



strokefoundation

National Stroke Audit

Rehabilitation Services Report 2012



About the National Stroke Foundation

The National Stroke Foundation is a national not-for-profit organisation working with stroke survivors, carers, health professionals, government and the public to reduce the impact of stroke on the Australian community.

We are the voice of stroke in Australia. Our mission is to stop stroke, save lives and end suffering.

We will achieve this by:

- Raising awareness about the risk factors and signs of stroke, and promoting healthy lifestyles.
- Improving treatment for stroke to save lives and reduce disability.
- Improving life after stroke for stroke survivors.
- Encouraging and facilitating stroke research.
- Raising funds from the community, corporate sector and government to continue our mission.

Visit www.strokefoundation.com.au for more information.

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Glossary

ADL

Activities of daily living. The basic elements of personal care.

AIHW

Australian Institute of Health and Welfare. Australia's national agency for health and welfare statistics and information.

AFRM

Australasian Faculty of Rehabilitation Medicine. The Faculty's role as a higher educational institution is central to its mission "to train, accredit and support medical practitioners in the management of disability and handicap arising out of illness and injury".

AROC

Australasian Rehabilitation Outcomes Centre. AROC collects and reports on data from the Australian specialist medical rehabilitation sector.

DVT

Deep Vein Thrombosis. A clot of blood in the deep veins of the leg, arm or abdomen.

FIM

Functional Independence Measure. A score for measuring outcomes of rehabilitative care by recording a person's actual performance of basic activities of daily living. The scale consists of 18 activities of daily living with a score for each item ranging between 1 and 7 (1 = completely dependent to 7 = independent without device).

ICD-10

The International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) is a coding of diseases and signs, symptoms, abnormal findings, complaints, social circumstances and external causes of injury or diseases, as classified by the World Health Organization (WHO).

IQR

Interquartile range. A measure of variability, based on dividing a data set into quartiles. In this report, we have used the first (Q1) and third (Q3) quartiles to provide a measure of variability. Q1 denotes the 25th percentile and Q3 the 75th percentile.

Known N

Known N is the number of eligible cases for any question that is being measured. It excludes from the denominator cases that do not qualify to be analysed, e.g. the Known N for analysis of treatment with antithrombotic medication would include ischaemic patients with stroke only.

MDT

Multidisciplinary team. Consists of medical, nursing and allied health practitioners.

MRS

Modified Rankin Score. A global disability scale that records a patient's functional ability with a score between 0 and 6 (0 = no symptoms, 6 = death).

NHMRC

National Health and Medical Research Council. NHMRC is Australia's peak body for health and medical research, health advice and ethics in health care and in health and medical research

NSF

National Stroke Foundation. The NSF is a not-for-profit organisation that works with the public, government, health professionals, patients, carers and stroke survivors to reduce the impact of stroke on the Australian community.

SUTC

Stroke Unit Trialist's Collaboration is a group of authors who have written several landmark systematic reviews showing that patients with stroke treated on stroke units have better health outcomes than those receiving conventional care.

Stroke unit

Various definitions exist. In principle the following attributes are common:

1. co-located beds within a geographically defined unit
2. a dedicated multidisciplinary team with a special interest in stroke or rehabilitation
3. regular team meetings and regular informal, clear interdisciplinary communication
4. access to ongoing professional education and training
5. a focus on patient-centred management with early involvement of carers.

Urban

Term used to describe metropolitan areas as well as large rural centres or regional areas with a population greater than 25,000.¹

Rural

Includes many types of geographical regions which vary from remote rural centres to small urban centres (but not metropolitan) with a population less than 25,000.¹

<30 stroke rehabilitation admissions per year

An arbitrary range used for analysing the audit data based on the likelihood that staff will be less experienced in stroke management given the low exposure to patients with stroke per year.²

31–79 stroke rehabilitation admissions per year

An arbitrary range used for analysing the audit data based on the likelihood that staff will be moderately experienced in stroke management given the moderate exposure to stroke patients per year.²

>80 stroke rehabilitation admissions per year

An arbitrary range used for analysing the audit data based on the likelihood that staff will be more experienced in stroke management given the high exposure to stroke patients per year.²

Executive summary

The *National Stroke Audit – Rehabilitation Services Report 2012* provides evidence of the critical function of rehabilitation in stroke recovery. The report aims to highlight areas where the system for stroke rehabilitation is working well and to report on improvements or changes that may be needed. It is the only audit report of its kind in Australia.

Importantly, features of current practice are described, as well as discussion of progress against the recommendations made following the National Stroke Foundation's first audit of rehabilitation services in 2008.

In 2012, the audit involved 111 eligible hospitals representing a mix of public and private settings with the majority being public hospitals (n=98 an increase from 96 hospitals in 2010). Among the patients included in the audit, 2% were of Aboriginal or Torres Strait Islander background and 10% were from a non-English speaking background.

Most (86%) of the hospitals participating in this audit were located in urban settings. A total of 2,821 stroke rehabilitation admissions were audited across the 111 hospitals, and this represents more than 40% of all (6,609) stroke cases admitted for in-patient rehabilitation during the audit reference year.

Overall, minimal improvements in hospital-based stroke rehabilitation were found since the inaugural audit in 2008. While there has been some encouraging change, for example, better access to specialist stroke rehabilitation staff, key areas identified as needing improvement over the last two audit cycles (2008 and 2010) remain at substandard levels of adherence to the *Clinical Guidelines for Stroke Management* recommendations.

One of the areas in need of the most change is providing better access to psychological and mood assessments, and support. Depression and mood disorders are a significant problem for stroke survivors with undiagnosed and untreated depression, which is recognised as a major barrier to successful rehabilitation. Only 38% of hospitals reported access to psychologists and only 50% of patients audited had mood assessments. Therefore, patients are missing out on appropriate services to ensure that their psychological and emotional support needs are met.

The involvement of the stroke survivor, their carer and family in goal setting for rehabilitation remains a priority to be addressed by in-patient rehabilitation services. The audit results reveal that one in five patients were not involved in setting their own rehabilitation goals. Further, one in five had no documented evidence that their management had been discussed with the team.

Comprehensive discharge planning processes and better access to community-based rehabilitation and counselling are also areas for service improvement. One-third of all patients in this audit received no referral for further rehabilitation in the community and only half of the hospitals surveyed reported that they routinely provide a discharge care plan to patients. Furthermore, almost half of audited patients (47%) did not receive advice for risk factor modification on discharge.

Unlike specialised acute stroke units with defined characteristics, no such definition exists for specialised stroke rehabilitation units. The need to identify the core elements of successful in-patient rehabilitation programs in Australia is required to improve patient outcomes. Once these core elements have been identified, a benchmark can be set for the minimum standard and characteristics of a specialised stroke rehabilitation unit.

In summary, the identified improvements found for in-patient rehabilitation services since 2008 demonstrate that there is potential to adapt services to better meet the needs of stroke survivors who receive in-patient rehabilitation according to evidence-based practice. However, there remain important areas requiring significant change to ensure that the *Clinical Guidelines for Stroke Management* are being sufficiently met for post-stroke care.

Recommendations

- Systems are established or enhanced to ensure the psychological and emotional support needs of all stroke survivors are considered during rehabilitation (including further assessment and treatment by psychologists) and is offered to those who require it.
- Systems are established to ensure greater involvement of stroke survivors and the family/carer as part of the multidisciplinary team with regards to goal setting for shared recovery objectives.
- Systems are established to ensure all stroke survivors, and their families and carers are provided with education, information and advice on stroke and stroke recovery, including risk factor modification.
- Further work should be undertaken to improve access to relevant community-based rehabilitation services once the stroke survivor has been discharged from hospital.
- Further work should be undertaken to identify core elements of effective stroke rehabilitation units to facilitate greater access to this model of evidence-based stroke care in Australia.

Table 1 Summary of adherence to recommended processes of care

| Process of care | Eligible to receive process of care Known N=2,821 | Number receiving process of care n | Adherence to process of care % |
|--|--|---------------------------------------|-----------------------------------|
| Patient-centred care | | | |
| Patient met team to discuss management* | 2,659 | 2,033 | 76 |
| Goal setting with the patient* | 2,692 | 2,127 | 79 |
| Secondary prevention | | | |
| Received advice for lifestyle risk factors | 1,698 | 906 | 53 |
| Discharged on lipid-lowering medication if ischaemic stroke [†] | 2,080 | 1,751 | 84 |
| Discharged on blood pressure-lowering medication [†] | 2,683 | 2,280 | 85 |
| Discharged on antithrombotics if ischaemic stroke [†] | 2,091 | 2,028 | 97 |
| Discharge planning and support for life after stroke | | | |
| Education provided to stroke survivor/family | 2,789 | 1,829 | 66 |
| Discharge care plan developed with input from team and patient | 2,503 | 1,849 | 74 |
| Received information on sexuality post stroke | 2,789 | 483 | 17 |
| Stroke survivor offered information about peer support* | 1,635 | 638 | 39 |
| Stroke survivor informed of self-management programs* | 2,423 | 603 | 25 |
| Post-discharge contact provided to stroke survivor or family | 2,789 | 1,577 | 57 |
| Discharged home | 2,821 | 1,934 | 69 |
| Carer received training [‡] | 931 | 727 | 78 |
| Home assessment | 1,618 | 1,193 | 74 |
| Stroke survivor offered assistance to return to driving | 586 | 572 | 98 |
| Stroke survivor offered assistance to return to work | 163 | 140 | 86 |
| Stroke survivor's general practitioner sent a discharge summary | 2,789 | 2,609 | 94 |
| Formal counselling offered to stroke survivor* | 2,654 | 821 | 31 |
| Formal counselling offered to family/carer [‡] | 960 | 317 | 33 |
| Post-discharge needs discussed with care [‡] | 971 | 753 | 76 |

*Patients without severe cognitive and/or communication difficulties

[†]For eligible patients only, without contraindications for drug[‡]Included carers of stroke survivors discharged to a private residence

Introduction

1.1 Stroke in Australia

Stroke is a major cause of mortality and disability in Australia.^{3,4} Most (89%) people with stroke will be admitted to hospital following onset and over one-third of those admitted will transition between acute and rehabilitation services.^{5,6} Stroke accounts for 16% of public hospital rehabilitation episodes making it the third largest impairment category for rehabilitation.⁷ The cost of stroke is immense when measured in financial terms.⁸ It is also a great a social burden since it carries significant personal consequences for those affected by stroke, as well as their families and carers.⁸

Most people with stroke benefit from rehabilitation,⁹ although the setting where this should occur will depend on the individual.¹⁰ Residual disability following stroke may include inability to walk, dependence on assistance with activities of daily living (ADLs), communication difficulties, visual impairment and mood problems. Rehabilitation is a holistic process facilitated by a multidisciplinary team (MDT) and defined as a health strategy with a primary goal of optimising function and enabling social reintegration for the stroke survivor.^{10,11} Rehabilitation following stroke should begin as early as possible (i.e. the first day after stroke) in the acute setting because early intervention is linked to improved health outcomes.^{10,12} Prompt intervention from a rehabilitation team may facilitate early recovery and consequently improved health outcomes.^{10,12-16}

1.2 Stroke rehabilitation services in Australia

The Australasian Rehabilitation Outcomes Centre's *The AROC Annual Report: the state of rehabilitation in Australia in 2011* reports that there were 6,438 stroke rehabilitation episodes during 2011 which is a small increase from 2010. Stroke represents the third largest impairment category of all the rehabilitation episodes in the public sector.⁷

Infrastructure (e.g. access to community rehabilitation) and resources (e.g. staffing) for stroke rehabilitation around Australia varies, as does adherence to recommended care.¹⁷ In general the systems of stroke care that currently exist in Australia comprise free-standing and co-located acute and rehabilitation services. The *Clinical Guidelines for Stroke Management 2010* recommends acute and rehabilitation services should provide a seamless transition for the person with stroke in the health system.^{10,18}

Rehabilitation services that enable access to specialist stroke expertise reduce the odds of death or dependency compared to general rehabilitation services.¹⁰ Workforce capacity and comprehensive team functioning are critical and previous audits have noted a need for better access to continuing staff education and the full range of disciplines.¹⁷

1.3 The National Stroke Audit Program

The National Stroke Foundation has been developing clinical guidelines for stroke management since 2003 and has been measuring adherence to recommendations in national guidelines since 2007 through the National Stroke Audit Program. Each alternate year the focus of the audit program changes between acute series and rehabilitation. The current *Clinical Guidelines for Stroke Management 2010*¹⁰ provides an overview of the current research evidence and presents recommendations for stroke care.

The National Stroke Audit Program comprises two components:

1. An Organisational Survey of stroke rehabilitation services across Australia. The survey assesses the resources required to deliver evidence-based stroke care such as the availability of stroke units, comprehensive assessment by the MDT and team meetings. The self-reported data are provided by a nominated clinician on behalf of the team. The questions are found in Appendix 5.2.
2. A Clinical Audit involving a retrospective review of up to 40 consecutive patients admitted to participating rehabilitation units. The Clinical Audit is used to measure the delivery of evidence-based processes of care such as timely assessment by allied health, goal setting, care planning and discharge planning. The questions are found in Appendix 5.2.

The Organisational Survey and Clinical Audit were developed in tandem and the results are presented collectively. This is because areas of excellence and areas of need identified in the Clinical Audit may be better understood in association with information about the available resources obtained from the Organisational Survey.

The *National Stroke Audit – Rehabilitation Services 2012* took place in Australian free-standing rehabilitation hospitals and the rehabilitation services of acute hospitals.

This report is designed to provide an overview of rehabilitation services for stroke in Australia. Feedback to participants is an essential component of the National Stroke Audit Program considering the evidence that audit and feedback can influence and change clinical practice.^{19,20} Each participating rehabilitation service receives a site-specific report highlighting performance and important clinical issues to the local care providers so that informed decisions can be made to improve patient care and outcomes. The process of audit and feedback is, therefore, a crucial part of the National Stroke Foundation's guidelines implementation process and core to a cycle of continuous quality improvement.

