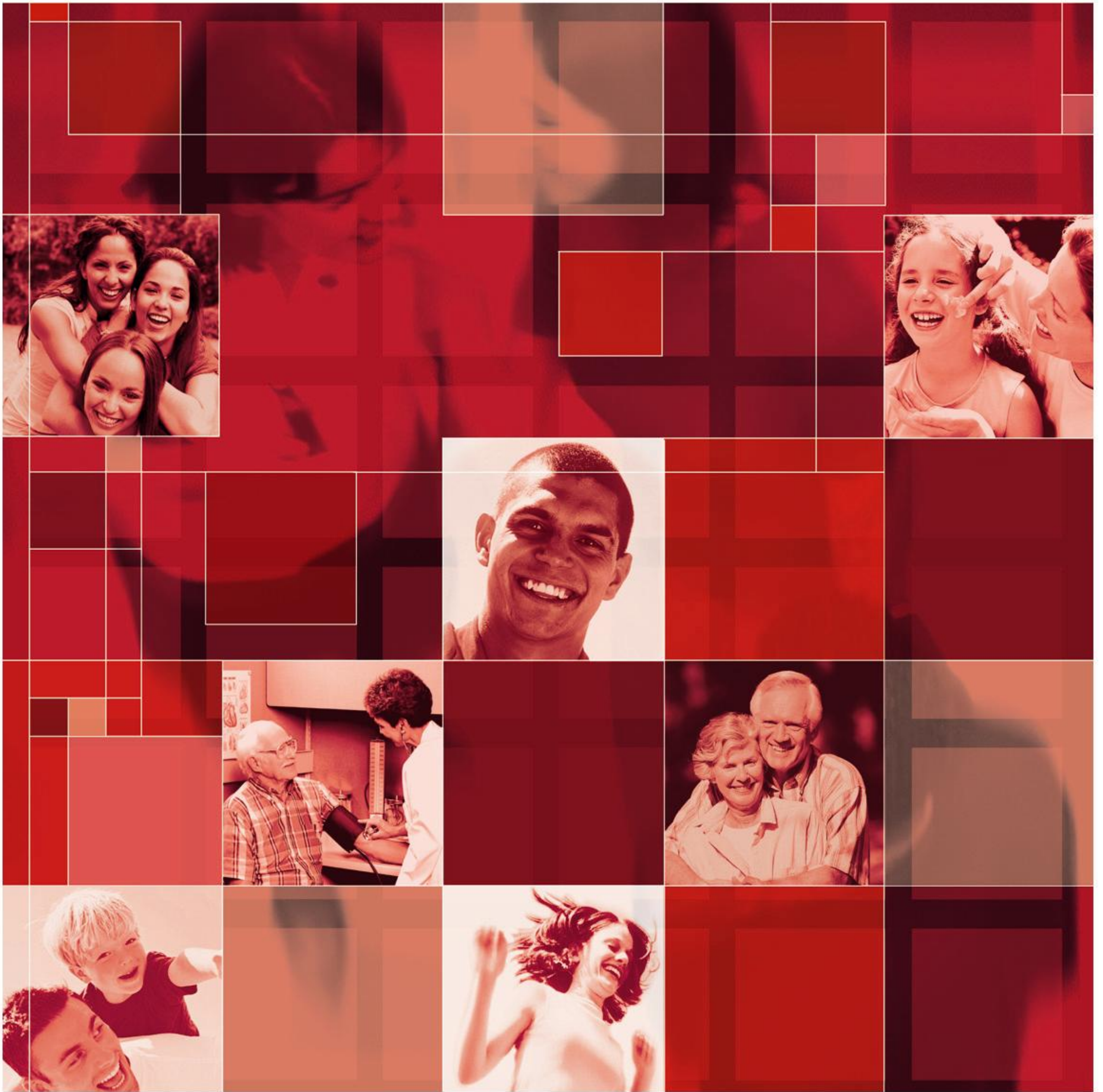
HUNTER NEW ENGLAND
NSW HEALTH

Stroke Services Plan 2008-2012

November 2008



HNE Health Stroke Services Plan 2008-2012
November 2008

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SECTION A

EXECUTIVE SUMMARY

Background

Stroke is a leading cause of chronic disability in adults in Australia and a major burden on health services. However, there is now strong evidence for improved management and prevention of stroke and a high priority for change in clinical practice to reflect the emerging evidence. Indeed, since the introduction of specialised stroke services in the Hunter Area (in line with evolving clinical practice to treat and prevent vascular disease generally) there has been a 23% decline in death rate from stroke (aged-standardised) in the Hunter New England area.

The development of the HNE Stroke Services Plan 2008-2012 was identified as a priority for HNE Health. Since the amalgamation of Hunter, lower Mid North Coast and New England Area Health Services, stroke services have been working collaboratively to enhance service provision. The Stroke Services Plan sets the direction and priorities for the development and delivery of stroke services across the Hunter New England area over the next five years.

Policy Directions

The HNE Stroke Services Plan is aligned to National and State directions. The Plan has adopted the Stroke Clinical Guidelines[1,2] from the National Stroke Foundation for the Management of People with Stroke across the continuum of hyper-acute care, acute care, post acute care (including rehabilitation) and community support and prevention activities. Best practice stroke care is rapidly changing as research expands and evidence grows. This plan recognises the need to be flexible over the life of the plan to be able to respond to changes in clinical practice (and technology) across the continuum of care and the diversity of the Hunter New England area including its metropolitan, rural and remote communities.

Key Directions

Research into effective stroke care delivery has resulted in significant growth of the evidence base for stroke care, and changes to the way stroke care is delivered. Planning for stroke care delivery into the future needs to incorporate the concepts of equity of access and delivery of best practice, taking into consideration local cultural and geographic influences and limitations. Stroke Prevention programs, and access to Stroke Units (for relevant stroke patients), are foundations for effective stroke care. Access to thrombolytic services (and to relevant surgical services) are a major challenge for geographically isolated patients in particular, but the evidence base for the effectiveness of this therapy means that access to thrombolysis is an essential component of contemporary acute stroke care.

Dedicated interdisciplinary stroke teams working in clearly defined stroke units with organised process of care form the foundation of effective stroke units. Planning for such service delivery highlights the following challenges:

- Access to formalised stroke units for inpatient care
- Access to thrombolytic care, especially for geographically isolated patients
- Supporting the isolated clinician/s who need to deliver stroke care to patients
- Maintaining a service model which is firm enough to deliver evidence base care, and flexible enough to change process as the evidence evolves
- Providing a clinical service which is culturally sensitive and appropriate
- Driving evidence based care across all phases of the patient journey (including prevention, as well as longer term maintenance)
- Maintaining a close and collaborative working relationship with primary care clinicians such as GPs

- Supporting a relevant data management infrastructure which can participate efficiently in audit, reporting, and research activities
- Maintaining a workforce with a dedication to maximising the quality of stroke care delivery across the area...

The recommendations within this stroke plan reflect priorities identified in the literature, and outcomes of clinician consultations. The Stroke Services stream has developed four key working groups to drive service planning, development, prioritisation, and to monitor outcomes. These four groups are:

- Clinical Pathways
- Workforce and Professional Development
- Research and Data Management
- Links, Networks and Communications

The groups will be working on the following:

- Developing best practice models of organised stroke care utilising a hub and spoke model with a focus on the establishment of stroke units and the delivery of thrombolytic therapy
- Reviewing workforce needs for clinical services to meet hub and spoke service requirements
- Identifying appropriate professional support needs for:
  - Key clinical staff (Stroke dedicated staff)
  - Generalist health providers (non-stroke dedicated staff)
- Exploring the establishment of data management systems across key sites, for example, Towards a Safer Culture (TASC) and Australasian Rehabilitation Outcomes Centre (AROC) to drive clinical change.

SECTION B

1. INTRODUCTION AND BACKGROUND

1.1 Overview to Plan Development

The development of the HNE Stroke Services Plan 2008-2012 was identified as a priority for 2007. The development of the HNE Stroke Services Clinical Stream has occurred concurrently with the development of the Stroke Services Plan.

Stroke Services across the area have previously developed separate clinical processes and structures due to historical and regional differences. Stroke Services, particularly in the Hunter recognised the need to develop formalised structures to support service delivery, professional development, research, and data management. The Hunter Stroke Service was established in the mid 1990s and the Northern Expert Working Group was formed in March 2007 and the two groups formed a partnership to meet these needs on an Area wide basis. The requirement to develop an Area Stroke Clinical Stream has added to the process. It is recognised that an Area Stroke Stream can support the evolution of these services into the future, and across a wide geographical region. There has been a long standing recognition of the value of developing clinical services structures, communication and decision making processes to support stroke services.

The development of the Stroke Services Plan will enhance stroke service provision across the Area.

1.2 Scope of the Stroke Services Plan

The scope of the Stroke Services Plan is the prevention of stroke and the care and treatment of adults with stroke including:

- Pre-hospital
- Acute services
- Post-acute/ rehabilitation services
- Community services.

It has been recognised that there are inter-connections between components of stroke services and other aspects of neurology, neurosurgery, aged care and rehabilitation services that have been considered in the development of the Stroke Services Plan.

Relevant services for children and young people - paediatric neurology and paediatric brain injury - are part of the HNE Children, Young People and Families Services Plan 2007-2011.

1.3 Goals of the Stroke Services Plan

The over-arching goal of the Stroke Services Plan is to ensure that people requiring stroke services have equitable access to a range of high quality services and best practice care irrespective of where they enter the health system, where they reside, or based on their gender or ethnicity.

Specifically, for HNE Health, the Plan seeks to:

- Provide direction for the delivery of an area wide stroke service that is evidence based, flexible in approach and responsive to client needs
- Develop a hub and spoke model to improve access to specialist stroke services including thrombolytic therapy
- Develop stroke workforce strategies ensuring an adequate and skilled workforce through professional development and support opportunities

- Increase the focus on prevention, health promotion and early intervention
- Identify opportunities for collaboration with other related services and key stakeholders

1.4 Stroke Services Planning Group

In 2007, HNE Health Area Executive Team identified the need for a HNE Stroke Services Plan to be developed. A Core Planning Group (CPG) was established, which is the key decision-making body for the development of the plan. Membership of the CPG is included as Appendix 1.

1.5 Key Stakeholders

The CPG was representative of the range of multidisciplinary health professionals providing primary to tertiary care in rural and urban settings.

Consultations with representatives from Aboriginal Partnership Group, HNE Health Population Health and Multicultural Health services were undertaken to ensure that the specific focus of promotion and prevention and the needs of people from diverse cultures and languages were recognised.

Other key internal and external stakeholders were identified by the CPG and consulted several times during the development of the Stroke Services Plan. Details of key stakeholders are included as Appendix 2.

1.6 Area Stroke Services Stream

HNE Health is introducing Area Clinical Networks to ensure equitable provision of high quality, clinically effective care, improve coordination of service delivery and build staff capacity across the Area. Area Clinical Networks link groups of health professionals from primary, secondary and tertiary care to work together in a coordinated manner. These networks shift the emphasis from separate institutions to a system of integrated care for the consumer.

Each Clinical Network can consist of two or more area-wide clinical streams. HNE Health Stroke Services are being developed as a clinical stream. Once established, consideration will be given to aligning the Stroke Services Stream with other services to form an Area Clinical Network.

The roles and responsibilities of an Area Clinical Stream include:

- Coordinating the development, review and use of appropriate clinical practice guidelines across relevant services
- Promoting professional development and education for staff
- Fostering the provision of information for service providers and consumers and their families to support access to appropriate care
- Enhancing service delivery through facilitation of integrated models of care
- Coordinating the collection, analysis and evaluation of data in relation to service delivery and outcomes
- Promoting and using the quality framework (safe, effective, accessible, efficient, appropriateness) in all activities
- Developing, implementing and monitoring of clinical services plans
- Developing recommendations and facilitation of activities in relation to the retention, recruitment, succession of staff
- Developing recommendations for resource prioritisation and allocation
- Developing recommendations to Area Executive and others as appropriate on service delivery and planning priorities

- Fostering peer support and strong relationships across facilities, services, Area Clinical Networks and external partners to support service delivery.

The development of an Area Stroke Services Stream will produce the following benefits:

- The establishment of a group of senior clinicians from across the area to provide clinical expertise for stroke services and to build an integrated approach to service delivery and continuous improvement
- A point of contact for Stroke Services with identified clinical leadership and management/coordination support
- A forum for clinical staff, Executive and others to raise issues
- Identification and strengthening of linkages with other clinical services, and external providers
- A group to lead the development of an agreed plan of activities for stroke services including responsibility for the implementation and monitoring of the Stroke Services Plan

1.7 Clinical Governance

Clinical Governance is based on the principle that all of us, clinicians and managers alike, are jointly accountable for the quality of patient care and the standard of that care delivery. Clinical Governance is the framework by which this accountability is ensured and demonstrated.

Today, quality and patient safety is managed, monitored and evaluated by: creating an environment that promotes use of best evidence in patient care and encourages data-based decision-making; having robust systems to identify incidents and risks; monitoring, evaluating and reporting on health and quality outcomes and, encouraging staff and patients to provide feedback and input into the quality and safety agenda.

The HNE Stroke Services Plan recognises that evidence for stroke care is rapidly progressing improvements in care and treatment options. Incorporating the latest evidence and research practice into developing clinical pathways, protocols and guidelines to improve health care for people with stroke is a key component of this five-year plan. Specialist stroke services have an important role in developing clinical governance processes to support improvements in stroke management across the care continuum.

2. POLICY CONTEXT

Appropriate strategies to be implemented over the next five years must align with relevant National and State policies, standards and frameworks.

A brief summary of priorities and goals of some of the key documents is included below.

2.1 National Directions

2.1.1 National Stroke Foundation. Clinical Guidelines for Acute Stroke Management 2007 and Clinical Guidelines for Stroke Rehabilitation and Recovery 2005

The National Stroke Foundation (NSF), on behalf of the Australian Health Minister's Advisory Council (AHMAC) has developed evidenced based guidelines for the care and treatment of people with stroke. The National Health and Medical Research Council (NHMRC) have endorsed the Clinical Guidelines for Acute Stroke Management[1] and the Clinical Guidelines for Stroke Rehabilitation and Recovery[2] for clinical use.

The NSF Stroke Clinical Guidelines were developed to provide clinicians with evidence based guidelines for the management of people with stroke. The guidelines highlight the benefits of coordinated patient management in a specialised stroke unit including access to thrombolytic therapy, early access to multidisciplinary teams and rehabilitation processes.

The guidelines cover the following aspects of stroke service provision:

- Stroke units/ organisation of stroke services / models of service delivery
- Pre-hospital care
- Early assessment and diagnosis including triage, clinical diagnostic evaluations investigations and use of intravenous tissue plasminogen activation (tPA)
- Assessment and management of the consequences of stroke
- Prevention and treatment of complications of stroke
- Early secondary prevention
- Discharge planning, transfer of care and integrated community care
- Living with stroke
- Resource implications.

A summary of the key aspects of these guidelines is included in Appendix 3.

2.1.2 Department of Health and Ageing. National Chronic Diseases Strategy 2006

The National Chronic Diseases Strategy (NCDS) aims to provide a consistent and coordinated approach to the management of preventable diseases across Australia. The primary objectives of NCDS are to:

- Prevent and/or delay the onset of chronic disease for individuals and population groups
- Reduce the progression and complications of chronic disease
- Maximise the wellbeing and quality of life of individuals living with chronic disease and their families and carers
- Reduce avoidable hospital admissions and health care procedures
- Implement best practice in the prevention, detection and management of chronic disease
- Enhance the capacity of the heath workforce to meet population demand for chronic disease prevention and care into the future.

Within the NCDS framework there is a strong focus on self-management for people with chronic disease.

2.1.3 National Stroke Foundation. National Stroke Unit Program Policy – Stroke Services in Australia

The National Stroke Unit Program Policy reviews the evidence relating to stroke unit care, their structure, processes and outcomes. It identifies current practice within Australia and the core components that are critical to providing quality stroke unit care. The program has developed a model of stroke care that can be implemented across a diverse range of clinical settings ensuring all Australians have access to best practice stroke care. The National Stroke Unit Program model categorises hospitals into A, B, C or D. See Appendix 4 for details regarding category criteria.

2.1.4 Department of Health and Ageing. National Service Improvement Framework for Heart, Stroke and Vascular Disease 2006

National Service Improvement Frameworks address chronic conditions and are intended to encourage the delivery of more person-centred, equitable, timely, effective, affordable and cohesive health care for all Australians. The principles guiding the development of these Frameworks include focusing on the patient journey, providing optimal services, addressing health inequalities, focusing on heart, stroke and vascular disease in Aboriginal and Torres Strait Islander people, improving health literacy and providing long term care and support of people with chronic conditions.

2.1.5 Healthy Horizons – A Framework for Improving the Health of Rural, Regional and Remote Australians 2003-07

Healthy Horizons presents a framework within which Commonwealth, State and Territory governments develop strategies and allocate resources to improve the health and well-being of people in rural, regional and remote Australia. The document highlights eight principles that are critical to the success of delivering services in rural, regional and remote areas. These principles are: primary health care; public health; capability of communities; community participation; access; sustainability; partnerships and collaboration and, safety and quality. The eight principles are incorporated into seven key goals that primarily reflect national health priority areas and that have the most potential to achieve improved outcomes for rural, regional and remote communities.

2.2 State Directions

2.2.1. A New Direction for NSW - State Plan

The NSW State Plan was released in November 2006. The purpose of this plan is to deliver better results for the community from NSW Government services. To achieve this, the plan sets clear priorities for Government action, with challenging targets for improvement to guide decision-making and resource allocation.

The plan identifies five areas of Government activity and the goals to be achieved in each area. Four of these areas are relevant to health:

- Rights, Respect and Responsibility – Keeping people safe and building harmonious communities
- Delivering Better Services – Healthy communities
- Fairness and Opportunity – Strengthening Aboriginal communities, opportunity and support for the most vulnerable, and, early intervention to tackle disadvantage
- Environment for Living – Improved urban environments

2.2.2 A New Direction for NSW - State Health Plan Towards 2010

The State Health Plan will guide the development of the NSW public health system towards 2010 and beyond. The plan reflects the priorities in the NSW Government's State Plan and the priorities of the Council of Australian Governments' national health reform agenda.

A key priority in the State Health Plan is to work with other government and non-government services and the private sector to bridge the health gap between people with the best health and those with poorer health in NSW.

The Plan identifies seven Strategic Directions, or key areas for action, that will focus efforts to ensure we will have a healthier community and continuing access to high quality affordable health services into the future.

The seven Strategic Directions are:

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

2.2.3 NSW Health NSW Rural Health Plan 2002

This plan builds on the outcomes of the Sinclair Report[1] (a report reviewing health services in smaller towns) and the Report of the Rural Health Implementation Coordination Group (RHICG) which recommends the development of rural referral hospitals to focus on medical sub-specialisation and to act as service hubs within an area network. In relation to stroke care, it is recommended that specialised core services be established at rural referral hospitals including stroke units, CT scanning services and interventional radiology. The final report of the NSW Rural Health Plan defines issues that are important for the provision of care for rural and remote populations, including providing services closer to people's homes and providing a sustainable and skilled workforce for current and future service provision.

2.2.4 NSW Health NSW Chronic Disease Strategy Phase Three 2006 –2009

The NSW Chronic Disease Strategic Framework describes the strategic supports, health care settings and elements of service delivery that together form a foundation for best practice chronic care in NSW.

2.2.5 NSW Health Aboriginal Chronic Conditions Area Health Service Standards

These standards address the treatment and management of cardiovascular disease, diabetes, chronic respiratory disease and cancer. They aim to improve health outcomes for Aboriginal people and incorporate the principles of:

- Self management and self determination of Aboriginal people
- Promoting Aboriginal community participation
- Placing individuals and community at the centre of care
- Emphasising a primary health care approach
- Fostering an integrated, coordinated approach across the continuum of care
- Fostering a multi-disciplinary care.
-

2.2.6 Stroke Services NSW. Draft Stroke Service Network Plan 2005-2010

The over-arching goal identified in this draft plan is equitable access to best practice stroke care in the NSW public hospital system**.** This plan is still in a draft format with the key areas and intended outcomes including:

Equity of Access and Outcomes of Acute Care

- The right patient receiving evidenced based care at the right facility
- Increasing proportions of people treated in acute stroke units - the length of hospital stay reduced for stroke patients admitted to acute stroke units.

Information Management
- Minimum data collected for stroke patients and available for clinicians
- Towards A Safer Culture (TASC) online data collection utilised with an electronic discharge referral system interface.

Education
- Access to ongoing education for all stroke clinicians facilitated through metropolitan and rural education programs, including State conferences, relevant scholarships and nurse competency development.

Pre Hospital and Emergency Services
- Improved pre-hospital recognition of stroke by paramedics
- Delivery of stroke patients to appropriate facilities.

Workforce Planning
- Review of current staff/patient ratios in stroke units, rehabilitation centres and hospitals that admit over 100 stroke patients annually. Appendix 5 outlines the minimal staff ratio guidelines for stroke units.

2.3 HNE Health Strategic Directions

2.3.1 A New Direction for Hunter New England – Health Service Strategic Plan Towards 2010

This Plan is the Area's overarching strategic document outlining the Area's corporate vision, objectives and strategic initiatives for the next 5-10 years. The Plan aims to build on the strengths of the organisation and further develop the capability of HNE Health into the future.

