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Executive Summary

Medical Assessment Units (MAUs) have been established in 29 hospitals across NSW since 2008. They were developed in conjunction with the Physicians Taskforce and the Acute Care Taskforce to deliver faster, safer, and better care for those patients with complex and chronic conditions, as an alternative to treatment in the Emergency Department.

Since the introduction of the MAUs in NSW in 2008, the number of patients assessed, diagnosed and treated has increased by 72% and now has an annual investment of over $100 million. It was recognised that after 4 years of operation, with this increasing patient demand and funding attached to a specific model of care that an evaluation was required to be conducted.

This evaluation was to determine the effectiveness of the NSW MAU Model of Care for patients with complex and chronic conditions. It was also to address if the MAU model of care has a positive impact on the patient journey, access block, current emergency department key performance indicators, hospital efficiency, financial resources, patient outcomes and quality of care. The outcome of the NSW MAU Evaluation was to provide contributions to decisions about the future development of MAUs, as well as maximise productivity and effectiveness of the current investment.

The NSW MAU Evaluation has utilised five main sources to determine the effectiveness of the NSW MAU Model of Care. This was conducted through a quantitative data analysis, a provider survey, a patient survey, an observation study and a literature review. An in-depth analysis against each component of the NSW MAU Model of Care has been conducted using all five sources, and is provided in the discussion section of this evaluation.

This evaluation has demonstrated that the NSW Redesign process has been successful in producing sustained, system wide change with its application to NSW Medical Assessment Units Model of Care. The NSW MAU Model of Care has been successful in generating approximately 23,540 bed days for the increasing number of patients arriving to our system, while providing a valued model of care for our patients as demonstrated though the exceptional patient experience rating of 88%.

Limitations to the operation of some individual MAUs across NSW have also been evidenced, although this has not negatively impacted the overall positive system wide results. The set of ten recommendations that are provided with the NSW MAU Evaluation will address these limitations with the outcome of improving the effectiveness of current and future MAUs and the service they deliver to patients.
SECTION 2

Recommendations

These recommendations have been developed to provide NSW Health, Local Health Districts (LHDs), and individual facilities with the information necessary to improve the effectiveness of current and future MAUs and the service they deliver to patients. The recommendations are intended to be addressed at all levels – NSW Health, the LHDs and importantly, at a hospital level with the involvement of all MAU stakeholders.

1. **Recommendation 1:**

   ACI will undertake a broader consultation of the Medical Assessment Unit Model of Care 2012 to ensure the components are achievable across existing and future MAUs.

   The *NSW Health Medical Assessment Unit (MAU) Operational Guide 2007* was designed to assist in the original implementation of the MAUs across NSW. In order to promote a standardised and best practice approach to Medical Assessment Units in NSW post this evaluation, the *Medical Assessment Unit Model of Care 2012* should be utilised as the basis for a new standard for MAUs across NSW. It is recommended that a NSW MAU Model of Care document outline; what the model is, why the model should be used, key principles, other models that support early entry and discharge, benefits, challenges and the case for implementation (refer to pages 71, 78 and Appendix 1).

2. **Recommendation 2:**

   NSW Ministry of Health works in conjunction with the Local Health Districts (LHDs) to review on a yearly basis the *NSW MAU Key Performance Indicators*. The *NSW MAU Key Performance Indicators* as documented in Appendix 2 will be utilised as the basis for the yearly review.

   The understanding of Medical Assessment Unit Key Performance Indicators (KPIs) as a direct reflection of improving patient outcomes is limited. The majority of staff could reflect what they are, not what they actually mean to patients. The *NSW MAU Key Performance Indicators* should include not only data definitions, they also include annual overview of state-wide results to illustrate the impact of MAUs at a state-wide level, targets or a guideline for achievement and evidence for collection against the MAU Model of Care (refer to pages 72, 80 and Appendix 2).

3. **Recommendation 3:**

   LHDs with MAUs conduct an annual Cost Benefit Analysis using the NSW Ministry of Health Valuation Methodology and this be submitted to the Ministry of Health with the LHD Efficiency and Savings Plan.

   On an annual basis each Medical Assessment Unit provide to their Local Health District (LHD) executive team a Cost Benefit Analysis using the Valuation Methodology (refer to Results Section page 39) and the *MAU Monthly Summary Data* (this is provided to each hospital by the Ministry of Health on a monthly basis). It is recommended that this be submitted to the Ministry of Health on a yearly basis with the LHD Efficiency and Savings Plan (refer to page 72).

4. **Recommendation 4:**

   LHDs with MAUs conduct a review of their staffing models. Dedicated staff should be considered a priority. Best practice includes a 7 day a week, senior led service with dedicated medical, nursing, allied health, support staff and a supernumerary care coordinator role.

   Staffing models in existing Medical Assessment Units needs to be reviewed. It is understood that staffing will be based on the size and patient cohort of the unit, although dedicated staffing to the MAU model of care needs to be considered as a priority.
It is to be taken into consideration that a 7 day a week, senior led service with dedicated medical, nursing, allied health, support staff and a supernumerary care coordinator role is considered the optimal recommendation for staffing of the medical assessment unit (refer to pages 75, 85 and Appendix 1).

5. **Recommendation 5:**

LHDs with MAUs conduct a review of their governance models. Governance models should include leadership from stakeholders critical to decision making about MAU patient flow and have regular meetings with these key decision makers.

Governance models in existing Medical Assessment Units need to be reviewed. Governance models need to include leadership from key stakeholders who are critical to making decisions about MAU patient flow (i.e. hospital executive, MAU medical, nursing and allied health, patient flow and Emergency Department). Best practice for a governance model includes; regular meetings with above key stakeholders who have the ability to addresses issues and implements solutions within short timeframes (refer to pages 76, 83, 84 and Appendix 1). The outcomes of effective governance and leadership are provided in the Discussion section: Observation Study (refer to page 83 and 84).

6. **Recommendation 6:**

LHDs with MAUs conduct a review of their current MAU business rules. This should be overseen by the MAU governance group. Business rules should include; inclusion and exclusion criteria, processes for priority access to services, early identification and access to community services and escalation procedures.

Business rules of existing Medical Assessment Units need to be reviewed. Documentation of Business Rules needs to be developed and committed to by the MAU governance group. They also need to be inclusive of inclusion and exclusion criteria (non complicated and easy for non MAU staff to identify MAU appropriate patients quickly), priority access to services (in-patient beds, diagnostic s, etc), early identification and access to community support services (i.e. Com Packs, Hospital in the Home, etc), escalation procedures inclusive of specific direction for MAU staff when issues arise regarding access to beds (i.e. no MAU beds available for ED patients, non-MAU patients in MAU beds, in-patient bed delays, etc), 48 hour patient breach and staffing issues (refer to page 76-77).

7. **Recommendation 7:**

LHDs with MAUs conduct a review of their patient flow principles. Timeframes should be utilised to ensure optimal patient flow through the MAU.

Patient flow principles of existing Medical Assessment Units need to be reviewed. For optimal patient flow through the MAU, timeframes should be utilised across the MAU model of care. This is to ensure that patients are provided with rapid comprehensive multidisciplinary assessments; faster diagnosis and earlier treatment within a 48 hour period (refer to page 79 and Appendix 1 – MAU Patient Flow).

8. **Recommendation 8:**

LHDs with MAUs conduct measurement of staff and patient satisfaction, at least annually. Feedback should improve local MAU models of care.

Measurement of staff and patient satisfaction of existing Medical Assessment Units need to be conducted regularly. This feedback also needs to be incorporated into improving the MAU model of care at individual hospitals (refer to page 83).

9. **Recommendation 9:**

LHDs with MAUs conduct a review of their current communication models. This should include communication between the MAU and other hospital departments, patients, patient’s families and community services.
Communication models of existing Medical Assessment Units need to be reviewed. This should include communication between the MAU and other hospital departments, patients, their families and community services. Communication models need to also include communication between MAUs across NSW to continue sharing of innovative practice. It is understood that at present a State-wide MAU Nursing Network Meeting occurs bi-monthly that facilitates the sharing of information and contribution to the continued innovation to the MAU model of care. This should continue and expansion to medical and allied health staff be investigated (refer to page 85 and 86).

10. **Recommendation 10:**

Health Education and Training Institute (HETI) considers an approach to strengthen General Medicine in NSW Hospitals.

Consideration of the re-establishment of Departments of General Medicine in NSW hospitals to provide training of General Physicians and to care for General Medicine patients admitted to hospital or like models. Consideration that General Physicians can provide medical governance, leadership and training required for effective running of Medical Assessment Units and the maintenance of high quality care. At present the specialty of General Medicine has evolved into a different model of care in NSW, due to minimal hospitals having active departments of General Medicine. Patients with general medical problems in NSW are usually admitted under the care of a Geriatrician or other sub-specialty medical teams in the absence of general medicine (refer to page 84).
SECTION 3

The NSW Medical Assessment Unit (MAU) Evaluation Abstract

With the investment in NSW MAUs since 2008 and an increase in the number of patients being treated in the MAU, the need was recognised to evaluate the effectiveness of these units. The evaluation will inform decisions about the future development of MAUs, as well as maximise productivity and effectiveness of the current investment.

Aim (refer to page 11)

This evaluation aimed to assess the impact and effectiveness of the MAU in meeting the original objectives provided in the MAU Operational Guide1:

a) Is the MAU model of care effective for patients with complex and chronic conditions? The main emphasis will be on patient outcomes, impact on length of stay and patient satisfaction.

b) Does the MAU model of care have a positive impact on the patient journey, access block, current emergency department key performance indicators, hospital efficiency, financial resources and quality of care?

Methodology (refer to page 17)

The NSW MAU evaluation gathered information from 5 main sources; Analysis of Data, Survey of Providers, Survey of Patients, Observational Study and Literature Review.

Results (refer to page 23)

The findings, key principles for effective operation of a MAU in NSW, key lessons learnt from existing MAU implementation and opportunities for improvement for the further development of the MAU model of care has been presented as well as recommendations for future and existing MAUs.

Discussion (refer to page 67)

Discussion of the information gathered from the above 5 main sources has been conducted along with consideration of:

■ Is the MAU Model of Care effective and are the MAUs operating at their full potential?

■ What are the best practice principles for the most effective MAU model of care?

■ Are there any opportunities to improve the operations, outcomes and quality of care for patients in MAUs in NSW?

Conclusion (refer to page 89)

For MAUs to be successful, provide quality outcomes and produce sustainable change for patients they cannot function in isolation to the hospital as a whole2. This theory has been described prolifically all with the underlying understanding that for quality improvement no part of any system can function in isolation to the system as a whole (i.e. Studor3, Six Sigma4, Lean5, Theory of Constraints6, Dartmouth Clinical Microsystems, Accelerated Implementation Methodology7). Clinical process redesign in isolation to overall systems improvement is a limited and unsustainable approach to healthcare improvement for our patients. The NSW Redesign process has been successful in producing sustained system wide change with its application to MAUs. Limitations to the operation of some individual MAUs across NSW have also been evidenced, although this has not negatively impacted the overall positive system wide results. Based on these individual limitations a set of recommendations has been developed for use by existing and future MAUs in NSW, to further improve the results produced by this model of care.

2 NSW Ministry of Health (2011) NSW Medical Assessment Unit Evaluation Provider Survey
6 Brandao de Souza L (2009) Trends and approaches in lean healthcare, Leadership in Health Services, 22(2): 121 - 139
7 Goldratt EM (1999) What is this thing called Theory of Constraints, and how should it be implemented, North River Press
Background of MAUs in NSW

Emergency Department (ED) crowding has been increasingly prevalent for over 20 years, and acute hospitals have continued to experience a rise in the number of emergency admissions coupled with increasing hospital occupancy rates and a reduction in available inpatient beds. Growing admission rates are attributed to the increasing numbers of emergency presentations of elderly patients with multiple chronic diseases, raised expectations of care and lower thresholds for admission.

This growing demand for health services is in evidence in NSW: from 2005 to 2011, there was a 24% increase in ED presentations and a concurrent 10% increase in inpatient admissions. This demand is predicted to further increase by 28.2% for ED presentations and by 15% for inpatient admissions from 2005 to 2013. Additionally in NSW, hospital admissions for the over 75-year age group has grown by 25% from 2005/06 to 2011. When presenting to hospital via an ED, elderly patients may not be triaged as high urgency; their wait for assessment, diagnosis and treatment can cause delayed care for patients contributing to ED overcrowding.

In recent years, Australian health authorities and hospitals have responded to these challenges by introducing initiatives aimed at managing the increasing demand for services. One such initiative is a model of care designed to fast-track patients with complex medical problems to the care of inpatient physicians and multidisciplinary teams who can best plan their management, care and disposition. In NSW, this model is known as a Medical Assessment Unit (MAU).

Internationally, MAUs are predominantly run under General Medicine Teams. It is recognised that generalists are the best to deal with the complex patient with multiple chronic conditions. The health environment is slightly different in NSW, in comparison to the rest of Australia as well as internationally. The speciality of General Medicine has evolved into a different model of care in NSW, due to minimal hospitals having active departments of General Medicine. Patients with general medical problems in NSW are usually admitted under the care of a Geriatrician or other sub-speciality medical teams. This has resulted in patients being ricocheted between multiple in-patient speciality teams and referred to as ‘outliers’ on sub-speciality wards.

A Medical Assessment Unit is specifically designed to increase efficiency in patient management while maintaining or improving quality of care and ultimately, assist with improving patient flow. The evolution of the Medical Assessment Unit (MAU) in Australia reflects current pressures on the health care system, especially the rise in medical admissions and the increased demand for inpatient beds. The MAU strategy has been designed to improve the management of inpatient beds and reduce length of stay in the Emergency Department and inpatient unit, by commencing assessment, diagnostics, treatment and preparation for earlier discharge. The MAU is designed to improve quality of care while assisting with improving patient flow and at the same time matching the demand for services to hospital capacity.
Patient flow is about ensuring that people receive the care they need, when they need it, with minimum waiting times. It is a key goal for hospitals as they aim to provide faster, safer and better care by keeping patients moving through the system and removing any blockages that impede flow.\textsuperscript{18} A whole-of-systems approach is required to manage this patient flow and match service demand with service capacity.\textsuperscript{19} This approach encompasses the entire patient journey extending from the Emergency Department through to the inpatient area and discharge back into the community.

As part of the Special Commission of Inquiry: Acute Care Services in NSW Public Hospitals 2008, Commissioner Garling commented on what is required for MAUs to be effective:

\begin{quote}
\textit{… Medical Assessment Units need dedicated medical staff, including senior physician cover, nursing, allied health and support staff. They also need effective communication and referral systems, not only with Emergency Department triage, but also with community services, primary care services, GPs and inpatient services. These supporting systems need to be in place to ensure effective and continuous care and efficient patient flow, given the patient groups identified as appropriate for admission to Medical Assessment Units. This is because in most cases, Medical Assessment Units are appropriate for patients who have had a prior assessment by a doctor, be it a GP or at another hospital…} \textsuperscript{20}
\end{quote}

In his recommendations from the Inquiry, Commissioner Garling suggested an increase in the number of MAUs in place in NSW for assessment of chronic and complex patients prior to admission. The NSW Government responded to this recommendation under Caring Together: The Action Plan for NSW Health with a significant investment in the MAU model of care.

Medical Assessment Units have been established in 29 hospitals across NSW since 2008. They were developed in conjunction with the Physicians Taskforce and the Acute Care Taskforce to deliver faster, safer, and better care for those patients with complex and chronic conditions as an alternative to treatment in the Emergency Department.

To achieve this, the MAU is staffed by an experienced and comprehensive multidisciplinary team, able to conduct rapid patient assessments, reach faster diagnosis and provide earlier access to treatment. The team aims to have the patient ready within 48 hours of admission for discharge home or transfer to another unit for ongoing care.

A total of 359 MAU beds are currently open across NSW; 329 of these are funded through dedicated Commonwealth and State initiatives. Since the introduction of the Medical Assessment Unit in 2008, the number of patients assessed and treated has increased by 72%. In 2008/09, the number of patients treated in a MAU was 29,049; this increased to 49,982 in 2011/12.

MAUs have shown to be effective in providing timely access to assessment and treatment for a specific population of medical patients. This is evidenced in Australia as well as in equivalent models internationally.


\textsuperscript{20} Special Commission of Inquiry: Acute Care Services in NSW Public Hospitals 2008(2): 734-735
The aim of this evaluation was to assess the impact and effectiveness of the MAU in meeting the original objectives provided in the MAU Operational Guide:\(^{21}\) -

a) Is the Medical Assessment Unit (MAU) model of care effective for patients with complex and chronic conditions? The main emphasis will be on patient outcomes, impact on length of stay and patient satisfaction.

b) Does the MAU model of care have a positive impact on the patient journey, access block, current emergency department key performance indicators, hospital efficiency, financial resources and quality of care?

The NSW Medical Assessment Unit Model of Care

The NSW MAU Operational Guide was developed by NSW Health in 2007. This guide was used to outline the intended structure for establishing and operating a Medical Assessment Unit in NSW. The intended audience was general managers, service managers, clinical leaders, and clinical managers involved in the establishment of a new MAU in their facility.

The NSW MAU Operational Guide 2007 outlines suggested governance arrangements, staffing and patient care models, business processes, patient selection criteria, bed management design, resources and performance management and targets to monitor the effectiveness of the MAU. For future establishment of Medical Assessment Units across NSW and provision of guidance for existing MAUs the NSW Medical Assessment Unit Model of Care June 2012 (refer to appendix 1) will be utilised as the future point for discussion across NSW.

Medical Assessment Units are inpatient short stay units that are usually close to or co-located with an Emergency Department and are typically staffed by inpatient teams. The difference between a MAU and an inpatient unit is that the MAUs feature a dedicated multidisciplinary team led by consultants, who should be available on a daily basis (if not twice daily) to conduct rounds with the multidisciplinary team and provide timely access to treatment and management decisions.\(^{22,23}\)

Medical Assessment Units provide an alternative to treatment in the Emergency Department for undifferentiated, complex, chronic, non-critical medical patients. These patients are not critically ill but have complicated conditions that take time to assess and require a range of medical expertise to diagnose and treat.

MAUs are staffed by an experienced and comprehensive multidisciplinary team, who is able to conduct rapid patient assessments, reach faster diagnosis and provide earlier treatment. Once a patient is assessed, their condition diagnosed and treatment provided, they will be able to return to home within 48 hours with community services provided as necessary. If further treatment is required, they will be referred to an inpatient team and transferred to a specialty ward.

A typical patient suitable for management in a MAU is the undifferentiated complex non-critical medical patient generally with co-morbidities. MAUs are also suited to the complex and chronic paediatric patient; there are specific paediatric models in NSW.

These patients can be streamed to the MAU from:

- The community (i.e. GPs, specialist rooms, ambulatory care or other identified community referrals) directly to the MAU through predefined pathways.
- ED triage direct to MAU – where the suitability of a patient is determined at ED triage, usually by the ED nurse or doctor or an MAU nurse or doctor.
- Within the ED after a very short period of time – the suitability of the patient is usually determined within the first hour of the ED stay by the ED nurse or doctor or an MAU nurse or doctor.


The typical MAU patient journey is depicted in Figure 1 below and starts at triage in ED or with a referral from the community into the MAU. The patient is either discharged home or admitted to an inpatient unit.

**Figure 1: MAU patient journey**

The MAU aims to reduce the average hospital length of stay for appropriate medical patients. Prior to implementation of the MAU model of care, data analysis from the NSW Health Demand and Performance Evaluation Branch indicated that the average length of stay in hospital was 4 days. For people aged 75 years and over this length of stay increased to 9 days with half of all hospital beds occupied by patients aged over 65 years.

In NSW, the MAU model of care provides two streams of care:

**Stream One** is for those patients that go home direct from the MAU. These patients have previously typically stayed in hospital for 3-5 days and can now be provided with rapid assessments, faster diagnosis and earlier treatments and sent home safely within 48 hours, with community care if needed. This patient group should account for approximately 50% of patients that are admitted to the MAU.

**Stream Two** is for those patients that are transferred to a specialty ward from the MAU. In an MAU, these patients are provided with rapid assessment, faster diagnosis and commencement of treatment within the MAU. They are then referred to an inpatient team and transferred to an in-patient ward after approximately 24-48hrs with a documented plan of care to be followed and sent home safely within 5-7 days. This patient group should account for approximately 50% of patients that are admitted to the MAU.

The 29 MAUs in operation in NSW vary in size and are either co-located to Emergency Departments, co-located to an existing ward or are standalone units. The types of patients assessed and treated in MAUs range from general medical to aged care, paediatric, respiratory and cardiac-specific patients. Regardless of the size of the unit or the funding received, Medical Assessment Units aim to provide a model of care for undifferentiated, complex, chronic, non-critical medical patients. The outcomes that each unit sets out to achieve are determined through the four main outcome measures\(^{24}\):

- The MAU Model of Care provides patients with rapid access to the Medical Assessment Unit (Right Care, Right Time, Right Place, and Right Provider) – measured as ‘average total time for all MAU patients in the ED (hours)’.
- The MAU Model of Care provides patients with access to rapid assessment, faster diagnosis and earlier treatment within 48 hours – measured as ‘average length of stay in the MAU (hours)’.

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\(^{25}\) NSW Health Demand and Performance Evaluation Branch, NSW Health Information Exchange (HIE) data base analysis 2004/05 to 2007/08
The MAU Model of Care provides patients who require further inpatient care, a continued management plan based on their initial rapid assessment, faster diagnosis and earlier treatment -measured as ‘average length of stay for MAU patients transferred to an inpatient unit (days)’.

The MAU Model of Care provides patients with safe and effective care; ongoing care or support is provided in their home environment if needed – measured as ‘Readmission rate within 28 days of MAU-home or MAU-ward-home separations (%)’.

Other models of care to support early entry into the MAU

Triage – Triage is streamlined to facilitate an efficient process that does not itself create a barrier to further assessment and clinical care. Only essential functions occur at the point of triage: the determination of patient acuity and level of urgency, basic first aid if needed, and referral to the most appropriate area for treatment. This can include models of care both within the ED and within the hospital.27 It is envisaged that hospitals with well developed MAUs and dedicated medical staffing utilise direct patient transfers from triage.

ED Senior Assessment and Streaming - Early ED Senior Assessment and Streaming model of care focuses on the assessment and treatment process that determine an early diagnosis, clinical management plan and disposition decision for patients. This model of care improves front line processes such as triage and includes early streaming of patients by a senior decision maker to avoid queuing and delays to care.28,29 It is envisaged that Emergency Departments utilising this model of care will stream appropriate patients direct to the MAU.

Clinical Initiatives Nurse (CIN) - The Clinical Initiatives Nurse (CIN) is a senior nursing role that provides nursing care to patients in ED waiting rooms. The three main functions of the CIN nurse are to30:

1. Maintenance of an ED nursing presence in the waiting room to facilitate a safe clinical environment
2. Communication with patients and carers regarding ED processes, waiting times and provision of relevant education on their health issues
3. Assess patients following triage to Initiate diagnostics or treatment, escalate care or refer patients to suitable services which may be external to the ED.

It is envisaged that Emergency Departments who have CIN nurses will utilise them to identify and refer patients to the MAU.

ASET (Aged Care Services in Emergency teams) – The ASET model of care is based on early identification, assessment and care planning for an older person presenting to an Emergency Department with identified aged care needs in addition to their acute care condition.

