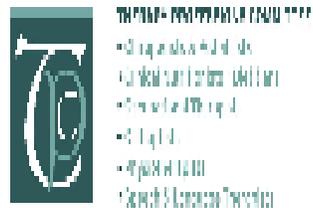# Report of the National Acute Medicine Programme

Royal College of Physicians of Ireland
Irish Association of Directors of Nursing and Midwifery
Therapy Professions Committee
Quality and Clinical Care Directorate,
Health Service Executive

Founded 1904

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Glossary

Acute medicine is the part of general (internal) medicine concerned with the immediate and early specialist management of adult patients suffering from a wide range of medical conditions who present to, or from within, hospitals requiring urgent or emergency care.

ASCHICE - ambulance information system
Age — patient's age
Sex — whether the patient is male or female
History — what has happened to the patient (e.g. collapsed in street)
Injuries/illness — what injuries have been sustained, or what illness symptoms are presenting
Condition — observations of the patient (pulse, BP etc.), interventions used (cannulation, intubation etc.)
ETA — estimated time of arrival to the hospital

An **acute medical unit (AMU)** is a facility whose primary function is the immediate and early specialist management of adult patients (i.e. aged 16 and older) with a wide range of medical conditions who present to a model 4 (tertiary) hospital. Its aim is to provide a dedicated location for the rapid assessment, diagnosis and commencement of appropriate treatment. Physicians, supported by a multidisciplinary team, will carry out patient assessment and treatment. It is envisaged that AMUs will operate on a 24/7 basis. The AMU should be co-located with the ED. Every AMU should have a designated lead consultant physician, clinical nurse manager and therapy lead. If required, patients can be admitted to the short stay medical beds within the unit for a short period for acute treatment and/or observation where the estimated length of stay is less than 48 hours.

An **acute medical assessment unit (AMAU)** will operate as an AMU with the following exceptions: It will be located in a model 3 (general) hospital; the hours of operation may vary from 12 to 24 hours, 7 days per week, depending on service need; and it will not have contiguous short stay medical beds.

The **AMU/AMAU lead physician** is a consultant physician with a special interest in acute medicine who has overall responsibility for the effective management of the AMU/AMAU.

Ambulatory care is clinical care which may include diagnosis, observation, treatment and rehabilitation, that is not provided within the traditional hospital bed base or within traditional out-patient services, and that can be provided across the primary/secondary care interface. In the context of acute medicine, it is care of a condition that is perceived either by the patient or by the referring practitioner as urgent, and that requires prompt clinical assessment, undertaken by a competent clinical decision maker. The healthcare setting may vary, but for optimal clinical care will often require prompt access to diagnostic support. Ambulatory care must be high quality care, designed to ensure the best outcomes for patients. It is the responsibility of those delivering the care to ensure that resources are deployed in the most cost-effective manner.

A **board round** is a desktop review by senior medical doctor(s) and nursing staff of the status of medical patients with a view to potential discharge.

Clinical justice relates to the application of the same principles of equity of access to senior clinical decision makers and diagnostic resources for all patients across the acute floor. The same metrics in terms of time of assessment by a senior medical doctor (i.e. one hour from arrival or sooner depending on patient acuity) and timely access to diagnostic resources should apply to patients in the ED and AMU/AMAU.

An **early warning score (EWS)** is a physiologically based system of scoring a patient's condition to help determine severity of illness and predict patient outcomes.

Integrated service areas (ISAs) are the local service delivery unit within the four HSE regions that deliver all health and social care services for a given population. Primary care teams comprise the building blocks for an ISA and an ISA must have at a minimum an acute hospital that provides the broad range of secondary care services, defined as a model three hospital. The purpose of the ISA is to deliver an integrated health and social care service to that population. The catchment area for each ISA is determined by a set of criteria such as secondary care catchment areas for acute hospitals, minimum population of 100,000 people, local authority boundaries for personal and social services, access/transport routes and cognisance of local/cultural issues.

A **medical assessment unit (MAU)** in a model 2 (local) hospital will see GP referred, differentiated medical patients who have a low risk of requiring full resuscitation. It will have assessment beds in a defined area and serve a clinical decision support function. Admissions will be to in-patient beds in a model 2 hospital. Patients who deteriorate unexpectedly will have guaranteed transfer to a model 3 or model 4 hospital.

The **models of hospitals** involves 4 levels of acute hospitals in relation to acute medicine patients, as proposed by the national clinical programmes. The models are: model 4 - tertiary hospital; model 3 - general hospital; model 2 - local with selected (GP-referred) medical patients; and model 1 - community/district.

A **navigation hub** is an ICT facilitated central resource staffed by case managers to direct, in real time, patients or clinicians to the service that is most appropriate for their needs.

A regional critical care retrieval team is proposed as part of the critical care programme for the safe regional or supra-regional transport of critically ill patients.

A **senior medical doctor** is a consultant, specialist registrar or registrar who has the competencies and experience to make a prompt clinical diagnosis and decide the need for specific investigations and treatment, the mode of treatment and the most appropriate setting for that treatment and ongoing care.

1. Executive summary

The acute medicine programme is a clinician-led initiative between the Royal College of Physicians of Ireland (RCPI), the Irish Association of Directors of Nursing and Midwifery (IADNAM), the Therapy Professions Committee (TPC), the Irish College of General Practitioners (ICGP) and the Quality and Clinical Care Directorate (QCCD), HSE. The programme recognises the essential role of large and small hospitals, general practitioners (GPs) and community services. It provides a framework for the delivery of acute medical services which seeks to substantially improve patient care.

The overarching aims of this programme are to ensure that all acute medical patients will experience:
- Safe, quality care
- Expedited diagnosis
- The correct treatment
- An appropriate environment
- Respect of their autonomy and privacy
- Timely care from a senior medical doctor working within a dedicated multidisciplinary team
- Improved communication
- A better patient experience

The key aspects of the programme are summarised below and explained in detail in the document. These include:

- **Standardised, safe patient care:** detailed guidelines, algorithms, care pathways and patient information materials will be developed and implemented for the most common acute medical presentations, which will include a focus on the prevention and control of healthcare associated infection.

- **Hospital models:** the purpose of these models is to provide a clear delineation of hospital services based upon the safe provision of patient care within the constraints of available facilities, staff provision, resources and local factors. The future growth in healthcare will be in the areas of ambulatory care (including chronic disease management and day surgery), diagnostics and rehabilitation which will be based in local (model 2) hospitals. As a result of these emerging models of healthcare delivery and the ageing population the total volume of activity in local hospitals will need to grow substantially for the successful implementation of this programme.

- **Primary care:** general practitioners (GPs) will be supported by their hospital colleagues in the provision of clinical discussion, assessment and treatment for patients with acute medical problems about whom the GP is concerned.

- **Acute medical units (AMUs), acute medical assessment units (AMAUs) and medical assessment units (MAUs):** the programme defines these different types of assessment units, how they should be led, operated and resourced and how they differ per hospital model.

- **National early warning score:** the programme recommends the implementation of a national early warning score (EWS) and associated protocols to enable early identification of deterioration in patients and how they should be best managed.

- **Navigation hub/bed bureau and case manager (CM):** the programme believes that acute medical services are best delivered within the context of an integrated service area (ISA) utilising a navigation hub concept where case managers (CMs) are able to stream patients referred by GPs and other services to the most appropriate pathways of care.

- **Governance and metrics:** the programme sets key accountabilities for the management of assessment units and key metrics to monitor their performance and effectiveness and so enable continuous improvement.

- **New working practices/continuous presence:** the programme sets out recommended enhancements to clinical work practices in order to ensure patients receive timely care from a senior medical doctor working within a dedicated multidisciplinary team and are discharged appropriately.

- **New approach to education, training and development:** the programme recommends the development of acute medicine as a specialty and the establishment of a cadre of acute medicine physicians (i.e. physicians with acute medicine as their primary specialty and physicians with a 50/50 acute medicine/other specialty interest). To facilitate this the RCPI will establish a new acute medicine training curriculum. The programme also recommends the development of acute medicine as a specialty for nursing and therapy professions.

- **Retrieval service:** critical to the success of the programme is the concept of guaranteed streaming and reverse streaming of patients to appropriate sites of care across the ISA with appropriate senior clinical input, by the case managers. To facilitate this further and to improve safety, the programme recommends the establishment of a retrieval service and associated transfer protocols.

- **Acute floor:** the development of an acute floor concept (in model 3 and 4 hospitals) comprising a co-located emergency department, acute medical unit, coronary care unit, acute stroke unit, intensive care unit, high dependency unit, interventional cardiology suite, acute surgical assessment unit and clinical decision unit is proposed.

The programme believes that the successful implementation of its recommendations will provide benefits to both service users and service providers. Patient advocates played a key role in the design of the programme and will continue to be involved in its implementation and evaluation.

The key benefits are outlined below for:

Acute medicine patients	• No patient will be cared for on a trolley for an extended period. • Patients will get the correct treatment. • Unnecessary delays and duplication in assessment, diagnosis and treatment will be prevented. • All patients will be seen by a senior medical doctor within 1 hour. • All key decisions will be reviewed by a consultant. • The patient and family/carers will be afforded the opportunity to have discussions with a senior medical doctor.
GPs	• The relationship between hospital staff and GPs will be a two way process based on mutual respect. • GPs will have direct methods of communication with consultants, case manager, nurse managers and therapy leads and be able to select the most appropriate patient pathway from a wider range of assessment, diagnostic and treatment options. • In addition to direct methods of communication, GPs will have accessible appropriate advice, assessment and treatment for patients with acute medical problems about whom the GP is concerned. • GPs will have direct access to diagnostic services (e.g. radiology, endoscopy) as per agreed protocols. • GPs will be members of the governance structure for the AMUs/AMAUs/MAUs. • GPs may wish to work within the hospital models in addition to their primary care role.
Nurses and directors of nursing	• Nurses will work in an environment which will provide dignified care for their patients. • No patient will be cared for on a trolley for an extended period. • Nurses will have an expanded role in the delivery of patient care including discharge planning and X-rays and medication prescribing. • Standardised, evidence-based care pathways and protocols developed through the Quality and Clinical Care Directorate (QCCD) to ensure that every patient receives the most appropriate care. • Evidence-based information on nursing and healthcare assistant staffing will be developed. • Identification and development of competencies for nurses working in acute medicine, in line with a forthcoming publication from the National Council for the Professional Development of Nurses and Midwives. • Development of the role of the nurse in line with the forthcoming publication from the Department of Health and Children. • The promotion of patient safety and quality of care will lead to better patient outcomes. • Enhanced interdisciplinary referrals will be determined using protocols. • Nurses will use the national early warning score (EWS) system which facilitates standardised identification of patients at risk of deterioration. • Nurse-led clinics will be established. • The case manager will have a nursing background. • The director of nursing is part of the leadership team responsible for ensuring the effective implementation of the programme.
Hospital doctors	• Will be able to assess, diagnose and treat patients in a dignified environment. • No patient will be cared for on a trolley for an extended period. • Care pathways and protocols developed through the Quality and Clinical

	Care Directorate (QCCD) will ensure that every patient receives the most appropriate care.
	• Same day diagnostics will be provided.
	• Rapid access to consultation and OPD services will be provided.
	• Doctors will not have competing responsibilities which will conflict with the provision of acute medical care.
	• Doctors will have protected time when off service to develop additional specialty/management interests.
	• The programme is a clinician-led initiative involving wide spread clinician consultation.
	• The programme recommends that authority should be delegated to clinicians to affect change locally.
	• A new career path will be provided in acute medicine.
	• There will be improved training in acute medicine.
	• There will be structured weekend work in accordance with the consultant contract 2008.
Hospital pharmacists	• Clinical pharmacists will provide medicines reconciliation immediately on patient arrival or as soon after as possible.
	• Clinical pharmacy will review and advise if admission is medication/toxicity related or if there are medication issues.
	• Patient specific medicines will be dispensed from the pharmacy.
	• If a patient has arrived from community/district/mental health hospital liaison will be established with clinical pharmacist for that site to ensure continuity of information on medication issues.
	• If a patient is admitted to model 3 or 4 hospital, the clinical pharmacist for the receiving ward will be fully appraised of patient status and history.
	• If a patient is not admitted, counselling on the safe use of their medicines and changes to medication regimens will be provided to the patient (and carers).
	• The new career path currently being developed for hospital pharmacists will encompass acute medicine.
	• Pharmacists may lead clinics in certain defined areas.
	• The expansion of service provision in line with defined service needs will be addressed e.g. extended hours and weekend service.
Therapy professionals	• Therapy professionals will be able to assess and treat patients in an appropriate setting, which affords the patient respect and dignity.
	• No patient will be cared for on a trolley for an extended period.
	• Therapists may deliver the national EWS which will facilitate standardised identification of patients at risk from deterioration.
	• Standardised evidence-based care pathways will be provided.
	• A combined document/generic therapy screening tool will be developed and implemented to enhance seamless transfer of care between provider sites.
	• Therapy led clinics will be established e.g. speech and language therapy led dysphagia clinics.
	• Therapists will have an expanded role in the delivery of patient care including discharge planning, NIV and arterial blood gas sampling.
	• Protocols to enhance interdisciplinary referral within care pathways will be determined.
	• The expansion of service provision in line with defined service needs will be addressed e.g. extended hours and weekend service.
	• The therapy professions will work together and with the MDT to build capacity in the integrated health care system to deliver this model e.g.

	staff grade rotation between provider sites, out reach, in reach services. • The therapy professions will develop a career pathway in acute medicine. • Dedicated OPD slots will provide rapid access to therapy services optimising outcomes and facilitating timely discharge. • The clinical service manager as part of the programme leadership team plays a critical role in the operational success of this model of care.
Department of Health and Children	• This programme will facilitate policy improvements recommended by the DOHC to improve the patient experience. • There will be enhanced quality of patient care, ease of access and cost savings.
HIQA	• This programme will assist HIQA in the standardisation of the quality and safety of patient care. • There will be improvements in quality and safety of patient care, ease of access, cost savings and improved clinical governance.
Clinical Indemnity Scheme	• Improvements in quality and safety of patient care should lead to a reduction in numbers of adverse events giving rise to claims.
HSE/hospital management	• The general manager/CEO, director of nursing, clinical director, clinical services manager are the leadership team responsible for ensuring the effective implementation of the programme. • The programme will ensure the standardisation of quality, safety and access to care and identify and correct variations in the delivery of services. • This programme provides a framework for roll out of enhanced ICT systems.
Public representatives	• The programme will definitively establish the role and justification of care in the various hospital models. • No patient will be cared for on a trolley for an extended period.

Summary

The acute medicine programme provides a strong framework for provision of acute medical care because it:

- Is driven by a quality agenda.
- Is clinically-led, taking a whole system approach.
- Has been developed by a multidisciplinary team nominated by their professions.
- Has benefited from its integration with other national clinical programmes to facilitate the development of an integrated solution development e.g. links between emergency medicine, critical care, surgery and other national programmes.
- Is a national programme, which is jointly led by the HSE and RCPI, and supported by the Irish College of General Practitioners (ICGP), Irish Association of the Directors of Nursing and Midwifery (IADNAM) and the Therapy Professions Committee (TPC).
- Has been informed by the Health Services Patient Charter[1] and has benefitted from the involvement of patient advocates in the design of the programme.

2. Introduction

Acute medicine is concerned with the immediate and early specialist management of adult patients suffering from a wide range of medical conditions who present to, or from within, hospital and require urgent or emergency care. Acute medical units (AMUs), acute medical assessment units (AMAUs) and medical assessment units (MAUs) have been developed to support the efficient delivery of patient care. The scope of acute medicine extends beyond these units however and also encompasses a broad spectrum of clinical activity including supporting primary care by the provision of timely clinical advice and facilitating access to diagnostic services for GP acute medical patients. This will reduce inappropriate hospital admissions and ensure early appropriate treatment to a safe and supported discharge to primary and community-based care.

Key factors in the provision of high quality acute medicine services include:
- The availability of consultant physicians, specialist registrars and registrars to assess and manage patients and direct them to the most appropriate care settings in consultation with nursing and therapy services.
- The availability of consultant physicians, specialist registrars, registrars and specialist nurses to provide timely advice to GPs on the management of individual patients.
- The development of AMUs/AMAUs/MAUs with dedicated multidisciplinary teams.
- The availability of diagnostics in a timely fashion.
- Appropriate governance, audit and organisational structures.
- Expansion of nursing, pharmacy and therapy practices and skill sets to match patient and service needs.
- Communication between all relevant health and social services and the development of good working relationships across specialties (both in hospital and community), services (both in hospital and community) and regions.
- The effective management of resources.

2.1 Programme objectives

The objectives of the programme are:

Quality: Reduce the admission rate of medical patients by 10% per year for 3 years post full implementation without increasing 30 day readmission, thus enhancing the global patient experience.

Access: Every medical patient presenting to the AMU/AMAU/MAU will be seen by a senior medical doctor within one hour.

Cost: Generate medical bed day savings of 10% per year for 3 years post full implementation.

2.2 Patient experience

The needs of patients have been central to the development of the programme. The principles of the Health Services Patient Charter[1] is based on eight principles which underpin high quality people-centred care. These principles have been identified through a review of national and international patient charters and other similar instruments and through wide consultation with the Irish public. The principles are as follows: access; dignity and respect; safe and effective services; communication and information; participation; privacy; improving health and accountability.

Patient advocates played a key role in the design of the acute medicine programme and will continue to be involved in its implementation and evaluation.

Ultimately this programme will benefit acute medical patients in many ways. For example, no patient will be cared for on a trolley for an extended period and all patients will be seen by a senior medical doctor within 1 hour. In addition, all unnecessary delays and duplication in assessment, diagnosis and treatment of medical patients will be prevented, as outlined in figure 1.

Figure 1. New pathways for medical patients within the acute medicine programme
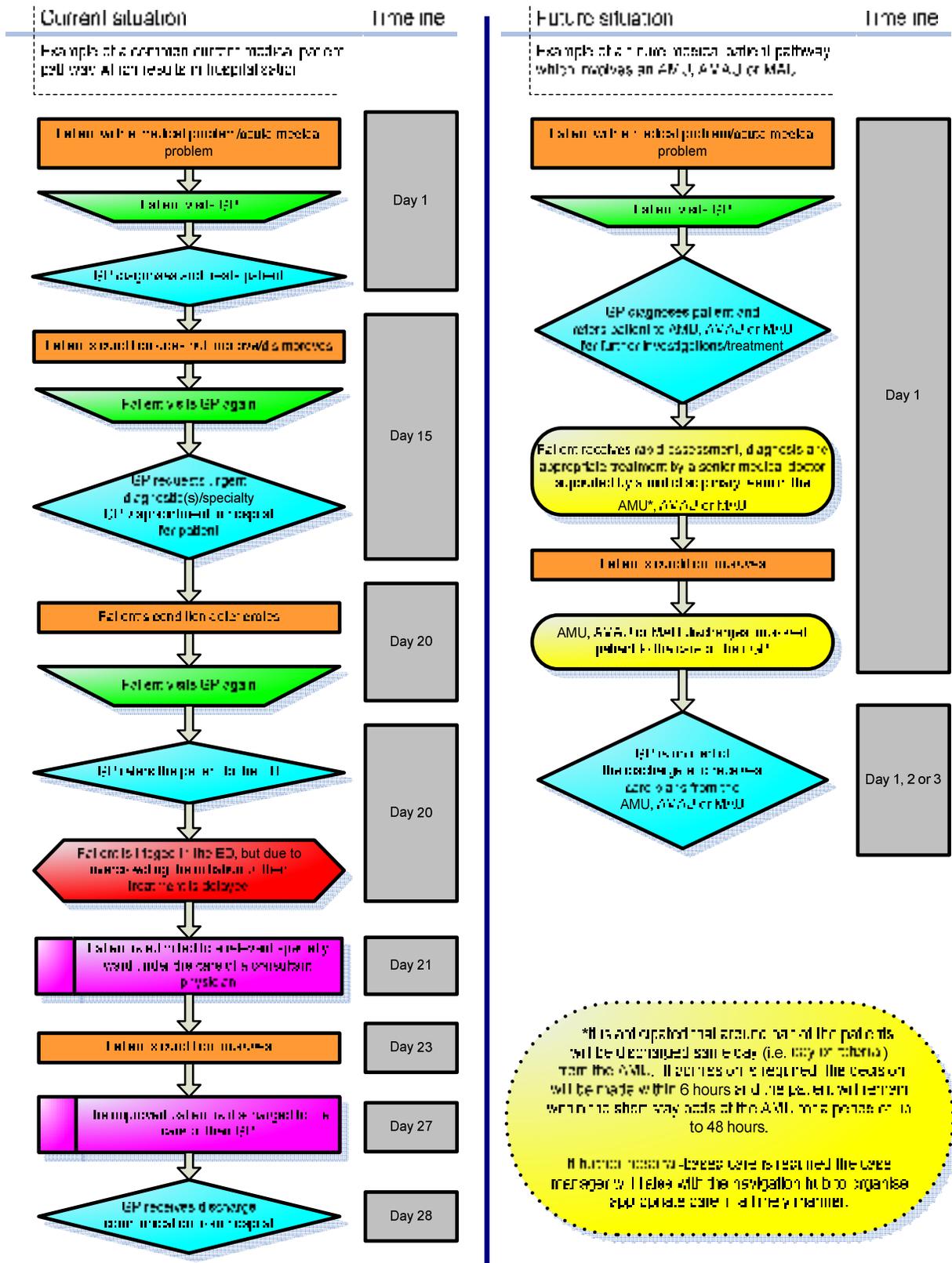
3. Acute medical units

The establishment of acute medical units has been internationally recommended[2, 3]. Acute medical units have been shown to improve the efficiency of acute medical care, by increasing the proportion of patients discharged within 24 hours and by decreasing length of stay and overall medical bed day usage[4]. A number of studies demonstrate that the introduction of an acute medical unit (AMU), combining assessment and short-stay function, is associated with a decrease in hospital mortality for medical patients and no increase in re-admission rates[5].

The benefits of AMUs are derived through the efficient streaming of medical patients to a location where they can be seen without delay by a senior medical doctor (i.e. a consultant, specialist registrar or registrar who has the competencies and experience to make a prompt clinical diagnosis and decide the need for specific investigations and treatment, the mode of treatment and the most appropriate setting for that treatment and ongoing care). Advantages from the patient's point of view are that extended waiting times are avoided and that a senior doctor is likely to determine with greater accuracy whether or not they need to be admitted. If admission is required, this will occur within a defined time period and the patient will be admitted to the most appropriate clinical area in the hospital. If admission can be avoided, the patient will have access to appropriate and timely out-patient follow-up. Well organised AMUs also improve efficiency by eliminating duplication of clinical assessment and unnecessary diagnostic testing.

The acute medicine programme recommends that in the Irish context, acute medical presentations to hospitals are best managed in dedicated medical facilities, staffed by physicians and a dedicated multidisciplinary team. These facilities will be stratified by patient acuity and structured as follows:
- acute medical unit (AMU)
- acute medical assessment unit (AMAU)
- medical assessment unit (MAU)

3.1 Description of an acute medical unit (AMU)

An acute medical unit (AMU) is a facility whose primary function is the immediate and early specialist management of adult patients (i.e. aged 16 and older) with a wide range of medical conditions who present to a model 4 (tertiary) hospital (ref section 4.1). Its aim is to provide a dedicated location for the rapid assessment, diagnosis and commencement of appropriate treatment and the determination, by a senior medical doctor, of whether an admission is necessary. Ideally patients will be referred directly from primary care but a proportion will be onward referrals from other sources including the emergency department (ED), out-patient department and other care settings, co-ordinated by the case manager. Patients presenting to hospital without GP referral will be seen in the first instance in the ED – not the AMU. Physicians, supported by a multidisciplinary team, will carry out patient assessment and treatment. A decision regarding discharge/admission will be made within 6 hours of patient arrival and will be facilitated by dedicated same day diagnostic imaging, laboratory and other services. In the event of discharge, the relevant GP will be informed (on the same day) of the decision together with all relevant clinical details and care plans.

It is envisaged that AMUs will operate on a 24/7 basis. The AMU should be co-located with the ED. Every AMU should have a designated lead consultant physician, clinical nurse manager and therapy lead.

The AMU will only admit patients for a short period for acute treatment and/or observation where the estimated length of stay is less than 48 hours. Patients who require admission for longer than 48 hours must move from this unit to a dedicated in-patient ward.

An AMU is not a replacement for a traditional out-patient department (OPD) and should not be available to bypass traditional OPD services or investigations. It is not considered an appropriate location for the assessment of patients with sub-acute presentations or for the management of patients with newly diagnosed chronic diseases. It is not a day ward (i.e. a designated unit for planned and scheduled procedures/investigations/treatments possibly under local, regional or general anesthesia, over a period of several hours and less than 23 hours). AMUs are not intended to replace EDs in any hospital and it is intended that AMUs will work in parallel with EDs. There will also be close links and interdependencies with critical care, medical specialist care, surgery and other specialties. Care pathways and protocols developed through the Quality and Clinical Care Directorate (QCCD) national clinical programmes will direct the care of appropriate patients in AMUs.

3.2 Description of an acute medical assessment unit (AMAU)

An acute medical assessment unit (AMAU) will operate as an AMU (described above) with the following exceptions:

- It will be located in a model 3 (general) hospital (ref section 4.1).
- The hours of operation may vary from 12 to 24 hours, 7 days per week, depending on service need.
- It has no contiguous short stay medical beds.

An AMAU will see GP referred patients with the entire spectrum of acute medical conditions, some of whom may require urgent medical care. As with AMUs patients presenting to hospital without GP referral will be seen in the first instance in ED – not the AMAU. It will have assessment beds in a defined area, ideally co-located with the ED. Admissions from the AMAU will be to in-patient beds including specialist units (e.g. CCU, ICU, HDU, acute stroke unit). Patients who require category 3 or 3S ICU support (ref appendix 17.9) will have guaranteed transfer to a model 4 hospital.

A decision regarding discharge/admission should be made within 6 hours and will be facilitated by dedicated radiology, laboratory and other services, including nursing, therapy professionals and medical social workers. In the event of discharge, the relevant GP will be informed (on the same day) of the decision together with all relevant clinical details and care plans. Every AMAU should have a designated lead consultant physician, clinical nurse manager and therapy lead.

3.3 Description of a medical assessment unit (MAU)

A medical assessment unit (MAU) in a model 2 (local) hospital (ref section 4.1) will manage GP referred, differentiated medical patients who have a low risk of requiring full resuscitation. Only patients referred by a GP will be seen. This unit will have assessment beds in a defined area and serve a clinical decision support function. Admissions will be to in-patient beds in a model 2 hospital. Patients who deteriorate unexpectedly will have guaranteed transfer to a model 3 or model 4 hospital.

GPs will refer low-risk medical patient (i.e. unlikely to require high intensity cardiopulmonary and/or neurological support) for assessment in the MAU during daytime hours. Patients with a significant risk of clinical deterioration should be referred to the associated model 3 or 4 hospital. However, patients should not be transferred if a 'Do Not Resuscitate' order is made and/or if patients make an informed decision to remain in the model 2 hospital.

A decision regarding discharge/admission should be made within 6 hours and will be facilitated by dedicated radiology, laboratory and other services, including nursing, therapy professionals and medical social workers. In the event of discharge, the relevant GP will be informed (on the same day) of the decision together with all relevant clinical details and care plans. Every MAU should have a designated lead consultant physician, who will be jointly appointed to the model 2 and associated model 3 or 4 hospital, a designated clinical nurse manager and assigned therapy resource. MAUs may be operational from 8am to 8pm, 7 days per week.

3.4 Summary

The programme recommends that acute medicine services should be developed and co-ordinated on an ISA and regional basis to ensure that all patients, irrespective of where they live, have equitable access to high quality acute medical care, which should adhere to clear, consistent clinical governance principles. By streaming patients referred by GPs to AMUs/AMAUs/MAUs, the programme supports the pivotal role of GPs.

Acute medicine requires the availability of senior medical doctors and a dedicated MDT to assess and manage patients and to determine whether further care is best provided through admission or alternative pathways of care. Improvements in the quality, equity and efficiency of acute medical care can be realised through the development of AMUs/AMAUs/MAUs.

4. The organisation of acute medicine services

4.1 Hospital models

The programme recommends four generic hospital models. The purpose of these models is to provide a clear delineation of hospital services based upon the safe provision of patient care within the constraints of available facilities, staff, resources and local factors. The level of service that can be safely provided in any hospital will determine which model applies. There will be a named physician with responsibility for patients on all aspects of their pathway. It is recognised that streaming of patients for some medical conditions is already in existence and these practices should continue where they are operating safely and effectively and be incorporated into the acute medicine programme locally.