The HNE Health Service Strategic Plan reflects priorities identified in the NSW State Plan and is closely aligned to the NSW State Health Plan. The Plan outlines specific initiatives to be implemented to ensure high quality health services that are responsive to the needs of health consumers and the community continues to be provided.

HNE Health is committed to achieving the seven Strategic Directions identified in the State Health Plan. The Area's Strategic Plan identifies strategies and initiatives to achieve these directions and measures to assess how well we are performing in achieving them.

2.3.2 HNE Area Healthcare Services Plan

This Plan is the Area's highest-level services planning document. It outlines the direction of clinical services development and delivery across the Hunter New England area over the next 5-10 years. The Plan presents details of the directions and development of clinical services across HNE Health, and of the clinical services delivered within the Area's geographic clusters.

It is imperative that all Clinical Services Plans developed for HNE Health are closely aligned with this Plan.

2.3.3 HNE Chronic Disease Plan 2006-2010

The principles underpinning the HNE Chronic Diseases Plan are consistent with the principles of the National Chronic Disease Strategy and NSW Chronic Disease Strategy. They include:
- Adopting a population approach and reducing health disadvantage
- Prioritising health promotion and illness prevention
- Achieving person-centered care and optimising self-management
- Providing the most effective care

- Facilitating coordinated and integrated multi-disciplinary care across services, settings and sectors
- Achieving significant and sustainable change
- Monitoring and evaluating progress.

Elements of chronic disease management identified as priorities include: prevention of disease; promotion and facilitation of rehabilitation and self-management strategies; models of care that improve psychological support; ongoing monitoring and coordination of care; advance care planning and, palliative care services.

2.3.4 HNE Aged Care and Rehabilitation Services Plan 2006-2010

The Aged Care and Rehabilitation Services Plan guides the provision of services for older people, their carers and adults needing rehabilitation. It also aims to improve opportunities for people to remain as independent and healthy as possible to participate in community life. The plan addresses the need for equity of access to quality services, effective and coordinated use of resources, and the development of partnerships and linkages across the geographical and cross cultural diversity of the Hunter New England area. A Clinical Network for Aged Care and Rehabilitation Services has been established to provide strategic leadership and direction for our aged care and rehabilitation services across HNE Health.

2.3.5 HNE Aboriginal Health Plan 2007-2011

The Aboriginal Health Plan has been developed in partnership with Aboriginal Community Controlled Health Services (ACCHS). One of the main aims of the Plan is to ensure that Aboriginal Health becomes ‘core business’ for our health services, and that all our staff (Aboriginal and non-Aboriginal) receive training specific to the needs of Aboriginal clients and their families.

Key issues to be addressed by the Aboriginal Health Plan include: strengthening of the partnership between HNE Health and ACCHS; access to services; communication; data quality; cultural respect; workforce development and support; a focus on health promotion and primary health care and, meeting the needs of the more disadvantaged Aboriginal people living in rural and remote parts of the Hunter New England.

Key Considerations

- National and State directions emphasise approaches that address clinical need across the continuum of care from hyper-acute, acute, post acute, rehabilitation and community re-integration and include prevention strategies.

- An innovative and flexible model of care is required to address the diversity of patient journeys experience by people with stroke in the Hunter New England area.

- Networking and communication with key stakeholders is essential in designing a collaborative and relevant service.

Strategic Directions

1.2 The best possible outcomes for people with Stroke

2.1 Engaging informing and collaborating with our partners in improving the health of our communities

3.1 Developing and fostering effective models of care and a culture of excellence

3. DEMOGRAPHICS AND THE BURDEN OF DISEASE

3.1 Introducing Hunter New England Health

HNE Health covers a significant geographic area (over 130,000 square kilometres or 16% of the area of NSW) spanning almost twelve hundred kilometres from north to south, and over eight hundred kilometres from east to west. Across this vast area, there are several large regional centres, including the port city of Newcastle, many small rural centres and several small remote communities. HNE Health faces enormous challenges in ensuring the provision of health services to meet the needs of such a widespread and diverse population. Major challenges include achieving improved health and wellbeing for all and improving equity of access to services across the area. The challenges faced are further compounded by the difficulties experienced in attracting suitably qualified and skilled health professionals to rural and remote areas.

In order to effectively manage the complex network of health services across such a vast area, HNE Health is divided into eight geographical clusters, which are based around Local Council Areas (see Table 1).

Table 1: Hunter New England Clusters by LCAs and LGAs

Cluster	Local Council Areas	Local Government Areas
Mehi	Moree Plains, Narrabri	Moree Plains, Narrabri
McIntyre	Inverell, Gwydir	Inverell, Bingara, Yallaroi, parts of the Guyra and Uralla shires
Tablelands	Tenterfield, Glen Innes, Severn, Guyra, Armidale-Dumaresq, Uralla	Tenterfield, Glen Innes, Severn, Armidale-Dumaresq, parts of the Guyra and Uralla shires
Peel	Tamworth, Walcha, Gunnedah	Tamworth, Walcha, Gunnedah, Parry, Barraba, Manilla, Nundle
Upper Hunter	Liverpool Plains, Upper Hunter, Muswellbrook	Scone, Murrurundi, Merriwa, Muswellbrook, Quirindi
Lower Hunter	Maitland, Dungog, Singleton, Cessnock	Maitland, Dungog, Singleton, Cessnock
Lower Mid North Coast	Greater Taree, Great Lakes, Gloucester	Greater Taree, Great Lakes, Gloucester
Greater Newcastle	Newcastle, Lake Macquarie, Port Stephens	Newcastle, Lake Macquarie, Port Stephens

Source: HNE Health Strategic Directions-Introducing the Area, the People, the Health Services August 2006

3.2 The Hunter New England Population at a Glance

- The Hunter New England area currently has a population of 839,179 (Dept. of Planning 2005), which is approximately 12% of the population of NSW
- The population is widely distributed across the Area: from a densely populated coastal zone to small rural townships with declining populations
- Modest population growth is projected: 3% over the next five years (compared to 4.5% in NSW) reaching 864,764 in 2011 and 890,087 in 2016 (Dept. of Planning 2005) (see Table 2).
- Population projections by age group show a declining birth rate (0-4 years), and an increase in the number of people aged 50 years and over (see Table 3).
- The HNE Health area has the largest Aboriginal population of all Area Health Services: 21.6% of the State's Aboriginal population or 3.2% of the Hunter New England population compared with 2.1% of the NSW population.
- Based on 2005 population estimates, in Hunter New England, the highest proportion of Aboriginal people live in the Mehi Cluster, which includes the towns of Moree, Wee Waa and Narrabri, and the remote townships of Toomelah and Boggabilla. The Peel

Cluster also has a high proportion of Aboriginal people, notably in Tamworth and Gunnedah. The greatest numbers of Aboriginal people live in the Greater Newcastle Cluster i.e. 8,486, but make up the smallest proportion of any Cluster population at 2.1% (see Table 4).

Table 2: Projected Population growth across HNE Health 2001 to 2016

Cluster/Area	2001	2006	2011	2016
Mehi Cluster	30,770	30,021	29,388	28,891
McIntyre Cluster	21,513	21,142	20,659	20,281
Tablelands Cluster	51,167	50,432	50,197	50,187
Peel Cluster	69,711	69,880	70,596	71,679
Upper Hunter Cluster	36,771	36,393	36,017	35,691
Lower Hunter Cluster	133,315	141,854	148,536	155,105
Lower Mid North Coast Cluster	81,866	87,033	91,189	95,220
Greater Newcastle Cluster	388,869	402,424	418,182	433,033
Hunter New England Area	**813,982**	**839,179**	**864,764**	**890,087**

Source: Dept. of Planning 2005

Table 3: Hunter New England Population Estimates by Age groups 2001 to 2016

Age	2001	%	2006	%	2011	%	2016	%
0-4	53,634	6.6%	48,418	5.8%	46,715	5.4%	46,172	5.2%
5-9	58,550	7.2%	55,366	6.6%	50,981	5.9%	49,412	5.6%
10-14	59,518	7.3%	59,360	7.1%	56,351	6.5%	52,336	5.9%
15-19	57,033	7.0%	57,927	6.9%	57,496	6.6%	54,809	6.2%
20-24	48,425	5.9%	52,088	6.2%	52,792	6.1%	52,433	5.9%
25-29	49,780	6.1%	47,254	5.6%	51,105	5.9%	51,616	5.8%
30-34	53,183	6.5%	52,855	6.3%	50,014	5.8%	53,449	5.9%
35-39	57,735	7.1%	55,295	6.6%	55,178	6.4%	52,855	5.9%
40-44	60,227	7.4%	58,747	7.0%	56,621	6.5%	56,683	6.4%
45-49	55,977	6.9%	60,302	7.2%	59,504	6.9%	57,706	6.5%
50-54	54,322	6.7%	56,480	6.7%	61,336	7.1%	60,929	6.8%
55-59	45,570	5.6%	55,311	6.6%	58,277	6.7%	63,391	7.1%
60-64	38,977	4.8%	46,024	5.5%	56,730	6.6%	59,829	6.7%
65-69	33,685	4.1%	38,064	4.5%	45,416	5.3%	56,280	6.3%
70-74	32,260	4.0%	31,270	3.7%	35,767	4.1%	43,008	4.8%
75-79	26,007	3.2%	27,768	3.3%	27,443	3.2%	31,864	3.6%
80-84	16,528	2.0%	20,246	2.4%	21,909	2.5%	22,156	2.5%
85+	12,571	1.5%	16,404	2.0%	21,129	2.4%	25,159	2.8%
Total	**813,982**	**100.0%**	**839,179**	**100.0%**	**864,764**	**100.0%**	**890,087**	**100.0%**

Source: Dept. of Planning 2005

Table 4: Estimated total of Aboriginal Population by HNE Health Cluster – 2005

Cluster	# Aboriginal	% Aboriginal
Greater Newcastle	8486	2.1
Lower Hunter	3646	2.6
Lower Mid North Coast	3110	3.6
McIntyre	953	4.6
Mehi	4719	15.6
Peel	5216	7.2
Tablelands	3265	6.4
Upper Hunter	1432	4.1
Total	30,827	3.7

Source: Health in the Hunter New England 2007

The data in Table 5 indicates that there will be a substantial increase in the population aged over 65 years across the Hunter New England area in both the short term and long term. As the prevalence of stroke increases with age, it can be anticipated that the demands on HNE Health Stroke services will increase for both acute inpatient and rehabilitation services.

Table 5: Age Projections by Cluster - 65 years and older

Cluster	2006	2011	2016	2006-2011	2006-2016
				% change	% change
McIntyre	3,780	4,050	4,440	7%	17%
Mehi	3450	3810	4260	10%	23%
Peel	12510	13860	15740	11%	26%
Tablelands	7620	8490	9800	11%	29%
Lower Hunter	17780	21100	26150	19%	47%
Upper Hunter	3690	4360	5220	18%	41%
Lower Mid North Coast	19690	22900	27090	16%	38%
Greater Newcastle	65220	73180	85780	12%	32%
HNE Total	**127880**	**145020**	**170300**	**13%**	**33%**

Source: Transport and Population Data Centre (2007) Department of Planning NSW Statistical Local Area Population Projections 2001-2031 - 2005 Release

3.3 Types of Stroke[3]

Cerebrovascular disease comprises several disorders in which there is a disturbance in the blood supply to the brain. The term 'stroke' refers to the most common manifestation of cerebrovascular disease. There are two main types of stroke: one is caused by blood clots and/or a blocked artery (ischaemic strokes) and one by bleeding (haemorrhagic strokes). As a result of the blockage/bleed part of the brain dies from lack of blood flow which in turn causes loss of function of the affected part of the brain. This can lead to death or impairment of a range of functions including movement of body parts, vision, communication and swallowing. Depression and anxiety are common after a stroke and many survivors have difficulty returning to their previous activities. This in turn impacts greatly on their carers and ongoing support in the community. Transient Ischaemic Attacks (TIAs) or 'mini' strokes are a temporary manifestation of cerebrovascular disease where the warning signs or symptoms disappear in less than 24 hours.

3.4 Risk factors for Stroke[3]

An individual's risk of stroke is influenced by a number of factors. Some of these factors, such as age, gender and a family history of stroke, cannot be changed. However, there are a number of lifestyle risk factors for stroke which can be modified and in so doing help reduce an individual's risk of having a stroke. Modifiable risk factors for stroke are:

- Raised or high blood pressure
- Raised cholesterol
- Smoking
- A diet low in fruit and vegetable intake and/or high in saturated fat and/or salt
- Being overweight/obese
- Not being physically active
- Diabetes
- Atrial fibrillation (irregular pulse)
- Alcohol consumption greater than 1 to 2 standard drinks per day

Following a healthy lifestyle contributes to the primary prevention of stroke. Healthy lifestyle also plays a key role in controlling risk factors once they have developed. It should be noted however that surgery or medication may also be necessary to control the risk factors when arterial blockages or prior strokes are diagnosed.[2]

3.5 The Impact of Stroke in Australia[3]

Stroke is the second leading cause of death in Australia and the leading cause of disability[3]. Across Australia in 2003, stroke claimed 9,006 lives, nearly 7% of all health related deaths. Around 346,700 Australians were survivors of stroke, and 282,600 Australians had disabling conditions associated with stroke. The prevalence of stroke was slightly higher among males than females and 73% were aged 65 years and over. The number of people having strokes and those surviving with a permanent disability are likely to increase in the future, given the rapid ageing of the Australian population, and a slowing in the decline of stroke death rates in recent years. Older Australians and Aboriginal and Torres Strait Islander peoples are also at greater risk of stroke than other Australians.

There are no national data on the incidence (new cases) of stroke. Estimates have been obtained from local registers in Melbourne and Perth. From these, it is estimated that each year there are about 40,000 to 48,000[1] stroke events among Australians, equating to a stroke every 11 to 13 minutes. The majority (around 70%) of these are first-ever strokes. Each year about 12,000 people who have previously had a stroke suffer another stroke.

Stroke costs the Australian community $1.3 billion every year[1].

3.6 The Impact of Stroke in NSW

The NSW Health Chief Health Officer's 2006 report[4] makes the following key points relating to the impact of stroke on the health of people in NSW.

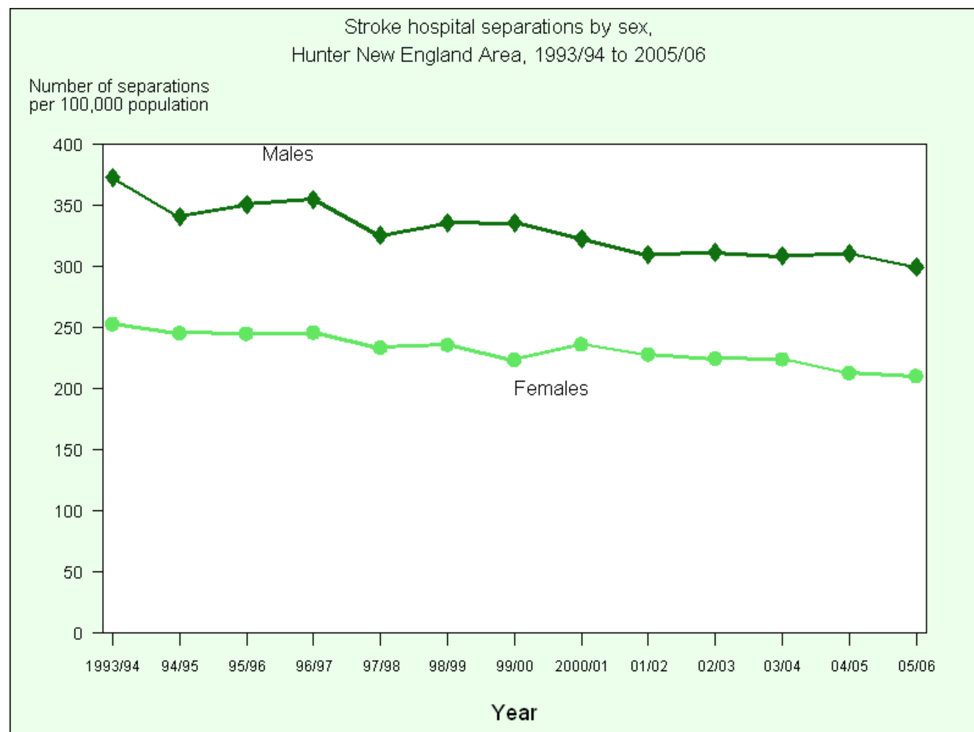
- Cardiovascular diseases cause about 17,500 deaths and 155,000 hospitalisations of NSW residents each year. Coronary heart disease and stroke are the two major conditions contributing to this disease burden, followed by heart failure and peripheral vascular disease.
- Death rates and numbers of deaths, from cardiovascular disease are higher in males than in females. Death rates are higher in outer regional and remote areas of NSW than in metropolitan areas.
- Death rates from all forms of cardiovascular disease have more than halved since 1984, after adjusting for population ageing. This is due to both:

- decreased incidence, associated with reductions in some risk factors, including smoking, saturated fats in the diet, and levels of blood pressure
- increased survival rates as a result of improvements in medical and surgical treatment and follow-up care.
- Stroke caused more than 4,500 deaths in NSW in 2004. Stroke was the principal reason for over 18,000 hospitalisations in 2004/05.
- If hospitalisation and death rates follow the same trend as the last 15 to 20 years, by 2015, hospitalisation rates for all cardiovascular diseases will be 19% lower than in 2004/05 and death rates will be 33% lower than in 2004. The overall number of hospitalisations are, however, projected to increase to around 157,000 by 2015 due to the ageing of the population. Despite this, the number of deaths is projected to fall to around 16,200 by 2015.

3.7 The Impact of Stroke in the Hunter New England area

Figure 1 indicates that between 1993 and 2006, in the Hunter New England area, the rate of stroke separations for males fell from 372 to 299 per 100,000 population and for females from 253 to 210 per 100,000 population. This probably reflects the ongoing emphasis of promoting healthy lifestyles and risk factor management in the primary care setting.

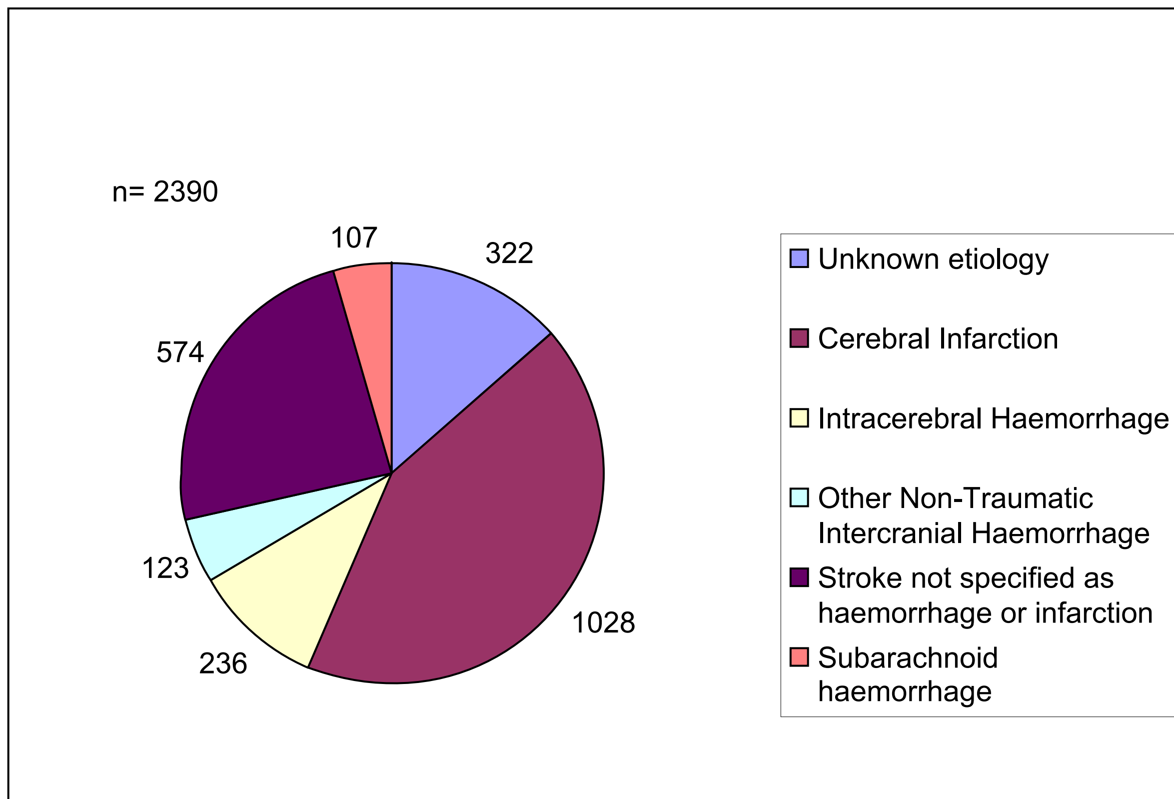
Figure 1: HNE Health Hospital Separations for Stroke by Gender 1993-2006



Source: Health of the Hunter Report 2008.

Figure 2 presents the average numbers of stroke separations by diagnosis type presenting to HNE Health hospitals for the period 2000-2006. The major clinical diagnosis type over that time was cerebral infarction (43%). National figures are higher with up to 80% of diagnoses being cerebral infarction. Accuracy of medical documentation and data coding practices may account for the unknown etiology numbers.