The primary goal of ASET is to improve the health outcomes of older people on presentation to the ED, minimise the requirement to remain in hospital, and prevent readmissions once patients are discharged by providing linkages to community services for support in the home environment.

In EDs that are utilising the ASET model of care, length of stay reductions of 60min have been seen in the over 70 years age group. The use of ASET also coincides with a 0.4% reduction in representations rates for the 70-74 year age group31.

It is envisaged that Emergency Departments with ASET will utilise them to stream appropriate patients direct to the MAU.

28   NSW Ministry of Health and Emergency Care Institute, Emergency Department Senior Assessment and Streaming Model of Care, will soon be available at: http://www.ecinsw.com.au/models-of-care
Other models of care to support discharge process into the community

Rehabilitation services - Under the NSW Rehabilitation Model of Care\(^{32}\), rehabilitation is defined as the provision of care that aims to:

- restore functional ability for a person who has experienced an illness or injury
- enable regaining function and self-sufficiency to the level prior to that illness or injury within the constraints of the medical prognosis for improvement
- develop functional ability to compensate for deficits that cannot be medically reversed.

Any patient discharged from the MAU requiring rehabilitation has the option of being referred to many ambulatory care options. Patients can access:

- Ambulatory Care (Day Hospital) - a comprehensive rehabilitation program conducted by a multidisciplinary team in an outpatient setting
- Ambulatory Care (Outpatients) – discipline specific therapy provided in an outpatient setting
- Ambulatory Care (Home based) – rehabilitation services provided in the patients home
- Outreach rehabilitation service for rural and regional centres (hub and spoke) - rehabilitation provided outside a specialised rehabilitation unit.

It is envisaged that appropriate MAU patients will be referred to rehabilitation services to provide a supported recovery in the home environment and aid in preventing unnecessary readmissions.

ComPacks – this is a non-clinical case managed program of community care available for people being transferred home from a participating New South Wales Public Hospital. It has been developed for patients who require immediate access to case management and a combination of community services to safely return home from hospital.\(^{33}\)

It is envisaged that appropriate MAU patients will be referred to ComPacks to provide a supported recovery in the home environment and aid in preventing unnecessary readmissions.

Hospital in the Home (HITH) services provide acute and post-acute care to children and adults residing outside hospital, as a substitution or prevention of in-hospital care. A person may receive their care at home (including Residential Aged Care Facilities) or in a hospital or community clinic setting (this may include at school or in the workplace). HITH care is short-term and preferably interdisciplinary, including doctors, nurses and allied health practitioners. It aims to provide the most appropriate care setting, avoid hospital admissions and reduce patient length of stay.

The most common conditions and treatments delivered by adult HITH services are intravenous antibiotic therapy for cellulitis, genitourinary tract, respiratory tract, postoperative/post-traumatic infections and osteomyelitis, and anticoagulant therapy for deep vein thrombosis or pulmonary embolism. For paediatric services, complex wound dressings for eczema, intravenous antibiotic therapy for cellulitis and cystic fibrosis are most common.

It is envisaged that appropriate MAU patients will be referred to HiTH services to provide a supported recovery in the home environment and aid in preventing unnecessary readmissions.

ARRCS (Acute to Aged-Related Care Services) – The AARCS aims to provide inpatient hospital coordination for older patients with complex and chronic conditions.

It is envisaged that hospitals that have AARCS will utilise this service to assist appropriate MAU patients.

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\(^{33}\) ARCHI Retrieved 5.6.12 http://www.archi.net.au/resources/moc/community-moc/compacks/2

METHODOLOGY
The NSW MAU Evaluation has drawn on five main sources of data (quantitative data analysis, provider survey, patient survey, observational study and literature review) to assess the impact and effectiveness of the MAU in meeting the original objectives provided in the *NSW MAU Operational Guide*\(^{35}\). Provided below are the main impacts that have been evaluated: -

*International experience suggests that a reduction in the time patient’s wait for a senior physician review and multidisciplinary assessment can:*

- Reduce the length of stay in the ED for these patients
- Reduce the level of intensive investigations prior to decision-making
- Reduce the length of stay in longer stay wards through multidisciplinary assessment at the time of hospital entry.
- Earlier activation of community based care solutions for these patients provides the opportunity for a coordinated approach to services across the acute setting, whether in an in-hospital environment or in the community.

*The expected benefits and outcomes of these for MAUs in NSW is for “Front-loading” assessment, diagnostics, treatment initiation and planning by senior physicians for a selected group of patients utilising alternative pathways, that delivers:*

- Reduction in ED LOS
- Reduction in in-hospital length of stay (LOS)
- Improved co-ordination to acute community care

In particular, the evaluation asks:

a) Is the Medical Assessment Unit (MAU) model of care effective for patients with complex and chronic conditions? The main emphasis will be on patient outcomes, impact on length of stay and patient satisfaction.

b) Does the MAU model of care have a positive impact on the patient journey, access block, current emergency department key performance indicators, hospital efficiency, financial resources and quality of care?

**Methodology of the 5 Main Sources of Data**

1. **Quantitative Data Analysis:**

This analysis included all 28 MAUs from NSW. A recently opened unit at Hornsby Hospital in 2011 was excluded for the purposes of this review; it is envisaged that this MAU will be included in any future evaluation.

The data analysis was completed using an extract of MAU activity data provided by NSW Health from the Health Information Exchange (HIE) dataset. The HIE stores data collections, such as the Admitted Patient Data Collection and the Emergency Department Data Collection. The information is collected at a LHD level and fed into the NSW Health database.\(^{36}\)

The analysis of the data was conducted by The Francis Group, on behalf of NSW Health. The Francis Group use a unique product called sfn, this tool allows data to be input into a ‘statistical process controlled chart’ (SPC) for comparative analysis purposes. The Francis Group was provided with 5 years of data (2006 – 2011) from 42 hospitals across NSW, this data was inclusive of; all EDs of role delineation level 3 and above, any patient that presented to any of these EDs and any in-patient in these 42 hospitals.

sfn provides participative, real time, dynamic root cause analysis over multiple systems; finance, quality, activity and HR. The reason this product was chosen for the MAU evaluation was due to its ability to analyse health data that displays strong seasonal variations (this was not found in any other products, that were shown only to allow static analysis). The Francis group provide further analysis of the data produced by sfn to show how demand, capacity and capability interact to produce outputs. It was determined that this could allow improvements to operational effectiveness as measured through relevant KPIs.

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The Francis group were asked to determine the following using quantitative data analysis techniques:

1) Comparison of pre and post MAU hospital statistics (LOS in ED, LOS in-patient wards, readmission rates, etc)
2) Comparison of hospital statistics of those hospitals within the same peer groups, for those with and without MAUs
3) Comparison of hospital statistics of Sydney metropolitan MAUs compared to Non metropolitan MAUs
4) Impact of the MAU model of care on length of stay of patients in the ED
5) Impact of MAU casemix on length of stay of patients in the MAU
6) Impact of the MAU model of care on length of stay of MAU patients who are transferred to an in-patient ward
7) Impact of the MAU model of care intervention, to a patients length of stay versus non MAU intervention
8) Impact of the MAU model of care on readmission rates
9) Correlation, if any, between length of stay in a MAU and readmission rates
10) Impact of the MAU model of care on patient, carer and staff experience
11) Review of effective and ineffective MAU processes including, although not limited to; staffing structures, governance structures, model of care, patient inclusion criteria, patient exclusion criteria, patient flow and case studies
12) Review effectiveness of current MAU data collection definitions and benchmarking
13) Cost benefit analysis of the MAU model of care

2. Survey of Providers:
An electronic survey was emailed out to 267 MAU key stakeholders across 28 MAUs. The survey posed a range of questions around staffing structures, governance structures, model of care, patient inclusion criteria, patient exclusion criteria, patient flows in and out of the MAU and knowledge of Key Performance Indicators.

The surveys was open for completion for an 8 week period, a total of 270 responses were received (153 completed responses and 117 partial responses). In total there were 47 questions that could possibly have been answered, not all questions were a requirement for all participants. The median response time to complete the survey was 26mins, 51 sec.

The Survey of Providers was divided into 7 themes: - 1. Demographics (Q1 and 2); 2.Staffing (Q3-21): Medical (Q3-7), Nursing (Q8-14), Allied Health (Q15-17), General staffing (Q18-21); 3.Governance (Q22-27); 4.MAU Model of Care (Q28-36); 5.Patient Flows (Q37-38); 6.Key performance indicators (Q39-43) and 7.Other comments (Q44-47).

3. Survey of Patients:
Baseline patient satisfaction information was sought through extraction from the Annual NSW Health Patient Survey. Results were key word searched for any correlation between responses received from any MAU patient. Minimal information was given via this method and has been excluded from inclusion in this evaluation.

The method that produced a representative patient cohort was through the use of the Patient Experience Trackers (PETs) - an electronic key pad containing 5 questions (refer to table 1 below). 15 MAUs were provided with a Patient Experience Tracker (PET) (refer to figure 2) over a 6 week period with the aim of having every patient complete the survey prior to discharge from the MAU.

Patients with a cognitive impairment were excluded from the survey. A total of 1184 respondents completed the survey across the 15 MAUs.
4. Observational Study:

An observational study was conducted in 15 MAUs by an expert review team which comprised an Acute Care Taskforce member, a Director/Deputy Director/Senior Manager from the Health Service Performance Improvement Branch of NSW Health, a Finance Manager, and the NSW Health MAU Project Manager. The MAUs included in the study included metropolitan and regional units from NSW.

The study set out to confirm whether the MAU is aligned to the original MAU concept from the NSW Department of Health\(^\text{37}\) and to determine the critical success factors of an MAU.

The observation at each MAU comprised of a tour of the MAU and structured interviews conducted with key stakeholders (MAU nursing, medical and allied health staff, hospital executive, patient flow team and the ED team).

Three questions were asked at each interview for all key stakeholders:
1. What do you think are the critical success factors for operating a MAU?
2. What improvements can be made to your model?
3. What is the ideal MAU model?

Data from the observations were collated according to key features of the unit, potential improvements and factors taken from the model that constitute an ideal MAU model.

5. Literature Review:

- A scan of current literature was carried out to enhance and support the data collected as part of the review.
- The literature scan included a review of evidence from peer reviewed journals, and grey literature, such as conference papers and reports, from national and international sources, a special report carried out by the Advisory Board Company in 2009.
- Key search words included, short stay medical units, medical assessment units, medical assessment and planning units, acute assessment units, acute medical assessment units, acute admission units, clinical decision units, emergency medical units, emergency assessment units, emergency medical assessment/admission units, multispecialty assessment area, medical receiving unit, emergency receiving unit.

Taken together, these five sources of data for the MAU evaluation seek to understand whether the MAU model has been successful in NSW in meeting the objectives. The findings from the evaluation will inform the key principles for future MAUs, identify further opportunities for improvement and also provided recommendations for future work.

The NSW MAUs included in each data collection and analysis activity are identified in the table below.

**Figure 3: Overview of the NSW MAU Evaluation**

**Table 1: MAUs included in data collection and analysis**

<table>
<thead>
<tr>
<th>MAU location</th>
<th>Quantitative Analysis</th>
<th>Observational Study</th>
<th>Provider Survey</th>
<th>Patient Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>St George Hospital</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Royal North Shore Hospital</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Liverpool Hospital</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Sutherland Hospital</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Westmead Hospital</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>St Vincent’s Hospital</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>John Hunter Hospital</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Maitland Hospital</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Wyong Hospital</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Wollongong Hospital</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Bankstown Hospital</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Orange Hospital</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Port Macquarie Hospital</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Royal Prince Alfred Hospital</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Prince of Wales Hospital</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Concord Hospital</td>
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<td></td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Canterbury Hospital</td>
<td>✓</td>
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<tr>
<td>Campbelltown Hospital</td>
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<td>✓</td>
<td>✓</td>
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<tr>
<td>Gosford Hospital</td>
<td>✓</td>
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<td>✓</td>
<td>✓</td>
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<tr>
<td>Nepean Hospital</td>
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<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Children’s Hospital Westmead</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Sydney Children’s Hospital</td>
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<td></td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Blacktown Hospital</td>
<td>✓</td>
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<td>✓</td>
<td>✓</td>
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<tr>
<td>Fairfield Hospital</td>
<td>✓</td>
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<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Calvary Mater Hospital</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Mona Vale Hospital</td>
<td>✓</td>
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<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Coffs Harbour Hospital</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Lismore Hospital</td>
<td>✓</td>
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<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
Data Analysis

The purpose of the data analysis was to understand the performance of the MAUs, their impact on other hospital processes and costs, their impact on patient outcomes, and a comparison of data between sites. Patient level activity data from 2006 to 2011 was extracted for each facility from the NSW Health Information Exchange (HIE). The analysis was undertaken at three levels to provide the greatest insight into the impact of MAUs; Summary benchmark indicators across all MAU facilities across NSW; Peer group benchmark comparisons to understand performance for similar hospitals and facilities and in-depth analysis of hospital performance by individual hospital/facility.

Discussion of the results and linkages to Recommendations is available in the Discussion Section.

Number, Size and Patient Cohort of Medical Assessment Units in NSW

29 Medical Assessment Units have been established in NSW since January 2008, a staged approach to implementation has occurred – the most recent unit opened at Hornsby Hospital in July 2011. Royal North Shore Hospital opened the first MAU in 2008; an additional 17 units followed soon after that year. Figure 4 below shows the number of MAUs established each year since January 2008.

Figure 4: The number of MAUs opened annually in NSW from 2008. (Source: NSW MoH MAU Monthly summary report)

The size of MAUs in NSW varies between facilities. They range in size from 21 beds (RNSH, St George and POWH) to 8 bed units (Canterbury, CHW, Maitland, Fairfield, Sydney Children’s, Calvary Mater, Mona Vale, Port Macquarie, and Coffs Harbour). The average number of beds in a MAU in NSW is just over 12 beds, as seen in Figure 5. The majority of MAUs (16 of 28) have 10 beds or less.

Figure 5: The number of beds in each NSW MAU (Source NSW MoH MAU Monthly summary report).
Of the 27 adult MAUs in NSW, 23 were general medical patient cohorts as seen in Figure 6 below. The patient cohorts for MAUs in NSW are still medically managed under sub-specialty models, the default for the general medical patient cohort is generally geriatricians (except RNSH and JHH), or the physician-of-the-day on a general medical roster.

Figure 6: Patient co-hort of MAU in NSW (Source NSW MoH MAU Monthly summary report).

Medical Assessment Units are geographically located differently throughout NSW hospitals. Some MAUs were found to be geographically co-located with the ED and key diagnostic services such as pathology and radiology whereas others were located in specific wards throughout the hospital. Figure 7 below shows the configuration and geographical locations of MAU beds across the 29 MAUs.

The bed type configuration of the MAUs includes, general medical, aged care, cardiac, respiratory and aged care beds.

Figure 7: NSW MAU Bed Configuration and Geographical Locations in NSW (Source: NSW MoH MAU Monthly summary report).
As at June 2012, there are 359 MAU beds operating in NSW, with 329 of these being funded through Commonwealth and State initiatives, the remaining 30 beds are an individual hospital investment. Between July 2008 and June 2012, a total of 169,886 patients have been assessed and treated in the NSW MAUs. This number has continued to grow annually since MAU establishment in 2008 as revealed in Figure 8.

Figure 8: The number of patients assessed and treated in an MAU in NSW since 2008.
(Source: NSW MoH HIE data extract)

The number of separations from MAUs has been increasing, in line with the establishment and enhancement of MAUs throughout NSW. While some variation has occurred on a month-by-month basis, the total number of separations has increased in 2011/2012 to approximately 4,000 separations per month in NSW as seen in Figure 9 below.

Figure 9: Patient separations by month from the MAU in NSW from July 2008 to June 2012.
(Source: NSW MoH HIE data extract)
Medical Patient Analysis for those hospitals in NSW with a Medical Assessment Unit (excluding surgical or procedural and planned or booked patients)

The MAU provides an alternative to treatment from the ED for non-critical, complex medical patients. The percentage of total medical patients (excluding surgical or procedural and planned or booked patients) for that hospital, who are treated in a MAU varies across NSW from 9% to 33% (figure 10). This is a measure of the throughput for a MAU. The hypothesis underlying this is that a higher percentage of patients passing through a MAU should be correlated with a corresponding reduction in ALOS for medical patients (excluding surgical or procedural and planned or booked patients).

Figure 10: Percentage of Overall Medical Patients (excluding surgical or procedural and planned or booked patients) treated in a MAU (Source: Francis Group data analysis 20.12.2012)

![Figure 10](image)

The LOS for medical patients (excluding surgical or procedural and planned or booked patients) using a MAU varies from over 8 days to under 4 days. This shows the variability of ALOS for medical patients using a MAU (figure 11). This indicates that in a number of the MAU units there are a higher proportion of long length of stay patients than would normally be expected. Sydney Children’s Hospital and the Children’s Hospital at Westmead have the narrowest range and shortest ALOS for MAU patients compared to all other hospitals. It should be noted that these are unique facilities in which the paediatric patient cohort tends to have shorter average LOS.

Figure 11: Length of Stay for Medical Patients (excluding surgical or procedural and planned or booked patients) using a MAU (Source: Francis Group data analysis 20.12.2012)

![Figure 11](image)

The proportion of patients transferred to a ward from a MAU varies from over 90% to under 20%. This is a measure of the extent to which a MAU is acting as a filter on admissions to other wards (figure 12). The hypothesis to be tested is that a MAU with a higher transfer rate to a ward also has a lower ALOS. However, a high transfer to ward rate could also be an indication that a MAU is being managed as a normal medical ward.

Figure 12: percentage of Medical Patients (excluding surgical or proceural and planned or booked patients) that are discharged home from the MAU (Source: Francis Group data analysis 20.12.2012)

Non-Medical Patient Analysis (surgical or procedural patients) for those patients in NSW utilising a Medical Assessment Unit

The proportion of non-medical admissions (i.e. surgical and procedural) to a MAU varies between 2% (Gosford) and 28% (Concord) in the peer group A1, principal referral hospitals. This highlights the variability in the profile of patients admitted to MAUs. On average, 10% of MAU admissions were for non-medical Diagnostic-Related Groups – these patients are considered ‘outliers’. Refer to figure 13 below.

Figure 13: Non medical admissions to the MAU – Peer Group A1 (Principal Referral Hospitals) (Source: Francis Group data analysis 20.12.2012)
9% of admissions to the MAU are planned or booked admissions. This varies between 2% (John Hunter/Wollongong) and 41% (Concord). This analysis shows that in most hospitals MAUs are not restricted to emergency admissions (i.e. patients that require treatment within 24hrs) (figure 14).

Please note: the term emergency admission for this data set has been collated using coding called ‘urgency_of_admission 01’. The definition of urgency_of_admission 01 = an admission of a patient who has a condition that requires treatment within 24 hours at the time of diagnosis’. This can be applied to any patient admitted to a hospital and not just patients admitted via the emergency department.

Figure 14: Planned or booked admissions to the MAU – Peer Group A1 (Principal Referral Hospitals) (Source: Francis Group data analysis 20.12.2012)

Average Length of Stay Comparisons for hospitals with a Medical Assessment Unit

In the Principal referral hospitals there has been a reduction of around ½ day (7.7 days to 7.2 days) in length of stay for medical patients (excluding surgical or procedural and planned or booked patients) since the introduction of MAUs (figure 15).

Figure 15: Average length of stay for medical patients (excluding surgical or procedural and planned or booked patients) in hospitals with a MAU in Peer Group A1: Principal Referral Hospitals (Source: Francis Group data analysis 20.12.2012)
The average length of stay for medical patients (excluding surgical or procedural and planned or booked patients) using MAU (6.6 days – figure 16) is approx 0.5 days shorter than the overall ALOS for these patients (7.2 days- figure 15). In comparison to pre-MAU medical patients who averaged 7.7 days (figure 15) in hospital and patients who have a proportion of their treatment provided in a MAU averages 6.6 days (figure 16).

This analysis is focusing on the 2nd stream of care provided by the MAU model i.e. is for those patients that are transferred to a specialty ward from the MAU. These patients have previously typically stayed in hospital for 7-9 days and can now be provided with rapid assessments, faster diagnosis and commencement of treatment within the MAU. They are then referred to an inpatient team and transferred to an in-patient ward after approximately 24-48hrs with a documented plan of care to be followed and sent home safely within 5-7days. This patient group should account for approximately 50% of patients that are admitted to the MAU.

Figure 16: Average length of stay for medical patients (excluding surgical or procedural and planned or booked patients) in hospitals with a MAU compared to non MAU patients– Peer Group A1 (Principal Referral Hospitals) (Source: Francis Group data analysis 20.12.2012)

The average length of stay for medical patients (excluding surgical or procedural and planned or booked patients) with an ALOS of up to 7 days has decreased. ALOS was 3.63 days prior to the introduction of the MAUs and 3.55 days post introduction of the MAUs (figure 17).

Figure 17: Length of Stay Reduction for Medical Patients (excluding surgical or procedural and planned or booked patients) excluding zero and up to 7 days – Peer Group A1 (Principal Referral Hospitals) (Source: Francis Group data analysis 20.12.2012)
The average length of stay for medical patients (excluding surgical or procedural and planned or booked patients) with an ALOS of up to 7 days who were assessed in MAU was 3.6 days (figure 18) this is slightly higher than the overall ALOS for this group of 3.55 days (figure 17). It has to be noted that prior to the MAU the overall ALOS for this group was 3.63 days (figure 17) and for patients who are assessed in a MAU is 3.6 days (figure 18) so for a pre and post MAU comparison for this group we do see a reduction. This suggests that the introduction of MAU has not been the only factor in reducing ALOS for this group.

This analysis was conducted to understand the 1st stream of care provided by the MAU model i.e. for those patients that go home direct from the MAU. These patients have previously typically stayed in hospital for 3-5 days and can now be provided with rapid assessments, faster diagnosis and earlier treatments and sent home safely within 48 hours, with community care if needed. This patient group should account for approximately 50% of patients that are admitted to the MAU.

Figure 18: Length of Stay Reduction for Medical Patients (excluding surgical or procedural and planned or booked patients) using a MAU excluding zero and up to 7 days – Peer Group A1 (Principal Referral Hospitals) (Source: Francis Group data analysis 20.12.2012)

The average length of stay for Emergency Medical Unit (EMU) patients has reduced since the introduction of MAU and is significantly shorter (1 day) than for MAU patients. This suggests that MAU is being used to assess more complex conditions, whilst patients who are more likely to be discharged quickly are being assessed in EMU (figure 19).

Figure 19: Length of Stay Reduction for Emergency Medical Patients (EMU) since the introduction of the MAU – Peer Group A1 (Principal Referral Hospitals) excluding zero and up to 7 days (Source: Francis Group data analysis 20.12.2012)
Medical Assessment Unit Key Performance Indicator Analysis

MAU Key Performance Indicators are collected monthly and distributed to all key stakeholders of the NSW MAUs. Each data element collected for the MAU provides an overview of outcomes the MAU sets out to achieve (Table 2) or to provide an understanding of the internal workings for each MAU in order to manage and monitor processes (Table 3). These data elements have been selected, suggested and agreed to by MAU key stakeholders.