4.1.1 Model 1 hospital

Characteristics:

1. This hospital will be a community/district hospital, with sub-acute in-patient beds.
2. Admissions can be requested by a GP, consultant geriatrician and/or other consultants following agreement with the medical officer.
3. Patients with rehabilitation, respite and/ or non-complex palliative care needs and patients who remain under the care of GPs may be admitted appropriately to in-patient beds in this hospital. These patients will be managed under the care of a medical officer (e.g. a designated GP or groups of GPs) who will be supported as necessary by consultant physicians. All patients will have an appropriate care plan.
4. This hospital will not have an ED, ICU, high dependency unit (HDU), coronary care unit (CCU), or an AMU/AMAU/MAU.
5. As this hospital will not have an ICU, patients requiring a higher level of care will be transferred to the ISA model 2, 3 or 4 hospital.
6. There will be guaranteed transfer of patients whose clinical status deteriorates from the model 1 hospital to the ISA model 2, 3 or 4 hospital(s). Where a patient is critically ill (ICS Levels 2 and 3), the regional critical care retrieval team will effect safe transfer. Remote critical care retrieval will include continued resuscitation, stabilisation and safe transport by the retrieval team (ref appendix 17.9).
7. Patients whose clinical status has improved sufficiently may be transferred from a model 3 or 4 hospital to a model 1 or 2 hospital for further care (i.e. bi-directional patient flow must also occur). However, patients should not be transferred if a 'Do Not Resuscitate' order is made and/or if patients make an informed decision to remain in the model 1 hospital.
8. The following services could be made available 5 days a week, based on local need:
   - Out-patient department (OPD)
   - Day services/ambulatory care assessments for older persons
   - Venesection/phlebotomy
   - Warfarin service
   - Chronic obstructive pulmonary disease (COPD) outreach service
   - Pulmonary rehabilitation
   - Supra-pubic catheter re-insertion

- Percutaneous endoscopic gastrostomy (PEG) tube re-insertion
- Antenatal/postnatal clinics
- Other services (depending on local policies and protocols)

9. Many of these services can be nurse-led and/or therapy-led with expansion of nursing and therapy practice in response to service need.

10. Clinical pharmacy services will be provided by clinical pharmacists attached to model 3 or model 4 hospitals.

12. All model 1 and 2 hospitals must have an in-house clinical pharmacy service or formal access to and reporting relationship with the service in a model 3 or 4 hospital.

13. All hospitals must have a person trained and responsible for infection prevention and control on site and formal access to advice from a consultant microbiologist/infectious disease physician.

Medical work practices:

The medical officer(s), or his/her deputy, will carry out weekday ward rounds and will be available on-call or as part of an "out-of-hours" GP service.

Interdependencies with the other national clinical programmes:

Acute medicine in model 1 hospitals has a number of interdependencies with other national clinical programmes. These are outlined below. It should also be noted that patients requiring a higher level of care will be transferred to the ISA model 2, 3 or 4 hospital as appropriate.

Model 1 hospital interdependences between acute medicine and other national clinical programmes

Acute cardiology	Patients with suspected acute coronary syndrome should not be admitted to or treated in a model 1 hospital, except under defined circumstances.
Ambulance services	GPs, hospital staff and ambulance services will agree the protocols for ambulance transfer to and between hospitals.
Anaesthesia	An anaesthesia service will not be provided.
Asthma	There may be out-patient services available on site utilising spirometry.
COPD	Outreach programmes and pulmonary rehabilitation may be available.
Diabetes	Diabetic clinics may be available.
Diagnostic imaging	There may be imaging depending on local need.
Epilepsy/neurology services (e.g. Parkinson's disease)	Epilepsy and neurology out-patient management may be available.
Healthcare associated infection	A person trained and responsible for infection prevention and control will be employed on site. Formal access to advice from a consultant microbiologist/infectious diseases physician is required.
Heart failure	Medical officers will manage patients with heart failure according to guidelines. The hospital may provide ambulatory services for diagnostics and OPD management of heart failure.
Medicine for the older person	Ambulatory care assessments for older persons may be provided on site.
Mental health services	Out-patient clinics may be available.
Palliative care	Patients whose palliative care needs could be met by their GP in a model 1 hospital environment e.g. end of life care, titration of

	medication. Admission criteria, discharge protocols and interface with specialist palliative care services should be according to agreed national palliative care programme protocols.
Primary care	Close liaison with GPs and primary care teams with regard to direct access for services, admission criteria and discharge policies and procedures.
Rheumatology	Rheumatology out-patient services may be linked to the nearest rheumatology unit.
Stroke	The hospital may have a stroke rehabilitation unit on site.
Surgery	Surgical OPD may be available.

4.1.2 Model 2 hospital

Characteristics:
The future growth in healthcare will be in the areas of ambulatory care (including chronic disease management and day surgery), diagnostics and rehabilitation which will be based in model 2 hospitals. As a result of these emerging models of healthcare delivery and the ageing population the total volume of activity of the Model 2 hospitals will grow substantially.

1. This hospital will have a daytime MAU.
2. GPs will refer low-risk (i.e. unlikely to require high intensity cardiopulmonary and/or neurological support) medical patients for assessment in the MAU during daytime hours.
3. This hospital will provide in-patient and out-patient care for differentiated, low-risk medical patients, who are not likely to require full resuscitation. All patients will have an appropriate care plan.
4. This hospital will not have an ICU, so the patient will be assessed and tracked using the national early warning score (ref section 6.4) and where appropriate, this score will prompt an acute medicine response and if necessary, transfer to the associated model 3 or 4 hospital.
5. A patient's condition may deteriorate and after detection and treatment by acute medicine a patient's acuity level may be ICS Level 2 unstable or Level 3 (ref appendix 17.9) requiring critical care retrieval and transfer to ICU in a model 3 or 4 hospital.
6. There will be guaranteed acceptance of transfer of all patients who deteriorate by the associated model 3 or 4 hospital (bi-directional patient flow must also occur if required).
7. Patients requiring palliative, respite, rehabilitation and pre-discharge care and patients for direct GP to consultant referral (via MAU) can be admitted to this hospital.
8. Patients will be admitted from the MAU under the care of a named consultant, and out-of-hours selected medical patients can be admitted by agreement between the G.P. and the on-call medical team/consultant.
9. The medical department and medical staff need to be part of a wider rotation under the governance of the acute medicine service in the ISA-linked model 3 or 4 hospital. During the day there will be appropriate NCHD presence in the MAU and wards.
10. The medical staffing at night will be a resident medical registrar/SpR and senior house officer (both of whom are advanced cardiac life support (ACLS) certified). In addition there will be a consultant on-call.
11. Nurse staffing at night will include a nurse manager/supervisor for the nursing services.
12. Therapy staffing will be at senior grade within each therapy discipline with additional therapy resource comprising staff and assistant grade positions. Clinical specialists in ISA model 3 and 4 hospitals will provide advice and/or support as required.
13. Standards of care should be measured and should be comparable to those delivered in model 3 and 4 hospitals.
14. The hospital may have a minor injury unit (MIU).
15. The following day services could be made available 5 days a week, based on local need:
    - Day surgery
    - Pre-operative clinics
    - Day services/ambulatory care assessment for older persons
    - Antenatal care/postnatal care

- Endoscopy/PEG tube insertion
- Non-invasive cardiology
- Cardiac failure clinic
- Cardiac rehabilitation service
- Venesection, infusion and transfusion therapy
- Bone marrow aspiration and trephine biopsy
- Abdominal paracentesis and thoracentesis
- Lumbar puncture
- Diabetic day centre
- Rheumatology day services
- Dermatology day services
- Oncology/haematology day ward
- Mental health day services
- COPD outreach
- Pulmonary rehabilitation
- Hepatology day services
- Diagnostic imaging
- Other services, depending on local policies and protocols.

16. Patient flow will be enhanced by expanded nursing and therapy practice (e.g. nurse prescribing of medicinal products and ionising radiation/X-rays and therapy facilitated discharge). These services will be developed in response to service need.
17. Clinical pharmacy services will be provided by clinical pharmacists attached to model 3 or model 4 hospitals.
18. All model 1 and 2 hospitals must have an in-house clinical pharmacy service or formal access to and reporting relationship with the service in a model 3 or 4 hospital.
19. All hospitals must have a person trained and responsible for infection prevention and control on site and formal access to advice from a consultant microbiologist/infectious disease physician.

Consultant physician work practices:
- The consultant physician on-call for the MAU will have a primary responsibility to be present and make management decisions during core working hours.
- There will be ward rounds every day on all newly admitted patients, patients whose clinical status deteriorates and patients identified for potential discharge.
- 'Board rounds' (i.e. desktop review of patient status with a view to potential discharge) will occur on all medical patients, once daily before 11am, including Public Holidays and weekends.
- At least 2 comprehensive ward rounds on all patients should take place weekly.

Interdependencies with the other national clinical programmes:
Acute medicine in model 2 hospitals has a number of interdependencies with other national clinical programmes. These are outlined below. It should also be noted that patients requiring a higher level of care will be transferred to the ISA model 3 or 4 hospital as appropriate.

Model 2 hospital interdependences between acute medicine and other national clinical programmes

Acute cardiology	Patients should be managed according to referral guidelines and clinical protocols. An out-patient clinic session should be provided by a visiting cardiologist one day per week to review the results of non-invasive tests. Patients with acute presentations should be transferred to a model 3 or 4 hospital according to protocol.
Ambulance services	GPs, hospital staff and ambulance services will agree the protocols for ambulance transfer to and between hospitals.
Asthma	There will be out-patient services available on site utilising spirometry.
COPD	In-patients will have care up to, and including, non-invasive ventilation (NIV). OPD, pulmonary rehabilitation and outreach may be available.
Diabetes	Diabetic day care, including chiropody and ophthalmology, may be available.
Diagnostic imaging	Plain film X-ray, ultrasound and CT-scanning will be provided. There will be an on-call diagnostic imaging service.
Endoscopy	Upper and lower gastrointestinal endoscopy and bronchoscopy may be available.
Epilepsy and neurology services	Epilepsy and neurology out-patient management may be available.
Healthcare associated infection	A person trained and responsible for infection prevention and control will be employed on site. Formal access to advice from a consultant microbiologist/infectious diseases physician is required.
Heart failure	A heart failure service will be established under the governance of a lead consultant physician. Selected heart failure patients with a clearly defined care plan who develop decompensated heart failure may be admitted. There will be a rapid access clinic for out-patient IV therapy to stablilise patients with deteriorating heart failure, possibly including inotropic care. A full out-patient service for diagnosis and specialist review will be provided.
Palliative care	Patients with palliative care needs may be managed in model 2 hospitals with appropriate support from the specialist palliative care services as required. Services provided in model 2 hospitals should be sufficiently flexible and integrated with specialist palliative care services to allow rapid and efficient movement of patients from one care setting to another depending on their clinical needs and personal preferences. Admission criteria, discharge protocols and interface with specialist palliative care services will be according to agreed national palliative care programme protocols.
Primary care	Direct access for some of the services listed (i.e. radiology, endoscopy, laboratory etc.) as part of agreed protocols.
Rheumatology	Rheumatology out-patient services will be linked to the nearest rheumatology unit in a model 3 or 4 hospital.
Stroke	Stroke rehabilitation will be provided.
Surgery	Day surgery and pre-admission assessment clinics will be provided.

4.1.3 Model 3 hospital

Characteristics:

1. This hospital will admit undifferentiated acute medical patients.
2. This hospital will have an AMAU which will open on a 12 to 24 hour basis every day of the year (where the AMAU is closed at night medical patients will be managed by the on-call senior medical doctor in the 24 hour ED).
3. There will be an ED on site and there may be a clinical decision unit (CDU, ref section 5.2) on site as part of the ED service.
4. The hospital will have a category 1 or 2 ICU[6] and may have a HDU (ref appendix 17.9).
5. There will be guaranteed bi-directional patient flow for appropriate medical in-patients between hospital models 1, 2 and 4. There will be bi-directional flow of critical care patients between hospital models 3 and 4.
6. There will be streaming to appropriate specialty units/wards as per protocols.
7. Where a patient requires category 3 or 3S ICU care the regional critical care retrieval team will effect safe transfer (ref appendix 17.9).
8. The medication needs and supplies for patients in model 1 and 2 hospitals will be coordinated through the model 3 hospital.
9. All hospitals must have a person trained and responsible for infection prevention and control on site and formal access to advice from a consultant microbiologist/infectious disease physician.

Consultant physician work practices:

AMAU:
- The consultant physician on-call for AMAU will have a primary responsibility to be present and make management decisions during core working hours 7 days per week.
- The consultant physician on-call for the hospital will manage the AMAU out-of-hours.
- Consultants will not cover more than one hospital when they are on-call,

Acute medicine ward rounds in the hospital:
- All consultant physicians/SpRs will undertake ward round on patients admitted under their care daily (Monday to Friday) before 11 am.
- The on-call consultant physician will carry out 1 in-patient ward round commencing before 11 am on Saturdays, Sundays and Public Holidays for newly admitted patients, patients whose clinical status is deteriorating and patients identified for potential discharge.
- The on-call consultant physician will carry out board rounds on remaining patients commencing before 11 am on Public Holidays and weekends (i.e. desktop review of patient status with a view to potential discharge).

Interdependencies with other disciplines:

The safe management of acute medical in-patients has several crucial interdependencies:

- Anaesthetic and surgical registrars will be available on site during daytime and out-of-hours.
- Consultant surgical and consultant anaesthetic cover should be available on site during weekdays and available on a locally-based roster out-of-hours.
- Consultants should not cover more than one hospital when they are on-call.
- Expansion of nursing and therapy roles e.g. NIV on specialised wards/units.
- Physiotherapy out-of-hours and emergency respiratory on-call services will be delivered.

Interdependencies with the other national clinical programmes:

Acute medicine in model 3 hospitals has a number of interdependencies with other national clinical programmes. These are outlined below.

Model 3 hospital interdependences between acute medicine and other national clinical programmes

Acute coronary syndrome	Direct transfer to the interventional cardiology service should be considered in cases of ST elevation myocardial infarction (STEMI). For non-STEMI cases, the need for coronary angiography within 24 hours should be considered and patients should be admitted to CCU (or ward if clinically stable). Non-acute chest pain should be managed according to protocol in a dedicated chest pain unit which should be supported by cardiology clinical nurse specialist (CNS) staff.
Ambulance services	GPs, hospital staff and ambulance services will agree the protocols for ambulance transfer to and between hospitals.
Anaesthesia/critical care	A category1/ 2 ICU will be provided. (ref appendix 17.9)
Asthma	All services related to managing acute asthma admissions including diagnostics and a pulmonary function laboratory will be provided.
COPD	In-patients will have care up to, and including, mechanical ventilation. OPD, pulmonary rehabilitation and outreach will be provided.
Diabetes	Diabetic in-patient care (including emergency presentations e.g. diabetic ketoacidosis (DKA)) and perioperative diabetic care will be available. Diabetic clinics will be provided.
Diagnostic imaging	There will be a full range of diagnostic imaging, with 24 hour on-call cover.
Endoscopy	Upper and lower gastrointestinal endoscopy and bronchoscopy will be available. An ERCP and EUS service may be provided.
Epilepsy and neurology services	Patients will be managed using an acute seizure protocol and pathway. There will be a rapid access clinic. AMAU patients will have preference for EEG testing. Services will include epilepsy education and support with primary care liaison. Relevant neurology services, for example, the management of Parkinson's disease, may also be provided.
Healthcare associated infection	Infection prevention and control team (which may include: clinical microbiologist, infection prevention and control nurse, infectious disease physician, surveillance scientist and antibiotic pharmacist) will be provided.
Heart failure	There will be a fully established heart failure programme with a designated lead consultant physician. Full medical management of all patients admitted with heart failure, including those requiring ICU care

	will be provided. There will be a full out-patient service for heart failure including a rapid access clinic for deteriorating patients.
Mental health services	A liaison psychiatry service will be available and acute psychiatry in-patient beds may be provided.
Palliative care	An on-site specialist palliative care service which functions as an extension of the lead specialist palliative care unit for the region will be available in model 3 hospitals. The consultant-led service should be provided by an inter-disciplinary team and staffed according to national recommendations[7] of the report of the National Advisory Committee on Palliative Care (2001). It should be provided in an integrated manner with other hospital services.
Primary care	Direct access for some of the services listed (i.e. radiology, endoscopy, laboratory etc.) as part of agreed protocols will be provided. GPs with specialist interests may attend the relevant clinics.
Renal	Any patient in a region who requires dialysis will be supported in a planned way reflecting the configuration of parent renal units. AMAUs will support patients in a local dialysis unit who deteriorate.
Rheumatology	Patients, including those with multisystem disease, vasculitis, connective tissue diseases and joint sepsis will have access to a rheumatology consult service or take-over of care as appropriate.
Stroke	There may be an acute stroke unit on site, including thrombolysis, rehabilitation and a stroke register. A rapid access service for transient ischaemic attacks (TIAs) and stroke prevention clinics will be provided.
Surgery	Elective surgery will be available on-site. There will be 24/7 access to emergency surgery. A senior member of the surgical team will be present on-site 24/7.

4.1.4 Model 4 hospital

Characteristics:

1. This hospital will admit undifferentiated acute medical patients including tertiary referred patients.
2. There will be a category 3 or 3S ICU on site[6] (ref appendix 17.9).
3. There will be an AMU present which is open on a continuous basis (24 hours, every day of the year).
4. There will be an ED, including a CDU on site.
5. There will be guaranteed bi-directional patient flow for appropriate medical in-patients between hospital models 1, 2 and 3. There will be bi-directional flow of critical care patients between hospital models 3 and 4.
6. Where a patient becomes critically ill in a model 1,2 or 3 hospital the regional critical care retrieval team will effect safe transfer to a model 4 hospital. Retrieval between model 4 hospitals will be required for national specialty transfers. Remote critical care retrieval will include continued resuscitation, stabilisation and safe transport by the retrieval team (ref appendix 17.9).
7. There will be streaming to appropriate specialty units/wards as per locally agreed protocols.
8. All hospitals must have a person trained and responsible for infection prevention and control on site and formal access to advice from a consultant microbiologist/infectious disease physician.

Consultant physician work practices:
- The AMUs of model 4 hospitals will be staffed by acute medicine physicians and/or acute physicians with a specialty interest during core working hours.
- Physician cover and ward rounds can be provided as described below or may be based on the model of direct medical specialty referral (ref appendix 17.4).

AMU:
- The consultant physician in the AMU will be present on a continuous basis for a 12 hour period (8 am – 8 pm), weekdays and for 5 hours per day on weekends and public holidays.
- The consultant physician on-call for the hospital will manage the AMU out-of-hours.
- Consultants will not cover more than one hospital when they are on-call.

Acute medicine and specialty ward rounds in the hospital:
- All consultant physicians/SpRs/registrars will undertake ward rounds on their own patients daily (Monday to Friday) before 11 am. Each service will undertake to review patients whose clinical status is deteriorating or patients identified for potential discharge with a board round review at weekends and Public Holidays (a board round is a desktop review of patient status with a view to potential discharge).
- The on-call consultant physician will carry out one in-patient ward round commencing before 11 am on Saturdays, Sundays and Public Holidays for newly

admitted patients, patients who are deteriorating and patients identified for discharge.

Interdependencies with the other disciplines:

The safe management of acute medical in-patients has several interdependencies:

- Anaesthetic and surgical registrars will be resident on site during daytime and out-of-hours.
- Consultant surgical and consultant anaesthetic cover should be available on site during weekdays and available on a locally based roster out-of-hours.
- Consultants should not cover more than one hospital when they are on-call.
- Out-of-hours and emergency on-call physiotherapy service will be provided.
- Occupational therapy services will be available as required to facilitate discharge.
- Expansion of nursing and therapy roles e.g. NIV on specialised wards/units, nurse/therapy facilitated discharge.

Interdependencies with the other national clinical programmes:

Acute medicine in model 4 hospitals has a number of interdependencies with other national clinical programmes. These are outlined below.

Model 4 hospital interdependences between acute medicine and other national clinical programmes

Acute coronary syndrome	Direct transfer to an interventional cardiology service should be considered in cases of ST elevation myocardial infarction (STEMI). For non-STEMI cases, the need for coronary angiography within 24 hours should be considered and patients should be admitted to CCU (or ward if clinically stable). Non-acute chest pain should be managed according to protocol in a dedicated chest pain unit which should be supported by cardiology clinical nurse specialist (CNS) staff.
Ambulance services	GPs, hospital staff and ambulance services will agree the protocols for ambulance transfer to and between hospitals.
Anaesthesia/critical care	A category 3/3S ICU will be provided.
Asthma	The site will provide all services related to managing acute asthma admissions including diagnostics and pulmonary function laboratory.
COPD	In-patients will have care up to, and including, mechanical ventilation. OPD, pulmonary rehabilitation and outreach will be provided.
Diabetes	In-patient care of complex diabetic complications (e.g. vascular and renal) will be available. Diabetic clinics will be provided.
Diagnostic imaging	There will be a full range of diagnostic imaging (including interventional radiology), with 24 hour on-call cover.
Endoscopy	Upper and lower gastrointestinal endoscopy and bronchoscopy will be available. An ERCP and EUS service may be provided. Interventional bronchoscopy services may be available.
Epilepsy and neurology services	Patients will be managed using an acute seizure protocol and pathway. There will be a rapid access clinic. AMU patients will have preference for EEG testing. Services will include epilepsy education and support with primary care liaison. Relevant neurology services, for example, the management of Parkinson's disease, may also be provided.
Healthcare associated infection	On site consultant microbiologists and an infection prevention and control team (which may include: clinical microbiologist, infection

	prevention and control nurse, infectious disease physician, surveillance scientist and antibiotic pharmacist) will be provided.
Heart failure	There will be a fully established heart failure programme with a designated lead consultant physician. Full medical management of all patients admitted with heart failure, including those requiring ICU care will be provided. There will be a full out-patient service for heart failure including a rapid access clinic for deteriorating patients.
Mental health services	A liaison psychiatry service will be available and acute psychiatry in-patient beds may be provided.
Palliative care	An on-site specialist palliative care service which functions as an extension of the lead specialist palliative care unit for the region will be available in model 4 hospitals. The consultant-led service should be provided by an inter-disciplinary team and staffed according to national recommendations. It should be provided in an integrated manner with other hospital services.
Primary care	Direct access for some of the services listed (i.e. radiology, endoscopy, laboratory etc.) as part of agreed protocols. GPs may develop a specialist interest and attend such clinics.
Renal	Any patient in a region who requires dialysis will be supported in a planned way reflecting the configuration of parent renal units. AMUs will support patients in a local dialysis unit who deteriorate.
Rheumatology	Patients, including those with multisystem disease, vasculitis, connective tissue diseases and joint sepsis will have access to a rheumatology consult service or take-over of care as appropriate.
Stroke	There will be an acute and rehabilitation stroke unit on site, including thrombolysis service, rapid access service for TIA, stroke prevention clinics, early supported discharge service, stroke register, vascular surgery, protocols for triage in neurosurgical services and advanced stroke imaging, including MRI.
Surgery	Elective and emergency surgery will be available 24/7, in addition to surgery related to the national cancer control programme, regional, supra-regional and national specialties. Senior members of the surgical team will be present on site 24/7.

4.2 The navigation hub

The programme recommends the establishment of a navigation hub within each ISA to support the streaming of patients to the most appropriate available care setting. The navigation hub will also enhance communication between primary care, community services and hospital-based services. It will be staffed by a number of case managers, who will be accessible to GPs and consultants through phone, fax, email or letter communication. The CM will have contact with the on-call physicians for AMU/AMAU/MAU and other medical specialties, public health liaison nurses and CNM to facilitate direct communication, where necessary, between the GP and the on-call consultant or specialty physician and nursing services.

The navigation hub CM will be fully appraised of the current available options for patient streaming within an ISA. The options available to the CMs will include the direction of appropriate patients to rapid access OPD appointments, day care facilities, referral to the AMU/AMAU/MAU or to the ED (for patients who are too unstable for AMU/AMAU/MAU assessment), or streaming directly to specialty services. Inter-regional transfers for national services should also be facilitated through the navigation hub. The CMs will co-ordinate the use of bed resources within an ISA. The establishment and operational effectiveness of the navigation hub will be a critical factor in the overall success of the programme.

4.3 Description of the acute floor concept

A designated acute floor (or acute area) should be developed to facilitate the seamless provision of patient-centred care across the range of specialties involved in the early management of acutely and critically ill patients. Ideally, in larger hospitals, this area should accommodate a co-located ED and CDU, acute medical unit, acute stroke unit, acute surgical assessment unit, intensive care unit, high dependency unit, coronary care unit, interventional cardiology (if present on site) and diagnostic imaging. The precise configuration of the acute floor will depend on the services provided in each hospital but the aim should be to co-locate on a floor, or on consecutive floors, the entire range of acute services which are available on site. Emergency and acute assessment areas should be easily accessible for ambulances, for patients arriving by car or on foot. Full access for people with disabilities is required. Future infrastructural hospital development should reflect the concept of a shared acute floor. Figures 2 and 3 indicate the acute floor concept in model 4 and model 3 hospitals respectively.

4.4 Clinical justice

Application of the same principles of equity of access to senior clinical decision makers and diagnostic resources for all patients across the acute floor is critical to the programme's success. The same metrics in terms of time of assessment by a senior

medical doctor (i.e. one hour from arrival or sooner depending on patient acuity) and timely access to diagnostic resources should apply to patients in the ED and AMU/AMAU/MAU.

4.5 Operational efficiencies

In order to ensure operational efficiencies the following approaches should be adopted:

- Duplication of infrastructure and facilities should be avoided in the interest of system efficiency and optimal resource management, but services should not compete for resources.
- Information and communication technology (ICT) systems should be introduced in a co-ordinated manner across the acute floor (and hospital) to enhance the quality and efficiency of patient care and to support the collection of process data for clinical audit and systems research.
- ICT systems should also support timely effective two-way communication with community services especially primary care, in terms of content, mechanisms, services and timeliness.
- The close proximity of acute units in one area, close to the diagnostic imaging department will facilitate patient movement to and from imaging and between acute floor services.
- Infection prevention and control issues should be considered at an early stage in determining the layout of the acute floor. This includes, but is not limited to, consideration of patient isolation rooms, hand hygiene facilities, bed spacing, air handling and decontamination of reusable medical devices or equipment.
- Therapy profession and medical social work services should be integrated across the acute floor.
- The development and utilisation of a combined assessment document will enable therapy professions to undertake assessment, treatment, onward referral and facilitate integrated discharge planning processes. A generic therapy screening tool should also be developed and staff from each discipline trained in the use and implementation of the tool. This screening assessment should form the basis for patient referral to other health and social care professionals and the development of the therapy intervention plans.
- There should be standardised documentation for use in AMUs/AMAUs/MAUs and documentation should be consistent across all emergency/acute and critical care areas in the acute floor to minimise duplication, avoid risk and enhance communication regarding patient care.