Figure 2: HNE Health Stroke Separations by Diagnosis Type Average per year 2000-06



Source: Health Information Exchange (HIE)

3.8 The Impact of Stroke on the Aboriginal Population

Aboriginal Australians have higher rates of death and illness from cardiovascular diseases including stroke. Aboriginal Australians are also more likely to smoke, undertake little physical activity, have high blood pressure, be overweight, be obese, have diabetes, drink alcohol at harmful levels and have kidney failure.[5]

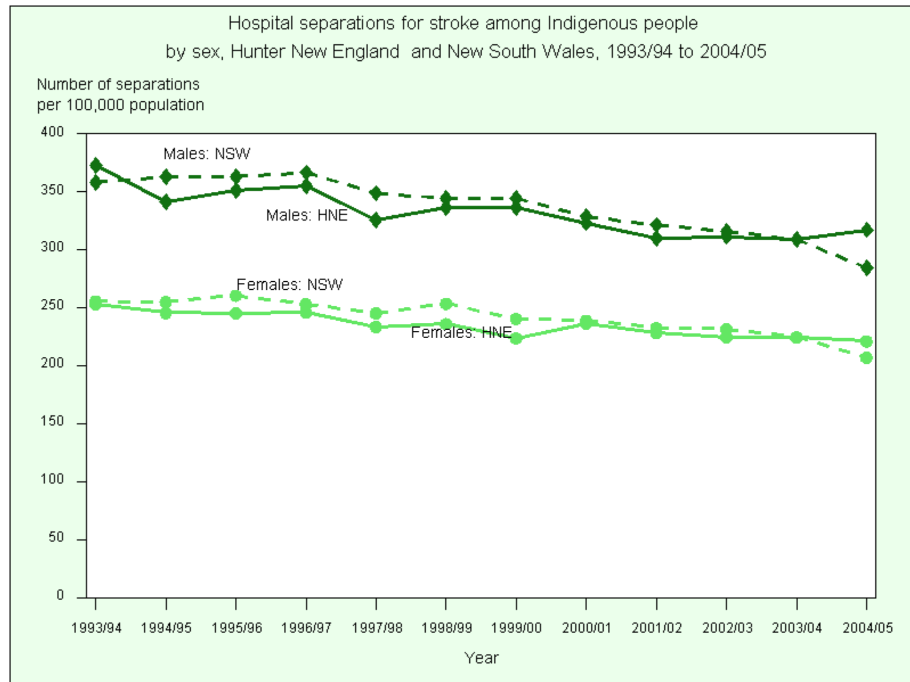
Based on self-reports from the National Health Survey 2001:

- Around one in five Aboriginal and Torres Strait Islander people have long-term heart, stroke and vascular conditions This correlates to an estimated 46,600 people affected
- The prevalence of heart, stroke and vascular conditions for Aboriginal Australians is similar among males and females (18% and 21% respectively)
- Aboriginal Australians living in remote areas are more likely to report heart, stroke and vascular conditions than those living in non-remote areas (24% compared with 18%)
- Since 1995, the prevalence of these conditions in rural and urban areas declined by 33% for Aboriginal Australians and 19% for non-Aboriginal Australians
- The prevalence of these conditions increases rapidly from 35 years of age, rising from 16% among 35–44year olds to 31% among 45–54 year olds, and to 47% for those aged 55 years and over
- The age standardised prevalence of these conditions among Aboriginal Australians (19%) is not significantly different from that of non-Aboriginal Australians (17%)
- Despite the apparent similar overall prevalence rate amongst Aboriginal and non-Aboriginal Australians, age standardised hospitalisation and death rates from heart, stroke and vascular diseases for Aboriginal Australians were 1.4 and 2.6 times as high respectively, as for other Australians in 2000–02. These figures, however, are likely to

be underestimated due to the under-identification of Aboriginal people in hospital and death records.

Given the significant impact of all cardiovascular diseases including stroke on the Aboriginal people, specific consideration of the provision of stroke services to Hunter New England Aboriginal communities is required.

Figure 3: NSW and HNE Hospital Stroke Separations for Aboriginal People by Gender 1993/4 to 2004/5



Source: NSW Health Chief Health Officer's Report 2006

Figure 3 shows that while overall rates remain high, hospital separation rates for Aboriginal males and females are declining at a similar rate to NSW for the period 2003/04 to 2004/05. Separations for males continue to exceed that for females although the gap is decreasing.

Table 6: Aboriginal and Torres Strait Islander People Stroke Separations 2000/01-2005/06

	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06
Aboriginal and Torres Strait Islander Stroke Separations	23	40	41	30	40	43
Total HNE Health Stroke Separations	2464	2356	2237	2317	2436	2548
Percentage of Aboriginal and Torres Strait Islander separations to total percentage of all HNE Health Stroke separations	0.9%	1.7%	1.7%	1.3%	1.5%	1.7%

Source: Health Information Exchange (HIE) NSW Health Accessed May 2007

The Aboriginal population represents 3.9% of the total population of the Hunter New England area. Given their higher incidence of cardiovascular diseases, it is expected that these rates

would be significantly higher. Based on the data in Table 6 there is likely to be significant underreporting of stroke separations for Aboriginal people. It is therefore likely that:

- Recording of Aboriginality is not accurate
- Aboriginal and Torres Strait Islander people may be less likely to present to hospital, contributing to their increased mortality
- This measure of disease incidence is not appropriate or adequate.

3.9 The Impact of Stroke on people from Culturally and Linguistically Diverse Backgrounds

Overseas-born people generally have good health. This reflects the 'healthy migrant effect', whereby people in good health are more likely to meet eligibility criteria, and to be willing and economically able to migrate. However, certain diseases and health risk factors are more prevalent among some country-of-birth groups. This reflects diverse social, economic, environmental, cultural, and genetic influences.

According to Australian Bureau of Statistics (ABS) figures for 2006, approximately 9.4% of the total population of Hunter New England is from culturally and linguistically diverse backgrounds. They include people from over 60 different ethnic groups who speak over 100 different languages. It is essential that staff identify when interpreters are needed in order to obtain accurate information from patients about their health problems and to ensure that these patients receive appropriate information about their disease, understand the treatment options and provide informed consent for any treatment.

Compared with other countries, Australia has a relatively low stroke mortality rate. The highest stroke mortality rates are in Eastern Europe, where rates are twice that of Australia. People from Eastern European backgrounds have higher rates of self-reported stroke risk factors such as alcohol drinking, overweight and obesity, diabetes and hospitalisations for coronary heart disease[4].

In HNE Health hospitals, for the years 2003 – 2007, an average of 97 separations per year were for people being treated for stroke who reported a non-English speaking country of birth and required access to interpreter services or information and support provided to them in a language other than English.

3.10 Psychosocial aspects of Stroke

Of the people who experience a first or recurrent stroke, an estimated 10 to 27 percent experience major depression and an additional 15 to 40 percent experience some symptoms of depression within 2 months following a stroke[6]. The average duration of major depression in people who have suffered a stroke is just under a year. Post-stroke depression is a significant contributor to disability and impairment following stroke.

Depression is a significant risk factor for stroke independent of other known risk factors i.e. it independently contributes to an increased risk of stroke.

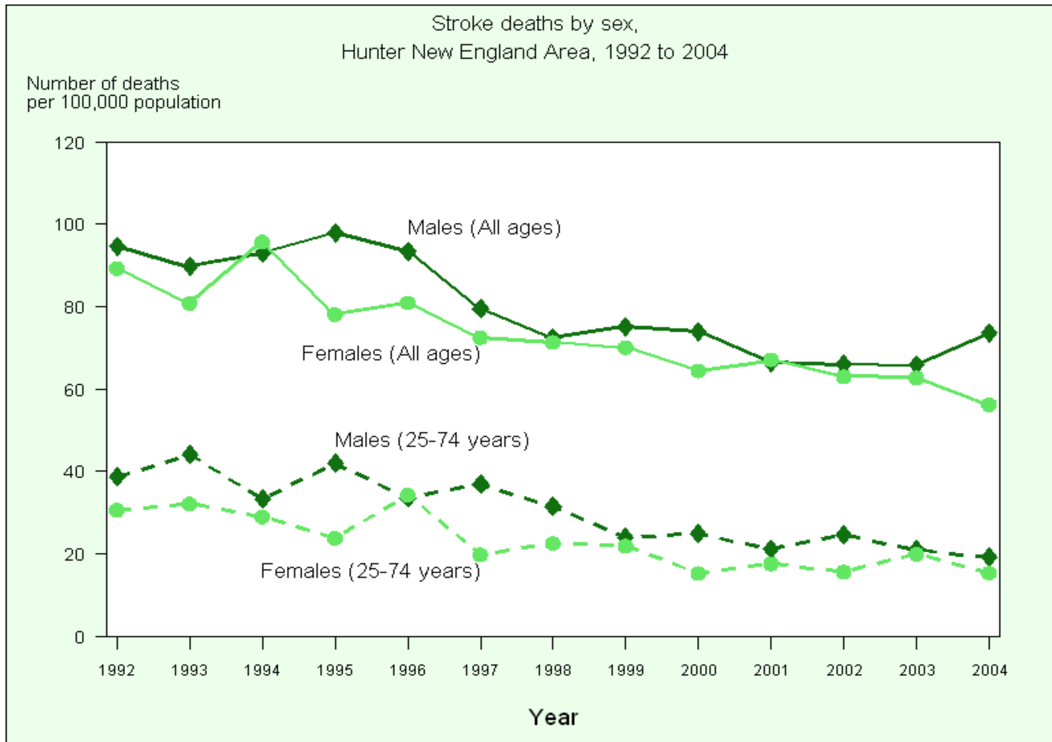
Despite the enormous advances in research, depression often goes undiagnosed and untreated following stroke[6]. Stroke survivors, their family members and friends, and even their physicians may misinterpret depressive symptoms as an inevitable reaction to the effects of a stroke. But depression is a separate illness that can and should be treated, even when a person is undergoing post-stroke rehabilitation. The early identification and treatment of depression is an important preventive measure.

HNE Mental Health services have an important role in providing services to people following stroke (based on current evidence of risk and disability). Post stroke depression is a serious complication which needs specialist mental health input at the rehabilitation and community service levels.

3.11 Stroke Mortality

Figures 4-6 are taken from the NSW Health Chief Health Officers Report (2006) and provide information on stroke deaths for the Hunter New England area. There has been a significant decline in mortality from Stroke from 1992 to 2004 for all ages, although males have a higher mortality rate than females.

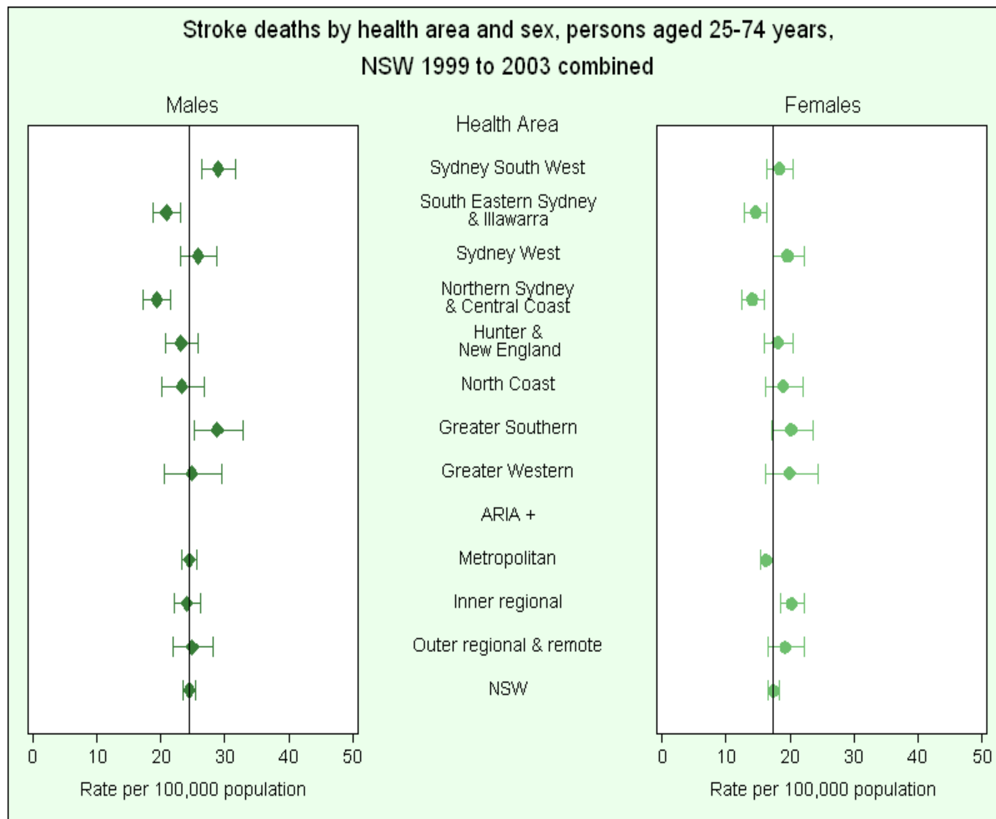
Figure 4: Stroke deaths by sex, HNE area, 1992 to 2004



Source: NSW Health Chief Health Officer's Report 2006

Figure 5 shows the stroke death rate for residents of the Hunter New England area is similar to that of NSW as a whole.

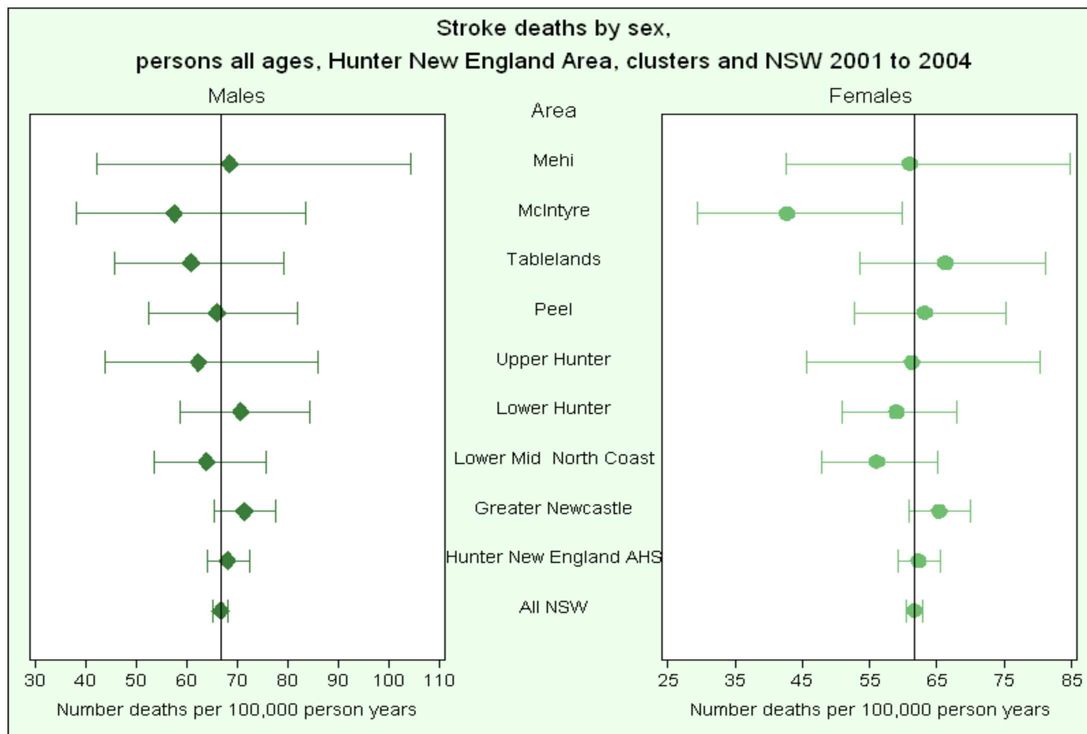
Figure 5: Stroke Deaths by Area Health Service and Sex 1999 to 2003 combined



Source: NSW Health Chief Health Officer's Report 2006

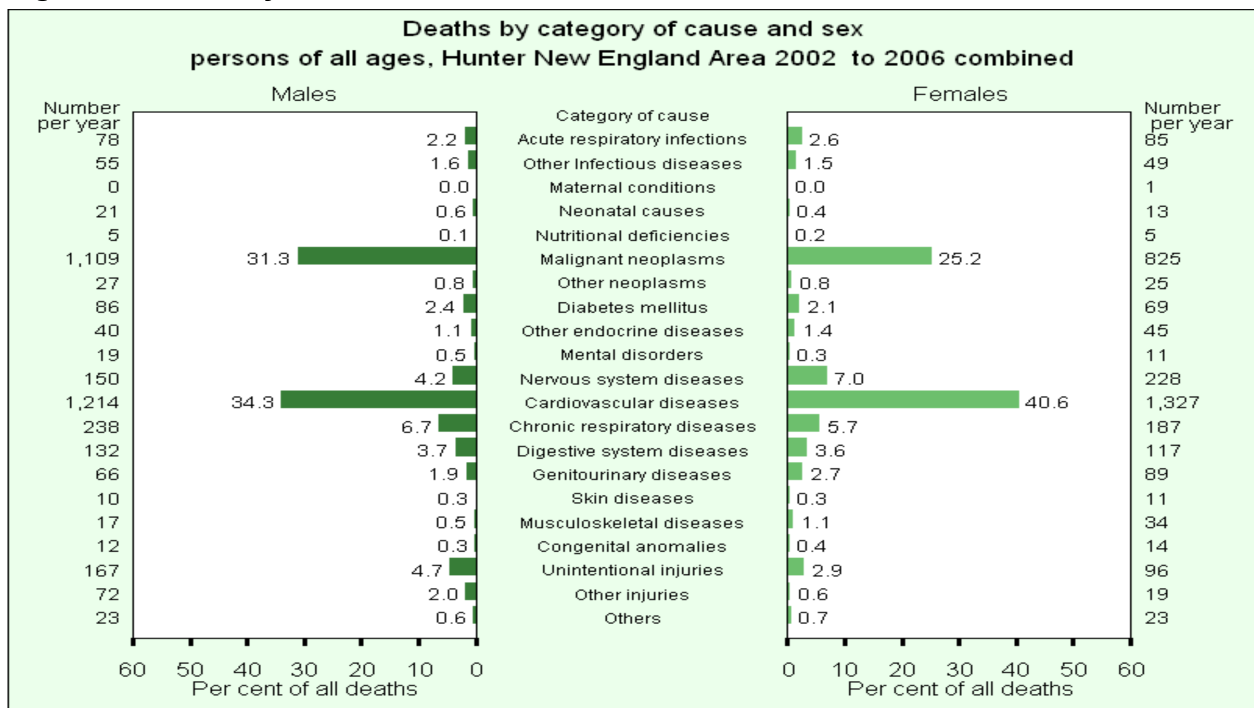
Figure 6 shows stroke death rates by cluster are not statistically different to NSW as a whole except for female residents of the McIntyre cluster, who are at significantly less risk. However, mortality rates tend to be slightly higher than the state average for male residents of the Mehi, Lower Hunter and Greater Newcastle clusters, and for female residents of the Greater Newcastle and Tablelands clusters.

Figure 6: Stroke Deaths by Sex and Cluster for HNE and NSW 2001-2004



Source: NSW Health Chief Health Officer's Report 2006

Figure 7: Deaths by cause and sex for HNE 2002-2006 combined

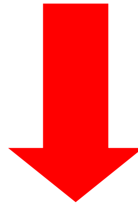


Source: Health of the Hunter Report 2008.

Figure 7 shows that cardiovascular disease, which includes stroke, is the leading cause of death in both sexes in the Hunter New England Area.

Key Considerations

- Stroke is one of the leading causes of death and disability in the Hunter New England area.
- The population of the Hunter New England is ageing. As Stroke is more prevalent with age it follows that there will be an increase demand for specialist stroke services in the future.
- Risk factor prevention strategies for people with stroke are similar to those for people with other chronic diseases such as cardio vascular and renal disease.
- HNE Health Stroke Services will be developed as a clinical stream to guide the implementation of the Stroke Services Plan across the Hunter New England area.



Strategic Directions

1.3 Promotion of prevention strategies to reduce the incidence and impact of Stroke.

3.2 Facilitating active and effective consultation and communication between healthcare providers, patients, carers and families

3.3 Effective, safe and integrated service delivery.

4. CURRENT MODELS OF CARE

4.1 Coordinated Stroke Care

Management of people with stroke, which includes access to geographically located stroke units where care is delivered by a neurologist and/or medical officer, nursing staff and multidisciplinary team with a special interest in stroke, is important to reduce morbidity and mortality. Early access to rehabilitation care is critical to achieving optimal outcomes.

The following descriptions of current models of service delivery focus on HNE Health metropolitan and rural referral hospitals.

4.2 Hyperacute/Acute Stroke Care

4.2.1 Acute stroke units

Acute stroke units (ASU) focus on treatment, diagnosis and management of early complications and secondary prevention within the first 72 hrs post stroke. Currently there are ASUs at John Hunter (4 beds), and Calvary Mater Newcastle (4 beds) hospitals. Access to neurologists is limited to Greater Newcastle cluster, Maitland Hospital and Tamworth Rural Referral Hospital. Stroke management is predominantly managed in the rural referral hospitals by geriatricians, rehabilitation physicians, general physicians or general practitioners. There is limited access to stroke units across the remainder of HNE Health with the majority of people with stroke being admitted to medical units and receiving generalist medical care. Even in areas where stroke units exist admission to the unit is not always possible. For example at the John Hunter Hospital (JHH) only 38% of people presenting with stroke are admitted to the ASU. Barriers to access include too few beds and bed management issues (such as delay in transfer from the acute unit to rehabilitation or community), and admission of non-stroke patients to ASU beds.

