreach service was:

- ensure good communication between stakeholders;
- if a community service is already in existence, link in with this service;
- do not limit what type of patients can be seen by the service, think "why *can't* we do this at home?"
- do not expect to initially establish a 24/7 outreach service – in fact not many people need help in the middle of the night; and
- do not limit the service to malignant haematology, or you will spilt the service in two.

Key evaluation findings

In 2006 the COT conducted a patient satisfaction survey of 31 patients which found that:

- 25 returned a score of excellent for 'level of support provided by the COT'.
- 26 patients also rated an 'improvement in symptom control' to a level of 8 or more out of 10.

An evaluation also found that in-home assessment, with direct admission to inpatient service, has created an effective emergency department bypass process.

Future opportunities for expanding non-inpatient care

Some opportunities for improving and expanding non-inpatient care were highlighted as:

- more appropriate physical facilities to provide greater privacy to discuss patient treatment, gain consent and interview families;
- a staffing model to allow 7 day triage in the home, allowing patients to bypass ED and directly transfer to the inpatient or short-stay ward. Also, strengthened links with the ED to minimise patient admission;
- a common computer system for the patient database which is shared between haematology, oncology and radiotherapy. This is currently being facilitated by the Area Cancer Services.
- uptake of telemedicine for medical specialist outreach to manage patients. Approximately half of patients may be able to be managed this way, provided records were available. However access to

Medicare Benefits Schedule rebates would need to be addressed, to allow consultants to bill for this time;

- staffing to allow 7 day and extended outpatient treatments, to fit in with patients work and family commitments; and
- administration of more chemotherapy in the home.

1. In NSW, a CNC is a registered nurse with at least five years FTE post registration experience plus post registration nursing qualifications relevant to the field in which he/she is appointed. A CNS is a registered with at least one year FTE post registration experience plus post registration nursing qualifications relevant to the field in which he/she is appointed; or four years post-registration experience, including three years experience in the relevant specialist field. Source: NSW Policy Directives.

APPENDIX G ROLE OF THE BMT COORDINATOR

This role is in place in the major NSW hospitals accredited for allogeneic transplant. Its function is to provide clinical pathway coordination, education and support for patients, their carers and families, to facilitate a successful BMT process.

The BMT coordinator role is focussed on pre-transplant, transplant, and immediately post-transplant care. Typically, the BMT coordinator will be coordinating a group of pre-transplant patients (case Study 1 site, around 10), whilst also providing inpatient consultation services for admitted patients (in Case Study 1 site, around 5) during and immediately post transplant. If needed, they may also provide some direct patient care, such as chemotherapy administration.

The typical day to day activities of the BMT coordinator focuses on organising the BMT process for each patient and includes:

- patient education, particularly pre-collection and pre-transplant;
- scheduling the transplant and confirming this in writing with the patient;
- liaison with patients and clinical staff to ensure proper clinical preparation for the various stages of the transplant process (blood tests, hearing tests, lung tests etc);
- day to day liaison with families and carers;
- daily bedside consultation with patients undergoing, or who may undergo, transplant, whilst they are an inpatient;
- attending formal transplant meetings each Monday, to liaise with consultants and update the transplant and harvest lists;
- attending other ward meetings as required;
- developing and maintaining patient information on all procedures they will be undergoing;
- liaison with the state bone marrow register, and supporting the patient in a search for suitable donors through organising tissue typing, blood tests, and speaking to patients about relatives as potential donors;
- locating donors who may be living interstate;
- all patient administration required to facilitate the transplant, such as providing the various test order forms, referral letters and correspondence for patients; and
- donor education and preparation of all correspondence and consents related to the donation process, referral letters and writing to relatives;

The BMT coordinator will usually operate out of an office close to the ward, and while they see patients daily, most of their work is conducted over the telephone. The role is considered to be highly specialised but collaborative, working closely with consultants as part of the care team and performing a critical patient education and service coordination role along the patient transplant pathway.

As the role is focussed on provision of inpatient education and care, a potential service gap identified by the BMT coordinator at the Case Study 1 site was the lack of liaison with patients and their carers post discharge. While patients undergoing autologous transplants are likely to return to reasonable health in around eight weeks, and can largely perform all activities of daily living before going home, allogeneic transplant patients will require follow-up, support and perhaps periods of inpatient care for a much longer time. At the Case Study 1 site, communication with the community nursing service is usually via email and telephone if they approach the BMT service for advice, however in practice this does not occur very often.

APPENDIX H WA CANCER NETWORK & UK NICE GUIDELINES

WA Cancer and Palliative Care Network

The *WA Cancer and Palliative Care Network Haematologic Malignancy Model of Care (2009)*¹ discusses the establishment of cancer centres and cancer units for the provision of care to patients with haematological malignancies. Based on this cancer 'network' rather than a site-based model, cancer centres will provide area based inpatient, ambulatory and outpatient services for tertiary level indications, as well as secondary level care for patients within the local area. Cancer units will provide a more limited scope of care to the local population, including outpatient review, and outpatient or day patient treatment for less intensive chemotherapy protocols. As demand grows and resources improve, more intensive treatment may also be offered in cancer units. The document recommends that units be affiliated with a designated cancer centre and that medical staff (at least) work across multiple sites functioning as a single area health service.

The model suggests that cancer centres care for the most complex haematology patients, including patients with acute leukaemia, those requiring intensive chemotherapy, and those undergoing bone marrow transplantation. One centre in Perth will be the designated state allogeneic bone marrow transplant centre. In addition, it is recommended that outpatient and ambulatory chemotherapy treatment, which is significantly myelosuppressive, should be managed from cancer centres where extensive supportive care services are available. The report states that most current public sector inpatient malignant haematology care is delivered at tertiary hospitals, although some inpatients could potentially be treated at secondary hospitals if a viable model for inpatient services at these centres could be developed.

UK NICE guidelines

A similar model of care is outlined by the National Institute for Clinical Excellence (NICE) in the UK in *Guidance on Cancer Services: Improving Outcomes in Haematological Cancers – The Manual (2003)*². This evidence-based guideline suggests that services for patients with haematological malignancies be organised to ensure not only that patients have access to each form of treatment, but that staff have sufficient expertise and facilities to deliver treatments safely and effectively.

The key recommendations from this guideline were that:

- people should be treated by multidisciplinary haemato-oncology teams (MDT's) which serve populations of 500,000 or more;
- to reduce errors, each diagnosis should be reviewed by experts;
- the team should include a clinical nurse and palliative care specialist, who should have central roles within the team, with clinical nurse specialists (CNS) arranging for patients and carers to receive multi-faceted support, coordinated care, and information;
- people with neck lumps should have rapid access to diagnostic services;
- complex chemotherapy for acute leukaemia should be carried out by specialist teams in single facilities within a site, as sufficient patient numbers are needed to develop and maintain expertise; and
- high dose therapy and transplantation should be carried out in accredited centres, which includes a requirement for a minimum case-load criterion of 10 procedures per annum.

Key topic areas addressed within the guideline, that are relevant to delivering non-inpatient services, include access to care, patient centred care, and the organisation of specialist services. These are described briefly below:

- (1) **Access to care** (i.e. referral and investigation). Urgent (two-week) referral guidelines for responding to particular symptoms and referring to a multidisciplinary team. The development of routine guidelines for GP's are recommended, and the organised collaboration of specialities, such as lump clinics for the investigation and care of lymphadenopathy.
- (2) **Patient centred care**. Clinical nurse specialists should be available to offer face to face support for patients, including psychosocial support and continuity of care. Information needs related to treatment and the likelihood of survival are important, however emotional and practical needs should also be recognised and met. This might include needs such as information, fertility

issues, practical and social support, nutritional and dietetic support, occupational therapy and physiotherapy.

- (3) **Organisation of specialist services.** Services should be networked and include multidisciplinary teams, which may be established for specific forms of haematological cancers. There are also recommended core team members and extended team members within this guideline.

In the organisation of specialist service networks, four levels of service are recommended with Level 4 offering the most complex services:

- (1) **Level 1:** Hospitals providing conventional chemotherapy and other forms of outpatient treatment, using dose levels that would not be expected to produce prolonged neutropenia. These services may include outpatient assessment and monitoring, outpatient or day case chemotherapy (i.e. for CLL or NHL), inpatient chemotherapy and palliative treatment (i.e. for patients with NHL who cannot cope with day case treatment), or facilities for management of neutropenic sepsis.
- (2) **Level 2:** Facilities for remission induction in patients with acute leukaemia using intensive chemotherapy regimes. This level of facility is also required to treat patients with aggressive lymphoma.
- (3) **Level 3:** Facilities for autologous transplantation.
- (4) **Level 4:** Centres with expertise in both autologous and allogeneic transplantation.

The manual recommends that service networks be organised to ensure that all patients have access to all levels of service, either within the network or in another network with which it collaborates. It recommends that all patients with haematological malignancies be managed by multidisciplinary haemato-oncology teams serving populations of 500,000 or more and that facilities providing treatment for remission induction in patients with acute leukaemia should see over five new patients per year in order to develop and maintain expertise. They should also provide services within designated wards, with continuous access to specialist nurses and haematologists, and high dose therapy and stem cell transplantation should only be offered in centres with a minimum caseload of ten procedures per annum.

NSW approach

Australia has developed guidelines for accreditation of centres offering allogeneic and/or autologous transplantation, including minimum patient numbers per year¹. For centres requesting accreditation for allogeneic transplants, a minimum of ten new allogeneic patients need to be transplanted per year, or five per site if more than one clinical site is included as part of the transplant facility. Centres accredited for allogeneic transplantation also receive accreditation for autologous transplantation. For centres seeking accreditation only for autologous transplantation, five new recipients of autologous transplant should be transplanted per year. In NSW, the four hospitals accredited to provide allogeneic transplants for adult patients are Royal North Shore Hospital, Royal Prince Alfred Hospital, St Vincent's Hospital and Westmead Hospital.

Under these overall models of care, it is likely that non-inpatient care of patients with chronic haematological malignancies could be managed in both secondary and tertiary centres with visiting outpatient consultative services, day treatment or ambulatory care units to secondary and rural sites, and integration of home-based services. Care for high grade malignancies and transplant services would be provided at tertiary centres, with some inpatient services or resident haematology services also being developed in large regional centres as demand for services grows alongside availability of skilled staff. This physical redistribution of patients may facilitate the development of disease specific clinics, although it must be remembered that patients with the same diagnosis can vary widely in their treatment needs and suitability to receive non-inpatient care.

In 2003, the Clinical Service Framework for Optimising Cancer in NSW³ was developed to sit between the Optimising Cancer Initiative and the NSW Chronic and Complex Care Program. The framework articulated specific standards for the development of area-wide approaches to optimising cancer care which included establishing area cancer service management structures and service networks with area-wide site-specific clinical groups such as haematology. The finalisation and/or operation of formal service networks is still in development.

1. National Pathology Accreditation Advisory Council. Requirements for procedures related to the collection, processing, storage and issue of human progenitor cells (Third Edition 2009) – NPAAC Tier 4 Standard. Canberra: Australian Government Department of Health and Ageing, 2009.
[http://www.health.gov.au/internet/main/publishing.nsf/Content/F772A9456D76ABA8CA2576110006D191/\\$File/requirementsforhpc.pdf](http://www.health.gov.au/internet/main/publishing.nsf/Content/F772A9456D76ABA8CA2576110006D191/$File/requirementsforhpc.pdf)
2. Guidance on Cancer Services: Improving Outcomes in Haematological Cancers – The Manual. London: National Institute for Clinical Excellence, October 2003.
3. NSW Government 2003. A Clinical Service Framework for Optimising Cancer Care in NSW. Available at: www.health.nsw.gov.au/pubs/2003/cancercare_sum_a4.html.