Figure 2. Diagram of the acute floor for model 4 hospitals

Diagnostic Support		
Acute Assessment Teams e.g. Mental Health	Interventional Cardiology*	Coronary Care Unit
Acute Medical Unit (AMU)	Emergency Medicine Clinical Decision Unit	Acute Stroke Unit
	Emergency Department	Intensive Care Unit (Category 3/3S)
		High Dependency Unit (HDU)
		Acute Surgical Assessment Unit
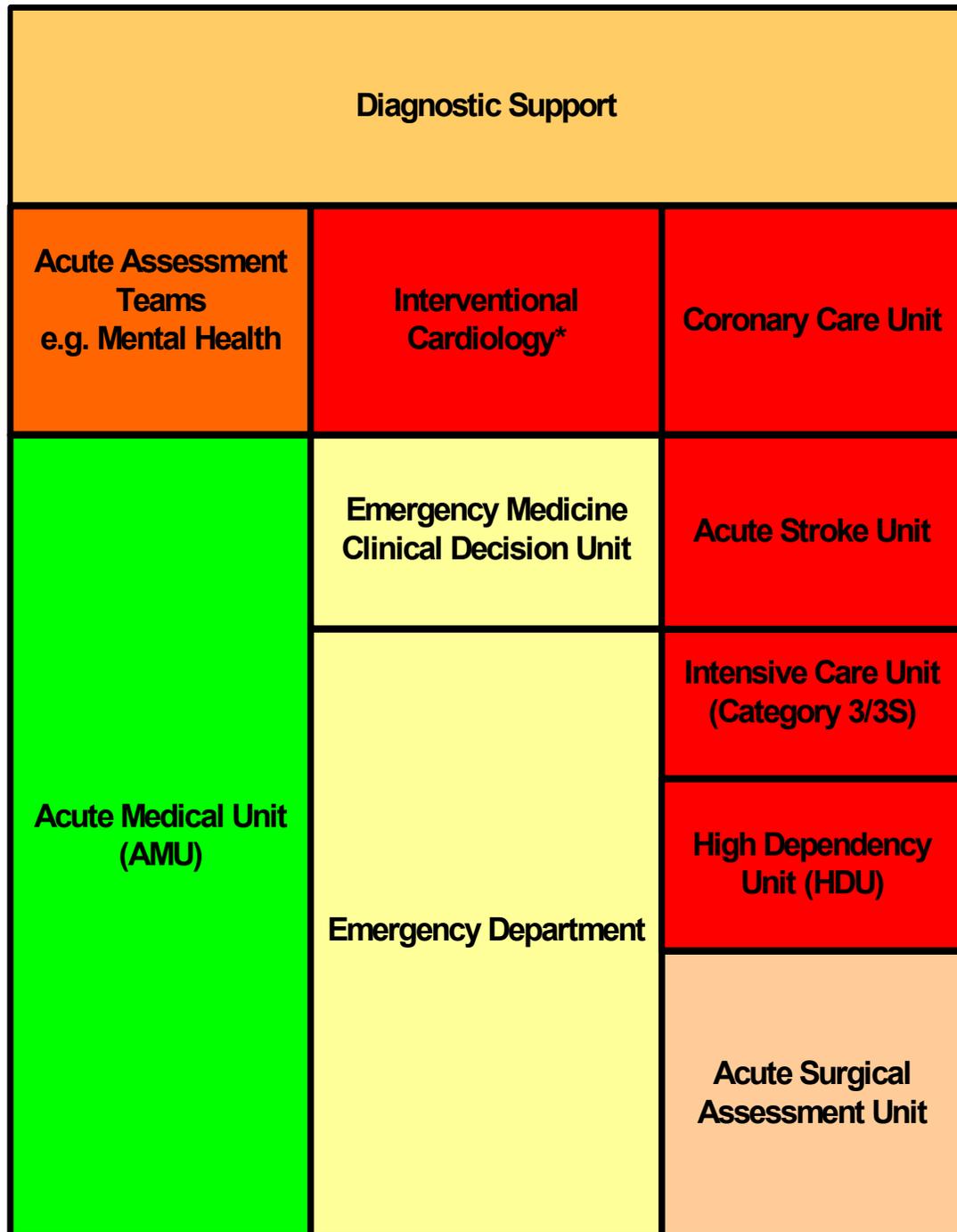
* Interventional Cardiology only included if available on site

Figure 3. Diagram of the acute floor for model 3 hospitals

Diagnostic Support		
Acute Assessment Teams e.g. Mental Health	Coronary Care Unit	Acute Stroke Unit
Acute Medical Assessment Unit (AMAU)	Emergency Medicine Clinical Decision Unit	Intensive Care Unit (Category 1 or 2)
	Emergency Department	High Dependency Unit (HDU)
		Acute Surgical Assessment Unit
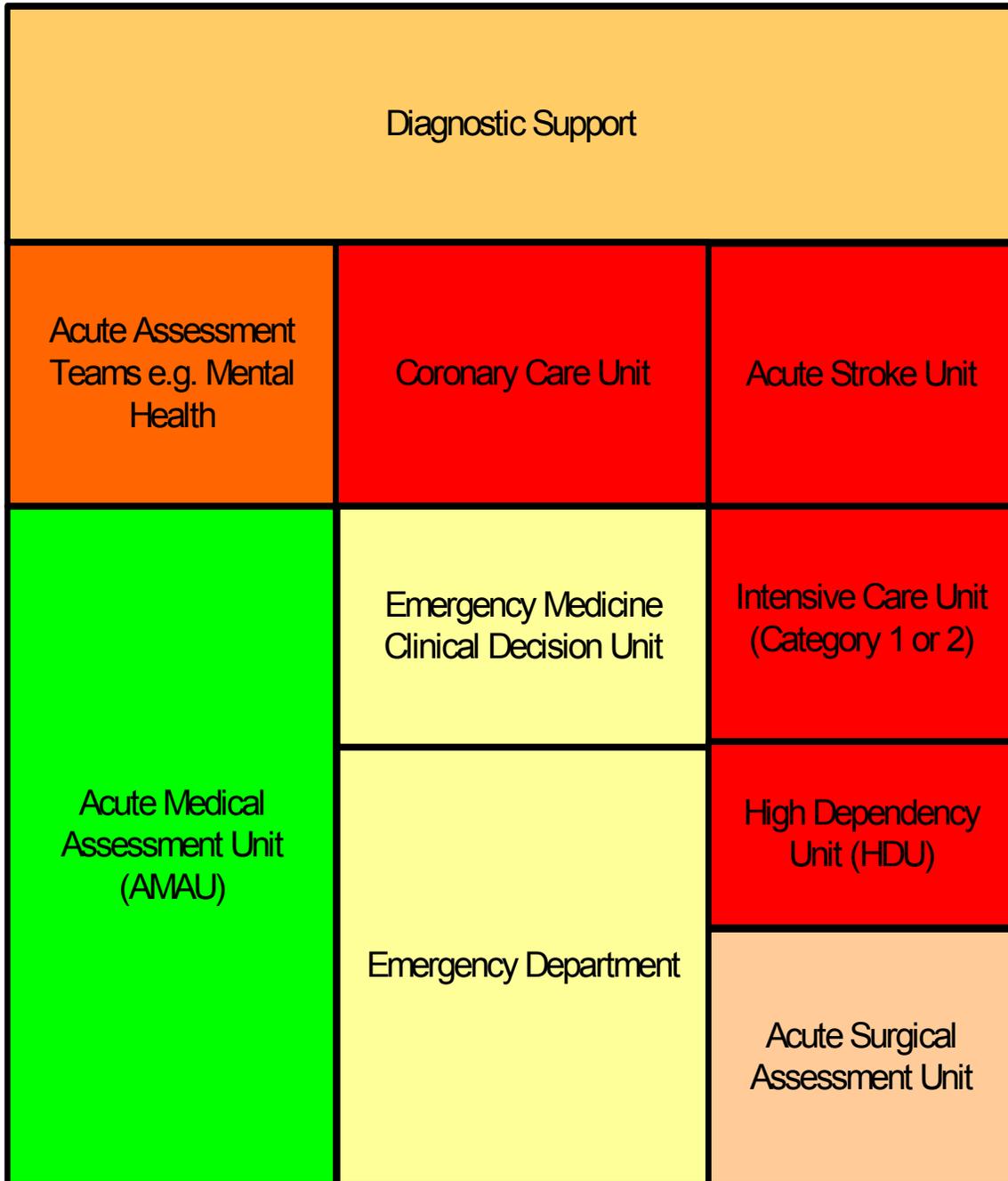
4.6 AMU/AMAU/MAU capacity

It is envisaged that AMUs will operate on a 24/7 basis, AMAUs will operate between 12 and 24 hours and MAUs will open during the daytime. Bed capacity should reflect the local demand of the individual hospital for acute medical beds and should be aligned with the provision of same day diagnostic facilities. An AMU/AMAU/MAU will require between 4 and 12 beds/trolleys for assessment. In AMUs for patients admitted (for up to 48 hours) it is anticipated that the bed requirement will be the average number of medical admissions plus 30%. Isolation rooms are also required[8, 9]. A list of equipment suggested for an AMU/AMAU/MAU is available in appendix 17.8.

4.7 Surge capacity

Where in-patient bed occupancy has reached a level of 85% within a hospital, the decision to implement surge capacity is the responsibility of lead physician for the AMU/AMAU/MAU. This should be co-ordinated through the navigation hub in consultation with the AMU/AMAU/MAU lead physician and CD. The surge capacity should include directing additional NCHDs/consultants to the AMU/AMAU/MAU, additional discharge rounds and urgent notification to GPs to reduce referrals. There should be hospital and ISA-wide strategies in place for surge capacity to prevent ED and AMU/AMAU/MAU overcrowding and all surge episodes should be recorded and reviewed.

4.8 Acute medicine in integrated service areas

Acute medicine services may be configured and implemented within integrated service areas (ISAs) or across more than one ISA within a HSE region. An ISA approach is advocated (i.e. a grouping of facilities including hospitals and community services with clearly defined roles and mutually agreed interdependencies, existing under a comprehensive governance structure with a robust system for assuming responsibility and accountability). An ISA will provide a spectrum of care from day care to complex multi-organ support based on quality, access, cost-effectiveness and equity.

Acute medicine will thrive where there is close integration of medical services between primary and secondary care and where close working relationships are fostered between GPs, primary care teams (PCTs) and their local integrated service area hospital consultants, nursing and other multidisciplinary team members. The close integration of local community services with acute day services, acute in-patient services and GP-run community hospital services will be essential in providing the full spectrum of supports for patients. This will allow medical patients to be managed at the most appropriate level of service complexity.

4.9 Acute medicine configuration within an ISA

An ISA should be served by a model 3 and/or model 4 hospital which provides continuous availability (24/7) of the specialty services of medicine, emergency medicine (EM), critical care, surgery, obstetrics and paediatrics. The range and volume of activity carried out in each of the specialties should be sufficient to allow for a high level of expertise to be maintained on an ongoing basis.

All model 1 or model 2 hospitals in the ISA must have an associated model 3 or model 4 hospital for in-patient admissions. A number of model 1 and model 2 hospitals will support model 3 and model 4 hospitals in providing an appropriate range of regional specialties and patient services.

5. The interface between acute medicine, emergency medicine and critical care

Patients with acute and emergency medical problems should experience a continuum of high quality medical care, from their first point of contact through their entire pathway of acute, emergency or critical care to safe discharge from hospital. Emergency medicine, critical care and acute medicine are complementary systems of patient care. The interface between these specialties should be developed and managed in a co-ordinated manner to maximise the quality and cost-effectiveness of care provided by both services.

5.1 Definition of emergency medicine

Emergency medicine (EM) is a field of healthcare based on the knowledge and skills required for the prevention, diagnosis and management of acute and urgent aspects of illness and injury affecting patients of all age groups with a full spectrum of episodic, undifferentiated physical and behavioural disorders. It encompasses an understanding of the development of pre-hospital and in-hospital emergency medical systems and the skills necessary for this development[10]. EM includes pre-hospital care. The key focus of EM is on the immediate assessment, resuscitation when necessary, and clinical management of undifferentiated conditions. The undifferentiated nature of patient presentations requires a period of intense, focused clinical assessment and multidisciplinary care in the ED to determine the patient's further care needs. It is critical to the quality of care provided to all ED patients that ED assessment is completed in a timely and efficient manner.

5.2 Clinical decision unit

A clinical decision unit (CDU) is a designated area of an ED in which patients undergo a short, intense period of investigation or observation under the care of a consultant in emergency medicine, up to a usual maximum length of stay of 24 hours. Other terms for such units include emergency short stay or observation wards. Chest pain assessment units are a specific type of CDU. Admission to these units enables the subsequent safe and early discharge of patients with potentially high-risk presentations who might otherwise undergo more protracted hospital admissions. Examples of conditions which can be effectively managed in a CDU include head injury and poisoning. CDU-based care is a well-established and cost-effective component of EM practice[11, 12, 13, 14].

5.3 Clinical governance across the ED/AMU/AMAU interface

- The lead consultants in emergency medicine and acute medicine are each responsible for the quality and efficiency of care provided in their respective clinical areas and will work collaboratively to ensure the effective running of their respective

services. The respective roles, responsibility, authority and accountability of the EM and acute medicine staff should be explicitly stated with respect to the overlap/boundary between the two services.

- Systems of care should be agreed between both specialties, which are evidence-based, quality-assured, cost-effective and sustainable, and there should be a shared approach to clinical audit, quality assurance and risk management across acute specialties.
- The roles of all health-care staff should be co-ordinated across the ED and AMU/AMAU interface. The potential for collaboration in relation to nurse and therapist management, training and work-practices should be promoted.
- All protocols and policies should be evidence-based, quality-assured, cost-effective and consistent with relevant national clinical guidelines.

5.4 Shared care processes

An equitable quality of care must be provided day and night and at all times clinical justice must prevail, with the most critically ill patients prioritised to receive care first, irrespective of whether they are happen to be in the ED or AMU/AMAU. The concept of "clinical justice" is further described in section 4.4. Local arrangements, protocols and policies will determine whether medical patients are admitted through ED/AMU/AMAU or are admitted under the care of other medical specialty on-call teams. These protocols should be evidence-based, quality-assured, cost-effective and consistent with relevant national clinical guidelines.

5.5 Patient streaming between the ED and the AMU/AMAU

- Ideally, patients attending model 3 and 4 hospitals should access ED and AMU/AMAU through a common entrance.
- AMU/AMAU accepted patients should be briefly assessed to ensure that they do not require immediate transfer to the ED resuscitation area. This brief assessment must not result in preventable delays for patients. Prioritisation according to the Manchester Triage System[12, 13] is recommended for patients entering a shared ED/AMU/AMAU care area. Initial assessment and triage processes should not be duplicated. Each patient should have a single HCAI assessment upon arrival at the hospital.
- AMU/AMAU referred patients who are redirected to the ED resuscitation area will remain the primary responsibility of the acute medicine team on-call, but emergency medicine, critical care and other specialty teams will provide support as required.
- Patients who have been assessed in a model 2 hospital MAU and who require admission or further investigation in a model 3 or 4 hospital should be directly transferred to a AMAU/AMU or medical ward and seen by a senior medical doctor within 1 hour of arrival.
- All clinical investigation results should accompany patients transferred from ED to the AMU/AMAU or a medical ward and there should be no unnecessary repetition of tests.

- Bed-side registration of patients should be promoted as it reduces waiting times for assessment[14]. Triage and clinical prioritisation may also be undertaken in a patient cubicle or at the bedside.
- Patients will be admitted from the ED/CDU directly to the AMU/AMAU after discussion between the consultant in EM or their delegate and the AMU/AMAU on-call physician or their delegate. Patient transfer can occur prior to the results of all clinical investigations being available. The assessment by the acute medicine team should, in general, occur in the AMU/AMAU rather than the ED unless the clinical status of the patient requires care in a resuscitation area, or when the AMU is closed.

5.6 Operational issues between ED and AMAU/AMU

- In model 1 hospitals there is no MAU/AMAU/AMU.
- In model 2 hospitals there is only an MAU function in which GP selected patients will be seen.
- In model 3 hospitals there is a 24 hour ED and when the AMAU is not open on a continuous basis, all patients presenting with medical conditions will be managed by the acute medical team on-call in the ED, from two hours before the AMAU closes until it reopens.
- In a model 4 hospital there is a 24 hour ED and a 24 hour AMU. The AMU incorporates an AMAU function and an adjacent medical short stay function.
- AMUs/AMAUs and EDs should not compete for resources.
- Potential process bottlenecks, such as access to time-critical diagnostics, must be avoided.
- There should be planning for surge capacity across the ED/AMU/AMAU interface and across the ISA to prevent overcrowding. In cases when demand exceeds capacity, a shared response will be required and the extra workload should be managed effectively across the ED and AMU/AMAU. A pre-agreed surge policy should be invoked in such situations and all such episodes reviewed by the CEO/GM/CD or AMU/AMAU/MAU lead physician to minimise the risk of recurrence.
- AMU/AMAU/ED/pre-hospital care/critical care interfaces should be included in major incident planning.

5.7 Pre-hospital care

Ambulance personnel may re-direct an AMU/AMAU/MAU-referred patient to an ED should the patient's clinical status deteriorate during transport. The ED should be placed on stand-by to receive all such patients.

6. AMU/AMAU/MAU patient assessment

6.1 Policies, protocols, care bundles and care pathways

As part of improving and standardisation of quality patient care, the various national clinical programmes will develop clinical decision-making resources for the most common acute medical presentations. These resources may comprise some or all of the following: guidelines, algorithms, care bundles, protocols, policies, care pathways and patient information.

These resources will be widely disseminated and with co-operation from primary care, hospital management and multidisciplinary teams, will be adapted and implemented locally as appropriate, for example in AMUs/AMAUs/MAUs, ED and hospital wards.

In the absence of nationally agreed protocols for particular conditions, locally developed pathways should be shared regionally and nationally, through the programme. In addition, care pathways which have been developed by emergency medicine, should be shared with AMUs/AMAUs/MAUs, as appropriate.

GPs, physicians, case managers, nursing services and all relevant MDTs will need to be aware of policies and protocols which direct patients with particular acute and emergency conditions to regional centres or designated hospitals.

6.2 AMU/AMAU/MAU patient attendance criteria

Formal criteria should be agreed in each hospital, including ED, in consultation with GP representatives to determine which patients are appropriate for the AMU/AMAU/MAU. These criteria will incorporate the inclusion and exclusion criteria outlined below.

6.2.1 AMU/AMAU/MAU inclusion criteria
Any adult patient (aged 16 years and older) whom a GP determines requires immediate medical admission or urgent medical assessment, may be considered suitable for AMU/AMAU/MAU referral, unless alternative pathways are considered more appropriate.

6.2.2 AMU/AMAU/MAU exclusion criteria
- Patients requiring ED based resuscitation e.g. patients who are clinically or physiologically unstable or are considered at high risk for sudden life-threatening clinical deterioration.
- Patients from other hospitals requiring direct admission to ICU, CCU, HDU or other critical or high dependency areas.

- The AMU/AMAU/MAU is not a suitable environment for the initial assessment of patients with acute behavioural problems.
- Patients with acute mental health problems should be seen promptly in an appropriate clinical environment.
- Trauma patients.
- Patient with undiagnosed abdominal pain/haematemesis.
- Patients with acute decrease in level of consciousness.
- Patients with exceptional isolation requirements which cannot be met in an AMU/AMAU/MAU setting

6.3 Primary care and acute medicine communication

GPs on phoning the CM, will be facilitated in referring patients to the most appropriate AMU/AMAU/MAU admissions unit or alternative service option e.g. rapid access clinic. If required, consultant physicians/SpRs/registrars will be available to GPs for consultation in this regard. GPs will also be able to contact the AMU/AMAU/MAU consultant physician on-call (in addition to the CM) via telephone for advice on complex cases. GP referred patients should present to AMU/AMAU/MAU with a letter of referral.

6.4 Early warning score

An early warning score (EWS) is a physiologically based system of scoring a patient's condition to help determine severity of illness and predict patient outcomes. The programme mandates the use of an early warning score (EWS) to help in the early detection of patients who are likely to deteriorate. This should be implemented nationally after appropriate training. Consistent use of a single agreed EWS system will ensure that all patients are objectively assessed in the same way, regardless of the clinical expertise of the clinician or where the patient is assessed. This will ensure that the severity of illness and the rate of deterioration can be explicitly stated and understood throughout the entire Irish hospital service. This will facilitate the early detection and transfer of patients who are likely to deteriorate. The EWS will also facilitate reverse flow of stabilised patients. This should ensure improved inter-professional communication and facilitate better and more uniform patient care. It will also enable audit of outcomes and performance comparison between different health care facilities. A work-stream will be established to implement the EWS nationally.

6.5 Assessment on arrival at hospital

- Patients referred directly to the AMU/AMAU by GP letter or telephone call will proceed directly to the AMU/AMAU after a brief triage in the ED to determine if urgent resuscitation is required. In a model 2 hospital patients will proceed directly to the MAU.

- In model 3 and 4 hospitals self-referred medical patients will be triaged, undergo early warning score (EWS), be assessed and managed by the emergency medicine team. Suitable patients will only then be referred to the AMAU/AMU thereafter.
- Health care associated infection (HCAI) assessment will be required.
- Where possible the patient will be registered at the bedside.
- The nursing staff will prioritise patients according to need.
- Clinical investigation should be commenced at the earliest possible opportunity and diagnostic tests should be initiated by nursing staff based on protocols, where appropriate, with relevant training and education. Nursing roles should include performing ECGs, phlebotomy and cannulation.
- Rapid access to therapy and medical social work services will be essential to facilitate appropriate assessment, determination of need and intervention. Appropriate timely onward referral should be initiated to relevant therapy professionals. This will be expedited with interdisciplinary referral in accordance with defined protocols
- All MDT practice should endorse the HSE code of practice in relation to integrated discharge planning. Clinical nursing assessment should include discharge planning considerations.

6.6 Assessment by the medical team

- AMU/AMAU/MAU patients will be assessed by a senior medical doctor within 1 hour. Patients will be stratified according to acuity and prioritised appropriately.
- The primary responsibility of the consultant physician on-call is to be present in the AMU/AMAU/MAU during core working hours and to facilitate a decision to admit or discharge within 6 hours.
- In model 4 hospitals the acute medicine physician will manage the AMU during core working hours 7 days per week.
- The consultant physician on-call for model 4 hospitals will manage the AMU out-of-hours.
- Priority of assessment should be based on clinical need, not on patient location. Nursing staff will play a key role in ensuring appropriate patient prioritisation.
- All admission and discharge decisions for medical patients must be ratified by a consultant physician, within 6 hours during core working times and within 12 hours during non core working.
- Implementation of condition-specific policies and protocols will facilitate prompt accurate assessment, investigation, diagnosis and treatment. This includes rapid access to diagnostics and other relevant services.
- On the post-take day the consultant physician needs to be available to manage patients who were admitted on take. The expectation will be to allocate a timeframe of 15 minutes per newly admitted patient. At minimum, the post-take morning needs to be free for consultants to manage these patients.

6.7 Diagnostic imaging

Patients should not be admitted solely for diagnostics. AMU/AMAU/MAU and medical in-patients must have access to same day diagnostic tests, particularly diagnostic imaging.

Competent decision making requires diagnostic support; the availability of these services must be improved and better aligned to when and where they are needed. The combination of first assessment and appropriate levels of diagnostic support greatly enhances the likelihood that the right diagnosis and treatment are delivered – first time. This may be life saving for the critically ill but is important at every level of illness severity to provide a fast and efficient service.

The current volume of activity being driven by ED and AMU/AMAU/MAU on medical patients for each diagnostic imaging procedure needs to be identified, stream-lined and delivered (including reporting) on the same day. The purpose of this is both to reduce delays in diagnosis (and treatment) and prevent any unnecessary bed day usage. This is reorganisation of current workflow, not additional work. The prioritisation requirements for diagnostic imaging support to the AMU/AMAU/MAU and ED are outlined in figure 4.

All diagnostic test requests and reports should be processed and stored electronically, to ensure optimal efficiency and to support systems monitoring and clinical audit.

Figure 4. Prioritisation of diagnostic imaging for the AMU, AMAU, MAU and the ED

Clinical Priority	Imaging Modalities	Recommended Timeframe for Availability of Report
Priority 1: Time-critical Diagnosis of Life-Threatening Emergency	Chest X-ray (portable/departmental) Plain Film of Abdomen	Immediately and continuously available (24/7/365).
	CT Brain CTPA CT Thoracic Aorta	Next immediate patient imaging slot during working day and within one hour on- call.
Priority 2: Imaging necessary for safe discharge from ED/AMU/AMAU/MAU or Influences admission or discharge decision making or Influences need for sub-specialty referral or inter-hospital transfer	CXR departmental Plain Film of Abdomen Other X-ray films as indicated	Available within 2 hours 24/7/365.
	CT Brain CTPA CT thorax US Abdomen	Ideally, available from 8am–8pm, 7 days a week Must have allocated slots in daily schedule for predictable demand. On-call: as per condition-specific protocols or discussion between Senior Clinician and Radiologist on-call for cases not covered by existing protocols.
	Venous Doppler Carotid Doppler	
	MRI Bone scan Interventional Radiology	These services may require inter-hospital transfer
Priority 3: Imaging scheduled for out-patient follow-up after AMU/AMAU/MAU assessment	As per Priority 2	Allocated slots in daily schedule for predictable demand.

Notes:
List of imaging modalities above is not exhaustive.
Vascular surgery services may provide venous and carotid doppler scans in some hospitals.

7. Acute medical care of the older person

7.1 The increasing demand for care of the older person

Older people represent the largest group presenting to acute hospitals with medical illnesses and account for 20% of ED attendances and 40% - 50% of acute medical admissions. It is estimated that by 2041, 22% of the population will be aged over 65 years. This will represent an increase for the over 65s from 460,000 to 1.3 million, while the over 80s will grow from 112,000 to 440,000.

Older people often have multiple complex disease-related conditions and require comprehensive, physical and psychosocial assessment. Care of older people is most effectively delivered through multidisciplinary teams of physicians, nurses, therapy professionals, pharmacists and medical social workers in collaboration with their GPs and other community support services.

Frail older adults who attend ED and are discharged are at risk of re-attending and readmission in the next 3 months. Thus identification and follow-up of these patients through an integrated acute hospital and primary care service will play an important role in admission avoidance.

7.2 Developing care of older people in acute medicine

As a result of the ageing demographic change, increasing frailty and co-morbidities acute hospital assessment, in-patient care and discharge planning will be required for an increasing number of older patients. Optimising this care will also require AMUs/AMAUs/MAUs in which:

- Communication between hospitals and primary care is improved so that there is a shared and seamless approach to care delivery for older patients, thus making it easier for them to "navigate" the system and access the care they need.
- There is an understanding of roles, facilities and services both by those working within acute hospital and those in primary care and community services.
- Close liaison occurs between specialist geriatricians, psychiatrists of old age, AMU/AMAU/MAU physicians, consultants in emergency medicine, with the support of liaison psychiatrists together with GPs and other community services. They will facilitate the joint adaptation of care pathways developed by the relevant national clinical programmes (e.g. stroke), the development of referral protocols and the sharing of clinical guidelines across assessment units and hospitals.
- Specific targeted initiatives are developed around the most common acute presenting complaints in older people such as falls, acute delirium, dementia-related syndromes, poly-pharmacy problems and general functional decline.
- A designated space is assigned within the AMU/AMAU/MAU which is tailored to meet the needs and expectations of an ageing population with more complex illnesses.

- Ensure gerontological/geriatric medicine training of ED/AMU/AMAU/MAU staff.
- Older people who require hospital admission are fast-tracked to an acute assessment bed or a designated area within an AMU/AMAU/MAU.
- An appropriate care plan is promptly initiated for all older patients in AMU/AMAUs/MAUs with a focus on maintaining their functional abilities and preventing iatrogenic disease.
- High complexity older patients should be admitted under the care of geriatricians with the early and intensive involvement of other medical specialties, nursing staff, therapy professionals and medical social workers.
- Maintaining and enabling older patients to remain at home should be the priority.
- Active discharge planning (including social supports) and prompt processing of the nursing home support scheme (NHSS) is provided for all older patients.
- Nurse/therapy facilitated discharge is instituted.
- Close collaboration with old age psychiatrists and their services to meet the mental health needs of those older people with cognitive impairment and dementia is required.
- Given the high level of older people with complex needs presenting for medical assessment, it is suggested that a significant number of AMU/AMAU/MAU physicians should have a specialist qualification in geriatric medicine.

7.3 Community medical services for the older person

Currently, older people can find themselves inappropriately admitted to or experience delayed discharge from hospitals, or admitted to nursing homes, because of the unavailability of appropriate care/services in the community. It is hoped that, in future, GPs will be enabled to provide the early management of acute illness and enable the provision of suitable care for patients in their own homes. Those requiring further acute care will be referred onto either AMUs/AMAUs/MAUs or ambulatory care services as deemed appropriate in liaison with the consultant geriatrician and/or psychiatrist of old age.

Geriatric outreach programmes to nursing homes will play a significant role in preventing unnecessary and avoidable acute hospital admissions, and supporting patient care in surroundings that are more familiar to them.

Developments in community services, including community intervention teams (CIT), may prove beneficial in this regard. Where these resources are deployed will vary depending on regional need. They may have potential to contribute in areas as diverse as ED liaison, nursing home liaison, AMU liaison, community team follow up and in rapid access clinics. Definition and leadership of these teams will need to be tailored to the needs of the local services developing them.

Overall the following areas will have a significant contribution to make for the care of the acutely ill older adult with an acute medical illness:

- ED/AMU/AMAU liaison and geriatric subspecialty admission in all acute hospitals (including the development of referral and management guidelines, pathways of care e.g. stroke).
- Elderly focused AMU/AMAU/MAU services with rapid access to ambulatory care.
- Improve availability of, and access to, the following services to support acute and chronic illness programmes in hospital and in community
    - Ambulatory care services/rapid access clinics
    - Rehab and respite service
    - Nursing home services
    - Home care and community services.
- Medicine for the elderly outreach programmes to nursing homes and other community locations.
- Specific targeted initiatives in conjunction with GPs around most common complaints for an acute presentation, e.g. falls, acute confusion, dementia, poly-pharmacy, functional decline.
- An increased availability of medicine for the elderly as part of GP training programmes.

8. AMU/AMAU/MAU discharge policy

8.1 Discharge communication

Effective communication is required between all stakeholders involved in patient discharge, in particular:

- AMU/AMAU/MAU staff will link with GP and relevant community service providers, as soon as possible if the decision is made to discharge a patient from AMU/AMAU/MAU. This link should be by agreed mechanisms and time frames and include relevant necessary detail, for example medication change, outcome of investigations, planned further hospital services and arrangements made for any needed community supports.
- This two-way communication between the hospital and the GP and relevant community service providers, should ensure that the necessary community services and supports and any further hospital services e.g. OPD are in place for the patient to enable timely discharge.
- A copy of the transfer/discharge communication, which is completed before discharge, will be given to the patient and sent on the same day by agreed mechanism (ideally encrypted and sent electronically) to the patient's GP, public health nurse and other healthcare providers (e.g. nursing home) and a further copy will be retained in the healthcare record.

The effectiveness of integrated discharge planning will be audited and reported as a performance metric within the AMU.

8.2 Discharge planning within the AMU/AMAU/MAU

- The AMU/AMAU/MAU seeks to discharge or admit patients within 6 hours when appropriate. Admission, if required should be for the shortest possible period.
- All patients should be assessed with regard to estimated length of stay, the need for specialist care and early discharge planning. The estimated length of stay will be determined by the consultant in conjunction with the MDT and communicated to the patient/family and carers. This is particularly important in the frail older patient who needs early input from therapy professionals and medical social work staff[15].
- Designated OPD appointments and arrangements for further clinical investigation will be put in place to facilitate discharge from the AMU/AMAU/MAU.
- Each patient will have a care plan documented in a timely fashion and communicated to themselves and/or their family, their GP and appropriate community services.
- All discharged patients will have the appropriate follow-up arrangements organised and communicated to themselves, their GP and appropriate community services. This includes information on infectious illness/healthcare associated infections and colonisation with multidrug resistant organisms.