4.2.2 Stroke thrombolysis

The administration of intravenous thrombolysis is now part of the routine management of eligible patients with acute stroke at John Hunter Hospital. The treatment is also available, although limited, at Tamworth Hospital.

Stroke thrombolysis needs to be administered within 3 hrs of stroke onset. This narrow time window increases the need for protocols that support the ambulance service in early recognition of stroke and appropriate transfers in line with best practice management. A trial has been undertaken in the Greater Newcastle Cluster to ensure more timely access to thrombolytic therapy. As improvements in thrombolytic treatment occur, early diagnosis and treatment services across HNE Health will need to be enhanced over the life of this plan.

Thrombolysis services rely on 24hr/7 day per week access to specialist teams and other clinical services that are difficult to maintain within limited resources and are consequently not currently feasible at many other sites across HNE Health.

4.2.3 Transient Ischaemic Attack (TIA) management

People with TIAs are far more likely to have another cerebrovascular event, with one in three people experiencing TIAs eventually having a stroke. Rapid access to investigations and prevention therapies is therefore essential. TIA outpatient clinics are currently available at the John Hunter Hospital. Access to such clinics and follow-up of TIA's in rural sites is limited.

4.3 Post acute/Rehabilitation for Stroke

The evidence for improving stroke outcomes supports access to specialist stroke rehabilitation units with early access to rehabilitation a key factor.

Access to rehabilitation beds is variable across HNE Health. Designated rehabilitation units are located in several facilities including:

- A four bed Stroke Unit at Belmont Hospital
- A generalist rehabilitation unit at Armidale Hospital
- Generalist onsite rehabilitation services at Maitland, Rankin Park, Tamworth and Manning Hospitals
- Generalist off site rehabilitation services at Manning/Wingham Hospitals
- A day-hospital rehabilitation service at Rankin Park Hospital

Generally, the acute phase of stroke care is provided in the public sector. Following the acute phase of stroke care some people elect to transfer to a private facility for the rehabilitation phase of their care.

Rehabilitation episodes are categorised and analysed by the Australasian Rehabilitation Outcomes Centre (AROC) with impairment codes and case-mix adjusted by AN-SNAP classes. Outcomes in rehabilitation cannot be measured by any single measure. It is the combination of elements that tell the story – change in Functional Independence Measure (FIM), length of stay (LOS), discharge destination, age and co-morbidities all add context. AROC provides analysis of each individual facility's data, and also compares that data to analysis of the overall sector (public or private), and to the national data.

The Functional Independence Measure (FIM) is used as a tool to assess the functional independence of patients at the start and end of a treatment episode. A higher FIM motor score indicates a higher level of functional independence in motor skills. Length of Stay (LOS) is also important to consider as it gives some indication of the effectiveness and efficiency of the rehabilitation episode in conjunction with FIM outcomes.

FIM change and FIM efficiency.

According to AROC, FIM change is the change in functional status per episode of care as measured by the difference between begin and end FIM scores. This change should be as high as possible.

FIM efficiency is defined as the change in functional status per day. AROC calculate this as the episode FIM change divided by the episode length of stay (LOS). It can either be measured as FIM efficiency per day or per week (to measure per week multiply result by seven). A good outcome would be a high FIM change with a shorter stay. A higher value shows a better outcome.

Table 7: Changes in Functional Independence Measure (FIM) Scores for HNE Health facilities 2005-2007

	2005/06				2006/07			
Facility	**Ave Age**	**Ave LOS**	**Ave FIM change**	**FIM Efficiency**	**Ave Age**	**Ave LOS**	**Ave FIM change**	**FIM Efficiency**
Rankin Park	73.30	32.76	20.92	0.64	70.56	25.24	20.82	0.82
Tamworth	72.06	29.58	17.00	0.57	71.40	28.78	19.00	0.66
Maitland	69.33	35.71	20.27	0.57	70.00	38.55	23.24	0.60
Wingham	75.70	23.54	18.21	0.77	72.44	34.50	24.86	0.72
Belmont	74.30	19.04	20.26	1.18	78.15	15.73	18.64	1.06
Armidale	Data unavailable				75.5	15.8	11.00	0.67
Manning	76.5	20.25	17	1.04	Data Unavailable			

Source: SNAP database 2007

FIM outcomes for HNE Health facilities are presented in Table 7. Between 2005/06 and 2006/07, the average FIM change improved at Tamworth, Maitland and Wingham Hospitals but worsened at Rankin Park and Belmont Hospitals. FIM efficiency improved at Rankin Park, Tamworth and Maitland Hospitals but worsened at Wingham and Belmont Hospitals.

4.4 Community Stroke Care

There are limited specialist stroke services available within the community setting across the Hunter New England area. The Greater Newcastle Community Stroke Team address the needs of the Greater Newcastle Cluster and providing group programs for chronic aphasia, upper limb management, art groups, young stroke survivors and primary and secondary prevention strategies. The Rural Stroke Team covers the Upper and Lower Hunter clusters and supports the implementation of evidence based stroke practice in rural hospitals, providing support and education for rural clinicians and undertaking a group program for chronic stroke survivors and their carers.

There are no other community based stroke specific teams in HNE Health. Outpatient allied health services to support community based stroke care are also available on a variable basis across HNE Health.

4.5 Rural Stroke Services – District Hospitals and Multipurpose Centres

Access to specialist stroke clinicians is limited in rural settings. Generalist clinicians provide stroke management as required and are open to support from specialist services when required. Generalist clinicians, particularly in smaller facilities, are often required to provide longer term rehabilitation management for stroke survivors despite limited specialist skills in this area. Often stroke services are provided by the same allied health professionals for the entire stroke journey - inpatient acute and post acute care and community/outpatient services. Medical management is often provided by VMO General Practitioners. Access to stroke specific medical specialists is limited.

4.6 Review of HNE Tertiary and Rural Referral Hospitals

Table 8 presents a review of HNE Tertiary and Rural Referral Hospitals, identifying the key components of evidence based Stroke care as recommended by the National Stroke Unit Program[7] (see Appendix 4). The categories allocated to each HNE Health hospital are based on current service provision at each of the sites against the recommended components of care.

HNE Health has one Category A (John Hunter), one Category B (Calvary Mater Newcastle) and five Category C (Armidale, Belmont, Maitland, Manning and Tamworth) hospital stroke services. The availability of the recommended components of stroke care varies from site to site. Acute Stroke Units are only at John Hunter and Calvary Mater Newcastle, Tissue plasminogen activator (t-PA) therapy is only available 24/7 at John Hunter with a limited service at Tamworth. Dedicated stroke allied health staff is inadequately provided across the area, with all disciplines only represented at Belmont Hospital. Stroke coordination processes are established at most sites with the exception of Manning Hospital. Post acute processes and data collection is achieved at most sites

.

Table 8: HNE Health Stroke Service - Major Rural Referral and Metropolitan Hospital Review

Recommended components of care	Armidale	Belmont	John Hunter	Maitland	Manning	Calvary Mater	Rankin Park Centre (RPC)	Tamworth
Hospital category	C	C	A	C	C	B	n/a	C
Pre-hospital stroke management pathway	No	Trial	Trial	Trial	No	Trial	N/A	No
CT scanning	Offsite – in town – 24hr access	Yes	24/7	Yes	Yes	24/7	N/A	Yes
Acute stroke unit	No	No	Yes	No	No	Yes	No	No
Post acute stroke unit	General Rehab patients on medical ward	Yes	Yes RPC	Yes	general rehab at Wingham	Yes RPC	Yes	General rehab
Comprehensive stroke unit	No	Yes	No	No	No	No	No	No
Neurologist	No	Access JHH	24/7	Access JHH	Limited access	Yes	N/A	Yes
Medical Officer - Stroke?	Gen Physician	Yes	Yes	Yes	Yes	Yes	Yes	Gen Physician
t-PA therapy	No	No	Yes	No	No	No	No	Limited – Protocols required
Stroke Coordinator	Yes	Yes	Yes	Yes	No	Yes	No	Yes
High nurse to patient ratio	No	No	available	No	No	No	No	No
Monitored beds	No	Yes	Yes	No	No	Yes	N/A	No
Pathway for Complications	Partial	Yes	Yes	No	No	Yes	No	partial
MDT dedicated stroke hours	**No**	**Yes**	**No**	**No**	**No**	**No**	**Yes**	**No**
-Registered nurses	No	Yes	Yes	Yes	No	Yes	Yes	1 CNS limited hrs
-Speech pathology	No	Yes	No	No	No	No	No	No
-Physiotherapy	No	Yes	No	No	No	No	No	No
-Occupational therapist	No	Yes	No	No	No	No	No	No
-Social work	No	Yes	No	No	No	No	No	No
-Dietitian	No	Yes	No	No	No	No	No	No
Coordinated process	Partially	Yes	Yes	Yes	No	Yes	Yes	Yes
Weekly meetings	On rehab	Yes	Yes	Yes	No	Yes	Yes	Yes (not stroke specific)
Family meetings	Rehab only	Yes	Yes	Yes	W/N	W/N	Yes	No
Admission criteria	No – to rehab?	Yes	Yes	Yes	No	Yes	Yes	No – all wd 3, yes for rehab
Discharge communication Process	Written	EDRS	EDRS	EDRS	No	No	EDRS	No
Process audit	ROAST, NSRI audit, TASC	NSRI, NSUA, TASC, SNAP	NSRI, NSUA, TASC	TASC, SNAP	TASC, SNAP, NSUA	NSRI, NSUA, TASC	SNAP	ROAST, NSRI audit, TASC

4.7 Data collection and management

Collection of stroke specific data is essential for stroke clinicians to be able to review current practice outcomes and adjust processes to improve clinical outcomes. The level of stoke specific data collection is variable and dependent on the resources available. Currently HNE Health has the following data systems which are relevant for stroke.

- Towards A Safer Culture (TASC) is a data set that measures process outcomes for stroke management in the Emergency and acute services at the John Hunter Hospital and Calvary Mater Newcastle Hospital and to a lesser extent at Rural Referral Hospitals and Cessnock and Kurri Kurri District Hospitals.

- Data relevant to people with stroke admitted for inpatient care in HNE Health facilities is managed within the HNE Heart and Stroke Register (HSR) and includes demographic, clinical outcome and mortality data. The HSR aims to:
  - monitor health outcomes such as admission, readmission, procedures and mortality rates for persons living in the Hunter New England area with heart disease or stroke
  - inform clinical practice and planning and drive quality improvement initiatives
  - provide a sampling frame for health services research.

- Post acute/rehabilitation data is submitted on all rehabilitation patients including stroke to the Australasian Rehabilitation Outcomes Center (AROC). This data focuses on patient functional outcomes and process outcomes. Functional outcomes are defined by the Functional Independence Measure (FIM) - see section 4.3.

4.8 Linkages to other HNE Health clinical services

4.8.1 Neurosurgery Services

There are comprehensive Neurosurgical services at John Hunter Hospital. Although access to neurosurgical consultations for people with stroke is required infrequently there is a need to ensure that processes are in place to enable people to access these services when required.

4.8.2 Vascular Surgery Services

The main arteries that carry blood to the brain are the carotid arteries. They can become narrowed in the neck due to a build up of cholesterol and other fatty material known as ‘plaque’. If the carotid arteries become partially blocked, resulting in reduced blood flow to the brain, it may be necessary to have an operation called a carotid endarterectomy. People with symptomatic or asymptomatic carotid artery stenosis need a multidisciplinary assessment as part of comprehensive care planning.

Carotid endarterectomy involves removing the plaque build up and opening up the artery which then improves blood flow to the brain and lowers the risk of stroke from blood clots or pieces of plaque breaking off and blocking blood flow in the brain. Though the results are usually very good, the carotid endarterectomy operation itself carries a small risk of causing a stroke.

Carotid endarterectomy surgery is available at John Hunter Hospital and in the private sector in the Greater Newcastle area. Carotid stenting is available in the private sector in Greater Newcastle and will be introduced shortly at the John Hunter Hospital. There are currently no plans for these procedures to be available outside of JHH even though some limited vascular surgery capacity is likely to be available at Tamworth in the very near future.

4.9 Linkages to other Organisations

HNE Health Stroke services have developed strong links and opportunities for collaboration with other organisations related to stroke service, education and research. These include:

- National Stroke Foundation
- Stroke Services NSW
- Institute of Rural Clinical Services and Teaching
- Hunter Medical Research Institute
- Centre for Brain and Mental Health Research
- University of Newcastle
- Other informal links exist with a number of stroke interest groups (see appendix 6).

5. CURRENT SERVICE PROVISION

This section presents data outlining the current activity of stroke services across the Hunter New England area.

5.1 Service Provision by Episode

For stroke care, an 'episode' is a period of time during which the patient is in a particular ward or unit. Patients may have several episodes of care in a single admission. They may move from an 'acute' episode, that is, requiring acute care in an inpatient ICU or ward, to a 'rehab.' episode where they are requiring non-acute rehabilitation care and therapy.

Table 9 describes service provision in relation to an average number of episodes for Stroke, TIA and Stroke Rehabilitation for the six years 2000/2001 to 2005/2006 by site and cluster. Predictably, for the clusters with a rural referral or tertiary hospital and a higher population base, the average number of episodes is greater, with Greater Newcastle Cluster and John Hunter, Rankin Park and Calvary Mater Newcastle Hospitals reporting the highest average number of episodes.

Table 9: Average number of episodes of Stroke, TIA and Stroke Rehabilitation by Hospital and Cluster 2000-2006

Hospital	Type of service	Stroke episodes of acute care	First episode TIA	Rehabilitation episodes
Tablelands Cluster including Armidale Hospital				
Armidale	RRH	58	17	32
Glen Innes	DHS	21	10	<5
Guyra	MPS	<5	5	
Total		**83**	**32**	**33**
McIntyre Cluster				
Warialda	MPS	7	13	
Inverell	DHS	26	20	12
Bingara	MPS	5	<5	
Total		**38**	**36**	**12**
Mehi Cluster				
Moree	DHS	17	12	<5
Narrabri	DHS	17	12	<5
Boggabri	C/MPS	<5	<5	
Total		**35**	**27**	**<5**
Peel Cluster including Tamworth Hospital				
Barraba	C/MPS	6	9	
Gunnedah	DHS	17	13	<5
Manilla	C/MPS	11	9	
Tamworth	RRH	151	32	67
Walcha	C/MPS	5	<5	<5
Total		**190**	**66**	**71**
Upper Hunter Cluster				
Werris Creek	C/MPS	<5		
Quirindi	DHS		8	
Scone	DHS	19	7	
Murrurundi	C/MPS	5	<5	
Merriwa	C/MPS	5	<5	
Muswellbrook	DHS	16	10	
Total		**46**	**31**	

Lower Hunter Cluster including Maitland Hospital				
Dungog	C/MPS	7	<5	
Singleton	DHS	24	18	<5
Maitland	RRH	166	51	40
Kurri Kurri	DHS	35	11	5
Cessnock	DHS	81	43	16
Total		**313**	**126**	**62**
Greater Newcastle Cluster including the John Hunter, Calvary Mater Newcastle and Rankin Park Hospitals (RPH)				
John Hunter/ Rankin Park	TRH	430	64	131 (RPH)
Calvary Mater	TRH	200	58	
Belmont	DHS	122	25	8
Nelson's Bay	CMPS	7	5	
Total		**759**	**149**	**139**
Lower Mid North Coast including Manning Hospital				
Wingham	C/MPS		<5	42
Gloucester	DHS	11	7	
Bulahdelah	C/MPS	<5	<5	
Manning	RRH	141	48	<5
Total		**156**	**62**	**46**

Source: Health Information Exchange (HIE) NSW Health Accessed May 2007
Note: RRH=Rural Referral Hospital; DHS=District Health Service; MPS=Multipurpose Service; C/MPS=Community/Multipurpose Service; TRH=Tertiary Referral Hospital

Table 10 describes the flow of stroke patients from their local health facility to the Rural Referral and metropolitan facilities for acute and post acute/rehabilitation care. This patient flow is geographically and historically based.

Table 10: Average Annual Acute and Post Acute Stroke Separations by Facility and Place of Residence 2000-2006

Hospital	Place of residence	Acute stroke Admissions	Stroke Rehabilitation Admissions
Armidale Rural Referral Hospital	Armidale	37 (61%)	17 (50%)
	Tenterfield	8 (13%)	
	Glen Innes	6 (10%)	
	Other	10 (16%)	17 (50%)
	Total	**61**	**34**
Tamworth Rural Referral Hospital	Tamworth	100 (69%)	37 (56%)
	Gunnedah	8 (6%)	
	Other HNE	36 (25%)	29 (44%)
	Total	**144**	**66**
Manning Base Hospital	Greater Taree	85 (58%)	
	Great Lakes	49 (34%)	
	Other	12 (8%)	
	Total	**146**	
Wingham Community Hospital	Taree		24 (60%)
	Great Lakes		16 40(%)
	Total		**40**
The Maitland Hospital	Maitland	105 (60%)	23 (55%)
	Cessnock	20 (12%)	6 (15%)
	Dungog	10 (6%)	6 (15%)
	Other	38 (22%)	6 (15%)
	Total	**173**	**41**
John Hunter Hospital	Newcastle	188 (32%)	
	Lake Macquarie	234 (40%)	
	Port Stephens	35 (6%)	
	Other HNE	132 (22%)	
	Total	**588**	
Calvary Mater Newcastle	Newcastle	122 (58%)	
	Lake Macquarie	8 (4%)	
	Port Stephens	48 (23%)	
	Other HNE	30 (15%)	
	Total	**208**	
Rankin Park Centre	Newcastle		49 (36%)
	Lake Macquarie		51 (38%)
	Port Stephens		24 (18%)
	Other HNE		12 (8%)
	Total		**136**

Source: Health Information Exchange (HIE) NSW Health Accessed May 2007
Note: Hospitals based at Glenn Innes, Guyra, Inverell, Gunnedah, Manilla, Moree, Warialda, Gloucester, Singleton, Denman and Tomaree were reviewed as part of this report but they did not have significant numbers of admission outside their local areas to warrant specific mention.

5.2 Service Provision in Rehabilitation Settings

A review of data has been undertaken to identify current levels of rehabilitation service provision. Table 11 shows that between 2000/01 and 2005/06, an average of 11.3% of people with stroke transferred from a first episode of acute care to a subsequent episode of rehabilitation care. This can be interpreted as an under-utilisation of rehabilitation care to optimise patient outcomes following acute treatment or, it may reflect a data recording issue

where there has been a lack of recorded type change between care episodes i.e. when people move from acute to rehabilitation care within the one facility a change in care type is not recorded.

Table 11: Proportion of First Episodes for Acute Stroke that progress to a Rehabilitation Episode 2001-2006

	2000/1	2001/2	20023	2003/4	2004/5	2005/6
Acute Episode	1865	1756	1702	1733	1856	1845
Rehabilitation Episode	241	192	180	186	196	221
Percentage	13%	11%	11%	11%	11%	12%

Source: Health Information Exchange (HIE) NSW Health Accessed May 2007
Note: Data records for some facilities such as Belmont Hospital are known to be inaccurate due to data recording systems.

Table 12: Proportion of all Acute Episodes to all Rehabilitation Episodes for Stroke 2001-2006

	2000/1	2001/2	2002/3	2003/4	2004/5	2005/6
Acute Episodes	1915	1821	1749	1811	1918	1970
Rehab Episodes	407	386	354	334	341	406
	21%	21%	20%	18%	18%	21%

Source: Health Information Exchange (HIE) NSW Health Accessed May 2007

Table 12 presents the proportions of rehabilitation episodes compared to total acute stroke episodes, between 2000/01 and 2005/06. Each year only around 20% of episodes have both acute and rehabilitation components. This may include multiple episodes of care for the same inpatient stay. The data again may indicate under-utilisation of rehabilitation to optimise clinical outcomes or a data recording issue due to type change in case type between episodes of care not recorded appropriately.

HNE Health clinicians advise that with current stroke care practices, 20-25% of patients with stroke will die in hospital, 20% may go home with home care support, 20% will require nursing home type care and 40% optimise their clinical outcomes through rehabilitation.

5.3 Private Stroke Service Provision

Generally acute stroke management occurs in public hospitals; however some patients do receive acute care in private facilities. A proportion of patients opt for rehabilitation programs in private facilities.

Table 13 presents the proportion of separations for private care or rehabilitation services as a proportion of total stroke separations by cluster. The proportions reported range between 1.7% (Mehi) and 20.4% (Lower Mid North Coast).

Table 13: Percentage of Private Hospital Activity 2005/6

Clusters	Public Separations	Private Separations	% Private Activity
Tablelands	125	14	10.0%
McIntyre	67	2	2.9%
Peel	219	12	5.2%
Mehi	58	1	1.7%
Upper Hunter	69	7	9.2%
Lower Hunter	352	26	6.9%
Greater Newcastle	813	73	8.2%
LMNC	191	49	20.4%
Total	**1703**	**190**	

Source: Flowinfo Version 8.1

5.4 Community Based Service Provision

For the Greater Newcastle, Lower Hunter and Upper Hunter clusters, Table 14 shows data on community based activities where the health issue identified in CHIME records was Stroke or CVA.