APPENDIX I LITERATURE SCAN

REVIEW OF NON-INPATIENT MODELS OF CARE FOR PATIENTS WITH HAEMATOLOGICAL MALIGNANCIES

September 2009

LITERATURE SCAN

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ABBREVIATIONS

AlloHSCT	allogeneic haematopoietic stem cell transplant
AML	acute myelogenous leukaemia
APAIS	Australian Public Affairs Information Service
APL	acute promyelocytic leukaemia
ALL	acute lymphoblastic leukaemia
AutoHSCT	autologous haematopoietic stem cell transplant
BC	British Columbia
BMH	bone marrow harvest
BMT	bone marrow transplant
BU	busulfan
CINAHL	Cumulative Index to Nursing and Allied Health Literature
CINSW	Cancer Institute NSW
CML	chronic myeloid leukaemia
DUMC	Duke University Medical Centre
G-CSF	granulocyte colony-stimulating factor
HITH	hospital in the home
HLA	human leukocyte antigen
HMA	Healthcare Management Advisors
HSCT	haematopoietic stem cell transplant
IPOP	inpatient/outpatient
L/BMT	Leukaemia/Bone Marrow Transplant
QOL	quality of life
TBI	total body irradiation

1 Search Strategy

A scan of the academic literature concerning outpatient treatment of adult malignant haematology has been undertaken. The essential elements of the literature review methodology ensured that the:

- literature was identified according to an explicit search strategy (outlined below);
- research material was selected according to defined inclusion and exclusion criteria; and
- material collected was evaluated against consistent methodological standards.

Search Strategy

A search was undertaken for published literature meeting the following criteria:

- published in English;
- published in the last 10 years (i.e. from 1999);
- initial search strategy conducted using the following key words: haematology services; oncology services; models of haematology care; malignant haematologic diseases; outpatient; outpatient clinics, hospital; ambulatory care facilities; best practice outpatient haematology; ambulatory oncology; cancer centre haematology; leukaemia outpatient/ambulatory; lymphoma outpatient/ambulatory; multiple myeloma outpatient/ambulatory; bone marrow transplant outpatient; and
- the scope of this project meant that the search excluded paediatric patients and patients with non-malignant haematological conditions.

Non-malignant haematology care and other oncology (i.e. non-haematological cancer) outpatient care are not the focus of this review, only malignant haematology care. However, as they are often treated in the same facilities, they are relevant in terms of their incidental impact on or relationship to malignant haematology care. Papers covering non-inpatient management of patients with non-haematological malignancies or other haematological conditions were included if they also discussed non-inpatient management of patients with haematological malignancies.

The literature search encompassed both peer-reviewed journals and other published literature. The search strategy has included the electronic databases, *OVID full text*, *Google Scholar*, *Cumulative Index to Nursing and Allied Health Literature (CINAHL)*, *PubMedMedline*, *Health Source Nursing/Academic Edition*, *Health Business Fulltext*, *Business Source Premier*, *Australian Public Affairs Information Service (APAIS)*, *Academic Search Elite*, and *Emerald Full*. Utilising these databases and search terms, a total of 2,298 articles met the initial inclusion criteria. This was further refined by examination of abstracts. On refinement, 191 were found to be appropriate for inclusion. After removal of duplicates, 170 peer reviewed articles were identified for close review. After closer examination and refinement of the project scope, the articles considered most relevant have been summarised in the body of this report and are included as references.

Additional web searches using Google were conducted to source additional information on models of care for adult patients with haematological malignancies and on individual organisations referred to in published literature.

2 Literature Scan

Literature relevant to the shift to non-inpatient management of adult patients with haematological malignancies makes some comment on the drivers of such change. A major focus of the literature is on feasibility and outcomes related to shifting interventions which have traditionally only been offered on an inpatient basis. The standard, or more traditional, management of patients on an inpatient or non-inpatient basis is presented in the first section of this chapter, followed by discussion of interventions more recently offered on a non-inpatient basis. Factors affecting the design and implementation of non-inpatient care models emerge from the literature review and are discussed in Section 2.7.

2.1 STANDARD MANAGEMENT – INPATIENT OR NON-INPATIENT

Interventions for patients with haematological cancers almost always involve chemotherapy, management of the side effects of chemotherapy, and for some patients, high dose chemotherapy and stem cell transplant. The chemotherapy regimen given, the use of other interventions such as radiotherapy and/or biological therapy, and the need for a stem cell transplant (allogeneic or autologous) are dependent on several factors including the type of cancer, stage of cancer and patient characteristics. Some of these interventions are routinely available to patients on a non-inpatient basis, whilst non-inpatient management of others is still evolving due to the complexity of the intervention regimen and/or the concern for patient safety which may result from reduced surveillance and possible delay in medical intervention (i.e. for patients with febrile neutropenia or bleeding)¹.

The routine availability of interventions on an inpatient or non-inpatient basis is discussed below. Whilst the discussion presents interventions according to cancer type, side effects of chemotherapy, or procedures involved in haematopoietic stem cell transplant, it must be remembered that actual intervention will be dependent on many factors including those outlined above and haematology service or unit characteristics. Information in this section has been obtained from patient and family information booklets available from The Cancer Council NSW^{2,3} and the Leukaemia Foundation⁴⁻¹⁰, and other publications outlining management approaches for haematological cancers¹.

2.1.1 Acute Leukaemia

Leukaemias are cancers that result from an overproduction of white blood cells in the bone marrow. They are characterised by anaemia, fatigue, bleeding and susceptibility to infection, and may present as four main types: acute myeloid leukaemia (AML); acute lymphoblastic leukaemia (ALL); chronic myeloid leukaemia (CML); and chronic lymphocytic leukaemia (CLL). Acute leukaemia affects immature blood cells, appears suddenly and develops quickly.

Treatment for acute leukaemia usually begins as soon as possible after diagnosis. Treatment usually involves chemotherapy and radiotherapy, and can also involve steroid therapy or a stem cell transplant.

Chemotherapy for acute leukaemia is usually given in two or three stages – induction, consolidation and maintenance. Chemotherapy for induction of remission in acute leukaemia is particularly demanding and these patients have generally required hospital admission as both the disease and the treatment reduce immunity to infection. The chemotherapy usually consists of a combination of three or four drugs given intravenously over a course of four to six weeks, with each chemotherapy cycle lasting a few days, followed by a rest period. Patients usually remain in hospital until their blood counts recover, which generally takes around three to four weeks.

Once the leukaemia is in remission, consolidation chemotherapy is given to target any remaining cancer cells. This treatment is milder than induction chemotherapy and depending on the treatment given and patient profile, may require outpatient hospital visits or admission for one or more nights. Maintenance chemotherapy is given for patients with ALL or a rare type of AML. This is less intensive therapy again, which is usually given over two years in tablet or intravenous form, generally not requiring inpatient admission.

The side effects of chemotherapy can necessitate hospital admission particularly in these immuno-compromised patients. This is discussed in Section 2.1.7 below.

Radiotherapy and steroid therapy can also be used in the treatment of acute leukaemia. Radiotherapy is used for patients with ALL and less commonly AML, and may be given as total body irradiation in preparation for a transplant (see Section 2.1.8 below). Steroid therapy is often given with the chemotherapy.

Some patients with acute leukaemia require high dose chemotherapy and stem cell rescue. This is discussed in Section 2.1.8 below.

2.1.2 Chronic Leukaemia

Chronic leukaemia usually affects older blood cells, appears gradually and develops slowly over months to years. Many people with chronic leukaemia have no symptoms at first, with the leukaemia being discovered during a routine blood test.

Treatment options depend on the stage of disease, type of chronic leukaemia diagnosed (i.e. CLL or CML) and other prognostic factors. Options can include careful monitoring or symptom management, chemotherapy, steroid therapy, immunotherapy, monoclonal antibodies, imatinib, radiotherapy, stem cell transplant and splenectomy. Other than the latter two options, which usually require inpatient admission, other treatments can be managed on an outpatient or day patient basis, with careful monitoring and education regarding side effects. Radiotherapy is usually given each weekday for several weeks and whilst it does not require admission, non-local patients may require local accommodation for this period.

2.1.3 Lymphomas

Lymphoma is the general term for cancers that develop in the lymphatic system which ordinarily contains lymphocytes, or specialised white blood cells that fight infection. There are 35 different types of lymphoma with five of these subtypes belonging to a group of diseases called Hodgkin lymphoma and all other subtypes commonly grouped together and called non-Hodgkin's lymphomas or B and T-cell lymphomas.

Hodgkin Lymphoma

Hodgkin lymphoma is distinguished from all other types of lymphoma because of the presence of a particular cancer cell called a *Reed-Sternberg cell*. Treatment for Hodgkin lymphoma depends mainly on the stage or extent of disease in the body, and generally involves chemotherapy or radiotherapy and in some cases surgery or a stem cell transplant.

A typical chemotherapy regime for Hodgkin lymphoma might involve around six cycles of a combination of drugs given over a period of six months. These may be given intravenously or orally and can usually be given in the outpatient's department of the hospital. In some cases though, admission may be required depending on the type of chemotherapy being given or the patient's health profile.

Radiotherapy is usually given in small doses or fractions each week day over a few weeks in the radiotherapy department of the hospital. Whilst it does not require admission, non-local patients may require local accommodation for this period.

Non-Hodgkin's Lymphomas

Treatment for non-Hodgkin lymphoma depends on several factors including the patient's age and general health, the stage of the disease, the exact type of lymphoma and whether the disease is indolent or aggressive. Indolent lymphomas, also known as low-grade lymphomas, tend to grow more slowly, cause few symptoms and may not need to be treated urgently. Follicular lymphoma is an example of a slow-growing lymphoma which can develop over months or years. Aggressive lymphomas or intermediate/high-grade lymphomas grow more quickly, cause more symptoms and

generally need to be treated soon after diagnosis. One of the most common types of aggressive lymphoma is diffuse large B-cell lymphoma. Some types of lymphoma can also present as leukaemia, when lymphoma cells are found in the blood and bone marrow. Burkitt's lymphoma is a rare but highly aggressive type of lymphoma which can also present as leukaemia.

Treatment for lymphomas usually involves chemotherapy or radiotherapy and surgery. A peripheral blood stem cell transplant, steroid therapy and biotherapies may also be required. Some low-grade lymphomas may be cured by radiotherapy alone or by chemotherapy given in tablet form or intravenously. This can usually be managed as an outpatient, with self-administration by the patient, or as day-case in a dedicated outpatient unit with a specialised chemotherapy team. More aggressive lymphomas generally require combination chemotherapy administered in a day-case ambulatory care unit, or on a dedicated inpatient ward with specialised nursing and support team. A typical chemotherapy regime for lymphoma might involve around six cycles of therapy, with a rest period in between each cycle, given over a period of several months. Some patients, particularly those with relapsed high-grade lymphoma, require high dose chemotherapy followed by stem cell transplant.

2.1.4 Myeloma

Myeloma is a cancer of plasma cells that usually arises in the bone marrow. Myeloma cells form tumours in bone marrow and on surfaces of bones. It is often referred to as multiple myeloma, as it can be found in several bone marrow sites on diagnosis.