8.3 Discharge planning across hospitals

It is imperative that physicians, hospital management and all MDT members actively facilitate discharge processes on a daily basis, as this is absolutely critical to the ability of the AMU/AMAU/MAU to function. Inefficient discharge processes threaten the units' ability to function in a safe and effective manner. Each physician or specialist registrar should perform a daily discharge ward round on their patients between 8am and 9am to confirm which patients are for discharge. Where possible, the patients likely to be suitable for discharge the following day should be identified to ensure their discharge takes place by 11am the following day. This may be aided by nurse facilitated discharge.

The CM should collate information provided on this ward round to enable them to organise patient transfer from the AMU/AMAU/MAU, as appropriate and maintain an overview of unit capacity.

8.4 Discharge procedure

In order to ensure effective discharge planning the following steps should be taken:
- Discharge planning will commence at assessment and should include information about the patient's pre-hospital abilities in relation to potential discharge issues.
- Each patient's estimated date of discharge will be identified during assessment, on the post-take ward round or within 24 hours of admission to hospital and documented clearly in their healthcare record.
- The estimated date of discharge will be discussed and agreed with the patient and/or family/carer.
- A discharge checklist will be completed before discharge. This will include communication with GP and relevant community services as mentioned earlier.
- In addition, "integrated discharge planning and nurse facilitated discharge planning should be supported by specific locally agreed policies, procedures and guidelines for all of the key elements of the integrated discharge planning" as outlined in the HSE code of practice for integrated discharge planning[16].

8.5 Integrated discharge planning

Effective multi-agency and multidisciplinary working is essential to manage the patients journey from pre-admission through hospital discharge to the community. The success of an AMU/AMAU/MAU is contingent upon creating sufficient movement through the units which is in turn critically dependent upon implementation of the Integrated Discharge Planning Standards. An efficient integrated discharge planning process will incorporate discharge policies, procedures and activities developed in conjunction with GP representatives and representatives from relevant community services. Patients discharged or admitted should receive a seamless transition from one stage of care to the next. Effective integrated discharge planning is "the critical link between treatment received in hospital by the patient and post-discharge care provided in the community..."[16] (p. 10). Discharge planning should be co-ordinated and patient-centred. This is more

likely to occur when hospitals, GPs and other community services communicate effectively.

8.6 Clinical leadership

Successful integrated discharge planning involves the championing and clinical leadership of improved patient care processes as determined by the proposed AMU/AMAU/MAU operational model. Healthcare professionals working within these units will have appropriate training in relation to the principles of integrated discharge planning and have a knowledge of the HSE code of practice for integrated discharge planning. Integrated discharge planning principles and processes should be incorporated into the undergraduate and postgraduate clinical education for all disciplines.

All relevant staff will be required to read the integrated discharge planning policies, procedures and guidelines relevant to the AMU/AMAU/MAU and to sign a statement to indicate that they have read and understood and will comply with same.

9. Examples of alternative pathways of acute medical care

9.1 Introduction

For the AMU/AMAU/MAU to function efficiently and effectively as a model of acute assessment and admission, it needs the capacity to direct patients to alternative pathways of medical care other than in-patient acute hospital admission. There are several models of care that will facilitate this process, some of which are discussed below. It should be noted that they are not mutually exclusive.

9.2 Ambulatory care

Ambulatory care is clinical care provided on a "day basis" that is not provided within the traditional hospital bed base or out-patient service. It includes diagnosis, observation, treatment and rehabilitation. Ambulatory care centres/settings can be stand-alone or based on the same campus as other health care facilities. Ambulatory care will have competent clinical decision makers. There will be immediate access to diagnostic support to facilitate "one stop" rapid diagnosis, treatment and/or reassurance. Usually ambulatory care is for people in defined age groups with defined symptoms and defined conditions. The key referrers to this type of care will be GPs. These facilities can also accept urgent review patients discharged from AMUs/AMAUs/MAUs who will otherwise be detained in hospital for ongoing review.

9.3 Enhanced provision for new patient appointments in out-patients

A critical success factor for the programme is a significant increase in availability of new patient and follow-up appointment slots in out-patients in order to facilitate:
- A potential streaming option for GPs via CMs regarding patients with differentiated medical problems.
- The need for rapid access new patient OPD appointments for patients assessed in the AMU/AMAU/MAU.
- A significant requirement for follow-up slots following assessment in the AMU/AMAU/MAU to review results of investigations and treatment.

Potential local implementation solutions to facilitate increased provision of new patient appointments slots might include:
- Aiming for a 2 : 1 ratio for return : new for non-chronic patients
- Medical OPD implementing a two visit policy, i.e. providing an initial assessment and a follow-up review. Any further appointments for the OPD must be approved by the consultant physician involved.

- Vigorous implementation of local do not attend (DNA) policies for patients who fail to attend. This might include referring patients back to their GP on their first non-attendance with no re-scheduling of appointments unless there is a new referral from the GP.

It is envisaged that the cadre of acute medical physicians appointed will have a primary role in staffing rapid access clinics which will be a vital part in the implementation of a successful local acute medicine programme. The therapy professions may usefully contribute to the provision of therapy-led rapid access clinics.

In addition to acute medicine physicians there will be local agreement, depending on anticipated volume of referrals, that all medical specialties out-patient clinics provide an appropriate number of urgent new patient slots weekly, for review of urgent referrals discharged from the AMU/AMAU/MAU and/or referred directly via the CMs. Clinics providing for review of new referrals of undifferentiated medical problems from primary care via the CM (perhaps provided by the acute medicine physicians) will be of particular value to the programme. To facilitate this process, the GP will contact the CM who will be able to direct the patient to an appropriate and timely clinic appointment.

Close interaction with the national OPD programme and close liaison with the local OPD planning group is critical to ensure appropriate rapid access to OPD clinics. Close discussion with the referring GPs in relation to the variety of services offered by a local AMU/AMAU/MAU through the CMs and navigation hub are likely to be critical success factors for the programme. CMs, by facilitating telephone consultations between GPs and the consultant/registrar/specialist nurse will provide a valuable service and may pre-empt the need for some admissions.

Local arrangements to facilitate the provision of appropriate numbers of new patient appointments may include physicians providing out-patient consultation services to the programme on a rotational basis, which may encompass a week to a month at a time. This will depend on local configuration of services and available manpower within specialties.

9.4 Out-patient parenteral antimicrobial therapy (OPAT)

The administration of intravenous antimicrobials has traditionally occurred in in-patient settings in acute hospitals in Ireland. However, there is a growing trend internationally to deliver intravenous antimicrobials in a non-inpatient setting. Such programmes are often referred to as out-patient parenteral antimicrobial therapy (OPAT), community-based parenteral antimicrobial therapy (CoPAT) and hospital in the home therapy (HITH) programmes. Although Ireland currently has several productive OPAT programmes, there is a lack of conformity across programmes, including formal national structures of clinical governance and standards of care. OPAT has the potential to deliver bed-day and cost savings if such programmes are expanded throughout the country in a regulated and structured manner.

A document outlining proposed standards for the administration of out-patient parenteral antimicrobial therapy (OPAT) in Ireland has recently been completed (ref appendix 17.10).

The IDSI working group acted to provide standards and clinical governance mechanisms for this mode of care delivery. This document outlines the benefits of OPAT and reviews infections appropriate for OPAT management. Out-patient parenteral therapy must be governed by the same standards of antimicrobial stewardship, intravascular catheter care and clinical governance as traditional in-patient, hospital-based care.

It is proposed that four regional infectious diseases centres for OPAT be established in a hub and spoke model working with other centres established within acute medicine departments. A national registry for all patients receiving OPAT will also be established. The OPAT team should sit within an existing acute medicine clinical directorate with clear managerial and clinical governance lines of responsibility and the OPAT programme must be part of the healthcare facility's antimicrobial stewardship programme and be represented on the antimicrobial stewardship committee.

Proposed models of care delivery, standard operating procedures and management algorithms for patient management are described in the OPAT standards document (ref appendix 17.10).

9.5 Rehabilitation wards and community (model 1) hospitals

Patients who warrant sub-acute care with a period of recovery and rehabilitation should be transferred directly from acute care facilities to rehabilitation wards in community (model 1) hospitals to avoid unnecessary acute hospital admission or undue hospital stays.

9.6 Services in community settings

Relationships with community service providers need to be strengthened and developed on an ongoing basis to streamline integration across the community/primary/secondary interface. Access and need at community level are influenced by a number of factors such as population, demographics, morbidities, social circumstances as well as availability of services.

Some patients may need a single service, others may need multiple (co-ordinated) services, some for a short time, others indefinitely. Other patients may need access to more structured community services, which should include input from community intervention teams (CITs) for specified periods or in other instances home care packages. The programme recommends the establishment of a CIT in each ISA. A CIT provides a nurse-led multidisciplinary, integrated immediate care facility which enables an appropriate "rapid" response to a patient with acute illness/care needs and who requires enhanced services for a defined period of time (ideally less than 72 hours) in the community/home; thus avoiding admission or supporting early discharge from hospital. The key component of the CITs work is integrating acute and community services. The CIT national steering group are currently compiling a guidance document on establishing and operating a CIT.

9.7 The provision of home care services

It is important to provide community services such as home IV services and community infusion units in order to prevent avoidable hospital admissions and to facilitate early discharge. These services must be provided on a same day basis where clinically appropriate.

10. Clinical governance

10.1 Clinical governance and accountability

Clinical directors (CDs), chief executive officers (CEOs) or general managers (GMs), directors of nursing (DONs), AMU/AMAU lead physicians (ref section 11.2), clinical services managers (CSM) or therapy discipline managers and relevant clinical teams are accountable for ensuring processes are adopted and maintained to deliver safe, high quality care for patients in the AMU/AMAU/MAU of their hospital. Clinical governance frameworks for acute medicine in individual hospitals within an ISA should be aligned.

10.2 Facility governance

The CDs, CEOs/GMs, DONs and CSM are accountable for the implementation of AMUs/AMAUs/MAUs within their hospital. They will meet with the CD(s) and AMU/AMAU lead physician on a regular basis to discuss operational issues and outcomes. The CEO/GM, DON and CSM will provide executive support and leadership for implementation within their hospital. The AMU/AMAU lead physician will have delegated authority and responsibility for the management of the AMU/AMAU (and the MAU in the associated model 2 hospital(s)). This does not affect the professional reporting relationship of other disciplines, for example, all nursing staff will have a professional reporting relationship with the DON. The AMU/AMAU lead physician will report to the CD.

As part of its governance structure, in addition to an overall hospital – primary care/community committee, each AMU/AMAU/MAU will have a liaison committee which will include a minimum of two GP representatives and at least one representative on behalf of other community support services. This latter committee will meet on a regular basis. In addition to reviewing audit results of the service, the committee will identify solutions, resolve issues where possible and improve the functioning of the units. The CEO/GM will be included in the circulation list for the minutes.

10.3 Establishment of an acute medicine governance group

The establishment of an acute medicine governance group is a key requirement for effective clinical governance. The group will be chaired by the AMU/AMAU lead physician and will meet on a monthly basis. The group will include all the professional and administrative leads within the acute medicine service and include GP representation. The overall responsibility of the group is to ensure that the following components of clinical governance are in place:

1. Ensure appropriate physical infrastructure and staffing in accordance with the acute medicine programme and best practice infection prevention and control guidelines.

2. Ensure all staff are clear about their own and their colleagues' roles, responsibilities, authority and accountability.
   - Ensure all staff have the appropriate authority to carry out their responsibilities.
   - Ensure that there is absolute clarity regarding areas of handover such as: the handover to out-of-hours services, within hospital transfers, hospital to hospital transfers and transfers between the hospital and community. At a minimum the responsible medical (consultant and registrar) and nursing staff for each patient must be identified on a 24/7 basis and handover reports must occur between all relevant clinical staff.
   - Ensure all staff are trained appropriately in the principles of infection prevention and control (to include training in hand hygiene, standard and transmission precautions).
3. Ensure that all relevant staff are aware of GP access protocols (i.e. advice, diagnostics, urgent OPD or AMU/AMAU/MAU) and communication of care plans.
4. Ensure national guidelines, care pathways, care bundles and patient information resources are available and utilised.
5. Ensure there is a structured, continuing professional development (CPD) programme for staff including educational meetings held within the unit and access to online educational resources.
6. Ensure performance management is in place for all staff.
7. Review performance measures and ensure corrective actions are identified, allocated to staff, tracked and reported to the group on a regular basis.
8. Ensure service users and stakeholders are engaged in a structured and regular manner and that the specific quality improvements initiatives are identified and successfully completed.
9. Ensure that a formal liaison group is established with GPs.
10. Put mechanisms, such as patient satisfaction surveys, in place in order to capture the experience of patients and the views/opinions of carers. The importance of capturing such AMU/AMAU/MAU feedback and the potential to utilise it locally and nationally to improve services and patient experience has been highlighted internationally[17].
11. Undertake a risk assessment on an annual basis and use this information to develop a risk register. Actions, responsibilities and target dates for correction of risk should be monitored as part of the work of the group. Details on the management of risk registers are available as part of the HSE quality, safety and risk framework[18].
12. Integrated discharge planning code of practice should be adopted and adhered to and part of the staff induction to the AMU/AMAU/MAU.
13. Ensure that an incident (including near misses) management process is in place. This should be based on local hospital policies and should include the following:
   - Identification of severity of risk (both to include the likelihood and the potential consequences of the risk).
   - Identification as to whether the incident reflects a systemic problem or an individual error.
   - Identification of action to mitigate the risk.
   - The action must be assigned to an individual and progress reported back to the group.

More detailed descriptions of the responsibilities of the group are outlined in appendix 17.5.

10.4 Clinical risk management

The management of clinical risks is an inherent part of the programme. Risks will be managed both proactively and reactively; however when emphasis is placed on the proactive management of risk, the potential for incidents occurring is decreased. Proactive risk management will be undertaken by means of risk registers. Risks that are highlighted during team meetings should be rated and added to the risk register. Actions, responsibilities and target dates for correction of risk should be monitored at monthly clinical risk management meetings.

10.5 Performance metrics

Audit of the AMU/AMAU/MAU aspect of the programme will be carried out in three domains – structural, procedural and outcome.

a. Structural audit
An annual structural audit will be carried out by each unit, via questionnaire, and returned to the AMP (ref appendix 17.6.1). This audit will explore whether or not the unit has the recommended structures in place.

b. Procedural audit
A monthly procedural audit will be carried out by each lead AMU/AMAU physician at unit level (ref appendix 17.6.2). This audit will help the unit lead, clinical director and nurse managers to manage the unit according to the operational procedures set out by the programme. If necessary, the programme leads will request the clinical director, nursing management and unit lead to discuss the findings of the procedural audits with them. Mortality and morbidity meetings should be developed, with clearly defined roles, responsibilities and actions. These meetings should be multidisciplinary and include representatives from critical care, emergency medicine, nursing services, other relevant hospital specialties and services together with GP representatives and a representative of community services.

c. Outcome audit
A suite of proxy outcome indicators in the domains of quality, access, cost have been developed for the programme (ref appendix 17.6.3). These indicators will need to be collected from each hospital by the Case-mix Unit and the Business Information Unit of the HSE. The DQCC will agree with Corporate Planning and Corporate Performance Directorate (CPCP), Casemix Unit and Business Information Unit on how this data will be collected. The results will be made available on a monthly and annual basis to the programme and will be fed back to local units.

The audit cycle will be completed and the multidisciplinary team in the AMU/AMAU/MAU, in conjunction with the AMU/AMAU/MAU liaison committee will identify the actions, responsibilities and target dates for continuous improvement initiatives.

11. Key roles and workforce planning for AMU/AMAU/MAU implementation

11.1 Introduction

This section describes key roles and the workforce requirements for an AMU/AMAU/MAU. The roles of the AMU/AMAU lead physician, case manager (this role requires consultation with key stakeholders), acute floor data manager, AMU/AMAU/MAU clinical nurse manager and lead therapy professional, central to the successful implementation of an AMU/AMAU/MAU are described in detail below.

The AMU/AMAU/MAU multidisciplinary team requirements are outlined in association with recommended work practices. All future workforce planning for healthcare services must be aligned with An Integrated Workforce Planning Strategy for the Health Services 2009-2012[19], from which service planners on all national clinical programmes are developing a workforce planning template.

11.2 The AMU/AMAU/MAU multidisciplinary team

The AMU/AMAU/MAU multidisciplinary team may include:
- Lead AMU/AMAU physician
- Consultant physicians
- Non consultant hospital doctors
- Senior nurse manager(s)
- Clinical nurse managers(s)
- Advanced nurse practitioner(s)
- Clinical nurse specialist(s)
- Nurses
- Specialty nurse(s) as appropriate.
- Health care assistant(s)
- Case manager
- Acute floor data manager
- Administrative staff
- Attendant(s)/porter(s) (shared between areas or from a pool)
- Hospital discharge planners prioritising the acute floor
- Dedicated household staff
- Clinical pharmacist
- Pharmacy technician
- Infection prevention and control team
- Therapy professions
- Clinical services manager
- Therapy manager
- Therapy clinical specialist/clinical lead

- Therapy staff grade: physiotherapist(s), occupational therapist(s), speech and language therapist(s), orthoptist(s), chiropody and podiatry, and nutrition and dietetics.
- Therapy assistant grade
- Medical social worker(s)
- Clinical measurement scientists

11.3 AMU/AMAU lead physician

A consultant physician with a special interest in acute medicine will usually undertake this role and will have overall responsibility for the effective management of the AMU/AMAU.

The AMU/AMAU lead physician will be one of the AMU/AMAU on-call consultants. He or she will be accountable to the CD and lead physician for acute medicine (when the lead physician for acute medicine is a different individual from the AMU/AMAU lead) and the responsibilities of this role may cross multiple sites within an ISA. A significant presence within the unit will be reflected in their work plan in addition to on-call commitments. A 3 year appointment to this role is envisaged.

The role will include accountability for clinical governance, risk management, strategic development of the unit and support education and training in acute medicine. In addition they will liaise closely with the AMU/AMAU/MAU clinical nurse manager(s), assistant director of nursing/divisional nurse manager, director of nursing, acute medicine therapy lead, clinical services manager, chief pharmacist and case manager. Close links will be maintained with primary care and hospital specialities which interface with acute medicine.

AMU/AMAU lead physician responsibilities

Operational issues:
- Accountability for reviewing all operational issues (including the AMU/AMAU/MAU roster) and ensuring that they are effectively addressed.
- Implementation of a pro-active discharge policy.
- Planning for effective surge capacity.
- Designation of clinical areas for AMU/AMAU/MAU and rapid access OPD services in discussion with hospital management.
- Collaboration with other AMUs/AMAUs/MAUs within an ISA.
- Liaison with AMU/AMAU/MAU CNM(s), assistant director of nursing, divisional nurse manager, DON and CD regarding overall service delivery.
- Liaison with infection prevention and control, therapy professionals, EM, surgeons, psychiatrists, pharmacy, critical care, primary care, ambulance service and other medical and non-medical services in order to ensure the effective running of the unit.
- Responsibility for clear and effective communication with local GPs, including the appropriateness of GP referrals to, and discharges from, the AMU/AMAU/MAU.

Clinical governance:

- Ensure that appropriate protocols and guidelines are in place and that adherence to these are encouraged and monitored.
- Responsibility for the management of clinical quality, safety and risk.
- Responsibility for leading the identification and implementation of ongoing continuous improvement initiatives in line with contemporary best practice.
- Accountability for monitoring the performance of the unit and co-ordinating actions to address variance in the performance of the unit.
- Monitor, report and assist in the investigation of critical incidents/adverse events.
- Develop strategic plans, operational plan and budget submission for the management and development of the AMU/AMAU/MAU.

Education and training:

- Ensure appropriate education and development planning for AMU/AMAU/MAU multidisciplinary teams.
- Promote education in acute medicine for undergraduates and postgraduates in conjunction with appropriate specialties e.g. EM, critical care, primary care, etc.

11.4 Medical team staffing in AMU/AMAU/MAU

11.4.1 Consultant physician

There should be one consultant physician on-call for AMU/AMAU/MAU, who may be drawn from the consultant physician rota or, in larger hospitals, from the complement of acute medicine physicians. The consultant physician on-call for AMAU/MAU will have a primary responsibility to be present and make management decisions for acute medical patients during core working hours 7 days per week[20, 21]. The consultant physician on-call for the hospital will manage the AMAU out-of-hours.

The acute medicine physicians in the AMU will be required to have a continuous presence during core working hours 7 days a week. Consultants will not cover more than one hospital when they are on-call.

Fixed consultant commitments should be correspondingly curtailed during on-call periods. In model 3 and model 4 hospitals the same criteria for urgent assessment by a senior medical doctor applies for medical patients both in the AMU/AMAU, ED and where applicable across the acute floor. Other physicians should provide a rapid consultation service.

11.4.2 Specialist registrars, registrars and senior house officers

Non consultant hospital doctor resources must be allocated on the basis of workload and to maximise training opportunities. There should be one registrar or SpR on duty at all times, with two available during periods of surge demand. There will also be a

requirement for SpRs to be available when needed. There should be one or more SHO in medicine present in the AMU/AMAU/MAU at all times.

NCHDs will be recruited centrally and rosters arranged between the various hospital models to maximise clinical training experience across a spectrum of AMU/AMAU/MAU care. It is essential that all these NCHDs receive consistent high level training and are certified with basic life support (BLS), advanced cardiac life support (ACLS) and training in the detection of clinical deterioration to include Early Warning Score (EWS).

MAUs will be staffed on a proportionate basis to ensure appropriate care is provided to patients and training to NCHDs.

11.4.3 Interns

Interns should form part of staff in the AMU/AMAU/MAU for training purposes only.

11.5 Case manager

The CM function will play a pivotal role in ensuring the clinical and operational effectiveness of the acute medicine service. The role will be developed in conjunction with current bed management, discharge planning, GPs, physicians, emergency physicians, nurse management and public health nurses. The programme will seek to work with key stakeholders to develop optimum processes to enable the effective streaming of patients within hospitals and between hospitals and community services. One of the critical success factors of the programme is the effective management of these processes.

The CM is the key to ensuring that GPs access the appropriate timely services for patients with acute medical problems.

The CM will be a senior nursing position with appropriate experience and have a reporting relationship with the relevant DON on professional issues and to the relevant lead physician for acute medicine on operational matters. The CM is the key to ensuring that GPs access the appropriate services for patients with acute medical problems. It is envisaged that the CM function will be sited in each ISA navigation hub and/or in model 3 and 4 hospitals.

Case manager responsibilities:
- Directing patients to the most appropriate service e.g. AMUs/AMAUs/MAUs, ED, OPD, general wards, specialist wards, specialist units, home and community services via the navigation hub.
- Close communication with GPs, the bed management function in the ISA, the CD, the DON, liaison public health nurses, the AMU/AMAU lead physician, the AMU/AMAU on-call consultant, AMU/AMAU/MAU registrars/SpRs, CNMs and relevant specialist services is essential.

- Tracking all calls (with GPs and others) and recording the information exchanged and the advice given.
- Contributing to the discharge planning process.
- Maintaining a close working relationship with the CD, the AMU/AMAU lead physician, the AMU/AMAU/MAU on-call physician, EM, liaison public health nurses, CNMs, the bed management function and other relevant specialty clinicians and nursing staff in relation to senior decision making around the allocation of patients to beds e.g. infection control issues.
- Where bed occupancy has reached a level of 85%, it will be the responsibility of the CM to implement an effective surge policy across the ISA to meet demand.
- The CM will also direct patient flow from the AMU/AMAU/MAU/hospital to other hospitals in the ISA for sub-acute care or step-down care, when the acute episode of patient care has been completed.

11.6 AMU/AMAU/MAU clinical nurse manager(s) and nursing staff

11.6.1 Clinical nurse manager

The clinical nurse managers (CNMs) in the AMU/AMAU/MAU have a crucial role ensuring the success of the unit. The DON, in consultation with the assistant directors of nursing/divisional nurse manager and CNMs, will be involved in the strategic development of the unit. The CNMs and nursing staff are responsible for the day-to-day management and will also support the strategic development of the unit, implement policies and ensure robust systems are in place for the admission, handover and discharge of patients. With regard to the latter they will ensure that there are effective links both with GPs, carers and other relevant community services. They will provide leadership and ensure efficient and effective communication with patients and relatives, other healthcare providers and multidisciplinary team members. The CNM will place particular emphasis on ensuring the timely initiation of patient assessment, instigation of safe care and completion of unit care – whether by handover to another hospital unit/service or GP/community service. CNMs in relevant chronic disease fields will make an important contribution to patient care in the AMU/AMAU/MAU.

11.6.2 Clinical nurse manager 2

The CNM 2 will provide leadership and ensure efficient and effective communication with patients, relatives, and carers liaising with other healthcare providers and multidisciplinary team members. The national CNM 2 job description will be utilised.

CNM 2 key responsibilities include:
- Manage patient care to ensure the highest professional standards are adhered to, within the guidelines laid out by An Bord Altranais, using an evidence-based, care planning approach and providing a high level of clinical leadership.

- The CNM 2 will practice nursing according to: professional clinical guidelines; national and area HSE guidelines; local policies, protocols and guidelines; and current legislation.
- Participate in teams/meetings/committees as appropriate, communicating and working in co-operation with other team members.
- Work closely with the CM and/or bed manager and/or discharge co-ordinator as appropriate in order to co-ordinate the flow of patients though the unit on a daily basis in organising admission and discharge.

11.6.3 Clinical nurse specialists and advanced nurse practitioners

In addition to core AMU/AMAU/MAU nursing staff, the development of clinical nurse specialist and advanced nurse practitioner posts specialising in acute medicine is recommended incorporating skill sets and competency development. Particular emphasis on independent assessment and development of initial treatment plans is recommended.

11.6.4 Nursing team staffing in the AMU/AMAU/MAU

Staffing levels need to reflect the intensive nature of service delivery in an AMU/AMAU/MAU. It is imperative that safe levels of suitably qualified nursing and health care assistant staff are maintained in the units. In order to promote collaboration and maintain and improve competencies, nursing staff may benefit from working in different areas of the acute floor, within their scope of practice. The AMU/AMAU/MAU nursing team will require the best skill mix, with staff having specific competencies appropriate to acute medicine, to deliver high quality care.

Scope of nursing practice, skills and competencies

The scope of nursing practice is defined by An Bord Altranais[22] as the range of roles, functions, responsibilities and activities, which a registered nurse is educated, competent and has the authority to perform. The scope of nursing and midwifery practice framework acknowledges the evolving role of nurses and midwives highlighting the principles and values that will underpin role development and expansion.

In response to challenges in the current healthcare environment, maximising the potential of nurses is of paramount importance. With this in mind a high level nursing development group, set up through the Office of the Nursing Services Director, will work with the programme on developing a skills and competency set (SCS) to support expanded practice required in different areas of acute medicine. This will ensure a proactive and strategic approach to the development of high quality nursing services within governance structures and in response to service need.

In the context of this programme currently included in the skills set recommended for nurses are the following: the use of an Early Warning Score (EWS), venepuncture and cannulation, nurse prescribing of medicines and ionising radiation (x-ray), criteria-led discharge and enhanced referral rights.

Core nurse and health care assistant (HCA) staffing recommendations

Nurse and healthcare assistant staffing of AMUs/AMAUs/MAUs in the Irish setting will require a site by site approach with the involvement of the management team of the service (director of Nursing/Midwifery, CEO/GM, clinical director and lead consultant). Consideration of available services, location, type, other available resources, patient throughput, care and dependency levels and other evidence-based studies will influence the individual staffing plans of AMUs/AMAUs/MAUs. There are two main types of evidence-based studies using the workload-based patient classification and staffing multiplier system and the diagnostic related group (DRG) approach.

Workload-based patient classification system using a staffing multiplier

Examples of staffing levels have been drawn from best practice AMUs/AMAUs/MAUs in the UK using typical dependency and throughput figures. This assumes that the dependency and throughput are the same in the Irish context.

The system has two components: (i) care levels that place patients into five dependency categories according to their nursing needs and (ii) a staffing multiplier that allocates nursing and nursing assistant WTEs to meet their needs. Care levels have been carefully defined by experts and the staffing multipliers calculated from detailed empirical studies in 'best practice' units.

In summary, care levels and related multipliers ensure that no matter where the patient is admitted, he or she will be allocated sufficient staff to meet his or her needs. The staffing multipliers are based on nursing data drawn from 24 UK AMUs/AMAUs/MAUs, covering all permutations such as wards design, affluent/deprived, urban/rural, etc. Consequently, care levels/multipliers should meet patients' needs in any context. Therefore, a Level O patient in one location in the country will be allocated the same 'best practice' staffing as a Level O patient in a different location.

From this UK AMUs/AMAUs and MAUs study, the staffing identified is 2.01 WTEs per occupied bed; broken down as follows: senior CNM 0.05 (CNM2); junior CNM 0.15 (CNM1); staff nurse 0.96; health care assistants 0.85 (HCAs).

An activity/quality study for the Irish context, however, will be required as different conditions apply in the UK Health Service; for example, UK healthcare assistants are contracted to four bands, ranging from basic (Band 1) to assistant practitioner (Band 4). Irish studies are needed, therefore, to re-allocate AMU/AMAU/MAU work to the appropriate grades.