1.4 Structure of the report

This report outlines the adherence to the *Clinical Guidelines for Stroke Management 2010*¹⁰ in hospitals providing rehabilitation for stroke survivors. It reports resources available within these units and the quality of care provided.

Methods

2.1 Development of the questions

The questions for the *National Stroke Audit – Rehabilitation Services 2012* were reviewed in line with the *Clinical Guidelines for Stroke Management 2010*¹⁰ with comments received from participants of the previous audit and staff from the National Stroke Foundation.

Since 2010, some new questions have been introduced, particularly in relation to the organisational characteristics of Australian stroke rehabilitation services. Some of the existing questions were modified to clarify terminology and provide extra responses. These improvements were designed to enhance the validity and reliability of the audit results.

2.2 Recruitment

To be eligible for the *National Stroke Audit – Rehabilitation Services 2012*, hospitals required a rehabilitation service. Chief executive officers from public and private hospitals were sent a letter of invitation to participate. These letters were then followed up by a series of phone calls and emails to senior staff members. Often these were individuals who had previously participated in the audit. Recruitment for the audit occurred between 1 December 2011 and 31 May 2012. An individual was nominated as the main contact at each site. This person received all correspondence during the audit period and was responsible for data collection and quality at their site.

2.3 Training

Hospitals received an online training package that contained a PowerPoint presentation, as well as access to the audit web tool practice page. This allowed auditors to become familiar with using the audit web tool prior to entering any real data. Once training was completed, auditors were asked to email the audit team for their site's individual site code and passwords. These unique and confidential codes gave them access to the online audit web tool and allowed secure data entry. In addition to the site code and passwords, auditors were supplied with a data dictionary that provided a rationale for each question, as well as definitions and help notes about the data required. The project team was available for questions at all times leading up to, and during, the data entry period.

2.4 Organisational Survey methods

Respondents from participating hospitals completed an organisational survey between 5 March and 4 June 2012. The questions are presented in Appendix 5.2.

2.5 Clinical Audit methods

Between 1 March and 31 May 2012 clinicians at participating rehabilitation units completed a clinical audit for 40 consecutive stroke admissions to the rehabilitation service for the 12 months commencing 1 January 2011. Discharge from the rehabilitation unit had to be prior to 31 December 2011. This was to enable reliable comparisons to be made across participating rehabilitation units. The questions are presented in Appendix 5.2. Patients with an ICD-10 code of I61.0–I61.9 (intracerebral haemorrhage), I63.0–I63.9 (cerebral infarction), I64 (Stroke not specified as haemorrhagic or infarction) and I62.9 (intracerebral haemorrhage unspecified) were eligible for inclusion. Patients presenting with transient ischaemic attack (TIA) or subarachnoid haemorrhage were excluded from the audit.

2.6 Data collection

Rehabilitation units that agreed to participate only in the Organisational Survey were provided with an electronic copy of the paper-based questionnaire that could be printed and taken to the MDT meeting. On completion the questionnaire was returned to the NSF by email, post or fax. The audit project team entered the results into a secure web-based data entry tool (DET). Where possible, any missing data were obtained by phone or email, and the audit team entered them directly into the DET. No patient-identifying data are collected by the National Stroke Foundation, however, hospitals were asked to keep records on site that matched the patient audit number with the unique patient record identifier to allow data to be verified, if required.

Sites could access the DET using a standard internet connection. The DET offers a variety of administrative functions, including allowing the monitoring of data collection at a local and central level, as well as minimising missing and inconsistent data through inbuilt logic checks. The DET includes help notes for the interpretation of each question and the project manager was available to provide assistance at all stages of data entry.

Respondents were able to change their responses prior to 4 June 2012 at which point all data were locked. However, data queries following programmed data logic checks up to 9 July 2012 permitted further changes where data were inconsistent or appeared incorrect.

Each participating rehabilitation unit was asked to enter the first five patients' clinical notes twice using two different auditors who were requested to do this independently. This was to identify whether a case note audited by two people provided the same responses without any discussion about the case. Data are not reported here. This information will be used to refine the 2014 audit.

2.7 Data verification

Staff from the Translational Public Health Unit, Monash University, implemented programmed data logic checks to validate data from the Organisational Survey and the Clinical Audit to ensure data were consistent. Following data cleaning, the final data were verified with each of the participating hospitals. Each participating rehabilitation unit was sent a copy of their raw organisational and clinical data in an Excel spreadsheet to verify before the final analyses were undertaken.

2.8 Data analysis

Staff from the Translational Public Health Unit, Monash University, analysed all data. For confidentiality, identifying information such as hospital name, not necessary for analysis, were excluded from the data submitted to Monash University. Only the hospital site identification number was provided.

The data were analysed using computer programs including Intercooled STATA 10.0 for Windows (Stata Corp, College Station, TX) and Excel (Microsoft Excel 2007). The data were exported from the web-based DET as an Excel spreadsheet and transferred into STATA.

All organisational and clinical data were aggregated to provide national estimates.

Subcategories for analysis included urban/rural status and public/private status. No units from the Australian Capital Territory (ACT) participated. We attempted to compare the data within a subcategory of specialised versus non-specialised units. However, given there is no agreed definition of a specialised rehabilitation unit, the comparison proved difficult and unreliable. This highlights the need for determining how stroke specialist rehabilitation units can be defined.

Adherence to processes of care was generally calculated on the entire sample. When reporting adherence to care, 'Known N' refers to all eligible patients. In some instances, eligibility criteria for processes of care were specified. For example, adherence to the process of care relating to the use of antithrombotics on discharge was calculated only for patients presenting with ischaemic stroke. For processes of care where eligibility criteria were specified, a note has been made in the rationale or in the table footnote. Derived variables relating to processes of care, such as length of stay, were calculated based on admission and discharge dates.

The median (50th percentile) and first and third quartiles (25th and 75th) were reported for skewed continuous data from questions such as the number of strokes admitted each year.

Difference in proportions between 2008 and 2012 were assessed using the 2-sample test of proportions and significance level set at $p < 0.05$.

2.9 Supplementary data

Given the large amount of data collected, we could not report all data. In addition to this report, a Supplement containing additional data analysed but not reported is available at www.strokefoundation.com.au/health-professionals/tools-and-resources/national-stroke-audit-reports/

Results

3.1 Response rates and location of participating hospitals

Of the 146 hospitals approached, 110 public hospitals were eligible. The number of eligible private hospitals is unknown, although 15 private hospitals were identified as eligible by previous participation in the National Stroke Audit and stroke clinical networks.

The 110 eligible public hospitals were targeted with active recruitment techniques, involving follow-up phone calls and email communication. In total, 98 public hospitals and 13 private hospitals completed the Organisational Survey and of these 89 public and 12 private hospitals participated in the Clinical Audit. This represents a 89% participation rate by eligible public hospitals.

A total of 12 eligible public hospitals elected not to participate. Of these, seven were from New South Wales (NSW), two each from Queensland (QLD) and Victoria (VIC), and one from Western Australia (WA).

Table 2 Participating hospitals by location and rurality

| | Organisational Survey | | | Clinical Audit | | |
|------------------|-----------------------|-----------|-----------|----------------|-----------|-----------|
| | Total | Public | Private | Total | Public | Private |
| Australia | 111 | 98 | 13 | 101 | 89 | 12 |
| NSW | 43 | 39 | 4 | 41 | 37 | 4 |
| NT | 2 | 2 | 0 | 1 | 1 | 0 |
| QLD | 19 | 15 | 4 | 14 | 11 | 3 |
| SA | 8 | 6 | 2 | 7 | 5 | 2 |
| TAS | 3 | 3 | 0 | 3 | 3 | 0 |
| VIC | 27 | 25 | 2 | 26 | 24 | 2 |
| WA | 9 | 8 | 1 | 9 | 8 | 1 |
| Rurality | | | | | | |
| Urban | 96 | 85 | 11 | 88 | 77 | 11 |
| Rural | 15 | 13 | 2 | 13 | 12 | 1 |

3.2 Auditor discipline

The professional background of the auditors are noted in Table 3.

Table 3 Auditor discipline

| | Surveys completed* N=111 | Cases audited* N=2,821 |
|------------------------|-----------------------------|---------------------------|
| Nurse | 41% | 41% |
| Doctor | 13% | 11% |
| Manager | 17% | 6% |
| Physiotherapist | 13% | 11% |
| Speech pathologist | 7% | 12% |
| Occupational therapist | 4% | 8% |
| Other# | 5% | 11% |

*Refers to the organisational survey

*Refers to patient case note audits

#Other includes dietician, social work, psychologist and other

3.3 Characteristics of participating hospitals

Respondents were asked to describe their rehabilitation service, i.e. if a free-standing rehabilitation hospital or a rehabilitation service as part of an acute hospital (Table 4).

Hospital beds are an important resource. Respondents were asked to report the number of beds on their rehabilitation ward (if applicable) and on the dedicated stroke rehabilitation unit (if present). A stroke rehabilitation unit differs from the other two types of stroke unit, acute and integrated, in that it does not admit patients acutely (within two days of stroke onset). Usually admission occurs within a week or so after stroke onset.

Respondents were asked to provide the number of stroke admissions to their rehabilitation unit in the previous year. The number of stroke admissions per year is an influential factor in the team's ability to offer specialist stroke services.

Results

The 111 hospitals participating in the Organisational Survey reported that they provided in-patient rehabilitation to 6,609 people with stroke in 2011. Hospitals that also participated in the Clinical Audit accounted for the care of 6,144 (93%) of these patients.

The majority of in-patient rehabilitation services were provided in either a standalone rehabilitation hospital (31%) or within a rehabilitation ward in the same building as the acute hospital (48%). Twenty rehabilitation services reported that they prioritise beds for stroke, either in a dedicated rehabilitation stroke unit or as part of their mixed unit. On the day of the survey, 715 patients with stroke were admitted to all the rehabilitation services. Of these, 98 (14%) patients were cared for on a dedicated stroke rehabilitation unit.

Staff reported a total of 3,460 dedicated in-patient rehabilitation beds in the 111 participating hospitals (per hospital median: 25; Q1 Q3: 16–40; range: 3–145). South Australia reported the largest rehabilitation services, while Northern Territory reported the smallest (Table 5). Over half the sites reported between 31 and 79 stroke admissions in 2011.

The number of stroke rehabilitation patients admitted to each hospital in 2011 ranged from 10 to 200 (median: 50; Q1 Q3: 31–76).

Table 4 Characteristics of service model

| Service model | Location | | | | | | | | Rurality | | Setting | |
|--|-----------------------------|----------------------|--------------------|----------------------|--------------------|---------------------|----------------------|--------------------|------------------------|------------------------|-------------------------|--------------------------|
| | Australia N=111 n (%) | NSW N=43 n (%) | NT N=2 n (%) | QLD N=19 n (%) | SA N=8 n (%) | TAS N=3 n (%) | VIC N=27 n (%) | WA N=9 n (%) | Urban N=96 n (%) | Rural N=15 n (%) | Public N=98 n (%) | Private N=13 n (%) |
| Free standing rehabilitation hospital | 35 (31) | 16 (37) | 0 (0) | 3 (16) | 3 (37) | 0 (0) | 12 (44) | 1 (11) | 32 (33) | 3 (20) | 29 (30) | 6 (46) |
| Rehabilitation ward within acute hospital in same building of same health campus | 53 (48) | 22 (51) | 1 (50) | 9 (47) | 2 (25) | 3 (100) | 11 (41) | 5 (56) | 42 (44) | 11 (73) | 47 (48) | 6 (46) |
| Rehabilitation ward within acute hospital in separate building of same health campus | 21 (19) | 5 (12) | 1 (50) | 7 (37) | 1 (13) | 0 (0) | 4 (15) | 3 (33) | 21 (22) | 0 (0) | 20 (20) | 1 (8) |
| Rehabilitation service within acute hospital without designated beds | 2 (2) | 0 (0) | 0 (0) | 0 (0) | 2 (25) | 0 (0) | 0 (0) | 0 (0) | 1 (1) | 1 (7) | 2 (2) | 0 (0) |

Table 5 Characteristics of participating hospitals by location, rurality and setting, and number of rehabilitation beds and stroke admissions

| | Number of beds Median (Q1 Q3)* | Number of admissions 2011 Median (Q1 Q3)* | Number of stroke admissions per site in 2011 | | | |
|--------------------------|--------------------------------------|---|--|-----------|-----------|-----------|
| | | | ≤30 | 31–79 | 80–99 | ≥100 |
| Australia (N=111) | 25 (16–40) | 50 (31–76) | 25 | 61 | 11 | 14 |
| NSW (N=43) | 22 (16–31) | 45 (29–69) | 11 | 26 | 5 | 1 |
| NT (N=2)* | min 9, max 18 | min 12, max 65 | 1 | 1 | 0 | 0 |
| QLD (N=19) | 20 (13–36) | 53 (37–75) | 4 | 12 | 2 | 1 |
| SA (N=8) | 37 (7–55) | 63 (36–105) | 2 | 3 | 1 | 2 |
| TAS (N=3) | 20 (8–26) | 39 (31–50) | 1 | 2 | 0 | 0 |
| VIC (N=27) | 30 (21–56) | 52 (36–90) | 4 | 14 | 3 | 6 |
| WA (N=9) | 24 (12–65) | 73 (37–111) | 2 | 3 | 0 | 4 |
| Rurality | | | | | | |
| Urban (N=96) | 27 (20–42) | 54 (37–82) | 15 | 56 | 11 | 14 |
| Rural (N=15) | 8 (8–20) | 22 (15–36) | 10 | 5 | 0 | 0 |
| Setting | | | | | | |
| Public (N=98) | 24 (15–30) | 53 (34–78) | 19 | 56 | 11 | 12 |
| Private (N=13) | 45 (34–54) | 40 (23–53) | 6 | 5 | 0 | 2 |

*Q1 Q3; quartile one, quartile three

*Minimum and maximum reported as only two sites

3.4 Workforce

An important component of rehabilitation is a specialised MDT of health professionals that provides a coordinated program and includes individual assessment, treatment, regular review, discharge planning and follow-up.