Treatment depends on the stage of the disease and the patient's age and general health. Treatment may involve chemotherapy, cortico-steroids, interferon, stem cell transplant, thalidomide, radiotherapy, bisphosphonates or new drug treatments as part of clinical trials. Chemotherapy may involve single drug therapy, particularly in older patients, which can be taken at home. Other patients require combination chemotherapy which may be taken orally or intravenously. In most cases, patients do not need to be admitted to hospital for chemotherapy, which can be given in the hospital's day treatment centre. For some patients though, including those receiving high dose chemotherapy and stem cell transplant, an inpatient admission may be required. Most of the side effects of chemotherapy can be managed on a non-inpatient basis, although admission may be required if the patient develops febrile neutropenia or other serious side effects (see Section 2.1.7).

Corticosteroids, interferon and thalidomide may be used as maintenance therapy for patients with myeloma. These can be taken at home, with patients or carers given instruction on administration of subcutaneous injection of interferon three times a week. Bisphosphonates used to prevent and treat osteoporosis may be taken orally in tablet form, or as an intravenous infusion once a month. These do not usually require hospital admission. Some patients may require a blood transfusion for anaemia, or plasmapheresis, to address hyperviscosity syndrome. These procedures are usually available in an outpatient department of the hospital.

Radiotherapy is usually given in small doses or fractions each week day over a few weeks in the radiotherapy department of the hospital. Whilst it does not require admission, non-local patients may require local accommodation for this period.

2.1.5 Myelodysplastic Syndromes

Myelodysplastic syndromes (MDS) are a group of diseases which result in ineffective formation and production of normal blood cells in the bone marrow, resulting in an increased number of immature blood cells. Around 30% of cases have the potential to progress to acute myeloid leukaemia, but people with mild disease may be simply anaemic, or may have few troubling symptoms. Myelodysplasia was previously considered a pre-leukaemia condition, but is now considered to be an invasive cancer which is notifiable to the Central Cancer Registry.

Treatment depends on factors including the exact type of MDS and the patient's age and general health. Treatment may involve regular observation only or supportive care including blood transfusions, antibiotics or use of growth factors, which usually do not require hospital inpatient admission. Patients requiring chemotherapy may need low-dose oral chemotherapy such as hydroxyurea in capsule form, or low-dose oral and/or intravenous cytotoxic chemotherapy requiring visits to a chemotherapy day centre or clinic two to three times per week. Other patients may require standard-dose chemotherapy or stem cell transplant, usually requiring hospital admission.

2.1.6 Myeloproliferative Disorders

Myeloproliferative disorders are a group of disorders in which abnormal bone marrow stem cells produce excess number of one or more types of blood cells. They are chronic diseases that usually remain stable for many years and progress gradually over time, and include disorders such as polycythaemia, essential thrombocythaemia, idiopathic myelofibrosis, chronic eosinophilic leukaemia, chronic neutrophilic leukaemia and mast cell disease.

Treatment depends on the exact diagnosis, but can involve myelosuppressive drugs such as hydroxyurea which can be taken at home, venesection conducted in an outpatient's department, or interferon which is usually given as a subcutaneous injection and can be taught to patients or carers to do at home. Other treatments can involve aspirin and anagrelide hydrochloride, which are taken orally at home, or radioactive phosphorus given in the nuclear medicine department of the hospital. Some patients with idiopathic myelofibrosis may require an allogeneic stem cell transplant.

2.1.7 Supportive Care and Management of Side Effects of Chemotherapy

Supportive care aims to relieve symptoms and prevent or treat complications arising from the disease or treatment being received. Some patients in the early stages of certain chronic haematological malignancies may be managed primarily by supportive care, while patients receiving chemotherapy, particularly intensive or high dose chemotherapy, may experience many side effects requiring supportive care.

Supportive care can include management of neutropenia, anaemia, thrombocytopenia, nausea, mucositis, hair loss, osteoporosis or infertility. Depending on the health of the patient and their current status as an inpatient or non-inpatient, supportive care for many of these conditions may be provided on a non-inpatient basis. Red blood cell or platelet transfusions are often conducted in a clinic or outpatient department of a hospital for example, and advances in anti-emetics mean that non-inpatient management of nausea and vomiting is now also possible for many patients.

Patients receiving chemotherapy, particularly intensive or high dose chemotherapy, are at high risk of infection due to neutropenia, and require immediate attention if this occurs. Advances in antibiotics allow some of these patients to be managed as outpatients or day patients. Febrile neutropenia is second only to chemotherapy administration as a cause of hospital admission during treatment for cancer¹². Patients undergoing stem cell transplantation require careful management, despite prophylactic antibiotics, in order to avoid treatment-related mortality.

2.1.8 Haematopoietic Stem Cell Transplant

Haematopoietic stem cell transplants (HSCT) involve the transplantation of blood stem cells derived from the bone marrow or peripheral blood. These transplants may be required in malignant haematological diseases including acute or chronic leukaemia, lymphoma or myeloma, non-malignant haematological diseases including severe auto-immune disorders, or non-haematological malignancies such as testicular cancer. There are two main types of HSCT – autologous HSCT (AutoHSCT) and allogeneic (AlloHSCT). In AutoHSCT, the patient donates their own stem cells whilst in remission, and these are returned to them following high-dose chemotherapy. In AlloHSCT, the stem cells are donated by another person whose tissue type is compatible with the patient's. Allogeneic transplants offer the best hope of cure for some haematological malignancies (i.e. CML), but are more complex procedures than AutoHSCT and carry significant risks.

Both AutoHSCT and AlloHSCT involve several stages variously available on an inpatient or non-inpatient basis. These are discussed below.

Stem cell collection

Stem cells may be harvested from the bone marrow or peripheral blood. Bone marrow harvest is a surgical procedure usually performed in an operating theatre under a general anaesthetic. It is more common these days to collect stem cells from peripheral blood. This procedure generally involves two steps. Firstly, patients or other donors are given subcutaneous injections of stem cell growth factors such as granulocyte colony stimulating factor (G-CSF) over several days. These stimulate the production of stem cells in the bone marrow and their movement into the blood stream. Patients or carers can be taught by the nurse to give these injections. Following mobilisation, stem cells are then collected using an apheresis machine to separate blood. This procedure usually takes three to four

hours and whilst it does not necessitate inpatient admission, it may require several visits to ensure adequate collection of stem cells.

Following collection, stem cells are generally cryopreserved and stored until they are infused on the day of the transplant.

Pre-transplant planning and work-up

Pre transplant tests can generally be conducted on the same day or may require several visits to the hospital.

Conditioning therapy

Conditioning therapy aims to destroy any remaining cancer cells. For patients undergoing AlloHSCT, it acts as an immunosuppressant to reduce the risk of donor cell rejection. The type of conditioning therapy given depends on several factors including disease type, patient's age and general health, and type of transplant.

Conditioning therapy generally involves five to eight days of high-dose chemotherapy alone or in combination with total body irradiation (TBI), the latter particularly in those undergoing AlloHSCT. Some patients may undergo a mini-AlloHSCT where they receive a reduced dose conditioning regime which is non-myeloablative. It is more common for patients to be admitted to hospital for high-dose chemotherapy, but some patients receive high-dose therapy in the outpatient's clinic. Inpatient or non-inpatient management of side effects of high-dose chemotherapy are discussed in Section 2.1.7 above. TBI is usually given twice a day for two to three days in the radiotherapy department of the hospital.

Stem cell transplant

The stem cell transplant or infusion is conducted on day zero of the transplant protocol, and may require two day zeros if the volume of stem cells being infused is large. Cryopreserved stem cells are defrosted prior to infusion, and then infused through a central venous catheter. The infusion process generally takes between thirty minutes and four hours.

Pre-engraftment

Pre-engraftment is the process whereby infused stem cells find their way to the bone marrow and repopulate. This can take 10 to 28 days, during which time patients are carefully monitored including daily checks of temperature, pulse, blood pressure and blood counts. Most patients remain in hospital until engraftment occurs due to the potential for complications in the first few weeks post-transplant. These complications can arise from the transplant process itself or the conditioning therapy used.

Complications can include febrile neutropenia, anaemia and thrombocytopenia requiring red blood cell or platelet infusions, veno-occlusive disease, haemorrhagic cystitis, or graft versus host disease in patients undergoing AlloHSCT.

Post-engraftment

Depending on general health, the patient is usually discharged following engraftment, if they have not been discharged prior to this. Patients are generally required to return to the hospital for outpatient check-ups several times per week initially. Intravenous medications and blood transfusions can be conducted at this time if required. Non-local patients may therefore require local accommodation.

2.2 DRIVERS OF CHANGE

The preceding section outlines aspects of care for patients with haematological malignancies which have routinely been provided either on an inpatient or non-inpatient basis. Published literature in recent years has considered a shift of some aspects of care routinely given as an inpatient to the non-inpatient setting. These are discussed in Section 2.3.

This section discusses the major drivers of the shift suggested from the literature. These drivers fall into four main areas: pressure on hospital inpatient bed usage; the risk of multiresistant nosocomial infection; advances in chemotherapy, supportive care and delivery systems; and a desire to improve patient quality of life and choices.

2.2.1 Pressure on inpatient bed usage

In response to pressure to decrease inpatient bed days as part of cost saving processes, health services have endeavoured to shift services from inpatient to outpatient care where possible. In some cases, the establishment of outpatient services for adult patients with haematological cancers has been part of a planned response by hospital administrators and oncology care services to expected future bed closures^{13,14}. In other cases, units found themselves challenged to find ways of increasing outpatient services as a consequence of increased demand or bed closures (for example, closure of inpatient bone marrow transplant beds¹³).

Several studies have highlighted that the intended cost savings from moving to outpatient care of patients with haematological malignancies may in fact be cost shifting^{15,16}. These studies primarily relate to the requirement for presence of a 24 hour caregiver for patients undergoing outpatient care during stem cell transplant, and suggest that carers are now bearing the cost of previous hospital expenses. Although not found in the literature scan, it is possible that in the Australian health environment, a move to non-inpatient management may also result in a degree of cost shifting from state to federal budget for funding of some chemotherapy interventions.

2.2.2 Nosocomial infection rates

The move to non-inpatient management of suitable patients has not only been driven by cost, but also by a desire to reduce patient exposure to severe multiresistant nosocomial infections. This is particularly important in patients with haematological malignancies, who are often at high risk of infection due to the nature of the cancer itself and due to the treatment regimens they are exposed to. Research into outpatient management of acute promyelocytic leukaemia after intensive consolidation chemotherapy for example, reported a reduced risk of developing infections due to highly pathogenic and antimicrobial-resistant nosocomial isolates in these immunocompromised patients when they received outpatient rather than inpatient management¹⁷.

2.2.3 Advances in chemotherapy, supportive care and delivery systems

Alongside the pressure to reduce inpatient bed days for both cost saving and infection risk reduction purposes, technological advances in chemotherapy options, supportive care and delivery systems have allowed this shift to non-inpatient care to occur for suitable patients.

These advances have primarily been reported in the area of haematopoietic stem cell transplants. In the past, toxicity associated with stem cell transplants has mandated often lengthy inpatient care¹⁸. Several advances have made outpatient treatment a viable option for carefully selected patients undergoing high dose chemotherapy followed by stem cell transplantation: the use of non-myeloablative regimens; the use of simplified pre-transplant conditioning, with haematopoietic colony-stimulating factors allowing dose intensification of chemotherapy and shortened period of severe neutropenia; availability of new antiemetics; and advances in antimicrobial prophylaxis^{16,18,19}.