As previously stated in the MAU Model of Care regardless of the size of the unit or the funding received, Medical Assessment Units aim to provide a model of care for undifferentiated, complex, chronic, non-critical medical patients. The outcome that each unit sets out to achieve is determined through the four main outcome measures (Table 2).

Table 2: NSW Medical Assessment Unit Key Performance Indicators – ‘Performance Indicators’

<table>
<thead>
<tr>
<th>Description</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Average Total Hours in ED for all MAU patients</td>
<td>&lt; 4 hours (originally set at &lt;6hrs, now moved to &lt;4hrs with commencement of 4hr rule)</td>
</tr>
<tr>
<td>2 Average Length of Stay in the MAU (hours)</td>
<td>&lt; 48 hours</td>
</tr>
<tr>
<td>3 Average Length of Stay of MAU patients transferred to the ward (days)</td>
<td>&lt; 7 days</td>
</tr>
<tr>
<td>4 Unplanned Readmissions within 28 days of MAU discharge from MAU-home OR MAU-inpatient ward</td>
<td>&lt; 10%</td>
</tr>
</tbody>
</table>

MAU Process indicators are also collected to provide individual MAUs with an understanding of their internal workings in order to manage and monitor processes (Table 3).

Table 3: NSW Medical Assessment Unit Key Performance Indicators – ‘Process Indicators’

<table>
<thead>
<tr>
<th>Description</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Separations from MAU</td>
<td>Nil</td>
</tr>
<tr>
<td>6 Average Length of Stay of MAU patients aged 65yrs +</td>
<td>Nil</td>
</tr>
<tr>
<td>7 % patients transferred from the MAU within 48hrs</td>
<td>Nil</td>
</tr>
<tr>
<td>8 % patients discharged home from MAU</td>
<td>To maintain patient flow this needs to be approximately 30% or greater</td>
</tr>
<tr>
<td>9 % patients discharged home from MAU within 48hrs</td>
<td>Nil</td>
</tr>
<tr>
<td>10 % patients transferred to inpatient ward from MAU</td>
<td>To maintain patient flow this needs to be approximately 70% or less</td>
</tr>
<tr>
<td>11 % patient admitted directly to the MAU</td>
<td>Nil</td>
</tr>
<tr>
<td>12 Unplanned Readmissions within 28 days of MAU discharge from MAU-home</td>
<td>&lt; 10%</td>
</tr>
</tbody>
</table>
One objective of the MAU Model of Care is providing patients with rapid access to the Medical Assessment Unit, ‘Right Care, Right Time, Right Place, and Right Provider’ and is monitored with the outcome measure, **Average total hours of MAU patients in the ED**. The collection of this indicator allows for patients who by-pass the ED to have ‘0’hrs for ED length of stay. This was done due to data limitations of some ED systems, and the inability to collect ED Triage to MAU admissions as direct admissions. This indicator suggests that the more direct admissions the lower it should be. The results in Table 4 and Figure 20 show this number has increased slightly overtime and is also approximately 3 hours longer than the target of 4 hours. This would suggest that MAU patients are unable to rapidly access a MAU.

Table 4: NSW Medical Assessment Unit Key Performance Indicators Results (source: NSW MoH HIE extract)

<table>
<thead>
<tr>
<th>Key Performance Indicator</th>
<th>2008/09</th>
<th>2009/10</th>
<th>2010/11</th>
<th>2011/12</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Total hrs of MAU patients in ED</td>
<td>7.2</td>
<td>7.4</td>
<td>8.1</td>
<td>7.8</td>
<td>&lt; 4 hours (previously &lt;6 hrs)</td>
</tr>
<tr>
<td>ALOS in MAU (hours)</td>
<td>56.1</td>
<td>50.6</td>
<td>49.6</td>
<td>49.7</td>
<td>≤ 48 hours</td>
</tr>
<tr>
<td>ALOS MAU patients transferred to ward (days)</td>
<td>9.5</td>
<td>8.4</td>
<td>8.0</td>
<td>7.9</td>
<td>≤ 7 days</td>
</tr>
<tr>
<td>Readmission rate within 28 days of MAU-home or MAU-ward-home separations</td>
<td>13.2%</td>
<td>13.4%</td>
<td>11.4%</td>
<td>11.8%</td>
<td>≤ 10%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Process Indicators - distributed with KPIs</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Separations from MAU</td>
<td>29,049</td>
<td>41,615</td>
<td>49,240</td>
<td>49,982</td>
<td>Nil</td>
</tr>
<tr>
<td>ALOS in MAU aged 65+ (hours)</td>
<td>60.8</td>
<td>50.9</td>
<td>49.6</td>
<td>49.7</td>
<td>≤ 48 hours</td>
</tr>
<tr>
<td>% Trans from MAU within 48hrs</td>
<td>58.8%</td>
<td>62.5%</td>
<td>62.1%</td>
<td>62.3%</td>
<td>80% - 90% (guide only)</td>
</tr>
<tr>
<td>% Discharged home from MAU</td>
<td>46.6%</td>
<td>39.7%</td>
<td>38.3%</td>
<td>39.4%</td>
<td>50%</td>
</tr>
<tr>
<td>% Discharged home from MAU within 48hrs</td>
<td>57.7%</td>
<td>62.0%</td>
<td>63.4%</td>
<td>65.1%</td>
<td>80% - 90% (guide only)</td>
</tr>
<tr>
<td>% MAU patients transferred to ward</td>
<td>53.4%</td>
<td>60.3%</td>
<td>61.7%</td>
<td>60.6%</td>
<td>50%</td>
</tr>
<tr>
<td>% Admissions direct to MAU</td>
<td>15.5%</td>
<td>12.9%</td>
<td>12.2%</td>
<td>13.2%</td>
<td>Nil</td>
</tr>
<tr>
<td>Readmission rate of MAU-home ONLY separations</td>
<td>N/A</td>
<td>N/A</td>
<td>9.1%</td>
<td>10.1%</td>
<td>≤ 10%</td>
</tr>
</tbody>
</table>

One objective of the MAU Model of Care is providing patients with rapid access to the Medical Assessment Unit, ‘Right Care, Right Time, Right Place, and Right Provider’ and is monitored with the outcome measure, **Average total hours of MAU patients in the ED**. The collection of this indicator allows for patients who by-pass the ED to have ‘0’hrs for ED length of stay. This was done due to data limitations of some ED systems, and the inability to collect ED Triage to MAU admissions as direct admissions. This indicator suggests that the more direct admissions the lower it should be. The results in Table 4 and Figure 20 show this number has increased slightly overtime and is also approximately 3 hours longer than the target of 4 hours. This would suggest that MAU patients are unable to rapidly access a MAU.

Figure 20: Average total hours of MAU patients in ED (Source: NSW MoH Monthly MAU Summary via HIE data extract)
Another objective of the MAU Model of Care is to provide those patients in the MAU with access to rapid assessment, faster diagnosis and earlier treatment within 48 hours. This is monitored with the outcome measure, *Average length of stay in the MAU*. The results in Table 5 and Figure 21 show this number has decreased overtime and is also close to the target of 48 hours. This would suggest that MAU patients are provided with rapid assessment, faster diagnosis and earlier treatment.

**Figure 21: Average length of Stay in the MAU (Source: NSW MoH Monthly MAU Summary via HIE data extract)**

![Figure 21: Average length of Stay in the MAU](image)

Another objective of the MAU Model of Care is to provide those patients who require further inpatient care, a continued management plan based on their initial rapid assessment, faster diagnosis and earlier treatment. This is monitored with the outcome measure *Average length of stay for MAU patients transferred to an inpatient ward*. The results in Table 5 and Figure 22 show this number has decreased by 1.6 days since 2008/09 and is also close to the target of 7 days. This would suggest that MAU patients are provided with a continued management plan that recognises their initial assessment, diagnosis and treatment. This result also confirms the assumptions of figure 15 that the MAU has reduced length of stay for medical patients.

**Figure 22: Average length of Stay for MAU patients transferred to an inpatient ward (Source: NSW MoH Monthly MAU Summary via HIE data extract)**

![Figure 22: Average length of Stay for MAU patients transferred to an inpatient ward](image)
Another objective of the MAU Model of Care is to provide patients with safe and effective care; ongoing care or support is provided in their home environment if needed. This is monitored with the outcome measure **Readmission rate within 28 days of MAU-home or MAU-ward-home separations**. The results in Table 5 and Figure 23 show this number has decreased overtime and is also close to the target of 10%. This would suggest that MAU model of care provides patients with safe and effective care and ongoing care or support is provided in their home environment if needed.

Figure 23: Readmission Rate within 28 days of MAU-home or MAU-ward-home separations (Source: NSW MoH Monthly MAU Summary via HIE data extract)

The Medical Assessment Unit process indicators are reflective of patient flow through the MAU and this is the main reason why the MAU utilise these to manage and monitor processes.

The elderly complex medical patient is one of the primary patient groups assessed and treated in the MAU. The process measure to capture this patient group is **Average length of Stay in the MAU for aged 65 yrs +**. The results in Table 5 and Figure 24 show this number has decreased overtime and is also close to the target of 48hours. This would suggest that MAU model of care provides all patients (regardless of age and associated co-morbidities and complexity) with rapid assessment, faster diagnosis and earlier treatment.

Figure 24: Average length of Stay in the MAU for aged 65 yrs +(Source: NSW MoH Monthly MAU Summary via HIE data extract)
The MAU model of care through its 2 streams of care can generate its own internal patient flow by managing an approximate ratio of 50% patient’s home in 48hrs and 50% to an in-patient bed in 48hrs. The constant turnover of the 50% patient’s home generates internal capacity within the MAU and allows the ability to ‘pull’ patients from the ED. The process measure to capture these patient groups is % patients transferred from the MAU within 48 hours. The results in Table 5 and Figure 25 show this number has increased overtime and is not close to the 80-90% guide. This would suggest that patient flow out of the MAU is affected by exit block and could suggest that a higher proportion of patients exiting the MAU need an inpatient bed.

Figure 25: % patients transferred from the MAU within 48 hours (Source: NSW MoH Monthly MAU Summary via HIE data extract)

![Graph showing % Trans from MAU within 48hrs]

The 1st stream of care the MAU model of care is for those patients that go home direct from the MAU. These patients have previously typically stayed in hospital for 3-5 days and can now be provided with rapid assessments, faster diagnosis and earlier treatments and sent home safely within 48 hours, with community care if needed. The process measure to capture this patient group is % patients discharged home from the MAU. The results in Table 5 and Figure 26 show this number has decreased overtime and is off the 50% target. This would suggest that patient flow out of the MAU is being affected by exit block as a lower proportion of patients go directly home from the MAU.

Figure 26: % patients discharged home from the MAU (Source: NSW MoH Monthly MAU Summary via HIE data extract)

![Graph showing % Discharged home from MAU]
It is expected that those patients that are discharged home will be processed through the MAU within 48 hours. The process measure to capture this patient group is % patients discharged home from the MAU within 48 hours. The results in Table 5 and Figure 27 show this number has increased overtime, although it is off the 80-90% guide. This would suggest that patients discharged home from the MAU are sometimes staying slightly longer than the 48 hours. This is conclusive with the theory that the ‘AVERAGE length of stay is 48 hours’, as some patients will be home prior to 48 hours and some patients may need slightly longer and referral to an inpatient ward for another 24hrs post the MAU stay is deemed inappropriate.

Figure 27: % patients discharged home from the MAU in 48 hours (Source: NSW MoH Monthly MAU Summary via HIE data extract)

The 2nd stream of care the MAU model of care provides is for those patients that are transferred to a specialty ward from the MAU. These patients have typically stayed in hospital for 7-9 days and are now provided with rapid assessment, faster diagnosis and commencement of treatment within the MAU. They are then referred and transferred to an in-patient ward within 24-48 hrs, with a documented plan of care. The process measure to capture this patient group is % patients transferred to a specialty ward. The results in Table 5 and Figure 28 show this number has increased overtime and is off the 50% target. This would suggest that patient flow out of the MAU is being affected by exit block as a higher proportion of MAU patients require an in-patient bed.

Figure 28: % MAU patients transferred to a specialty ward (Source: NSW MoH Monthly MAU Summary via HIE data extract)
The MAU model of care describes a typical patient suitable for management in a MAU is the undifferentiated complex non-critical medical patient with co-morbidities. These patients are streamed from 3 main sources community (GPs, specialist rooms, ambulatory care or other identified community referrals), ED triage or within the ED. The process measure to capture the community patient group is \% direct admissions to the MAU. The results in Table 5 and Figure 28 show this number has deceased overtime. This would suggest that patient flow into the MAU from the community is not being utilised due to external and internal factors.

It is expected that those patients from Stream One who are discharged directly from the MAU are provided with safe and effective care. This is a subset of the overall MAU readmission rate which is reflective of both streams of the MAU model of Care. It should be noted that the less patients that are discharged home from the MAU directly impacts this indicator, due to a decreased denominator. The process measure to capture this patient group is \% Readmission within 28 days of MAU to Home ONLY separations. The results in Table 5 and Figure 30 show this number has remained steady and is on target. This would suggest that 1st stream provided by the MAU model of care provides is safe and effective and ongoing care or support is provided in their home environment if needed.
Medical Assessment Unit Cost Benefit Analysis

Funding for Medical Assessment Units has previously been provided through both State and Commonwealth initiatives in the form of acute care bed funding. The average yearly cost of an acute care bed was estimated at approximately $300,000 (inclusive of salaries and wages, goods and services, repairs, maintenance, renewals (RMR) and overheads).

329 acute care beds are funded for the MAU model of care across NSW. The estimated yearly running costs of these MAU acute care beds are $98,700,000. For the purpose of the cost benefit analysis the benefit of the MAUs was quantified in terms of potential bed day savings and also conversion of bed day savings into a dollar amount, as MAU efficiency is determined by the benefit it provides to the system. It needs to be noted that efficiencies produced by the MAUs generate capacity for the increasing number of patients that are arriving to our hospitals.

Discussion of the Cost Benefit Analysis and linkages to Recommendations is available in the Discussion Section.

Table 5: NSW Ministry of Health (2011/12) Efficiency and Revenue Plan, Clinical Services Efficiency Strategy E-2A: Medical Assessment Units

<table>
<thead>
<tr>
<th>Strategy Name: Medical Assessment Units (MAUs)</th>
<th>Ref:</th>
<th>E-2A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finance Plan: Efficiency</td>
<td>Category: Clinical Services</td>
<td></td>
</tr>
</tbody>
</table>

Overview:
MAUs were established in NSW in 2008 to deliver better care for patients with complex and chronic conditions and as an alternative to treatment in the Emergency Department (ED). Staffed by doctors, nurses and allied health staff skilled in caring for patients with complex and chronic conditions, MAUs are designed to conduct faster assessment and diagnosis, and provide earlier treatment.

Implementation approach:
MAUs in NSW have been established in 29 hospitals since January 2008 with 2 more units to be opened. Once all the MAUs are operational they will be funded with an annual investment of over $100 million.

Impact on service delivery:
Once MAU staff assess, diagnose and/or provide treatment, they arrange for the patient to either safely return home or transfer to an inpatient ward within 48 hours. If patients require ongoing care or support in their home environment this is arranged while they are in the MAU.

Valuation methodology:
2011-12 measurement used the reduction in ALOS of MAU patients that were transferred to a ward and the increasing quantity of services provided by MAUs. MAU funding is not deemed to be extra funding to system as they are a choice of bed type rather than extra beds.

a) With no extra volume, the saving is the reduced ALOS compared to the prior year:

\[ '10-11 volume' \times ('11-12 ALOS' - '10-11 ALOS') \times 'Cost per bed day' \]

b) Extra volume this year produces savings compared to implementation year:

\[ ('11-12 volume' - '10-11 volume') \times ('11-12 ALOS' - '08-09 ALOS') \times 'Cost per bed day' \]

Efficiency benefit = a) + b)

Risks:
This measurement uses reliable data from MAU reporting, but may be subject to patient selection. A more effective measurement would be reduction in ALOS for patients in MAUs compared to non-MAU treatment, however patient selection means this counterfactual has not been possible to quantify.

Valuation Methodology Results:

Table 6: MAU Data and Costings (source: NSW MoH Monthly MAU Summary Reports, MoH Finance bed costings and The Francis group DRG data analysis)

<table>
<thead>
<tr>
<th>Medical Assessment Units (MAU)</th>
<th>2008/09</th>
<th>2009/10</th>
<th>2010/11</th>
<th>2011/12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost per bed day</td>
<td>$753</td>
<td>$771</td>
<td>$822</td>
<td>$855</td>
</tr>
<tr>
<td>ALOS MAU patients transferred to ward (days)</td>
<td>9.5</td>
<td>8.4</td>
<td>8.0</td>
<td>7.9</td>
</tr>
<tr>
<td>Separations from MAU</td>
<td>29,049</td>
<td>41,615</td>
<td>49,240</td>
<td>49,982</td>
</tr>
<tr>
<td>ALOS for patients with a medical DRG (days) – pre MAU</td>
<td>7.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALOS for patients with a medical DRG and had proportion of treatment in a MAU(days) – post MAU</td>
<td>6.6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The calculation of 2011-12 MAU efficiency benefit utilises the reduction in ALOS of MAU patients that were transferred to a ward and the increasing quantity of services provided by MAUs (see below). For 2011/12 the Medical Assessment Units produced an efficiency of 6,111 bed days or $5,225,076.

a) With no extra volume, the saving is the reduced ALOS compared to the prior year:

\[
\text{bed day savings} = [\text{‘10-11 volume’} \times (\text{‘10-11 ALOS’} - \text{‘11-12 ALOS’})] \times \text{‘Cost per bed day’}
\]

\[
= [49,240 \times (8.0 – 7.9)] \times $855
\]

\[
= 49,240 \times 0.1 \times $855
\]

\[
= 4,924 \text{ bed day savings or } $4,210,020
\]

b) Extra volume this year produces savings compared to implementation year:

\[
\text{bed day savings} = [\text{‘11-12 volume’} - \text{‘10-11 volume’}] \times (\text{‘08-09 ALOS’} - \text{‘11-12 ALOS’}) \times \text{‘Cost per bed day’}
\]

\[
= [(49,982 – 49,240) \times (9.5 – 7.9)] \times $855
\]

\[
= 1,187 \text{ bed day savings or } $1,015,056
\]

c) Efficiency benefit = a) + b)

\[
= 4,924 + 1,187 \text{ OR } $4,210,020 + $1,015,056
\]

\[
= 6,111 \text{ bed day savings OR } $5,225,076
\]

The calculation of initial MAU efficiency benefit utilises reduction in ALOS for patients in MAUs compared to non-MAU treatment, this was produced comparing ALOS for patients with a medical DRG prior to the MAUs being implemented vs. ALOS for patients with a medical DRG and had a proportion of their treatment in a MAU after MAU implementation (see below). The initial efficiencies produced by the MAU were 17,429 bed days or $13,124,338.

Reduction in ALOS for patients in MAU compared to Non-MAU Patients

d) Reduced ALOS compared to the prior year:

\[
\text{bed day savings} = [\text{‘08-09 MAU volume’} \times (\text{‘pre MAU ALOS’} - \text{‘post MAU ALOS’})] \times \text{‘Cost per bed day’}
\]

\[
= [29,049 \times (7.2 – 6.6)] \times $753
\]

\[
= [29,049 \times 0.6] \times $753
\]

\[
= 17,429 \text{ bed day savings OR } $13,124,338
\]
Survey of Providers

Of the 267 staff sent the provider survey for completion, a total of 270 responses (153 completed responses and 117 partial responses) were received with a range of facilities and MAU stakeholders completing the 47 questions (not all questions were a requirement for all participants). The median response time of the survey was 26 mins, 51 sec. The number of respondents varied greatly between hospitals with a range from one hospital respondent to 25 in a single hospital.

Discussion of the Survey of Providers and linkages to Recommendations is available in the Discussion Section.

Demographics

The responses received (n=270) for the provider survey varies greatly between hospitals with a range from 0 to 25 in single hospitals with a mean of 9.6 respondents (refer to figure 31 below).

Figure 31: Survey respondents by Hospital (Source: NSW MoH MAU Evaluation Provider Survey)

The respondents to the survey, by professional group, ranges greatly from Medical Management (2%) to Nursing Clinical (35%) with a mean of 14% (refer to figure 32 below).

Figure 32: Survey respondents by Professional Grouping (Source: NSW MoH MAU Evaluation Provider Survey)
**Medical Staffing**

Medical staffing that was available in-hours with admitting rights to the MAU, ranges from the physician of the month (1%) to a physician of the day (34%) with a mean of 17% (refer to figure 33 below).

**Figure 33: Dedicated medical staffing available in-hours (Source: NSW MoH MAU Evaluation Provider Survey)**

![Admitting Medical Officer Availability for MAU in hours (n=128)](image)

Dedicated Medical staffing that was available in-hours to support the MAU, ranges from a hospitalist (3%) to a staff specialist (24%) with a mean of 14% (refer to figure 34 below).

**Figure 34: Dedicated medical staffing available in-hours (Source: NSW MoH MAU Evaluation Provider Survey)**

![Medical Staffing Available in Hours (n=194)](image)
Medical staffing that was available after-hours with admitting rights to the MAU, ranges from being dedicated to the MAU (13%) to a physician of the day (38%) with a mean of 17% (refer to figure 35 below).

Figure 35: Dedicated medical staffing available in-hours (Source: NSW MoH MAU Evaluation Provider Survey)

Dedicated Medical staffing that was available after-hours to support the MAU, ranges from an advanced trainee (7%) to a Registrar/Basic Trainee (40%) with a mean of 14% (refer to figure 36 below). This is in line with the NHS Survey that showed that on-call consultant presence is significantly less overnight and at weekends than weekdays.

Figure 36: Dedicated medical staffing available in-hours (Source: NSW MoH MAU Evaluation Provider Survey)

Nursing Staffing

The dedicated nursing staff that worked in the MAUs, ranges from trainee enrolled nurses (4%) to a Registered Nurse (88%) with a mean of 35% (refer to figure 37 below).

Figure 37: Dedicated nursing staff for the MAU (Source: NSW MoH MAU Evaluation Provider Survey)

Allied Health Staffing

The Allied Health staffing for the MAUs on weekdays in NSW ranges from being a service that is solely dedicated to working in the MAU, to being a shared service that operates across multiple hospital departments. Social Work (23%), Occupational Therapy (24%) and Physiotherapy (25%) have the highest percentage of staffing dedicated to the MAUs. Pharmacy (20%), Speech Therapy (22%) and Dietetics (25%) have the highest percentage of staffing as a shared service (refer to figure 38 below).

Figure 38: Dedicated MAU allied health staff v’s shared service for allied health staff in MAU on weekdays (Source: NSW MoH MAU Evaluation Provider Survey)
The Allied Health staffing for the MAUs on weekends in NSW ranges from being a service that is solely dedicated to working in the MAU, to being a shared service that operates across multiple hospital departments. Social Work (27%), Physiotherapy (29%) and Occupational Therapy (38%) have the highest percentage of staffing dedicated to the MAUs on weekends. Social Work (20%) and Physiotherapy (32%) have the highest percentage of staffing as a shared service (refer to figure 39 below).

Figure 39: Dedicated MAU allied health staff v’s shared service for allied health staff in MAU on weekdays (Source: NSW MoH MAU Evaluation Provider Survey)

General Staffing

The Medical Assessment Units have experienced issues in recruiting to certain positions since the majority opened in 2008. Allied health (40%) and Medical (40%) staffing are reported as having the most difficulty in recruiting to vacant positions (refer to figure 40 below).