Data reported for the Lower Mid North Coast Aged Care Services has been extracted from the Primary Health and Extended Care Information System for Manning Great Lakes Aged Care Services and includes activities relating to cerebrovascular disease, cerebrovascular attacks (CVA), stroke and Transient Ischaemic Attacks (TIAs). No data was available for other community based services in the Lower Mid North Coast.

Community data for the Mehi, Mcintyre, Tablelands and Peel clusters was unavailable as stroke health issues have not been specifically identified in clinical records for people receiving community based care.

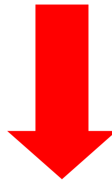
Table 14: Community Based Activity- Individual Occasions of Service

Team	03/04	04/05	05/06	Average annual services
Centre Based				
Rankin Park Day Hospital	4	46	160	70
Toronto Poly Clinic Rehab Unit	51	61	34	49
Community Based				
Hunter Community Stroke Team	112	44	19	58
LMNC Aged Care Services	209	203	235	215
Other Hunter Community Services	175	53	72	100
Hunter Rural Stroke Team		17	11	14
Totals per year	**551**	**424**	**531**	**506**

Source: Community Health Information Management Exchange (CHIME) records 2007 and the Primary Health and Extended Care Information System.

Key Considerations

- The provision of thrombolytic therapies requires access to skilled clinicians and coordination of services between prehospital, emergency and acute services
- The delivery of stroke care is inconsistent and variable across HNE Health.
- Effective, evidence based coordinated stroke care is required across HNE Health.
- The number of stroke patients accessing rehabilitation services is low.
- Specialist community clinical stroke services are limited especially in the rural setting



Strategic Directions

3.1 Developing and fostering effective models of care and a culture of excellence

4.1 Effective prioritisation, allocation and management of resources and assets for maximum health benefit.

3.3 Effective, safe and integrated service delivery

5.1 Attracting, developing and retaining valued, capable staff.

6. KEY ISSUES AND DIRECTIONS

As part of the consultation process, planning sessions were held in Newcastle and Tamworth involving clinicians from across HNE Health services, to identify key issues and directions for stroke services.

Following these and other extensive consultations, key issues have been identified that will guide future directions for the HNE Stroke Services Stream. These issues are described below.

6.1 Service Issues

- Lack of stroke units
- Inadequate provision of thrombolytic therapy Area wide
- Uncoordinated patient flows, inadequate admission policies and protocols and practice guidelines
- Lack of uniform data collection and management systems
- Inconsistent links with GPs and community based services
- Lack of specialist support to smaller sites for Telehealth and tele-radiology 24/7
- Reduced access to delivery of relevant evidence based services in the community (e.g. post hospital discharge)
- Limited access to CT Scanning in larger centres, with some larger centres such as Armidale Rural Referral Hospital not having onsite CT scanning facilities
- Lack of specialist resources at some facilities. Current stroke management may not meet patient requirements. Patient and family preferences may also need consideration when determining ongoing care requirements
- Lack of coordination/formalised linkages with specialty services such as palliative care
- Large geographical distances to access services place significant burden on the patient, their carers and the community
- Limited access to specialist stroke services contributes to increased lengths of stay in acute services and delays rehabilitation
- Delay in transfer to and discharge from rehabilitation services are caused by:
    - Increased lengths of stay for severe stroke cases
    - Lack of adequate numbers of allied health professionals including therapy assistants
    - The majority of stroke patients are elderly with complex issues which impacts on discharge planning
    - Insufficient acute and/or rehabilitation bed numbers
    - Insufficient outpatient and community based stroke services
- Lack of access to appropriate counselling, support and education for patients, carers and relatives
- Delays in patient presentation for medical treatment due to a lack of community awareness of the signs and symptoms of stroke as well as distance travelled to receive treatment
- No formalised support system for General Practitioners (GP) in providing stroke care
- Access to stroke recovery support groups following discharge is variable across the area
- Community Services Issues
    - Community stroke services are not currently linked to stroke pathways
    - There is variable knowledge and understanding of available community services among hospital and outpatient rehabilitation staff.
    - Pressure for early discharge may lead to inadequate assessment of reintegration needs
    - Existing community services are complex to negotiate for both patients and referring services, with multiple contact points and assessment and referral processes.

  - o Limited resources are allocated to primary and secondary stroke prevention and education.

6.2 Workforce Issues

- Difficulties in recruitment and retention of all health clinical disciplines
- Lack of staff dedicated to providing stroke services can often lead to staff being called on to deal with more urgent acute cases e.g. in intensive care, which can limit the time available for providing services to the stroke population
- Access to professional development programs is challenging. The distance required to travel to access education, together with the associated costs and time away from client caseload present a major barriers
- Access to education and support for smaller centres which deal with smaller numbers of stroke patients is particularly limited
- Difficulties in providing area wide professional support for:
  - o Key clinical staff (Stroke dedicated staff)
  - o Generalist health providers (non-stroke dedicated staff)
- Due to the limited availability of allied health clinicians and the demands placed on them for services, people with stroke are not identified as a priority, especially those awaiting transfer to rehabilitation centres. Allied health is currently managed in discipline streams that have competing interests. This may limit the ability of stroke services to promote stroke as a specialty service, maintain a specialist workforce and thereby retain staff
- Inconsistency in providing additional specialist medical support in the (hyper) acute stroke phase to smaller centres

6.3 Aboriginal Health Issues

The HNE Aboriginal Health Plan 2007-2011 undertook extensive consultations as part of the Plan's development. Cardiovascular disease was identified as a major health issue for Aboriginal people throughout those consultations. Other key issues identified in the consultations related to stroke health service provision include:

- Inadequate communication between HNE Health and Aboriginal Community Controlled Health Services, between patients and hospital staff
- Difficulties for community based primary health care providers facilitating a holistic care plan and having to deal with the many services provided by HNE Health
- Access to transport, cost and frequency of service
- Need for cultural awareness training to improve access to services – including to GPs, multidisciplinary teams, visiting clinics and mobile services, and to Hospital Liaison Officers
- Difficulties for clients and families when transferred to larger centres (e.g. accommodation, meals and emotional support for families)
- Screening and timely follow up
- Outreach services to isolated communities.

It should also be noted that HNE Health is undertaking an Integrated Chronic Care for Aboriginal People project which will have implications for stroke care into the future.

6.4 Future Directions

The majority of people who have a stroke will be admitted to hospital for assessment and treatment. The available evidence suggests that optimal stroke care is best provided in a specialist stroke unit. One systematic review of 24 trials provided evidence that care provided in a stroke unit significantly reduced death and disability after stroke compared with conventional care in general wards. Care provided on stroke units is also more likely to include regular delivery of key processes of care such as those outlined in the National

Stroke Foundation guidelines. Stroke units that have been shown to deliver highly effective stroke care share a number of characteristics including:

- A coordinated interdisciplinary team
- Staff who have a special interest in the management of stroke, and have access to ongoing
- Clear communication strategies, with regular team meetings to discuss management
    - (including discharge planning) and other meetings as needed (e.g., family Conferences)
- Active encouragement of people with stroke and their carers and/or family members to be involved in the rehabilitation process.

There are additional stroke therapies currently being trialled in tertiary referral centres. These therapies are undergoing evaluation in randomised and non-randomised studies. The therapies can be broadly classified as neurointervention or endovascular treatment. These treatments are now standard for the management of subarachnoid haemorrhage, but are being increasingly used for acute ischaemic stroke in situations where intravenous thrombolysis is relatively or totally ineffective. A process to develop and build the capacity to deliver these therapies in highly selected stroke patients within the John Hunter Hospital is underway.

The development of capability in this area will be contingent on funding for equipment and other technical infrastructure as well as the required support staff. It is envisaged that there will be a trained interventional neurologist capable of providing this service by 2011.

The evidence for effective stroke care also suggests that several weeks of rehabilitation (in a comprehensive stroke unit or in a stroke rehabilitation unit) are required. The available evidence relating to models of community based stroke care is limited.

In some areas, the numbers of people who require care following a stroke are not high enough to justify a dedicated stroke unit or to maintain staff expertise. Other models of care need to be adopted, based on the available evidence. The potential risks and benefits of transferring to the nearest stroke unit need to be balanced against the risks and benefits of less specialised care closer to home. The needs and wishes of those with stroke and their families must also be considered. Many aspects of good stroke care can be achieved including coordinating services delivered by an interdisciplinary team, commencing rehabilitation from day one, and undertaking regular team meetings. Stroke experts can support these smaller sites through a hub and spoke model.

Results from the 2006 NSW Rural Stroke Project Phase 1[8] identified: a lack of organised stroke services; limited specialist management including nursing, medical and allied health; variable access to diagnostic facilities with access worsening as distances from major centres increase; lack of dedicated resources and infrastructure and, inconsistent use of evidence-based medicine through systems of care as the major issues throughout rural NSW pertaining to stroke services. The report does highlight however, that key elements of organised stroke care including: access to education; a coordinated approach through the use of evidence-based systems of care; early identification and management of stroke commencing on day 1; family and carer involvement in rehabilitation; stroke prevention and, integration of emergency, acute, post acute and community services, can be achieved in all levels of hospitals from rural referral hospitals through to district hospitals, community hospitals and multi-purpose services.

Various models for organising stroke services are currently being trialed throughout NSW and aim to demonstrate the most effective means of implementing stroke services in rural

and remote areas. The need to further explore the use of telehealth facilities and tele-stroke management, together with the role of nurse practitioners, is also highlighted in the report.

6.5 Proposed Model for Stroke Care

Appropriate models of care are required to meet the varying needs of people with stroke across the phases of care and across diverse contexts of service delivery. To address the challenges of providing consistent quality care across such a vast Area and considering the diversity of services, it is proposed that a ‘hub and spoke’ model be implemented for stroke services across HNE Health.

Hub and Spoke Model

In the ‘hub and spoke’ model specialist stroke services are located at large facilities (known as ‘hubs’) and provide specialist stroke support including patient management and education, to outlying smaller facilities (known as ‘spokes’)[8]. The large and smaller facilities form a service network allowing patient flows to occur between facilities.

It is recognised that there is a diversity of demographics, geography, culture and health service availability across HNE Health. In proposing this model of stroke care it is not intended to be prescriptive as to how services will develop in response to local needs. It is intended to provide the basis for service developments based on emerging evidence. Further development of the model is likely during the life of this Plan and beyond. The challenge for HNE Health Stroke Services will be to work in a flexible manner to enhance stroke care while recognising and responding to the challenges of ensuring that access to care is equitable across the Area.

Thrombolytic Services

The Area will have a small number (1-3) of thrombolytic centres for hyperacute stroke care. The locations of these centres are yet to be decided but will include John Hunter and Tamworth Hospitals. Another possibility, depending upon available resources, is Maitland Hospital. These hospitals will need to have the ability to offer new evidence based hyperacute therapies, such as neurointervention, that may develop over the next few years if deemed relevant.

Acute Stroke Services

All hospitals that offer thrombolytic services will offer acute stroke services. Acute stroke services can be divided into two categories.

1. *Acute/comprehensive services*: These services will admit potentially unstable patients who are not necessarily hyperacute, but who need acute assessment and management in terms of identifying stroke aetiology, and for monitoring and maintenance. Appropriate acute management, secondary prevention and rehabilitation will be provided. Care will be multidisciplinary/transdisciplinary, led by senior clinicians, with stroke dedicated staff and generally provided in a specialised unit. Such units will either combine with rehabilitation to form a comprehensive unit, or have close affiliation/liaison with formal stroke rehabilitation programs.

2. *Acute stroke assessment packages:* Patients will be referred to these acute (hub) services from distant geographic locations (spokes). High risk TIA patients or stroke patients can be referred in for the acute care as outlined above, but with a focus not only on acute assessment and management, but also preparation of a post acute plan to be delivered locally when the patient returns to their local service. It is anticipated that this acute assessment/post acute planning process may take 3-5 days.

Inpatient Stoke Rehabilitation/Post Acute Stroke Services

The following models of care are proposed for stroke rehabilitation services.

1. *Specialised Inpatient Stroke Rehabilitation Units*: These will be located in a number of centres (hubs) across HNE Health, including Rankin Park Centre, Belmont Hospital, Maitland Hospital, Tamworth Hospital, and Armidale Hospital. Specialist stroke rehabilitation units offer a complete evidence based inpatient rehabilitation program for stroke patients as well as a rehabilitation assessment service for spoke hospitals.

2. *Generalist Inpatient Rehabilitation Services:* Several spoke hospitals across HNE Health offer generalist inpatient rehabilitation services. These services will have inpatient resources including access to allied health staff. Rehabilitation clinicians will have access to support (via formalised networks and communication processes) with the specialist stroke rehabilitation teams located in the hub rehabilitation units.

3. *Community Outreach service*s: provided to smaller sites for post acute inpatient care and/or for clients at home.

Community Based Services

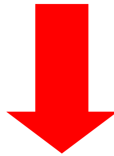
Some specialised community based teams already exist in the Greater Newcastle, Lower Hunter and Upper Hunter clusters. The model for community based service delivery requires further development for most of HNE Health. Consideration needs to be given to the degree/level of specialisation of teams (depending on location and role of service delivery) and may range from dedicated specialised (stroke only) to specialised, multidimensional (may have special skills in stroke as well as cardiac, diabetes, and aged care) through to generalist. All community based teams will also have formalised, structured supportive networks to facilitate clinical consultation and patient transfer across phases of care.

Other Considerations

As is implied in a number of areas above, for the proposed ‘hub and spoke’ model to work, formal clinical networks, structured support mechanisms for clinicians, formalised professional development programs and clear pathways for coordination of care will need to be developed. Telehealth specialised stroke assessment and management across the Hunter New England area will also be a key factor to consider.

Key Considerations

- Significant variation in stroke service provision across the continuum of services and geographic area of HNE Health
- There is a need to support generalist clinicians caring for stroke in the rural setting
- Development of stroke pathways that ensure appropriate and early admission or transfer to stroke units is required to improve outcomes
- Need for Area wide coordinated research and education programs to provide support and curriculum development, and to include ambulance services, general practitioners and Aboriginal health services



Strategic Directions

1.2 The best possible outcomes for people with stroke

2.1 Engaging, informing and collaborating with our partners in improving the health of our communities

3.1 Developing and fostering effective models of care and a culture of excellence

5.3 Leading innovative evidence based healthcare and research.

7. ABORIGINAL IMPACT STATEMENT

In the development of the HNE Stroke Services Plan, the health needs and interests of Aboriginal people have been considered, and where relevant, incorporated and appropriately addressed.

See Appendix 7 for the completed Aboriginal Health Impact Statement.

8. ETHNIC AFFAIRS PRIORITIES STATEMENT

In the development of the HNE Stroke Services Plan, the health needs and interests of people from culturally and linguistically diverse groups have been considered. HNE Health is committed to delivering services that best meet their needs and there are specific strategies included in the Strategic Action Plan demonstrating that commitment.

9. SERVICE TRIANGLES

The following Service Triangles are diagrammatic representations of the major service components of HNE Health Stroke services.

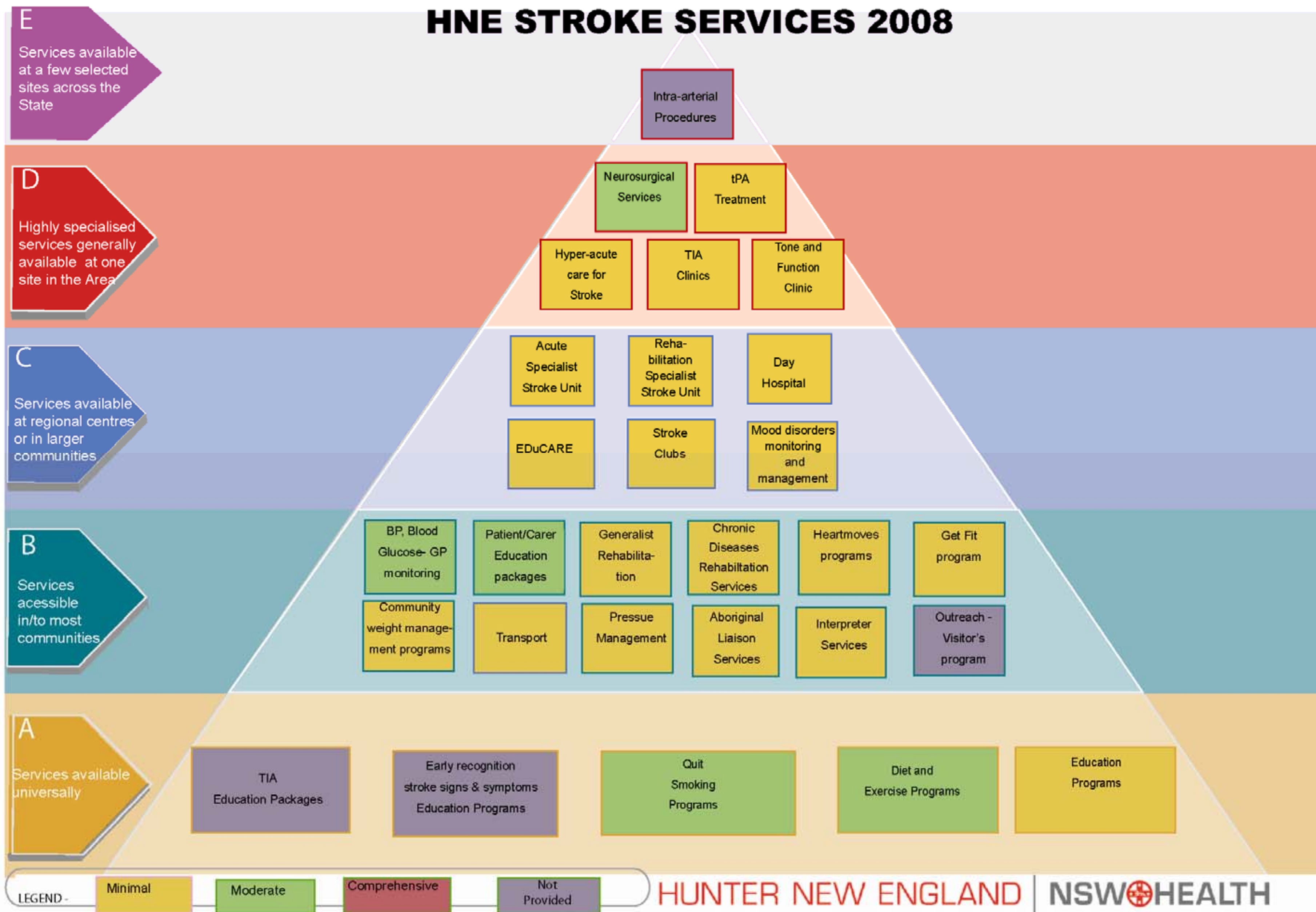
Two Service Triangles are developed as part of all clinical services plans. The first representing services currently provided and the second services that will be provided in five years time i.e. when the plan is implemented.

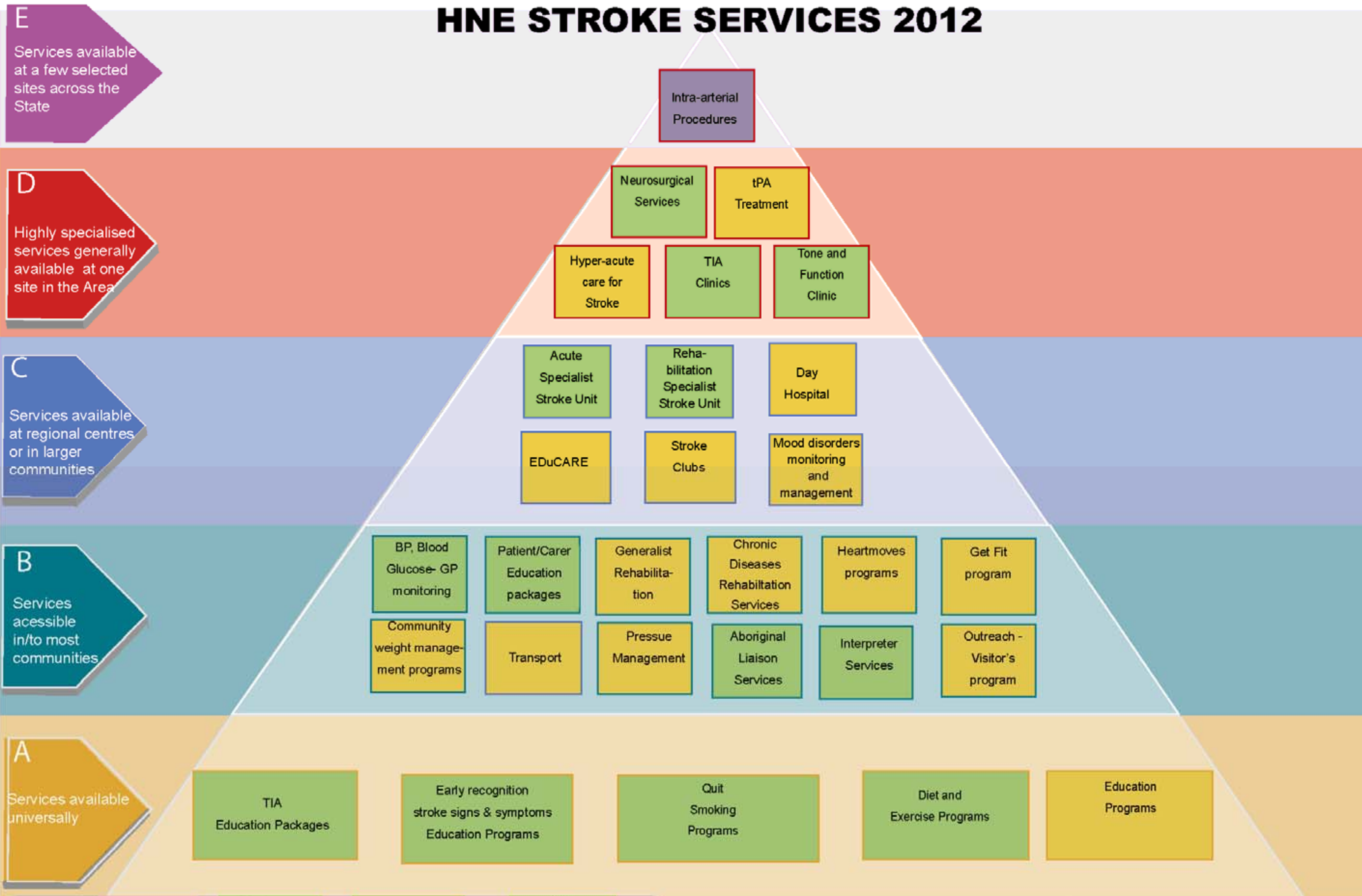
Both triangles begin by identifying the complete or 'ideal' range of Stroke services that could be provided i.e. if you were able to establish Stroke services from scratch and resources/the availability of suitably qualified staff were not issues, what services would you include to ensure you had state of the art, best practice, comprehensive Stroke services available.