2.2.4 Patient/caregiver quality of life.

Allowing suitable patients to be seen as outpatients has also been shown to either not impact or to positively impact patient and carer quality of life^{20,21}. An inpatient-outpatient model of care, as distinct from an inpatient only model of care, for patients with haematological malignancies undergoing either autologous or allogeneic bone marrow transplant has been shown to be less emotionally distressing and to better meet the needs of family caregivers²⁰. Specific implications for outpatient care models include the importance of caregiver education regarding patient care, and the need for assessment and intervention to address caregiver psychological needs.

2.3 EVOLVING AREAS OF NON-INPATIENT MANAGEMENT

Over the last ten years, published literature on non-inpatient management of haematological cancers has largely focused on evolving areas of outpatient care. These areas have primarily involved the feasibility, safety and effectiveness of outpatient provision of some or all components of haematopoietic stem cell transplant (HSCT), outpatient provision of induction and/or consolidation phase chemotherapy for patients with acute leukaemia, and outpatient management of complications of chemotherapy such as febrile neutropenia. These are discussed below.

2.3.1 Haematopoietic stem cell transplant

Research into the shift to outpatient provision of stem cell transplantation has covered HSCT in general, or been specific to autologous or allogeneic transplantation or specific stages of the transplant process. Each of these is discussed below.

HSCT – in general

Traditionally HSCT involved an inpatient admission to complete the process of conditioning therapy followed by stem cell reinfusion, and about 30-40 days of inpatient care after transplantation²². Recent developments in less mucotoxic preparative regimens, improvements in supportive care (i.e. antibiotics, antiemetics and transfusion protocols), and the use of peripheral blood rather than bone marrow stem cells, have facilitated a shift to outpatient models of care for patients undergoing HSCT⁴⁸. Several centres have established comprehensive care protocols allowing totally outpatient based HSCT in suitable patients, or inpatient-outpatient models of care to be established.

The Bone Marrow Transplant Program, Loyola University Medical Centre, Maywood, Illinois, USA has developed and initiated a totally outpatient HSCT program for suitable patients including those undergoing mucotoxic regimens such as total body irradiation (TBI)⁴⁸. Research was conducted at this centre to assess resource utilisation and patient satisfaction between patients receiving the first 100 such outpatient transplants and 32 patients receiving transplants as inpatients during the same interval. Inpatient management occurred if patients chose this option, if a caregiver was unavailable, or due to financial restrictions. Patient diagnoses included non-Hodgkins lymphoma, Hodgkins disease, myeloma, acute lymphoblastic leukaemia, acute myeloid leukaemia, chronic lymphocytic leukaemia and chronic myelogenous leukaemia. Except for more unmarried in-patients, the groups were matched in terms of age/gender and clinical characteristics, diagnoses and comorbidity index scores. Symptoms were managed predominately with oral agents, and pain management consisted of transdermal fentanyl and oral morphine solution. Time to engraftment, severity of mucositis and transplant duration were identical for the two groups. Twenty-seven of the outpatients were admitted for a median of 6 days, primarily for progressing infection, but 92% of all transplant days were outpatient. There were no septic episodes or hospital admissions for pain management. There were no deaths to day 30 in either group and 100-day survival was identical. There was a mean cost saving of US\$16,000 per outpatient transplant, and outpatient patient/caregiver quality of life was similar to that reported for in-patients. It was concluded that patients undergoing severely mucotoxic regimens can be safely transplanted in an outpatient setting with a significant cost saving, with no increase in morbidity or mortality.

The Ottawa Hospital Blood and Marrow Transplant Program introduced a comprehensive outpatient program for patients requiring stem cell transplant in 1995¹⁵. Outpatient care in this Program includes the pre-transplant conditioning regimen, anti-emetics, TBI, stem cell graft infusion, intravenous hydration, electrolyte replacement, intravenous antimicrobials, blood product transfusion support, growth factor injection, central venous catheter care and general nursing care. Specific research conducted at this centre in patients with acute or chronic leukaemia, Hodgkin's or non-Hodgkin's lymphoma, or multiple myeloma receiving TBI prior to receiving either autologous or allogeneic bone marrow transplant, found that outpatient TBI could be safely delivered as a pre-transplant conditioning regimen with a significant reduction in the number of inpatient bed days. Patients found to be suitable for outpatient rather than inpatient TBI were found to be older, more likely male, and more likely to have a lymphoproliferative disorder for which they were receiving a single fraction TBI followed by autologous transplant.

The Oncology Centre, Johns Hopkins University, Baltimore, USA, began performing outpatient based bone marrow transplant using an inpatient outpatient (IPOP) continuum-of-care model in late 1995²⁴. A new clinical area adjacent to the inpatient facility was designed, which was capable of providing intensive ambulatory care to transplantation patients. Allogeneic and autologous transplant recipients with haematologic malignancies were eligible for IPOP care, regardless of whether they had a standard or high risk of treatment failure. A study was conducted to determine whether a shift in care from an inpatient-based to an outpatient-based bone marrow transplantation (BMT) program decreased charges to payers without increasing clinical complications or out-of-pocket costs to patients. This nonrandomised prospective cohort study compared clinical and economic outcomes for 132 consecutive BMT patients with hematologic malignancies who received either inpatient or outpatient-based BMT care. The outpatient-based group had significantly less mean inpatient bed days, with similar rates of major complications, including death, acute graft-versus-host disease, and veno-occlusive disease of the liver. It was concluded that increased use of outpatient-based BMT should produce substantial cost savings for payers, without adverse effects on patients for those patients who do not have a high risk of treatment failure. Outpatient based BMT did not expose patients to more frequent or severe transplantation-related complications.

HSCT – autologous

Considerable recent literature supports the feasibility, safety and effectiveness of provision of outpatient AutoHSCT programs for suitable patients^{16,18,19,25}. In almost all studies, patients identified as suitable for outpatient care included, but were not limited to, those with at least one 24 hour caregiver available, accommodation within 30-60 minutes drive of the treatment centre (allowing for local traffic conditions), informed patient consent, medical stability and absence of significant co-morbidities. It is important to note that in some studies, almost half the patients could not participate in an outpatient program, as they did not have a suitable full-time caregiver available¹⁶.

The outpatient program introduced at the Ottawa Hospital Blood and Marrow Transplant Program has been described above. Other research at this centre has been conducted on the experiences of patients with relapsed follicular lymphoma receiving outpatient AutoHSCT as part of this program²⁵. Authors conclude that outpatient AutoHSCT with TBI is feasible, safe and effective for patients with relapsed follicular lymphoma. The median number of days of participation in the transplant program was 20.5, with 58.4% of days spent in the outpatient setting. The main reasons for inpatient transfers were febrile neutropenia and gastro-intestinal toxicity.

Several studies have examined the quality of life (QOL) of patients undergoing outpatient AutoHSCT, either during the progression of the transplant program, or compared with patients undergoing inpatient AutoHSCT. QOL of patients receiving outpatient high dose chemotherapy and AutoHSCT has been reported to decrease post-treatment, but increase to levels higher than those found pre-treatment by six months. A good clinical outcome following high-dose chemotherapy with AutoSCT was associated with higher QOL and greater satisfaction with care²⁶.

Despite logical arguments suggesting that patients with haematological malignancies would prefer to be at home and not in hospital²⁷, some variation exists in QOL scores for outpatient vs inpatient receiving AutoHSCT¹⁶. One study found no significant difference in QOL between inpatients and outpatients receiving AutoHSCT, whilst another found that psychological, physical, social and financial outcomes for the outpatient AutoHSCT group were comparable if not better²¹.

A retrospective descriptive study of patients undergoing outpatient AutoHSCT compared symptoms and symptom management for those who completed AutoHSCT without hospital admission, with those patients who required unplanned hospital admission during the transplantation period. The sample consisted of 87 patients with multiple myeloma, treated as outpatients during a 16-month period. Patient fatigue and extent of oral rehydration in a 24 hour period were found to significantly increase hospital admission rates. A higher percentage of outpatient visits that included documented teaching on self-care to patients/caregivers by nursing staff was also found to significantly reduce unplanned hospital admission rates. It was commented that nurses are well positioned to monitor symptoms, but that home management places the burden on the patient and caregiver¹⁹.

HSCT – allogeneic

Allogeneic transplant recipients have a higher infection risk, and unscheduled readmission rate, than autologous transplant recipients. These patients are a vulnerable population with needs for significant nursing interventions at and after initial discharge²². Some research suggests that partially outpatient-based allogeneic HSCT (AlloHSCT) is feasible, safe and effective in suitable patients.

Driven by increasing numbers of patients waiting for bone marrow transplantation, a partially outpatient-based AlloHSCT program was introduced for selected patients with chronic myeloid leukaemia at the Bone Marrow Transplantation Unit of Hospital das Clinicas, Faculdade de Medicina da Universidade de Sao Paulo, Sao Paulo, Brazil²⁸. Patients were admitted to hospital for catheter placement, high dose chemotherapy and bone marrow infusion. Suitable patients were then discharged home. After discharge, all patients were followed daily at a specialised outpatient clinic, which was open from 0700-1900 every day. Patients were given medical evaluations, nursing care, medications, laboratory tests, and blood transfusion support as needed, as outpatients. After hours medical or nursing care was provided at the transplantation ward by staff on call, and telephone assistance was available at any time. Results demonstrate that partially outpatient-based AlloHSCT for patients with chronic myeloid leukaemia leads to significantly fewer days of hospitalisation, and less incidence of pseudomonas-positive cultures and nausea and vomiting of grade 2-3. No differences in mortality were found between those treated as inpatients and those receiving partial outpatient care in the first 48 days post transplant.

A study conducted by the Division of Clinical Haematology, Hospital de la Santa Creu i Sant Pau, Autonomous University of Barcelona, Spain²⁹, concluded that AlloHSCT after a reduced-intensity conditioning protocol is a well-tolerated procedure, associated with decreased short-term toxicity, that could be performed on an outpatient basis. The reduced intensity conditioning regimen consisted of fludarabine plus melphalan for lymphoid malignancies, and fludarabine plus busulphan for myeloid malignancies. In 41 consecutive patients allografted from a human leukocyte antigen (HLA) identical sibling after reduced intensity conditioning, it was found that the most frequent conditioning-related toxicities were neutropenic fever and gastrointestinal toxicity. 27% of patients (n=11) did not experience any toxicity. The authors conclude that if AlloHSCT had been planned as an outpatient procedure in these patients, with admission indicated only in the case of more than one conditioning-related toxicity, the mean inpatient period would have been 9 days (range 0-33, p<0.001).

HSCT –partial

Certain aspects of outpatient HSCT have been the subject of specific research. These aspects include provision of outpatient TBI as discussed above, bone marrow harvest (BMH) conducted on an outpatient basis, specific chemotherapy regimens that may be taken at home, and post transplant care using hospital in the home (HITH).

BMH, where stem cells are collected directly from the bone marrow prior to transplant, is a surgical procedure usually carried out in an operating theatre under a general anaesthetic³⁰. The Birmingham Heartlands Hospital in Birmingham, UK, commenced a program of day case outpatient BMH in 1999, the majority occurring in patients with haematological malignancies. Patients choosing outpatient BMH need to reside within a 30 minute drive from the hospital (allowing timely readmission if required), have a caregiver available for the 24 hours following the procedure, and have any co-morbidities well controlled. An analysis of results of this program over the following three years found that day case BMH is safe, cost-effective and reduces the pressure on inpatient beds. Only 10.6% of those accepted for day case BMH required overnight admission, with all of these requiring a maximum of one night's admission³¹.

The safety of home administration of oral busulfan prior to receiving either autologous or allogeneic transplant has been evaluated³². This research primarily comprised patients with non-Hodgkin's lymphoma, multiple myeloma or acute myelogenous leukaemia, and found that a myeloablative busulfan-containing regimen, including oral anticonvulsant and antiemetic prophylaxis, could be safely administered at home in suitable patients.