The rehabilitation team may include many disciplines combining and coordinating the use of medical, nursing and allied health skills, along with social, educational and vocational services.

Respondents were asked to describe the composition and experience of their rehabilitation team including the specialisation of the medical leader.

Results

For most hospitals (except 12 public hospitals), the medical leadership for stroke was formally recognised (Table 6). It was mostly provided by rehabilitation physicians or geriatricians, but, as expected, specialists were less common in rural locations. All other team members are outlined in Table 7.

Few hospitals across Australia provided access to recreational therapists (14 hospitals, 13%) and diversional therapists (19 hospitals, 17%). With the exception of recreational therapists, generally over 70% of clinicians working in stroke rehabilitation had over three years experience.

Table 6 Medical leader for rehabilitation of stroke patients

| | Rehabilitation physician n (%) | Geriatrician n (%) | General medical physician n (%) | Neurologist n (%) | General practitioner/ visiting medical officer n (%) |
|--------------------------|-----------------------------------|-----------------------|------------------------------------|----------------------|--|
| Australia (N=111) | 68 (61) | 20 (18) | 7 (6) | 4 (4) | 12 (11) |
| NSW (N=43) | 31 (72) | 4 (9) | 1 (2) | 2 (5) | 5 (12) |
| NT (N=2) | 1 (50) | 0 (0) | 1 (50) | 0 (0) | 0 (0) |
| QLD (N=19) | 9 (47) | 7 (37) | 0 (0) | 0 (0) | 3 (16) |
| SA (N=8) | 4 (50) | 1 (12) | 0 (0) | 1 (13) | 2 (25) |
| TAS (N=3) | 1 (33) | 0 (0) | 2 (67) | 0 (0) | 0 (0) |
| VIC (N=27) | 22 (81) | 1 (4) | 2 (7) | 1 (4) | 1 (4) |
| WA (N=9) | 0 (0) | 7 (78) | 1 (11) | 0 (0) | 1 (11) |
| Rurality | | | | | |
| Urban (N=96) | 64 (67) | 19 (20) | 5 (5) | 4 (4) | 4 (4) |
| Rural (N=15) | 4 (27) | 1 (7) | 2 (13) | 0 (0) | 8 (53) |
| Setting | | | | | |
| Public (N=98) | 57 (58) | 18 (19) | 7 (7) | 4 (4) | 12 (12) |
| Private (N=13) | 11 (85) | 2 (15) | 0 (0) | 0 (0) | 0 (0) |

Table 7 Composition and experience of rehabilitation team

| | Location | | Setting | | | | Rurality | | | |
|--|--|----------------------------|--|----------------------------|--|----------------------------|--|----------------------------|--|----------------------------|
| | Australia (N=111) | | Public (N=98) | | Private (N=13) | | Urban (N=96) | | Rural (N=15) | |
| | Active involvement with stroke rehabilitation n* (%) | >3 years experience n* (%) | Active involvement with stroke rehabilitation n* (%) | >3 years experience n* (%) | Active involvement with stroke rehabilitation n* (%) | >3 years experience n* (%) | Active involvement with stroke rehabilitation n* (%) | >3 years experience n* (%) | Active involvement with stroke rehabilitation n* (%) | >3 years experience n* (%) |
| Rehabilitation nurse | 105 (95) | 101 (96) | 93 (95) | 89 (96) | 12 (92) | 12 (100) | 90 (94) | 88 (98) | 15 (100) | 13 (87) |
| Clinical nurse consultant | 42 (38) | 38 (90) | 37 (38) | 33 (89) | 5 (38) | 5 (100) | 39 (41) | 37 (95) | 3 (20) | 1 (33) |
| Clinical nurse specialist | 55 (50) | 46 (84) | 52 (53) | 45 (87) | 3 (23) | 1 (33) | 48 (50) | 41 (85) | 7 (47) | 5 (71) |
| Occupational therapist | 110 (99) | 101 (92) | 97 (99) | 90 (93) | 13 (100) | 11 (85) | 96 (100) | 89 (93) | 14 (93) | 12 (86) |
| Physiotherapist | 111 (100) | 104 (94) | 98 (100) | 91 (93) | 13 (100) | 13 (100) | 96 (100) | 90 (94) | 15 (100) | 14 (93) |
| Speech pathologist | 111 (100) | 96 (86) | 98 (100) | 85 (87) | 13 (100) | 11 (85) | 96 (100) | 84 (88) | 15 (100) | 12 (80) |
| Dietitian | 110 (99) | 76 (69) | 97 (99) | 66 (68) | 13 (100) | 10 (77) | 95 (99) | 67 (71) | 15 (100) | 9 (60) |
| Social worker | 105 (95) | 86 (82) | 96 (98) | 78 (81) | 9 (69) | 8 (89) | 93 (97) | 78 (84) | 12 (80) | 8 (67) |
| Clinical psychologist | 42 (38) | 33 (79) | 36 (37) | 28 (78) | 6 (46) | 5 (83) | 41 (43) | 32 (78) | 1 (7) | 1 (100) |
| Neuropsychologist | 41 (37) | 38 (93) | 38 (39) | 37 (97) | 3 (23) | 1 (33) | 41 (43) | 38 (93) | 0 (0) | – |
| Allied health assistant/ therapy assistant | 108 (97) | 83 (77) | 95 (97) | 72 (76) | 13 (100) | 11 (85) | 93 (97) | 73 (78) | 15 (100) | 10 (67) |
| Stroke liaison officer/ stroke care coordinator | 25 (23) | 20 (80) | 23 (23) | 18 (78) | 2 (15) | 2 (100) | 22 (23) | 19 (86) | 3 (20) | 1 (33) |
| Recreational therapist | 14 (13) | 8 (57) | 12 (12) | 8 (67) | 2 (15) | 0 (0) | 14 (15) | 8 (57) | 0 (0) | – |
| Diversional therapist | 19 (17) | 15 (79) | 17 (17) | 13 (76) | 2 (15) | 2 (100) | 18 (19) | 14 (78) | 1 (7) | 1 (100) |

*Known n of available workforce (see table above) used for determining percentage of existing available workforce with >3yrs experience in stroke rehabilitation

* Numerator: workforce with >3years experience in stroke rehabilitation

3.5 Team communication

Regular communication among the MDT is vital to address the various issues that may arise in a timely manner.¹⁰ Case conferences and team meetings facilitate coordinated communication. Respondents were asked to report the frequency of case conference meetings.

Results

Regular team meetings (case conferences) occurred at 110 (99%) hospitals. Of these, 107 (97%) hospitals reported meeting at least once per week and 30 (27%) hospitals reported meeting more frequently. Regular representation at the meetings varied between disciplines.

Table 8 Regular attendees at team meetings

| | Location | Rurality | | Setting | |
|--|----------------------------|--------------------------|--------------------------|---------------------------|----------------------------|
| | Australia (N=110) n (%) | Urban (N=95) n (%) | Rural (N=15) n (%) | Public (N=97) n (%) | Private (N=13) n (%) |
| Rehabilitation physician | 79 (72) | 74 (78) | 5 (33) | 67 (69) | 12 (92) |
| Geriatrician | 35 (32) | 33 (35) | 2 (13) | 29 (30) | 6 (46) |
| General medical physician | 10 (9) | 9 (9) | 1 (7) | 9 (9) | 1 (8) |
| Neurologist | 5 (5) | 5 (5) | 0 (0) | 4 (4) | 1 (8) |
| General practitioner/visiting medical officers | 8 (7) | 4 (4) | 4 (27) | 8 (8) | 0 (0) |
| Nurse | 110 (100) | 95 (100) | 15 (100) | 97 (100) | 13 (100) |
| Occupational therapist | 109 (99) | 95 (100) | 14 (93) | 96 (99) | 13 (100) |
| Physiotherapist | 110 (100) | 95 (100) | 15 (100) | 97 (100) | 13 (100) |
| Speech pathologist | 97 (88) | 85 (89) | 12 (80) | 90 (93) | 7 (54) |
| Dietitian | 60 (55) | 53 (56) | 7 (47) | 58 (60) | 2 (15) |
| Psychologist | 29 (26) | 29 (31) | 0 (0) | 28 (29) | 1 (8) |
| Social worker | 99 (90) | 89 (94) | 10 (67) | 91 (94) | 8 (62) |
| Pharmacist | 15 (14) | 15 (16) | 0 (0) | 15 (15) | 0 (0) |

3.6 Staff development

Embedding a culture of evidence-based practice can be facilitated by providing targeted education, collaborative involvement in data collection and quality improvement, and by undertaking research. Access to regular stroke-specific education is a core component of organised stroke care.¹⁰ Respondents were asked to report on staff access to continuing education related to stroke management and their participation in research.

Table 9 Staff development

| | Location | Rurality | | Setting | |
|---|-------------------------------|--------------------------|--------------------------|---------------------------|----------------------------|
| | Australia (N=111) n (%) | Urban (N=96) n (%) | Rural (N=15) n (%) | Public (N=98) n (%) | Private (N=13) n (%) |
| Hospitals with access to a program of continuing education of staff relating to stroke management | 75 (68) | 68 (71) | 7 (47) | 65 (66) | 10 (77) |

3.7 Facilities and equipment

Many of the recommendations for stroke rehabilitation in the *Clinical Guidelines for Stroke Management 2010*¹⁰ are dependent on specific resources or techniques. Respondents were asked to describe the organisational resources available for use in rehabilitation at their hospital and they were also asked, in consultation with their team, to describe the selection of therapies usually provided for common impairments following stroke. This was to determine access to evidence-based therapies from the *Clinical Guidelines for Stroke Management 2010*.¹⁰

Results

Thirty-three of the 52 sites reportedly conducting stroke research had a focus on rehabilitation-specific studies. A total of 158 research studies were being undertaken of which 82 were rehabilitation specific.

Results

Table 10 describes the rehabilitation facilities and equipment that are available for stroke survivors. Staff from the participating sites reported variable access to these facilities.

Table 10 Facilities and equipment available for stroke survivors

| | Location | Rurality | | Setting | |
|--|-------------------------------|--------------------------|--------------------------|---------------------------|----------------------------|
| | Australia (N=111) n (%) | Urban (N=96) n (%) | Rural (N=15) n (%) | Public (N=98) n (%) | Private (N=13) n (%) |
| Therapy gymnasium | 110 (99) | 95 (99) | 15 (100) | 97 (99) | 13 (100) |
| Therapy kitchen | 105 (95) | 94 (98) | 11 (73) | 92 (94) | 13 (100) |
| Therapy bathroom | 73 (66) | 66 (69) | 7 (47) | 66 (67) | 7 (54) |
| Dining room | 95 (86) | 81 (84) | 14 (93) | 84 (86) | 11 (85) |
| Recreation room | 64 (58) | 60 (63) | 4 (27) | 55 (56) | 9 (69) |
| Dedicated private room | 97 (87) | 87 (91) | 10 (67) | 85 (87) | 12 (92) |
| Independent living unit/room | 42 (38) | 39 (41) | 3 (20) | 41 (42) | 1 (8) |
| Robotic equipment | 10 (9) | 9 (9) | 1 (7) | 10 (10) | 0 (0) |
| Supported body weight device over treadmill | 51 (46) | 48 (50) | 3 (20) | 48 (49) | 3 (23) |
| Supported body weight device over ground | 66 (59) | 62 (65) | 4 (27) | 62 (63) | 4 (31) |
| Functional electrical stimulation | 90 (81) | 80 (83) | 10 (67) | 77 (79) | 13 (100) |
| Upright cycle | 90 (81) | 79 (82) | 11 (73) | 78 (80) | 12 (92) |
| Recumbent cycle | 70 (63) | 64 (67) | 6 (40) | 60 (61) | 10 (77) |
| Upper limb ergometer | 67 (60) | 63 (66) | 4 (27) | 58 (59) | 9 (69) |
| Free weights/weights unit | 105 (95) | 92 (96) | 13 (87) | 92 (94) | 13 (100) |
| Alternative and augmentative communication devices | 70 (63) | 66 (69) | 4 (27) | 65 (66) | 5 (38) |
| Nintendo Wii™ | 84 (76) | 74 (77) | 10 (67) | 72 (73) | 12 (92) |

3.8 Assessment for suitability for rehabilitation

Access to rehabilitation, and case mix of rehabilitation inpatients, is dependent on the assessment for suitability and acceptance for rehabilitation. This is often done in the acute setting. Respondents were asked to describe how patients were assessed for admission to the rehabilitation service.

Results

The decision on suitability and acceptance for rehabilitation was most often made by the specialist rehabilitation physicians (77%). Forty-one percent of respondents indicated that suitability was assessed in conjunction with the full MDT.

Table 11 Assessment for suitability for rehabilitation

| Discipline | Location | | | | | | | | Rurality | | Setting | |
|--|-------------------------------|------------------------|-------------------|------------------------|-------------------|-----------------------|------------------------|----------------------|--------------------------|--------------------------|---------------------------|----------------------------|
| | Australia (N=111) n (%) | NSW (N=43) n (%) | NT (N=2) n (%) | QLD (N=19) n (%) | SA (N=8) n (%) | TAS (N=3) n (%) | VIC (N=27) n (%) | WA (N=9) n (%) | Urban (N=96) n (%) | Rural (N=15) n (%) | Public (N=98) n (%) | Private (N=13) n (%) |
| Acute physician | 16 (14) | 5 (12) | 0 (0) | 1 (5) | 1 (13) | 0 (0) | 6 (22) | 3 (33) | 13 (14) | 3 (20) | 14 (14) | 2 (15) |
| Rehabilitation physician or geriatrician | 86 (77) | 36 (84) | 2 (100) | 14 (74) | 3 (38) | 2 (67) | 21 (78) | 8 (89) | 79 (82) | 7 (47) | 75 (77) | 11 (85) |
| Nurse | 46 (41) | 14 (33) | 1 (50) | 6 (32) | 5 (63) | 2 (67) | 14 (52) | 4 (44) | 41 (43) | 5 (33) | 38 (39) | 8 (62) |
| Multidisciplinary team | 45 (41) | 19 (44) | 1 (50) | 7 (37) | 2 (25) | 2 (67) | 8 (30) | 6 (67) | 33 (34) | 12 (80) | 41 (42) | 4 (31) |
| Other | 9 (8) | 2 (5) | 0 (0) | 1 (5) | 1 (13) | 0 (0) | 3 (11) | 2 (22) | 8 (8) | 1 (7) | 8 (8) | 1 (8) |

3.9 Characteristics of patients from Clinical Audit

3.9.1 Patient demographics

A total of 2,821 (including 247 reliability cases) patient case notes were audited. The majority (92%) of these patients were managed in urban hospitals.