Figure 40: Recruitment issues in the MAU (Source: NSW MoH MAU Evaluation Provider Survey)
The Medical Assessment Units have improved staffing levels since the majority opened in 2008. 43% have said that this has lead to improve patient outcomes whilst 58% said no changes were able to be identified (refer to figure 41 below).

Figure 41: Staffing adjustments that have lead to improved patient outcomes (Source: NSW MoH MAU Evaluation Provider Survey)

Governance

Governance of the Medical Assessment Units is continually reported as a critical success factor. Monthly governance meetings (42%) were reported as the most popular; although 19% of MAU staff reported that they do not have any governance meetings (refer to figure 42 below).

Figure 42: Frequency of MAU Governance Meetings (Source: NSW MoH MAU Evaluation Provider Survey)
Priority access to services allows Medical Assessment Units to provide rapid patient assessments, obtain faster diagnosis and provide earlier access to treatment. Diagnostics (40%) was reported as the highest for priority access (refer to figure 43 below).

Figure 43: Priority Access to Services for the MAU (Source: NSW MoH MAU Evaluation Provider Survey)

Business rules and escalation plans for Medical Assessment Units are designed to provide operational guidance. 60% MAU reported they had Business Rules and only 40% reported they had escalation plans within their business rules (refer to figure 44 below).

Figure 44: MAU Business Rules and Escalation Plan (Source: NSW MoH MAU Evaluation Provider Survey)
Of the 60% of Medical Assessment Units that had Business rules and the 40% that had escalation plans within their Business Rules, the majority of these were adhered to in-hours and in an ad-hoc manner and after hours it was reported that they were only minimally followed (refer to figure 45 below).

Figure 45: Adherence to MAU Business Rules and Escalation Plans (Source: NSW MoH MAU Evaluation Provider Survey)

Of the 40% of Medical Assessment Units that had escalation plans within their Business Rules, in-patient bed delays (50%) non-MAU patients in MAU beds (62%) and 48hr patient breach (77%) were reported as the majority of processes that were contained in the escalation plans (refer to figure 46 below).

Figure 46: Processes in the MAU Escalation Plan (Source: NSW MoH MAU Evaluation Provider Survey)
For Medical Assessment Units to be able to provide an effective service and impact the whole of hospital, the Model of Care needs to be understood widely. It was reported that only some (66%) understood the MAU model of care across the hospitals (refer to figure 47 below).

Figure 47: Understanding of the MAU Model of Care across the Hospital (Source: NSW MoH MAU Evaluation Provider Survey)

![Understanding of the MAU Model of Care across the Hospital](image)

**MAU Model of Care**

66% of MAU staff identified that they had sufficient beds. Of the staff that said No they didn’t have enough beds the major theme in the comments was around being access block (refer to figure 48 below).

Figure 48: Sufficient MAU beds (Source: NSW MoH MAU Evaluation Provider Survey)

![Sufficient MAU Beds](image)
The MAU Model of Care provides an alternative to treatment in the Emergency Department for undifferentiated, complex, chronic, non-critical medical patients, with one streaming method into the MAU for patients within the ED. Suitability of MAU patients is usually determined within the first hour. One of the tools available for MAUs to identify patients early within the Emergency Department is to have access to the Emergency Department patient management system; this allows the MAU to identify and screen for any suitable patients. Staff were asked if they had access to this system, the majority (53%) said no (27%), or they did not know (26%). Although 47% reported that they did use the system (refer to figure 49 below).

Figure 49: MAU access to ED Patient Management System (Source: NSW MoH MAU Evaluation Provider Survey)

One of the innovative ways MAUs have assisted EDs, is to self identify MAU appropriate patients. Staff were asked if they actually did this and the majority (80%) of the staff reported they did this either some of the time, most of the time or all of the time (refer to figure 50 below).

Figure 50: MAU staff going to ED to identify/review/’pull’ patients to the MAU (Source: NSW MoH MAU Evaluation Provider Survey)
Patient Inclusions and exclusion criteria have been identified as being used by 85% of MAUs. The majority of staff surveyed reported that they were adhered to in-hours (75%), although out-of-hours they were only minimally referred to (25%) (refer to figure 51 below).

The MAU Model of Care provides patients with rapid assessment, faster diagnosis and earlier treatment, as MAUs are staffed by an experienced and comprehensive multidisciplinary team. The MAU staff surveyed were asked about targets and timeframes for patients to be seen within. They reported a mixture of results depending on the clinician. The majority of Doctors completed clinical assessments of patients within 2hrs (37%) or had no timeframe (28%) at all; the majority of nursing staff completed clinical assessments of patients within 2hours (56%), although 25% reported no time frame at all; and the majority of Allied Health staff reported they had no time frame (30%) at all, although 21% reported that they completed initial assessments within 4 hours (refer to figure 52 below).

The MAU Model of Care provides patients, once assessed, their condition diagnosed and treatment given, the ability to return to their home environment within 48 hours with community services provided as necessary. If further treatment is required, they will be referred to an inpatient team and transferred to a specialty ward. The majority of staff reported that the 48 hour length of stay is the preferred model (87%), although 13% reported that the 72 hour timeframe was utilised (refer to figure 53 below).
The MAU Model of Care provides an alternative to treatment from the Emergency Department for undifferentiated, complex, chronic, non-critical medical patients. These patients are not critically ill but have complicated conditions that take time to assess and require a range of medical expertise to diagnose and treat. The multidisciplinary ward/white board rounds enable the MAU staff to conduct this through collaborative assessment and case management plans for each patient in the MAU. The majority of staff reported that they conduct daily multidisciplinary ward or whiteboard rounds (61%), a minority reported twice daily (12%) and a minority also reported weekdays only (13%) and none at all (11%) (refer to figure 54 below).

To improve the MAU Model of Care provided in hospitals, staff were asked if they surveyed staff or patients and if the outcomes of this produced any changes within the MAUs. The majority of staff surveyed (56%) said they conducted either staff or patient surveys and 19% of staff said that changes were made as a result of staff or patient surveys (refer to figure 55 below).
The MAU model of Care provides entry for patients streaming from the community, ED triage direct to MAU and from within the ED after a very short period of time. It also provides 2 streams of care for patients exiting the MAU; Stream One is for those patients that go home direct from the MAU and Stream Two is for those patients that are transferred to a specialty ward from the MAU. Staff reported that for the majority of patients entering the MAU a bed was available most of the time (62%). For the majority of patients exiting the MAU to their home environment staff reported that community health (49%) and non clinical community (46%) services were available most of the time. For the majority of patients exiting the MAU to an in-patient bed (51%), staff reported that these were available only some of the time (refer to figure 56 below).

Figure 55: Surveys conducted in the MAU (Source: NSW MoH MAU Evaluation Provider Survey)

Figure 56: Frequency of Services provided for MAU patients (Source: NSW MoH MAU Evaluation Provider Survey)
MAU Key Performance Indicators

Regardless of the size of the unit or the funding received, Medical Assessment Units aim to provide a model of care for undifferentiated, complex, chronic, non-critical medical patients. The outcome that each unit sets out to achieve is determined through four main outcome measures. Eight process measures are also provided to give MAU staff an understanding of their internal workings in order to manage and monitor processes. When asked about the key performance indicators the majority of staff utilised the state-wide KPIs (94%), did not recommend other indicators (76%), did not utilise other KPIs (77%) and thought that the outcomes of the MAU were reflected in the KPIs (63%)(refer to figure 57 below).

Figure 57: MAU key Performance Indicators (Source: NSW MoH MAU Evaluation Provider Survey)

![MAU Key Performance Indicators](image)

Strongest Feature of the MAUs

The MAU staff were asked to comment on what they thought the strongest feature of their MAU was. These comments were then themed according to the response given. The majority of responses were comments about the positive internal relationships within the MAU (53%) mostly reflecting the positive aspects of the MAU team (refer to figure 58 below).

Figure 58: Strongest Feature of the MAUs (Source: NSW MoH MAU Evaluation Provider Survey)

![Strongest Features of the MAU](image)
Weakest Feature of the MAUs

The MAU staff were asked to comment on what they thought the weakest feature of their MAU was. These comments were then themed according to the response given. The majority of responses were comments about issues with patient flow (34%) mostly reflecting the negative experiences of bed block. The other response that related highly was issues around workforce (28%) mostly reflecting the lack of medical and allied health workforce and also the lack of a nursing education positions (refer to figure 59 below).

Figure 59: Weakest Feature of the MAUs (Source: NSW MoH MAU Evaluation Provider Survey)

MAU patient receive that no other patients receive

The MAU staff were asked to comment on what they thought MAU patients receive that no other patients receive. These comments were then themed according to the response given. The majority of responses were comments about early patient intervention (55%) mostly reflecting the positive experiences of rapid assessment, faster diagnosis and earlier treatment provided by MAU staff to MAU patients. The other responses reflected the high quality of care (33%) related to the senior decision making from the multidisciplinary team and the attentive MAU workforce (12%) related to the senior multidisciplinary team providing patient care (refer to figure 59 below).

Figure 59: Weakest Feature of the MAUs (Source: NSW MoH MAU Evaluation Provider Survey)
## Survey of Patients

Baseline patient satisfaction information was sought through extraction from the Annual NSW Health Patient Survey. Results were key word searched for any correlation between responses received from any medical assessment unit patient. Minimal information was given via this method and has been excluded from inclusion in this evaluation.

The method that produced a representative patient cohort is through use of the Patient Experience Trackers (PETs) - an electronic key pad containing 5 questions on the following domains: confidence, planned treatment, ease of talking about concerns, preparation for discharge and overall care. The patient was able to respond on a Likert Scale and a total score obtainable was out of 100 (refer to table 7 below).

The domains of the NSW MAU Patient Survey are directly linked to questions about the effectiveness of the NSW MAU model of Care. The NSW MAU Model of Care states:

- ‘MAUs are staffed by an experienced and comprehensive multidisciplinary team, who is able to conduct rapid patient assessments, reach faster diagnosis and provide earlier treatment. Once a patient is assessed, their condition diagnosed and treatment provided, they will be able to return to home within 48 hours with community services provided as necessary. If further treatment is required, they will be referred to an inpatient team and transferred to a specialty ward’

- ‘The difference between a MAU and an inpatient unit is that the MAUs feature a dedicated multidisciplinary team led by consultants, who should be available on a daily basis (if not twice daily) to conduct rounds with the multidisciplinary team and provide timely access to treatment and management decisions’.

- 'The MAU Model of Care provides patients with safe and effective care; ongoing care or support is provided in their home environment if needed’

The NSW MAU Patient survey questions are related to:

- **Confidence** in staff ‘MAUs are staffed by an experienced and comprehensive multidisciplinary team, who is able to conduct rapid patient assessments, reach faster diagnosis and provide earlier treatment’

- **Planned treatment**, ‘Once a patient is assessed, their condition diagnosed and treatment provided, they will be able to return to home within 48 hours with community services provided as necessary’

- **Patient involved in their care** (ease of talking about concerns, preparation for discharge) ‘The difference between a MAU and an inpatient unit is that the MAUs feature a dedicated multidisciplinary team led by consultants, who should be available on a daily basis (if not twice daily) to conduct rounds with the multidisciplinary team and provide timely access to treatment and management decisions’

- **Overall care** ‘The MAU Model of Care provides patients with safe and effective care’

The aim of was for every patient to complete the survey prior to discharge from the MAU, although patients with a cognitive impairment were excluded from the survey. A total of 1184 respondents have completed the survey across the 15 MAUs (refer to figure 60 below).

Discussion of the Survey of Patients and linkages to Recommendations is available in the Discussion Section.
Table 7: Patient survey questions and results.

<table>
<thead>
<tr>
<th>Domain</th>
<th>Survey question</th>
<th>Average score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Confidence</td>
<td>Did you have confidence in the staff treating you during your stay?</td>
<td>93/100</td>
</tr>
<tr>
<td>2 Planned treatment</td>
<td>During your care, did you get enough information about your treatment?</td>
<td>88/100</td>
</tr>
<tr>
<td>3 Ease of talking about</td>
<td>It was easy to find someone to talk to about my concerns</td>
<td>86/100</td>
</tr>
<tr>
<td>4 Preparation for</td>
<td>Were you or your family given enough time to prepare for discharge?</td>
<td>82/100</td>
</tr>
<tr>
<td>5 Overall care</td>
<td>Overall, how would you rate the care you received during your stay?</td>
<td>88/100</td>
</tr>
</tbody>
</table>

Figure 60: Patient Experience Tracker survey scores out of 100 for 5 domains

The calculation of the patient survey scores was the value of the answer selected (i.e. Question 1: Always = 100% - refer to Table 8) multiplied by the weighting for the question (i.e. Question 1: weighting = 20% - refer to Table 8), therefore if a patient answered question 1 with ALWAYS the weighed question score is 20% (i.e. 100% x 20% = 20%).

Table 8: Patient survey questions and weightings

<table>
<thead>
<tr>
<th>Leading Statement on Feedback Pad:</th>
<th>Please take a moment to provide us with your feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Question Description</td>
<td>Short Question</td>
</tr>
<tr>
<td>Did you have confidence in the</td>
<td>Confidence</td>
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<tr>
<td>staff treating you during your</td>
<td></td>
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<tr>
<td>stay?</td>
<td></td>
</tr>
<tr>
<td>During your care, did you get</td>
<td>Planned treatment</td>
</tr>
<tr>
<td>enough information about your</td>
<td></td>
</tr>
<tr>
<td>treatment?</td>
<td></td>
</tr>
<tr>
<td>It was easy to find someone to</td>
<td>Ease of talking about concerns</td>
</tr>
<tr>
<td>talk to about my concerns?</td>
<td></td>
</tr>
<tr>
<td>Were you or your family given</td>
<td>Preparation for discharge</td>
</tr>
<tr>
<td>enough time to prepare for</td>
<td></td>
</tr>
<tr>
<td>discharge?</td>
<td></td>
</tr>
<tr>
<td>Overall, how would you rate the</td>
<td>Overall Care</td>
</tr>
<tr>
<td>care you received during your</td>
<td></td>
</tr>
<tr>
<td>stay?</td>
<td></td>
</tr>
</tbody>
</table>
The 15 MAUs that participated in the patient survey conducted the survey over a 6 week period. A summary of the results is presented through weekly trends (refer to figure 61), day of the week (refer to figure 62) and hour of the day (refer to figure 63). The first week of the patient survey had the highest volume of patients answering the questions (n=264) and the final week of the survey had the lowest volume of patients answering the questions (n=111).

Figure 61: Patient Experience Tracker, Weekly Survey Results over 5 domains (source: CFS Australasia MAU Patient Survey Summary Report)

![Patient Experience Tracker, Weekly Survey Results over 5 domains](source: CFS Australasia MAU Patient Survey Summary Report)

Figure 62: Patient Experience Tracker, Summary by Day of the Week (source: CFS Australasia MAU Patient Survey Summary Report)

![Patient Experience Tracker, Summary by Day of the Week](source: CFS Australasia MAU Patient Survey Summary Report)

Figure 63: Patient Experience Tracker, Summary by hour of the day (source: CFS Australasia MAU Patient Survey Summary Report)

![Patient Experience Tracker, Summary by hour of the day](source: CFS Australasia MAU Patient Survey Summary Report)
Observational Study

The observational study was conducted in 15 MAUs (refer to table 2) by an expert review team who set out to determine if the MAUs are aligned to the original MAU concept from NSW Department of Health. Three questions were asked at each interview with MAU key stakeholders (MAU nursing, medical and allied health staff, hospital executive, patient flow team and the ED team):

1. What do you think are the critical success factors for operating a MAU?
2. What improvements can be made to your model?
3. What is the ideal MAU model?

Data from the observation study was collated according to themes.

Discussion of the Observation Study and linkages to Recommendations is available in the Discussion Section.

Governance

■ Strong governance from medical, nursing, allied health and the hospital executive was seen as critical.
■ General medicine/acute medicine was continually mentioned as the specialty that would provide the best practice medical governance model as they covered all appropriate patients that went to the MAU and weren’t limited by age or medical sub-specialty. It was noted that General Medicine as a specialty in NSW is limited.
■ Internal MAU communication was also seen as critical to promote strong governance.
■ Regular governance meetings all key stakeholders (medical, nursing, executive, patient flow, ED, MAU) was seen as critical to continually improve the model.
  – A forum for understanding MAU issues
  – Have the ear of the executive
  – Actions and outcomes of meetings highlights the desire of the organisation to make the MAU model work
  – First priority in the mornings is to clear the MAU for ED patients to access
  – Entrenchment of the ‘48hr sorting model’ – even though outliers are placed on the MAU the model still applies to all patients
  – Executive on call is the only person that can open beds in the hospital
  – Willingness to change the model to suit the changing environment
    – i.e. ED MAU development
    – i.e. Quarantining of interns from 930-1030am for discharges

Strong Leadership

■ Strong leaders are seen as the key drivers and motivator for success of the MAU mode
■ Strong joint leadership between medical, nursing and allied health is seen as a key success factor
■ Senior decision makers at the beginning of a patient’s arrival to hospital were critical in ensuring faster, safer and better care.

Dedicated staffing to the Model

■ Clinical champions were seen as critical components for the success of a MAU i.e. key staff to drive the MAU model and motivate others and be willing to change and adapt the model to the growing needs of the hospital
■ Staff that understand the internal hospital/MAU culture
■ Staff that function as a team and drive the model
■ Consultant led model by a Senior dedicated physician who accepts and cares for MAU patients
■ Staff accept that the MAU model is a necessary strategy for addressing the growing needs of the hospital

■ Dedicated staffing from medical, nursing and allied health that create a team approach to all patient care coordination needs is seen as critical

■ Dedicated registrar/fellow/staff specialist to MAU unit (onsite and available everyday) to be able to accept patients direct from ED/triage/ambulance trolley

■ Dedicated CNC/Clinical Coordinator/Supernumerary nursing position to assist in maintaining patient flow from ED through to in-patient wards.

■ Dedicated allied health staff to conduct patient assessments within 4 hours of patients arrival and prevent patient deconditioning. Ability to conduct joint assessments— as assessing also doing discharge planning together

■ Dedicated nurse educator staffing (i.e. CNE) to provide skills development and training i.e. aged care nursing skills to acute assessment skills

■ Support Staff were seen as critical to the MAU model …‘a few individuals can lead to dysfunction in the model that is access to porters or cleaners’...

■ Access to dedicated porters, cleaners and ward assistant facilitates continual patient flow

### Priority Access to Services

■ Same priority as ED in accessing diagnostics, to minimise delays. Patients generally remain in the ED to access diagnostics if MAU doesn’t have the same priority. Priority access is seen as critical to facilitate quicker patient turnaround time and improve patient flow

■ Rapid access to senior medical clinicians is seen as critical. Especially in MAUs utilising a VMO workforce and accessing them to conduct MAU patient assessments as soon as the patient arrives was often described as inconsistent.

■ Priority access to sub acute services. Patient flow assisted by the ability to decanting patients. Provides a continuation of care as the same geriatricians service sub acute and acute care

### Direct Admissions

■ Ambulatory care direct admissions for ED avoidance for patients that would have otherwise been in the ED. Patients cared for in the ambulatory care setting rather than just admitting them. Ability to flow patients between ambulatory care and the MAU

■ Direct linkages with community for inbound and outbound patients i.e. heart failure clinic, nursing homes and flying squad. This facilitates direct admissions from the community and faster discharge processes.

### Relationships

■ Internal relationships within MAU and external relationships developed with clinicians and management outside the MAU aids communication and builds trust and respect among team members and the rest of the hospital.

■ Mutual trust and creditability among medical, nursing and allied health MAU staff facilitates good relations within MAU team.

■ Relationships with the ED and a close proximity to the ED is seen as critical

■ MAU doesn’t ‘work in isolation’. Relationships with ED, wards, diagnostic services and community facilitate patient flow.

■ Trust and creditability between MAU and ED to enable patients to be ‘pulled’ from triage/ambulance trolleys - MAU staff visible in ED serves as a constant reminder for ED staff and improves communication and relationships

■ Trust and creditability between MAU and in-patient teams to accept patients immediately from MAU

■ Trust and creditability between MAU and patient flow managers that enables the MAU to quickly manage their own patient flows (i.e. ED-MAU-Ward)

■ Strong community linkages and relationships were seen as critical to enabling rapid access into the MAU and exiting the MAU

■ ‘Desire to make it work’

■ ‘Every MAU patient identified saves 2 hrs of ED time’ ED Staff Specialist

### Twice Daily Multidisciplinary Meeting

■ Representative of all teams (medical, Nursing, Allied Health)

■ Planning is seen as critical to patient movements with a strong focus on discharge planning
Team approach that results in well coordinated care is seen as a critical for success
■ All opinions respected equally
■ A strong collegial spirit is displayed
■ Multi-disciplinary ward round (not just white board round) in the morning and Medical staff ward round in the afternoon
■ Multidisciplinary team ward round in the morning is seen as critical for discharge planning and care planning
■ The Afternoon ward round is seen as critical in identifying further discharges
■ A few sites expressed they originally commenced with once daily multidisciplinary meetings, although moved to twice daily and has recommenced this as critical to improving patient flow and coordination

**Multidisciplinary Approach to Patient Care**

■ Multidisciplinary meeting critical for discharge planning and care planning
■ Multidisciplinary team seen as critical for providing a thorough assessment of the patient
■ The ED registrars that rotate through the MAU, anecdotal feedback is that the multidisciplinary approach to patient care attracts these registrars and they request rotations in the MAU
■ Anecdotally stated that when they are able to provide a multidisciplinary assessment for patients it facilitates quicker patient turnaround time and improved patient flow
■ The respect and collaboration between Allied Health, Nursing and Medical teams is also seen as critical
■ Multidisciplinary team critical for discharge planning and care planning
■ Senior doctor seeing patients from day 1 is seen as a critical part of this approach to care
■ The constant communication this model promotes is also seen as critical i.e. constant communication and updating of patient care requirements throughout the day not just at the team meetings

**Internal Management of Patient Flow**

■ The ability to internally manage the flow of patients in and out of the MAU was seen as critical.
■ Bed availability was seen as critical to be able to ‘pull’ patients from ED
■ Ability to escalate patient flow issues to hospital patient flow team
■ MAU can generate its own internal patient flow by managing an approximate ratio of 50% patient’s home in 48hrs and 50% to an in-patient bed in 48hrs. The constant turnover of the 50% patients home, generates capacity to be able to ‘pull’ patient from the ED. The overall benefits that have been described when utilising this model was the reduction in overall outliers in the MAU as proactively selecting patients for MAU beds. And the benefit mentioned by several ED staff specialists …‘Every MAU patient saves ED 2 hours’
■ Coordination with hospital patient flow staff, although proactive management by the MAU gives the ability to act faster and support the entire hospital’s patient flow
■ Anecdotally internal patient flow management that they are able to get the right patients in the right ward the first time. This in turn reduces outliers and improves patient flow

**Innovative models**

■ *Flow and Capacity created between ED MAU and MAU ward* - 16 MAU beds are flexed up and down by 4 for the ED MAU. 4 open in the ED MAU at 8am and 4 beds close on the ward, 4 beds in the ED MAU close at 10pm and 4 open on the MAU
■ *Virtual community beds* - 5 community health ‘virtual beds’ used for MAU patients needing additional services in the home. Patients are able to access this service for 4 weeks. Subcontracting of nursing and allied health services
■ *Flexible MAU Model* - Ability to adapt model to the changing hospital needs i.e. MAU servicing acutely unwell patients, Staff will see medical patients as soon as possible and commence treatment, Senior staff at front end, for example Medical Advanced Trainee in ED, Addition of 2 procedural rooms (a 24hr model of care) outside of the MAU bed base that MAUs have the expertise to care for. This was to enable patients that otherwise receive care within the ED or in-patient wards to receive it in these procedural rooms (ascities taps, iron infusions, pre scope patients requiring bowel prep)
■ *Allied Health Rapid Response Model/Quick Response Program* - Dedicated Social Work, Occupational Therapy and Physiotherapy 7 days per week. The model services both ED and the MAU, with the view to achieve patient assessments within 4hrs of a patient’s arrival/referral. Follow up is provided at home the next day post discharge if needed. Anecdotally
feel this has decreased the need for keeping patients in ‘just one more day’ Post discharge follow up in the home by allied health. Seen as critical in assisting with quicker discharge rather than waiting ‘just one more day’

- **Integrated Aged Care/Community Model** - An integrated management approach across aged care and the community was seen as critical in managing the flow of patients back to their home environments within tight timeframes. Innovative approaches used to flow patients back to the community i.e. negotiated with nursing homes to discharge patients back on the weekends and A Flying Squad is being established to assist in managing nursing home patients in the nursing home i.e. Registrar and aged care physician go to the nursing home if an ambulance is called for a patient

- ‘Pulling’ Patient from ED (hunter gather model) - Strengthens and builds a relationship with ED, provides ED with a visual reminder of the MAU model of care, Reduces overall outliers in the MAU as selecting patients for MAU beds, Proactive patient management through use of ‘pulling’ patients from ED rather than relying on ED to ‘push’ patients – conducted by both medical and/or nursing…”Every MAU patient saves ED 2 hours”…ED Staff Specialist

- Allied Health Team Leader model - Team leader who participates in twice daily multidisciplinary ward rounds and Reviews all patients and refers as required to other allied health specialties

**Ideal MAU Model**

- General medicine/acute medicine for sustainability
- Close to or co-located with ED placing a medical upfront senior decision maker at the front door with ambulatory care / Hospital in the Home services close by and not co-located with another ward
- Purpose built MAU with the following available:
  - Area for family conferences
  - Bathrooms for shower chairs/walkers
  - Storage for allied health equipment
  - Assessment/clinic space
  - Areas for nursing, medical and allied health staff
  - Computer work stations
  - Telemetry capabilities
  - Patient lounge (exit lounge)
- Dedicated 7 day/week, senior led service and dedicated staffing to the model – medical, nursing, allied health and support staff
- Senior dedicated, risk adverse, medical decision maker with dedicated medical staff Monday to Sunday, 8- 10pm to allow for direct patient admissions
- Closely linked to community services i.e. Hospital in the Home, Community Packages,
Literature Review

Limitations of Analysis: While sourcing evidence in peer-reviewed journals and other studies is considered an important aspect of any analysis, this proved to have limitations for this evaluation. Notwithstanding that the concept of a Medical Assessment Unit (MAU) or its equivalent is relatively new internationally, a limited number of studies have been carried out to assess these units.