Advances in outpatient and supportive care, and increased pressure on hospital bed usage, have led to the investigation of hospital in the home (HITH) management following AutoHSCT for patients with multiple myeloma or lymphoma. An Australian study reports on a protocol for HITH care following AutoHSCT, developed by the Newcastle Mater Hospital Haematology Unit together with the Mater Acute Care Community Service¹⁸. Preliminary experience suggests that, with adequate infrastructure support and rigorous patient selection, this model of care is both safe and feasible. Patients need to be medically stable, give informed consent, have a caregiver available, a suitable home environment, be compliant with therapy, have accommodation within 45 minutes drive from hospital and require no more than once daily therapy.

2.3.2 Management of acute leukaemia

Treatment of acute leukaemia generally involves chemotherapy and radiotherapy, and may also involve steroid therapy or a stem cell transplant. Curative intent chemotherapy for acute myeloid leukaemia (AML) usually involves an induction phase, followed by consolidation phase, and chemotherapy for acute lymphoblastic leukaemia (ALL) usually involves an induction phase, consolidation phase and maintenance phase³³. Patients receiving induction and consolidation phase chemotherapy have traditionally been hospitalised for the duration of the chemotherapy until count recovery, as treatment leads to prolonged severe neutropenia during which patients are highly susceptible to infection^{1,34}. More recently, an increasing number of institutions have begun implementing early discharge and outpatient management in selected patients, in response to pressure on inpatient bed numbers and nosocomial infection rates. These have been reported in patients with AML and are discussed below.

In September 2001, the Vancouver General Hospital and British Columbia Cancer Agency through the Leukemia/Bone Marrow Transplant Program of British Columbia, moved management of patients with AML to the outpatient setting where possible³⁵. This was driven by an increasing number of patients waiting to be admitted into a restricted number of inpatient beds, resulting in possible detrimental delays between chemotherapy cycles. No changes were made to the actual chemotherapy administered. Between September 2001 and October 2002, 71 cycles of induction chemotherapy were administered for newly diagnosed or relapsed AML, with all patients having their initial work-up and induction chemotherapy administered in hospital. In 25 cycles, the patient was discharged post chemotherapy prior to count recovery, with nine patients (36%) requiring readmission to hospital with one or more febrile episodes. 67 consolidation cycles were given on an outpatient basis, with 14 (21%) requiring readmission due to febrile neutropenic episodes or documented infections. Supportive care included antimicrobial prophylaxis, antifungal prophylaxis and good oral hygiene. There were no treatment related deaths. The authors conclude that outpatient management of AML is safe and feasible using the strategies they outline in the report, but qualify that this was an observational report conducted at a highly specialised centre (see page 92 for details on the centre structure).

An additional study conducted at the Vancouver General Hospital and British Columbia Cancer Agency through the Leukemia/Bone Marrow Transplant Program, built on this centre's previous experience with outpatient management of AML patients receiving curative intent chemotherapy as outlined above. A retrospective analysis was conducted to assess the occurrence of septicaemia in AML patients over a 5 year period, during which time the centre shifted from primarily inpatient care of patients with AML to selective outpatient management coupled with prophylactic antibiotic therapy¹. A total of 294 patients, receiving 623 cycles of chemotherapy, were identified. A significant decrease in septicaemia was observed from the inpatient to outpatient cohort, with no significant emerging resistance and no septicaemia-related mortality noted in the outpatient cohort. The authors conclude that a comprehensive non-inpatient management program dedicated to high-risk AML was feasible and safe with respect to infectious complications.

A study conducted by the Dipartimento di Biotecnologie Cellulari ed Ematologia, University La Sapienza, Rome, examined the feasibility and safety of outpatient management of acute promyelocytic leukaemia (APL), a subtype of AML¹⁷. This study aimed to evaluate the feasibility and safety of outpatient management of patients with APL during consolidation phase chemotherapy, and to determine the incidence and types of complications requiring readmission to hospital. Patients received induction phase chemotherapy as inpatients, until achievement of haematologic complete remission and normalisation of peripheral blood counts. Patients then received three chemotherapy consolidation courses, the first two administered as an inpatient, and the third as an outpatient where possible. Usually patients treated as inpatients were discharged at the end of consolidation

chemotherapy, as long as they were in good clinical condition, without fever and/or bleeding, and not receiving intravenous therapy. These patients were followed on an ambulatory basis during the phase of bone marrow aplasia. 42 % of cases were re-hospitalised, with the majority of these cases due to fever and one due to severe anaemia. One patient died due to a brain haemorrhage. Patients were managed out of the hospital for 76% of the post-consolidation neutropenia period. The authors conclude that the availability of an emergency unit specifically dedicated to outpatients with haematological diseases allows outpatient management of patients with APL to be safe, well accepted, potentially cost-saving, and contributes to reducing the risk of severe nosocomial infections.

2.3.3 Management of febrile neutropenia

Febrile neutropenia is second only to chemotherapy administration as a cause of hospital admission during treatment for cancer³⁶, and is a complication of cytotoxic therapies for haematological malignancies such as leukaemia. With antibiotic therapy for febrile neutropenia undergoing a steady evolution in the past 25 years, research has been conducted into the identification and management of patients with febrile neutropenia at low risk of life threatening complications, in whom duration of hospitalisation and intensity of therapy can be reduced safely³⁶. However, much of this research has been conducted in patients with non-haematologic malignancies.

Carstensen and Sørensen³⁷ recently reviewed medical literature examining the efficacy and safety of outpatient versus hospital-based management of low-risk febrile neutropenia in adult cancer patients. The authors concluded that outpatient management of adult cancer patients with low-risk febrile neutropenia is safe, effective, and comparable to standard hospital-based therapy, but that patients with acute leukaemia, organ failure, haemodynamic instability and/or inability to take oral medications could not be considered low risk. It should be noted though that the initial search strategy for this review only included patients with solid tumours.

A review by Chisholm and Dommett³⁶ discussed how the management of febrile neutropenia has evolved to enable patients identified as low risk to be treated on specific low risk management strategies, with an emphasis on some of the practical considerations for the implementation of such strategies. The authors describe indices which have been developed to assist in the identification of patients suitable for low-risk management. These indices variously include solid tumour or no previous fungal infection in patients with haematological malignancy, or leukaemia in remission, amongst other factors. The authors conclude that low-risk strategies will be dependent on local healthcare infrastructure (such as availability of 24 hour advice) and the expertise of staff in the management of patients with low-risk febrile neutropenia. All strategies demand the ability to review patients regularly, either at home or in the hospital.

One study was found which considered the feasibility and efficacy of a particular outpatient management regimen for patients with solid tumours or lymphomas who had low risk of neutropenic fever³⁸. In 50 patients with solid tumours or lymphoma, 60 episodes of neutropenic fever were treated with the combination of oral ofloxacin 400 mg twice a day, oral amoxicillin 1g 3 times a day and granulocyte colony-stimulating factor (G-CSF) 5 microgram/kg/day subcutaneously. Oral antibiotics were administered for at least 5 days and G-CSF was continued until resolution of neutropenia. The patients were ambulatory, haemodynamically stable, and without significant co-morbidity. The combination was successful in 57 episodes (95%), with a median time for fever resolution of 3 days (range: 1-5 days). There was no significant toxicity associated with the antibiotic regimen, with the exception of one case of reversible renal impairment. The authors comment that the role of G-CSF was questionable, since one half of the patients developed fever while on G-CSF prophylaxis. The study concluded that the combination of oral ofloxacin and amoxicillin with G-CSF was highly effective for the outpatient treatment of cancer patients who developed uncomplicated febrile neutropenia.

Some studies also report the criteria for inpatient admission of patients with haematological malignancies, who develop neutropenic fever whilst undergoing outpatient treatment. For example, a study of patients with AML, receiving consolidation phase curative intent chemotherapy on an outpatient basis, identified the following as factors leading to admission for patients with neutropenic fever: hemodynamic instability; hypoxia; fever over 39.5°C; fever unresponsive to therapy with antibiotics for 3 days; rigors; World Health Organisation grade 3 bleeding; requirement of intravenous antibiotics more than once daily; neutropenic colitis; failure to thrive as an outpatient; or caregiver being unable to adequately care for the patient¹.

2.4 MODELS OF CARE FOR MANAGEMENT OF PATIENTS WITH HAEMATOLOGICAL MALIGNANCIES

Prior to consideration of models of care supporting provision of the evolving areas of non-inpatient care discussed above, the context into which these non-inpatient models fit must be considered. This section discusses models of care for haematological malignancies which encompass both inpatient and non-inpatient services. Discussion regarding these models addresses the types of patients covered by the service, the levels of intervention offered, and workforce organisation recommended to support care models.

2.4.1 Models of care for which patients?

Although the scope of this report is on the shift to non-inpatient management for adult patients with haematological malignancies, many services for these patients do not exist in isolation. This group of patients encompass a diverse range of illnesses, with a wide variety of treatment needs³⁹. Services for these patients may need to be integrated with other oncology services and/or services for patients with non-malignant haematological disorders, as clinical staff and facilities may be shared. Although detailed analysis of these integrated models of care is beyond the scope of this report, it must be recognised that comprehensive planning of service organisation including staffing, facilities and laboratory services across each of these patient groups may be important for optimal service delivery.

2.4.2 Level of intervention offered

Recommendations regarding service provision and organisation for patients with haematological malignancies, both in Australia³⁹ and overseas¹¹, have highlighted the need for services to not only consider patient access to services but also the level of intervention provided by services to allow development and maintenance of staff expertise.

The *WA Cancer and Palliative Care Network Haematologic Malignancy Model of Care (2009)*³⁹ for example, discusses the establishment of cancer centres and cancer units for provision of care to patients with haematological malignancies. Based on this cancer 'network', rather than site-based model, cancer centres will provide area-based inpatient, ambulatory and outpatient services for tertiary level indications, as well as secondary level care for patients within the local area. Cancer units will provide a more limited scope of care to the local population, including outpatient review, and outpatient or day patient treatment with less intensive chemotherapy protocols. As demand grows and resources improve, more intensive treatment may also be offered in cancer units. The document recommends that units be affiliated with a designated cancer centre and that medical staff (at least) work across both sites, functioning as a single area health service.

The *WA Cancer and Palliative Care Network Haematologic Malignancy Model of Care (2009)*³⁹ suggests that cancer centres care for the most complex haematology patients, including patients with acute leukaemia, those requiring intensive chemotherapy, and those undergoing bone marrow transplantation. One centre in Perth will be the designated state allogeneic bone marrow transplant centre. In addition, it is recommended that outpatient and ambulatory chemotherapy treatment which is significantly myelosuppressive should be managed from cancer centres where extensive supportive care services are available. The report states that most current public sector inpatient malignant haematology care is delivered at tertiary hospitals, although some inpatients could potentially be treated at secondary hospitals if a viable model for inpatient services at these centres could be developed.

A similar model of care is outlined by the National Institute for Clinical Excellence in the UK, in *Guidance on Cancer Services: Improving Outcomes in Haematological Cancers – The Manual (2003)*¹¹. These evidence-based guidelines suggest that services for patients with haematological malignancies be organised to ensure not only that patients have access to each form of treatment, but that staff have sufficient expertise and facilities to deliver treatments safely and effectively. Four levels of service are recommended:

- Level 1: Hospitals providing conventional chemotherapy and other forms of outpatient treatment, using dose levels that would not be expected to produce prolonged neutropenia. These services may include outpatient assessment and monitoring, outpatient or day case chemotherapy (i.e. for

CLL or NHL), inpatient chemotherapy and palliative treatment (i.e. for patients with NHL who cannot cope with day case treatment), or facilities for management of neutropenic sepsis.