3.9.2 Transfers to and location of rehabilitation

Forty-four percent of the patients admitted for rehabilitation had been transferred from the stroke unit of an acute hospital. The majority (79%) of the audited cases were managed in mixed rehabilitation wards. Just over one-fifth of the cases audited were treated in either a specialist stroke or neuro-rehabilitation unit.

Table 12 Patient demographics

| Demographic | Location | | | | | | | | Rurality | | Setting | |
|--|---------------------------------|---------------------------|-----------------------|-------------------------|------------------------|------------------------|-------------------------|------------------------|-----------------------------|---------------------------|------------------------------|-----------------------------|
| | Australia (N=2,821) n (%) | NSW (N=1,069) n (%) | NT (N=12) n (%) | QLD (N=455) n (%) | SA (N=187) n (%) | TAS (N=75) n (%) | VIC (N=777) n (%) | WA (N=246) n (%) | Urban (N=2,588) n (%) | Rural (N=233) n (%) | Public (N=2,542) n (%) | Private (N=279) n (%) |
| Male | 1533 (54) | 573 (54) | 8 (67) | 261 (57) | 98 (52) | 51 (68) | 412 (53) | 130 (53) | 1398 (54) | 135 (58) | 1405 (55) | 128 (45) |
| <65 | 671 (24) | 241 (23) | 7 (58) | 125 (27) | 44 (24) | 17 (23) | 180 (23) | 57 (23) | 626 (24) | 45 (19) | 640 (25) | 31 (11) |
| 65–74 | 688 (24) | 267 (25) | 4 (33) | 111 (24) | 43 (23) | 25 (33) | 180 (23) | 58 (24) | 632 (24) | 56 (24) | 631 (25) | 57 (21) |
| 75–84 | 928 (33) | 341 (32) | 1 (8) | 150 (33) | 63 (34) | 25 (33) | 271 (35) | 77 (31) | 843 (33) | 85 (37) | 824 (32) | 104 (37) |
| ≥85 | 534 (19) | 220 (21) | 0 (0) | 69 (15) | 37 (20) | 8 (11) | 146 (19) | 54 (22) | 487 (19) | 47 (20) | 447 (18) | 87 (31) |
| Median Age (Q1 Q3)* | 76 (66–83) | 76 (66–84) | 55 (47–70) | 74 (64–82) | 76 (66–84) | 73 (66–80) | 76 (66–84) | 76 (65–84) | 76 (65–83) | 77 (68–84) | 75 (65–83) | 82 (73–87) |
| Aboriginal and/or Torres Strait Islander background | 55 (2) | 24 (2) | 4 (33) | 9 (2) | 1 (1) | 1 (1) | 8 (1) | 8 (3) | 50 (2) | 5 (2) | 54 (2) | 1 (1) |
| Non-English speaking background with requirement for interpreter | 284 (10) | 101 (9) | 2 (17) | 30 (7) | 20 (11) | 2 (3) | 116 (15) | 13 (5) | 276 (11) | 8 (3) | 273 (11) | 11 (4) |
| Ischaemic stroke | 2136 (76) | 810 (76) | 11 (92) | 335 (74) | 154 (82) | 56 (75) | 576 (74) | 194 (79) | 1977 (76) | 159 (68) | 1923 (76) | 213 (76) |
| Intracerebral haemorrhage | 519 (18) | 189 (18) | 1 (8) | 88 (19) | 30 (16) | 14 (19) | 157 (20) | 40 (16) | 482 (19) | 37 (16) | 470 (18) | 49 (18) |
| Unknown stroke type | 166 (6) | 70 (7) | 0 (0) | 32 (7) | 3 (2) | 5 (7) | 44 (6) | 12 (5) | 129 (5) | 37 (16) | 149 (6) | 17 (6) |
| Median FIM on admission (Q1 Q3)* | 75 (52–95) | 73 (52–94) | 76 (61–99) | 78 (54–96) | 85 (68–102) | 78 (54–97) | 72 (49–94) | 67 (53–85) | 75 (52–95) | 75 (52–97) | 72 (50–93) | 90 (72–104) |
| Independence on Admission (mRS 0–2) [†] | 198 (7) | 68 (7) | 3 (25) | 35 (8) | 9 (5) | 7 (9) | 53 (7) | 23 (9) | 174 (7) | 24 (10) | 178 (7) | 20 (7) |

*Q1 Q3; first quartile, third quartile

†<20% missing data

‡<2% missing data

Table 13 Where patients were transferred from (prior to in-patient rehabilitation)

| | Location | Rurality | | Setting | |
|-------------------------------|------------------------------|-----------------------------|---------------------------|-----------------------------|-----------------------------|
| | Australia (N=2,821) n (%) | Urban (N=2,588) n (%) | Rural (N=233) n (%) | Public (N=2542) n (%) | Private (N=279) n (%) |
| Stroke unit | 1,243 (44) | 1,226 (47) | 17 (7) | 1,168 (46) | 75 (27) |
| Acute in-patient ward | 1,231 (43) | 1,049 (40) | 182 (78) | 1,077 (42) | 154 (55) |
| Acute unknown ward | 187 (7) | 179 (7) | 8 (4) | 148 (6) | 39 (14) |
| Rehabilitation ward | 56 (2) | 50 (2) | 6 (3) | 55 (2) | 1 (1) |
| General practitioner referral | 15 (1) | 12 (1) | 3 (1) | 9 (1) | 6 (2) |
| Other/Unknown | 89 (3) | 72 (3) | 17 (7) | 85 (3) | 4 (1) |

Table 14 The ward patients were treated on during in-patient rehabilitation

| | Location | | | | | | | | Rurality | | Setting | |
|--------------------------------------|---------------------------------|---------------------------|-----------------------|-------------------------|------------------------|------------------------|-------------------------|------------------------|-----------------------------|---------------------------|------------------------------|-----------------------------|
| | Australia (N=2,821) n (%) | NSW (N=1,069) n (%) | NT (N=12) n (%) | QLD (N=455) n (%) | SA (N=187) n (%) | TAS (N=75) n (%) | VIC (N=777) n (%) | WA (N=246) n (%) | Urban (N=2,588) n (%) | Rural (N=233) n (%) | Public (N=2,542) n (%) | Private (N=279) n (%) |
| Dedicated stroke rehabilitation unit | 323 (12) | 80 (7) | 0 (0) | 0 (0) | 32 (17) | 0 (0) | 68 (9) | 143 (58) | 323 (13) | 0 (0) | 300 (12) | 23 (8) |
| Neurorehabilitation unit | 265 (9) | 58 (5) | 0 (0) | 0 (0) | 64 (34) | 0 (0) | 143 (18) | 0 (0) | 265 (10) | 0 (0) | 229 (9) | 36 (13) |
| Mixed rehabilitation ward | 2233 (79) | 931 (87) | 12 (100) | 455 (100) | 91 (49) | 75 (100) | 566 (73) | 103 (42) | 2000 (77) | 233 (100) | 2013 (79) | 220 (79) |

3.10 Patient assessment

3.10.1 MDT assessment

Respondents were asked to provide the dates and times of assessment by members of the MDT on each audited case so that median times to assessment could be calculated. Eligibility for an assessment by allied health was determined from the medical record. Reporting of assessment rates and times to assessment for dietitians and psychologists took into account the presence of nutrition complications and mood impairment respectively.

Results

The majority of patients were assessed by most members of the MDT at some point during their admission (Table 15).

Some patients were not seen by some allied health disciplines because the particular therapist was not on staff. This was most common for patients with mood impairment where clinical psychology was not available. Forty-one percent of patients with mood impairment on admission were assessed by psychology with a median time to assessment for psychology of 12 days (Q1 Q3:7–22).

Table 15 MDT assessment

| Discipline | Eligible for assessment N | Received assessment n (%) | Median time to assessment M (Q1 Q3)* days |
|------------------------|------------------------------|------------------------------|--|
| Physiotherapy | 2,811 | 2,802 (99) | 0 (0–1) |
| Occupational therapy | 2,803 | 2,761 (99) | 1 (0–2) |
| Speech pathology | 2,532 | 2,370 (94) | 1 (0–3) |
| Social work | 2,590 | 2,224 (86) | 4 (2–9) |
| Dietetics ⁺ | 1,048 ⁺ | 1,006 (96) | 3 (1–6) |

*Q1 Q3; first quartile, third quartile

⁺Known N includes patients with nutrition complications identified on admission

3.10.2 Use of standardised assessment tools

Once admitted to a rehabilitation service, timely intervention from the MDT is important¹⁰ with increasing evidence for early intervention and for more intensive and frequent therapy sessions.^{10,12–16} Decisions about therapy and rehabilitation goals are guided by early assessment using standardised tools.¹⁰ Respondents were asked to indicate if standardised assessments were used for evaluating impairments following stroke, and to select those most frequently used. More than one assessment tool for each impairment could be selected.

Results

Respondents from all surveyed sites reported the use of standardised assessment tools for evaluation of common impairments after stroke. The assessment tools used for common impairments are outlined in Table 16. Only 50% of patients received an assessment for mood, however, documentation was poor and a large number (890) of patients were excluded from this analysis. The 'other' tools varied widely and further work is required to report comprehensively.

Table 16 Summary of tools used for assessing impairments

| Assessment | Received assessment n* (%) | Tool used to assess impairment | Rate of selection of tool n (%) ⁺ |
|--|-------------------------------|--|--|
| Upper limb function (N [#] =2,652) | 2,428 (92) | Upper limb component of the Motor Assessment Scale: UL-MAS | 1,100 (45) |
| | | 9 hole peg test: 9HPT | 416 (17) |
| | | Other | 1,260 (52) |
| Urinary incontinence (N [#] =2,596) | 2,238 (86) | Non-standardised Bladder function chart | 737 (33) |
| | | Post-void residual scan | 738 (33) |
| | | FIM subset | 1,710 (76) |
| | | Other | 371 (17) |
| Mood (N [#] =1,931) | 967 (50) | Geriatric Depression Scale: GDS | 135 (14) |
| | | Hospital and Depression Scale: HADS | 148 (15) |
| | | Other | 561 (58) |

*n is all patients who received assessment, excluding missing data

⁺Of all patients who received assessment, excluding missing data

[#]Known N is used for denominator for total number of patients who had documentation yes/no of assessment performed, excludes not documented data

3.11 Management of impairments

Participants were asked to audit impairments on admission and management of consequences for selected topics. Management options were based on common therapy recommended in the *Clinical Guidelines for Stroke Management 2010*.¹⁰

Results

The impairments found on admission varied. Most (87%) patients had difficulties with activities of daily living (ADLs), and 84% were unable to walk. As with the previous section, the use of 'other' therapies or management strategies varied and further work is required to report comprehensively.

Table 17 Management of impairments

| | Assessment documented N* | Impairment Present n (%)* | Type of therapy/management | Therapy provided n (%)* |
|----------------------------------|--------------------------|---------------------------|---|-------------------------|
| Difficulty walking independently | 2,801 | 2,353 (84) | Tailored, repetitive practice of walking | 2,162 (92) |
| | | | Cueing of cadence | 1,021 (43) |
| | | | Mechanically assisted gait | 291 (12) |
| | | | Joint position biofeedback | 292 (12) |
| | | | Other therapy | 1,275 (54) |
| Difficulties with ADLs | 2,794 | 2,444 (87) | Task specific practice | 2,194 (90) |
| | | | Trained use of appropriate aids | 1,487 (61) |
| | | | Other | 952 (39) |
| Aphasia | 2,689 | 825 (31) | Alternative means of communication | 454 (55) |
| | | | Phonological and semantic interventions | 560 (68) |
| | | | Constraint-induced language therapy | 65 (8) |
| | | | Supported conversation techniques | 590 (72) |
| | | | Delivery of therapy programs via computer | 61 (7) |
| | | | Group therapy | 172 (21) |
| | | | Other therapy | 341 (41) |
| Neglect/inattention | 2,517 | 762 (30) | Visual scanning with sensory stimulation | 485 (64) |
| | | | Prism adaption | 11 (1) |
| | | | Eye patching | 18 (2) |
| | | | Simple cues | 637 (84) |
| | | | Mental imagery training | 118 (15) |
| | | | Other therapy | 237 (31) |
| Nutrition complication | 2,601 | 1,064 (41) | Ongoing monitoring by dietician | 986 (93) |
| | | | Nutritional supplementation | 797 (75) |
| | | | Alternative feeding | 172 (16) |

*Known N; all patients with assessment recorded (excludes missing data)

†Of all patients with impairment present

3.12 Complications during hospital admission

Figure 1 depicts the complications present on admission to rehabilitation and those that developed during the rehabilitation stay. Fifteen percent of the patients audited had a 'fall' and 13% (365) developed a urinary tract infection during the rehabilitation admission.

3.13 Intensity of practice

The amount and intensity of rehabilitation provided to stroke survivors greatly affects their outcomes. The *Clinical Guidelines for Stroke Management 2010*¹⁰ recommend that patients be provided as much therapy as possible with a minimum of an hour active practice for physical therapy and as much therapy for dysphagia or communication difficulties as can be tolerated.¹⁰ Group therapy is suggested as one strategy to increase amount of practice.¹⁰

Results

The reported intensity of available practice of the participating rehabilitation services are outlined in Table 18. The frequency of each activity varied. Group therapy was used at 97 (87%) hospitals.