The concept of an Acute Assessment Unit (or MAU) for medical patients is described differently within Australia and internationally. Additionally, there are a variety of names given to these units which may or may not be used interchangeably. As a result, the ability to compare these units and identify differences in operational methods that impact outcomes is limited. For example, Australian units differ from most UK units, where a consultant-led team provides care to a patient for their entire hospital stay (including time spent in MAU), as well as outpatient follow-up post-discharge. This facilitates continuity of care and reduces multiple transfers of care from the MAU team to a separate in-patient team.

Despite these limitations, the literature discussed in this evaluation does provide consistent evidence of the benefit of MAUs: a reduced in-hospital length of stay, increased direct discharge rates and the associated bed day savings.

Asthma and chronic obstructive lung disease, pneumonia, congestive heart failure, urinary tract infection and cellulitis were the five most common discharge diagnoses for hospitalist-run observation units.41 Research has shown that the inpatient LOS is influenced by a number of factors, including the delay in initial review by a senior consultant, the challenges associated with obtaining diagnostic investigations promptly, prolonged waiting in ED for a hospital bed, the workload of clinical staff and medical complications arising during the admission. The initial presentation, assessment and treatment of patients with acute medical conditions are crucial but vulnerable to influence by several factors. These factors include the experience of the assessing medical staff, the reluctance of subspecialty units to accept patients with multiple medical problems and prolonged waits for tests and results.42

Peer reviewed literature has shown positive results in the UK for the effectiveness of MAUs. The establishment of MAUs (known as Acute Medical Units) or their equivalent has resulted in:

- Reductions in hospital LOS 43, 44, 45, 46
- Decrease in ED LOS 47
- Increase in the proportion of medical patients discharges directly home from MAU 48, 49, 50
- No increase in the 30-day readmission rate following unit commencement 51, 52

Australia literature has also shown benefits with varied results. A peer-reviewed study of the Medical Assessment and Planning Unit (MAPU) at the Royal Melbourne Hospital showed that although the reduction in median length of stay did not reach statistical significance, the reduction in ED LOS of 22% in the MAPU group, compared with the non-MAPU group is a major contributor to improved flow and capacity within the ED. This improvement potential is significant in the context of the newly introduced National Emergency Access Targets.53

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In the UK, a reduction in ED LOS was shown in an evaluation of a Surgical Short Stay Unit (SSU) where achievement of the four-hour target in the accident and emergency department improved from a mean of 96% in November 2005 to 99% in January 2006. It was thought that the development of the SSU contributed to this by increasing the number of acute medical beds available for patients triaged in accident and emergency.54

Literature has shown varying rates of emergency admission in Australia and internationally. The Sir Charles Gairdner Hospital in Perth established their Acute Assessment Unit (AAU) in 2001. For emergency medical admissions, 60% now pass through the AAU and 35% of all patients admitted to the AAU are discharged home. The Auckland City Hospital opened an Assessment and Planning Unit (APU) in 2003, with 32% of all admissions being direct from the ED and 68% being direct admissions from the community.55

Generally, literature has shown that readmission rates are higher in older patients with more complex care needs. As the patient cohort admitted to the MAU is generally older, with co-morbidities and greater requirements for social care on discharge, readmission will be more likely.56

Literature in Australia has shown mixed results. The introduction of a MAU in a Melbourne hospital resulted in a 0.4 day reduction in length of stay of medical patients over 12 months, although readmission rates went up from 24 to 28%57. Previous analysis of MAUs across NSW has attributed increasing readmission rates to decreasing access to community support.58

However, research from the MAUs equivalent in the UK has shown that reduced LOS and increased direct discharge rates achieved have not been associated with increased rates of readmission at 30 days, despite increases in total numbers of presentations and greater co-morbidity burden and illness severity.59 The readmission rate at Leeds General Infirmary fell from 13% to 6% following the instigation of their Acute Medical Unit.60

Internationally, it has been seen that there is a focus on direct admissions into the MAU with Auckland City Hospital achieving 68% of their admissions into the Admission and Planning Unit from the community.61

Analyses reported from MAUs in Australia and New Zealand reveal consistent reductions in inpatient length of stay ranging from 0.5 to 1.7 days, with estimated bed day savings of between 3000 and 12,000 days.62 Auckland City Hospital estimated a saving within the Department of General Medicine of $900,000 per year as a result of the APU in which the average LOS for patients admitted to the APU decreased by 0.45 days and the percentage of medical patients being discharged home without the need for an inpatient bed increased from 17% to 39%.

In line with the NSW model, an Acute Assessment Unit in South Australia has shown the mean age of the admitted general medical patients in their unit was 71 years.63

60 Moloney ED, Smith D, Bennett K et al (2005). Impact of an acute medical admission unit on length of hospital stay and emergency department 'wait times.' Q J Med; 98:283-9
The literature revealed that the five most common discharge diagnoses for hospitalist-run observation units were asthma and chronic obstructive lung disease, pneumonia, congestive heart failure, urinary tract infection and cellulitis.\textsuperscript{64}

Additionally, research has shown that the co-location of the MAUs with the ED creates a functional bond through physical proximity, where staff groups interact, and professional knowledge and relationships develop.\textsuperscript{65}

The difference between a MAU and an inpatient unit is that the MAUs feature a multidisciplinary team led by consultants, who should be available on a daily basis to conduct rounds and provide timely access to treatment and management decisions.\textsuperscript{66,67}

International and nationally, MAUs are predominantly run under General Medicine Teams.\textsuperscript{68}

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DISCUSSION
Data Analysis

The discussion of the data analysis takes into account each component of the MAU model of care and uses the data (from the Results Section) to tests the strengths and weaknesses of the model.

Component of Model of Care: Medical Assessment Units are inpatient short stay units that are usually close to or co-located with an Emergency Department and are typically staffed by inpatient teams. The difference between a MAU and an inpatient unit is that the MAUs feature a multidisciplinary team led by consultants, who should be available on a daily basis to conduct rounds and provide timely access to treatment and management decisions.69,70

Hypothesis Tested: this was tested in the data by looking at which hospitals had MAUs, the size of the MAUs, the patient cohorts in the MAUs, medical management and the configuration and geographical locations.

- In NSW, 29 Medical Assessment Units have been established in NSW since January 2008. All the principal referral hospitals have a MAU (12), followed by nine MAUs in Major Metropolitan hospitals, six MAUs in Major Non-Metropolitan hospitals and two MAUs in paediatric specialist hospitals. The majority of MAUs have been operating since 2008; only a small number have opened or are expected to open since then.
- The size of MAUs in NSW varies between facilities with the average number of beds in the MAU is approximately 12 beds, although 16 of the 28 MAUs have 10 beds or less.
- Internationally, MAUs are predominantly run under General Medicine Teams.71 In NSW, there are three different types of patient cohorts in the MAUs – general, aged care and paediatric. The patient cohorts for MAUs in NSW are still medically managed under sub-specialty models, the default for the general medical patient cohort is generally geriatricians (except RNSH, JHH, Wollongong and Campbelltown), or the physician-of-the-day on a general medical roster.
- The bed type configuration of the MAUs includes, general medical, cardiac, respiratory and aged care beds. This was dependant on the available space within a hospital, the actual size of the hospital, the patient demand, the specialty mix of the hospital and the availability of physical bed space. MAU structures include, for example, stand alone MAU Units and MAU units that are co-located within existing wards in the hospital i.e on general medical wards, cardiac wards, respiratory wards.

Component of Model of Care: Medical Assessment Units provide an alternative to treatment from the Emergency Department for undifferentiated, complex, chronic, non-critical medical patients. These patients are not critically ill but have complicated conditions that take time to assess and require a range of medical expertise to diagnose and treat.

Hypothesis Tested: this was tested in 3 stages; the proportion of non-medical admissions going through MAUs, planned or booked admissions going through MAUs and the impact the MAU has on all medical patients (excluding surgical or procedural and planned or booked patients) that were treated at individual hospitals with a MAU.

- On average, 10% of MAU admissions were for non-medical Diagnostic-Related Groups (DRGs). The proportion of non-medical admissions (i.e. surgical and procedural) into a MAU varies (2%-28%). This highlights the variability in the profile of patients admitted to MAUs. These patients generally fall outside the undifferentiated, complex, chronic, non-critical medical patient category and are considered ‘outliers’.
- On average, 9% of admissions to the MAU are planned or booked admissions. The proportion of planned or booked admissions into the MAU varies (2%- 41%). This analysis shows that in most hospitals MAUs are not restricted to emergency admissions (i.e. patients that require treatment within 24hrs).

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The impact the MAU has on all medical patients (excluding surgical or procedural and planned or booked patients) that were treated at individual hospitals with a MAU showed large variation (9%-33%). This suggests that depending on the individual hospital only 9%-33% of patients are non-critical complex medical patients, or there are other factors affecting what % of medical patients are treated in a MAU i.e. identification of patients, the variability in size of bed base, availability of beds for patients, exclusion criteria’s to rigid, etc.

Component of Model of Care: MAUs are staffed by an experienced and comprehensive multidisciplinary team, who is able to conduct rapid patient assessments, reach faster diagnosis and provide earlier treatment. Once a patient is assessed, their condition diagnosed and treatment provided, they will be able to return to home within 48 hours with community services provided as necessary. If further treatment is required, they will be referred to an inpatient team and transferred to a specialty ward.

The MAU aims to reduce the average hospital length of stay for appropriate medical patients. Prior to implementation of the MAU model of care, data analysis from the NSW Health Demand and Performance Evaluation Branch indicated that the average length of stay in hospital was 4 days. For people aged 75 years and over this length of stay increased to 9 days with half of all hospital beds occupied by patients aged over 65 years.

Hypothesis Tested: this was tested in 2 stages; through the average length of stay (ALOS) impact for all medical patients in hospitals that have a MAU and ALOS impact for medical patients that go through a MAU.

- The assumption is that MAUs have systematically impacted overall ALOS for medical patients when they first opened and this has been sustained.
- The ALOS for medical patients (excluding surgical or procedural and planned or booked patients) with an ALOS of up to 7 days has decreased by 0.8 days (3.63 days to 3.55 days) since the introduction of the MAUs.
- In the Principal referral hospitals there has been a reduction of around 0.5 days (7.7 days to 7.2 days) in ALOS for medical patients (excluding surgical or procedural and planned or booked patients) since the introduction of MAUs.
- The ALOS for medical patients (excluding surgical or procedural and planned or booked patients) that have a proportion of their treatment in a MAU (6.6 days) is approx 0.5 days shorter than the overall ALOS for these patients (7.2 days).
- The ALOS for medical patients (excluding surgical or procedural or planned or booked patients) with an ALOS of up to 7 days that have a proportion of their treatment in a MAU (3.6 days) is slightly higher than the overall ALOS (3.55 days). It has to be noted that prior to the MAU the overall ALOS for this group was 3.63 days, so for a pre and post MAU comparison for this group we do see a 0.3 day reduction. This suggests that the introduction of MAU has not been the only factor in reducing ALOS for this group.
- The average length of stay for Emergency Medical Unit (EMU) patients has reduced since the introduction of MAU and is significantly shorter (1 day) than for MAU patients. This suggests that MAU is being used to assess more complex conditions, whilst patients who are more likely to be discharged quickly are being assessed in EMU.
- Across all MAUs there was large variation (< 4 days to > 8 days) in ALOS for medical patients (excluding surgical or procedural and planned or booked patients) that go through a MAU. This suggests that some MAUs are functioning according to the model of care and impact ALOS and some MAUs do not, it could also be assumed that there are other factors affecting this i.e. outliers/ non MAU patients in the MAU, exit block issues, etc.

Component of Model of Care: A typical patient suitable for management in a MAU is the undifferentiated complex non-critical medical patient generally with co-morbidities. MAUs are also suited to the complex and chronic paediatric patient; there are specific paediatric models in NSW.

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73 NSW Health Demand and Performance Evaluation Branch, NSW Health Information Exchange (HIE) data base analysis 2004/05 to 2007/08
These patients can be streamed to the MAU from:

- The community (i.e. GPs, specialist rooms, ambulatory care or other identified community referrals) directly to the MAU through predefined pathways.
- ED triage direct to MAU – where the suitability of a patient is determined at ED triage, usually by the ED nurse or doctor or an MAU nurse or doctor.
- Within the ED after a very short period of time – the suitability of the patient is usually determined within the first hour of the ED stay by the ED nurse or doctor or an MAU nurse or doctor.

**Hypothesis Tested:** this was tested in 2 stages; through the percentage of direct admissions to the MAU and the average total hours of MAU patients in the Emergency Department.

- The percentage of direct admissions to the MAU has decreased slightly over 3 years (15.5% to 13.2%). This would suggest that patients direct from the community are not core business of the MAU.
- The average total hours for MAU patient in ED has increased slightly over 3 years (7.2hrs to 7.8hrs). This would suggest that patients from triage and the ED are unable to rapidly access a MAU.

**Component of Model of Care: Stream One** is for those patients that go home direct from the MAU. These patients have previously typically stayed in hospital for 3-5 days and can now be provided with rapid assessments, faster diagnosis and earlier treatments and sent home safely within 48 hours, with community care if needed. This patient group should account for approximately 50% of patients that are admitted to the MAU.

**Hypothesis Tested:** this was tested in 4 stages; through the ALOS of patients in the MAU, the % patients discharged home from the MAU, % patients discharged home within 48 hours and the ALOS medical patients up to 7 days who were treated in a MAU.

- The ALOS of patients in a MAU has decreased over 3 years (56.1 hours to 49.7 hours). This would suggest that MAU patients are able to be provided with rapid assessments, faster diagnosis and earlier treatments.
- The % patients discharged home from the MAU has decreased slightly over 3 years (46.6% to 39.4%) and is off the 50% target. This would suggest that MAUs are decreasingly treating this patient cohort, or there are other factors affecting this i.e. identification of patients, availability of beds for appropriate patients, services not available for patients to be discharged home with, rigid selection criteria, outliers in MAU beds, etc.
- The % patient discharged home from a MAU within 48 hours has increased over 3 years (57.7% to 65.1%). This suggests that patients discharged home from the MAU are sometimes staying slightly longer than the 48 hours. This is conclusive with the theory of averages as some patients will be home prior to 48 hours and some patients may need slightly longer and referral to an inpatient ward for another 24hrs post the MAU stay is deemed inappropriate.
- The ALOS for medical patients (excluding surgical or procedural and planned or booked patients) with an ALOS of up to 7 days prior to MAU commencing was 3.63 days. For this patient group post MAU implementation and had a proportion of their treatment in a MAU their ALOS was 3.6 days, a decrease of 0.3 days.

**Component of Model of Care: Stream Two** is for those patients that are transferred to a specialty ward from the MAU. In an MAU, these patients are provided with rapid assessment, faster diagnosis and commencement of treatment within the MAU. They are then referred to an inpatient team and transferred to an in-patient ward after approximately 24-48hrs with a documented plan of care to be followed and sent home safely within 5-7 days. This patient group should account for approximately 50% of patients that are admitted to the MAU.

**Hypothesis Tested:** this was tested in 3 stages; through the % MAU patients transferred to a ward, the proportion of % MAU patients transferred to a ward in individual MAUs, ALOS of MAU patients transferred to a ward and the and the ALOS medical patients who were treated in a MAU.
% patients transferred to a ward have increased (53.4% to 60.6%) over 3 years and are above the 50% target. This would suggest that patient flow out of the MAU is being affected by exit block as a higher proportion of MAU patients require an in-patient bed.

The proportion of patients transferred to a ward from a MAU showed large variation across individual MAUs (<20% to >90%). This could suggest that a high transfer rate should result in a lower ALOS, however a low transfer rate could mean the MAU is being managed as a normal medical ward.

ALOS for MAU patients transferred to an inpatient ward has decreased by 1.6 days since 2008/09 and is also close to the target of 7 days. This would suggest that MAU patients are provided with a continued management plan that recognises their initial assessment, diagnosis and treatment. This result also confirms the assumptions that the MAU has reduced ALOS for medical patients.

The ALOS for medical patients (excluding surgical or procedural and planned or booked patients) that have a proportion of their treatment in a MAU (6.6 days) is approx 0.5 days shorter than the overall ALOS for these patients (7.2 days).

Component of Model of Care: Regardless of the size of the unit or the funding received, Medical Assessment Units aim to provide a model of care for undifferentiated, complex, chronic, non-critical medical patients. The outcome that each unit sets out to achieve is determined through the four main outcome measures:

- The MAU Model of Care provides patients with rapid access to the Medical Assessment Unit (Right Care, Right Time, Right Place, and Right Provider) – measured as average total time for all MAU patients in the ED.
- The MAU Model of Care provides patients with access to rapid assessment, faster diagnosis and earlier treatment within 48 hours – measured as average length of stay in the MAU.
- The MAU Model of Care provides patients who require further inpatient care, a continued management plan based on their initial rapid assessment, faster diagnosis and earlier treatment -measured as average length of stay for MAU patients transferred to an inpatient unit.
- The MAU Model of Care provides patients with safe and effective care; ongoing care or support is provided in their home environment if needed – measured as MAU readmission rates.

Hypothesis Tested: The final hypothesis to be tested is; ‘does the MAU Model of Care provides patients with safe and effective care? Ongoing care or support is provided in their home environment if needed using MAU readmission rates.

- Readmission rate within 28 days of MAU-home or MAU-ward-home separations has decreased over 3 years (13.2% to 11.8%) and is also close to the target of 10%. This would suggest that MAU model of care provides patients with safe and effective care and ongoing care or support is provided in their home environment if needed.
- % Readmission within 28 days of MAU to Home ONLY separations has remained steady for 2 years and is on target. This would suggest that 1st stream provided by the MAU model of care provides safe and effective and ongoing care or support is provided in their home environment if needed.

**RECOMMENDATION 1:** for the full set of Recommendations refer to page 4

Based on the analysis of the data it is recommended, for MAUs to be effective, that a NSW MAU Model of Care document be created outlining best practice principles (refer to Appendix 1 for NSW Medical Assessment Model of Care 2012). Recommendations for the MAU Model of Care are also referred to in the Discussion Section: Provider Survey (refer to page 78).

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RECOMMENDATION 2: for the full set of Recommendations refer to page 4

It is recommended that the MAU Key Performance Indicator (KPI) Definitions document be revised to include an annual overview of state-wide results to illustrate the impact of MAUs at a state-wide level. It is also recommended that inclusion of guidelines against process indicators where no formal target has been set, to provide a guideline of achievement for MAUs (refer to Appendix 2). Recommendations for the MAU KPIs are also referred to in the Discussion Section: Provider Survey (refer to page 80).

Cost Benefit Analysis

The estimated yearly running costs of the MAUs are $98,700,000 this is for the 329 funded acute care beds. For the cost benefit analysis, the benefit of MAUs has been quantified in terms of potential bed day savings and also conversion of bed day savings into a dollar amount, as MAU efficiency is determined by the benefit it provides to the system. The efficiencies produced by the MAUs generate capacity for the increasing number of patients that are arriving to our hospitals.

Analyses reported from MAUs in Australia and New Zealand reveal consistent reductions in inpatient length of stay ranging from 0.5 to 1.7 days, with estimated bed day savings of between 3000 and 12,000 days. Auckland City Hospital estimated a saving within the Department of General Medicine of $900,000 per year as a result of the APU in which the average LOS for patients admitted to the APU decreased by 0.45 days and the percentage of medical patients being discharged home without the need for an inpatient bed increased from 17% to 39%.

The NSW MAUs have produced system wide changed on implementation of 17,429 bed days or $13,124,338. This was demonstrated through the efficiency benefit produced by comparing ALOS for patients with a medical DRG prior to the MAUs being implemented to ALOS for patients with a medical DRG and had a proportion of their treatment in a MAU after MAU implementation.

This change has been sustained as demonstrated with the efficiency benefit of 6,111 bed days or $5,225,076 in 2011/12. This was produced by the benefit produced by the reduction in ALOS of MAU patients that were transferred to a ward and the increasing quantity of services provided by MAUs.