- Level 2: Facilities for remission induction in patients with acute leukaemia using intensive chemotherapy regimes. This level of facility would also treat patients with aggressive lymphoma.
- Level 3: Facilities for autologous transplantation.
- Level 4: Centres with expertise in both autologous and allogeneic transplantation.

The manual recommends that service networks be organised to ensure that all patients have access to all levels of service, either within the network or in another network with which it collaborates. It recommends that all patients with haematological malignancies be managed by multidisciplinary haemato-oncology teams serving populations of 500,000 or more, that facilities providing treatment for remission induction in patients with acute leukaemia should see over five new patients per year in order to develop and maintain expertise and should provide services in designated wards with continuous access to specialist nurses and haematologists, and that high dose therapy and stem cell transplantation only be offered in centres with a minimum caseload of ten procedures per annum.

It should be noted here that Australia also has guidelines in place for accreditation of centres offering allogeneic and/or autologous transplantation, including minimum patient numbers per year⁴⁰. For centres requesting accreditation for allogeneic transplants, a minimum of ten new allogeneic patients need to be transplanted per year, or five per site if more than one clinical site is included as part of the transplant facility. Centres accredited for allogeneic transplantation also receive accreditation for autologous transplantation. For centres only seeking accreditation for autologous transplantation, five new recipients of autologous transplant should be transplanted per year.

Under these overall models of care, it is likely that non-inpatient care of patients with chronic haematological malignancies could be managed in both secondary and tertiary centres, through outpatient consultative services, day treatment or ambulatory care units to secondary and rural sites, and integration of home-based services. Care for high grade malignancies and transplant services would be provided at tertiary centres, with some inpatient services or resident haematology services also being developed in large regional centres as demand for services grows alongside availability of skilled staff. This physical redistribution of patients may facilitate the development of disease specific clinics, although it must be remembered that patients with the same diagnosis can vary widely in their treatment needs and ability to receive non-inpatient care.

2.4.3 Workforce – Staffing and Organisation

Both the UK and WA documents referred to above recommend that care for every patient with haematological cancer be provided by a multidisciplinary team, with expertise in the particular form of haematological cancer, and at a site considered appropriate to the intensity of the treatment to be administered and particular patient variables. The WA report recommends that cancer centre ambulatory facilities must also be designed to accommodate a multidisciplinary model of service provision.

Core members of the multidisciplinary team should include haematologists and trainees, junior medical staff, nursing staff, pharmacists, administrative support staff, and clinical oncologist and radiologist if required for patients with lymphoma or myeloma. One of the key recommendations of the UK *Guidance on Cancer Services: Improving Outcomes in Haematological Cancers – The Manual (2003)*¹¹ report was that clinical nurse and palliative care specialists should also have a central role in these teams. The role of clinical nurse specialists in this context is to arrange for patients and carers to receive multi-faceted support, coordinated care and information throughout the course of their illness.

Other members of the extended team whose services may be required on a consultative basis include infectious disease physicians, members of the transplant team, dietician, immunologist, radiotherapist, radiology services, vascular access specialist, microbiologist, counselling staff, social worker, chaplaincy or psychiatry services. Other specialists may be required for specific cases.

Models of service organisation are particularly important for nursing and medical staff managing patients with haematological malignancies. A range of consultant haematology medical staff are required across tertiary, secondary and rural locations including malignant haematology, laboratory, transfusion medicine, coagulation, general haematology and in some centres, autologous and/or allogeneic transplantation. Area-based nursing services will need to develop to manage an

increasingly distributed service model across inpatient, outpatient, day patient and community patient care³⁹.

2.5 NON-INPATIENT CARE MODELS

Non-inpatient care models fit within the broader inpatient and non-inpatient care continuum available at different services for adult patients with haematological malignancies. Within this context, as described in Section 2.4 above, models of care supporting non-inpatient management emerge from the literature.

Specific research into non-inpatient care models for patients with haematological malignancies has primarily considered the impact of non-inpatient management on treatment outcomes and patient safety. Factors influencing these outcomes, particularly in the emerging areas of non-inpatient care described in Section 2.3, include the selection of suitable patients to receive outpatient management, the structure of haematology services supporting non-inpatient models of care and the systems in place to support these care models. Various models of care have been described in the literature, generally with similarities in terms of patient eligibility, and differences in terms of unit structure. These are presented below.

2.5.1 Patient Characteristics

Despite the shift in recent years to non-inpatient management of patients with haematological malignancies where possible, not all patients will be able to receive outpatient care.

The most commonly reported criteria used to assess these patients as suitable for outpatient treatment are clinical stability, absence of serious comorbidities, accommodation (including temporary accommodation) less than 30-60 minutes from the facility taking into account local traffic conditions, 24 hour caregiver, and patient compliance and desire to participate^{1,15,16,18,22,23,32}. The availability of insurance coverage for outpatient services was less frequently cited as a basis for the decision^{16,23,24}.

As previously mentioned, one study found that of 139 prospective participants in an outpatient HSCT program, almost half were unable to participate because they lacked a suitable caregiver. The most common reason for this was that the patient was single or widowed, or their family and friends were needed to provide childcare¹⁶.

2.5.2 Unit Structure

The structure of existing units offering non-inpatient treatment facilities for adult patients with haematological malignancies varies according to several factors. These include relationship with inpatient facilities, 'housing' of unit within broader haematology or oncology services, numbers of patients, staffing structure and resources, opening hours, after-hours access to services and relationship with emergency department. Details regarding several of these units are provided in this section, with comment regarding the factors affecting successful implementation of outpatient programs provided in Section 2.7.

Vancouver General Hospital and British Columbia Cancer Agency, Vancouver, Canada

The Leukaemia/Bone Marrow Transplant (L/BMT) Program of British Columbia (BC) is a referral adult provincial program centred at the Vancouver General Hospital site and associated with the BC Cancer Agency. The program sees over 350 new patient referrals annually, including 80 cases of new AML per year¹. Over the past few years, the L/BMT Program has also established a total of four outreach clinics outside of Greater Vancouver to serve eligible patients who cannot conveniently come to Vancouver for their doctor's appointments. These clinics are held at the local BC Cancer Agency Centre in each of four cities³⁵.

The L/BMT program at the Vancouver General Hospital implemented a selective ambulatory protocol in September 2001, allowing the majority of consolidation chemotherapy cycles to be administered entirely on an outpatient basis for suitable patients with acute myeloid leukaemia. In addition, some select patients receiving induction cycles are discharged early from the inpatient ward. The program offers affordable housing for out-of-town patients, referral to social services if patients require

additional funding to meet costs of outpatient treatment, and clinic opening hours of 0800-1900, 7 days per week. An attending physician, two clinical associates or fellows, and four to seven nurses staff this clinic, and patients are discussed by the care team on a daily basis.

Routine and walk-in assessments, laboratory, blood bank and pharmacy support are available during clinic hours. Outside clinic hours, patients are instructed to contact the L/BMT physician on call if they develop a temperature over 38°C or if they have other concerns. If further assessment is required, the physician directs them to the hospital emergency department. AML neutropenic patients requiring admission are admitted on the same day with direct admission to the L/BMT where possible¹.

Ottawa Hospital Blood and Marrow Transplant Program, Ottawa, Canada

As described in Section 2.3.1, the Ottawa Hospital Blood and Marrow Transplant Program established a comprehensive outpatient HSCT program in 1995, which operates 12 hours per day, 7 days a week. Initially two, then four, inpatient beds on the existing haematology/oncology/bone marrow transplant ward were utilised as outpatient beds, allowing multiple patients to use the same bed through the 12 hour period. Care of inpatients and outpatients was provided by the same multidisciplinary transplant team, which was seen as an important factor contributing to the success of the program. Patients could be transferred between the inpatient and the outpatient programs as tolerated during the course of their transplant¹⁵.

Several options for accommodation were required to meet the needs of the patients and their caregivers. Patients within a 30 minute drive could stay at their home. Patients could also stay at a not-for-profit motel located on the grounds of the University of Ottawa Health Sciences complex. Patients and their caregiver were also able to stay on a hospital ward that was closed (i.e. not being used for patient care by the hospital). This ward was located one floor above the transplant unit. There was no general nursing care provided to the rooms on this ward but patients were supplied with a telephone, access to a TV lounge, and had an emergency call system to be used in the case of a medical emergency. Calls from patients on the closed ward were handled in the same manner as calls from other outpatients residing off site. Patients could eat meals either in the hospital cafeteria or at outside restaurants.

More recently, published research indicates that the stem cell transplant day hospital at the Ottawa Hospital consists of two private and one semiprivate hospital rooms which are adjacent to a five-bed medical day care unit and the inpatient ward²⁵. The day hospital is open 12 hours per day 7 days per week.

Centre for the Southern Interior British Columbia Cancer Agency, British Columbia, Canada

The effectiveness and safety of a nurse-led telephone clinic at the Southern Interior British Columbia Cancer Agency, whose role was to follow-up patients with indolent and chronic haematological malignancies, was assessed. Patients seen at their routine follow-up visit were assessed for eligibility for the Teleclinic, then referred to the pilot Teleclinic by their oncologist. Eligible patients were those not on active cancer treatment, who lived in a remote area and could participate in telephone interviews. Patients were interviewed by an oncology nurse experienced in haematologic malignancies. The interview covered patient well-being, disease-related symptoms, review of laboratory results and imaging, patient questions or concerns, immunisation information and supportive measures. Fifty-three patients consented to participate in the pilot study. Following their Teleclinic interview, patients were asked to complete a "Subject Satisfaction Questionnaire". Overall patient satisfaction with the Teleclinic was high. Patients felt that they continued to receive high quality care from their specialist team, whilst saving on unnecessary travel. It was determined that patients with low-grade and chronic haematological malignancies could be followed effectively and safely by an oncology nurse-led telephone clinic⁴¹.

The Bone Marrow Transplant Program, Loyola University Medical Center, Maywood, Illinois, USA

As described in Section 2.3.1 the Loyola University Medical Center has developed and initiated a totally outpatient HSCT program for suitable patients with haematological malignancies²³.

Patients are cared for in a specially designed outpatient transplant unit that occupies a portion of the ground floor of the Cancer Center Building, and is physically separated from both the inpatient transplant unit and the outpatient chemotherapy area. It is a 12 bed facility connected to a central

nursing station, and provides care up to 12 hours per day (0700 to 1900) year round. The unit is in a building equipped with an on-site laboratory, radiology suite and chemotherapy pharmacy.

The program was designed as a nursing care unit, with primary care provided by unit nurses and transplant nurse practitioners with physician oversight. However, each patient in both the inpatient and outpatient settings is seen and evaluated by an attending physician at least once daily. This physician approves nightly discharge for outpatients. The unit was designed to treat patients from the start to completion of transplant, with total management of nearly all transplant complications including benign arrhythmias, febrile neutropenia, anaemia, thrombocytopenia requiring transfusion support, systemic fungal infections, pain from severe mucositis and non-life threatening infections. Patients are admitted to the inpatient unit only for care that would typically be provided by an intensive care unit.

After training by nursing staff, lay caregivers provide nightly care including administration of intravenous antibiotics and oral medications, monitoring temperature, blood pressure, pulse, and intake and output readings. Written instructions for the administration of all medications and for collecting vital signs are provided each night. Homecare nursing staff are on call each evening and available if needed. The name and contact details of the physician on call are identified each night for the patient.