Figure 1 Complications on admission and during rehabilitation

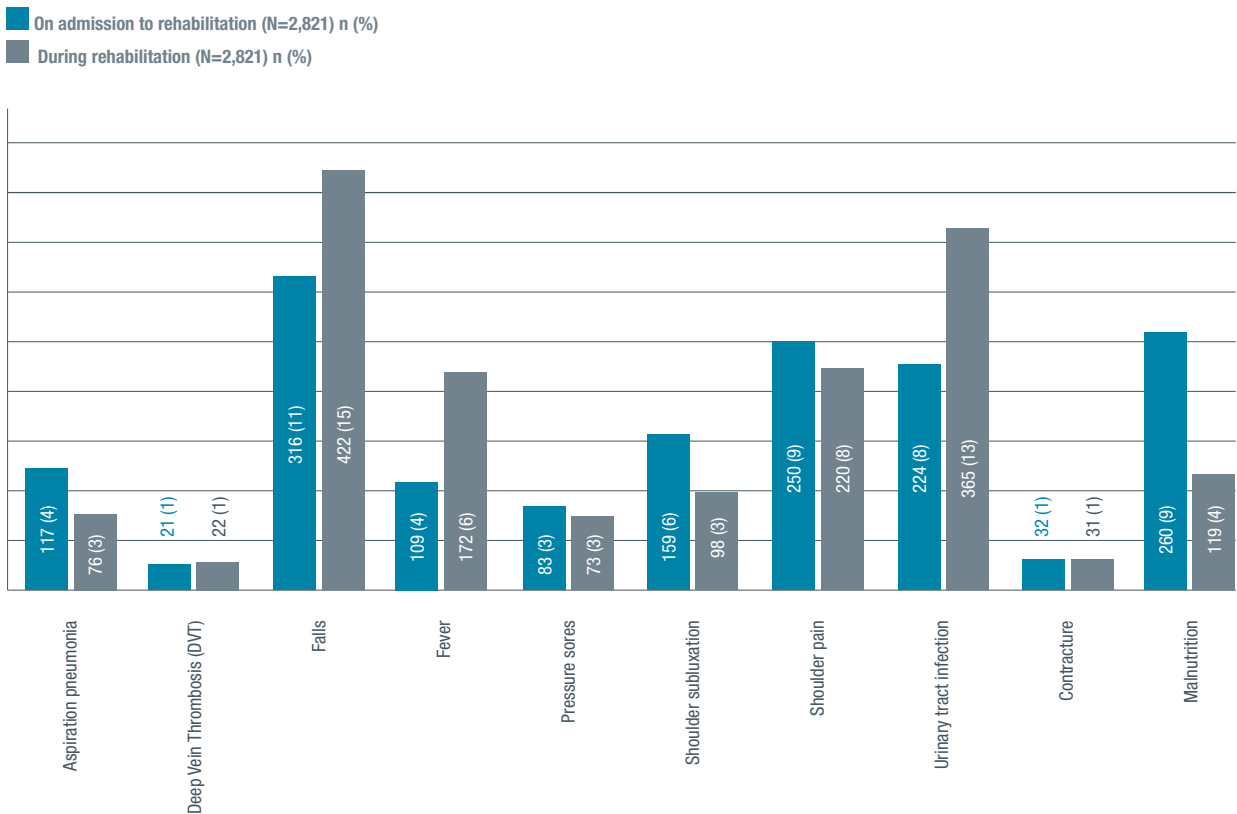


Table 18 Intensity of available therapy

| | Australia (N=111) n (%) | If yes, frequency | | | |
|---|-------------------------------|-------------------|------------------|--------------------|-----------------|
| | | Always n (%) | Usually n (%) | Sometimes n (%) | Rarely n (%) |
| Do patients with motor impairments usually undertake at least one hour of active physical therapy (physiotherapy and/or OT) per day (at least five times per week)? | 108 (97) | 55 (51) | 46 (42) | 5 (5) | 2 (2) |
| Is group circuit class training used as a method to increase amount of practice? | 67 (60) | 15 (22) | 29 (43) | 20 (30) | 3 (5) |
| Is speech therapy for dysphagia or communication difficulties provided as much as can be tolerated (aiming for at least 2 hours per week)? | 104 (94) | 50 (48) | 44 (42) | 9 (9) | 1 (1) |
| Is provision made during the day for patients to practice skills learnt in therapy sessions? | 110 (99) | 35 (32) | 54 (49) | 20 (18) | 1 (1) |

3.14 Communication with patients

Communication with the patient is an integral component of stroke rehabilitation. It is important that the patient is provided the opportunity to discuss their desired goals for rehabilitation with the MDT. Goal setting performed with the team will ensure that the goals will be relevant to the stroke survivor, and will also permit the team to evaluate the progress of the patient throughout their admission.¹⁰

Respondents were asked to describe how goal setting was performed and to audit the practice of goal setting in the clinical case notes. Respondents were also asked to report the numbers of patients meeting with the team to discuss their management and goal setting.

Results

In total 2,033 (76%) patients, without severe cognitive and/or communication difficulties, had the opportunity to meet and discuss their management with the MDT. For 162 (6%) patients with severe cognitive and/or communication difficulties, family members met with the team in lieu of the patient to discuss their management. One in five patients had no documented evidence of discussing their management with the team.

Most hospitals (82%) had a formal process for goal setting. The processes used for establishing goals are outlined in Table 19. The most common practice for goal setting was an interview with the patient by individual disciplines followed by a review at the MDT meeting (74%). In total, 2,127 (79%) patients without cognitive or severe communication difficulties were central to the process of setting their goals with input from the MDT. For 129 (5%) patients with severe cognitive or communication difficulties, the patient's goals were set by their family/carer with input from the MDT. One in five patients did not have the opportunity to discuss goal setting with the MDT.

Table 19 Processes for goal setting (Organisational Survey)

| Process | Location | | | | | | | | Rurality | | Setting | |
|---|-------------------------------|------------------------|-------------------|------------------------|-------------------|-----------------------|------------------------|----------------------|--------------------------|--------------------------|---------------------------|----------------------------|
| | Australia (N=111) n (%) | NSW (N=43) n (%) | NT (N=2) n (%) | QLD (N=19) n (%) | SA (N=8) n (%) | TAS (N=3) n (%) | VIC (N=27) n (%) | WA (N=9) n (%) | Urban (N=96) n (%) | Rural (N=15) n (%) | Public (N=98) n (%) | Private (N=13) n (%) |
| Usual practice is that person interviewed by separate disciplines only | 7 (6) | 2 (5) | 0 (0) | 1 (5) | 2 (25) | 0 (0) | 2 (7) | 0 (0) | 6 (6) | 1 (7) | 6 (6) | 1 (8) |
| Usual practice is that person interviewed by disciplines separately and goals reviewed at MDT meeting | 82 (74) | 32 (74) | 2 (100) | 14 (74) | 5 (63) | 1 (33) | 23 (85) | 5 (56) | 74 (77) | 8 (53) | 71 (72) | 11 (85) |
| Usual practice is that person and MDT develop goals together | 15 (14) | 7 (16) | 0 (0) | 4 (21) | 0 (0) | 1 (33) | 1 (4) | 2 (22) | 10 (10) | 5 (33) | 14 (14) | 1 (8) |
| No consistent process | 5 (4) | 1 (2) | 0 (0) | 0 (0) | 0 (0) | 1 (33) | 1 (4) | 2 (22) | 5 (5) | 0 (0) | 5 (5) | 0 (0) |
| Other | 2 (2) | 1 (2) | 0 (0) | 0 (0) | 1 (13) | 0 (0) | 0 (0) | 0 (0) | 1 (1) | 1 (7) | 2 (2) | 0 (0) |

Table 20 Involvement of patient/family in goal setting processes (Clinical Audit)

| | Location | | | | | | | | Rurality | | Setting | |
|---|---------------------------------|---------------------------|-----------------------|-------------------------|------------------------|------------------------|-------------------------|------------------------|-----------------------------|---------------------------|------------------------------|-----------------------------|
| | Australia (N=2,659) n (%) | NSW (N=1,004) n (%) | NT (N=12) n (%) | QLD (N=431) n (%) | SA (N=183) n (%) | TAS (N=75) n (%) | VIC (N=718) n (%) | WA (N=236) n (%) | Urban (N=2,433) n (%) | Rural (N=216) n (%) | Public (N=2,387) n (%) | Private (N=272) n (%) |
| Patients met with team to discuss management* | 2,033 (76) | 757 (75) | 11 (92) | 313 (73) | 147 (80) | 54 (72) | 579 (81) | 172 (73) | 1,854 (76) | 179 (83) | 1,846 (77) | 187 (69) |
| | (N=2,692) n (%) | (N=1,012) n (%) | (N=12) n (%) | (N=441) n (%) | (N=180) n (%) | (N=75) n (%) | (N=737) n (%) | (N=235) n (%) | (N=2,470) n (%) | (N=222) n (%) | (N=2,420) n (%) | (N=272) n (%) |
| Goals set with input from patients* | 2,127 (79) | 782 (77) | 11 (92) | 367 (83) | 128 (71) | 34 (45) | 649 (88) | 156 (66) | 1,944 (79) | 183 (82) | 1,924 (80) | 203 (75) |
| | (N=2,821) n (%) | (N=1,069) n (%) | (N=12) n (%) | (N=455) n (%) | (N=187) n (%) | (N=75) n (%) | (N=777) n (%) | (N=246) n (%) | (N=2,588) n (%) | (N=233) n (%) | (N=2,542) n (%) | (N=279) n (%) |
| Patients/family received information regarding stroke | 1,846 (65) | 710 (66) | 11 (92) | 294 (65) | 160 (86) | 54 (72) | 424 (55) | 193 (78) | 1,691 (65) | 155 (67) | 1,659 (65) | 187 (67) |

*Patients without cognitive/communication difficulties

3.15 Secondary prevention

There are clear recommendations in the *Clinical Guidelines for Stroke Management 2010*¹⁰ for the use of blood pressure-lowering, cholesterol-lowering and antiplatelet or anticoagulation pharmacotherapy to prevent further vascular events.¹⁰ All stroke survivors should be assessed and educated on lifestyle risk factor modification.¹⁰

Results

Table 21 summarises the secondary prevention measures provided on discharge. Ninety-seven percent of patients with an ischaemic stroke were prescribed antithrombotics, while just over half received advice about risk factor modification.

Table 21 Secondary prevention measures on discharge

| | Location | Rurality | | Setting | |
|---|---------------|-------------|-------------|--------------|---------------|
| | Australia (%) | Urban n (%) | Rural n (%) | Public n (%) | Private n (%) |
| On antithrombotics on discharge** (N=2,091) | 2,018 (97) | 1,868 (96) | 150 (98) | 1,812 (96) | 206 (98) |
| On antihypertensives on discharge* (N=2,683) | 2,280 (85) | 2,106 (85) | 174 (82) | 2,047 (85) | 233 (87) |
| On lipid lowering therapy on discharge** (N=2,080) | 1,751 (84) | 1,633 (85) | 118 (78) | 1,594 (85) | 157 (76) |
| Received advice about risk factor modification on discharge* (N=1,698) | 906 (53) | 850 (54) | 56 (44) | 819 (54) | 87 (46) |

*Ischaemic strokes only. For details of all Known N please see the Supplement report

**Patients discharged alive, and with no contraindication for drug. For details of all Known N please see the Supplement report

3.16 Preparation for discharge

The dynamics of each survivor's stroke vary greatly. A range of physical, psychosocial, social and financial consequences can create challenges for the stroke survivor's adjustment to life in the community following discharge. Rehabilitation is concerned with addressing these factors and facilitating the stroke survivor's reintegration to the community as well as their physical recovery. Effective discharge planning facilitates the transfer of the stroke survivor to the community by maximising independence, minimising social isolation and ensuring that the needs of the patient and carer are addressed. Carers often report difficulties coping in the community due to inadequate training and lack of support following the discharge of the stroke survivor.^{10,21}

Aspects of care recommended in the *Clinical Guidelines for Stroke Management 2010* include a potential home visit, assessment and discussion of the post-discharge needs of the patient and family/carer, and timely communication with relevant health professionals in the community.¹⁰ Information should be collated in a post-discharge care plan including information about follow-up appointments/services, medications and equipment, patient goals and therapy to continue in the community with a copy provided to the stroke survivor and or family/carer.¹⁰ All stroke survivors and their families/carers should be provided with tailored information and opportunities for clarification or reinforcement of the information provided.¹⁰

Respondents were asked to describe how discharge-planning processes and patient education is usually delivered at their hospital. Respondents were then asked to describe the discharge-planning processes that had been documented for their audited patients and their carers.

Results

Of the 111 hospitals surveyed, 96% stated that patient education was provided at their hospital. Education delivery methods include written/audiovisual and verbal sessions, either individual or group. Most hospitals preferred to use written/audiovisual materials (78%) or deliver individual sessions (93%), while fewer hospitals reported using group education sessions (33%). Half of the hospitals surveyed reported providing a discharge care plan, while the Clinical Audit revealed almost three-quarters of patients received a care plan prior to discharge. Just over half of hospitals surveyed reported having protocols guiding discharge planning (52%) and offering a key contact person for post-discharge programs (59%), which is similar to that found in the Clinical Audit (Table 23).

Tailored information regarding stroke rehabilitation and recovery was provided to 1,846 (65%) of stroke survivors. It was most often provided as an individual verbal education session (82%), followed by written/audio-visual resources (53%) and group education session (17%). This is much lower than reported in the Organisational Survey (Table 22). Adherence to the other discharge planning processes are outlined in Table 23.