RECOMMENDATION 3: for the full set of Recommendations refer to page 4

Based on this cost benefit analysis it is recommended that on a yearly basis each Medical Assessment Unit provide to their Local Health District (LHD) executive team a Cost Benefit Analysis using the Valuation Methodology provided (refer to Results Section page 39) in conjunction with the data provided to each hospital on a monthly basis by the Ministry of Health. It is recommended that this is submitted to the Ministry of Health yearly with the LHD Efficiency and Savings Plan.

Provider Survey

The discussion of the Provider Survey takes into account the 7 different themes (Demographics, Staffing Governance, MAU Model of Care, Patient Flows, Key performance indicators and general comments) and uses the information provided (from the Results Section) to make recommendations for future and existing MAUs.

Demographics

The provider survey received responses from 270 staff, although responses from staff varied from individual hospitals. The majority of staff surveyed were clinical nursing staff and the least responses were received from medical management.
Staffing

The physician of the day model was reported as the most common for medical management of patients in the MAU both in hours and after hours.

Senior medical leadership is critical to the success of the MAU. The highest percentage of medical staffing dedicated to the MAU model of care is a staff specialist in-hours and a registrar/basic trainee after hours. It would appear that the MAU has strong medical leadership within hours, although after hours this appears to be limited.

Medical recruitment and availability of medical staffing is seen to be an issue

This was further confirmed by 40% staff saying there are issues with medical recruitment for MAUs.

An NHS Survey\textsuperscript{76} survey showed that consultant presence on site was significantly less overnight and at weekends than week days. This is in-line with the results of the MAU Provider Survey. The NHS survey also found, for acute medicine, that mortality and other aspects of patient care are poorer for those patients admitted during out of hours and weekend periods, as consultant presence was linked to better outcomes.

As expected Nursing staffing in the MAU has the highest percentage of staffing coming from the frontline clinicians (registered nurses and enrolled nurses).

All MAUs have a Nursing Unit Manager, although not all are dedicated solely to the MAU as reflected in the FTE of a Nursing Unit Manager dedicated to the MAU being 0.5FTE to 1.0FTE. It would appear that having a dedicated Nursing Unit Manager is contingent on bed base sizing.

Senior nursing leaders are critical to the success of the MAU model of care, especially for care coordination and planning, case management and patient flow. It would appear that the majority of MAUs have a Nursing Unit Manager, although the presence of other senior nursing leaders was limited. Clinical Nursing Consultants were reported as present in 37% of MAUs, although the next proportion of senior nursing leaders present was significantly lower Clinical Nurse Educators (27%), Clinical Nurse Specialist 2 (24%), supernumerary team leaders (20%) and no MAU reported having a Nurse Practitioner.

When asked about the specific roles of senior nursing leaders the distinction between each became evident. The Clinical Nurse Consultant role appeared to function strategically as well as operationally across the whole of hospital.

\textsuperscript{76} NHS London (2011) Adult emergency services: Adult medicine and emergency general surgery: Survey of current arrangements, London Health Programmes
The Clinical Nurse Specialist 2, Clinical Educator roles and supernumerary team leaders appeared to have the majority of their functions focused on the operational aspects of the MAU.

Allied health staffing is seen as critical to the success of the MAU model of care, especially for facilitating early patient assessment to prevent functional decline and improve patient outcomes. Allied health presence in the MAUs is variable across all disciplines. It would appear that Social Work, Physiotherapy and Occupational Therapy have the majority presence in the MAUs both on weekdays and weekends. The other disciplines of speech therapy, pharmacy and dietetics appear to have less of a presence and are more inclined to be a shared service with other wards and units and not specifically dedicated to the MAU.

The majority of MAUs have seen the value in a 7 day allied health model for the MAU and have staffed accordingly (mainly Physiotherapy, Social Work and Occupational Therapy). The feedback from the MAU staff has reflected this: -

- "When the MAU has full time allied health staffing they are able to assess patients as soon as they arrive ... it ensures that patients have all the equipment, services and ongoing follow up they require prior to discharge which improves patients' outcomes and prevents readmissions".
- "When we didn't have dedicated allied health staffing there were not enough hours to do comprehensive assessments...most patients were admitted to the ward rather than being treated and discharged home".
- "Lack of weekend therapists impacts patient flow, delays discharge and leads to patients staying in hospital over the weekend until assessments can be conducted on Mondays".

The adjustments that were made to staffing that improved patient outcomes for patients in the MAU ranged from changes in the medical model: -

- "We moved from a general medicine model to a subspecialty model, as had no general medicine admitting roster so it was failing".
- "When the MAU received dedicated medical staff, the unit has been able to function effectively and provide direct access for patient's by-passing the ED".
RECOMMENDATION 4: for the full set of Recommendations refer to page 4

Based on the analysis of the staffing questions from the provider survey it is recommended that those hospitals that have a Medical Assessment Unit review their staffing models. It is understood that staffing will be based on the size and patient cohort of the unit, although dedicated staffing to the MAU model of care needs to be considered as a priority (refer to Appendix 1-Optimal Staffing Model). Recommendations for staffing are also referred to in the Discussion Section: Observation Study (refer to page 85).

Governance

Governance of the medical assessment units is seen as a critical success factor. Governance meetings with monthly frequency being identified as the most popular, which include the major stakeholders of the MAU (i.e. hospital executive, ED, patient flow, MAU multidisciplinary team), have provided guidance, a shared response and action for resolving operational issues.

Priority access to services is perceived as a critical success factor for the MAUs, in providing patients with rapid patient assessments reach faster diagnosis and provide earlier access to treatment that ensures unhindered patient flow and optimal MAU performance. Only 40% of staff surveyed reported that the MAUs had priority access to diagnostics, with access to in-patient beds (36%) and specialty referrals (24%) reported a lot lower.
Respondents from the provider survey commented on the implications of the limited access to services and how this impacts on patient flow:

‘Supernumerary senior nurse helps to maintain early identification of deterioration as well as patients suitable for discharge’

‘We now have a team leader role to coordinate the MAU discharges/admissions giving patient rapid access and earlier, better coordinated discharge. Also this has made a huge difference to the workload of the NUM’

Priority, rapid access and good relationships with diagnostic services, 24/7, are seen as crucial by the respondents to the provider survey. The consequences of delayed access on patient flow are major leading to patients waiting longer in ED if the MAU does not have priority access.

“Access to diagnostics need to be the same as ED. Patients generally remain in the ED to access diagnostics if MAU doesn’t have the same priority as turnaround times for diagnostics is greatly increased”

Business rules and escalation plans allow for optimal operational management of the Medical Assessment Unit. Business rules were reported to be used in 60% of MAUs with the majority reporting that they were only adhered to in-hours or in an ad-hoc manner. Out of hours it was reported that business rules were rarely adhered to.

Only 40% of the MAUs reported that they had escalation plans within their business rules and the majority of focus was on in-patient bed delays, non-MAU patients in MAU beds and 48hr patient breach.

The majority of staff surveyed reported there is only some understanding of the MAU model of care across the entire hospital. For Medical Assessment Units to be able to provide an effective service and impact the whole of hospital the Model of Care needs to be understood widely, this is seen as critical to the success of the MAU.

‘It’s difficult to gain support for the MAU as it is erratic in what it can offer and when’

RECOMMENDATION 5: for the full set of Recommendations refer to page 4

Based on the analysis of the governance questions from the provider survey it is recommended that that those hospitals that have a Medical Assessment Unit review their governance and leadership models. Governance models need to include leadership from key stakeholders who are critical to making decisions about MAU patient flow (i.e. hospital executive, MAU medical, nursing and allied health, patient flow and Emergency Department). It is recommended that the governance model includes; regular meetings with above key stakeholders who have the ability to addresses issues and implements solutions within short timeframes (refer to Appendix 1- Optimal Governance Model). Recommendations for leadership and governance are also referred to in Discussion section: Provider Survey (refer to pages 83 and 84).

RECOMMENDATION 6: for the full set of Recommendations refer to page 4

It is recommended that those hospitals that have a Medical Assessment Unit review their current business rules. Documentation
of Business Rules needs to be developed and committed to by the MAU governance group. They also need to contain inclusion and exclusion criteria (non complicated and easy for non MAU staff to identify MAU appropriate patients quickly), priority access to services (in-patient beds, diagnostic s, etc), early identification and access to community support services (i.e. ComPacks, Hospital in the Home, etc), escalation procedures inclusive of specific direction for MAU staff when issues arise regarding access to beds (i.e. no MAU beds available for ED patients, non-MAU patients in MAU beds, in-patient bed delays, etc), 48 hour patient breach and staffing issues.

MAU Model of Care

The majority of MAU staff perceived they had enough beds in their existing MAUs. The reflection of staff that reported that they didn’t have enough beds was mostly around access block issues: -

- ‘Many patients are unable to be admitted into MAU because our beds are unavailable because we are blocked; therefore patients are transferred to a medical in-patient ward’
- ‘We get such a big turn over most days and constantly have MAU suitable patients waiting in ED to come around but end up staying in ED and transferred to the wards no beds left on the MAU.
- ‘The MAU is a fantastic model of care. There are many patients who currently end up on inpatient wards who would benefit from MAU’s processes, particularly Allied Health’

The MAU Model of Care provides an alternative to treatment from the Emergency Department for undifferentiated, complex, chronic, non-critical medical patients, with one streaming method into the MAU for patients within the ED. Suitability of MAU patients is usually determined within the first hour. To be able to identify these patients within this time frame staff within the MAUs were asked if they used the ED patient management system as a tool for early identification and the majority (53%) said no or they didn’t know. Staff were also asked if MAU staff physically went to the ED to identify/review/pull’ patients to the MAU, the majority (80%) of the staff reported they did this some of the time, most of the time and all of the time.

As a component of the MAU business rules patient inclusion and exclusion criteria are used to identify MAU appropriate patients for that specific hospital. The majority of staff surveyed (85%) identified that they are used, although according to the staff survey they are only adhered to in-hours. This is in-line with what staff reported when asked about adherence to business rules.

The MAU Model of Care provides patients with rapid assessments, faster diagnosis and earlier treatment, as MAUs are staffed by an experienced and comprehensive multidisciplinary team. When staff were asked if timeframes were in place for completion of initial clinical assessment a high proportion reported completion within the targeted timeframes (i.e. Medical and Nursing Staff – within 2 hours and Allied Health within 4 hours), although a high proportion also reported that there were no timeframes in place.

The MAU Model of Care provides patients, once assessed, their condition diagnosed and treatment given, the ability to return to their home environment within 48 hours with community services provided as necessary. If further treatment is required, they will be referred to an inpatient team and transferred to a specialty ward. The majority of staff reported that their MAUs utilised the 48 hour timeframe, with only a minority utilising the 72 hour timeframe.
RECOMMENDATION 1...continued: for the full set of Recommendations refer to page 4

Based on the analysis of the MAU model of care questions from the provider survey it is recommended, that for MAUs to be effective, that a NSW MAU Model of Care document be created (refer to Appendix 1 – for NSW Medical Assessment Model of Care 2012). It is recommended that the NSW MAU Model of Care document outline; what the model is, why the model should be used, key principles, other models that support early entry and discharge, benefits, challenges and the case for implementation. Recommendations for the NSW MAU Model of Care are also referred to in the Discussion Section: Data Analysis (refer to page 71).

MAU Patient Flow

The MAU Model of Care provides an alternative to treatment from the Emergency Department for undifferentiated, complex, chronic, non-critical medical patients. These patients are not critically ill but have complicated conditions that take time to assess and require a range of medical expertise to diagnose and treat. The multidisciplinary ward/white board rounds enable the MAU staff to conduct this through collaborative assessment and case management plans for each patient in the MAU. The majority of MAUs conduct this daily, with a minority reporting twice daily. It was also reported that in a minority of units these were only conducted on weekdays or not at all. The comments made by staff were all positive towards the multidisciplinary ward/white board rounds: -

‘Adequate length of time for a proper comprehensive assessment and not too long to affect bed flow into the unit’

‘In theory 48 hours allows for patients to be assessed and diagnosed within 24 hours with a decision to be transferred to a ward or home, treatment plans are undertaken for the next 24 hours. In reality if a decision is made at the 24 hour mark for transfer to a ward it generally takes longer than 24 hours to have a bed become available and they end up staying on the MAU for their entire hospital stay’

‘This time frame allows for both assessment and treatment to occur and a number of patients can be discharged home within this time frame. It also allows for adequate care plans to be made for transfer to other services’

‘In theory 48 hours allows for patients to be assessed and diagnosed within 24 hours with a decision to be transferred to a ward or home, treatment plans are undertaken for the next 24 hours. In reality if a decision is made at the 24 hour mark for transfer to a ward it generally takes longer than 24 hours to have a bed become available and they end up staying on the MAU for their entire hospital stay’

The existence of MAU has increased the flow of patients through the hospital. We also are able to take patients faster from ED allowing a higher number of patients to be seen

‘Multidisciplinary rounds definitely assist care co-ordination and are integral to the running of the MAU. They involve doctors, allied health and nursing staff and give all parties the chance to plan discharges and in-patient care. Consult referrals can be done straight away and discharge planning can be openly discussed’

‘On MAU ward this greatly assists decision making, however not all staff are able to attend and this does affect the communication and quality of the meetings’
To improve the MAU Model of Care provided in hospitals, staff were asked if they surveyed staff or patients and if the outcomes of this produced any changes within the MAUs. A majority of staff reported that they either conducted staff or patient surveys, the majority of changes made as a result occurred internally within the MAUs not across the whole hospital. Please note that a high proportion of staff also reported that they have not conducted staff or patient surveys.

**RECOMMENDATION 7:** for the full set of Recommendations refer to page 4

Based on the analysis of the MAU patient flow questions from the provider survey it is recommended that those hospitals that have a Medical Assessment Unit review their MAU patient flow principles. It is recommended for optimal patient flow through the MAU, timeframes should be utilised across the MAU model of care. This is to ensure that patients are provided with rapid comprehensive multidisciplinary assessments; faster diagnosis and earlier treatment within a 48 hour period (refer to Appendix 1 – MAU Patient Flow).

**MAU Key Performance Indicators**

Regardless of the size of the unit or the funding received, Medical Assessment Units aim to provide a model of care for undifferentiated, complex, chronic, non-critical medical patients. The outcome that each unit sets out to achieve is determined through four main outcome measures. Eight process measures are also provided to give MAU staff an understanding of their internal workings in order to manage and monitor processes. The majority of MAU staff utilised the state-wide KPIs, did not recommend other indicators, did not utilise other KPIs and thought that the outcomes of the MAU were reflected in the KPIs.

The MAU staff were also asked if they thought patient outcomes were impacted as a result of actively measuring and monitoring MAU performance. The overall comments reflected what they did, not what it actually means to patients. It appears that there is limited understanding of the correlation between KPIs being utilised to improve patient outcomes.
RECOMMENDATION 2 …continued: for the full set of Recommendations refer to page 4

Based on the analysis of the MAU key performance indicator questions from the provider survey it is recommended that the MAU Key Performance Indicator (KPI) Definitions document be revised to include the evidence for collection for each of the MAU KPIs to ensure that there is an understanding of the correlation between KPIs and improved patient outcomes (refer to Appendix 2). Recommendations for the NSW MAU KPIs are also referred to in the Discussion Section: data Analysis (refer to page 72).

Strongest Feature of the MAUs

The majority of MAU staff thought the strongest feature of the MAUs was the positive internal relationships within the MAU. Most comments expressed were about the positive team environment.

- ‘dedicated nursing team, medical doctors and allied health who every day come to this unit and work in a very pressured environment who try to provide excellent clinical care to patients’
- ‘The multidisciplinary team effort and the successful management of the complex care needed by the patients who are admitted to the unit’
- ‘We have an excellent team and are privileged to have a very dedicated nursing, medical and allied health team. Our best feature is our teamwork, camaraderie and multidisciplinary cooperation’

Weakest Feature of the MAUs

The majority of MAU staff thought the weakest feature of the MAUs included issues with patient flow. Most comments expressed the negative experiences of bed block. The other weakest feature was issues around workforce. Most comments expressed the lack of medical and allied health workforce and also the lack of a nursing education position.

- ‘Bed block. It’s impossible to run the unit effectively if patients can’t leave because they have not got a place to go to. The medical, nursing and allied health assessments and treatments are all done within one day- it’s then that the waiting process starts’
- ‘No permanent allied health staff as they are moved when the hospital are short elsewhere’
- ‘No educator position to skill up junior nurses and AINs critical thinking skills, multitasking and advanced patient assessment skills required in the MAU. The MAU is really hard work, many acute unwell, heavy patients. Many complex difficult admissions and discharges up to 11 a day, it is one of the hardest wards in the hospital.’ Many staff have left because of the poor morale this has created’
MAU patient receive that no other patients receive

The majority of MAU staff thought that no other patients apart from MAU patients received early patient intervention. Most comments expressed the positive experiences of rapid assessment, faster diagnosis and earlier treatment provided by MAU staff to MAU patients. High quality care and an attentive MAU workforce were also expressed as features distinctive to the MAU. Most comments expressed the senior decision making from the multidisciplinary team that provides high quality care.

‘MAU love - the intense review from all aspects, open attitude, compassion, experience, the medical team intense focus, with a “We can” attitude rather than a “it’s too hard attitude”

‘The potential to be assessed and treated quickly and to a high level, allowing patients to return home in a quicker timeframe than what would be considered normal’

‘Priority clinical review especially on weekends, therefore more efficient inpatient admission. Also the fact there is a multidisciplinary assessment across teams leads to improved discharge planning’

General Comments

I think it’s important to look at MAUs in the context and culture of the hospital they are in. The MAU does not function in isolation, so problems in the hospital in general will affect the MAU.

We all believe in the model and strive to achieve these goals however the majority of our funding has not been released and senior level support from our hospital has been non-existent since opening.

I believe the concept of MAU is excellent and would improve the standard of healthcare we offer, however the intention to follow this concept at our hospital was never achieved as from the beginning the unit was thrown together in a politically correct fury and then fizzled out once some or any box was ticked.

The model of care has been demonstrated to work. Activity has doubled with a less than 20% increase in bed usage.
Patient Survey

The aim of was for every patient to complete the survey prior to discharge from the MAU, although patients with a cognitive impairment were excluded from the survey. A total of 1184 respondents have completed the survey across the 15 MAUs over a 6 week period. 1,184 patient’s responding to the patient survey in 6 weeks, was considered to be an exceptional response rate for the time period.

Patients responded on a Likert Scale across 5 domains; confidence, planned treatment, eases of talking about concerns, preparation for discharge and overall care. The results of the MAU patients that responded to the survey across all domains show a very high experience rating.

Confidence in staff had the highest experience rating at 93%. This demonstrates that the component of the NSW MAU Model of care ‘MAUs are staffed by an experienced and comprehensive multidisciplinary team, who is able to conduct rapid patient assessments, reach faster diagnosis and provide earlier treatment’ is effective for patients.

Planned treatment had the 2nd highest experience rating at 88%. This demonstrates that the component of the NSW MAU Model of care ‘Once a patient is assessed, their condition diagnosed and treatment provided, they will be able to return to home within 48 hours with community services provided as necessary’ is effective for patients.

Patient involved in their care (ease of talking about concerns, preparation for discharge) had the 3rd highest experience rating at 86% and 82% respectively. This demonstrates that the component of the NSW MAU Model of care ‘The difference between a MAU and an inpatient unit is that the MAUs feature a dedicated multidisciplinary team led by consultants, who should be available on a daily basis (if not twice daily) to conduct rounds with the multidisciplinary team and provide timely access to treatment and management decisions’ is effective for patients.

Overall care also had the 2nd highest experience rating at 88%. This demonstrates that the component of the NSW MAU Model of care ‘The MAU Model of Care provides patients with safe and effective care’ is effective for patients.

The overall average experience score for the 1,184 patients was 88%. This is comparable to the NSW Health Patient Survey latest survey results available (refer to table 9) where 89.1% of patients described their overall care as excellent or very good.

Table 9: NSW Health Patient Survey 2009 Overall Scores
RECOMMENDATION 8: for the full set of Recommendations refer to page 4

It is recommended that those hospitals that have a Medical Assessment Unit measure, on a regular basis, staff and patient satisfaction and incorporate this feedback into improving the individual MAU models of care provided.

Observation Study

Governance

The main critical success factor for a cohesive and well-functioning MAU was strong governance built on action. This was expressed through hospitals as a whole having a desire to make the model work and providing the MAU with governance and leadership from the executive team down to the staff on the ground.

It was also seen that medical governance in the MAU was limited by the subspecialty approach in NSW. General medicine was continually mentioned as the specialty that would provide the best practice medical governance model as they covered all appropriate patients that went to the MAU and weren’t limited by age or medical sub specialty.

Internationally, MAUs are predominantly run under General Medicine Teams77. It is recognised that generalists are the best to deal with the complex patient with multiple chronic conditions78. The health environment is slightly different in NSW, in comparison to the rest of Australia as well as internationally29. The specialty of General Medicine has evolved into a different model of care in NSW, due to minimal hospitals having active departments of General Medicine. Patients with general medical problems in NSW are usually admitted under the care of a Geriatrician or other sub-specialty medical teams.

Effective governance was demonstrated through:

- Monthly action-orientated meetings with all hospital representatives who are critical to MAU patient flow (i.e. ED staff, patient flow, MAU staff, Hospital Executive and inpatient unit) present. The meetings allowed discussion of identified issues, with actions assigned and followed through by all present.
- The MAU was given first priority for patient flow at the beginning of each day to move patients to inpatient units to expedite ED patient access the MAU beds.
- Where MAU patient flow prioritisation occurred, hospital staff commented that access to the MAU beds earlier in the day by ED is not denied regardless of how busy the MAU is.
- The priority for inpatients beds has been reversed at some hospitals where ICU, HDU and CCU always have first priority; however the MAU is given priority over ED for accessing medical inpatient beds and ED medical patients are moved to an MAU bed as early as possible.

RECOMMENDATION 5…continued: for the full set of Recommendations refer to page 4

Based on the analysis provided through the observation study it is recommended that those hospitals that have a Medical Assessment Unit review their governance and leadership models. One of the critical success factors identified through the observation study was strong governance built on action. The outcomes of effective governance are also shown above. Recommendations for leadership and governance are also referred to in Discussion section: Provider Survey (refer to pages 76 and 84).

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RECOMMENDATION 10: for the full set of Recommendations refer to page 4

Based on the analysis provided through the observation study it is also recommended that HETI considers the re-establishment of Departments of General Medicine in NSW hospitals to provide training of General Physicians and to care for General Medicine patients admitted to hospital or like models. Consideration that General Physicians can provide medical governance, leadership and training required for effective running of Medical Assessment Units and the maintenance of high quality care. At present the specialty of General Medicine has evolved into a different model of care in NSW, due to minimal hospitals having active departments of General Medicine. Patients with general medical problems in NSW are usually admitted under the care of a Geriatrician or other sub-speciality medical teams in the absence of general medicine

Leadership

Strong leaders were seen as a critical success factor and were present in cohesive well-functioning MAUs. These leaders were the key drivers and motivators for success. They were identified as clinical champions – the drivers, leaders and motivators for the MAU model. This group of staff generally included a MAU Medical Director, Nursing Unit Manager, Allied Health Team Leader, and senior nursing staff member – CNC, CNS2 or Clinical Coordinator.