Example of UK AMUs/AMAUs/MAUs staffing multipliers:
As the UK based multipliers stand, a 12 bed, 24 hour AMU/AMAU/MAU needs:

Occupied Beds		Staffing Multiplier		Whole-time Equivalent (rounded)
12	x	2.01	=	24.12 Total

Breakdown of the above figures

12	x	0.05	=	0.6 (CNM 2 likely to be uplifted to 1 WTE drawn from CNM 1 WTEs).
12	x	0.15	=	1.8 CNM 1
12	x	0.96	=	11.52 SNs
12	x	0.85	=	10.2 HCAs

For simplicity, the 'example' uses occupied 'beds'. In practice, however, beds will be replaced by patient dependency and throughput data.

Diagnostic related group (DRG) based approaches

It's likely that countries with developed health services will move from dependency-based ward staffing to DRG based approaches. That is, staffing multipliers also will be allocated to a DRG so that ward staffing is based on the DRGs in the ward at that time. The DRG-based approach has several advantages. First, it is a more sensitive workload indicator. That is, 15 patients, each with a separate DRG and related multipliers will give a more accurate staffing establishment than patients allocated to five broader dependency groups. The disadvantage is that DRGs are not allocated to patients until after discharge, so a mechanism is needed to ensure DRGs are live.

Owing to the DRG approaches' tentative nature, we recommend that AMU/AMAU/MAU DRGs and patients care levels are collected simultaneously so that Ireland's AMU/AMAU/MAU workforce planning and development study is not compromised[23].

Health care assistants

The nationally agreed job description for HCAs[24] will be utilised.

11.7 Therapy professionals

Early access to therapy professionals will be a central part of the operational success of the programme. This is essential in order to identify individual patients' needs and appropriate treatment and adopt a risk management approach to patient flow.

Therapy services should be realigned to meet operational requirements within the AMU e.g. extended operational hours and 5/7 service provision. The existing out-of-hours on-call physiotherapy service will be provided to the AMU/AMAU.

The therapy lead and relevant senior therapists will actively participate in ward rounds, care planning and integrated discharge; appropriate policies and procedures will be developed to support this role. In consultation with the CSMs/therapy discipline managers,

the therapy lead will be responsible for the operational management of the therapy service to the AMU. In addition, they will contribute to the strategic development of the unit, manage therapy skill mix, provide leadership and ensure effective communication with other relevant disciplines. The therapy lead is responsible for ensuring appropriate therapy intervention across the continuum of services within the unit, upon transfer to other units and at the interface with other national programmes.

Therapy profession staff will work across the acute floor within their scope of practice. In order to support reverse streaming, therapy services will identify and protect rapid-access out-patient slots across the primary and secondary care interface.

There should be an agreed approach at national level to the determination and calculation of therapy staffing requirements to support the AMU/AMAU/MAU.

The discipline specific clinical specialist in model 3 and 4 hospitals should provide outreach support to model 2 and model 1 facilities.

Therapy professionals staffing

The therapy resource to the AMU/AMAU /MAU will need to be agreed at a national level and determined to be appropriate to the bed numbers and acuity of the presenting caseload. The optimal use of therapy workforce skills is seen as a potential method to ensure health outcomes.

There should be an agreed approach at national level to the determination and calculation of therapy staffing requirements to support the AMU/AMAU/MAU. The therapy professions committee will undertake a workforce planning exercise to determine a nationally agreed mechanism for WTE calculation.

11.8 Acute floor data manager

The acute floor data manager's role will encompass responsibility for the collection and dissemination of all acute floor metrics. The role should be developed to support clinical audit within the acute medicine service and across the related specialties (EM, critical care and surgery). A job description for this role is available in appendix 17.7.

Acute floor data manager responsibilities include:
- Work closely with ICT staff to ensure that the required ICT support is in place to ensure collection of all required metrics.
- Communicate effectively with all relevant stakeholders.
- Report to AMU/AMAU lead physician

11.9 Administrative staff

Administrative staff will be essential to the effective functioning of the MAU/AMAU/AMU. There must be a minimum of one administrative staff member present in the AMU/AMAU/MAU during all opening hours.

Administrative staff responsibilities include:
- They will provide secretarial support and serve as a key communication link between the healthcare team, patients, families and other hospital departments.
- They will support the management of the patient flow to and through the AMUAMAU/MAU and have responsibility for organising OPD appointments and discharge communications.
- They will also assist the data manager in the collection of metrics and performance data for the unit.

11.10 Hospital pharmacists

The director of pharmacy operating from a model 3 or model 4 hospital will have responsibility for medication safety issues, medication procurement and supply, medicines information services and aseptic manufacturing for all hospital patents in the defined ISA (including model 1 and model 2 hospitals). The integration and continuity of pharmaceutical care is an important consideration in medication safety management. The director of pharmacy will also will advise on legislative requirements and guidelines for the use of medicines.

Clinical pharmacists will provide medicines reconciliation immediately on patient arrival or as soon after as possible. They will also review and advise if admission is medication/toxicity related or if there are medication issues. Patient specific medicines will be dispensed from the pharmacy. If a patient has arrived from community/district/mental health hospital liaison will be established with clinical pharmacist for that site to ensure continuity of information on medication issues. If a patient is admitted to model 3 or 4 hospital, the clinical pharmacist for the receiving ward will be fully appraised of patient status and history. If a patient is not admitted, counselling on the safe use of their medicines and changes to medication regimens will be provided to the patient (and carers). In addition, as part of the discharge mechanism, any changes in medication will be highlighted for the GP's attention. The expansion of service provision in line with defined service needs will be addressed e.g. extended hours and weekend service.

12. Education and continuing professional development

12.1 Medical education

A new specialist training scheme in acute medicine will be developed in conjunction with the Royal College of Physicians of Ireland and the Irish Committee on Higher Medical Training (ICHMT). This will provide training in the specialty of acute medicine only or acute medicine and another specialty e.g. respiratory/gastroenterology/etc.

A very successful training programme in acute medicine have been established in the UK, with the Royal College of Physicians (UK) and Society for Acute Medicine playing key roles in its development[25, 26].

There will be an emphasis on a collaborative approach to education and training; the specialties of emergency medicine, acute medicine and critical care medicine should collaborate on relevant aspects of medical education and ongoing professional development, to train and support doctors working in these specialties to provide patients with the highest possible standards of medical care. In addition as part of GP training there will be increased opportunities for training both within AMUs/AMAUs/MAUs and EDs.

Training will be provided in the application of the national EWS.

12.2 Nursing education

An experienced, dedicated nursing team with competencies in acute medicine is required to ensure the highest quality of care for patients. Senior nurses need to be equipped with management and leadership skills to support a culture of ongoing education, training, practice and professional development. This should encompass training on the early clinical assessment and management of the acutely unwell patient, recognition of the patient with complex needs and the promotion of appropriate ambulatory care and training in the application of the national EWS.

Undergraduate nursing

Exposure to AMUs/AMAUs/MAUs at undergraduate level is recommended.

Postgraduate nursing

Inclusion of a module in AMU/AMAU/MAU nursing is recommended for the Postgraduate/Higher Diploma in Emergency Medicine. The development of a dedicated Postgraduate/Higher Diploma in Acute Medicine nursing will be explored by a high level nursing development group.

Health care assistants

Continuing education, training and up-skilling of this group is recommended.

12.3 Education of therapy professionals

The undergraduate therapy curriculum and clinical placement sites should reflect the acute medicine programme into the future. At postgraduate level this specialty should be an accepted career pathway and reflected in Master of Science programmes and research.

The designated posts of advanced therapy practitioner in acute medicine should be determined and the requisite competencies defined.

12.4 New work practices and approaches to training

Cultural work practice and education and training changes around the provision of an acute floor are critical success factors for the programme. This is likely to be a particular problem encountered in model 4 hospitals, where there is a focus on specialty care. It is pivotal to the success of the programme that there is recognition of the critical importance of senior medical doctors assessing patients promptly on presentation to the acute floor and committing to providing this service as their work priority during hours rostered to the acute medicine service.

Appropriate continuing medical education (CME) and continuing professional development (CPD) training must be encouraged to promote provision of safe and effective care for patients presenting with acute medical problems. Exposure of undergraduate and postgraduate trainees to various components of the acute floor throughout their training is likely to facilitate a culture change.

13. Information and communications technology

13.1 Importance of information and communications technology (ICT)

Information and communications technology (ICT) is vital in assisting the health care professionals and health services to provide quality healthcare, which is safe and accountable as well as processing and managing patient records within and between services, within and between settings – whether hospital, primary care or other Community services   Important features of these systems are reliability, security and ease of accessing pertinent data.

13.2 Information systems

Vital information systems include:
- Clinical systems e.g. patient administration system (PAS), hospital inpatient enquiry (HIPE), order communication systems, closed loop medication management systems, clinical decision support systems, radiology and laboratory information systems, bed management package are all associated with patient-centred care and aim to help in providing best practice in the treatment of patients at all levels. Also included here are Community systems and in particular GP patients systems together with the need for effective interfacing with pertinent hospital services eg laboratory, referrals, discharges, advice etc.
- Business systems within hospitals and community services, associated with supporting departments such as finance and maintenance to ensure quality and cost control and to provide information in helping to support decision makers in the hospitals and community services.
- Reporting tools, which gather information into a central repository in order to allow the different clinical relevant services both within and outside of hospital to access timely accurate data and information.
- The development and implementation of a combined assessment document is required to facilitate health and social care professionals to undertake assessment, treatment, referral and integrated discharge planning processes.
- The development and implementation with GPs of referral and discharge forms for various services.

13.3 Electronic discharge summaries

The effectiveness and quality of care for patients is largely dependent on communication between physicians both in secondary care and in primary care. Written communication between secondary and primary care in the form of a discharge summary is vitally important for informing GPs and other healthcare professionals of the details regarding patients' admission into hospital, as well as ensuring there is continuity of care in the community. Discharge summaries are often the only form of communication that occurs at the transition between secondary and primary care.

Prior to discharging patients from hospital, a discharge summary (handwritten or typed) is required to be completed. Ideally copies are kept in patient files and given to the patient, as well as forwarding a copy to the GP. Correctly completing all relevant sections on a discharge summary is part of good medical practice, clinical governance and hospital/patient documentation.

Historically, discharge summaries have been found to be poorly written, contain inaccurate and ineffective information, including: inadequacies of medical evaluation, level of experience of the discharge author and accuracy. Subsequently, there has been a general move towards electronic discharge summaries with a standard format. AMUs/AMAUs/MAUs should, if possible, develop a system where electronic discharge summaries replace written and transcribed records which ensures timely completion of discharge summaries.

Advantages of an electronic system over a paper based system include:
- More information is included
- No need to later type or dictate a formal letter
- Presence of a permanent electronic record
- Immediate availability
- Legibility
- Full details provided to GP at time of discharge
- Allows more accurate clinical coding
- Facilitates retrieval of information

13.4 Summary

Ultimately this information will increase the availability of patient information at the point of care, enhance and improve speed of communication between hospitals and GPs, assist other decision makers within the hospital and funding agencies in making decisions on the ultimate and effective use of scarce resources.

ICT should provide essential support for all administrative, support services and, increasingly, patient care delivery. It embraces all voice, video and data communications technologies and ideally might provide one central management point for all purchases of hardware, software, telecommunications, ICT development and advisory services.

ICT is essential to the successful implementation of the programme's objectives, validation and ongoing monitoring.

14. Communications

The programme advocates a policy of strong, effective, consistent communication with all stakeholders. As a founding principle, the programme promotes quality, including reliability and safety, with a patient-centred approach.

14.1 Guidelines for effective communication

The principles and objectives in relation to communication with patients are to:
- Create a safe and informative culture within the AMU/AMAU/MAU to reassure and advise patients on their medical care and treatment options and to empower their decision making. The physical environment of the unit should reflect this approach and facilitate communication between staff, patients and their families and carers.
- Ensure a professional approach with adequate time made available for discussion with patients and their families/carers. Encourage staff to listen to, and respond appropriately to patients' concerns and views.
- Share and provide complete customised information about their care and hospital experience to the patient and their family/carers that respects individual values and choices and ensure continuity of care.
- Provide accurate written information to the patient and their GP on: diagnosis; medication; the discharge process; and follow-up.
- Foster and support health promotion and self-directed care for patients to help improve and maintain their health.

The principles and objectives in relation to staff communication are:
- Staff should observe professional, national and local communications guidelines and policies.
- A team-centred rather than hierarchical approach should be fostered in working together for the benefit of the patient.
- A dynamic, effective, caring culture is important for both staff and patients.
- Promote a policy of courtesy and respect for the patient and between all team members and specialties, including primary care, so as to build a culture of collaboration and co-operation.
- Ensure effective communication in relation to patient referrals and follow-up.
- Share clinical guidelines, protocols, best practice and "lessons learned" using a common framework that ensures an organised, systematic delivery of medical care that is safe and effective.
- Organise both regular operational and educational review meetings, including audit, for all staff to share information within and outside the hospital.

The principles and objectives in relation to communication with primary care staff and others providing services in the community are:
- A dynamic, effective, caring culture is important for both health care workers and patients.

- Timely effective communication plays a key role in this culture.
- Mutual respect and understanding of the roles played by all health care workers whether based in hospital, primary care or other community services is key to good communication.
- All healthcare workers involved in caring for a patient are part of the wider care team for that patient. Recognition of this wider team and effective communication with that team should be fostered in working together for the benefit of the patient.
- A policy of courtesy and respect for the patient and between all team members and specialties, including primary care and community services, will help build a culture of collaboration and co-operation.
- Of particular relevance for primary care and other community services is effective communication in relation to patient referrals, care pathway follow-up and discharge to different services.
- Shared clinical guidelines and joint development of protocols using a common framework will help ensure an organised, systematic delivery of safe effective medical care.
- Regular operational and educational review meetings, including audit at times and locations which suit all involved, contribute to effective communication.
- The joint development, use and ongoing review of standard methods for communication in terms of referral, discharge, results, update, urgent advice, enhanced service needs etc. is vital. This includes data items required, method of communication (paper, electronic, phone) and contact details etc.

14.2 Patient information

The re-organisation of acute medical care to AMU/AMAU/MAU based systems must be clearly communicated to patients and carers (ref appendix 17.2). This can be achieved using both hardcopy (e.g. leaflet or booklet) and electronic media (e.g. hospital website). The content of the patient information for AMU/AMAUs/MAUs will be determined locally. Potentially useful information for inclusion in the AMU/AMAU/MAU patient information media includes:

- The rationale for AMU/AMAU/MAU development.
- A description of services.
- An overview of how patients can access the services of the AMU/AMAU/MAU (including an emphasis of the importance of the role of the GP).
- The location of the AMU/AMAU/MAU in the hospital.
- Opening hours.
- Contact details.
- Information regarding access policies or visiting times for AMU/AMAU/MAU patients' families/carers and visitors.
- Information regarding hospital infection control policy.

Reliable, evidence-based patient information will also be made available in the AMU/AMAU/MAU to patients and carers/family members/visitors and may also be provided electronically. It is hoped that this information will promote self-management of existing conditions and contribute to the prevention of other health problems.

14.3 Patient and carer experience of AMU/AMAU/MAU care

AMUs/AMAUs/MAUs seek to provide prompt, patient-centred care and improve patients' experience of acute medical healthcare, facilitated by a structured approach for patients and family to speak with the consultant. Mechanisms, such as patient satisfaction surveys, will be used to capture the experience of patients, families and carers. The importance of capturing such unit feedback is vital as it affords the potential to utilise it locally and nationally to improve services and patient experiences.

15. Programme opportunities and challenges

This programme presents numerous opportunities and challenges. Many of these are explicit in this document, others are implicit. The current service can be improved both from the point of view of patients and those working in the health services. This programme will facilitate these improvements.

15.1 Remote rural health

Certain hospitals, located in geographically remote areas of the country, face unique challenges in meeting the requirement of this programme. These hospitals have provided a high standard of care to their catchment population for many years. For such hospitals, the programme recommends a pragmatic approach in terms of future provision of care. This will ensure that relatively isolated and dispersed rural populations are not disadvantaged by the removal of some services which do not correspond to the defined models. In such circumstances a balance between population healthcare expectations, needs and service provision should be sought. This approach is supported a substantial body of evidence relating to provision of healthcare to rural communities[27].

In addition to hospitals located in geographically remote areas, many more hospitals serve patients who reside in areas which can be described as remote by virtue of geography or transport links. For such patients, these factors should be taken into account at an individual level when delivering their acute medical needs.

15.2 Hospital physical environment

The AMU/AMAU/MAU should have access to the physical environment appropriate to its function as an AMU/AMAU/MAU. As these functions include infection control, the environment should be in keeping with recommended building standards[28].

15.3 Rapid access OPD appointment slots for new patient referrals

The provision of adequate numbers of rapid access OPD new patient appointments will be challenging. These will be required for patients referred directly by the CMs following discussion with the relevant GP and rapid access OPD follow-up appointments for patients seen in the AMU/AMAU/MAU. The opportunity includes not only more timely care but potentially avoided admissions.

15.4 New work practices and approaches to training

Changes in work practices (e.g. structure of the day and skill mix) are critical for the success of programme. This will require major cultural changes not just at the work practice level but also at under-graduate, post-graduate and ongoing training/continuous professional development level for all staff of all grades.

A crucial change in work practices is the presence of senior medical doctors assessing acute medical patients promptly on presentation to hospital and committing to prioritising this during hours rostered to the acute medicine service.

Appropriate continuing medical education (CME) and continuing professional development (CPD) training must be encouraged to promote provision of safe and effective care for patients presenting with acute medical problems. Exposure of undergraduate and postgraduate trainees, including those in general practice, to various components of the acute floor throughout their training is likely to facilitate a culture change.

15.5 Interdependencies with national clinical programmes

Crucial to the provision of improved care is the provision of supported integrated chronic disease management programmes focused mainly in primary care but also the community. Priority will be needed in the implementation of national clinical programmes for common diseases such as COPD, diabetes, asthma and cardiac failure within primary care teams. One aspect of this is encouraging some GPs trainees to develop a specialty interest and expertise such as chronic diseases. The national clinical programmes for chronic diseases will support outreach in the community by specialist physicians and nurses to facilitate integrated care. Yet another aspect or opportunity is supporting patient education and self-management plans.

Expansion of the critical care consultant base in model 3 and model 4 hospitals reflecting international practice will be required. This will be delivered by consultant specialties including intensivists, anaesthetists, respiratory physicians and emergency physicians.

The acute medicine programme is critically inter-dependent on successful interaction with all national clinical programmes (ref appendix 17.3). Close interaction and liaison with these programmes with a concept of the acute medicine programme as the "bookmark" within each programme is imperative for successful delivery of appropriate care.

15.6 Other challenges and opportunities

These include:

- Constraints imposed by the European Working Time Directive.
- NCHD recruitment issues.

- Staffing issues, both manpower and skill mix.
- Co-ordinating care between acute hospital, primary care services and community services, both during routine working hours and out-of-hours.
- Challenges and potential of ICT to facilitate secure and relevant data and information movement within and between services.
- Patient expectations.
- Practical and cultural barriers to change both for staff, patients and the public.
- Perverse incentives within the care delivery system, e.g. the current health insurance policies regarding remuneration for patients seen within the AMU/AMAU/MAU.
- Potential adverse impact on out-patient and endoscopy waiting lists.
- Potential problems in provision of timely access to diagnostics.
- Challenges with the concept of streaming and reverse streaming between hospitals.
- Budgetary constraints.

This is not comprehensive list of the challenges or the opportunities ahead. Recognising challenges is the first step to identifying and implementing solutions.

16. References

[1] Health Service Executive & Department of Health and Children. (2010) *You and your Health Service, What you can expect from your health service and what your health service can expect from you.* Available at: http://hsenet.hse.ie/HSE_Central/Consumer_Affairs/new/yyhs.html. Accessed 20th October 2010.

[2] Royal College of Physicians (2007) *Acute medical care. The right person, in the right setting – first time. Report of the Acute Medicine Task Force.* London: RCP, 2007. Available at: http://bookshop.rcplondon.ac.uk/details.aspx?e=235 Accessed 20th October 2010.

[3] Internal Medicine Society of Australia and New Zealand Medical Assessment and Planning Unit Working Group. (2006) *Standards for medical assessment and planning units in public and private hospitals*. Available at: http://www.imsanz.org.au/resources/documents/IMSANZ_MAPU.pdf. Accessed 14th April 2010.

[4] Scott, I., Vaughan, L., Bell, D. (2009) 'Effectiveness of acute medical units in hospitals: a systematic review'. *International Journal for Quality in Health Care* , 21 (6): 397–407.

[5] Comhairle na nOspideal (2004) *Acute Medical Units.* Available at: http://www.lenus.ie/hse/bitstream/10147/44659/1/6113.pdf. Accessed 15th June 2010.

[6] Haupt, M., Bekes, C., Brilli, R., Carl, L., Gray, A., Jastremski, M., Naylor, D., Rudis, M., Spevetz, A., Wedel, S., Horst, M.; Task Force of the American College of Critical Care Medicine, Society of Critical Care Medicine. (2003) 'Guidelines on critical care services and personnel: Recommendations based on a system of categorization of three levels of care'. *Critical Care Medicine*, 31 (11):2677-83.

[7] National Advisory Committee on Palliative Care. (2001) *Report of the National Advisory Committee on Palliative Care*. Dublin: DoHC. Available at: http://www.lenus.ie/hse/bitstream/10147/42522/1/1890.pdf. Accessed 20th September 2010.

[8] The Society for Acute Medicine. (2004) *Recommendations for Nurse Staffing on Acute Medicine / Medical Assessment Units (AMU).* Available at: http://www.acutemedicine.org.uk/. Accessed 14th April 2010.

[9] Department of Health. (2005) *A guide to emergency medical and surgical admissions*. Available at: http://www.dh.gov.uk/dr_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_4121902.pdf. Accessed 14th April 2010.

[10] International Federation for Emergency Medicine. (2008) *About IFEM*. Available at: http://www.ifem.cc/About_IFEM.aspx Accessed 10th June 2010.

[11] College of Emergency Medicine. (2008) *The Way Ahead 2008-2012. Strategy and Guidance for Emergency Medicine in the United Kingdom and the Republic of Ireland.*

Available at: http://www.collemergencymed.ac.uk/asp/subview.asp?id=504 . Accessed 2nd June 2010.

[12] Mackway-Jones, K. (1997) *Emergency triage: Manchester Triage Group*. London: BMJ Publishing Group.

[13] Roberts, R., Graff, L. (2001) 'Economic Issues in Observation Unit Medicine'. *Emergency Medicine Clinics of North America*, 19 (1): 19-19.

[14] Roberts, R., Zalenski, R., Mensah, E., Rydman, R., Ciavarella, G., Gussow, L., Das, K., Kampe, L., Dicover, B., McDermott, M., Hart, A., Straus, H., Murphy, D., Rao, R. (1997). 'Costs of an emergency department-based accelerated diagnostic protocol vs hospitalization in patients with chest pain: a randomized controlled trial.' *JAMA*, 278(20): 1670-6.

[15] Bell, D., Skene, H., Jones, M., Vaughan, L. (2008) 'A guide to the acute medical unit'. *British Journal of Hospital Medicine*, 69 (7): M107-M109.

[16] HSE. (2008) *Code of Practice for Integrated Discharge Planning*. Available at: http://www.lenus.ie/hse/bitstream/10147/65289/1/CoPdischarge_planning.pdf. Accessed 14th April 2010.

[17] Royal College of Physicians. (2007) *Acute medical care. The right person, in the right setting – first time. Report of the Acute Medicine Task Force*. London: RCP. Available at: http://www.rcplondon.ac.uk/pubs/contents/2a8ed5fa-64af-4b2c-af03-85e90b7a6d20.pdf. Accessed 14th April 2010.

[18] HSE. (2007) *Integrated Risk Management Policy*. Version 2. Available at: http://www.hse.ie/eng/About/Who/OQR023_20071130_v2HSE_Integrated_Risk_Management_Policy.pdf. Accessed 14th April 2010.

[19] Department of Health and Children. (2009) *An Integrated Workforce Planning Strategy for the Health Services 2009-2012*. Available at: http://www.hse.ie/eng/staff/HR/An_Integrated_Workforce_Planning_Strategy_for_the_Health_Services_2009-2012.pdf. Accessed 14th April 2010.

[20] McNeill, G., Brahmbhatt, DH., Prevost, A.T., Trepte, NJ. (2009) 'What is the effect of a consultant presence in an acute medical unit?' *Clinical Medicine*, 9(3): 214-8.

[21] RCP Council. (2010) 'RCP position statement on the care of medical patients out of hours.' Available at: http://www.rcplondon.ac.uk/professional-Issues/Pages/RCP-on-care-of-medical-patients-out-of-hours.aspx. Accessed 14th December 2010.

[22] An Bord Altranais. (2000) *Scope of Nursing and Midwifery Practice Framework*. Dublin: An Bord Altranais.

[23] Hurst, K. (2010) 'Evaluating the strengths and weaknesses of NHS workforce planning methods'. *Nursing Times*, 106(40): 10-14.

[24] HSE (2006) *Report of the High Level Group on Health Care Assistants Regarding the Implementation of the Health Care Assistants Programme*.
Available at: http://www.skillprogramme.ie/publications/26.pdf. Accessed 20th April 2010.

[25] Joint Royal Colleges of Physicians' Training Board (JRCPTB) website. Available at: http://www.jrcptb.org.uk/about-us/Pages/Introduction.aspx. Accessed October 20th 2010.

[26] Skene, H. & Ward, D.K. (2008) 'The Society for Acute Medicine UK Acute Medicine Training Survey 2007'. *Acute Medicine*, 7(1): 50–54.

[27] Nimegeer, A., Farmer, J., West, C., Whiston, S., Heaney, D. (2010)
Remote Service Futures: Health Care Service Design with Communities - Final Report.
Available at: http://www.abdn.ac.uk/crh/uploads/files/remote-service-futures-project-final-report.pdf. Accessed 15th October 2010.

[28] HSE Health Protection Surveillance Centre. (2008) *Infection Prevention and Control Building Guidelines for Acute Hospitals in Ireland - Strategy for the control of Antimicrobial Resistance in Ireland.* Available at: http://www.hpsc.ie/hpsc/A-Z/MicrobiologyAntimicrobialResistance/StrategyforthecontrolofAntimicrobialResistanceinIrelandSARI/KeyDocuments/File,3439,en.pdf Accessed 20th October 2010.

17. Appendices

17.1 Acknowledgements

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17.2 Patient friendly programme information

National acute medicine programme 2010

We are trying to improve the patient's experience of care by directing them to the right care at the right time and in the right place. Their access will be fast tracked, and where appropriate diagnostic tests and treatment will be carried out, thereby improving their chances of a full recovery.

Some problems with the current system include:
- Patients waiting on trolleys for long periods of time
- Differences in care with some patients not receiving the most appropriate treatment e.g. acute stroke care
- The lack of nationally agreed standards and rules as to how hospitals should manage sick patients
- Patients are not being seen early enough in their hospital stay by senior doctors and sometimes do not receive a full explanation about their condition
- There is a delay in having tests performed

What is the acute medicine programme document?

The document produced by the national acute medicine programme identifies a clear set of rules and recommendations as to how an ill medical patient is managed. This is the type of patient that is referred to the emergency department at present. The programme also describes how the hospital system needs to be arranged around 4 different types of hospital models.

What can people expect?

If a patient with a medical condition attends a hospital with a GP letter, they can go directly to the acute medical unit. They will be seen by a senior medical doctor within one hour of entering the acute medical unit. A decision on admission or discharge will be made within six hours. This will reduce the amount of time a patient spends in hospital.

The acute medicine programme is very much in line with the principles of the Health Services Patient Charter (You and your Health Service, What you can expect from your health service and what your health service can expect from you, 2010) which is based on eight principles underpinning high quality people-centred care. The principles are as follows:
- Access
- Dignity and respect
- Safe and effective services
- Communication and information
- Participation
- Privacy
- Improving health
- Accountability

It has been very important that patient advocates played a key role in the design of the acute medicine programme and will continue to be involved in its implementation and evaluation. As with all the national clinical programmes there is a very clear role for families, carers or advocates ensuring that patients/service users receive care that meets the expectations outlined in the charter.

Key components of the programme include:

1. Standardising acute medical units i.e. the way in which medical patients are managed in hospitals right across the country.
2. The use of a national early warning score (internationally recognised scoring system of a patient's condition which will identify when their condition is deteriorating and prompt immediate corrective action).
3. It will be clear which consultant is responsible for the management of each patient and is responsible for communicating information about their care to each patient.
4. A service is being set up to make sure that patients are transferred safely between hospitals taking them to the point where they will receive the best treatment for their condition. The patient and their family will be fully informed by the doctor or nurse if a transfer is likely to take place to other hospitals in the area or outside depending on the circumstances.
5. Tests will be performed and diagnosis made on the same day as the patient enters the hospital, for the majority of conditions, during the opening hours of the acute medical units.
6. Improved management of patient discharge.

What difference will the programme make?

The programme advocates the introduction of acute medical units. These departments will allow patients with certain medical conditions, for example, people who suffer strokes, heart attacks or chronic illnesses to be seen and assessed promptly with appropriate and specialised diagnostic facilities. Some differences that the programme will make are outlined below:

- A faster service that more closely responds to the patient's needs.
- Patient safety will be improved because the hospitals to which they will be referred will have the appropriate services to meet their needs.
- A clear and standard set of rules will be developed as to how a hospital needs to treat acutely ill patients.
- Improved patient care by ensuring universal implementation of best practice.
- For the majority of conditions, during the opening hours of the acute medical units, tests will be performed on the same day as the patient enters the hospital.
- Shorter length of stay in hospitals.
- Prevent patients having to wait for long periods on trolleys.
- Improved discharge planning process.
- The clinical nurse manager and the senior medical doctor will ensure that the patient is made aware of what is happening at all stages of their care, especially if they require transfer to another hospital.