Once all services that could potentially be delivered as part of a comprehensive Stroke service are identified, they are classified according to several criteria including complexity of care/treatment provided, the demand for the service, the specialist staff required and the cost of the service.

A service coverage matrix is then applied to the model to represent how well services are currently provided in the Hunter New England i.e. no stroke service provided or services provided at a 'minimal', 'moderate' or 'comprehensive' level. This process produces the first (or current) Service Triangle.

A second Service Triangle to represent service development/provision in five years' time (as a result of Stroke Services Plan implementation) is then completed, again starting with the ideal range of services and applying the service coverage matrix.


HNE STROKE SERVICES 2008
E
Services available at a few selected sites across the State
Intra-arterial Procedures
D
Highly specialised services generally available at one site in the Area
Neurosurgical Services
tPA Treatment
Hyper-acute care for Stroke
TIA Clinics
Tone and Function Clinic
C
Services available at regional centres or in larger communities
Acute Specialist Stroke Unit
Reha-bilitation Specialist Stroke Unit
Day Hospital
EDuCARE
Stroke Clubs
Mood disorders monitoring and management
B
Services acessible in/to most communities
BP, Blood Glucose- GP monitoring
Patient/Carer Education packages
Generalist Rehabilita-tion
Chronic Diseases Rehabiltation Services
Heartmoves programs
Get Fit program
Community weight manage-ment programs
Transport
Pressue Management
Aboriginal Liaison Services
Interpreter Services
Outreach - Visitor's program
A
Services available universally
TIA Education Packages
Early recognition stroke signs & symptoms Education Programs
Quit Smoking Programs
Diet and Exercise Programs
Education Programs
LEGEND -
Minimal
Moderate
Comprehensive
Not Provided
HUNTER NEW ENGLAND
NSW HEALTH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HUNTER NEW ENGLAND
NSW HEALTH

10. REFERENCES

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11. STRATEGIC OBJECTIVES AND STRATEGIC ACTION PLAN

The following pages present HNE Stroke Services Strategic Objectives and Strategic Action Plan for the next five years. The Plan details the strategic initiatives that will be implemented to achieve the strategic objectives.

Stroke Services Strategic Objectives

The Stroke Services' vision, purpose, key focus areas and strategic objectives are presented as a one-page summary.

The Key Focus Areas are those areas that are considered critical to achieving the Stroke Services' Vision. For each Key Focus Area, Strategic Objectives are identified to ensure the Stroke Services remain focused on the most important issues and needs.

Stroke Services Strategic Action Plan

The Strategic Action Plan identifies performance measure/s for each of the strategic objectives and presents the strategic initiatives (the actions, activities or projects) that will be implemented over the next five years to improve performance, reach targets and achieve key objectives.

Each objective is risk-rated using the HNE Health Risk Matrix (included in Appendix 8), which is based on the NSW Health Severity Assessment Code (SAC). In rating the strategic objectives the consequences and likelihood of not achieving an objective and the impact on service provision and outcomes for the community were considered. The risk ratings identified for each strategic objective signify the priority placed on achieving each objective and indicate where Stroke Services want to be in relation to the objective in five years time. A current risk rating (based on what we are doing now) and a target risk rating (what the risk will be once we have implemented the strategic initiatives) is assessed for each objective.

VISION: Healthier communities: Excellence in Stroke care
PURPOSE: Working with our communities to deliver an equitable, quality Stroke service

OUR VALUES

- TEAMWORK
- HONESTY
- RESPECT
- ETHICS
- EXCELLENCE
- CARING
- COURAGE
- COMMITMENT

Focus Area: **1.0 Communities, Patients, Carers and Families**

To achieve our vision, the key outcomes we must deliver are:

- 1.1 Communities that are informed and pro-active in relation to health
- 1.2 The best possible outcomes for people with stroke
- 1.3 Promotion of prevention strategies to reduce the incidence and impact of stroke

Focus Area:
2.0 External Partners

To deliver the required community outcomes, we need to excel in:

- 2.1 Engaging, informing and collaborating with our partners in improving the health of our communities

Focus Area:
3.0 Internal Networking and Processes

To deliver the required community outcomes, we need to excel in:

- 3.1 Developing and fostering effective models of care and a culture of excellence
- 3.2 Facilitating active and effective consultation and communication between healthcare providers, patients, carers and families
- 3.3 Effective, safe and integrated service delivery

Focus Area:
4.0 Resource Accountability

To deliver the required community outcomes, we need to excel in:

- 4.1 Effective prioritisation, allocation and management of resources and assets for maximum health benefit

Focus Area: **5.0 Our People, Culture and Capability**
(Employees and Contracted)

To achieve the desired community outcomes and sustain our ability to change and improve, we need to excel in:

- 5.1 Attracting, developing and retaining valued, capable staff
- 5.2 Fostering a culture of professional accountability
- 5.3 Leading innovative evidence based healthcare and research

Abbreviations:

ACARS	Aged Care and Rehabilitation Services
ACCHS	Aboriginal Community Controlled Health Services
AMS	Aboriginal Medical Service
AROC	Australasian Rehabilitation Outcomes Centre
CALD	Culturally and Linguistically Diverse
CALD	Culturally and Linguistically Diverse
Clin Coord	Clinical Stream Coordinator(s)
Clin Ldr	Clinical Stream Leader
CP & PD s/c	Clinical Pathways & Professional Development sub -committee
CSRP	Clinical Services Re-design Project
EEN	Endorsed enrolled nurse
FTE	Full-time equivalent
GP	General Practitioner
HDU	High Dependency Unit
HNE	Hunter New England
IIMS	Incident Information Management System
JHH	John Hunter Hospital
LHAC	Local Health Advisory Committee
LN & C s/c	Links, Networks & Communication sub-committee
NGO	Non-Government Organisation
R & DM s/c	Research and Data Management sub-committee
RCA	Root Cause Analysis
TASC	Towards a Safer Culture
VMO	Visiting Medical Officer
Workforce s/c	Workforce sub-committee
↓	Decrease by
↑	Increase by
>	Greater than
<	Less than

FOCUS AREA:	**COMMUNITIES, PATIENTS, CARERS AND FAMILIES**		
OBJECTIVE:	To achieve our vision, a key outcome we must deliver is: **1.1 Communities that are informed and pro-active in relation to health**	**Risk Rating**	
		Current	**Target**
		K	**L**
DESTINATION STATEMENT:	*People in our communities have confidence in working with us and in managing their own health*		

Measure:	Target	Reporting Timeframe	Initiatives/Actions:	Responsibility	Time frame	♦ Funding 1,2,3	★ Priority L,M,H
Number community groups that Stroke Services work with	20	Annual	• Promote the delivery of evidence-based clinical care through working with the Community Forums on Health, LHAC and other existing networks	Clin Coords	From Dec 08	1	
Percent patients discharged to community with a community care plan	50%	Six monthly	• Advocate for a community representative/involvement in Stroke Services planning to become a member of the Stroke Services Leadership Group	Clin Coords	Mar 08	1	
			• Work in partnership with the NGO Stroke support groups for the rural areas	Clin Coords	Aug 08	1	
			• Investigate appropriate models of care for patient self management to meet Stroke needs.	Chair, CP & PD	Dec 08	1	
			• Support activities to inform communities at risk in conjunction with the CSRP Older Person's Journey Project	Chair, LN & C s/c	Aug 08	1	

♦ **Funding Key:** 1. Initiative/Action to be implemented without funding 2. Initiative/Action to be implemented with funding from existing resources 3. Enhancement funding required
★ **Priority Key:** Strategic Initiatives/Actions that require "Enhancement Funding" (3) are to be prioritised as either **L**ow, **M**edium or **H**igh, based on their contribution to achieving the objective

FOCUS AREA:	COMMUNITIES, PATIENTS, CARERS AND FAMILIES		
OBJECTIVE:	To achieve our vision, a key outcome we must deliver is: **1.2 The best possible outcomes for people with stroke**	**Risk Rating**	
		Current	**Target**
		D	K
DESTINATION STATEMENT:	*Appropriate models of care and services are available to meet the individual needs of people with Stroke*		

Measure:	Target	Reporting Timeframe	Initiatives/Actions:	Responsibility	Time frame	♦ Funding 1,2,3	★ Priority L,M,H
Percent patients waiting no longer than 7 days from onset of stroke to commence a rehabilitation process	70%	Annual	• Develop processes for culturally sensitive care planning including the involvement of people with stroke, carers, families and appropriate supports such as Aboriginal Liaison Officers, multi-cultural health workers and interpreters where necessary to ensure all aspects of care planning are addressed	Chair, LN & C s/c	Aug 09	1	
Percent stroke survivors returning to previous accommodation levels from hospital	↑ 5% on baseline	Annual	• Develop and implement a process to standardise care planning i.e. Involving Patient, carers and families in all aspects of care planning through appropriate family meetings e.g. one week post admission and one week prior to discharge	Chair, CP & PD s/c	Aug 09	1	
			• Develop and implement flexible models of service delivery aligned with patient priorities and the available evidence	Chair, CP & PD s/c	Dec 08	2	
			• Implement processes to ensure all Stroke patients admitted have an estimated date of discharge established early in their admission	Chair, CP & PD s/c	Dec 08	1	
			• Improved pre-hospital pathway to increase access of 'witnessed Stroke' to coordinated Stroke Units through community education etc.	Chair, R & DM s/c	From Aug 08	1	
			• Improve assessment and referral of people with stroke requiring specialist services including palliative care, mental health, neurosurgery and neuropsychiatry services.	Chair, CP & PD s/c	Dec 09	2	

♦ **Funding Key:** 1. Initiative/Action to be implemented without funding 2. Initiative/Action to be implemented with funding from existing resources 3. Enhancement funding required
★ **Priority Key:** Strategic Initiatives/Actions that require "Enhancement Funding" (3) are to be prioritised as either **L**ow, **M**edium or **H**igh, based on their contribution to achieving the objective

FOCUS AREA:	COMMUNITIES, PATIENTS, CARERS AND FAMILIES		
OBJECTIVE:	To achieve our vision, a key outcome we must deliver is: **1.3 Promotion of prevention strategies to reduce the incidence and impact of Stroke**	**Risk Rating**	
		Current	**Target**
		D	**K**
DESTINATION STATEMENT:	*People in our communities are healthier and have fewer Stroke risks*		

Measure:	Target	Reporting Timeframe	Initiatives/Actions:	Responsibility	Time frame	♦ Funding 1,2,3	★ Priority L,M,H
Percent stroke survivors admitted with subsequent stroke	↓ 5% on baseline	Three monthly	• Promote the Primary prevention of Stroke through: - Working with Population Health, other clinical streams and clinical networks to develop appropriate strategies to focus on risk factor management and the prevention of Stroke	Chair, CP&PD s/c	From Dec 09	1	
Percent people presenting to EDs with TIA who have their stroke risk rated	50%	Six monthly	- Working with Aboriginal Health and Chronic Care Services on the implementation and on going development of the NSW Aboriginal Chronic Conditions Area Health Service Standards.	Chair, LN & C s/c	Aug 08	1	
			- Providing information related to stroke prevention to Migrant Health and CALD communities in culturally appropriate means and languages.	Chair, LN & C s/c	Oct 08	1	
			• Promote the Secondary prevention of Stroke by: - Developing strategies that encourage the implementation of evidence based, immediate secondary prevention to reduce mortality within the first 30 days of initial Stroke and reduce the incidence of Stroke over time	Chair, R & DM s/c	From Dec 09	1	
			- Maintaining the support given to the Aboriginal Vascular Health Program and its future development.	Clin Leader/ Clin Co-ords	Aug 08	1	

♦ **Funding Key:** 1. Initiative/Action to be implemented without funding 2. Initiative/Action to be implemented with funding from existing resources 3. Enhancement funding required
★ **Priority Key:** Strategic Initiatives/Actions that require “Enhancement Funding” (3) are to be prioritised as either **L**ow, **M**edium or **H**igh, based on their contribution to achieving the objective

FOCUS AREA:	EXTERNAL PARTNERS		
OBJECTIVE:	To deliver the required community outcomes, we need to excel in: **2.1 Engaging, informing and collaborating with our partners in improving the health of our communities**	**Risk Rating** **Current** **K**	 **Target** **L**
DESTINATION STATEMENT:	*Our partnerships deliver benefits to Hunter New England people through shared goals, clearly agreed responsibilities and effective outcomes*		

Measure:	Target	Reporting Timeframe	Initiatives/Actions:	Responsibility	Time frame	♦ Funding 1,2,3	★ Priority L,M,H
Number of formal collaborations with external partners	6	Annual	• Work with NSW Ambulance Service to coordinate the management of stroke patients within HNE Health to ensure equitable access to appropriate transfer and Stroke services treatment e.g. tPA appropriate care	Chair, R & DM s/c	Aug 08 ongoing	2	
			• Provide education and support to relevant external partners e.g. Division of General Practitioners, HACC services	Chair, CP & PD s/c	Oct 08 ongoing	1	
			• Continue to strengthen the partnerships with the universities to ensure stroke maintains a high profile in learning and research, and is supported by academic environments	Chair, LN & C s/c	Aug 09	1	
			• Continue to develop partnerships with national bodies to strengthen local services through liaison with national leadership and to ensure local input in national priorities.	Clinical Leader	Aug 09	2	
			• Work with the Aboriginal Community Controlled Health Services (ACCHS) and the HNE Health Aboriginal Service, through the Aboriginal Partnership, to develop and implement appropriate educational information	Chair, LN & C s/c	Dec 09	2	
			• Provide information to multicultural community services on evidence based Stroke care	Chair, LN & C s/c	Dec 09	1	
			• Collaborate with general practitioners to develop strategies for case management of Stroke patients, including provision of support by a specialist multidisciplinary Stroke service	Clin Leader	Aug 10	2	
			• In coordination with Stroke Services NSW, advocate to influence changes in Emergency Departments, the triage of Stroke patients from category triage 3 to category triage 2	Clin Leader	Dec 09	1	

♦ **Funding Key:** 1. Initiative/Action to be implemented without funding 2. Initiative/Action to be implemented with funding from existing resources 3. Enhancement funding required
★ **Priority Key:** Strategic Initiatives/Actions that require "Enhancement Funding" (3) are to be prioritised as either **L**ow, **M**edium or **H**igh, based on their contribution to achieving the objective

FOCUS AREA:	INTERNAL NETWORKING AND PROCESSES		
OBJECTIVE:	To deliver the required community outcomes, we need to excel in: **3.1 Developing and fostering effective models of care and a culture of excellence**	**Risk Rating**	
		Current	**Target**
		D	L
DESTINATION STATEMENT:	*We focus on the needs of those who receive our care and regularly evaluate how well we meet those needs*		

Measure:	Target	Reporting Timeframe	Initiatives/Actions:	Responsibility	Time frame	♦ Funding 1,2,3	★ Priority L,M,H
Number standardised guidelines/protocols developed and implemented	10	Annual	• Develop criteria for the Hub and Spoke model of care for Stroke and seek approval for implementation.	Chair, CP & PD s/c	Oct 08	1	
			• Review, identify and advocate for resources to support effective diagnostic and treatment practices e.g. cardiac monitors, CT scanning onsite, equipment.	Chair, CP & PD s/c		3	H
Percent hospitals without dedicated stroke units but with agreed pathways of care.	10%	Annual	• Identify staffing requirements to support appropriate and timely access to Stroke services e.g. neurologists, allied health, and nursing patient ratios.	Clin Ldr		3	H

♦ **Funding Key:** 1. Initiative/Action to be implemented without funding 2. Initiative/Action to be implemented with funding from existing resources 3. Enhancement funding required
★ **Priority Key:** Strategic Initiatives/Actions that require “Enhancement Funding” (3) are to be prioritised as either **L**ow, **M**edium or **H**igh, based on their contribution to achieving the objective

FOCUS AREA:	**INTERNAL NETWORKING AND PROCESSES**						
OBJECTIVE:	To deliver the required community outcomes, we need to excel in: **3.1 Developing and fostering effective models of care and a culture of excellence (continued)**						
3.1 Continued…			• Develop area wide coordination of multidisciplinary professional development and education in relation to stroke management	Chair, CP & PD s/c	Aug 08	2	
			• Review current Stroke service practices to determine gaps and needs and align with the National Stroke Guidelines	Chair, CP & PD s/c	Dec 08	1	
			• Examine the feasibility of co-locating rehabilitation units with acute Stroke services or other key strategic locations	Clin Leader /Coords	Dec 08	1	
			• Support initiatives for effective Stroke related discharge planning in conjunction with existing systems such as through Aged Care and Rehabilitation Services (ACARS)	Clin Leader/ Clin Coords	Dec 08	2	
			• Consider implementing outpatient day hospital services and home rehabilitation services in partnership with ACARS	Clin Leader	Dec 09	2	
			• Develop and implement strategies for all clinicians caring for Stroke patients to be supported by a specialist multidisciplinary Stroke service (outreach model)	Clin Leader/ Clin Coords		3	H
			• Develop and implement protocols and pathways to guide care delivery, across the continuum e.g. 7 days/week access to swallow screening	Chair, CP & PD s/c	Dec 09	1	
			• Establish a process for follow-up of patients one month post discharge from hospital and link with other services as required	Chair, CP & PD s/c	Aug 08	1	
			• Support initiatives to develop flexible models of service delivery to improve access for high risk groups e.g. Aboriginal Chronic Diseases Demonstration projects, Older Person's Journey Project, men's projects.	Chair, LN &C s/c	Dec 09	1	

♦ **Funding Key:** 1. Initiative/Action to be implemented without funding 2. Initiative/Action to be implemented with funding from existing resources 3. Enhancement funding required
★ **Priority Key:** Strategic Initiatives/Actions that require "Enhancement Funding" (3) are to be prioritised as either **L**ow, **M**edium or **H**igh, based on their contribution to achieving the objective

FOCUS AREA:	**INTERNAL NETWORKING AND PROCESSES**							
OBJECTIVE:	To deliver the required community outcomes, we need to excel in: **3.2 Facilitating active and effective consultation and communication between healthcare providers, patients, carers and families**						**Risk Rating** **Current**: **K**	**Target**: **R**
DESTINATION STATEMENT:	*We have structures and communication systems that effectively involve patients, carers and families in decision-making and ensure that knowledge is shared*							
Measure:	**Target**	**Reporting Timeframe**	**Initiatives/Actions:**	**Responsibility**	**Time frame**	**♦ Funding 1,2,3**	**★ Priority L,M,H**	
Percent people with stroke where family interview is undertaken and recorded during hospital admission	50%	Annual	• Evaluate the utilisation of rural Stroke Care Coordinators to facilitate the patient flow across the continuum of care and identify carer's needs,	Clin Coords	Aug 08	1		
			• Develop and implement criteria for all stroke patients to be case managed by appropriately trained staff to facilitate appropriate care including maintenance, palliative and rehabilitation care - consideration to be given to proximity to home care, identifying and addressing risk factor management and carer's needs.	Chair, CP & PD s/c	Aug 09	2		
			• Develop processes to ensure decision making is assisted by effective data collection and management systems (e.g.TASC, ROAST, NSF, SNAP/AROC, Heart and Stroke Register)	Chair, R & DM s/c	Dec 10	2		
			• Ensure the referral of Aboriginal people to Aboriginal Liaison Officers and Aboriginal Health Education Officers to encourage effective communication and participation.	Chair, L&NC s/c	Dec 09	1		
			• Ensure the use of multi-cultural liaison officers and interpreters for people from CALD backgrounds to encourage effective communication and participation.	Chair, L&NC s/c	Dec 09	1		
			• Improve processes and communication for patient transition from acute to rehabilitation care and onto GPs and community based services in consultation with ACARS and Chronic Care service providers through:	Clin Coords	Dec 10	2		
			- Developing and implementing protocols and pathways to guide care delivery through the coordination of specialist multidisciplinary Stroke teams.	Chair, CP & PD s/c	Aug 09	1		

♦ **Funding Key:** 1. Initiative/Action to be implemented without funding 2. Initiative/Action to be implemented with funding from existing resources 3. Enhancement funding required
★ **Priority Key:** Strategic Initiatives/Actions that require "Enhancement Funding" (3) are to be prioritised as either **L**ow, **M**edium or **H**igh, based on their contribution to achieving the objective