Examples of strong leadership were:
- A MAU Director that goes to triage/ambulance bay to ‘pull’ patients directly to the MAU.
- A MAU NUM who uses improving key performance indicators to motivate staff, and to drive and create continued success in MAU service delivery.
- A MAU Allied Health Team leader who conducts wholesale referrals of all MAU patients and is then able to refer patients to specific allied health staff when necessary.
- A MAU CNC/CNS2/c clinical coordinator that identifies MAU patients in ED to ‘pull’ to the MAU.
- Hospital staff commented that: ‘every MAU patient identified early saves us 2 hours in the ED’.

RECOMMENDATION 5…continued: for the full set of Recommendations refer to page 4

Based on the analysis provided through the observation study it is recommended that those hospitals that have a Medical Assessment Unit review their governance and leadership models. One of the critical success factors identified through the observation study was strong leaders are the key motivators and drivers for success. Governance models need to include leadership from key stakeholders who are critical to making decisions about MAU patient flow (i.e. hospital executive, MAU medical, nursing and allied health, patient flow and Emergency Department). The outcomes of effective leadership are also shown above. Recommendations for leadership and governance are also referred to in Discussion section: Provider Survey (refer to pages 76 and 83).

Communication

Another critical success factor is continuous and ongoing communication to all staff involved in the MAU functions. This is especially important to feedback to MAU staff any evaluation of clinical initiatives – what has worked and what hasn’t. Continuous communication in the MAU accelerated the implementation of any new clinical initiatives. Staff knew what their role was and when the initiative was planned for implementation. This communication also enabled the executive teams to appreciate what worked effectively in the MAU and what didn’t work.

Examples of effective communication were:
- Communicating monthly MAU data to all MAU staff and using this to show achievements for changes in internal practices.
- An example is in a Sydney Metropolitan MAU, the ‘LOS in the MAU’ was increasing, and ‘patients transferred out of the MAU within 48 hours’ was increasing.
- Timeframes for internal processes were put into action (Nursing assessment complete within 2 hours of patient arrival, within 4 hours of patient arrival or 4 hours post the morning multidisciplinary team meeting allied health assessments are
complete, within 2–3 hours of arrival medical assessment is complete, within 24 hrs OR on the second multidisciplinary team meeting the decision to transfer the patient to a ward or discharge home will be made.

- Over time the ‘LOS in the MAU’ has decreased and ‘patients transferred out of the MAU within 48 hours’ has decreased. This success was continuously fed back to the MAU staff as improvements were made and the changes have been sustained.

**RECOMMENDATION 9:** for the full set of Recommendations refer to page 4

Based on the analysis provided through the observation study it is recommended that those hospitals that have a Medical Assessment Unit review their current communication models. This should include communication between the MAU and other hospital departments, patients, their families and community services. Recommendations for communication and innovation are also referred to in the *Discussion section: Observation Study* (refer to page 86).

**Dedicated Staffing to the MAU Model of Care**

Dedicated staffing to the MAU model of care was considered a critical success factor. Examples of optimal staffing practices were:

- A dedicated Medical Director who is a General Medical Staff Specialist was seen as the optimal staffing model. It was seen that the Medical Director should play a key role in governance of the unit, decision-making for the MAU patients, providing leadership to the MAU medical team, creating and maintaining relationships with other medical teams in ED and inpatient units, and in the community.

- Dedicated medical staffing for the MAU is seen to enable the early identification of patients for the MAU and facilitates their timely assessment, treatment and discharge. A Visiting Medical Officer (VMO) and rotating medical workforce was found to delay timely access and discharge for MAU patients, resulting in patients spending unnecessary time in the hospital and breaches to the 48-hour targets. Facilities that rely on this workforce may need to consider alternatives such as criteria-led discharge to allow Junior Medical Staff and nurses to initiate appropriate patient discharge.

- Care Coordinators are seen as essential to the function of the MAU, especially in facilitating the early identification of patients suitable for the MAU. Care coordinators not only enable early MAU patient identification, they improve MAU patient flow, assist in reducing ED length of stay and facilitate a smooth patient transition to the ward or home. Care Coordinators are seen as a dedicated supernumerary staff member with the requisite patient assessment skills, patient flow knowledge and coordination skills.

- A dedicated Nursing Unit Manager (NUM) was seen to be a proactive leader and in combination with Medical Director, ‘drive’ the MAU model. The NUM was seen to be responsible for patient flow through the MAU, enforcing controls around admission and discharge guidelines, and minimising outlier patients in the MAU, and will establish and maintain strong relationships with ED and the wards.

- Dedicated Allied Health staff to the MAU was seen as optimal. It was considered that at a minimum dedicated allied health staffing should include; Occupational Therapy, Social Work and Physiotherapy seven days per week. Depending on the individual MAU requirements, consideration of other Allied Health staff such as Speech Pathology, Pharmacy and Dieticians should be implemented on a part-time or full time basis. Improving access to allied health was seen to help reduce delays for patients to be assessed and treated and improve the ability of hospitals to discharge patients over the weekend period.

**RECOMMENDATION 4…continued:** for the full set of Recommendations refer to page 4

It is recommended that that those hospitals that have a Medical Assessment Unit review their staffing models. It is to be taken into consideration that a 7 day a week, senior led service with dedicated medical, nursing, allied health, support staff and a supernumerary care coordinator role is considered the optimal recommendation for staffing of the medical assessment unit (refer to appendix 1 – MAU Optimal Staffing Model). Recommendations for staffing are also referred to in the *Discussion section: Provider Survey* (refer to page 75).
Innovation through stakeholder engagement and the development of relationships

The development of interpersonal relationships that lead to trust and credibility between key stakeholders of the MAU and that resulted in innovative care practices was critical. Trust and credibility was seen as essential to the speed of any change implemented within the MAU.

Examples of these relationships were:

- Between MAU and ED staff to enable patients to be ‘pulled’ from triage and ambulance trolleys.
- Between MAU and inpatient teams to accept patients immediately from the MAU.
- Between MAU and patient flow managers to enable the MAU to quickly manage their own patient flows (from ED to the MAU and to the Ward).

Trust and credibility with the ED, inpatient teams and patient flow has been fast tracked in a few MAUs by:

- A staff specialist based in the MAU, who is able to provide a consultant-led service, accepts direct patient referrals from ED physicians and is able to refer patients directly to inpatient physicians.
- An MAU NUM recruited from within the organisation that has an understanding of internal hospital culture and processes.
- An MAU CNC recruited from ED who has an existing relationship with ED staff. Their judgment of appropriate patients for the MAU is accepted by ED and patients are sent directly to the MAU.
- Nursing staff for the MAU recruited from ED and critical care areas that have highly developed ‘acute patient assessment’ skills.

RECOMMENDATION 9...continued: for the full set of Recommendations refer to page 4

Based on the analysis provided through the observation study it is recommended that those hospitals that have a Medical Assessment Unit review their current communication models. Communication models need to include communication between MAUs across NSW to continue sharing of innovative practice. It is understood that at present a State-wide MAU Nursing Network Meeting occurs bi-monthly that facilitates the sharing of information and contribution to the continued innovation to the MAU model of care. Recommendations for communication and innovation are also referred to in this section (refer to page 85).
CONCLUSION
Since the introduction of the Medical Assessment Units in NSW in 2008, the number of patients assessed, diagnosed and treated in a MAU has increased by 72% and now has an annual investment of over $100 million.

For MAUs to be successful, provide quality outcomes and produce sustainable change for patients they cannot function in isolation to the hospital as a whole. This theory has been described prolifically all with the underlying understanding that for quality improvement no part of any system can function in isolation to the system as a whole (i.e. Studor, Six Sigma, Lean, Theory of Constraints, Dartmouth Clinical Microsystems, Accelerated Implementation Methodology). Clinical process redesign in isolation to overall systems improvement is a limited and non sustainable approach to healthcare improvement for our patients.

The benefit of MAUs has been quantified in terms of potential bed day savings and also conversion of bed day savings into a dollar amount, as MAU efficiency is determined by the benefit it provides to the system. The efficiencies produced by the MAUs generate capacity for the increasing number of patients that are arriving to our hospitals.

The NSW MAUs have produced system wide changed on implementation of 17,429 bed days or $13,124,338. This was demonstrated through the efficiency benefit produced by comparing ALOS for patients with a medical DRG prior to the MAUs being implemented to ALOS for patients with a medical DRG and had a proportion of their treatment in a MAU after MAU implementation.

This change has been sustained as demonstrated with the efficiency benefit of 6,111 bed days or $5,225,076 in 2011/12. This benefit was produced by the reduction in ALOS of MAU patients that were transferred to a ward and the increasing quantity of services provided by MAUs.

The NSW Redesign process has been successful in producing sustained, system wide change with its application to Medical Assessment Units. The NSW MAU Model of Care has been successful in generating approximately 23,540 bed days for the increasing number of patients arriving to our system, while providing a valued model of care for our patients as demonstrated through the exceptional patient experience rating of 88%.

Limitations to the operation of some individual MAUs across NSW have also been evidenced, although this has not negatively impacted the overall positive system wide results. The set of ten recommendations that are provided with the NSW MAU evaluation will address these limitations with the outcome of improving the effectiveness of current and future MAUs and the service they deliver to patients.

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80 NSW Ministry of Health (2011) NSW Medical Assessment Unit Evaluation Provider Survey
84 Brandao de Souza L (2009) Trends and approaches in lean healthcare, Leadership in Health Services, 22(2): 121 - 139
85 Goldratt EM (1999) What is this thing called Theory of Constraints; and how should it be implemented, North River Press
APPENDIX 1 – NSW MAU MODEL OF CARE
**NSW Medical Assessment Units (MAUs) Model of Care**

What is the model?

Medical Assessment Units are inpatient short stay units that are usually close to or co-located with an Emergency Department and are typically staffed by inpatient teams.

The difference between a MAU and an inpatient unit is that the MAUs feature a dedicated multidisciplinary team led by consultants, who should be available on a daily basis (if not twice daily) to conduct rounds with the multidisciplinary team and provide timely access to treatment and management decisions.

Medical Assessment Units provide an alternative to treatment in the Emergency Department for undifferentiated, complex, chronic, non-critical medical patients. These patients are not critically ill but have complicated conditions that take time to assess and require a range of medical expertise to diagnose and treat.

MAUs are staffed by an experienced and comprehensive multidisciplinary team, who is able to conduct rapid patient assessments, reach faster diagnosis and provide earlier treatment.

Once a patient is assessed, their condition diagnosed and treatment provided, they will be able to return to home within 48 hours with community services provided as necessary. If further treatment is required, they will be referred to an inpatient team and transferred to a specialty ward.

A typical patient suitable for management in a MAU is the undifferentiated complex non-critical medical patient generally with co-morbidities. MAUs are also suited to the complex and chronic paediatric patient; there are specific paediatric models in NSW.

These patients can be streamed to the MAU from:

- The community (i.e. GPs, specialist rooms, ambulatory care or other identified community referrals) directly to the MAU through predefined pathways.
- ED triage direct to MAU – where the suitability of a patient is determined at ED triage, usually by the ED nurse or doctor or an MAU nurse or doctor.

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Within the ED after a very short period of time – the suitability of the patient is usually determined within the first hour of the ED stay by the ED nurse or doctor or or a MAU nurse or doctor.

In NSW, the MAU model of care provides two streams of care:

**Stream One** is for those patients that go home direct from the MAU. These patients have previously typically stayed in hospital for 3-5 days and can now be provided with rapid assessments, faster diagnosis and earlier treatments and sent home safely within 48 hours, with community care if needed. This patient group should account for approximately 50% of patients that are admitted to the MAU.

**Stream Two** is for those patients that are transferred to a specialty ward from the MAU. In an MAU, these patients are provided with rapid assessment, faster diagnosis and commencement of treatment within the MAU. They are then referred to an inpatient team and transferred to an in-patient ward after approximately 24-48hrs with a documented plan of care to be followed and sent home safely within 5-7 days. This patient group should account for approximately 50% of patients that are admitted to the MAU.

**Why use the model?**

MAUs provide rapid access to an experienced multidisciplinary team at or near to the point of entry into a hospital for undifferentiated, complex, chronic, non-critical medical patients. The MAU team aims to provide rapid assessments, faster diagnosis and earlier treatment to enable patients to return to their home environment within 48 hrs or to an inpatient ward if further treatment is needed.

**Key principles**

MAUs in operation in NSW vary in size and are either co-located to Emergency Departments, co-located to an existing ward or are standalone units. The types of patients assessed and treated in MAUs range from general medical to aged care, paediatric, respiratory and cardiac-specific patients.

Regardless of the size of the unit or the funding received, Medical Assessment Units aim to provide a model of care for undifferentiated, complex, chronic, non-critical medical patients. The outcome that each unit sets out to achieve is determined through the four main outcome measures:

- The MAU Model of Care provides patients with rapid access to the Medical Assessment Unit (Right Care, Right Time, Right Place, and Right Provider) – measured as average total time for all MAU patients in the ED.
- The MAU Model of Care provides patients with access to rapid assessment, faster diagnosis and earlier treatment within 48 hours – measured as average length of stay in the MAU.
- The MAU Model of Care provides patients who require further inpatient care, a continued management plan based on their initial rapid assessment, faster diagnosis and earlier treatment -measured as average length of stay for MAU patients transferred to an inpatient unit.
- The MAU Model of Care provides patients with safe and effective care; ongoing care or support is provided in their home environment if needed – measured as MAU readmission rates.

**Other Models of Care to Support Early Entry into a MAU**

Triage - Triage is streamlined to facilitate an efficient process that does not itself create a barrier to further assessment and clinical care. Only essential functions occur at the point of triage: the determination of patient acuity and level of urgency, basic first aid if needed, and referral to the most appropriate area for treatment. This can include models of care both within the ED and within the hospital.\(^{89}\) It is envisaged that hospitals with well developed MAUs and dedicated medical staffing utilise direct patient transfers from triage.

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ED Senior Assessment and Streaming – Early ED Senior Assessment and Streaming model of care focuses on the assessment and treatment process that determine an early diagnosis, clinical management plan and disposition decision for patients. This model of care improves front line processes such as triage and includes early streaming of patients by a senior decision maker to avoid queuing and delays to care. It is envisaged that Emergency Departments utilising this model of care will stream appropriate patients direct to the MAU.

Clinical Initiatives Nurse (CIN) – The Clinical Initiatives Nurse (CIN) is a senior nursing role that provides nursing care to patients in ED waiting rooms. The three main functions of the CIN nurse are to:
1. Maintenance of an ED nursing presence in the waiting room to facilitate a safe clinical environment
2. Communication with patients and carers regarding ED processes, waiting times and provision of relevant education on their health issues
3. Assess patients following triage to Initiate diagnostics or treatment, escalate care or refer patients to suitable services which may be external to the ED.

It is envisaged that Emergency Departments who have CIN nurses will utilise them to identify and refer patients to the MAU.

ASET (Aged Care Services in Emergency teams) – The ASET model of care is based on early identification, assessment and care planning for an older person presenting to an Emergency Department with identified aged care needs in addition to their acute care condition.

The primary goal of ASET is to improve the health outcomes of older people on presentation to the ED, minimise the requirement to remain in hospital, and prevent readmissions once patients are discharged by providing linkages to community services for support in the home environment.

In EDs that are utilising the ASET model of care, length of stay reductions of 60min have been seen in the over 70 years age group. The use of ASET also coincides with a 0.4% reduction in representations rates for the 70-74 year age group.

It is envisaged that Emergency Departments with ASET will utilise them to stream appropriate patients direct to the MAU.

Other Models of Care to Support Discharge to Home Environment from MAU

Rehabilitation services - Under the NSW Rehabilitation Model of Care, rehabilitation is defined as the provision of care that aims to:
- restore functional ability for a person who has experienced an illness or injury
- enable regaining function and self-sufficiency to the level prior to that illness or injury within the constraints of the medical prognosis for improvement
- develop functional ability to compensate for deficits that cannot be medically reversed.

Any patient discharged from the MAU requiring rehabilitation has the option of being referred to many ambulatory care options. Patients can access:
- Ambulatory Care (Day Hospital) - a comprehensive rehabilitation program conducted by a multidisciplinary team in an outpatient setting
- Ambulatory Care (Outpatients) – discipline specific therapy provided in an outpatient setting
- Ambulatory Care (Home based) – rehabilitation services provided in the patients home
- Outreach rehabilitation service for rural and regional centres (hub and spoke) - rehabilitation provided outside a specialised rehabilitation unit.

90 NSW Ministry of Health and Emergency Care Institute, Emergency Department Senior Assessment and Streaming Model of Care, will soon be available at: http://www.ecinsw.com.au/models-of-care
ComPacks – this is a non-clinical case managed program of community care available for people being transferred home from a participating New South Wales Public Hospital. It has been developed for patients who require immediate access to case management and a combination of community services to safely return home from hospital.95

Hospital in the Home (HITH) services provide acute and post-acute care to children and adults residing outside hospital, as a substitution or prevention of in-hospital care. A person may receive their care at home (including Residential Aged Care Facilities) or in a hospital or community clinic setting (this may include at school or in the workplace). HITH care is short-term and preferably interdisciplinary, including doctors, nurses and allied health practitioners. It aims to provide the most appropriate care setting, avoid hospital admissions and reduce patient length of stay.

The most common conditions and treatments delivered by adult HITH services are intravenous antibiotic therapy for cellulitis, genitourinary tract, respiratory tract, postoperative/post-traumatic infections and osteomyelitis, and anticoagulant therapy for deep vein thrombosis or pulmonary embolism. For paediatric services, complex wound dressings for eczema, intravenous antibiotic therapy for cellulitis and cystic fibrosis are most common.96

ARRCS (Acute to Aged-Related Care Services) – The AARCS aims to provide inpatient hospital coordination for older patients with complex and chronic conditions.

It is envisaged that hospitals that have AARCS will utilise this service to assist appropriate MAU patients.

Benefits of the model

■ Reduction in undifferentiated, complex, chronic, non-critical medical patients presenting to the ED by providing direct referral to the MAU
■ Reduced length of stay in the ED for undifferentiated, complex, chronic, non-critical medical patients
■ Decreased in-hospital Length of Stay (LOS) by providing rapid assessment, faster diagnosis and earlier treatment at the point of entry into a hospital
■ Reduced level of intensive investigations prior to decision-making
■ Reduced number of patient outliers on inpatient wards
■ Reduction in readmissions due to improved coordination and early activation for community care for those patients discharged home.

Challenges

■ Identification of ‘MAU-appropriate patients’ prior to or at entry into the hospital
■ Community and ED staff education about patient suitability for the MAU
■ ED MAUs are used as an overflow unit when the ED is busy
■ MAU used as a holding bay until ward beds become available
■ MAU used for acute inpatient admissions when inpatient beds are not available.

Case for implementation

To assess the need to implement this model to support your hospital, consider the following:

Patient demand for a MAU from the ED (determining what proportion of ED presentations are undifferentiated, complex, chronic, non-critical medical patients): -

■ What proportion (% and number) of Emergency Department presentations are medical patients (i.e. do not need surgical intervention)?
■ What proportion (% and number) of Emergency Department medical patients were admitted to an in-patient unit (i.e. medical patients that are not admitted and discharged from the ED)?
■ What proportion (% and number) of Emergency Department medical patients were admitted to an in-patient unit (i.e. medical patients that are not admitted and discharged from the ED) for single organ v’s complex conditions?

95 ARCHI Retrieved 5.6.12 http://www.archi.net.au/resources/moc/community-moc/compacks/2
What is the age breakdown and ALOS in the ED for (i.e. are medical patients managed for > 4hrs in the ED?): -

Medical patients admitted and discharged from the ED.
Medical patients admitted to an inpatient unit from the ED.
Medical patients admitted to an inpatient unit from the ED for single organ v's complex conditions.
If you have an Emergency Department Short Stay Unit OR Emergency Medical Unit what proportion (% and number) of admitted medical patients utilise this and are then transferred to another in-patient unit?

**Patient demand for a MAU from the community** (determining what proportion of community presentations are undifferentiated, complex, chronic, non-critical medical patients): -

- What proportion (% and number) of separations from your hospital are medical DRGs (i.e. not surgical or procedural)?
- What proportion (% and number) of these patients were referred into the hospital (source_of_referral) from 02-community health, 03-outpatients, 06-nursing home/residential aged care facility?

**Patient outcomes to determine MAU viability** (determining what proportion of readmitted undifferentiated, complex, chronic, non-critical medical patients would have benefitted from a MAU): -

- What is the readmission rate for your hospital?
- What is the readmission rate for unplanned medical patients in your hospital?
- What is the age breakdown of unplanned medical readmissions?
Medical Assessment Unit Patient Flow

0-4hrs Prior to MAU admission

Identify MAU Appropriate Patients

The undifferentiated, complex, chronic, non-critical medical patients accesses MAU from:
- The community (i.e. GPs, specialist rooms, ambulatory care or other identified community referrals) directly to the MAU through predefined pathways.
- ED triage direct to MAU – where the suitability of a patient is determined at ED triage, usually by the ED nurse or doctor or an MAU nurse or doctor.

Within the ED after a very short period of time – the suitability of the patient is usually determined within the first hour of the ED stay by the ED nurse or doctor or a MAU nurse or doctor.

0 - 2 hrs In MAU

MAU patient assessment by Medical & Nursing

MAUs are staffed by an experienced and comprehensive multidisciplinary team, who is able to conduct rapid patient assessments, reach a faster diagnosis and provide earlier treatment.

Rapid assessment conducted by Nursing Team

Rapid assessment conducted by Medical Team

2-4 hrs In MAU

MAU patient assessment by Allied Health

MAUs are staffed by an experienced and comprehensive multidisciplinary team, who is able to conduct rapid patient assessments, reach a faster diagnosis and provide earlier treatment.

Rapid assessment conducted by Allied Health Team

Within 12 hrs In MAU

MAU patient planning at Multidisciplinary Ward Round

MAUs feature a dedicated multidisciplinary team led by consultants, who should be available on a daily basis (if not twice daily) to conduct rounds with the multidisciplinary team and provide timely access to treatment and management decisions

Multidisciplinary Ward Round

Fast diagnosis and early treatment decisions conducted by medical, nursing & allied health team

Within 48 hrs In MAU

MAU patient transition to home environment or in-patient unit

Return home or transfer to ward

Once a patient is assessed, their condition diagnosed and treatment provided, they will be able to return to home within 48 hours with community services provided as necessary. If further treatment is required, they will be referred to an inpatient team and transferred to a specialty ward.

If further inpatient care, a continued management plan required based on their initial rapid assessment, faster diagnosis and earlier treatment.

Ongoing care or support is provided in the patients home environment if needed.
Access to dedicated porters, cleaners & ward assistant facilitates continual patient flow

Dedicated Allied Health staff preferably 7 days/week of physiotherapy, occupational therapy & social work
Speech Pathology, Pharmacy and Dieticians, consideration of part time or full time basis dependant on unit requirements.