Northwestern Memorial Hospital, Chicago, USA

The provision of an outpatient AutoHSCT program for patients with haematologic malignancy or breast cancer has been described at The Northwestern Memorial Hospital, Chicago¹⁶. Patients receiving outpatient HSCT at the hospital were housed in a nearby residential facility, specially equipped for HSCT patients. Patients were evaluated daily (except for occasional Sundays) in the Northwestern Memorial Hospital Clinical Research Center by a transplant physician. Home healthcare nurses facilitated these visits by drawing blood early in the morning for daily complete blood counts and blood chemistries (and twice weekly liver function tests) and by providing fluids and medications during evening hours where necessary. Outpatients received prophylactic antibiotics, antifungal and antiviral agents. In the event of a fever, patients were admitted to the inpatient unit and once medically stable were discharged to the outpatient facility.

Patients and their families were educated regarding the role of the caregiver. Each patient and caregiver(s) was provided with information on food preparation, dietary guidelines, taking vital signs, quantitating intake and output, neutropenic precautions, signs and symptoms of infection and data collection. The number of education sessions varied according to patient and caregiver need. Patient and caregiver compliance with outpatient procedures was assessed daily through review of records maintained by the caregiver.

Duke University Medical Centre, Durham, North Carolina, USA

The Division of Medical Oncology at the Duke University Medical Centre (DUMC) provides a range of haematology and oncology services to a patient base of approximately 6,000. The centre exists within the hospital and comprises 18 outpatient facilities, including 3 major oncology clinics, 14 separate diagnostic testing facilities and a large treatment facility. Patients can visit with or without appointment and may visit more than one of these facilities in any one day. In October 1999, the medical oncology clinics moved into a new space designed to increase efficiency and productivity.

Once the medical clinics moved to the new space, it was realised that, despite an improvement in some aspects of service delivery, they still faced unbalanced resource usage, inadequate patient flow patterns, and poor scheduling practices. These meant that patients continued to experience long delays in clinics and in admission to the treatment centre located downstream of the clinics. Management realised that they had failed to recognise the interconnectedness and dynamics of all of the facilities that are contained within the oncology centre.

Research was conducted, using the DUMC as a case study, to evaluate a framework designed to evaluate and compare various operational structures across several performance measures to address these issues¹⁴. Whilst the research was not specifically related to outpatient haematology services and models of care, it did highlight several factors that should be taken into consideration when planning outpatient services for cancer patients. These include the flow of patients through clinics, diagnostic facilities and treatment areas, variation in patient arrival rates (both scheduled and

unscheduled) across different times of the day and different days of the week, and physician and other staff to patient ratios.

Bone Marrow Transplantation Unit of Hospital das Clinicas, Faculdade de Medicina da Universidade de Sao Paulo, Sao Paulo, Brazil

As described in Section 2.3.1 a partially outpatient-based allogeneic HSCT program was introduced for selected patients with chronic myeloid leukaemia at the Bone Marrow Transplantation Unit of Hospital das Clinicas, Faculdade de Medicina da Universidade de Sao Paulo, Sao Paulo, Brazil²⁸. This program was offered at a specialised outpatient clinic which was open from 0700-1900 every day. Patients were admitted to the hospital for double-lumen catheter placement, high-dose chemotherapy and bone marrow infusion, and then discharged if they met outpatient management criteria. After discharge, all patients were followed daily at the specialised outpatient clinic.

Patients were given medical evaluations, nursing care, medications, laboratory tests, and blood transfusion support as needed as outpatients. After hours medical or nursing care was provided at the transplantation ward by staff on call, and telephone assistance was available at any time. Patients were admitted to the ward if they required inpatient care.

Every patient had a caregiver 24 hours per day during the hospital stay, as well as during the outpatient period. Prior to transplantation, information was provided by nursing staff to all patients and carers on personal hygiene and house cleaning, avoidance of house pets and adequate food preparation.

Hospital in the Home: The Newcastle Mater Hospital Haematology Unit and Mater Acute Care Community Service, Newcastle, Australia

The Newcastle Mater Hospital Haematology Unit, together with the Mater Acute Care Community Service, developed a protocol for hospital in the home (HITH) care for patients with multiple myeloma or lymphoma following AutoHSCT¹⁸. All patients suitable for HITH care were provided with an outpatient management plan prior to discharge, which included indications for contacting the HITH nurse or attending the haematology day ward or the emergency department.

HITH nurses attend patients daily to assess their progress and administer therapy including intravenous antibiotics and subcutaneous injections such as G-CSF and/or enoxaparin. At each daily visit, the HITH nurse performs a structured clinical assessment, recording details of relevant history and examination. Results of routine investigations are reviewed by the nurse, and outpatient blood or platelet transfusions are organised as necessary. Any clinical concerns are discussed with the attending haematologist and also by the medical registrar on-call if after hours. Patients requiring admission are admitted to the haematology ward under the care of the attending haematologist.

2.5.3 Systems to Support Service Delivery

A range of tools and systems have been developed which increase the efficiency of non-inpatient cancer services, improve workflows and reduce strain upon staff and patients. Much research in this area has not been specific to patients with haematologic malignancies, although factors such as patient flow and scheduling, complexity of treatment regimens, time required for preparation and delivery of treatment regimens, physical space restraints and staff resourcing are likely to be common factors for consideration in outpatient management of both solid tumour and haematologic cancers^{14,42,43}. Research in one haematology-oncology day unit has been reported, which investigated possible solutions to an increased demand for services, which had led to staff and patient concerns regarding maintenance of quality patient care. This is discussed below.

An action research project conducted in the Haematology/Oncology Day Unit of the Gold Coast Hospital, Queensland, was designed to investigate the extent of and solutions to patient waiting lists, the time patients had to wait on treatment days, patient symptom management, patient education, and the identification and management of chemotherapy complications⁴⁴. Staff at the unit had expressed concern that they were either underutilised or so overstretched that they feared making errors in patient care and had insufficient time for patient counselling and education. It was felt that a workload based on requirements of patient chemotherapy protocols, rather than occasions of service, would allow more accurate estimations of time required to administer protocols and care for patients.

Following data collection related to time to administer different types of chemotherapy regimens in a number of haematology-oncology day units in Southeast Queensland, a chemotherapy protocol manual was written by the multidisciplinary team at the unit. This manual is reviewed as treatment regimes alter, but remains the basis of the appointment booking system. A common system of medical records was also introduced, which allowed for improved communication between all members of the multidisciplinary team. Despite these changes, nurses were still concerned regarding lengthy patient waiting times (on waiting lists and on presentation), so further research was conducted into patient booking and staff allocation systems. As a result of this, appointment sheets were redesigned to allow a more even spread of appointments across the day, allocation of day-long procedures to the beginning of each day, allocation of a nurse primary care giver to each patient for the day, a specific review clinic for those not requiring treatment on that visit, and the implementation of a computer-based chart request system.

The authors report that these changes improved patient wait times, patient satisfaction and symptom management, and increased the amount of time available for nurses to engage in patient psychosocial care and education.

2.6 THE 'SHIFT' PROCESS

The majority of literature on non-inpatient services for patients with haematological malignancies is focussed on outpatient-based interventions and outcomes, rather than on the shift process itself. A study on the actual process of shifting from inpatient to non-inpatient care at one oncology day/evening hospital, and the issues encountered, is discussed here, followed by some suggested principles for successfully changing models of care developed by Queensland Health.

2.6.1 An Example of Issues Encountered During the Shift to Non-inpatient Care

The shift from inpatient to non-inpatient care is described in a paper entitled *Building a dream: creating an oncology day/evening hospital*¹³, referring to the development of an oncology day/evening hospital in Winnipeg, Manitoba⁴⁵. It is not clear whether patients with haematological malignancies are treated at this hospital, but the issues faced in shifting to an outpatient model of care are presented nonetheless, as there will most likely be some overlap. The driver for the project was the closure of large numbers of acute inpatient care beds, which was reportedly in keeping with the political philosophy at the time. Greatest cost savings were envisaged when entire inpatient units were closed. This closure of units led to irrational combinations of regrouped patients though, with groupings based on patient numbers rather than related clinical activity, and experienced staff were not always moved with patients. It was also identified that services for oncology patients were provided in several areas of the hospital, making it difficult to develop knowledgeable and experienced oncology nurses.

A team of administrators at the hospital and at the cancer centre agreed that a unique setting could be created to support movement of inpatient activity to the ambulatory setting, and the consolidation of existing ambulatory services into a focussed program.

The first step in the project was a comprehensive assessment of the numbers and types of inpatient cases and the related lengths of stay. Further analysis was then conducted as to which patients could receive outpatient therapy if an extended hour treatment facility existed. A review of services required to serve the population was undertaken, including gaining input from all stakeholders such as nursing, medical, pharmacy, health records, materials handling and housekeeping. The project was implemented in two phases, with Phase I extending the hours of operation until 2200 hours weekday evenings and addition of eight hours daily on weekends and public holidays, and Phase II adding seven treatment spaces and moving inpatient gynaecological cancer treatment to the outpatient setting. Treatment waiting times, admissions to hospital and intra-treatment transfers have all been reduced, with anecdotal reports of a high degree of patient satisfaction.

Challenges faced along the way included dealing with resistance from medical, nursing and allied health staff, allowing adequate time to hire staff, a national nurse shortage, and the change in opening hours requiring staffing support over extended hours.

2.6.2 A Framework for Changing Models of Care

Whilst not specifically related to haematological or cancer services, or in fact the shift from inpatient to non-inpatient care, the document *Changing Models of Care Framework* produced by Queensland Health⁴⁶ provides step by step principles and processes for reviewing and changing a model of care, which can be considered in the context of this project.

The document provides a methodology and guide to the change process and recommends eleven principles for success in changing models of care. These include:

- Constant and consistent communication, collaboration and consultation;
- Sign off and support by District Manager and District Executive;
- Facilitation of joint decision making between the health care providers and the consumers;
- Alignment with current policy and local, state and national directives;
- Based on the most appropriate available evidence;
- Specific health care issues of Aboriginal and Torres Strait Islander and ethnic groups are addressed;
- Collaboration with other government departments and non-government organisations;
- Use of a quality framework to facilitate continuous clinical improvement;
- Provision of a comprehensive, diverse and defined range of integrated clinical services delivered to meet community needs;
- Episodes of care to extend across the acute and community continuum; and
- Planned evaluation.

In addition, the document identifies four phases to be considered in the process of changing models of care, which are relevant to the shifting of patients with haematological malignancies from the inpatient to non-inpatient setting. The first phase requires a definition of the problem, with suggested elements to seek further information on including: the current care delivery process and referral patterns including inpatient, ambulatory and residential care settings (i.e. flow chart of current process for patient care); current patient outcomes in terms of safety, equity of access, patient satisfaction; current staffing profile and levels of satisfaction; current communication structures between staff and between staff and patients; and current cost of service delivery (including available assets, buildings, equipment etc). The second phase involves development of a community profile which would include a description and needs analysis of the population group served by the particular haematology service or unit. Phase 3 involves development and implementation of the project plan including objectives, implications, workforce and industrial issues, budget, legislative or policy implications, health outcome implications and communication. The final phase involves evaluation of the new model of care using the same evaluation process that was applied to the old model, so that the impact of the change can be assessed.