FOCUS AREA:	**INTERNAL NETWORKING AND PROCESSES**					
OBJECTIVE:	To deliver the required community outcomes, we need to excel in: **3.3 Effective, safe and integrated service delivery**				**Risk Rating** Current: **D**	Target: **L**
DESTINATION STATEMENT:	*Patients experience a seamless and safe journey*					

Measure:	Target	Reporting Timeframe	Initiatives/Actions:	Responsibility	Time frame	♦ Funding 1,2,3	★ Priority L,M,H
Number hospitals that comply with TASC reporting	5	Six monthly	• Develop and implement the Hub and Spoke Model or equivalent by: - Review and work towards the formalisation of acute stroke units at Tamworth, Maitland, Manning and possibly Armidale Rural Referral Hospitals with a view to providing hyper-acute services within a 5 year timeframe, as appropriate. - Provide ongoing resourcing of the John Hunter Hospital based Stroke Thrombolytic Service and other emerging evidence based treatment including neurointervention.	Chair, CP & PD s/c	Aug 08 ongoing	3 3 3	H H H
Percent patients having CT scans within 24 hours	50%	Six monthly	- For other Stroke services provide clinical expertise through the coordination of access to specialist multidisciplinary Stroke teams with flexible models of service delivery across the continuum. All clinicians to be supported by the use of tele-health including Care Coordinators.			2	
Percent patients having swallow screen attended within 24hours	20%	Six monthly	- Undertake a review and make recommendations for the improved treatment of people following TIA including the possible establishment of TIA clinics. - Work in partnership with HDU services within HNE Health for the provision of acute Stroke care, where appropriate within HDU services			1	
Percent of patients with complication rates in stroke units (acute/rehab) UTI<10% Falls <5%, Asp Pneumonia <20%	20%	Three monthly	• Review and establish clear roles and functions of key Stroke teams with goals to minimise duplication of services • Develop and implement an Area wide patient tracking system for people who are discharged to aged care facilities for potential rehabilitation	Clin Leader/ Clin Co-ord. Chair, R & DM s/c	Aug 08 ongoing Dec 09	1 2	
Percent patients in acute settings with referral to allied health within 24 hours	50%	Six monthly	• Work collaboratively with other clinical redesign projects which impact on Stroke • Develop community and health service education relating to early recognition and acute stroke care • Consult with Cardiac Services and the Performance Improvement Unit to support the Heart and Stroke Register.	Clin Leader/ Clin Co-ords Chair, L & NC s/c Clin Leader	Dec 08 Aug 08 ongoing Aug 08	1 1 1	

♦ **Funding Key:** 1. Initiative/Action to be implemented without funding 2. Initiative/Action to be implemented with funding from existing resources 3. Enhancement funding required
★ **Priority Key:** Strategic Initiatives/Actions that require "Enhancement Funding" (3) are to be prioritised as either **L**ow, **M**edium or **H**igh, based on their contribution to achieving the objective

FOCUS AREA:	**RESOURCE ACCOUNTABILITY**						
OBJECTIVE:	To deliver the required community outcomes, we need to excel in: **4.1 Effective prioritisation, allocation and management of resources and assets for maximum health benefit**					**Risk Rating** Current: **D**	Target: **L**
DESTINATION STATEMENT:	*We have systems to ensure that our funding, facilities and other resources support effective stroke service delivery*						
Measure:	**Target**	**Reporting Timeframe**	**Initiatives/Actions:**	**Responsibility**	**Time frame**	**♦ Funding 1,2,3**	**★ Priority L,M,H**
Number high priority initiatives undertaken within timeframes.	50%	Annual	• Advocate for the development of comprehensive (acute and rehabilitation co-location) stroke units within existing and new facilities	Clin Leader	ongoing	1	
			• Advocate for funding for the development of community based services e.g. early supported discharge	Clin Leader	ongoing	1	
			• Advocate for funding for evidence based care for hyper-acute (e.g. thrombolytic services and neuro-intervention), acute, sub/post-acute and preventive services	Clin Leader	ongoing	1	
			• Attract and maintain revenue and enhancement opportunities for research and professional development	Clin Leader	ongoing	1	

♦ **Funding Key:** 1. Initiative/Action to be implemented without funding 2. Initiative/Action to be implemented with funding from existing resources 3. Enhancement funding required
★ **Priority Key:** Strategic Initiatives/Actions that require "Enhancement Funding" (3) are to be prioritised as either **L**ow, **M**edium or **H**igh, based on their contribution to achieving the objective

FOCUS AREA:	OUR PEOPLE, CULTURE AND CAPABILITY						
OBJECTIVE:	To achieve the desired outcomes and sustain our ability to change and improve, we need to excel in: **5.1 Attracting, developing and retaining valued, capable staff**					Risk Rating Current: D	Target: L
DESTINATION STATEMENT:	*We have the right people with the right skills, in the right place, at the right time*						
Measure:	**Target**	**Reporting Timeframe**	**Initiatives/Actions:**	**Responsibility**	**Time frame**	**♦ Funding 1,2,3**	**★ Priority L,M,H**
Percent staff attending HNE Health Stroke Service Education who are not employed in key teams	45%	Annual	• Map workforce to changing clinical service needs and evolving stroke care models including professional development and research	Chair, Workforce s/c	Aug 08	2	
Number programs offered by HNE Health Stroke Service	20%	Annual	• Identify processes that attract and retain high quality staff	Chair, Workforce s/c	Aug 08	1	
			• Provide support and incentives for staff undertaking rotations in urban, remote/rural areas	Clin Coords		3	M
			• Advocate for specialty position/s in Stroke services, including allied health, nursing e.g. clinical nurse specialists (succession and vocational opportunities)	Clin Leader	June 10	1	
			• Identify clinical staff with specialist skills and stroke interest in order to facilitate their vocational development.	Clin Leader		3	M
			• Work with managers in recognising quality staff who can drive process change	Clin Leader	June 09	1	

♦ **Funding Key:** 1. Initiative/Action to be implemented without funding 2. Initiative/Action to be implemented with funding from existing resources 3. Enhancement funding required
★ **Priority Key:** Strategic Initiatives/Actions that require “Enhancement Funding” (3) are to be prioritised as either **L**ow, **M**edium or **H**igh, based on their contribution to achieving the objective

FOCUS AREA:	**OUR PEOPLE, CULTURE AND CAPABILITY**		
OBJECTIVE:	To achieve the desired outcomes and sustain our ability to change and improve, we need to excel in: **5.2 Fostering a culture of professional accountability**	**Risk Rating**	
		Current	**Target**
		L	V
DESTINATION STATEMENT:	*Our staff develop their skills, accept responsibility for their decisions and actions, and are supported to optimise their performance*		

Measure:	Target	Reporting Timeframe	Initiatives/Actions:	Responsibility	Time frame	♦ Funding 1,2,3	★ Priority L,M,H
Percent stroke specific staff attending/undertaking professional development	90%	Annual	• Define discipline specific core stroke skill set and related capabilities based on patient profile and context of service delivery	Chair, Workforce s/c	Dec 10	2	
			• Facilitate professional development including participation in HNE Health, state, national and international stroke forums	Clin Coords		3	M
			• Encourage and support access to scholarships targeting areas relating to the delivery of stroke services.	Clin Ldr	Dec 10		
			• Promote and instill organisational behaviours and values	Clin Coords	Aug 08	1	
			• Support the specialised skill development required by GPs who provide VMO services in partnership with the Divisions of GP.	Clin Leader		3	H

♦ **Funding Key:** 1. Initiative/Action to be implemented without funding 2. Initiative/Action to be implemented with funding from existing resources 3. Enhancement funding required
★ **Priority Key:** Strategic Initiatives/Actions that require “Enhancement Funding” (3) are to be prioritised as either **L**ow, **M**edium or **H**igh, based on their contribution to achieving the objective

FOCUS AREA:	**OUR PEOPLE, CULTURE AND CAPABILITY**		
OBJECTIVE:	To achieve the desired outcomes and sustain our ability to change and improve, we need to excel in: **5.3 Leading innovative evidence based healthcare and research**	**Risk Rating**	
		Current	**Target**
		L	**R**
DESTINATION STATEMENT:	*We are recognised nationally and internationally for innovation in stroke services*		

Measure:	Target	Reporting Timeframe	Initiatives/Actions:	Responsibility	Time frame	♦ Funding 1,2,3	⋆ Priority L,M,H
Number competitive grants submitted and successful	8	Annual	• Facilitate further research to drive evidence-based change in clinical practice, encouraging rural participation	Chair, R & DM s/c		3	L
Number quality projects and/or practice development/improvement projects completed by key teams	10	Annual	• Encourage and support staff to apply for grants and funding opportunities for further research in stroke	Chair, R & DM s/c	Aug 08 ongoing	1	
			• Encourage and support staff research linked to Stroke care	Chair, R & DM s/c	Aug 08 ongoing	1	
Number journal publications	20	Annual	• Utilise multimedia options to facilitate research and practice change collaborations	Chair, LN & C s/c		3	L
			• Develop research skills and capabilities across disciplines and geography	Chair, R & DM s/c		3	L

♦ **Funding Key:** 1. Initiative/Action to be implemented without funding 2. Initiative/Action to be implemented with funding from existing resources 3. Enhancement funding required
⋆ **Priority Key:** Strategic Initiatives/Actions that require “Enhancement Funding” (3) are to be prioritised as either **L**ow, **M**edium or **H**igh, based on their contribution to achieving the objective

12. APPENDICIES

Appendix 1: Stroke Planning Group

A Stroke Services Planning Group was established to develop:

1. The Stroke Services Plan and,
2. The Stroke Clinical Services Stream across the area.

The Planning Group was representative of the range of multidisciplinary health professionals providing primary to tertiary care across rural and urban settings. The membership was:

Michael Di Rienzo, Executive Sponsor, Director Clinical Operations Acute
Megan Alston, Team Leader/Speech Pathologist, Community Stroke Team, Greater Newcastle Cluster
Candice Dahlstrom, Aboriginal Health representative
Gerry DeGabriele, Geriatrician, Armidale
Chris Levi, Director Acute Services, Hunter Stroke Service
Bill (William) McClean, Geriatrician,Manning Hospital
Kim Nguyen, Senior Manager Community Health and Director of Allied Health, Greater Newcastle Cluster
Carmel Peek, Service Manager Division of Medicine John Hunter Hospital
Michael Pollack, Director Hunter Stroke Service
Ian Wilson, Nurse Unit Manager, Medical Ward, Tamworth Hospital
Malcolm Evans, Acute Stroke Research Manager, Hunter Stroke Service
Margo Carberry, Community Health Service Manager, Narrabri
Stephen Reilly, Nurse Unit Manager, Medical ward, Manning Hospital
Felicity Robinson Speech Pathologist in Charge, Tamworth

The Planning Group also included the Plan Development Team:
Jane Kerr, Manager, Area Cardiovascular Disease Co-ordinator
Louise–Anne Jordan, Manager, Clinical Service Delivery, Hunter Stroke Service (to July 2007)
Robyn Golledge Team Leader/Clinical Nurse Consultant, Hunter Rural Stroke Team (from August 2007)
Matt Dougherty, Planning Officer, Strategic and Clinical Services Planning Unit
Debbie Jaggers, Area Co-ordinator Clinical Networks (to September 2007)
Phil Way, Acting Area Co-ordinator Clinical Networks (October 2007)
Nadine White, Manager Strategic Workforce Innovation and Redesign, Workforce Planning Development Unit.

Appendix 2: Key Stakeholders

The Key Stakeholder Group included key groups with an interest in the outcome of the development of the Stroke Clinical Stream and Services Plan. The group included all relevant internal and external stakeholders who interact with the Stroke Services provided by HNE Health. They may be part of HNE Health, Non-Government Organisations, other Government Departments or Support Groups etc. Consultation around the HNE Stroke Services Stream comprised HNE Health Services only.

Stakeholder	Contact Person
Internal HNE Health:	
General:	
Area Executive Team	Terry Clout
	Nigel Lyons
	Michael Di Rienzo
	Kim Browne
	Kim Hill
	Chris Kewley
	David Dixon
	Tracey McCosker
	Scott McLachlan
Clinical Governance Unit	Kim Hill
Clusters:	
Mehi	David Quirk
Peel	Paul Gorrick
McIntyre	Lynne Shands
Tablelands	Wendy Mulligan
Lower Mid North Coast	Ken Hampson
Upper Hunter	Wendy Hordern
Lower Hunter	Yvonne Patricks
Greater Newcastle	Derene Anderson
Hospitals:	
John Hunter Children's Hospital	Patricia Marks
John Hunter	Michael Di Rienzo
Tamworth/Armidale	Fergus Fitzsimons
Manning	Tim Mooney
Calvary Mater Hospital	Colin Osborn
Maitland	Sandra Platt
Neurology Services	Dr James Hughes
Urology Services	Dr Stephen Clarke, Dr John Fisher, Dr Somali
Renal Stream	Al Gillies, Jill Telfer, Kelly Adams
Vascular Surgery	Dr Arvind Deshpande
Intensive Care	Dr Ken Havill, Heather Chislet, Dr Phillip Hungerford, Dr Martin Rowley, Karen Chronister, Serena Shaw
Diabetes	Dr Julia Lowe, Steve May, Clare Felton
Cardiology	Professor Peter Fletcher, Dr Alexander Levendel, Dawn McIvor
Chronic Disease	Carolyn Bailey, Jane Kerr
Children, Young People and Families Network	Prof Trish Davidson, Cathy Hastings
Aged Care and Rehabilitation Services Network	Dr John Ward, Viki Brummell
Diagnostic Imaging	Michael Symonds, Dr Barry Soans, Dr Paul Thomas, Brad Hansen
Pathology	Bruce Tually, Neil Horton
Haematology	Dr Michael Seldon, Dr Arno Enno
Infection Control	John Ferguson, Sandy Berenger

Stakeholder	Contact Person
	Helen O'Hara
General Surgical	Prof Stephen Deane, Todd McEwan
Anaesthetics	Dr Roy Dennis, Dale Erwin, Dr Patrick Farrell
Operating Theatres/Recovery	Carol Dorrington, Gail O'Connor
Emergency Departments	Dr Carolyn Hullick, Dr Nick Ryan Dr Ron Hawksford David Gleadhill, Jim Wills, Cameron Dart
General Medicine	Dr Geoffrey Tyler, Dr Chris Levi, Dr Peter Finlayson
Pharmacy	Helen Dowling, Trudi Martin
Information Technology	Paul Crosby
New England Brain Injury Rehabilitation Services	Margaret McPherson
Stroke Care Co-ordinators	Rachel Peake, Alex Little
Aged Care and Rehabilitation Services	Viki Brummel, Dr John Ward, Dr Michael Pollack
Mental Health	David Crompton, Judy Kennedy
Aboriginal Health	Tony Martin
Multicultural Health	Catherine Norman
Population Health	John Wiggers
Palliative Care	Peter Ravenscroft, Lynne O'Brien
Patient Flow Unit	Jenny Carter
Transport	Margo Roland
Transitional Care	Rebecca Harris
New England Retrieval Service	Dr John Kennedy
Allied Health	David Rhodes
Men's Health Forum	Graham Fazio
Area Health Advisory Council	
Local Health Advisory Committees	
Community Forums on Health	
Hunter Urban Division of General Practice	Dr Mark Foster
Hunter Rural Division of General Practice	Alison Crocker
Barwon Division of General Practice	Fiona Strong
North West Slopes Division of General Practice	Graeme Kershaw
New England Division of General Practice	Sally Armitage
NSW Ambulance	
Consumers, Clients and Carers	
Stroke Groups	
Multicultural Health Service	Seok Ohr
Aboriginal Partnership Group	Tony Martin
Aboriginal Medical Services (AMS)	
University of Newcastle	Murray Webber
	Graham Vimpani
	Dianna Keating
University of New England	Jeanne Maddison
University Department of Rural Health	Dr Peter Jones
TAFE NSW	
Royal Australian College of Surgeons	
Royal Australian College of GPs	
Professional College of Nursing	
Department of Ageing, Disability and Home Care	

Appendix 3: National Stroke Foundation Guidelines

The National Stroke Foundation on behalf of the Australian Health Minister's Advisory Council (AHMAC) has developed evidenced based guidelines for the care and treatment of people suffering from stroke. Clinical guidelines for Stroke Rehabilitation and Recovery and Acute Stroke Services have been developed and endorsed for use..

The National Stroke Foundation has developed a Stroke Care Pathway to guide practice and as a resource for health professionals in the care of people experiencing stroke. These guidelines and care pathway provide a direction for service delivery and inform the HNE Health Stroke Services Plan.

Clinical Guidelines for Acute Stroke Management

These guidelines were completed and endorsed in November 2007.

ORGANISATION OF CARE	
Service area	**Recommendations and Guidelines**
1. Stroke units / service delivery / organisation of services.	There is overwhelming evidence that the most effective care for stroke patients is provided on a geographically defined ward area where care is provided by a specialist, experienced stroke team. The structure of stroke unit care varies between facilities but all provide care according to protocols, and have regular team meetings and access to ongoing education. a) Care for stroke patients should be provided on a stroke unit that is defined by: ▪ Patients located in a geographically defined unit ▪ The presence of a coordinated multidisciplinary team comprising of a stroke physician, nursing staff, occupational therapist, physiotherapist, speech pathologist, dietitician, social worker and where possible, a psychologist ▪ Staff specialising in the management of stroke and having access to ongoing professional education ▪ Team meeting regularly to discuss management and discharge planning, and ▪ Care provided according to agreed protocols. b) After the acute phase, stroke care may be delivered in the hospital, via outpatients or in the community, with equal effect. c) Patients should only be managed at home if the patient, carer and treating team agree that adequate formal and informal 24 hour support will be provided and the patient can routinely transfer from bed to chair. d) Stroke services should be organised to recognise the special medical, social and rehabilitative needs of stroke patients in specific sub-groups (especially paediatric, young adult, Culturally and Linguistically Diverse CALD), Aboriginal and Torres Strait Islanders).
2. Pre-hospital care	There is growing evidence that the early stages of stroke management are important in terms of reducing damage to the brain and minimising the effects of stroke. Guidelines relating to pre-hospital care describe the care provided to a patient immediately after the onset of symptoms prior to admission to hospital. They relate to the response and management by emergency medical systems. Guidelines: a) Stroke should be recognised by emergency medical services, health care professionals and the public as a condition that requires emergency medical attention. b) Suspected stroke patients should be given a high priority grouping by ambulance services. c) Emergency personnel should be trained in the recognition of stroke and appropriate initial management.

ORGANISATION OF CARE	
Service area	**Recommendations and guidelines**
Pre-hospital care continued	d) Emergency medical services should preferentially transport suspected stroke patients to centres with stroke units. e) All centres offering a stroke unit service should inform the local ambulance service of the details of such service's availability to ensure that the emergency medical services are able to triage to the most appropriate destination, given patient condition, resources and availability of stroke services.
3. Management in the emergency department.	Appropriate diagnosis of stroke and immediate referral to a stroke team is of growing importance with advances in hyperacute treatments and in minimising the risk of complications in the early stages of stroke. It is therefore vital that emergency department protocols reflect this evidence and that stroke is triaged and responded to in an appropriate manner.
3.1.Triage	Stroke should be treated as a medical emergency and prioritised as such by emergency department staff, with rapid referral to the stroke team.
3.2. Clinical diagnostic evaluation	Guidelines a) Diagnosis should be reviewed by a clinician experienced in the evaluation of stroke. b) CT should be performed to distinguish haemorrhage from infarction and exclude other pathologies within 24 hours of symptom onset. c) CT should be performed sooner where acute therapies (such as tPA) are available. Refer to specific guidelines developed in relation to the use of tPA (National Stroke Foundation / Stroke Society of Australasia 2003). d) MRI may be used as an alternative to CT but there are concerns about its accuracy in the hyperacute diagnosis of haemorrhage. e) Repeat CT should be performed urgently when a patient's condition deteriorates.