Table 22 Site-specific information on patient education

| | Location | | | | | | | | Rurality | | Setting | |
|----------------------------|-------------------------------|------------------------|-------------------|------------------------|-------------------|-----------------------|------------------------|----------------------|--------------------------|--------------------------|---------------------------|----------------------------|
| | Australia (N=111) n (%) | NSW (N=43) n (%) | NT (N=2) n (%) | QLD (N=19) n (%) | SA (N=8) n (%) | TAS (N=3) n (%) | VIC (N=27) n (%) | WA (N=9) n (%) | Urban (N=96) n (%) | Rural (N=15) n (%) | Public (N=98) n (%) | Private (N=13) n (%) |
| Patient education provided | 106 (96) | 41 (95) | 2 (100) | 18 (95) | 8 (100) | 3 (100) | 25 (93) | 9 (100) | 91 (95) | 15 (100) | 94 (96) | 12 (92) |
| If yes, provided by | (N=106) n (%) | (N=41) n (%) | (N=2) n (%) | (N=18) n (%) | (N=8) n (%) | (N=3) n (%) | (N=25) n (%) | (N=9) n (%) | (N=91) n (%) | (N=15) n (%) | (N=94) n (%) | (N=12) n (%) |
| Written or audio | 83 (78) | 28 (68) | 1 (50) | 13 (72) | 8 (100) | 2 (67) | 23 (92) | 8 (89) | 72 (79) | 11 (73) | 74 (79) | 9 (75) |
| Individual verbal | 99 (93) | 38 (93) | 2 (100) | 17 (94) | 7 (88) | 3 (100) | 23 (92) | 9 (100) | 85 (93) | 14 (93) | 87 (93) | 12 (100) |
| Group session | 35 (33) | 15 (37) | 1 (50) | 8 (44) | 2 (25) | 0 (0) | 9 (36) | 0 (0) | 33 (36) | 2 (13) | 31 (33) | 4 (33) |

Table 23 Use of discharge-planning processes

| | Location | | | | | | | | Rurality | | Setting | |
|--|--------------------|--------------|-------------|--------------|-------------|--------------|--------------|-------------|----------------|----------------|-----------------|------------------|
| | Australia n (%) | NSW n (%) | NT n (%) | QLD n (%) | SA n (%) | TAS n (%) | VIC n (%) | WA n (%) | Urban n (%) | Rural n (%) | Public n (%) | Private n (%) |
| Discharge care plan provided (N=2,503)* | 1,849 (74) | 664 (71) | 12 (100) | 299 (71) | 138 (82) | 45 (74) | 576 (84) | 115 (53) | 1,701 (74) | 148 (74) | 1,669 (74) | 180 (70) |
| Home assessment completed (N=1,618) [†] | 1,193 (74) | 467 (76) | 3 (30) | 168 (68) | 92 (80) | 42 (70) | 314 (73) | 107 (75) | 1,098 (74) | 95 (75) | 1,061 (74) | 132 (75) |
| GP sent discharge summary (N=2,821) [‡] | 2,626 (93) | 994 (93) | 7 (58) | 409 (90) | 182 (97) | 72 (96) | 729 (94) | 233 (95) | 2,421 (94) | 205 (88) | 2,369 (93) | 257 (92) |
| Contact provided for post-discharge programs (N=2,789)** | 1,577 (57) | 635 (60) | 7 (58) | 206 (46) | 136 (73) | 24 (32) | 421 (55) | 148 (61) | 1,455 (57) | 122 (54) | 1,449 (58) | 128 (46) |

*Known N is limited to eligible patients alive at discharge. For details of all Known N please see the Supplement report

[†]Known N is limited to eligible patients discharged home. For details of all Known N please see the Supplement report

[‡]Known N includes all audited cases. For details of all Known N please see the Supplement report

**Known N is limited to eligible patients alive at discharge. Contact provided to patient or family. For details of all Known N please see the Supplement report

3.17 Life after stroke for patient and family

The transition from therapy to life after stroke can be challenging.²¹ The *Clinical Guidelines for Stroke Management 2010* covers a range of topics including return to driving, return to work, leisure activities, sexuality and accessing support.¹⁰

Respondents were asked to describe the activities that have been documented related to preparing the patient and carer for life in the community.

Results

The information provided to stroke survivors and carers regarding preparation for life in the community varied (summarised in Tables 24 and 25). One-quarter of patients were provided with information about self-management programs and 17% received information on sexuality. While 78% of carers were provided training, only 33% were offered formal counselling.

Table 24 Preparation of stroke survivor for life in the community

| | Location | Rurality | | Setting | |
|---|-----------------|-------------|-------------|--------------|---------------|
| | Australia n (%) | Urban n (%) | Rural n (%) | Public n (%) | Private n (%) |
| Offered formal counselling if no cognitive issues* (N=2,654) | 821 (31) | 745 (31) | 76 (35) | 755 (32) | 66 (25) |
| Received information on sexuality* (N=2,789) | 483 (17) | 446 (17) | 37 (16) | 433 (17) | 50 (18) |
| Provided information about self-management programs* (N=2,423) | 603 (25) | 547 (25) | 56 (27) | 541 (25) | 62 (24) |
| Offered information about peer support* (N=1,635) | 638 (39) | 592 (39) | 46 (32) | 576 (39) | 62 (36) |
| Offered assistance to return to work if wanted to return to work* (N=163) | 140 (86) | 138 (86) | 2 (100) | 131 (86) | 9 (82) |
| Offered assistance to return to driving if wanted to return to driving* (N=586) | 572 (98) | 527 (97) | 45 (100) | 512 (98) | 60 (98) |

*Known N is limited to patients alive at discharge. For details of all Known N please see the Supplement report

+For those patients discharged to private residence. For details of all Known N please see the Supplement report

Table 25 Preparation of carer for life in the community

| | Location | Rurality | | Setting | |
|--|-----------------|-------------|-------------|--------------|---------------|
| | Australia n (%) | Urban n (%) | Rural n (%) | Public n (%) | Private n (%) |
| Carers provided training (N=931)* | 727 (78) | 661 (78) | 66 (86) | 652 (77) | 75 (88) |
| Carers received support needs assessment (N=971)+ | 753 (77) | 692 (78) | 61 (74) | 691 (78) | 62 (73) |
| Carers offered information about peer support (N=698)+ | 388 (56) | 352 (55) | 36 (60) | 351 (56) | 37 (53) |
| Carers offered formal targeted counselling (N=960)+ | 317 (33) | 278 (32) | 39 (48) | 292 (33) | 25 (29) |

*Known N (Australia) is limited to carers of stroke survivors that were discharged to private residence (excluding 'no, but'). For details of all Known N please see the Supplement report

3.18 Patient outcomes

Outcome measures allow health professionals to evaluate the effectiveness and efficacy of rehabilitation interventions and therapies. Respondents were asked to describe the outcome measures used at their hospital and describe the patient outcomes of the audited cases using discharge destination, length of stay and function on discharge.

3.18.1 Use of outcome measures

Results

All of the participating hospitals reported using at least one outcome measure. The Functional Independence Measure (FIM) was the most frequently used measure. Table 26 provides a summary of the most commonly used outcome measure in Australian rehabilitation services.

3.18.2 Mortality, length of stay and functional outcomes

Of the 2,821 patients audited, 32 (1%) people died while in hospital. The median length of stay for those people who died was 23 days (Q1 Q3; 7–41 days).

The median length of stay for the 2,789 patients discharged from hospital was 26 days (Q1 Q3; 14–43).

The median FIM on discharge was 107 (Q1 Q3; 83–117).

A total of 1,093 (49%) patients achieved a 22-point net positive change in FIM. Of these, 79% were discharged to a private residence. It has been shown that a 22-point change in FIM represents a reliable threshold for consideration of a positive response to rehabilitation.²² This also correlates with average FIM improvement of approximately 22 from admission to discharge reported in AROC data.⁷

Table 26 Use of standardised outcome measures

| | Functional Independence Measure n (%) | Motor Assessment Scale n (%) | Barthel Index n (%) | Modified Rankin Scale n (%) | Scandinavian Stroke Scale n (%) |
|-------------------|--|---------------------------------|------------------------|--------------------------------|------------------------------------|
| Australia (N=111) | 102 (92) | 60 (54) | 36 (32) | 14 (13) | 2 (2) |

Table 27 Distribution of FIM scores on admission and discharge

| FIM Range | Location | | Rurality | | | | Setting | | | |
|-------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | Australia | | Urban | | Rural | | Public | | Private | |
| | Admission % | Discharge % | Admission % | Discharge % | Admission % | Discharge % | Admission % | Discharge % | Admission % | Discharge % |
| 18–60 | 33 | 13 | 34 | 13 | 32 | 19 | 36 | 14 | 15 | 6 |
| 61–78 | 21 | 9 | 22 | 9 | 20 | 5 | 22 | 10 | 16 | 6 |
| 79–99 | 26 | 18 | 27 | 18 | 25 | 15 | 25 | 18 | 35 | 16 |
| 100–126 | 19 | 60 | 18 | 60 | 23 | 62 | 17 | 58 | 33 | 72 |
| Median (Q1 Q3)* change FIM | 21 (10–35) | | 22 (11–36) | | 19 (8–32) | | 22 (11–37) | | 16 (9–25) | |

*Q1 Q3; first quartile, third quartile

3.18.3 Discharge destination

The discharge destinations of the audited patient cases are outlined in Table 28. Of the 1,934 stroke survivors discharged home, 1,064 (55%) had formal supports on discharge. These supports were new for 802 (85%) patients.

3.19 Access to community rehabilitation

Rehabilitation often needs to continue after discharge from an in-patient setting and can be undertaken in various settings depending on availability.¹⁰ A Cochrane systematic review provided evidence that community rehabilitation has a small but worthwhile effect.²³ Community-based allied health practitioners monitor the need for, and encourage actual participation in, community and exercise activities.¹⁰

Respondents were asked to describe whether their rehabilitation service provided ongoing rehabilitation services including early supported discharge, day hospital, community-based rehabilitation provided in the home and outpatient rehabilitation (Table 29).

Results

Most hospitals (96%) had access to at least one form of rehabilitation service in the community. Four hospitals had no access to any community rehabilitation. The delay to accessing further rehabilitation varied depending on type.

Of the 30 hospitals that reported access to early supported discharge, 19 responded that their model was considered a true substitute for in-patient rehabilitation.

Table 31 represents all stroke survivors (2,675) referred for community rehabilitation, regardless of discharge destination. A total of 1,934 (72%) were discharged home and of these, 1,455 (78%) were referred for further rehabilitation in the community. Referrals to ongoing rehabilitation included 252 (17%) cases to a transitional care service, 568 (39%) to outpatient rehabilitation and 616 (42%) to community rehabilitation.

The availability of allied health staff in community rehabilitation services varied. Physiotherapists, occupational therapists and speech pathologists were more readily available (approximately 80–100%) in all settings (outpatient, rehabilitation provided in the home, early supported discharge services and day hospitals). Generally, the availability of psychologists was limited (23–45%).

Table 28 Discharge destination

| | Location | | | | | | | | Rurality | | Setting | |
|------------------------|---------------------------------|---------------------------|-----------------------|-------------------------|------------------------|------------------------|-------------------------|------------------------|-----------------------------|---------------------------|------------------------------|-----------------------------|
| | Australia (N=2,821) n (%) | NSW (N=1,069) n (%) | NT (N=12) n (%) | QLD (N=455) n (%) | SA (N=187) n (%) | TAS (N=75) n (%) | VIC (N=777) n (%) | WA (N=246) n (%) | Urban (N=2,588) n (%) | Rural (N=233) n (%) | Public (N=2,542) n (%) | Private (N=279) n (%) |
| Private residence | 1,934 (69) | 720 (67) | 10 (84) | 307 (67) | 144 (77) | 64 (85) | 532 (68) | 157 (64) | 1,783 (69) | 151 (65) | 1,725 (68) | 209 (75) |
| High level supported | 309 (11) | 153 (14) | 0 (0) | 45 (10) | 14 (8) | 3 (4) | 66 (9) | 28 (11) | 286 (11) | 23 (10) | 281 (11) | 28 (10) |
| Low level supported | 130 (5) | 47 (5) | 0 (0) | 21 (5) | 8 (4) | 0 (0) | 41 (5) | 13 (5) | 121 (5) | 9 (4) | 109 (5) | 21 (8) |
| Died in hospital | 32 (1) | 13 (1) | 0 (0) | 7 (2) | 0 (0) | 0 (0) | 9 (1) | 3 (1) | 25 (1) | 7 (3) | 32 (1) | 0 (0) |
| Statistical discharge* | 214 (8) | 76 (7) | 1 (8) | 29 (6) | 10 (5) | 3 (4) | 62 (8) | 33 (14) | 194 (7) | 20 (8) | 210 (8) | 4 (1) |
| Other | 202 (7) | 60 (6) | 1 (8) | 46 (10) | 11 (6) | 5 (7) | 67 (9) | 12 (5) | 179 (7) | 23 (10) | 185 (7) | 17 (6) |

*Statistical discharge means the patient was re-coded and was no longer participating in rehabilitation at the site. It may include patients transferred to another hospital for further rehabilitation or patients transferred to another service within the same hospital for any of acute care/maintenance/palliative care

Table 29 Access to community rehabilitation

| | Location | | | | | | | | Rurality | | Setting | |
|---|-------------------------------|------------------------|-------------------|------------------------|-------------------|-----------------------|------------------------|----------------------|--------------------------|--------------------------|---------------------------|----------------------------|
| | Australia (N=111) n (%) | NSW (N=43) n (%) | NT (N=2) n (%) | QLD (N=19) n (%) | SA (N=8) n (%) | TAS (N=3) n (%) | VIC (N=27) n (%) | WA (N=9) n (%) | Urban (N=96) n (%) | Rural (N=15) n (%) | Public (N=98) n (%) | Private (N=13) n (%) |
| Early supported discharge teams | 30 (27) | 7 (16) | 1 (50) | 8 (42) | 2 (25) | 1 (33) | 7 (26) | 4 (44) | 28 (29) | 2 (13) | 26 (27) | 4 (31) |
| Outpatient rehabilitation | 89 (80) | 36 (84) | 2 (100) | 12 (63) | 2 (25) | 2 (67) | 26 (96) | 9 (100) | 78 (81) | 11 (73) | 81 (83) | 8 (62) |
| Community-based rehabilitation provided in the home | 82 (74) | 28 (65) | 0 (0) | 17 (89) | 6 (75) | 1 (33) | 25 (93) | 5 (56) | 72 (75) | 10 (67) | 76 (78) | 6 (46) |
| Day hospital | 33 (30) | 12 (28) | 0 (0) | 10 (53) | 4 (50) | 0 (0) | 2 (7) | 5 (56) | 32 (33) | 1 (7) | 22 (22) | 11 (85) |
| Access to any of the four types of rehabilitation | 107 (96) | 39 (91) | 2 (100) | 19 (100) | 8 (100) | 3 (100) | 27 (100) | 9 (100) | 95 (99) | 12 (80) | 94 (96) | 13 (100) |
| No access to any types of rehabilitation | 4 (4) | 4 (9) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 1 (1) | 3 (20) | 4 (4) | 0 (0) |