- There will be sets of rules by which all hospitals will safely operate and increases in the range of services available for patients.
- Smaller hospitals can grow in activity in the areas of day surgery, outpatients, rehabilitation and diagnostics.

Why is this different?

- This programme provides the best care for patients at the most suitable location.
- There will be more effective and faster assessment, diagnosis and treatment for patients.
- It is being led by doctors, nurses and other healthcare professionals.
- The programme has taken the advice of patient groups to ensure that it is as patient-centred as possible. There is a detailed and standard set of rules by which the hospitals must operate.
- Implementation of the programme will be on a phased basis, strengthened by continuing consultation and communication with patients and staff.

Additional information

The national acute medicine programme is a Health Service Executive initiative in association with a number of different groups (e.g. the Royal College of Physicians of Ireland, Irish Association of Directors of Nursing and Midwifery, Irish College of General Practitioners and Therapy Professions Committee. It is being led by Professor Garry Courtney from St. Luke's Hospital, Kilkenny and Professor Shane O'Neill from Beaumont Hospital, Dublin. They are advised and supported by a team of professionals including representatives from nursing, therapy professions, hospital doctors and GPs. Patient representatives have been consulted and their input has enhanced the programme.

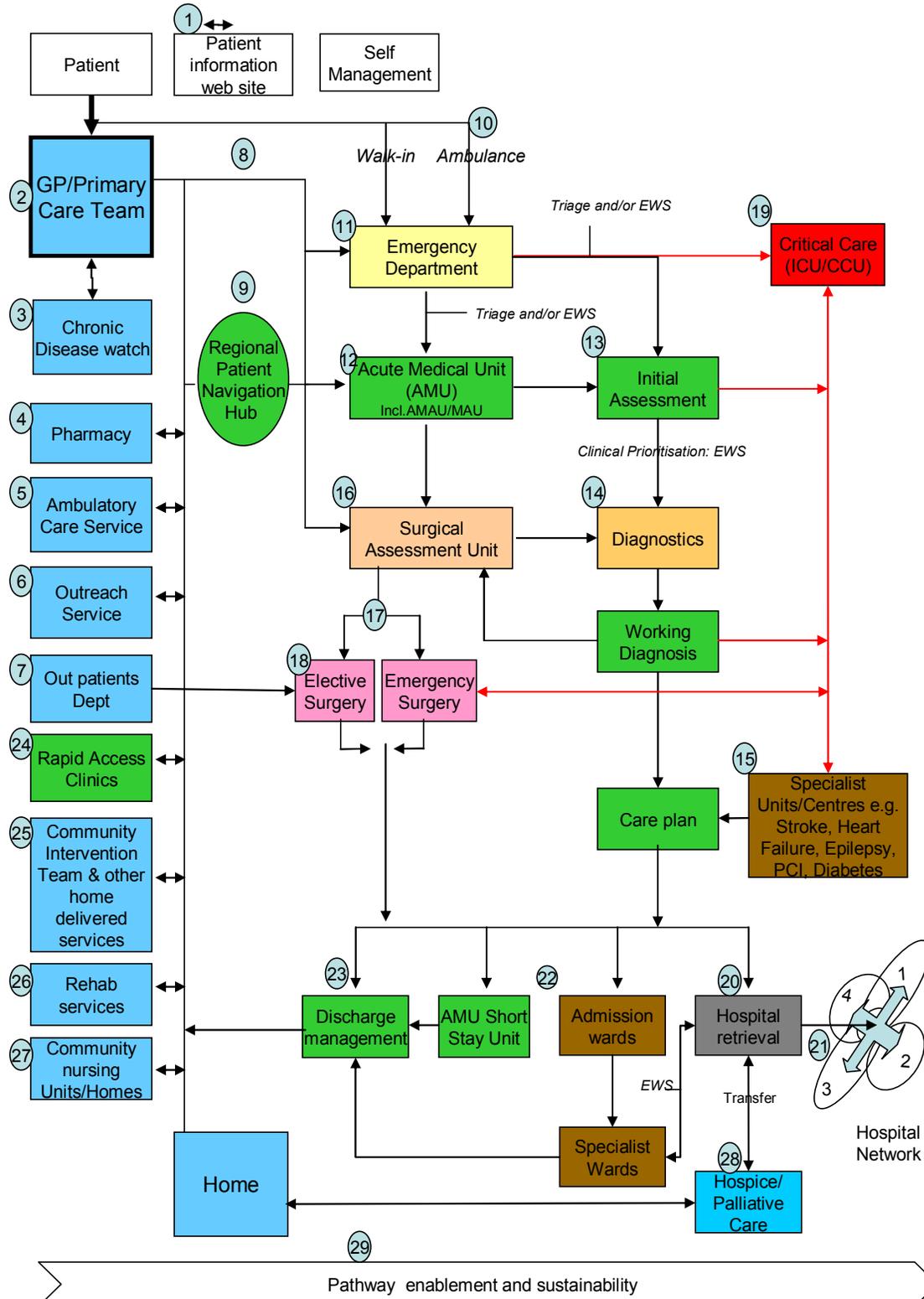## 17.3 Blueprint for the national clinical programmes

The acute medicine programme is one of a number of national clinical programmes entrusted with the task of developing standardised models of clinical care which will improve the quality of, access to, and the cost of clinical services. Collectively the key changes which the national clinical programmes are focused on are:

1. **Out-patients:** improved access for out-patients will be made possible through better process management, standardised guidelines and balancing demand with supply of services.
2. **Hospital access:** there will be a reduction in numbers waiting for admission through better management of end-to-end patient flow through the hospital and by reducing the numbers of people presenting at the hospital.
3. **Integration of chronic disease management:** there will be improved integration between primary and secondary care to reduce the numbers of people presenting to hospitals, reduce admissions, reduce average length of stay and to improve patient outcomes.
4. **Clinical related costs savings:** clinician-led identification and management of savings in order to reinvest in clinical services.
5. **Regional/network alignment and enhancement of local hospitals:** regional management of ambulance and hospital resources will be optimised in order to improve both cost effectiveness and patient outcomes while delivering care locally.
6. **Primary care:** primary care will be supported by hospital doctors, nursing and therapy professionals through responsive services, shared guidelines, care pathways and effective communication streams, to maximise care for medical patients at primary care and in the community.
7. **Patient self management:** patient outcomes will be improved through greater patient access to information and self-management guidance.

The acute medicine programme outlined in the document above contributes to these change themes. The solutions have been developed in collaboration with other national programmes and should not be viewed in isolation. Together the solutions of all national clinical programmes form an integrated blueprint for the standardisation of care. The national clinical programmes recognise the need to integrate the management of clinical services within a hospital as well as between hospitals and primary and community services.

The acute medicine programme is only one part of an overall blueprint for the delivery of standardised integrated services. The blueprint is illustrated in the accompanying diagram. The blueprint illustrates at a high level not just the acute medicine programmes model of care but also models of care and solutions being developed by all other national programmes. The areas highlighted in green relate to solutions recommended and defined in this document. An overview of the blueprint is provided below the diagram. Ultimately however the ability of the acute medicine programme's solutions to deliver on its objectives is dependent on other national programmes and initiatives being implemented in parallel.

Framework for National Clinical Programmes

1 ↔ Patient information web site

Patient

Self Management

2 GP/Primary Care Team

10

Walk-in   Ambulance

8

11 Emergency Department

Triage and/or EWS

19 Critical Care (ICU/CCU)

3 Chronic Disease watch

9 Regional Patient Navigation Hub

Triage and/or EWS

12 Acute Medical Unit (AMU) Incl.AMAU/MAU

13 Initial Assessment

4 Pharmacy

Clinical Prioritisation: EWS

5 Ambulatory Care Service

16 Surgical Assessment Unit

14 Diagnostics

6 Outreach Service

7 Out patients Dept

17

18 Elective Surgery

Emergency Surgery

Working Diagnosis

24 Rapid Access Clinics

15 Specialist Units/Centres e.g. Stroke, Heart Failure, Epilepsy, PCI, Diabetes

25 Community Intervention Team & other home delivered services

Care plan

26 Rehab services

23 Discharge management

22 AMU Short Stay Unit

Admission wards

20 Hospital retrieval

27 Community nursing Units/Homes

EWS

Transfer

Hospital Network

Home

Specialist Wards

28 Hospice/ Palliative Care

21

1
2
3
4

29

Pathway enablement and sustainability

Blueprint overview:

- A patient can access self management information via a national patient information website (1).
- A patient who presents to a GP/primary care team will be assessed and may be managed via chronic disease watch (i.e. a programme of care for a number of chronic diseases outlining standardised care including medication and monitoring criteria). Pharmacists will provide complementary medication management advice and guidance (2-4).
- A GP/primary care team may refer a patient to out-patients, outreach programmes or ambulatory care services using standardised pathways and guidelines (5-7).
- A GP will have a dedicated point of liaison with the hospital in order to consult on the best pathway for their patient. They will also be able to access a navigation hub were a case manager can discuss availability of beds and alternative patient services (8-9).
- Patients will be referred directly to AMUs/AMAUs/MAUs in most cases by GPs and in some cases after presenting to the ED. They will assessed within one hour by a senior medical doctor and receive same day diagnostics (12-14). A large proportion of AMU/AMAU/MAU patients will be discharged same day with a care plan which is communicated to their GP or alternative community services e.g. community intervention team, outreach, rapid access out-patient clinic (23-25) .
- GPs will be able to refer directly to acute surgical assessment units. Surgery will be delivered per productive theatre pathways. Elective surgery will be performed within national day of surgery, day surgery, and average length of stay targets (16-18).
- A patient with a chronic condition e.g. heart failure, epilepsy, stroke etc. will be taken directly to the appropriate chronic disease unit via direct GP referral, ambulance and ED triage, AMU assessment. Chronic disease management after an acute episode will be managed in an integrated way between the GP (chronic disease watch) and the speciality multidisciplinary team (15, 2 & 3).
- The ambulance service will deliver patients to the ED in consultation with their GP and/or per national access protocols which determine the appropriate location to take a patient based on assessment of their condition. The ambulance service will also provide a transfer and retrieval service to enable safe transfer of patients between hospitals and aid bed utilisation through the bi-directional flow of patients between hospitals (10 & 20).
- Clinical services will be aligned between logical geographical groupings of hospitals in order to ensure optimum and safe patient outcomes and to utilise resources (e.g. critical care) effectively (19 & 21).
- A national early warning score (EWS) will be used throughout the patient journey (e.g. in the ED, AMU, Ambulance etc.) to determine severity of illness and predict patient outcomes.
- Key services such as rehabilitation, community nursing units and palliative care services will be managed as per care pathways with acute hospitals services in order to improve access and optimise patient choices (26-28).
- To enable and sustain this integrated blueprint a number of key factors need to be present, including: clinical directors with appropriate delegated authority and support; effective cost and management information processes; aligned change management resources and capabilities (29).

17.4 Direct medical specialty referral in model 4 hospitals

Model 4 hospitals with multiple medical specialties may opt to develop systems of direct specialty referral, whereby patients are referred directly to a specialty consultant who will be responsible for the entire episode of in-patient care. Admitting teams may be formed within specialties that admit relatively high volumes of acute medical presentations e.g. respiratory, gastroenterology, cardiology, medicine for the elderly and acute medicine. Patients may be referred directly by a GP or the ED to the specialty consultant. Direct medical specialty referral (DMSR) patients may be assessed in the ED, AMU and may be admitted to specialty wards, according to locally agreed protocols.

Recommendations for direct medical specialty referral systems:
1. These systems must operate in conjunction with the acute medicine service and should demonstrate comparable standards of quality of care, efficiency and cost-effectiveness to non-subspecialty acute medicine referral systems.
2. Clinical governance arrangements for acute medicine will apply to the DMSR process and the lead physician for acute medicine will play a key role in the coordination of DMSR on a daily basis.
3. On-call workloads must be fairly distributed across all participating specialties.
4. Agreed protocols will need to be developed to ensure that referral processes are patient-centred and that patients with multi-system presentations and multiple co-morbidities receive particular consideration and are not disadvantaged by this system.
5. There must be adequate numbers of medical specialty consultants to provide cover for a safe and sustainable service.
6. DMSR may operate on an 8am-8pm or on a 24 hour on-call basis, depending on local arrangements and resources.
7. 24 hour on-call DMSR should be provided on a 1:4 to 1:12 on-call basis.
8. Specialties with relatively low-volume acute take should provide optimal support to the DMSR system through part-time participation in an on-call roster (e.g. 8am-8pm) or through the provision of an urgent consult service for AMU, ED and specialty ward patients and should also provide priority access to specialty OPD slots for AMU patients.
9. Consultant teams participating in DMSR must also provide rapid consultation services.
10. Resources, including doctors in training should be distributed equitably across the on-call specialties.
11. There must be clear communication between all healthcare providers involved in the referral and consultation processes in the interests of patient safety and the efficiency of the referral systems.
12. Local protocols and bed management policies should indicate which conditions are most appropriate for admission to the AMU or to specialty wards and the CM should be made aware of all such admissions.
13. Rapid access specialty clinics are a key component of this system.
14. Procedural and outcome measures for acute medicine are equally applicable to and must be collected for patients admitted through DMSR as acute medical admissions.
15. Consultants appointed to work on a 50:50 basis in acute medicine and a medical sub-specialty may provide their on-call commitment to the hospital by participation in the rosters for acute medicine and for their sub-specialty, according to local arrangements.

17.5 Acute medicine governance group

The acute medicine governance group should be chaired by the AMU/AMAU lead physician.

1. The membership of the group should be chosen for their knowledge, skills and abilities, including, where necessary, an ability to represent relevant interest (e.g. GPs, medical, nursing, therapy professionals, pharmacy, service users etc.). Where necessary, suitable induction and other necessary training should be provided for committee members to support them in helping the committee discharge its duties effectively.
2. The group should be results-focused and have a clear and documented purpose and terms of reference.
3. Meetings should commence with sign off of minutes of previous meeting and any associated action lists and time scales.
4. The agenda should be well organised and issued ahead of any meeting, allowing suitable time for committee members to appraise themselves of the agenda and any associated papers etc.
5. The terms of reference must be reviewed every year or sooner if necessary.

Key responsibilities of the group:
Risk management and patient safety items, to include the prevention and control of healthcare associated infection, must be addressed at every meeting. The group must address the following items at a minimum quarterly.

(i) Communication and consultation
- Receive assurance from service users and stakeholders that there is clear communication and consultation with its stakeholders (as outlined above).
- Develop a multidisciplinary team approach to the management of all clinical issues.

(ii) Accountability
- Receive assurance from staff that the responsibility, accountability and authority for key clinical end-to-end processes are clear with specific measures and targets against which process performance will be tracked.

(iii) Capacity and capacity planning
- Define and make recommendations to the GM/CEO/CD on clinical priorities
- Identify and implement cost savings initiatives.

(iv) Policies, procedures, protocols and guidelines
- Adopt (from national guidance documents) and monitor implementation of care pathways, care bundles and patient information.

(v) Monitoring and review
- Review key performance measures. In the case of underperformance agree actions, allocate responsibility and track progress of actions.
- Identify issues relating to specific clinical underperformance and progress in accordance with hospital policy via clinical governance committee.

(vi) Clinical effectiveness and audit
- Develop and/or implement an annual clinical audit forward plan as part of the annual planning and delivery cycle for clinical audit activities.

(vii) Patient/service user and GP involvement
- Engage in structured format with service users with a focus on ongoing service improvements.

(viii) Risk management and patient safety (standing item, every meeting)
- Ensure incident management is occurring in accordance with agreed policy.
- Review the management of incidents, the analysis of the root cause of incidents and the implementation of corrective action.
- Review risk register and track actions.
- Develop, implement and monitor patient safety initiatives around critical areas e.g. medication errors, thromboprophylaxis and management of deteriorating patients.
- Review complaints and ensure they are managed effectively and in line with hospital policy.

(ix) Staffing and staff management
- Receive assurance and make recommendations regarding performance management and continuing professional development processes as they are developed.

17.6 Performance metrics

17.6.1 Structural audit indicators

	Y	N
• Hospital has a functional MAU/AMAU/AMU	☐	☐
• MAU/AMAU/AMU has a nominated consultant clinical lead	☐	☐
• MAU/AMAU/AMU has written operational policy	☐	☐

- List specialties which participate in the MAU/AMAU/AMU consultant roster

_____
_____
_____
_____

- List other medical rosters in operation

_____
_____
_____
_____

	Y	N
• Consultants on acute take have no fixed commitments e.g. OPD, Endoscopy etc. on the day of take or the morning after take.	☐	☐
• Dedicated NCHDs rostered to MAU/AMAU/AMU and their attendance monitored	☐	☐
• An assessment clinical scoring system is in use for all patients at admission. Please specify:	☐	☐

_____
_____
_____
_____

| • Clinical scoring system is linked to a graded response strategy. Please specify: | ☐ | ☐ |

_____

_____

• One registration of patient takes place	☐	☐
• One HCAI assessment takes place	☐	☐
• Are there priority radiology appointments	☐	☐

	Y	**N**

- Are these adequate? If not please specify: ☐ ☐

_____
_____
_____
_____

- Dedicated OPD appointments/day services. ☐ ☐

- Rapid access to specialist OPD/nurse-led clinics. ☐ ☐

- Is there operational policy for MAU/AMAU/AMU in relation to hospital surge policy? ☐ ☐

- Dedicated staff grades and numbers.

_____
_____
_____
_____

- Total number of MAU/AMAU/AMU beds   No:_____

- Number of assessment beds   No:_____

- Number of isolation beds   No:_____

- Proportion of medical consultant positions who have a 50% or more commitment to acute medicine.   %: _____

	Y	**N**

- Regular GP liaison meetings ☐ ☐

17.6.2 Procedural audit measures

The following are measures which each MAU/AMAU/AMU will need to collect data on, the performance of the unit should be audited on a monthly basis. This is the responsibility of the lead physician. The data should be available to the hospital clinical director and to the acute medicine programme if required. This would be agreed with the clinical director.

- Proportion of patients seen by the medical registrar within one hour of registration in

    A   MAU/AMAU/AMU   _____

    B. ED   _____

- Proportion of NCHDs rostered for MAU/AMAU/AMU who did not conform to roster attendance
  _____

- Mean and median length of stay by consultant for the top 10 National DRGs in the AMU
  _____

- Proportion of patients referred by GP who were

	Mean	Lowest GP	Highest GP
A. Admitted			
B. Referred to OPD			
C. Discharged without follow up			

(This data should be collected and analysed separately for each GP monthly, and reported here as mean, lowest and highest GP in range).

- Proportion of week days when the on duty physician did three ward rounds (this will require data collection on each ward round done per day).

  _____

- Proportion of week-end days when the physician on duty did two ward rounds (this will require each ward round to be recorded each day).

  _____

- Number of GP referrals not phoned in.

  _____
  (This data should be collected and analysed monthly for each GP, and reported as an aggregate number here)

- For units which have radiology ICT systems capable of producing the data;

  Mean and median time from radiology request to investigation done for

    - CXR   _____
    - CT Brain   _____
    - CTPA   _____
    - CT Thorax   _____
    - US abdomen   _____
    - Venous Doppler _____
    - Carotid Doppler _____

- Number of times in the preceding month whereby the capacity of AMU was exceeded.

  _____

- Number of ED patients referred to MAU/AMAU/AMU   _____

- Percentage of consultations of specialist teams done within 2 hours in MAU/AMAU/AMU

  _____

17.6.3 Outcome audit indicators (proxy outcome)

This data only relates to "medical patients" greater or equal to 16 years* (See definition)

	Benefit measure	Target
	QUALITY	
1.	Number and percentage of non elective re-admissions with the same condition for medical patients within	
	A. 7 days	
	B. 30 days	
2.	Number and percentage of in-hospital deaths of medical patients	
	ACCESS	
3.	Number of medical patient attendances at	
	A. Acute Medical Unit	
	B. ED	
4.	Median, mean and upper and lower 75th centile times from patient registration to decision to admit for medical patients attending	
	A. Acute Medical Unit	
	B. ED	
5.	Median, mean and upper and lower 75th centile times from patient registration to decision to discharge for medical patients attending	
	A. Acute Medical Unit	
	B. ED	
6.	Mean, median and upper and lower 75th centile times from decision to admit to medical patient leaving AMU/ED for patients from	
	A. Acute Medical Unit	
	B. ED	
7.	Percentage of medical patients admitted to the hospital within six hours of registration from	
	A. Acute Medical Unit	
	B. ED	
8.	Number and percentage of medical patients discharged within six hours of registration from	
	A. Acute Medical Unit	
	B. ED	
9.	Mean number of medical patients admitted per day and percentage, for each day of the week; (average over previous month)	
	Monday	
	Tuesday	
	Wednesday	
	Thursday	
	Friday	
	Saturday	
	Sunday	
10	Mean number of medical patients discharged per day and percentage, for each day of the week; (average over previous month)	
	Monday	
	Tuesday	
	Wednesday	
	Thursday	
	Friday	

	Saturday	
	Sunday	
	COST	
11	Number and percentage of medical patients with mean length of stay = ;	
	0 days* Also grouped as	
	1 day ALOS 0 – 2 days	
	2 days ALOS 3 – 10 days	
	3 days 11 – 14 days	
	4 days 15 days plus	
	5 days Total ALOS	
	6 days	
	7 days	
	8 days	
	9 days	
	10 days	
	11 days	
	12 days	
	13 days	
	14 days	
	15 days plus	
	* Definition – mean length of stay = 0 applies to all medical patients assessed in the AMU/AMAU, or medical patients presenting at ED who are referred to the medical team for assessment.	
12	Number and percentage of beds filled with delayed discharges	
13	Number of bed days used for medical patient in patient discharges and deaths	
14	Total number of medical in patient discharges and deaths.	

* Definition: Patients greater or equal to 16 years.

Medical patients are defined as patients admitted under a consultant physician, as defined by the acute medicine programme.

17.6.4 DoHC database list of consultant specialties

Medical specialties defined by the AMP

0100   Cardiology
0300   Dermatology
0400   Endocrinology
0402   Diabetes Melitus
0700   Gastro-Enterology
0800   Genito-Urinary Medicine
0900   Geriatric Medicine
1100   Haematology
1102   Transfusion Medicine
1300   Neurology
1600   Oncology
2300   Nephrology
2400   Respiratory Medicine
2500   Rheumatology
2700   Infectious Diseases
2702   Tropical Infectious Diseases
3000   Rehabilitation Medicine
3002   Spinal paralysis
5000   General Medicine
6700   Clinical (medical) Genetics
7300   Palliative Medicine
7700   Metabolic Medicine
7900   Clinical Immunology

17.7 Job descriptions

17.7.1 Case manager job description

A job description will be compiled for this role following discussion with key stakeholders.

17.7.2 Acute floor data manager job description

Overview:
The acute floor data manager will be responsible for the collection, management, collation and dissemination of all acute floor metrics. The acute floor data manager reports to the CD and GM/CEO.

Principle duties:
- Promotes effective, efficient delivery of services to hospital staff and liaise with interacting departments.
- Is responsible for the collection, collation and presentation of all relevant data including presentation of reports, statistics and any other ad hoc information as requested by the CD and GM/CEO.
- Participates in auditing the appropriateness and effectiveness of current service elements and new service developments.
- Resolves daily operating problems.
- Assists staff as needed with daily operations.
- Reviews and implements policies and procedures as related to the department.
- Oversees orientation of new staff, identifies training needs of self and staff and initiate in service instruction as needed. Attends training courses as appropriate such as those organised by the ESRI.
- Ensures communication amongst staff to include regularly scheduled staff meetings, recording and circulating of minutes of same.
- Identifies opportunities for improvement and initiates steps to accomplish same, including liaison with relevant managers with regard to service planning and developments.
- Develops strong links with information and management services department in the planning and introduction of ICT to the directorate.
- Provides management information including statistical information as required.
- Orientates and supervises new staff, particularly in relation to data collection and utilisation.

17.8 AMU/AMAU/MAU equipment requirements

AMU/AMAU/MAU equipment requirements may include:

- Emergency trolley
- Beds
- Chairs
- Personal alcohol hand rub dispensers
- Alcohol hand rub dispenser at each patient station
- Clinical hand wash sinks (numbers as per national guidelines)
- ECG machine
- Cardiac monitors
- ABG analyser
- BNP analyser
- Ultrasound machine
- Spirometry
- Echocardiogram
- Phlebotomy trolley
- Non-invasive blood pressure monitors
- Oxygen saturation monitors
- Oxygen and suction points
- Non-invasive positive pressure ventilation
- Ketone monitor
- Glucose monitor
- Doppler machine
- Opthalmoscopes and auroscopes
- Holter monitor
- Nebulisers
- Drugs press/trolley
- Computer with access to internal ICT system (compatible with ED/radiology/laboratory ICT system)
- Fax machine
- Telephones
- Printer for patient identification labels
- Electronic whiteboard documenting expected patients, and patients already residing within the unit
- Transfer defibrillator in addition to defibrillator on resuscitation trolley
- Mobile suction machine
- Mobile O2 saturation machine
- Portable O2
- O2 delivery systems.
- Walking aids and appliances
- Microlab
- Steps
- Wheelchairs
- Physio tools software
- NIV battery packs

- Weighting scales
- Procedure trolleys/infusomats/perfusors/IV stands
- Cardiac monitoring facility with each observation monitor for each bay
- Thermometers
- Laboratory report printer
- Urinalysis machine
- Attack alarm devices for all staff working in the unit
- ASCHICE ambulance information system

17.9 Critical care

Regional and supra-regional critical care retrieval team service proposal
Context: The HSE QCCD acute medicine programme hospital models proposal defines a tiered integrated centralised acute hospital system.
Proposal: For the safe and prompt regional or supra-regional transfer of critically ill patients within the hospital models system, a critical care retrieval team service is required.

17.9.1 Critical care units are situated in hospital models 3 and 4

Acute medicine programme

Model 1 hospital	Model 2 hospital	Model 3 hospital ('Spoke hospital')	Model 4 hospital ('Hub hospital' – multi-specialty)
		Category 1 ICU or Category 2 ICU	Category 3 ICU or Category 3S ICU
		HDU	HDU
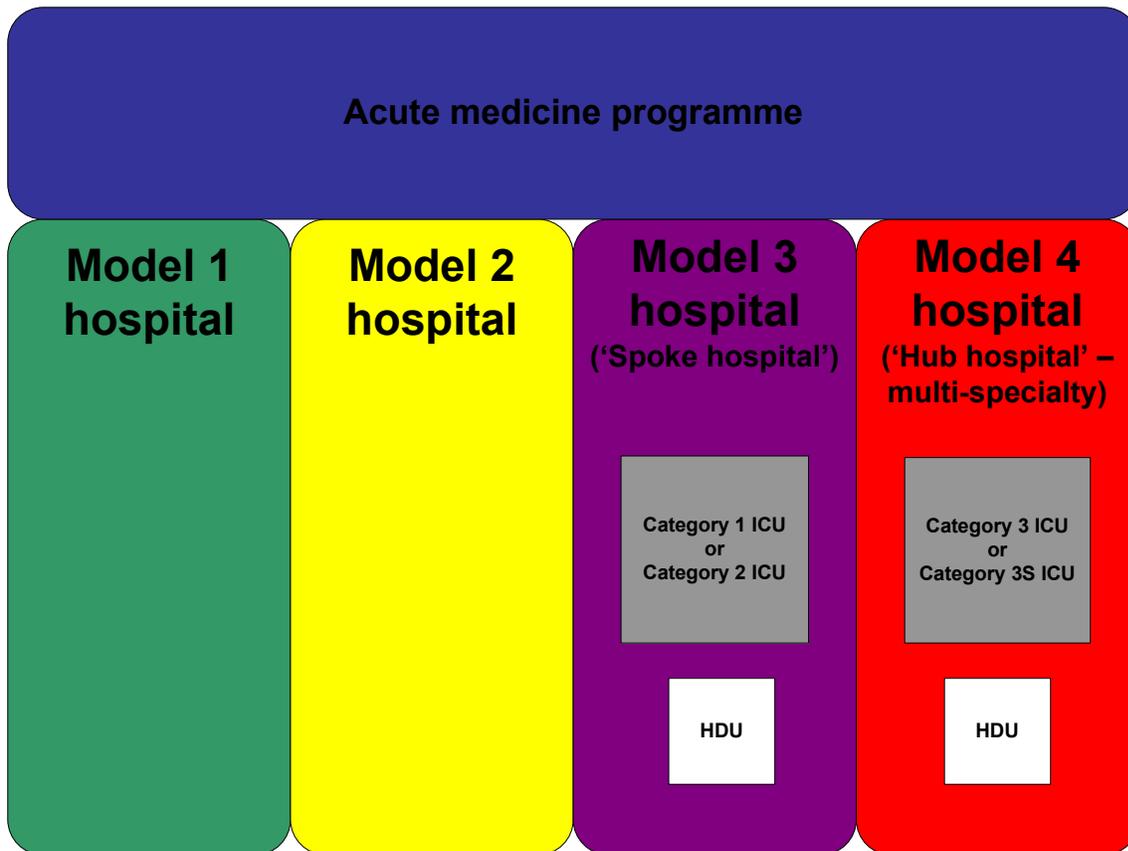
17.9.2 ICU Categories

Critical Care Unit ICU/HDU Categories (Haupt/CICM)

Description	CICM/Haupt classification
ICUs – Invasive ventilatory support (48-72 hours), earlier transfer if severe critical illness	Category 1 ICU
ICUs – General critical care, multi-organ failure support incl. CRRT	Category 2 ICU
ICUs – General critical care, multi-organ support, multispecialty support	Category 3 ICU
ICUs – General critical care, multi-organ support, multispecialty support, critical care specialty (e.g. neurocritical, cardiothoracic)	Category 3S ICU
HDUs – High dependency units	HDU

ICU Categories after College of Intensive Care (AusNZ) Minimum Standards for Intensive Care Units 2010 and Haupt SCCM 2003.