ORGANISATION OF CARE	
Service area	**Recommendations and guidelines**
3.3. Investigations	Guidelines a) The following investigations should be obtained routinely in all patients – full blood picture, electrocardiogram, electrolytes, renal function, and glucose. b) Selected patients may require the following additional investigations: carotid duplex, echocardiography, angiography, MRI, fasting lipids erythrocyte sedimentation rate, chest x-ray, vasculitis screen, prothrombotic screen etc. These tests should be performed as soon as possible after stroke onset, and in selected patients, some of these tests may need to be performed as an emergency procedure. c) In atypical cases, or young stroke patients, additional tests including tests for prothrombotic states, vasculitis, the effects of drugs/alcohol etc. may be required.
3.4. Use of tPA.	Specific issues relating to the use of tPA are addressed in separate guidelines: National Stroke Foundation / Stroke Society of Australasia (2003) 'Consensus Statement – Australian Guidelines for the Use of Intravenous Tissue Plasminogen Activator in Acute Ischaemic Stroke Within Three Hours of Stroke Onset'. Guidelines a) tPA should only be administered in stroke units with experience in its use and in accordance with the guidelines for administration of tPA. Refer to specific guidelines developed in relation to the use of tPA. National Stroke Foundation / Stroke Society of Australasia (2003) 'Consensus Statement – Australian Guidelines for the Use of Intravenous Tissue Plasminogen Activator in Acute Ischaemic Stroke Within Three Hours of Stroke Onset'.
4. General stroke treatment	General stroke treatment is provided by a multidisciplinary team that work in an interdisciplinary manner to ensure outcome is optimised, risk complications are reduced, and the patient and family are informed about their management. In the acute phase of stroke, the emphasis is on assessment and discharge planning to ensure that appropriate decisions about treatment and rehabilitation are made as early as possible. There is also an emphasis on management to reduce complications such as aspiration pneumonia, deep vein thrombosis, recurrent stroke and pressure sores.
5. Prevention and treatment of complications of stroke	Medical complications are extremely common after stroke. Clinicians must be vigilant in order to prevent, identify and appropriately manage the complications that may arise.
6. Early secondary prevention	For people who suffer a first in a lifetime stroke and survive at least two days, the proportion who have a recurrent event in the first six months is nine per cent and in five years is 15 per cent (Hankey et al 1998). It is important that modifiable risk factors are identified in patients to ensure that appropriate evidence based secondary prevention measures are instigated. This requires investigation into the cause of stroke to direct appropriate medical intervention and educational advice and support.
7. Discharge planning	Good discharge planning is crucial not only in reducing the length of stay and number of re-admissions but also in ensuring the successful reintegration of the stroke survivors and their families into the community (Rudd et al. 1997). Successful discharge planning should be the culmination of a best practice rehabilitation program and ensure that social isolation and depression after discharge is minimised and that independence is maximised. Discharge planning is a complex process that relies on effective communication between team members and the patient and family. It should consider the need for equipment, social and liaison with community providers.

National Stroke Foundation – Clinical Guidelines for Stroke Rehabilitation and Recovery

These guidelines have been developed under the direction of an expert Advisory panel. The level of evidence for treatment options recommended is indicated in the right hand column. An explanation of the evidence levels is at the bottom of the table. These guidelines have been ratified by the Australian Health Minister's Advisory Council (AHMAC) and the relevant professional associations.

ORGANISATION OF CARE		
Service area	**Recommendations**	**Level of Evidence**
Stroke unit care	a) All people admitted to hospital with stroke and who require rehabilitation should be treated in a comprehensive or rehabilitation stroke unit with an interdisciplinary team. b) If no stroke unit is available, consideration should be given to transferring the person with stroke (when medically stable) to the nearest stroke unit, or a hospital that most closely meets the criteria for stroke unit care.	(Level I, Ref 14) R Recommended best practice based on clinical experience and expert opinion.
Inpatient integrated care pathways	There is insufficient evidence to support recommendations about routine use of care pathways. If used, care pathways should be flexible enough to meet the heterogeneous needs of people with stroke.	R
Inpatient stroke care coordinator	A stroke coordinator may be used to foster coordination of services and assist in discharge planning.	R
Early supported discharge	Where comprehensive interdisciplinary community rehabilitation services and carer support services are available, early supported discharge services may be provided for people with mild to moderate disability.	(Level I, Refs 22-25)
Community rehabilitation	Rehabilitation for people with stroke in the community is equally effective if delivered in the hospital via outpatients or day hospital, or in the community.	(Level I, Refs 26, 27, 30)
Discharge destination	Decisions about discharge destination (home vs. residential care) should be made in the context of availability of supportive services and the wishes of the stroke survivor and carer.	R
Respite care	People with stroke and their carers should have access to respite care. This may be provided in their own home or an institution.	R
Ongoing review	People with stroke should have regular and ongoing review by a member of a stroke team, including at least one specialist medical review following discharge.	R

DISCHARGE PLANNING, TRANSFER OF CARE AND INTEGRATED COMMUNITY CARE		
Family and team meetings	The stroke team should meet regularly with the person with stroke and the family to involve them in management, goal setting and planning for discharge.	R
Pre-discharge needs assessment	a) Before discharge, people with stroke and their carers should have the opportunity to identify and discuss their post-discharge needs (e.g. physical, emotional, social and financial) with the interdisciplinary team. b) Before discharge (or home trial) from inpatient care and, where appropriate, a home assessment should be carried out to ensure safety and community access. Optimal independence will be facilitated through home modification and adaptive equipment, as required.	R R
Care plans	People with stroke, their carers, the general practitioner and community care providers should be involved with the interdisciplinary team in the development of a care plan that outlines care in the community after discharge, including the development of self-management strategies, provision of equipment and support services, and outpatient appointments.	R
Carer training	Relevant members of the interdisciplinary team should provide specific training for carers before the person's discharge home. This should include training, as necessary in: • personal care techniques, communication strategies, physical handling techniques, ongoing prevention and other specific stroke-related problems • safe swallowing and modified diet.	(Level II, Refs 43) R
Liaison with community providers	The stroke survivor's general practitioner, other primary health professionals and community service providers should be involved in, and informed about, the discharge plans and agreed post-discharge management, as early as possible prior to discharge.	R
Post-discharge follow-up	a) Contact with a family support / liaison worker may be considered for carers and stroke survivors in the community to assist with their knowledge and/or satisfaction. b) Stroke survivors and their families should be followed up by a relevant member of the team after their discharge from a formal rehabilitation program. c) People with stroke and carers should be provided with a contact person (in the hospital or community) for any post-discharge queries.	(Level II, Refs 48, 51, 52) R R
General information and education	All stroke survivors and their families should be provided with timely, up-to-date information in conjunction with opportunities to learn via education from members of the interdisciplinary team and other appropriate community service providers. Simple information provision alone is not effective.	(Level I, Refs 53, 54; Level II, Refs 43, 56)

Designation of Levels of Evidence – National Health and Medical Research Council
I Evidence obtained from a systematic review of all relevant randomised controlled trials.
II Evidence obtained from at least one properly designed randomised controlled trial.
III – 1 Evidence obtained from well-designed pseudo-randomised controlled trials (alternate allocation or some other method).
III – 2 Evidence obtained from comparative studies with concurrent controls and allocation randomised (cohort studies), case-control studies, or interrupted time-series with group.
III – 3 Evidence obtained from comparative studies with historical control, two or more studies, or interrupted time series without a parallel control group.
IV Evidence obtained from case series, either post-test or pre-test and post-test.

Appendix 4: Categories of the National Stroke Unit Program (NSUP) Model of Stroke Services

The NSUP developed a model to describe how different facilities may be categorised depending on the nature of resources available and the clinical complexity of stroke patients managed. The model outlines core or fundamental components of stroke care that should be provided in all settings. It suggests that in areas where components of care are unavailable, protocols be put in place to ensure patients are transferred to a setting where they will receive all appropriate core elements of stroke care as their condition requires. .
It is possible to classify HNE Health services according to these categories as follows:

Stroke Service Model: Summary Table

Component of care	Category A hospital	Category B hospital	Category C hospital	Category D hospital
Immediate access to Computerised Tomography (CT)	√	√	√ (within 24 hours)	X (transfer to facility with CT with patient consent)
Access to High Dependency Unit *	√	√	X	X
On-site access to Neurosurgery**	√	X	X	X
Geographically located Stroke Unit	√	√	√ (or a mobile stroke team with care plan)	X Recommended transfer. Provide care required on-site via protocols
Specialised, dedicated, multi-disciplinary team	√	√		Multi-disciplinary team supported by specialist team at Categories A and B
Emergency Department protocols for rapid triage	√	√ (or transfer)	√ (or transfer)	Protocols for transfer
Access to regular professional development and education relating to stroke	√	√	Access to professional development relating to stroke and support from Categories A and B	Access to professional development relating to stroke as required and support of Categories A and B
Management of all strokes including complex strokes	√		X	X
Moderately complex strokes with low to moderate risk of deterioration	√	√	X	X
Stable stroke	√	√	√	X
Elected deviation from model Patient/Physician informed decision not to adhere to Model transfer recommendation in particular cases such as • Palliative care • Low complexity care			√	√

**High Dependency Unit (HDU): The recommendation for access to high dependency units at category A and B hospitals is made so patients who deteriorate may be appropriately managed.*
***Neurosurgery: Access to neurosurgery is recommended for category A model of care. This recommendation is made so that neurosurgical opinions and intervention of complex patients can be assessed (e.g. those diagnosed with hydrocephalus). Taken from the National Stroke Research Institute.*

Appendix 5: Minimum Staff Ratio Guidelines

These standards have been developed by the Greater Metropolitan Clinical Taskforce for Stroke Services in consultation with practitioners from medicine, nursing and allied health as a guide for planning and service development.
These recommendations are intended as *minimum* guidelines for comparison and are not intended to represent ideal staff ratios. GMCT advocate that staffing levels should not fall below these ratios.

Minimum required staff to stroke patient ratios for 10 patients

	Stroke Unit*	**Stroke Rehabilitation Unit****
Speech Pathologist	0.9	1.2
Physiotherapist	1.2	1.5
Occupational Therapist	1.1	1.3
Dietitian	0.4	0.2
Pharmacist	0.2[#]	0.2
Social Worker	0.9	0.8
Clinical Psychologist[##]	0.5	0.6
Nursing (morning shift)[###]	2.9	2.9
Nursing (evening shift)[###]	2.9	2.9
Nursing (night shift)[###]	2.5	2.5

** Where available the staff ratio was calculated by average of current median Stroke Unit staffing, UK median staffing and Australasian Faculty of Rehabilitation Medicine guidelines for neurology in-patients).*
*** Where available the staff ratio was calculated by average of current median Stroke Rehabilitation Unit staffing and Australasian Faculty of Rehabilitation Medicine guidelines for neurology in-patients. It is expected for some stroke rehabilitation services that provide complex personal care and carer supervision, especially for the young working age person with stroke that the staffing levels required would be increased. The GMCT study did not review other relevant staff in the rehabilitation team (e.g. diversional therapist, orthotists, music therapy, podiatry, rehabilitation counseling and rehabilitation engineering) however recommends that they be available when required.*
 # This complies with the Society of Hospital Pharmacist of Australia “Recommendation for Clinical Pharmacist Staffing based on Type of Bed” 2005.
Clinical psychologist in this context included clinical and neuropsychology staffing.
Nursing numbers would need to be adjusted for 1:1 nursing ratios for hyperacute stroke or thrombolysis cases, at the discretion of each stroke service.

Reference: NSW Stroke Workforce Survey. Results Prepared for the Greater Metropolitan Clinical Taskforce (GMCT) by: A/Professor Catherine Storey, Ms Susan Day, Dr Bronwyn Jenkins 2007

Appendix 6: Description of Related Service Links

National Stroke Foundation

A not-for-profit organisation that provides advice about stroke, its needs and best practice to government and health professionals. It works in alliance with other like organisations and advocates for stroke at a national level. Functions include:

- Working with all stakeholders to develop and implement policy on the prevention and management of stroke.
- Educating the public about the risk factors and signs of stroke and promoting healthy lifestyles.
- Encouraging the development of comprehensive and co-ordinated services for all stroke survivors and their families.

National Stroke Research Institute

A Centre of Excellence in stroke research with an international reputation. The work of the Institute addresses the problem of stroke across the spectrum. It is a subsidiary of the National Stroke Foundation, based at the Austin Hospital in Melbourne with collaborating centres around Australia.

Stroke Society of Australasia (SSA)

Formed by clinicians and researchers to further the study into all aspects of stroke and to improve the standards of management of stroke in Australia. The SSA has representation on Federal and State committees that formulate government policy on stroke. It also has strong ties with the National Stroke Foundation.

Australasian Stroke Unit Network

A subcommittee of the Stroke Society of Australasia that aims to establish a communication and audit network between stroke service providers in Australia and New Zealand.

Australasian Stroke Trials Network

A subcommittee of the Stroke Society of Australasia formed to facilitate participation of stroke units around Australasia in national and international multicentre therapeutic trials.

Rural Organisation of Australian Stroke Teams

A collaboration between the Royal College of Physicians and Federal Government to roll-out evidence based stroke care in rural parts of Australia. The plan includes rolling out a small number of Key Performance Indicators (KPI) to establish evidence based processes of care. This program started in Victoria with 9 hospitals actively participating (8 contributing data and 4 introducing new stroke services). Rollout across rural NSW is currently being considered.

Clinical Excellence Commission (CEC)

Established as a statutory health corporation reporting annually to the NSW Minister for Health, the CEC's core mission is to identify issues of a systemic nature that affect patient safety and clinical quality in the NSW health system, and, to develop and advise on implementation strategies to address these issues.

NSW Institute of Rural Clinical Services and Teaching

Established to contribute to an effective and equitable rural health service by driving the agenda for attracting and sustaining a cohesive rural health workforce and supporting staff to improve rural health practice and service delivery.

NSW Stroke Recovery Association

The NSW Stroke Recovery Association aims to maximise the recovery of individuals who have suffered a Stroke and reduce the impact on their family/carers and the community. The Association is a focal point for information about Stroke recovery and prevention. The Association was established in 1977 and since then has played a major role in the recovery and support of many Stroke survivors. It has assisted in the development of policy and best practice and in establishing some 57 Stroke Recovery Clubs throughout NSW. Currently the Stroke Recovery Association provides the following services:

- Telephone Counselling
- Stroke Information Kits
- Co-ordination of Stroke Recovery Clubs
- Stroke Seminars and workshops
- A library of books, videos and brochures
- Regular newsletter on Stroke issues to members
- Referrals to other services
- Co-ordination of Stroke Awareness Week

(taken from the Stroke Recovery Association of NSW Website)

Ambulance Service of NSW

The Ambulance Service is committed to providing high quality clinical care and health related transport services to over 6.3 million people in NSW, across an area of 801,600 square kilometres. More than 3,300 men and women work from 266 locations across the State, operating over 800 ambulance vehicles and 300 support vehicles to provide emergency, non-emergency, aeromedical, rescue and retrieval services.

The Service prides itself on high standards of clinical training, modern technology, extensive fleet and specialist skills of our operational and corporate staff.
(taken from the Ambulance Service of NSW Website)

Appendix 7: Aboriginal Health Impact Statement

Hunter New England Stroke Services Plan 2008-2012

The health needs and interests of Aboriginal people have been considered, and appropriately addressed in the development of this plan.

Appropriate engagement and collaboration with Aboriginal people has occurred
In the development and implementation of this plan.

Mr Michael DiRienzo

Director of Clinical Operations (Acute Services)

Hunter New England Health

1. Has there been appropriate representation of Aboriginal stakeholders in the development of the policy, program or strategy?
Yes

2. Have Aboriginal stakeholders been involved from the early stages of policy, program or strategy development? Yes

An expression of interest was sent to Aboriginal Health calling for representatives from HNE Aboriginal Health workers to be on the planning committee.

The Director of Aboriginal Health was involved in discussions regarding the formation of the Planning Committee for the Stroke Services Plan and Aboriginal Health Officers were involved in the planning committee and consultation processes.

There has been an Aboriginal Health representative on the Stroke Planning Group throughout the development of the Stroke Services Plan.

3. Have consultation/negotiation processes occurred with Aboriginal stakeholders? Yes

4. Have these processes been effective? Yes

Specific consultations occurred with the senior managers of Aboriginal Health in HNE Health as well as Aboriginal Health representation on the Committee and frequent collaboration with plan leaders. Aboriginal Community Controlled Health Services, formerly known as Aboriginal Medical Services (AMS) were not directly consulted due to a limited consultation period and recent consultations undertaken in developing the Aboriginal Health Services Plan for the Area.

5. Have links been made with relevant existing mainstream and/or Aboriginal-specific policies, programs and/or strategies? Yes

Links have been made to:

- Aboriginal Health Services plan for the Hunter New England area,
- NSW Aboriginal Health Strategic Plan
- Ensuring Progress in Aboriginal Health in NSW
- NSW Aboriginal Chronic Care Program and Standards
- Aboriginal Vascular Health Program

6. Does the policy, program or strategy clearly identify the effects it will have on Aboriginal health outcomes and health services? Yes

The HNE Stroke Services Plan recognises the need for improvements to health services for Aboriginal people with Stroke across the Hunter New England area. There is also recognition of the need for consultation to enhance services for Aboriginal people and communities to be developed in partnership with Aboriginal community controlled medical services and other Aboriginal groups and services.

Current issues identified in the plan include

- Recognition of the health disadvantage within Aboriginal communities
- Chronic health needs particularly in relationship with diabetes and cardiovascular disease
- Access to health services, particularly in rural and remote areas
- Early identification, screening and treatment for Aboriginal people with chronic diseases

7. Have these effects been adequately addressed in the policy, program or strategy?
Yes

There has been recognition that the development of health services for Aboriginal people with stroke needs to occur in consultation and partnership with the relevant Aboriginal community controlled medical services and other community organisations. In addition it is recognized that primary health care services need to recognise the cultural needs of Aboriginal people and support the early involvement of families and carers, Aboriginal Health workers in hospitals and Aboriginal Health Education Officers in the community.

Strategies identified in the plan to address these issues include:

- Early referral to Aboriginal Liaison Officers and Aboriginal Health Education Officers
- Developing partnerships with chronic health disease programs including support to the Aboriginal Vascular Health Program
- Improving the accessibility and appropriateness of general health services, including stroke related services
- Providing culturally appropriate educational and information resources to Aboriginal people and communities
- Developing closer partnerships with Aboriginal Community Controlled Health Services and other Aboriginal groups and services
- Supporting implementation of the NSW Aboriginal Chronic Conditions Area Health Service Standards

Have all items of the checklist been reviewed and answered? Yes

8. Are the identified effects on Aboriginal health outcomes and health services sufficiently different for Aboriginal people (compared to the general population) to warrant the development of a separate policy, program or strategy? No

The HNE Stroke Services Plan outlines the broad direction for Stroke services in the region. Aboriginal people need to have improved access to general health services to ensure that the needs of people with stroke are managed appropriately. The plan recognises that there is a need for specific strategies to identify Aboriginal people with chronic health conditions and provide culturally appropriate health services to ensure their access to care and treatment.

In addition, it is recognised that the health and wellbeing of Aboriginal people is dependent on historical, physical, cultural and social factors, and, that the health needs of Aboriginal people with stroke need to be addressed as part of strategies to address local community health issues and in particular the chronic health issues facing Aboriginal communities. This has been recognised in the HNE Chronic Diseases Plan, the HNE Stroke Services Plan and the Aboriginal Health Services Plan for the Hunter New England area.

9. Will implementation of the policy, program or strategy be supported by an adequate allocation of resources specifically for its Aboriginal health aspects? Yes

The plan recognises the need for improved access and appropriateness of health services for Aboriginal people with stroke. This includes increased co-operation between mainstream health and Aboriginal health services, and, Aboriginal controlled health services. The plan identifies the need to provide information on early identification of stroke and prevention programs for Aboriginal people and communities. There is recognition of the need to work closely with Aboriginal Community Controlled Health Services and chronic disease services.

10. Will the initiative build the capacity of Aboriginal people/organisations through participation? Yes

The development of initiatives in the Service Plan is dependent on improved stroke services within existing acute and community based health services and partnerships with Aboriginal stakeholders across the region. Partnerships will need to be developed with front line health clinicians for Aboriginal clients, particularly the Aboriginal Community Controlled Health Services.

11. Will the policy, program or strategy is implemented in partnership with Aboriginal stakeholders? Yes

The Service plan will be monitored on an ongoing basis by the Stroke Services leadership group. The initiatives and measures in the plan will be regularly over the life of the plan.

12. Does an evaluation plan exist for this policy, program or strategy? Yes

13. Has it been developed in conjunction with Aboriginal stakeholders? Yes
Aboriginal stakeholder involvement in the evaluation process has been limited to input from the representative on the planning group. There was not wider stakeholder input to the evaluation development process for the Stroke Services Plan.

Appendix 8: HNE Health Risk Matrix

ACTION REQUIRED TABLE

LIKELIHOOD TABLE

Probability	***Definition***
Frequent	Is expected to occur again either immediately or within a short period of time (likely to occur most weeks)
Likely	Will probably occur in most circumstances (monthly or several times a year)
Possible	Possibly will recur – might occur at some time (may happen every 1 to 2 years)
Unlikely	Possibly will recur – could occur at some time in 2 to 5 years
Rare	Unlikely to recur – may occur only in exceptional circumstances (may happen every 5 to 30 years)

ACTION REQUIRED TABLE

RISK ESCALATOR/ACTION REQUIRED

Extreme Risk Escalate risk to Chief Executive
SAC1 immediate action required – Reportable Incident Brief (RIB) for all SAC 1 incidents must be forwarded to the DoH within 24 hours. A Privileged Root Cause Analysis (RCA) investigation must be undertaken for all Clinical SAC 1 incidents with a report being submitted to the DoH.
High Risk Escalate risk to Director
SAC2 need to notify senior management. Detailed investigation required. Ongoing monitoring of trended aggregated incident data may also identify and prioritise issues requiring a practice improvement project.
Medium Risk **Escalate risk to Service or Hospital Manager**
SAC3 management responsibility must be specified – Aggregate data then undertake a practice improvement project. **Exception** – all financial losses must be reported to senior management
Low Risk Escalate risk to immediate supervisor
SAC4 manage by routine procedures – Aggregate data then undertake a practice improvement project
NB:
RIB reports are completed for SAC 2, 3 or 4 incidents if there is the potential for media interest or they require direct notification under legislative reporting or policy directives.

CONSEQUENCE / LIKELIHOOD	Serious	Major	Moderate	Minor	Minimum
Frequent	A	B	J	P	S
Likely	C	D	K	Q	T
Possible	E	H	L	R	U
Unlikely	F	I	N	V	X
Rare	G	M	O	W	Y