Nursing Unit Manager – dedicated is optimal, dependant on size of unit
Care Coordinator – dedicated supernumerary position to allow early patient ID, improve patient flow & reduce delays (i.e. NP/CNC/CNS2/etc) preferably 7 days/week
Dedicated nursing staff for direct patient care preferably 1:4 ratio

Dedicated medical director preferably a General Medical staff specialist – i.e. a senior decision maker
Dedicated medical staffing preferably Monday to Sunday, 8-10pm to allow for direct patient admissions
VMO & rotating medical workforce delays timely access & discharge for MAU patients

Dedicated medical director preferably a General Medical staff specialist – i.e. a senior decision maker

Dedicated medical staffing preferably Monday to Sunday, 8-10pm to allow for direct patient admissions
VMO & rotating medical workforce delays timely access & discharge for MAU patients

Dedicated Allied Health staff preferably 7 days/week of physiotherapy, occupational therapy & social work
Speech Pathology, Pharmacy and Dieticians, consideration of part time or full time basis dependant on unit requirements.

Access to dedicated porters, cleaners & ward assistant facilitates continual patient flow
APPENDIX 2 – NSW MAU KPIS,
Data Definitions and Evidence for Collection
## Key Performance Indicators – Overview of Results

<table>
<thead>
<tr>
<th>Description</th>
<th>2008/09</th>
<th>2009/10</th>
<th>2010/11</th>
<th>2011/12</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Total hrs of MAU patients in ED</td>
<td>7.2</td>
<td>7.4</td>
<td>8.1</td>
<td>7.8</td>
<td>&lt; 4 hours (previously &lt;6 hrs)</td>
</tr>
<tr>
<td>ALOS in MAU (hours)</td>
<td>56.1</td>
<td>50.6</td>
<td>49.6</td>
<td>49.7</td>
<td>≤ 48 hours</td>
</tr>
<tr>
<td>ALOS MAU patients transferred to ward (days)</td>
<td>9.5</td>
<td>8.4</td>
<td>8.0</td>
<td>7.9</td>
<td>≤ 7 days</td>
</tr>
<tr>
<td>Readmission rate within 28 days of MAU-home or MAU-ward-home separations</td>
<td>13.2%</td>
<td>13.4%</td>
<td>11.4%</td>
<td>11.8%</td>
<td>≤ 10%</td>
</tr>
</tbody>
</table>

### Process Indicators - distributed with KPIs

<table>
<thead>
<tr>
<th>Description</th>
<th>2008/09</th>
<th>2009/10</th>
<th>2010/11</th>
<th>2011/12</th>
<th>Nil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Separations from MAU</td>
<td>29,049</td>
<td>41,615</td>
<td>49,240</td>
<td>49,982</td>
<td>Nil</td>
</tr>
<tr>
<td>ALOS in MAU aged 65+ (hours)</td>
<td>60.8</td>
<td>50.9</td>
<td>49.6</td>
<td>49.7</td>
<td>≤ 48 hours</td>
</tr>
<tr>
<td>% Trans from MAU within 48hrs</td>
<td>58.8%</td>
<td>62.5%</td>
<td>62.1%</td>
<td>62.3%</td>
<td>80% - 90% (guide only)</td>
</tr>
<tr>
<td>% Discharged home from MAU</td>
<td>46.6%</td>
<td>39.7%</td>
<td>38.3%</td>
<td>39.4%</td>
<td>50%</td>
</tr>
<tr>
<td>% Discharged home from MAU within 48hrs</td>
<td>57.7%</td>
<td>62.0%</td>
<td>63.4%</td>
<td>65.1%</td>
<td>80% - 90% (guide only)</td>
</tr>
<tr>
<td>% MAU patients transferred to ward</td>
<td>53.4%</td>
<td>60.3%</td>
<td>61.7%</td>
<td>60.6%</td>
<td>50%</td>
</tr>
<tr>
<td>% Admissions direct to MAU</td>
<td>15.5%</td>
<td>12.9%</td>
<td>12.2%</td>
<td>13.2%</td>
<td>Nil</td>
</tr>
<tr>
<td>Readmission rate of MAU-home ONLY separations</td>
<td>N/A</td>
<td>N/A</td>
<td>9.1%</td>
<td>10.1%</td>
<td>≤ 10%</td>
</tr>
</tbody>
</table>

### Performance/Outcome Indicators

<table>
<thead>
<tr>
<th>Description</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Average Total Hours in ED for all MAU patients</td>
<td>≤ 4 hours</td>
</tr>
<tr>
<td>2 Average Length of Stay in the MAU (hours)</td>
<td>≤ 7 days</td>
</tr>
<tr>
<td>3 Average Length of Stay of MAU patients transferred to the ward (days)</td>
<td>≤ 10%</td>
</tr>
<tr>
<td>4 Unplanned Readmissions within 28 days of MAU discharge from MAU-home OR MAU-inpatient ward_home</td>
<td>≤ 48 hours</td>
</tr>
</tbody>
</table>

### Process Indicators

<table>
<thead>
<tr>
<th>Description</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Separations from MAU</td>
<td>Nil</td>
</tr>
<tr>
<td>6 Average Length of Stay of MAU patients aged 65yrs +</td>
<td>≤ 48 hours</td>
</tr>
<tr>
<td>7 % patients transferred from the MAU within 48hrs</td>
<td>80% - 90% (guide only)</td>
</tr>
<tr>
<td>8 % patients discharged home from MAU</td>
<td>50%</td>
</tr>
<tr>
<td>9 % patients discharged home from MAU within 48hrs</td>
<td>80% - 90% (guide only)</td>
</tr>
<tr>
<td>10 % patients transferred to inpatient ward from MAU</td>
<td>50%</td>
</tr>
<tr>
<td>11 % patient admitted directly to the MAU</td>
<td>Nil</td>
</tr>
<tr>
<td>12 Unplanned Readmissions within 28 days of MAU discharge from MAU-home</td>
<td>≤ 10%</td>
</tr>
</tbody>
</table>

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**The Medical Assessment Unit (MAU) Unit_Type = ‘87’ (Admitted Patient Data Dictionary)**

A bed in a dedicated Medical Assessment Unit (MAU) which is a physical ward that is close to the Emergency Department or co-located.

The MAU is an alternative pathway for adult non-critical medical patients; in many cases these will be chronic complex medical patients with co-morbidities.

Patients within the MAU can expect to stay for a period of up to 48 hours, after this time most will be discharged home (with community services where appropriate), while some who require specialised care will be transferred to an inpatient bed.
**Performance Indicator Descriptions**

Medical Assessment Unit performance indicators (a.k.a outcome indicators) are patient centric indicators and as such are focusing on the benefits of the MAU, for patients. The process indicators are to assist LHDs and individual hospitals to understand, manage and monitor internal processes.

1. **Average Total Hours in ED for all MAU patients**
   - **Target:** < 6hrs
   - **Criteria:** Average hours in ED for ALL patients admitted to the MAU (direct admissions who bypass ED/ED triage will be given “0hrs” for ED LOS)
   - **Numerator:** \( \text{sum(episode_length_hours)} \) where unit_type in (‘17’, ‘58’)
   - **Denominator:** Count of stays where patient was admitted to MAU and ED
   - **Data source:** DAYS_EPISODE, EPISODE
   - **Limitations:** Discharged patients; Time period; Same facility, \( \text{sum(episode_length_hours)} > 0 \) where unit_type = ‘87’

2. **Average Length of stay (hours) in MAU**
   - **Target:** < 48hrs
   - **Criteria:** Patients admitted to a MAU
   - **Numerator:** \( \text{sum(episode_length_hours)} \) where unit_type = ‘87’
   - **Denominator:** Count of stays where patient was in a MAU
   - **Data source:** DAYS_EPISODE, EPISODE
   - **Limitations:** Discharged patients; Time period; Same facility, \( \text{sum(episode_length_hours)} > 0 \) where unit_type = ‘87’
   - **Comments:** This indicator does not differentiate between patients that were admit to MAU via ED and those admitted directly to MAU

3. **Average Length of Stay of MAU patients transferred to a ward**
   - **Target:** < 7 days
   - **Criteria:** Patients admitted to MAU and subsequently transferred to inpatient ward
   - **Numerator:** \( \text{sum(episode_length_hours)} \) excluding unit_type in (‘17’, ‘58’) where patient was in a MAU and inpatient ward
   - **Denominator:** Count of stays where patient was in a MAU and inpatient ward
   - **Data source:** DAYS_EPISODE, EPISODE
   - **Limitations:** Discharged patients; Time period; Same facility, \( \text{sum(episode_length_hours)} > 0 \) where unit_type = ‘87’

4. **Readmission Rate within 28 days of MAU Discharged Home (New)**
   - **Target:** <10%
   - **Criteria:** Patients with a readmission via the Emergency Department to the same hospital within 28 days of discharge from hospital to place of usual residence. The initial inpatient stay contains some time in the MAU and may also contain some time in another inpatient ward. The patient was discharged from the MAU, an inpatient ward, or the discharge lounge. If the patient went to a discharge lounge, the time spent in the discharge lounge is not counted in any calculations and the prior ward is deemed to be the last ward.
   - **Emergency Department admission:** Unit_type = ‘17’ or ‘58’ in DAYS_EPISODE table
   - **MAU discharged to place of usual residence:** trans_type=‘DIS’ AND unit_type is a MAU ward in the DAYS_EPISODE table (or if the last ward is a transit lounge, the previous ward is used) AND Inpatient mode_of_separation in (‘1’,‘2’,‘3’,‘6’,‘7’,‘8’,‘11’) in the EPISODE table
   - **Numerator:** Count of persons in the denominator that had an admission via the emergency department within 28 days of discharge
**Denominator**: Total number of patients discharged from MAU or MAU-ward to usual place of residence  
**Data sources**: DAYS_EPISODE, EPISODE, STAY  
**Limitations**: Time period; Same facility sum(episode_length_hours) > 0 where unit_type = ‘87’

**Process Indicators Descriptions**

5. **Separations from MAU**  
**Target**: No target  
**Criteria**: Patients admitted to a MAU  
**Numerator**: Count of stays where patient was in a MAU  
**Denominator**: None  
**Data source**: DAYS_EPISODE, EPISODE  
**Limitations**: Discharged patients; Time period; Same facility sum(episode_length_hours) > 0 where unit_type = ‘87’

6. **Average Length of Stay (hours) in MAU for patients aged 65 and over**  
**Target**: <48hrs  
**Criteria**: Patients aged 65+ that were admitted to a MAU  
**Numerator**: sum(episode_length_hours) where unit_type = ‘87’ and age in STAY table >=65  
**Denominator**: Count of stays where patient was in a MAU and age in STAY table >=65  
**Data source**: DAYS_EPISODE, EPISODE, STAY  
**Limitations**: Discharged patients; Time period; Same facility sum(episode_length_hours) > 0 where unit_type = ‘87’

7. **% patients transferred from the MAU within 48hrs**  
**Target**: No target  
**Criteria**: If a patient has been transferred in/out from MAU more than once during the same inpatient episode, the stay is only counted once, but total time in MAU is aggregated.  
**Numerator**: Count of stays of stays where sum(episode_length_hours) < 48. Currently this may cause a rounding problem, so alternately sum the difference in hours and minutes between start_date and end_date for all MAU wards  
**Denominator**: Count of stays where patient was in a MAU  
**Data source**: DAYS_EPISODE, EPISODE  
**Limitations**: Discharged patients; Time period; Same facility sum(episode_length_hours) > 0 where unit_type = ‘87’

8. **% patients discharged home from the MAU**  
**Target**: No Target (Advice: To maintain patient flow this needs to be approximately 30% or greater)  
**Criteria**: admitted to MAU AND discharged home to place of usual residence from MAU unit  
**Numerator**: Count of MAU discharges where trans_type='DIS' AND unit_type is a MAU ward in the DAYS_EPISODE table AND mode_of_separation in (‘1’,'2’,'3’,'6’,'7’,'8’,'11’) in the EPISODE table  
BO calculates as below: Total hrs – (ED_hrs+discharge_lounge_hrs+MAU_hrs) = 0 and mode of separation in (1,2,3,6,7,8,11).  
**Denominator**: Count of stays where patient was in a MAU  
**Data source**: DAYS_EPISODE, EPISODE  
**Limitations**: Discharged patients; Time period; Same facility sum(episode_length_hours) > 0 where unit_type = ‘87’

9. **% patients discharged home from the MAU within 48hrs**  
**Target**: No Target  
**Criteria**: Number of MAU patients who spent less than 48 hrs in MAU discharged directly to home or usual residence mode_of_sep in (‘1’,’2’,’3’,’6’,’7’,’8’,’11’) and time spent in other wards except ED and discharge lounge = 0.  
**Denominator**: Number of patients discharged from MAU  
**Data source**: DAYS_EPISODE, EPISODE
Limitations: Discharged patients; Time period; Same facility sum(episode_length_hours) > 0 where unit_type = ‘87’

10. % patients transferred to an inpatient ward from the MAU
   Target: No Target (Advice: To maintain patient flow this needs to be approximately 70% or less)
   Criteria: Patients admitted to MAU and subsequently transferred to inpatient ward
   DAYS_EPISODE table contains a record with Unit_type = ‘87’ and Total hours spent excluding ED Hours, MAU Hours and Discharge Lounge Hours is greater than zero.
   Numerator: Count of stays where patient was in a MAU and inpatient ward
   Denominator: Count of stays where patient was in a MAU
   Data source: DAYS_EPISODE, EPISODE
   Limitations: Discharged patients; Time period; Same facility sum(episode_length_hours) > 0 where unit_type = ‘87’

11. % patient admitted directly to the MAU
    Target: No Target
    Criteria: Percentage of patients admitted directly to MAU ward without coming through an ED to the total number of MAU Patients
    Numerator: Number of patients stayed in MAU who spent no time in ED.
    Denominator: Count of stays where patient was in a MAU
    Data source: DAYS_EPISODE, EPISODE
    Limitations: Discharged patients; Time period; Same facility sum(episode_length_hours) > 0 where unit_type = ‘87’

12. Readmission Rate within 28 days of MAU Discharged home direct from MAU unit
    Target: Nil
    Criteria: Patients with a readmission via the Emergency Department to the same hospital within 28 days of discharge from MAU ward/unit to place of usual residence. The inpatient stay only contained time in the MAU ward and the patient was discharged from MAU.
    Emergency Department admission: Unit_type = ‘17’ or ‘58’ in DAYS_EPISODE table
    MAU discharged to place of usual residence: trans_type='DIS' AND unit_type is a MAU ward in the DAYS_EPISODE table AND Inpatient mode_of_separation in (‘1’, ‘2’, ‘3’, ‘6’, ‘7’, ‘8’, ’11’) in the EPISODE table
    Numerator: Count of persons in the denominator that had an admission via the emergency department within 28 days of discharge
    Denominator: Count of admissions to MAU that were discharged from the MAU ward
    Data sources: DAYS_EPISODE, EPISODE, STAY
    Limitations: Time period; Same facility
MAU Key Performance Indicators (KPIs) – Evidence for Collection

Performance/Outcome indicators

Average Total Hours in ED for all MAU patients

This indicator is to identify if the MAU Model of Care is providing patients with rapid access to the Medical Assessment Unit, ‘Right Care, Right Time, Right Place, and Right Provider’ and is monitored with the outcome measure, Average total hours of MAU patients in the ED.

The collection of this indicator allows for patients who by-pass the ED to have ‘0’hrs for ED length of stay. This was done due to data limitations of some ED systems, and the inability to collect ED Triage to MAU admissions as direct admissions. This indicator suggests that the more direct admissions the lower it should be.

Evidence: Able to decrease morbidity and mortality by not having patients in the ED for longer than 8 hrs

- Reversal of ED overcrowding leading to a decrease in mortality rates (Geehold GC and De Klerk NH (2012) Emergency department overcrowding, mortality and the 4-hour rule in Western Australia, Medical Journal of Australia, 196 (2):122-126)
- 30% Increase in Mortality for access block patients (Richardson DB (2006) Increase in patient mortality at 10 days associated with emergency department overcrowding, Medical journal of Australia, 184:213-216)
- Other Evidence:

Average Length of stay (hours) in MAU

This indicator is to identify if the MAU Model of Care is providing patients in the MAU with access to rapid assessment, faster diagnosis and earlier treatment within 48 hours. This is monitored with the outcome measure, Average length of stay in the MAU.

Evidence:

- Significantly reducing length of stay without adversely affecting readmission rates
  - Pg 429: ‘this study has shown that older patients with more complex care needs are more likely to be readmitted. Surprisingly, a rapid throughput of patients is not associated with readmission’... Importantly this study has demonstrated that most readmissions can be avoided with more judicious multidisciplinary medical care”

Average Length of Stay of MAU patients transferred to the ward (days)

This indicator is to identify if the MAU Model of Care is providing patients who require further inpatient care, a continued management plan based on their initial rapid assessment, faster diagnosis and earlier treatment. This is monitored with the outcome measure Average length of stay for MAU patients transferred to an inpatient ward.
Evidence:
- The target is currently set at <7 days, the evidence gathered through data analysis in 2007 prior to the MAUs commencing showed ‘Average length of stay in hospital is 4 days. For people aged over 75 this jumps to 9 days’
- With the MAU model of care directed to undifferentiated, complex, chronic, non-critical medical patients, it was identified prior to the commencement of the MAUs that a high proportion of these patients would be the older patient

Unplanned Readmissions within 28 days of MAU discharge from MAU-home OR MAU-inpatient ward_home

This indicator is to identify if the MAU Model of Care is providing patients with safe and effective care; ongoing care or support is provided in their home environment if needed. This is monitored with the outcome measure Readmission rate within 28 days of MAU-home or MAU-ward-home separations. PLEASE NOTE: on a monthly basis when the MAU summary report is distributed, every MAU also receives the readmission MRNs for every patient, so individual site analysis can be conducted and trends identified.

Evidence:
- Setting of the benchmark at 10%
  - Based on evidence in the literature it is known that undifferentiated, complex, chronic, noncritical medical patients have high readmission rates.
  - The unplanned readmission rate for all admissions in NSW is set at 6.3%
  - 10% was seen (based on verbal discussions with the Physicians Taskforce in 2007 prior to commencement of the MAUs) as the benchmark for this clientele group
- Significantly reducing length of stay without adversely affecting readmission rates
  - Pg 429: ‘this study has shown that older patients with more complex care needs are more likely to be readmitted. Surprisingly, a rapid throughput of patients is not associated with readmission’... Importantly this study has demonstrated that most readmissions can be avoided with more judicious multidisciplinary medical care”

Process indicators

Separations from MAU

The MAU length of stay is on average 48 hrs (2 days). Based on this 48 hours length of stay the average amount of patients per year you could get through 1 MAU bed (based on the theory that it is opened and available for 365 days of the year 24 hours a day- i.e. 100% occupancy) is 183 patients [i.e. 365 days (total bed days)/2 (available bed days)].

<table>
<thead>
<tr>
<th>Available MAU Beds</th>
<th>80% Occupancy</th>
<th>85% Occupancy</th>
<th>90% Occupancy</th>
<th>100% Occupancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 beds</td>
<td>1,171 patients</td>
<td>1,244 patients</td>
<td>1,318 patients</td>
<td>1,464 patients</td>
</tr>
<tr>
<td>10 beds</td>
<td>1,464 patients</td>
<td>1,556 patients</td>
<td>1,647 patients</td>
<td>1,830 patients</td>
</tr>
<tr>
<td>12 beds</td>
<td>1,757 patients</td>
<td>1,867 patients</td>
<td>1,976 patients</td>
<td>2,196 patients</td>
</tr>
<tr>
<td>15 beds</td>
<td>2,196 patients</td>
<td>2,333 patients</td>
<td>2,471 patients</td>
<td>2,745 patients</td>
</tr>
<tr>
<td>20 beds</td>
<td>2,928 patients</td>
<td>3,111 patients</td>
<td>3,294 patients</td>
<td>3,660 patients</td>
</tr>
</tbody>
</table>

Average Length of Stay (hours) in MAU for patients aged 65 and over

This indicator is to identify if the MAU Model of Care is providing patients, regardless of age and associated co-morbidities and complexity, with rapid assessment, faster diagnosis and earlier treatment.
The elderly complex medical patient is one of the primary patient groups assessed and treated in the majority of MAUs. The process measure to capture this patient group is *Average length of Stay in the MAU for aged 65 yrs +.*

**% patients transferred from the MAU within 48hrs**

This indicator is to identify if the MAU Model of Care is providing patients with care through its 2 streams. Through use of the 2 streams of care, the MAU can generate its own internal patient flow by managing an approximate ratio of 50% patient’s home in 48hrs and 50% to an in-patient bed in 48hrs. The constant turnover of the 50% patient’s home generates internal capacity within the MAU and allows the ability to ‘pull’ patients from the ED. The process measure to capture these patient groups is **% patients transferred from the MAU within 48 hours.**

It is recommended around 80-90% of patients are transferred from the MAU within 48hrs. Anything less than 70% would be symptomatic of exit block from the MAU i.e. a higher proportion of patients needing transfer to a ward rather than going home. The overall benefits that have been described when utilising this model was reduction in the overall outliers in the MAU as you are proactively selecting patients for MAU beds.

**% patients discharged home from the MAU**

This indicator is to identify if the MAU Model of Care is providing care for patients through its 1st stream of care **those patients that go home direct from the MAU.** These patients have previously typically stayed in hospital for 3-5 days and can now be provided with rapid assessments, faster diagnosis and earlier treatments and sent home safely within 48 hours, with community care if needed. This patient group accounts for approximately 50% of patients that are admitted to the MAU. The process measure to capture this patient group is **% patients discharged home from the MAU.**

It is recommended that approximately 50% patients are discharged home from the MAU. Anything less than 30% would be symptomatic of exit block from the MAU i.e. a higher proportion of patients needing transfer to a ward rather than going home.

**% patients discharged home from the MAU within 48hrs**

This indicator is to identify if the MAU Model of Care is providing care for those patients that are discharged home and will be processed through the MAU within 48 hours. The process measure to capture this patient group is **% patients discharged home from the MAU within 48 hours.**

It is recommended around 80-90% of patients are transferred from the MAU within 48hrs. It is understood that some patients will be home prior to 48 hours and some patients may need slightly longer and referral to an inpatient ward for another 24hrs post the MAU stay is deemed inappropriate.

**% patients transferred to an inpatient ward from the MAU**

This indicator is to identify if the MAU Model of Care is providing care for patients through its 2nd stream of care **those patients that are transferred to a specialty ward from the MAU.** These patients have previously typically stayed in hospital for 7-9 days and are now provided with rapid assessment, faster diagnosis and commencement of treatment within the MAU. They are then referred and transferred to an in-patient ward within 24–48 hrs, with a documented plan of care. The process measure to capture this patient group is **% patients transferred to a specialty ward.**
It is recommended that approximately 50% patients are transferred to a ward from the MAU. Anything less than 30% would be symptomatic of exit block from the MAU i.e. a higher proportion of patients needing transfer to a ward rather than going home.

% patient admitted directly to the MAU

The MAU model of care describes a typical patient suitable for management in a MAU is the undifferentiated complex non-critical medical patient with co-morbidities. These patients are streamed from 3 main sources community (GPs, specialist rooms, ambulatory care or other identified community referrals), ED triage or within the ED. The process measure to capture the community patient group is % direct admissions to the MAU.

Readmission Rate within 28 days of MAU Discharged home direct from MAU unit

It is expected that those patients from Stream One who are discharged directly from the MAU are provided with safe and effective care. This is a subset of the overall MAU readmission rate which is reflective of both streams of the MAU model of Care. It should be noted that the less patients that are discharged home from the MAU directly impacts this indictor, due to a decreased denominator. The process measure to capture this patient group is % Readmission within 28 days of MAU to Home ONLY separations.