17.9.3 Acuity levels

UK Intensive Care Society 'Levels of Care for adult patients'
ICS Level 0 (Ward): patients' needs can be met through normal ward care in an acute hospital.

ICS Level 1 (Ward at-risk): patients at risk of their condition deteriorating, or those recently relocated from higher levels of care, whose needs can be met on an acute ward with additional advice and support from the critical care team.

ICS Level 2 ('HDU'): patients requiring more detailed observation or intervention including support for a single failing organ system or postoperative care and those stepping down from higher level care.

ICS Level 3 ('ICU'): patients requiring advanced respiratory support alone or basic respiratory support together with support of at least two organ systems. This level includes all complex patients requiring support for multi-organ failure.

17.9.4 Patient deterioration and detection by EWS systems

Patients who deteriorate in any hospital will be detected by an acute medicine national EWS and following prompt acute medicine treatment and resuscitation transferred safely as needed to a hospital appropriate for acuity level.

a. A cardiac arrest is responded to by the resuscitation team as appropriate.

b. The EWS system detects patient deterioration occurs and 'triggers' Acute Medicine clinical review and treatment as needed.

17.9.5 Regional or network acute medicine and critical care retrieval framework

Following clinical evaluation and acute medicine treatment, a clinical decision may be made to transfer the patient to a model 3 or 4 hospital as needed or as appropriate in consultation with the critical care consultant of the accepting hospital.

Model Hospital Patient's clinical deterioration course following Acute Medicine competency treatment	Notional clinical early warning score	ICS Critical illness Level	Transport team	Interfacility Patient Transfer Standard
Gradual, responsive to supplemental O2, fluids	Intermediate	Level 0	Paramedic	Acute nonemergent care (Cen A ambulance/4C)
Gradual, responsive to supplemental O2, fluids	Intermediate	Level 1 or Level 2 stable	Advanced paramedic	Acute emergent care (Cen B ambulance/4D)
Sudden, hypoxia, hypotension	High	Level 2 unstable	Regional retrieval team (MICAS supraregional)	Mobile Intensive Care (Cen C ambulance/4E)
Sudden, hypoxia, hypotension; Cardiorespiratory arrest	High	Level 3	Regional retrieval team	Mobile Intensive Care (Cen C ambulance/4E)

17.9.6 Regional critical care retrieval team service (RCCRTS)

Where a patient is critically ill and unstable (ICS Levels 2 and 3), following acute medicine treatment and resuscitation the RCCRTS effects safe transfer. Typically, ICS Levels 0, 1 and stable Level 2 would not require RCCRTS transfer. Transfer may be regional or supra-regional, as needed. Critical care retrieval includes continued resuscitation, stabilisation and safe transport of the critically ill patient by the retrieval team. Staffing includes an extra regional senior critical care specialist registrar grade, senior critical care nurse, advanced paramedic available at short notice (15-30min) 24/7.

Typically, the RCCRTS resource requirement is:

a. 5 anaesthetic/critical care registrars, non-resident

b. 5 WTE staff nurses, all non-resident

c. dedicated advanced paramedic personnel

d. all with critically ill patient transport competencies

The dedicated ambulance available 24/7 would conform to critical care transport standards for regional and supra-regional transport.

Regional critical care retrieval teams would be embedded in PHECC Inter-facility Patient Transfer Standard as 4E Mobile Intensive Care.

17.9.7 Regional and supra-regional surge capacity

When the regional critical care retrieval team service is activated, when the appropriate receiving hospital ICU is at critical care capacity, surge care capacity is generated in the accepting hospital in excess of 100% capacity. This is done using flex-up/flex-down surge rosters as needed to meet the needs of critically ill patients.

17.9.8 Mobile intensive care ambulance service (MICAS)

The national existing MICAS service consists of a solitary ambulance-staffed vehicle, one registrar and one nurse and is available Mon-Fri 9-5. MICAS needs to be integrated/expanded with regional critical care retrieval.

17.9.9 Air transfer

Service agreements exist between HSE and AirCorps or other carrier for air evacuation and need to be integrated.

17.9.10 Recommendation

The HSE QCCD Critical Care Programme (CCP), the Colleges' Joint Faculty of Intensive Care Medicine of Ireland (JFICMI) (pending), the College of Anaesthetists of Ireland (CAI), the Intensive Care Society of Ireland (ICSI), the Association of Anaesthetists of Great Britain and Ireland- Irish Standing Committee (AAGBI-ISC) and the Mobile Intensive Care Ambulance Service (MICAS) steering committee recommend a dedicated staffed

regional/supra-regional critical care retrieval team service to complement the acute medicine programme hospital models proposal.

Critical care retrieval references

Intensive Care Society. (2002) *Guidelines for the Transport of the Critically Ill Adult.* Available at: http://www.ics.ac.uk/intensive_care_professional/standards_and_guidelines/transport_of_the_critically_ill_2002. Accessed 19th October 2010.

Council of the Intensive Care Society of Ireland. (1991) *Transport of the Critically Ill*. Available at: http://www.icmed.com/archive/publications/Transport%20of%20the%20Critically%20Ill.pdf. Accessed 19th October 2010.

The Association of Anaesthetists of Great Britain and Ireland. (2006) *Recommendations for the Safe Transfer of Patients with Brain Injury*. Available at: http://www.aagbi.org/publications/guidelines/docs/braininjury.pdf. Accessed 19th October 2010

The Association of Anaesthetists of Great Britain and Ireland. (2006). Inter-hospital transfer of the critically-ill patient in the Republic of Ireland: Guidelines for Anaesthetists in referring units. http://www.aagbi.org/aboutaagbi/irishstanding/publications/criticallyilltransfer2006.pdf
Accessed 21st November 2010

Northern Ireland Critical Care Transfer Service (NICCaTS) Report 2005-2010. Copy forwarded by medical director Dr GG Lavery.

Note:

The draft is supplied by the QCCD Critical Care Programme (21/11/10) and is subject to change with the development of transport medicine within HSE, PHECC, DOHC and HIQA.

17.10 Out-patient Parenteral Antimicrobial Therapy

Out-patient Parenteral Antimicrobial Therapy in Ireland: Practice Standards

Infectious Diseases Society of Ireland (IDSI)
OPAT Working Group

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Table of Contents

1. Executive Summary

The purpose of this document is to provide standards for the administration of out-patient parenteral antimicrobial therapy (OPAT) in Ireland. This follows a meeting between the Minister for Health and Children and representatives of the Infectious Diseases Society of Ireland (IDSI) in late 2008, which identified the development of out-patient parenteral antimicrobial therapy (OPAT) as a clinical priority. The IDSI acted to provide standards and clinical governance mechanisms for this mode of care delivery following discussions with the Health Service Executive's (HSE) National Director for Quality and Clinical Care. This document outlines the benefits of OPAT and reviews infections appropriate for OPAT management and the characteristics of antimicrobials suitable for OPAT. Recommendations for clinical governance structures are made and standards are provided for the delivery of OPAT care in Ireland.

2. Proposed quality standards for OPAT

2.1. OPAT team and service structure

2.1(i) The OPAT team should sit within an existing acute medicine clinical directorate with clear managerial and clinical governance lines of responsibility.

2.1(ii) The OPAT programme must be part of the healthcare facility's antimicrobial stewardship programme and should be represented on the antimicrobial stewardship committee

2.1(iii) The OPAT multidisciplinary team should include, as a minimum, a medically qualified lead physician with experience in treating the infection in question, knowledge of antimicrobial stewardship and experience in delivering OPAT (OPAT physician), specialist nurse and a clinical pharmacist with a specialist interest in antimicrobial stewardship. The specialist experience required by the OPAT physician should reflect local need (e.g. paediatric cystic fibrosis specialist training). Staff numbers should also reflect local need. There should be a procedure of referral of complex cases (e.g. infections requiring >2 weeks treatment) to a regional infection specialist (e.g. infectious diseases physician or clinical microbiologist working as part of an established OPAT clinical team) in a hub-and-spoke model. The paediatric OPAT multidisciplinary team should include a consultant with either specialist training in infectious diseases, clinical microbiology or cystic fibrosis and respiratory medicine and experience in delivering OPAT, CF nurse specialist and a clinical pharmacist with a specialist interest in antimicrobial stewardship.

2.1(iv) The provision of an OPAT service should only be provided in clinical centres with access to clinical microbiology input and microbiology laboratory facilities.

2.1(v) The role of the OPAT physician includes the following:

- Clinical governance for the management of the patient's infection whilst in the OPAT programme including formulation of a clear plan of management post-OPAT (e.g. IV to oral switch, monitoring off therapy and determination of clinical cure).
- Decide if OPAT is appropriate
- Assess patient and carer suitability
- Selection of antimicrobials and antimicrobial stewardship in collaboration with the regional infection specialist
- Devise a management plan (including contingency arrangements in the case of OPAT failure)
- Communicate same with referring clinician, general practitioner and other healthcare workers in the community as required
- Assessment at OPAT clinic
- Clinical responsibility for patient on OPAT in collaboration with specialist physician/surgeon
- Interpretation of relevant laboratory monitoring, including therapeutic drug monitoring
- Assess response to therapy
- Monitor for drug toxicity
- Communicate progress with patient, team members, referring clinician and general practitioner
- Review the required duration of treatment
- Report on OPAT activity to the relevant institutional bodies (as defined by local requirements)

2.1(vi) The role of the OPAT nurse includes the following:

- Assess patient and carer suitability
- Patient and carer education and support
- Co-ordinate with compounder and pharmacist regarding discharge planning and ongoing outpatient supplies of IV antimicrobials
- Co-ordinate OPAT clinic review

- Co-ordinate monitoring of response to OPAT and any drug toxicity
- PICC line insertion after appropriate training

2.1(vii) The role of the clinical pharmacist includes the following:

- Liaison with ward pharmacists for patient recruitment
- Participation in antimicrobial stewardship MDT advising on antibiotic selection
- Review of the OPAT prescription before it is sent to the compounder / pharmacy / home care provider
- Advice on optimal dosing of antimicrobials
- Communication with compounders to confirm availability of antimicrobial agents and stability data
- Co-ordination of medication supply
- Liaison with primary care pharmacists (e.g. when funding issues arise)
- Monitoring drug levels, toxicity and interactions in conjunction with the OPAT physician
- Adverse event reporting
- Drafting of relevant policies and procedures

2.1(viii) The team should meet for a weekly virtual ward round to discuss all patients currently receiving OPAT.

2.1(ix) There should be a clear mechanism in place for urgent discussion and review of emergent clinical problems during therapy. This should be communicated to the patient, carers and the patient's GP.

2.1(x) There should be regular communication between the OPAT team, the patient's GP and the referring clinician, including notification of acceptance onto the OPAT programme, progress (when therapy is prolonged) and completion of therapy after monitoring and follow-up for cure.

2.2 Patient selection

2.2(i) It is the responsibility of the OPAT physician to agree specific infection-related inclusion and exclusion criteria for OPAT. These should incorporate specific infection severity criteria and the need for referral to a regional infection specialist, if indicated.

2.2(ii) Initial assessment for OPAT should involve the OPAT physician, pharmacist and specialist nurse.

2.2(iii) There should be agreed and documented OPAT patient suitability criteria incorporating physical, social and logistic criteria. These should be formally documented for each patient referred.

2.2(iv) Patients should give informed consent to this mode of treatment and the agreement should be documented. Consent should also be obtained for data use in audit and quality review.

2.2(v) Before discharge, patients with an intravascular catheter and their carers should be educated by a member(s) of the OPAT team with respect to procedures necessary to safely manage their device and to prevent infection and to recognise the early signs of infection. The provision of education should be documented in the patients' clinical notes.

2.3. Antimicrobial management and drug delivery

2.3(i) Choice and dose of antimicrobial agent, frequency of administration and duration of therapy is the responsibility of the OPAT physician and OPAT team taking consideration of the healthcare facility's antimicrobial stewardship programme (in consultation with the referring physician). Prescription of antibiotics is the responsibility of the OPAT team.

2.3(ii) The treatment plan should be discussed with the referring clinician at the time of referral.

2.3(iii) Patients ability to tolerate the selected antimicrobial agent must be established before entry in to the programme.

2.3(iv) Reconstitution and administration of antimicrobials should comply with published hospital guidelines, e.g. Hospital pharmacy guidelines[29] or agreed guidelines between individual institutions and external compounding facilities where utilised.

2.3(v) Insertion of and care of intravascular lines should comply with published national guidelines[30].

2.4. Monitoring of the patient during OPAT

2.4(i) Patients should undergo weekly outpatient review at an OPAT clinic as a minimum.

2.4(ii) Intravascular catheters should be regularly reviewed by the OPAT team, documented as reviewed and those that are no longer clinically indicated promptly removed. Line tips should be sent to the microbiology laboratory for culture if there is suspicion of infection.

2.4(iii) Where deemed appropriate by the OPAT physician as part of the treatment plan, patients should be reviewed on each day of IV drug administration to optimise the potential for IV to oral switch.

2.4(iv) Patients receiving in excess of one week of antimicrobial therapy should be reviewed by an OPAT specialist nurse and OPAT physician at least weekly, with the support of a dedicated clinical pharmacist available.

2.4(v) Weekly review should include:

  2.4(v) (a) Blood tests (FBC, renal and liver function, CRP, therapeutic drug monitoring where required [as set out in the patient's treatment plan])

  2.4(v) (b) Line care and dressing

  2.4(v) (c) Review of infection site

  2.4(v) (i) Review of systemic features of infection including symptom review and measurement of temperature, blood pressure and pulse

  2.4(v) (v) Structured clinical case discussion with the OPAT team including the OPAT physician.

2.4(vi) Clinical response to antimicrobial management and safety of prescribed medication are monitored by the OPAT physician within the OPAT team.

2.4(vii) The OPAT physician and team should be alerted promptly to abnormal results or clinical concerns that arise during a course of OPAT.

2.4(viii) In addition to routine reviews, there should be a mechanism in place for review of patients receiving OPAT at other times according to clinical need.

2.4(ix) There should be a clear pathway for 24-hour immediate access to advice / review / admission for OPAT patients and this should be communicated to the patient both verbally and in writing.

2.5 Outcome monitoring and governance

2.5(i) Data on OPAT patients should be recorded prospectively for service evaluation and audit in a password-protected electronic database with patient consent in accordance with data protection regulations.

2.5(ii) Standard outcome criteria should be used at review whilst on OPAT, on completion of intravenous therapy, and in complicated infections (see section 5.2 and 7.2) upon completion of oral therapy and after the relevant period of follow-up, e.g.:

  Cured/improved

  No change

  Readmitted

  Change of plan

  Relapse (at follow-up)

  Death

In addition, data on adverse drug reactions and vascular access complications should be recorded.

2.5(iii) Regular audit of outcomes and complications should be undertaken with feedback to healthcare facility management, antimicrobial stewardship committee or drug and therapeutics committee and healthcare facility clinical directors.

2.5(iv) Regular surveys of patient experience should be undertaken using health-related quality of life scoring tools. Minimum of 10% sample of key groups annually (e.g. short-term treated groups such as soft tissue infection and longer-term treatment groups such as bone and joint infection).

2.5(v) Each member of the OPAT team is responsible for personal continuing professional development (CPD) relating to best clinical practice.

3. Background

The administration of intravenous antimicrobials has traditionally occurred in in-patient settings in acute hospitals in Ireland. However, there is a growing trend internationally to deliver intravenous antimicrobials in a non-inpatient setting. Such programmes are often referred to as out-patient parenteral antimicrobial therapy (OPAT), community-based parenteral antimicrobial therapy (CoPAT) and hospital in the home therapy (HITH). In this document, the term OPAT encompasses CoPAT and HITH. Out-patient parenteral therapy must be governed by the same standards of antimicrobial stewardship, intravascular catheter care and clinical governance as traditional in-patient, hospital-based care.

OPAT originated in the USA in the 1970s for the management of infective exacerbations in children with cystic fibrosis[31]. Since then, an abundance of evidence demonstrating its safety and efficacy in adults has emerged[32,33].

Subsequently, in the late 1980s and early 1990s, reports emerged of serious paediatric bacterial infections treated with outpatient ceftriaxone therapy[34] and children with acute bacterial meningitis who received convalescent outpatient therapy[35,36]. By the late 1990s and early 2000s fever and neutropaenia in low-risk paediatric patients with cancer were being managed with outpatient therapy in certain centres[37,38,39]. At this time, early discharge with home antibiotic therapy for the treatment of neonatal infection was pioneered by a few centres[40], with complications recognized[41,42].

OPAT is now widely practiced in the USA and is provided to an estimated 1 in 1000 Americans each year[43]. Studies from the United Kingdom[44], Canada[45], Australia[46] and Singapore[47] have demonstrated benefits of OPAT to both patients and institutions providing OPAT care.

The healthcare policy plan from IBM Global Business Policies entitled 'Healthcare 2015: Win-win or lose-lose? A portrait and a path to successful transformation'[48] suggested that specific conditions, e.g. certain infections should be managed in dedicated, specialised ambulatory settings as opposed to traditional expensive acute-care locations. The McKinsey report in 2009 into inefficiencies in the acute health sector of the National Health Service of the UK suggests that around 40 per cent of patients in a typical hospital do not need to be there at any one time[49]. The most significant reasons were delays in the patient receiving hospital investigations or therapies, and a lack of more suitable care facilities in the patients' own home or community.

While there are few randomised, controlled trials comparing OPAT to in-patient hospital care, there is a large body of published case series demonstrating the safety and efficacy of OPAT[4-10]. A randomized trial from primary care in New Zealand found that OPAT therapy of cellulitis was safe, effective, and preferred by the patients[50]. Many jurisdictions have OPAT practice guidelines with specific recommendations for their own areas, including the comprehensive guidelines from the Infectious Diseases Society of America[51]. In the past year, the British Society for Antimicrobial Chemotherapy (BSAC) has convened a multi-disciplinary working group to formulate 'Standardised Methods for the Implementation of OPAT'. Although Ireland currently has several productive OPAT programmes, there is a lack of conformity across programmes, including formal national structures of clinical governance and standards of care.

4. OPAT in Irish Health Policy

The reconfiguration of Irish hospital services to deliver optimal and cost-effective results was identified as a transformation priority by the HSE's 'Transformation Programme 2007-2010'[52]. Furthermore, the report 'Acute Hospital Bed Capacity Review: A Preferred Health System in Ireland to 2020', commissioned by the HSE, identified OPAT as a tool to reduce acute medical admissions by 15% by the year 2020[53]. The Hospital Antimicrobial Stewardship Working Group of the Strategy for the Control of Antimicrobial Resistance in

Ireland (SARI) National Committee has recommended the use of OPAT as an integral component to improve the quality of antimicrobial use[54].

Whilst OPAT has the potential to deliver healthcare in a safe, efficient manner countrywide, national standards for OPAT delivery have not yet been devised. Currently, isolated pilot OPAT programmes exist in Ireland. Kieran *et al* reported that the OPAT programme at St. James's Hospital, Dublin has delivered intravenous antimicrobials to out-patients since 2006 in a safe, efficient manner with high levels of patient satisfaction with 1289 bed-days saved over 3 years[55]. OPAT has the potential to deliver bed-day and cost savings if such programmes are expanded throughout the country in a regulated and structured manner.

5. Infections Appropriate for OPAT

5.1 Infections Requiring Short Treatment Courses

Many infections require short treatment courses of antimicrobials. These include cellulitis which is the most common infection treated with OPAT in the US and Australia[56]. Other infections requiring shorter treatment durations include community-acquired pneumonia, pyelonephritis and infective exacerbations of chronic lung diseases. It is imperative that any patient with the above conditions must be medically fit for discharge and meet the entry criteria prior to admission into an OPAT programme. Anti-infective agents with high oral bioavailability may be considered as an alternative to short course intravenous therapy if the patient meets the criteria for oral switch as per the healthcare facility's intravenous-to-oral switch policy.

5.2 Infections Requiring Longer Treatment Courses

Infections in this category usually require more than 4 weeks of intravenous therapy or require prolonged antimicrobial therapy of which parenteral treatment comprises a proportion and include a wide spectrum of infections[18] including osteomyelitis, prosthetic joint infections, empyema, visceral abscesses and infective endocarditis. Insertion of a peripherally inserted central catheter (PICC) line facilitates safer long-term intravenous access. , Collaboration with other medical and surgical teams is essential for a successful outcome in infections requiring longer treatment durations. For example, OPAT management of infective endocarditis requires frequent review by a cardiologist with echocardiography surveillance. Management of prosthetic joint and diabetic foot infections necessitates collaboration with other specialities including orthopedic surgery,

endocrinology and podiatry with the option of a definitive surgical procedure if antimicrobial management is unsuccessful.

6. Benefits of OPAT

6.1 Institutional and Organisational Benefits

In the current era of increasing demand for a finite number of hospital beds, OPAT has the potential to deliver much more efficient hospital bed use. Kieran *et al* described a saving of 1289 in-patient bed-days over a 3-year period[27]. An OPAT programme at the Mater Misericordiae University Hospital, Dublin saved 2019 bed days between Q3 2008 and Q2 2010, an average saving of 30.6 bed days per patient treated[57]. The Children's University Hospital OPAT programme saved a total of 859 bed days over two years, an average saving of 29 bed days per patient treated[58] (**Table 1)**. A single OPAT centre in Oxford, UK saved over 6,200 bed-days in 286 patient episodes in a single calendar year[59]. These savings are achieved through avoidance of non-essential admissions, early discharge and reduced re-admissions resulting in a substantial capacity gain for each institution.

The cost savings of OPAT have also been consistently demonstrated. An OPAT programme at Sheffield, UK delivered safe, effective ambulatory care to 334 patients at 41% of equivalent in-patient costs of an infectious diseases unit and at 47% of equivalent in-patient costs using national (UK) averages[16]. OPAT delivery cost was 57% of equivalent in-patient care in Canada[17] and 61% in Singapore[19]. Management of bone and joint infections at an OPAT centre in Dundee, Scotland cost £1,749 per episode in the ambulatory setting as opposed to £11,400 in the equivalent in-patient setting[60]. In the US, costs of OPAT care were 6.5 times less than for inpatient hospital care, and four times less than for nursing home care[61].

It is envisaged that similar bed-day and cost savings would be achieved if such programmes were expanded throughout Ireland after clinical governance structures are put in place.

Table 1. Examples of OPAT Programmes in Irish Hospitals

	Year Commenced	No. Patients	Bed Days Saved	Bed Days Saved Per Patient
St James's Hospital	2006		1909	
Mater Misericordiae University Hospital	Q3 2008-Q2 2010	66	2019	30.6
Galway University Hospitals	2006	21	504	24
Children's University Hospital	2004	30	859 (2008-2009)	29

6.2 Patient Benefits

Patients receiving OPAT can remain at home or in non-acute care settings, avoiding unnecessary hospitalisation and remain productive in the workplace, at home or at school. When given the choice in appropriate conditions, patients selecting OPAT ahead of in-patient hospital care reported higher levels of satisfaction with OPAT[22]. In addition, the risk of healthcare-associated infections is less when patients are treated in their homes[62].

6.3 Benefits for Primary Care

Primary Care Practitioners may have easier access to services providing intravenous therapy with potential admission avoidance and be better informed about patients' progress through improved communication methods. Under appropriate governance, OPAT could be expanded in parallel within the primary care programme.

7. Considerations for Special Populations

7.1 Paediatric Patients

Standards in a paediatric OPAT programme, as in adult programmes, must be at least equal to, if not higher than standards of inpatient paediatric care and be consultant led and delivered. Rapid, reliable and efficient communication between caregivers and healthcare professional participants of the OPAT programme is essential. Children receiving OPAT must be considered differently to adults because of the former's special needs. Therefore

patient evaluation and selection and caregiver ability assessment are crucial. Regarding medications, some are not licensed for use in children, drug doses may be more complicated to calculate being based on weight (kg) and certain drugs, e.g. vancomycin, have poorly predictable serum concentrations when dosages are based on standard parameters[63,64,65].

7.1.1 Cystic fibrosis as a model of care in paediatrics

A recent Cochrane database review of home intravenous antibiotics in both children and adults with cystic fibrosis (CF) identified that OPAT does not harm patients, entails fewer investigations, reduces social disruption and can be cost effective[66].

Treatment of pneumonia in children with CF may be used as a model for OPAT in children. Between January and December 2005, the respiratory and cystic fibrosis department at the Children's University Hospital, Temple St., Dublin prescribed 31 courses of intravenous antibiotics of which 28 (90%) were performed at home. A total of 444 inpatient bed days were saved, with an average of 16 bed days per patient[30]. The CF nurse specialist taught parents how to administer home intravenous antibiotics. Parent training time to reach competency was between 3 to 7 days. As parent expertise and experience increased with increasing numbers of home intravenous antibiotic courses, re-training time decreased. Over a two year period between January 2008 and Dec 2009, the OPAT programme run by the same department saved a total of 859 bed days, an average saving of 29 bed days per patient treated. Of the thirty patients treated, 26 had CF and 4 had non-CF bronchiectasis.

7.1.2 Unique characteristics of the CF model

As children with CF get older, lung function deteriorates and they get more episodes of pneumonia[67]. Parents and guardians of children with CF are in a position to gain a high level of expertise in OPAT through repeated training and experience which might be expected to lead to lower risk of errors. Some children with CF have permanent indwelling intravenous access (portocath). Maintenance of vascular access is easier in these patients than those with PICC lines or peripheral intravenous lines. A relatively limited number of antibiotics are generally used in CF due to the characteristic infections seen in this condition. The role of the paediatric dedicated CF nurse specialist is well developed in coordinating paediatric OPAT care and may be used as a model for adult OPAT nurse specialists.

7.2 Complicated Adult Infections

As described in section 5.2, some complicated infections may require prolonged antibiotic treatment courses. Often parenteral antibiotics comprise only a portion of the overall treatment strategy with a consolidation phase with oral antibiotics and long-term monitoring often required once treatment is discontinued to ensure clinical cure is achieved.

Where OPAT is considered in the care of a patient with a complicated infection that requires a total parenteral treatment period of more than2 weeks or for patients with conditions in which parenteral therapy comprises only a portion of the overall treatment strategy, the management of the patient should be supervised by a regional infection specialist (i.e. infectious diseases physician or clinical microbiologist working as part of an established OPAT team) in conjunction with other relevant specialists (such as cardiologists in the case of infective endocarditis or orthopaedic surgeons in the case of prosthetic joint infections) to ensure that appropriate post-OPAT care is provided and the patient is adequately followed up to prevent relapse and ensure clinical cure.

8. Models of Care Delivery

Every healthcare provider has an individual case mix determined by local factors and so will have difference requirements for an OPAT service. Individual OPAT services have developed differently to meet these local requirements and each model of service delivery has strengths and weaknesses. Adopting the appropriate service model will maximize the impact of the OPAT service on local resource utilization.

Patients may be recruited to the OPAT programme from the emergency department, acute medicine unit, in-patient wards or directly from primary care (**Figure 1**). There are three models of delivery of OPAT. The administration of antimicrobials may be performed by a healthcare professional in the patient's home, community healthcare facility or hospital clinic, termed healthcare-professional OPAT (H-OPAT). The healthcare professional may be an OPAT nurse specialist, public health nurse, Community Intervention Team member, or care may be provided by a contracted private healthcare firm. In the second model of care delivery, the patient or patient's relative/carer administers the antimicrobials, termed self-administered OPAT (S-OPAT). This form of OPAT is currently the most commonly used in Ireland and has the advantage of low manpower resource utilization in facilitating administration as well as offering the patient greater flexibility in terms of mobility whilst on OPAT. Matthews *et al* reviewed 2059 episodes of OPAT delivered at Oxford, UK and

found no difference in complications between those receiving H-OPAT and S-OPAT[31]. They concluded that S-OPAT was a safe and feasible strategy for carefully selected patients in a supervised OPAT programme. OPAT can also be delivered in non-acute healthcare facilities, e.g. nursing homes.