2.7 FACTORS AFFECTING DESIGN AND IMPLEMENTATION OF NON-INPATIENT CARE MODELS

Previous sections have discussed the drivers of change for provision of non-inpatient care for patients with haematological malignancies, the interventions that have more recently shifted to non-inpatient management in suitable patients, the structure and experiences of several units where aspects of non-inpatient care have been implemented, and some general factors for consideration in changing models of care. Some specific factors emerge from published literature as important for consideration when designing or implementing a shift from inpatient to non-inpatient models of care for patients with haematological malignancies. These are discussed below.

2.7.1 Physical Location

The physical location of non-inpatient haematological cancer services may be driven as much by tangible requirements or demands as by philosophical beliefs as to the ideal service. Depending on patient numbers, historical unit structure, patterns of ward closure, available resources, and clinician and/or administrator vision for change amongst other factors, facilities may be established as part of haematology units, haematology/oncology units or as separate facilities offering outpatient bone marrow transplant for example.

The benefit of locating non-inpatient services alongside or within inpatient facilities for haematological conditions is the easier provision of an IPOP model of care, allowing patients to be moved between inpatient and outpatient care relatively smoothly. This of course is dependent on available physical space and patient numbers. Where numbers of patients are large, the establishment of a separate outpatient unit can then be considered, housed either in the same facility as inpatient wards, or in a separate building.

Again, patient numbers, complexity of care and available resources may dictate whether these non-inpatient services are offered within existing or expanded services for patients with non-haematological, or haematological malignancies, or whether a separate non-inpatient service is established for patients with haematological malignancies or conditions only. The former option allows consolidation of ambulatory oncology treatment services, whilst the latter ensures that patients can receive care from specially trained haematology staff. In large units, a combination of these may be possible.

Services such as laboratory, radiology suite and chemotherapy pharmacy have also been described as ideally located on-site.

2.7.2 Interventions Offered

Based on the complexity of the intervention regimen and/or concern for patient safety, some interventions and treatments for patients with haematological malignancies have only recently been offered on a non-inpatient basis. Advances in chemotherapy options, supportive care and delivery systems have allowed this shift to occur in suitable patients. A shift to non-inpatient management has most recently been described in patients undergoing HSCT, receiving treatment for acute leukaemia, or for management of treatment complications such as febrile neutropenia.

In some cases it has been reported that the shift to outpatient management involved no change in the actual chemotherapy administered, and in other cases where units aimed to manage febrile neutropenia on an outpatient basis for example, the availability of a specific outpatient care protocol for management of febrile neutropenia was considered important in reducing readmission rates¹⁸.

2.7.3 Patient Access to Services

Non-inpatient services for these patients are ideally provided in a facility which operates extended hours including evenings, weekends and public holidays. Most services discussed in the literature offer services between 0700-1900 hours, 7 days per week, for both scheduled and unscheduled patients.

Critical also is a clear contact number and procedure for patients to access services after-hours. It has been recommended that planning of cancer centres and units must consider the infrastructure needs in ambulatory programs for these patients, who often require supportive care and urgent assessment³⁹. Urgent review of these patients in emergency departments may not be appropriate, due to lack of isolation facilities and staff lack of familiarity or expertise with specific treatment algorithms. An emergency unit specifically dedicated to outpatients with haematological diseases was described in one facility¹⁷. This emergency unit is dedicated to outpatients with haematologic diseases requiring immediate clinical evaluation, therapeutic intervention and hospitalisation for all kinds of emergencies including those following intensive chemotherapy. In the absence of a dedicated emergency unit though, most facilities describe a clear process which is communicated to patients and carers to ensure patient safety is not compromised in the outpatient setting. Contact numbers are generally provided for the physician on call, who can then advise patients to attend the emergency department if required.

Access to services requires additional consideration for non-local patients. In most facilities reported in the literature, access to local accommodation is available for these patients, as it is a requirement that patients are within 30-60 minutes of the facility when receiving certain treatments as an outpatient. This accommodation ranges from access to local motels with transport available to the treatment facility, on-site accommodation in a separate facility, or in some cases on-site accommodation in closed hospital wards which have been converted to accommodate patients and carers.

2.7.4 Patient/Caregiver Education

The role of the caregiver is crucial in non-inpatient management of patients with some haematological malignancies. Patients receiving non-inpatient HSCT in particular rely on 24 hour lay caregivers who can be responsible for administration of intravenous antibiotics and oral medications, monitoring temperature, blood pressure, pulse, and intake and output readings. Most importantly, the caregiver and patient need to be clear on when to seek advice, assistance or emergency treatment, and know how to maintain oral hydration and an appropriate diet.

Literature supports a clear role for nurses in provision of education to patients and caregivers to facilitate non-inpatient care to occur. In shifting services to an outpatient model, consideration must be given as to how and when nurses or other members of the healthcare team can provide education and support to the patient and their families or caregivers. It has been found that nurses in particular have had to modify their time with patients to overlap the delivery of medication with education and supportive counselling¹⁵.

2.7.5 Staffing Models and Resource Management

Various staffing models for non-inpatient units have been reported. These range from nurse-managed chemotherapy clinics⁴³, physician run units, or nursing care units with physician oversight²³. In some cases, where the outpatient unit was located alongside the inpatient unit in the same physical location, the same multidisciplinary team cared for both inpatients and outpatients. This was reported as an important factor contributing to the success of one outpatient HSCT program¹⁵.

2.7.6 Electronic Patient Information Systems

Although the availability of electronic patient information systems did not emerge as a key issue affecting successful implementation of non-inpatient models of care in the published literature, it has certainly been highlighted as a critical factor in overall models of care for patients with haematological malignancies³⁹. A well designed and complete electronic record, containing real-time or up-to-date clinical, diagnostic and treatment information, will greatly facilitate models of patient care and safety. Electronic prescribing and treatment records are the priority in initial development of electronic records.

2.8 MEASUREMENT INDICES

Two approaches to measuring the effectiveness of the shift from inpatient to non-inpatient models of care emerge from published grey and academic literature. The first involves the establishment of evidence-based recommendations on key factors for successful design and implementation of models of care, with subsequent measurement of the presence and adherence to these factors by haematologic cancer services. The second is generally used, although not specified as a measurement index in published academic literature, and involves the measurement of the feasibility, safety, effectiveness and/or cost-effectiveness of a shift to non-inpatient care.

An example of the first approach may be taken from the UK NICE *Guidance on Cancer Services: Improving Outcomes in Haematological Cancers – The Manual (2003)*¹¹. This manual presents some key recommendations on the organisation of models of care to improve outcomes in patients with haematological cancers. Some of the key recommendations include the following: patient management by multidisciplinary teams (MDTs) serving populations of 500,000 or more; rapid-access diagnostic services for patients with lymphadenopathy; central roles for clinical nurse specialists to arrange for patients and carers to receive multifaceted support, information and coordinated care throughout the course of their illness; and treatment such as those intended to induce remission in patients with acute leukaemia or high dose therapy with stem cell transplantation to be carried out only in centres seeing sufficient patients to develop and maintain expertise in this area. For each of these and other recommendations, the evidence base and suggested measurement indices are provided in the document. Suggested measurement indices relate to the structure of the service, the process by which the service is delivered, and the outcomes for patients. Measurement therefore relates to whether key recommendations relating to haematological cancer service organisation and delivery have been realised, and patient experiences and outcomes resulting from receipt of such care.

The second approach to measuring the effectiveness of the shift from inpatient to non-inpatient models of care is that used inherently in much published academic literature. This involves measuring the feasibility, safety, effectiveness and/or cost-effectiveness of a shift to non-inpatient care for particular interventions or services.

Whilst it could be argued that results of the latter approach to measurement should be available as the evidence base prior to shifting to non-inpatient care, because the shift of some of these interventions to non-inpatient care is still evolving, measurement of both the feasibility and clinical outcomes as well as the existence or otherwise of key elements of service organisation could both be argued as important in measuring service success.

2.9 SUMMARY

Evaluation of non-inpatient cancer care models indicates that significant benefits are possible for patients and the health care system. These include opportunities for patient choice in treatment time, improved quality of life for patients through prevention of hospitalisation, decrease in treatment waiting times, consolidation of patients into ambulatory oncology treatment settings, and more rational inpatient bed utilisation with reduction of inpatient admissions.

The development and implementation of non-inpatient models of care for adult patients with haematological malignancies over recent years has followed a similar process to that which has occurred for patients with solid tumours. This shift has largely been driven by pressure on hospital inpatient bed usage and a concern regarding patient exposure to severe multiresistant nosocomial infections. The latter is particularly important for patients with haematological malignancies, who are often at high risk of infection due to the nature of the cancer itself and due to the treatment regimens they are exposed to. Advances in chemotherapy, supportive care and delivery systems have also facilitated a move towards non-inpatient management of these patients where possible.

Over the last ten years, published literature has largely focussed on areas of non-inpatient care which had not been routinely available on an outpatient basis. These include partial or full provision of outpatient haematopoietic stem cell transplant, induction and/or consolidation phase chemotherapy for patients with acute leukaemia, and outpatient management of chemotherapy complications including febrile neutropenia. Literature supports the feasibility, safety and effectiveness of non-inpatient care in each of these areas for suitable adult patients with haematological malignancies, with associated potential cost savings to the health service.

The identification of suitable patients and the structure of units and services established to provide non-inpatient care have been identified as critical components of successful service delivery. Patients eligible for outpatient management of HSCT or consolidation chemotherapy cycles for acute leukaemia for example, are required to have accommodation less than one hour from the treatment facility, 24 hour caregiver availability, clinical stability and an absence of serious co-morbidities. One study found that over half the potential participants were unable to receive non-inpatient care because they lacked a suitable caregiver. Services must therefore be established to accommodate the needs of patients requiring inpatient or non-inpatient management, as well as patients who may benefit from an inpatient-outpatient model of care.

The structure of non-inpatient care services for adult patients with haematological malignancies can vary according to the interventions offered, relationship with inpatient facilities, and whether the unit is housed within broader haematology or oncology services. The actual level of intervention (i.e. up to allogeneic transplant) offered either as an inpatient or outpatient will depend on the accreditation status of the facility and the number of patients required to maintain staff skills and expertise. The physical location of services and proximity to inpatient wards is dependent on several factors including patient numbers, historical unit structure, patterns of ward closure, available resources, and clinician and/or administrator vision for change. Housing non-inpatient services for patients with haematological malignancies within an outpatient oncology service allows consolidation of ambulatory oncology treatment services, but does not necessarily allow patients to receive care from specially trained haematology staff. Housing of inpatient and outpatient services for haematological malignancies in the same facility can allow the same multidisciplinary team to care for inpatients and outpatients, which was reported as important in some studies.

Other factors considered important in the establishment of successful non-inpatient models of care include the following:

- extended opening hours seven days per week including public holidays, for both scheduled and unscheduled patients;
- clear procedure for patients to access services after-hours;
- where possible a dedicated emergency unit or procedure for patients to by-pass the general hospital emergency department and admission procedure;
- availability of laboratory, radiology and chemotherapy pharmacy services on-site;
- consideration of access to services for non-local patients; and
- adequate time allowed and dedicated to patient and carer education and supportive counselling.

Measurement indices relating to the shift to non-inpatient models of care for these patients may be related to such things as change in patient outcomes and process flow, staff satisfaction and/or cost effectiveness, or more to a checklist of whether key recommended or ideal structures or processes for improving patient outcomes are included and implemented in service delivery.

To create a workable and successful service offering a non-inpatient model of care to suitable patients with haematological malignancies, consideration needs to be given to available patients, resources and interventions to be offered, the physical location of the unit and associated staffing models, and patient access to available services.

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http://www.health.qld.gov.au/publications/change_management/Care_Framework.pdf