Table 30 Usual time to access community rehabilitation after discharge

| | Sites with access to service N | Time to access community rehabilitation service | | | | |
|---|-----------------------------------|---|--------------------|--------------------|--------------------|-------------------|
| | | <1 week n (%) | 1–2 weeks n (%) | 2–3 weeks n (%) | 3–4 weeks n (%) | >4 weeks n (%) |
| Early supported discharge teams | 30 | 19 (63) | 9 (30) | 2 (7) | – | – |
| Outpatient rehabilitation | 89 | 27 (30) | 28 (31) | 21 (24) | 6 (7) | 7 (8) |
| Community-based rehabilitation provided in the home | 82 | 32 (39) | 23 (28) | 14 (17) | 9 (11) | 4 (5) |
| Day hospital | 33 | 17 (52) | 7 (21) | 2 (6) | 2 (6) | 5 (15) |

Table 31 Patients referred for community rehabilitation

| | Location | | | | | | | | Rurality | | Setting | |
|--------------------------------------|---------------------------------|-------------------------|-----------------------|-------------------------|------------------------|------------------------|-------------------------|------------------------|-----------------------------|---------------------------|------------------------------|-----------------------------|
| | Australia (N=2,675) n (%) | NSW (N=997) n (%) | NT (N=12) n (%) | QLD (N=423) n (%) | SA (N=183) n (%) | TAS (N=74) n (%) | VIC (N=754) n (%) | WA (N=233) n (%) | Urban (N=2,461) n (%) | Rural (N=214) n (%) | Public (N=2,399) n (%) | Private (N=276) n (%) |
| Referred for further rehabilitation* | 1,800 (67) | 583 (58) | 8 (67) | 275 (65) | 136 (74) | 41 (55) | 575 (76) | 182 (78) | 1,701 (69) | 99 (46) | 1,616 (67) | 184 (67) |
| If yes, type of rehab* | (N=1,800) n (%) | (N=583) n (%) | (N=8) n (%) | (N=275) n (%) | (N=136) n (%) | (N=41) n (%) | (N=575) n (%) | (N=182) n (%) | (N=1,701) n (%) | (N=99) n (%) | (N=1,616) n (%) | (N=184) n (%) |
| Community rehabilitation | 657 (37) | 116 (20) | 1 (13) | 62 (23) | 59 (43) | 20 (49) | 303 (53) | 96 (53) | 642 (38) | 15 (15) | 606 (38) | 51 (28) |
| Outpatient rehabilitation | 606 (34) | 275 (47) | 6 (75) | 99 (36) | 40 (29) | 8 (20) | 125 (22) | 53 (29) | 572 (34) | 34 (34) | 526 (33) | 80 (43) |
| Other inpatient rehabilitation | 238 (13) | 85 (15) | 1 (13) | 58 (21) | 13 (10) | 1 (2) | 49 (9) | 31 (17) | 224 (13) | 14 (14) | 212 (13) | 26 (14) |
| GEM | 10 (1) | 1 (2) | 0 (0) | 1 (1) | 1 (1) | 0 (0) | 7 (1) | 0 (0) | 7 (1) | 3 (3) | 10 (1) | 0 (0) |
| Transitional Service | 364 (20) | 137 (24) | 1 (13) | 63 (23) | 28 (21) | 12 (29) | 107 (19) | 16 (9) | 327 (19) | 37 (37) | 335 (21) | 29 (16) |

*Known N (excluding missing data) used for denominator

*Patients can be referred to more than one type of rehabilitation

3.20 Changes over time

Examining changes in adherence to select recommendations over time provides a way to assess whether priorities identified in 2008 and 2010 are being translated into practice.

Teams providing care to patients with stroke should ensure appropriate discharge planning occurs for all of them.

Table 32 presents the adherence to select recommendations in each audit year since 2008 and the change in percentage between 2008 and 2012, and between 2010 and 2012. While the audit questions relating to the recommendations may have varied over time, the intentions were similar. All hospitals that participated in any of the three audits were included. The '-' sign means that there was a decrease in adherence in more recent times, while a '+' sign designates an improvement.

There has been a significant improvement in adherence to many of the recommendations when compared to 2008. This includes organisational measures such as staff access to continuing education, use of assessment tools and access to community rehabilitation services, in addition to clinical recommendations including stroke survivor receiving lifestyle advice and information on sexuality, informing the stroke survivor of peer support, carer training and offering information to the carer about peer support. The areas where a statistically significant decrease in adherence was found between 2008 and 2012 related to 'the number of patients having their mood assessed', 'use of formal processes for goal setting with patients', 'survivors receiving information regarding self-management programs' and 'post-discharge contacts', as well as 'discussing post-discharge needs with carers'.

Compared to the 2010 results, there was a significant increase in adherence to the majority of recommendations in 2012 with the exception of 'post-discharge needs discussed with carer', which decreased.

Table 32 Progress on recommendations over time (all sites)

| Recommendation | Adherence by year | | | Change in % | |
|---|-------------------|-----------|-----------|--------------|--------------|
| | 2008 % | 2010 % | 2012 % | 2008 vs 2012 | 2010 vs 2012 |
| % Access to continuing education relating to stroke management to facilitate improved adherence to evidence-based care | 54 | 55 | 68 | +14* | +13* |
| % Sites using assessment tools post stroke | 93 | 100 | 100 | +7* | 0 |
| % Sites using formal process for goal setting with patients | 93 | 76 | 82 | -11* | +6 |
| % Goals set with input from the team and patient [†] | – | 79 | 79 | – | 0 |
| % Mood assessed | 76 | – | 50 | -24* | – |
| Discharge-planning | | | | | |
| % Discharge care plan outlining post-discharge care in the community developed with the input from the team and the patient | – | 75 | 74 | – | -1 |
| % Received information on sexuality post stroke | 13 | 12 | 17 | +4* | +5* |
| % Stroke survivor offered information about peer support | 34 | 27 | 39 | +5* | +12* |
| % Stroke survivor informed of self-management programs | 40 | 26 | 25 | -15* | -1 |
| % Post-discharge contact provided to stroke survivor | 58 | 50 | 54 | -4* | +4* |
| % Carer received training [‡] | 74 | 74 | 83 | +9* | +9* |
| % Home assessment performed ^{**} | 81 | 74 | 74 | -7* | 0 |
| % Post-discharge needs discussed with carer [‡] | 91 | 86 | 80 | -9* | -6* |
| % Carer offered information about peer support [‡] | 40 | 42 | 56 | +16* | +14* |
| % Stroke survivor's general practitioner sent a discharge summary | 95 | 94 | 94 | -1 | 0 |
| Secondary prevention | | | | | |
| % Life style advice given to stroke survivor | 46 | 42 | 53 | +7* | +11* |
| % Discharged on antithrombotic if ischaemic stroke and not contraindicated | – | 89 | 97 | – | +8* |
| % Discharged on lipid-lowering medication if ischaemic stroke and not contraindicated | 77 | 79 | 84 | +7* | +5* |
| % Discharged on blood pressure-lowering medication and not contraindicated | 78 | 82 | 85 | +7* | +3* |
| % Access to any community rehabilitation services ^{##} | 92 | 97 | 96 | +4 | -1 |
| Total number of stroke rehabilitation research programs | 56 | 79 | 82 | | |

*Chi square test comparing audits. Significance $p < 0.05$

[†]For patients without severe cognitive/communication difficulties

[‡]Eligible patients included those who were discharged home and dependent (mRS>2)

^{**}Eligible patients who were discharged home

^{##}This included access to community rehabilitation in the home, early supported discharge, day hospital or outpatients

Discussion

Rehabilitation remains fundamental to recovery after a stroke. The *National Stroke Audit – Rehabilitation Services Report 2012* provides valuable data on the current state of in-patient stroke rehabilitation services within Australia.

The purpose of the *National Stroke Audit – Rehabilitation Services Report 2012* is to describe adherence to relevant evidence-based processes of care outlined in the *Clinical Guidelines for Stroke Management 2010*.¹⁰ This cycle of the Clinical Audit includes greater emphasis on clinical questions for common impairments compared to the *National Stroke Audit – Rehabilitation Services Report 2010*.¹⁷ The current report provides an overview of the organisation of rehabilitation services and the quality of care available to patients with stroke. These data are also used to provide participating hospitals with an opportunity to benchmark against other similar sized services and encourage quality improvement. For the first time, additional information is provided as an addendum to this report.

In summary, the *National Stroke Audit – Rehabilitation Services Report 2012* had a total of 111 eligible participating hospitals, (an increase from 107 in 2010). Among these hospitals, 101 (91%) provided clinical data, which represents an increase from 96 in 2010. The majority of participating hospitals (n= 96) were from areas classified as urban, which is defined as being located within a population base of greater than 25,000. The median bed number per hospital was reported as 25 with an IQR of 16–40. This figure is an increase from the *National Stroke Audit – Rehabilitation Services Report 2010*¹⁷ in which the median bed number per site was 22. Nationally, the annual median admission number per hospital was 50 (IQR 31–76). While participating sites increased from 2010, the total number of stroke admissions was reported to be slightly lower (6,609 total stroke admissions in 2012 compared to 7,106 admissions in 2010).

In the 2012 audit cycle, hospitals contributing data in the Clinical Audit accounted for the care of 6,144 (93%) of these patients. This compares very well with the 6,438 stroke cases reported by AROC for this same period.⁸ Hence, the number of participants included in this report provides a good overview and representative sample for describing the current status of stroke rehabilitation in Australia. Importantly, requesting up to 40 cases per site for the Clinical Audit provides a large sampling base at an individual site level since the median number of admission per site is 50 (i.e. the data represents about 80% of admissions for most sites involved).

A total of 2,821 cases were audited. Just over half (54%) were male with a median age of 76 (IQR 66–83), 2% of patients were Aboriginal and/or Torres Strait Islander and 10% were from a non-English speaking background. Median FIM on admission was 75 (IQR 52–95), median length of stay was 26 days (24 days in 2010 audit) and 60% of patients left hospital independent (defined as a FIM ≥ 100). All of these figures are similar to previous audits and are closely matched to AROC stroke episode data for 2011.⁷

The *National Stroke Audit – Rehabilitation Services Report 2012* highlights areas where the system for stroke rehabilitation is working well, but also where ongoing change is needed to improve clinical care. Although some progress has been made from previous audits, there is still a long way to go across several areas to ensure all patients receive the best possible care as recommended in the *Clinical Guidelines for Stroke Management 2010*.¹⁰ A summary of the most salient points derived from these data are outlined below.

Organisation of care

The audit results provide evidence that in-patient rehabilitation is delivered in different ways across Australia. By far the most common approach is through a mixed rehabilitation ward (79%). Of the 2,821 patients audited, few (12%) received care on a dedicated stroke rehabilitation unit. Only 20 hospitals reported prioritising beds for stroke either in a dedicated rehabilitation stroke unit or as part of a mixed rehabilitation or neuro-rehabilitation ward. The *Clinical Guidelines for Stroke Management 2010*¹⁰ recommends that patients requiring ongoing in-patient rehabilitation after their acute stay should be transferred to a stroke rehabilitation unit or to care of a rehabilitation team with expertise in stroke care. Much effort has been devoted to describe what constitutes specialised stroke care in an acute setting. The Stroke Unit Trialists Collaboration Cochrane review identified rehabilitation was a critical element of benefit for people with stroke.¹⁰ Specialisation within an acute setting has been described as including key elements such as co-location (within one geographic ward), MDT who meet at least weekly to coordinate care and staff with special interest and education in stroke care and rehabilitation.²⁴ Preliminary analysis of data using these features to

distinguish specialist versus non-specialist service showed no marked difference in adherence to processes of care provided or patient outcome. Clearly, many types of in-patient rehabilitation care share these attributes and, therefore, identifying specialist stroke services using these distinguishing features was found to be inadequate. It is therefore recommended that further work be carried out to identify core elements of in-patient rehabilitation that lead to improved patient outcomes. These elements can then be used as the defining features of specialist stroke rehabilitation care.

Team functioning and development

Access to a specialised MDT is essential for stroke rehabilitation. The audit provides evidence that hospitals had good access to most disciplines. Psychology is the least accessible with only 38% of sites reporting access. Access to senior nursing staff is also poor, with 38% of hospitals reporting access to a clinical nurse consultant and 50% having access to a clinical nurse specialist.

Regular team meetings for discussing patient care are important. This ensures patients receive consistent care and information. Ninety-nine percent of participants in the audit reported that team meetings occur at least once a week. The majority of allied health staff involved with stroke care attend these meetings, but psychology is least likely to attend (about 26% nationally). This is unsurprising given the lack of access to psychology services. It has negative implications for access to mood assessments and subsequent management as discussed in the next section.

Ongoing staff development in stroke management is important for ensuring that patients are provided with the most relevant and up-to-date care practices. In this report, about one in three hospitals have no access to programs for continuing staff development in stroke management. While this has improved from previous years, further improvement is required.

Mood impairment and psychological assessment

Alteration in mood is commonly associated with stroke. Depression has been reported in one-third of patients regardless of the stage of recovery (acute, post acute or long term)²⁵ and anxiety is also highly prevalent.²⁶ Mood impairment has a negative impact on patient outcome and may impact on families and carers. Mood and emotional support should be considered in all patients and ongoing support, including further assessment and management from specialised health professionals, should be offered to those who require it. In this audit, only 50% of patients had

their mood assessed, although this appears higher than reality given the number of excluded cases.