Figure 1. Models of OPAT Care Delivery
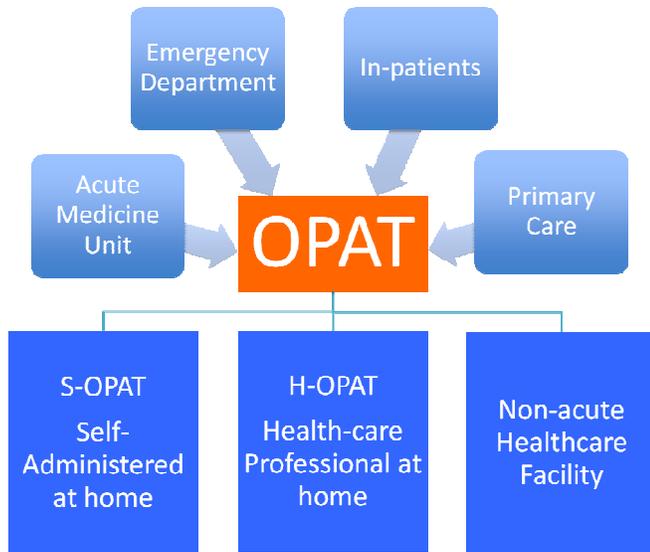
9. Communication

It is essential that all relevant community and hospital healthcare workers, the patient and carers are clearly informed about the OPAT programme, including the patient review schedule, expected duration of therapy, responsibilities of the OPAT team members, IV line care and how to contact the OPAT team members urgently should complications arise. The referring physician/surgeon and the general practitioner should be informed that their patient is being managed with intravenous antimicrobial therapy in the community and that the patient has been advised how to access immediate care should complications arise. It is also essential that the patient's public health nurses and private third-party health providers, where appropriate, are aware of the management plan and how to contact the OPAT team if required, including out-of-hours access. Patients and their care-givers must also have an immediately accessible communication channel with the OPAT

team, available at all times. Upon completion of OPAT, where no further clinical follow-up is required (see sections 5.2 and 7.2), the referring healthcare practitioner and general practitioner should be informed that the patient has been discharged from the OPAT programme. Telephone, email contact and use of modern communication methods are therefore necessary for all parties to be kept informed, particularly where complications of OPAT arise[68].

10. Antimicrobials and OPAT

10.1 Antimicrobial Stewardship

It is essential that an antimicrobial stewardship programme exists at any institution with an OPAT programme as recommended by SARI[26]. The lead OPAT physician should be a member of the antimicrobial stewardship committee. OPAT audit reports should be regularly reviewed by the antimicrobial stewardship committee or drugs and therapeutics committee. All OPAT care should be equivalent to that of inpatient care.

10.2 Selection of Antimicrobial Agents

Selection of antimicrobial agents for OPAT must take into account the usual concepts of the identification of the likely infecting organism and patient-specific characteristics, but consideration must also be given to antimicrobial pharmacokinetics and drug stability. Antimicrobials with longer half-lives and high stability tend to be favoured in OPAT programmes due to convenience for both patient and service providers. Decisions on appropriate antimicrobials for OPAT should be made by the OPAT physician in consultation with the referring clinician and in concordance with the healthcare facility's antimicrobial stewardship policy.

Beta-lactams and glycopeptides are the most commonly prescribed antimicrobials in OPAT programmes. Ceftriaxone and teicoplanin were the most frequently used antimicrobials in a review from Oxford, UK of 2,208 OPAT episodes[31]. The relatively long half-life of ceftriaxone allows favourable once-daily dosing and, consequently, there is much experience with ceftriaxone use in OPAT programmes[69]. However, caution must be taken not to choose antimicrobials for OPAT treatment just for their convenience and dosing characteristics. Other beta-lactam antimicrobials (e.g. flucloxacillin), because of their short half-lives and time-dependent killing with only a brief post-antibiotic effect, may be administered by continuous infusion[70,71].

Vancomycin has also been extensively used in OPAT programmes due to its favorable dosing characteristics and the emergence of methicillin-resistant *S. aureus* (MRSA*).* Therapeutic drug level monitoring and interpretation of results by the OPAT team is essential to ensure adequate vancomycin trough concentrations are achieved, thereby optimizing efficacy and reducing the risk of the emergence of resistance and/or clinical failure

Daptomycin, a novel lipopeptide, is also emerging as a frequently used OPAT medication with once-daily dosing and a favourable safety profile[72].

Aminoglycosides, which demonstrate concentration-dependent killing and a prolonged post-antibiotic effect, can be safely administered once daily to patients with normal renal function with similar efficacy as traditional multi-daily dosing[73]. However, once daily gentamicin requires close clinical and therapeutic drug monitoring and is not recommended for patients with reduced renal function, elderly patients, in pregnancy and in the treatment of infective endocarditis[74]. Patients and caregivers should maintain vigilance for any signs or symptoms of vestibulo-cochlear dysfunction, such as reduced hearing, tinnitus and vertigo, that can occur with prolonged use of aminoglycosides and, to a lesser extent, vancomycin.

The initial dose of an intravenous agent should be administered in a supervised setting, such as an ambulatory care department, or the hospital, prior to the patient being discharged to the OPAT programme. Personnel trained in resuscitation and with ready access to appropriate equipment should be available. With use of drugs requiring dose adjustment to attain therapeutic response, such as vancomycin, the patient should only be entered onto OPAT once an effective and safe dosing regimen has been established. Generally, patients should be demonstrating a clinical response to therapy prior to discharge to the OPAT programme. Antimicrobial properties and a guide for monitoring are summarised in **Appendix 1**.

10.3 Methods of Antimicrobial Administration

Certain antimicrobials can be given by "direct push" over 5-10 minutes, e.g. ceftriaxone, teicoplanin and daptomycin. Other agents require greater volume dilution and can be administered using gravity, e.g. vancomycin. For antimicrobials, infused over a certain time period, spring-loaded infusion devices are safe and relatively inexpensive. Battery-powered electronic infusion pumps are the device of choice for continuous infusions, e.g.

anti-staphylococcal penicillins. These infusion pumps are small and mobile enough to allow patients continue with normal daily activity.

10.4 Role of the Antimicrobial Compounding Facility

Compounding is an essential component of any OPAT programme that relies predominantly on S-OPAT (the majority of cases currently in Ireland). However, not all patients will require a compounded antimicrobial. Compounding of antimicrobials into sterile, pre-dosed, devices that can either be delivered through vacuum technology or through infusion devices facilitates S-OPAT by reducing the risk of contamination and infections and decreasing the likelihood of medication delivery errors (such as over-dosing or over-rapid infusion of drugs). Pre-compounded antimicrobials should ideally be used when S-OPAT is being considered as a treatment model.

The role of the compounding facility is to prepare the antimicrobials under controlled aseptic conditions. In many cases compounding intravenous (IV) antimicrobials under these conditions allows for a longer shelf life to be assigned, than if they are reconstituted in a non-sterile environment. Compounding under aseptic conditions greatly decreases the risk of the intravenous product being contaminated by particles or contaminants during reconstitution. It also decreases the amount of manipulation during administration, and so reduces the risk of introducing infection. Compounding facilities providing IV antimicrobials for use in OPAT programmes must be issued with a manufacturing license from the local regulatory body, i.e. the Irish Medicines Board (IMB) for Irish compounding facilities. Compounding facilities can only compound IV antimicrobials for which they have sufficient stability data. A compounder with an extensive list of available IV antimicrobials will allow the OPAT programme to manage the greatest number of patients. A hospital pharmacy department with an in-house aseptic compounding unit could supply the compounded IV antimicrobials to the OPAT programme if it has been issued the appropriate IMB manufacturing license. Considerable initial investment in the facility and staffing resources would be required to obtain the license. Further investment would be required on an annual basis for license maintenance. Commercial licensed compounding facilities exist in Ireland that are licensed to compound IV antimicrobial agents. There are also commercial options available for the provision of waste management and homecare nursing for patients being treated with OPAT.

11. Vascular Access

The choice of vascular access device should be individualised to each patient, taking the type of antimicrobials used and anticipated length of therapy into account. Peripheral intravenous catheters, changed every 2-3 days, are appropriate for therapies of short duration in well-motivated patients. Only agents with a low potential to cause phlebitis can be administered through peripheral catheters.

For longer treatment periods, durable access devices are required. The PICC is a convenient and safe vascular device, with low infection rates with appropriate care[75]. After training and assessment in appropriate infection prevention and control practices for insertion and maintenance of intravenous catheters, PICC lines can be inserted by an OPAT nurse specialist in an out-patient setting, thereby avoiding admission for vascular device insertion and decreasing pressure on interventional radiology services. Chest radiography should be used to assess the position of the PICC line tip prior to infusion of antimicrobials[76].

Before discharge from a healthcare facility, patients with an intravascular catheter and their carers should be educated by a member(s) of the OPAT team with respect to procedures necessary to safely manage their device and to prevent infection and to recognise the early signs of infection. Provision of such education should be clearly documented in the patient's clinical notes. After discharge, intravascular catheters should be reviewed by the OPAT team, documented as reviewed and those that are no longer clinically indicated promptly removed. The insertion site should be examined for drainage, tenderness, pain, redness, swelling, and position and all findings documented. PICC line dressings should be changed frequently. Patients and their carers should be encouraged to report any changes in their catheter site or any development of discomfort.

12. Standard Operating Procedure for OPAT Programme.

Patients may be sourced from in-patient wards, the emergency department of primary care for the OPAT programme, (**Figure 1**). After a referral is made to the OPAT service, an assessment is performed by the OPAT team (OPAT physician, nurse and pharmacist) (**Figure 2**). If a patient who is suitable for OPAT presents to the emergency department outside of regular working hours, they should be referred to the acute medical unit or admitted to an Emergency Department Admissions Ward and assessed by the OPAT team the next morning. The patient must be clinically stable, have suitable vascular access and the infection must require parenteral antimicrobials and be appropriate for OPAT care.

The patient's social circumstances and home support are also assessed to ensure that there is a safe environment for the administration of OPAT. Health and safety of staff, patients and carers in each home care setting needs to be formally assessed prior to entry into the programme.

The intravenous antimicrobial agent of choice should be chosen and the required level of nursing support in the home must be assessed. Currently, funding for both the IV antimicrobial and ancillaries, and nursing support needs to be approved before entry in to the programme. There needs to be a definitive process in place for approving / accessing funding for patients in advance of entry in to an OPAT programme.

For those on compounded products, the OPAT team must liaise closely with the antimicrobial compounder(s) throughout the OPAT course. The OPAT team must communicate any changes in prescriptions to the compounders in a timely manner to ensure the patient receives the appropriate dose, at the appropriate time and to minimise wastage.

The patient is usually accepted into the OPAT programme after several doses of parenteral antimicrobials have been administered in the hospital and safety has been demonstrated. If S-OPAT is planned, an ability to safely self-administer parenteral antimicrobials must be demonstrated and documented prior to discharge, either by the patient or the patient's caregiver. The patient or carer must consent to being treated in the OPAT programme and understand to what they are agreeing. The patient should be provided with written information about what to do should specific problems arise. The patient or carer should also be provided with contact telephone numbers for relevant OPAT team members or service providers and out of hours contact numbers. Patients should not be entered in to the programme if they or their carer is not comfortable with the option of OPAT. A plan for duration of parenteral therapy and monitoring for response and toxicity is formulated by the OPAT physician. The patient is then discharged from hospital and OPAT is administered by the patient themselves in their own home (S-OPAT), by a healthcare professional in the patient's home (H-OPAT) or in a non-acute healthcare facility.

Weekly assessment is performed at the OPAT clinic, including review by the OPAT physician. Clinical and laboratory monitoring of response to therapy, disease progression and drug toxicity are performed and the vascular access device is assessed for signs of infection and the dressing changed where required.

At each clinical review and after completion of the planned course of OPAT therapy, the OPAT physician should document one of the following outcomes – cure, improvement, no change or deterioration. Patients who fail to improve or who develop complications may need to be re-admitted to the hospital for further management. Patients who achieve a cure, or, in the case of complicated infections, are recommended to switch to consolidation oral therapy, may be followed up at the OPAT clinic or referred back to the referring clinician to monitor for relapse. All developments and outcomes should be communicated with the patient, the referring clinician and the primary care practitioner and outcome data should be entered into a national OPAT registry.

Referral for OPAT

Assessment by OPAT Team
Appropriate Infection
Requires Parenteral Antimicrobials
Medically Stable
Appropriate Vascular Access
Patient and Carers Informed Consent
Suitable Social Circumstances
Methods of Communication Established
Source of Antimicrobials and support established
Funding secured

Entry to OPAT Programme

Minimum of One Dose of Antimicrobial Given in Hospital or Healthcare Facility
Assess for Adverse Reaction
Patient and Carer Education

Discharge to OPAT Programme with plan for duration of therapy and monitoring of response.

Daily visit by OPAT community healthcare professional to administer antimicrobials (H-OPAT)

Patient/Carer Administers antimicrobials With/without monitoring by community healthcare professional (S-OPAT)

Assessment at OPAT Clinic (at least weekly)
Review by OPAT Physician
Monitoring of Response to Therapy
Laboratory Monitoring as per antimicrobial guidelines above
Assess for medication side-effects
Vascular access device monitoring

OPAT course completed
Clinic Follow-up
Communication with referring team
Outcomes Database Updated

Condition fails to improve or complication develops

Readmission for therapy
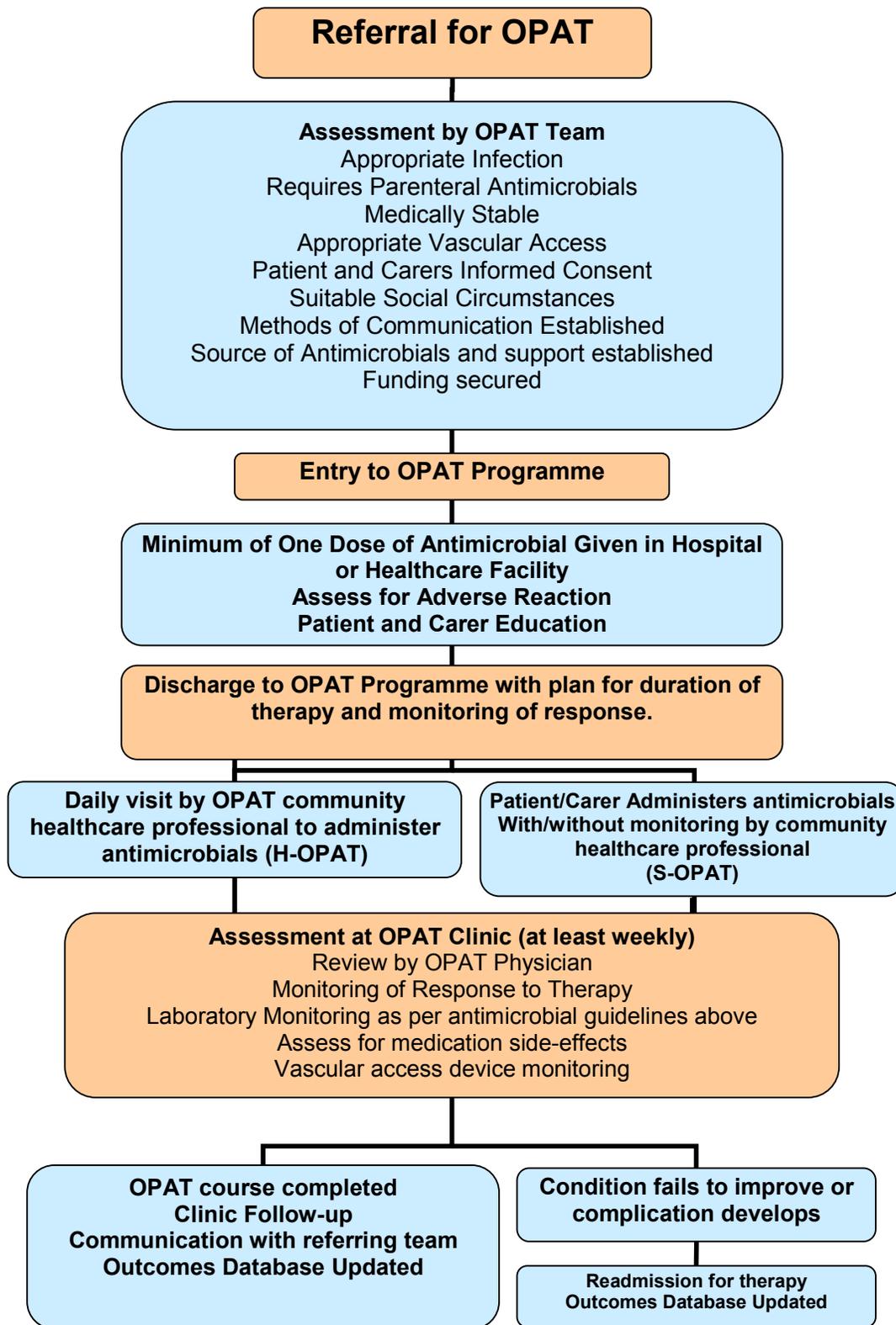**Outcomes Database Updated**

Figure 2. Management Algorithm for OPAT Care Delivery

13. Summary

An expansion of OPAT in Ireland would allow the Health Service Executive to achieve one of its transformation priorities of delivering healthcare in a cost-effective, safe, resource-efficient manner in community setting. The development of OPAT programmes would also fulfill the priorities of the HSE's Quality and Clinical Care Directorate, namely delivering universally-accessible, cost-effective, quality care. However, OPAT must be delivered in a structured manner according to best-practice standards and with appropriate clinical governance. This document outlines structures to ensure standards and governance is achieved.

Appendix 1. Properties of Antimicrobials Commonly Used in OPAT

Antimicrobial	Dosing	Half-life (hours)	Monitoring	Cautions
Cefazolin[a]	8 hourly	1-2	Weekly FBC, LFT, U&E.	
Ceftazidime	8-12 hourly	1-2	Weekly FBC, LFT, U&E.	
Ceftriaxone	Daily or 12 hourly	5-11	Weekly FBC, LFT, U&E.	
Flucloxacillin	6 hourly or infusion	0.3-1	Weekly FBC, LFT, U&E.	Hepatitis
Benzylpenicillin	4-6 hourly or infusion	0.4-1	Weekly FBC, LFT, U&E.	Hypersensitivity
Piperacillin-tazobactam	8 hourly	0.5-1	Weekly FBC, LFT, U&E.	
Meropenem	8 hourly	1.5	Weekly FBC, LFT, U&E.	
Aztreonam	8 hourly	1.5-2	Weekly FBC, LFT, U&E.	
Vancomycin	Daily/q12 hourly or infusion	4-6	TDM Weekly U&E	"Red Man Syndrome" with rapid infusion, neutropenia, leucopenia
Teicoplanin	Daily	40 hours	Weekly FBC, U&E TDM	Fever, anaemia, thrombocytopenia
Daptomycin	Daily	7-11	Weekly FBC, LFT, U&E. CPK at least weekly.	Myositis, GI side effects
Aminoglycosides	Daily	2-3	Twice weekly U&E. TDM	Nephrotoxicity and vestibular toxicity
Clindamycin[b]	8 hourly	2-3	Weekly FBC, LFT, U&E.	
Ciprofloxacin[b]	12 hourly	4	Weekly LFT	Tendon rupture
Linezolid[b]	12 hourly	4.5	Weekly FBC, LFT	Pancytopenia, peripheral and optic neuropathy
Trimethoprim-Sulfamethoxazole	8 hourly	8-13	Weekly FBC, LFT, U&E.	Rash, marrow suppression
Amphotericin B (liposomal)	Daily	24-360	Twice weekly FBC, U&E, Mg	Nephrotoxicity, Low K, Mg
Caspofungin	Daily	>48	Weekly LFT	
Acyclovir	8 hourly	2-3.5	Twice weekly FBC, U&E, Mg	Nephrotoxicity
Ganciclovir	Daily/q12 hourly	2.5-3.6	Twice weekly FBC, U&E	Pancytopenia, nephrotoxicity

FBC, full blood count; LFT, liver function tests; U&E, urea & electrolytes; K, potassium; Mg, magnesium; TDM, therapeutic drug monitoring; GI, Gastro-intestinal; CPK, creatine phophokinase. [a] Currently unlicensed in Ireland. [b] Good oral bio-availability, avoid intravenous use if possible. *Clostridium difficile* colitis possible with all antimicrobials.

Appendix 2. Dissemination Process

This document was sent for consultation in July 2010 to the groups listed below. A period of six weeks was allowed for review and response.

- Royal College of Physicians of Ireland
- Royal College of Surgeons of Ireland
- Irish College of General Practitioners
- Infectious Diseases Society of Ireland
- Irish Society of Clinical Microbiology
- Irish Association for Emergency Medicine
- Faculty of Paediatrics, Royal College of Physicians of Ireland
- The Irish Antimicrobial Pharmacists Group
- The Hospital Pharmacists Association of Ireland
- HSE Quality and Clinical Care Directorate
- Irish Patient's Association

References

[29] St James's Hospital Pharmacy Department. Intravenous Drug Administration Guidelines. Guideline Number SJH: PHAR (G): 002.

[30] SARI Prevention of Intravascular Catheter-related Infection Sub-Committee. Prevention of Intravascular Catheter-related Infection in Ireland HSE Health Protection Surveillance Centre ISBN 978-0-9551236-6-5

[31] Rucker RW, Harrison GM. Outpatient intravenous medications in the management of cystic fibrosis. Pediatrics 1974;54:358–60.

[32] Kind AC, Williams DN, Persons G, Gibson JA. Intravenous antibiotic therapy at home. Arch Intern Med 1979;139:413–5.

[33] Poretz DM, Eron LJ, Goldenberg RI, et al. Intravenous antibiotic therapy in an outpatient setting. JAMA 1982;248:336–9.

[34] Bradley JS, Ching DK, Phillips SE. Outpatient therapy for serious pediatric infections with ceftriaxone. Pediatr Infect Dis J 1988;7:160-164

[35] Arditi M, Yogev R. Convalescent outpatient therapy for selected children with acute bacterial meningitis. Semin Pediatr Infect Dis 1990;1:404-410.

[36] Bradley JS, Ching DK, Wilson TA, Compogiannis LS. Once daily ceftriaxone to complete therapy of uncomplicated group B streptococcal infection in neonates. A preliminary report. Clin Pediatr 1992;31:274-278.

[37] Mullen CA, Petropoulos D, Roberts WM et al. Economic and resource utilisation analysis of outpatient management of fever and neutropaenia in low-risk pediatric patients with cancer. J Pediatr Hematol Oncol 1999;21:212-218.

[38] Patrick CC, Shenep JL. Outpatient management of the febrile neutropenic child with cancer. Adv Pediatrc Infect Dis 1999;14:29-47.

[39] Petrilli AS, Dantas LS, Campos MC, Tanaka C, Ginani VC, Seber A. Oral ciprofloxacin vs. intravenous ceftriaxone administered in an out-patient setting for fever and neutropenia in low-risk pediatric oncology patients: randomized prospective trial. Med Pediatr Oncol2000;34:87-91.

[40] Wagner CI, Wagstaff P, Cox TH, Annibale DJ. Early discharge with home antibiotic therapy in the treatment of neonatal infection. J Perinatol 2000;20:346-350.

[41] Gomez M, Maraqa N, Alvarez A, Rathore M. Complications of out-patient parenteral antibiotic therapy in childhood. Pediatr Infect Dis J 2001;20:541-543.

[42] Porea TJ, MArgolin JF, Chintagumpala MM. Radiological case of the month: pulmonary air embolus with home antibiotic infusion. Arch Pediatr Adolesc Med 2001;155:963-964.

[43] Winters RW, Parver AK, Sansbury JD. Home infusion therapy: a service and demographic profile: a report for the National Alliance for Infusion Therapy. Washington, DC: National Alliance for Infusion Therapy, 1992:1–61.

[44] Chapman AL, Dixon S, Andrews D, et al. Clinical efficacy and cost-effectiveness of outpatient parenteral antibiotic therapy (OPAT): a UK perspective. J Antimicrob Chemother. 2009 Sep 21.

[45] Wai AO, Frighetto L, Marra CA, et al. Cost analysis of an adult outpatient parenteral antibiotic therapy (OPAT) programme. A Canadian teaching hospital and Ministry of Health perspective. Pharmacoeconomics. 2000 Nov;18(5):451-7.

[46] Grayson ML, Silvers J, Turnidge J. Home intravenous antibiotic therapy: a safe and effective alternative to inpatient care. Med J Aust 1995; 162: 249–252.

[47] Yong C, Fisher DA, Sklar GE, et al. A cost analysis of Outpatient Parenteral Antibiotic Therapy (OPAT): an Asian perspective. Int J Antimicrob Agents. 2009 Jan;33(1):46-51.

[48] IBM Global Business Policies. Healthcare 2015: Win-win or lose-lose? A portrait and a path to successful transformation. G510-6318-00. 2006

[49] McKinsey and Company Consultants.

[50] Corwin P, Toop L, McGeoch G, et al. Randomised controlled trial of intravenous antibiotic treatment for cellulitis at home compared with hospital.,BMJ. 2005 January 15; 330(7483):129

[51] Tice AD, Rehm SJ, Dalovisio JR, et al. Practice Guidelines for Outpatient Parenteral Antimicrobial Therapy. Clin Infect Dis 2004; 38: 1651-72.

[52] Health Service Executive. Transformation Programme 2007-2010. ISBN 0948562684 2006

[53] Health Service Executive. Acute Hospital Bed Capacity Review: A Preferred Health System in Ireland to 2020. PA Consulting 2007 00313-2.

[54] Strategy for the Control of Antimicrobial Resistance in Ireland. SARI Hospital Antimicrobial Stewardship Working Group. Guidelines for Antimicrobial Stewardship in Hospitals in Ireland.
December 2009 HSE Health Protection Surveillance Centre ISBN 978-0-9551236-7-2

[55] Kieran J, O'Reilly A, Parker J, Clarke S, Bergin C. Self-administered outpatient parenteral antimicrobial therapy: a report of three years experience in the Irish healthcare setting. Eur J Clin Microbiol Infect Dis. 2009 Nov;28(11):1369-74.

[56] Grayson ML, Stanley K, Montalto M, et al. The Victorian Hospital-in-the-Home Outcomes Study. Abstracts from the Australian Home and Outpatient Intravenous Therapy Association Annual Scientific Meeting 2000. Melbourne; 13 Oct 2000.

[57] McFaul K et al. 2nd IDSI ASM, June 2009. Abstract CID2-012.

[58] O'Connell E. National Nursing Council Annual Meeting, Dublin 2006

[59] Matthews PC, Conlon CP, Berendt AR, et al. Outpatient parenteral antimicrobial therapy OPAT): is it safe for selected patients to self-administer at home? A retrospective analysis of a large cohort over 13 years. J Antimicrob Chemother, 2007;60:356–62.

[60] Nathwani D, Barlow G, Adjuckiwiecz K, et al., Cost minimisation analysis and audit of antibiotic management of bone and joint infections with ambulatory teicoplanin, inpatient care or outpatient liezolid therapy. J Antimicrob Chemother, 2003;51:391–6.

[61] Dalovisio JR, Juneau J, Baumgarten K, Kateiva J. Financial impact of a home intravenous antibiotic programme on a medicare managed care programme. Clin Infect Dis. 2000 Apr;30(4):639-42.

[62] Graham DR. Nosohusial infections: a decade of surveillance for complications of home intravenous therapy. Infection Control and Hospital Epidemiology 2000;21:152.

[63] Rodvold KA, Everett JA, Pryka RD, Kraus DM. Pharmacokinetics and administration regimes of vancomycin in neonates, infants and children. Clin Pharmacokinet 1997;33:32-51.

[64] Miles MV, Li L, Lakkis H, Youngblood J, McGinnis P. Special considerations for monitoring vancomycin concentrations in pediatric patients. The Drug Monit 1997;19:265-270.

[65] Asbury WH, Darsey EH, Rose WB, Murphy JE, Buffington DE, Capers CC, Vancomycin pharmacokinetics in neonates and infants: a retrospective evaluation. Ann Pharmacother 1993;27:490-6.

[66] Balaguer A, Gonzalez de Gios J. Home intravenous antibiotics for cystic fibrosis. Cochrane database Syst Rev 2008 16(3): CD001917

[67] Flume PA, Mogayzel PJ Jr, Robinson KA, et al. Cystic fibrosis pulmonary guidelines: treatment of pulmonary exacerbations. Am J Respir Crit Care Med. 2009 Nov 1;180(9):802-8.

[68] Gilchrist M, Franklin BD, Patel JP. An outpatient parenteral antibiotic therapy (OPAT) map to identify risks associated with an OPAT service. J Antimicrob Chemother. 2008;62(1):177-83.

[69] Nathwani D. Place of Parenteral Cephalosporins in the Ambulatory Setting. Drugs 2000;59:Suppl 3:37-46.

[70] Craig WA. Antibiotic selection factors and description of a hospital-based outpatient antibiotic therapy programme in the USA. Eur J Clin Microbiol Infect Dis 1995; 14:636–42.

[71] Craig WA, Ebert SC. Continuous infusion of beta-lactam antibiotics. Antimicrob Agents Chemother 1992; 36:2577.

[72] Martone WJ, Lindfield KC, Katz DE. Outpatient parenteral antibiotic therapy with daptomycin: insights from a patient registry, Int J Clin Pract, 2008;62:1183–7.

[73] Munckhof WJ, Grayson ML, Turnidge JD. A meta-analysis on the safety and efficacy of aminoglycosides given either once daily or as divided doses. J Antimicrob Chemother 1996; 37: 645-663.

[74] Dew RI, Sulsa G. Once-daily aminoglycoside treatment. Infect Dis Clin Pract 1996; 5:12–24.

[75] Ng PK, Ault MJ, Ellrodt AG, et al. Peripherally inserted central catheters in general medicine. Mayo Clin Proc 1997;72:225–33.

[76] National Association of Vascular Access Networks. Tip location of peripherally inserted central catheters. J Vascular Access Devices 1998; 3:8–10.