Clearly, access to psychology staff remains an issue with just over one-third of hospitals having clinical or neuropsychology as part of their stroke team. There was also a large lag in time of assessment from psychology services (mean 12 days).

Counselling sessions provide essential support and information for stroke survivors and their families. Yet, among the 2,654 patients discharged with no cognitive impairment, only 31% received any formal targeted counselling.

Clearly, access to psychology assessment and management of mood impairments for stroke survivors continue to be an area that requires greater focus and is in need of improvement.

Information and education

Educating stroke survivors and their families/carers is essential. It gives the survivor the ability to understand what has happened to them, what to expect in the future and how to prevent or reduce their risk of secondary stroke. It also helps families understand what the survivor is experiencing. In the Organisational Survey, hospitals reported providing education to the majority of stroke survivors (96%). However, the Clinical Audit reveals a paucity of documented evidence for the provision of tailored information, which was lacking for over one-third of stroke survivors. Furthermore, almost half (47%) of stroke survivors did not receive advice for lifestyle risk factor modification.

As in previous years, information about sexuality post stroke was very low (<20%), as was information about self-management programs. Only 25% of stroke survivors were informed of self-management programs they could access in the community. This may, in part, be related to a lack of availability of these programs in the community. Although carer training was provided to 83% of carers, it remains unclear if this training meets their identified needs.

Communication and goal setting

Communication with the patient is an integral component of stroke rehabilitation and it is important that the patient is provided the opportunity to discuss their desired goals for rehabilitation with the MDT. One in three stroke survivors and their families did not have documented evidence that they received information regarding stroke and one in five had no documented evidence that their management had been discussed with the team. Results remain unchanged

from previous reports with only 14% of sites reporting that the usual goal setting practice included the patient and the MDT. Further, one in five patients were not involved in setting their own rehabilitation goals. The majority of sites reported goal setting involving disciplines interviewing the patient individually then goals being reviewed at MDT meetings (separate to the patient interaction). This can mean a breakdown in communication with the patient/family or carer and may lead to lack of consensus among the MDT. It is important the patient and carer/family are clear about goals being set and are empowered to take ownership of their recovery.

Assessment and management of the consequences of stroke

Questions on the assessment and management of common consequences of stroke were reintroduced (from 2008 report) into the Clinical Audit of rehabilitation services. Results provide evidence that the use of therapies recommended in the *Clinical Guidelines for Stroke Management 2010*¹⁰ was well adhered to, including tailored practice of walking (92%), and task-specific practice for those with ADLs difficulties (90%) and those with upper limb difficulties (83%). Interestingly, constraint-induced therapy was only used in 6% of patients with upper limb difficulties even though this is a grade A recommendation in the Guidelines.¹⁰ Supported conversation techniques are a common therapy for aphasia (72%) with groups used for one in five patients with aphasia. Nutritional supplementation occurred in 75% of those deemed to have nutritional complications. Encouragingly, 80% of those with urinary incontinence had a documented management plan.

For the first time, the audit included questions about the intensity of therapy. It is interesting to note almost all sites (97%) reported they provide one hour of physical therapy with those who reported 'yes' indicated this occurs always (51%) or usually (42%). Similarly, recommended intensity of speech therapy for swallowing and communication difficulties was reported by 94% of sites (of whom 48% reported this occurred always and 42% usually). This appears inconsistent with observational data on the amount of therapy patients actually receive and common barriers around workforce noted in discussions with health professionals. While difficult, more comprehensive clinical audit data or linked observational studies would need to be undertaken to further evaluate current practice in this area. AROC is currently undertaking such a study.

Secondary prevention

Initiation of medication prior to discharge increases compliance and is therefore important. All three major secondary prevention medications (blood pressure-lowering, lipid-lowering and antithrombotic therapy) were provided to 84–97% of patients. This is slightly greater than the *National Stroke Audit – Acute Services Clinical Audit Report 2011*⁶ estimates of 80–96%. Education and behaviour change for risk factors to prevent further strokes remains suboptimal (53%) and similar to acute care (46%). Greater effort should be made with tools such as motivational interviewing to empower behaviour change while in rehabilitation.

Preparation for discharge

The enduring impact of stroke on the stroke survivor and their family can often lead to feelings of isolation and abandonment following discharge from hospital.¹⁰ Providing patients with care plans that outline important information pertaining to the person's stroke should include the management of their modifiable risk factors and medication, addressing ways to manage the impacts of illness on their lifestyle, emotions and interpersonal relationships, as well as adherence to treatment regimes. Only half the hospitals surveyed reported routinely providing a discharge care plan to patients, while the clinical audit revealed almost three-quarters of patients received a care plan prior to discharge. This area of stroke care has consistently been highlighted for improvement across both acute and rehabilitation audits, and continued attention is warranted.

Community rehabilitation and follow-up

One-third of patients discharged after in-patient rehabilitation received no referral for further rehabilitation in the community. Of those who accessed further rehabilitation, 37% went on to have community-based rehabilitation, 34% had outpatient rehabilitation and the remaining accessed either transitional care or other outpatient services. Further investigation is needed to accurately determine and report why these figures are low. The national guidelines recommend health services with stroke units should provide comprehensive, experienced multidisciplinary community rehabilitation.¹⁰ Such services should be adequately resourced and include support services for stroke survivors and their families/carers.¹⁰

Various factors influencing the use of community rehabilitation services may apply. These may include poor uptake of community services by the stroke survivor, extended waiting times to access appointments and limited access to community rehabilitation especially in rural areas or the patient may have recovered and does not require further rehabilitation interventions. It is noted that use of transitional care models has increased to 19%, up from 12% in 2010. This model is more commonly used in rural settings compared to urban sites (37% v 19%).

Many stroke survivors are waiting several weeks before continuing their rehabilitation once in the community with 5–15% taking longer than a month to receive ongoing therapy. Over one-third of stroke survivors are not being seen within a week by early supported discharge services that should provide similar access and intensity of rehabilitation as available within hospital.

Comparisons over years

It is encouraging to see some significant improvements since the first audit cycle in the *National Stroke Audit – Rehabilitation Services Report 2008*, although clearly further improvement is required. Continuing education is being offered to more staff (68% compared to 55% in 2010), there have been improvements in the provision of information on sexuality (17% compared to 12% 2010), and peer support for patients (39% compared to 27% 2010) and carers (56% compared to 42% 2010). Secondary prevention education for lifestyle modification has also improved over time (53% compared to 42%), but clearly more attention is required.

However, other recommendations related to discharge planning have not changed. No real changes have occurred in relation to patient goal setting. Worryingly, mood assessment occurred in less people than in 2008 (50% compared to 76% 2008). Discussing the needs with a carer has dropped from 91% in 2008 to 80% in 2012, whereas carer training has increased slightly to 78% from 74%. Thus while quite high, one in five carers are not adequately prepared for their role.

Limitations of the data

Interpreting the data in this report must be done with caution for several reasons. Firstly, audit data may be subject to various forms of reporting bias. Secondly, documentation issues should be considered.

Recording of data for the Clinical Audit assumes that if a process was not documented then it was not performed, which may not always be the case. This is highlighted when data from the Organisational Survey and Clinical Audit provide conflicting information (e.g. such as the provision of education prior to discharge). However, as documentation of care is a medico-legal responsibility and proof that care was delivered, care could not be assumed in the absence of documentation. Better documentation will provide the ability to gather more robust data for monitoring stroke care and should be factored into quality improvement activities. Because there are no consistent guidelines defining the appropriate minimum facilities for rehabilitation stroke units, unlike acute care definitions, comparing unit to unit can be difficult.

Strengths of the data

Minimising bias was an important focus when developing this year's Clinical Audit. Auditors were provided with initial training and ongoing support throughout the audit process. A comprehensive data dictionary was provided to increase inter-rater reliability and each site conducted a reliability check in which data from five cases was entered by two auditors. Logic checks were inbuilt to the web tool to verify data entered and all sites received their data for verification once the Clinical Audit was closed. In addition, the audit project team was able to monitor data entry to follow up on missing data where these were critical to analysis. To minimise interpretation bias, data were analysed by an independent organisation.

Using audit data to improve care

The *National Stroke Audit – Rehabilitation Services Report 2012* is intended to provide a national picture of the quality of stroke care in Australia and can be used as a tool for stroke services and stroke teams to develop quality improvement activities.

Each participating hospital will receive an individual site report that outlines their own performance compared with national benchmarks. It is important that these data be considered by the local team so that areas for action can be identified and then addressed locally.

Conclusion

The *National Stroke Audit – Rehabilitation Services Report 2012* provides important information for showing the current strengths of our hospital system for stroke rehabilitation, as well as important areas requiring further development and focus.

Based on this summary, the National Stroke Foundation makes the following recommendations to improve stroke rehabilitation processes and outcomes:

Recommendations

- Systems are established or enhanced to ensure the psychological and emotional support needs of all stroke survivors are considered during rehabilitation (including further assessment and treatment by psychologists) and is offered to those who require it.
- Systems are established to ensure greater involvement of stroke survivors and the family/carer as part of the multidisciplinary team with regards to goal setting for shared recovery objectives.
- Systems are established to ensure all stroke survivors, and their families and carers are provided with education, information and advice on stroke and stroke recovery, including risk factor modification.
- Further work should be undertaken to improve access to relevant community-based rehabilitation services once the stroke survivor has been discharged from hospital.
- Further work should be undertaken to identify core elements of effective stroke rehabilitation units to facilitate greater access to this model of evidence-based stroke care in Australia.

Chapter 5

Appendices

Appendix 5.1 Participating hospitals

The National Stroke Audit is the combination of a huge amount of work from many people and we greatly appreciate those who participated from the following hospitals.

NSW**Albury Wodonga Health Service – Albury Campus**

Abby Heafield
Cindy Ridgway
George Atkins
Julie Brauman
Kirstin Broadhead
Lynette Johnstone
Murray Hair
Patrick Hower
Sarah Potter
Vanessa Crosby

Armidale Hospital

Amanda Styles

Ballina District Hospital

Alison Haylor
Lisa Crozier
Michelle Lupton

Balmain Hospital

Dr. Indu Nair
Dr. Jayanthini
Ganeshkumar

Bathurst Hospital

Fiona Ryan

Belmont Hospital

Karen Ruddell
Luisa Renna
Megan Spear
Natalie Frkovic

Berkeley Vale Private Hospital

Michelle Turner

Camden Hospital

Brian Lane
Kendell Neilson

Coffs Harbour Base Hospital

Melissa Christos
Karen Longworth

Coledale District Hospital

Melissa Harrison
Suzanne Lide

Coonabarabran Hospital

Barbara Brennan

Concord Hospital

Dr Prakirti Bhatt
Dr Veena Raykar

David Berry Hospital

Kate Woods

Fairfield Hospital

Victoria Knol

Greenwich Hospital

Brad Carpenter

Griffith Base Hospital

Susan Matich

Hornsby and Ku-ring-gai Hospital

Cesar Uy
Malcolm Kanard

Rankin Park Centre

Alison Peruch
Amanda Cairney
Carlie Swinton
Helen Baines
Judith Dunne
Karen Blake
Karen Chatfield
Lea Unthank-Fry
Megan Lancaster
Nevenka Bareham
Renae Mannix
Robyn Walker
Sherree Robinson

Kempsey District Hospital

Andrew Bennett
Jan Wilkins

Lady Davidson Hospital

Alicia Parker
Alyson Keith
Cynthia Menezes
Elishia Scobie
Heidi Ricker

Lawrence Hargrave Hospital

Ian Galvin
Pam Peace

Lourdes Hospital

Caroline Squires
Christina Edwards
Dipalee Amin
Erin Collins
Kaylene Green
Kylie Kearton
Narelle Miller

Maitland Hospital

Ashley Nelson
Cathy Broderick
Holly Cotterell
Jessica Allen-Atkins
Kerrie Strong
Michelle Lynch
Renae Galvin

Mercy Care Centre Young

Lucie Flynn
Megan Thirgood

Metro Rehabilitation Hospital

Fiona Scott
Karla Cooper
Natalie Shiel

Mona Vale Hospital

Margaret Beazley

Mount Druitt Hospital

Loraine Stephenson

Murwillumbah District Hospital

Debbie Huxstep

Nepean Hospital

Leah Guyatt
Lyn Stanton
Roslynn Marshall

Orange Base Hospital

Fiona Ryan

Prince of Wales Hospital

Andrew Murray
Peter Thompson

Port Kembla Hospital

Kristen Farrell
Kirsty Marsh
Marian Brown
Melinda Ryan
Sue-Ellen Hogg

Royal Rehabilitation Centre Sydney

Belinda Carr
Sandra Lever
Sarah Fereday
Thea Hamieh

Ryde Hospital

Howard Davis
Samantha Chan

St George Hospital

Melissa Tinsley

St Joseph's Hospital

Annie Chung
Betsy Vaz
Christie Allen
Kenny Vuong
Latha Vaitilingam
Lauren Robinson
Margaret Chan
Pam Chen
Shawna Snow
Stella Kok

St Vincent's Hospital

Olivia Misa
Rosemary MacMahon

Tamworth Base Hospital

Rachel Peake

War Memorial Hospital

Alexis McMahon
Beth Rossington
Elizabeth Marks
Genevieve Maiden
Jill Hall
Kate Guthrie
Laura Lim
Lisa Azizi
Nurit Schnapp
Rachel Miles

Wauchope District Memorial Hospital

Cate Glezos
Jodi Gallagher

Westmead Hospital

Pip Galland

Wingham Community Hospital

Jennifer Rudd
Lee Ann Moulds

Wyang Public Hospital

Justine Watkins

NT**Alice Springs Hospital**

Karen Harris

Royal Darwin Hospital

Howard Flavell
Thanh Duong

QLD**Brighton Health Campus and Services**

Gillian Reid

Bundaberg Base Hospital

Rens Schoneveld
Sheryll Habermann

Caloundra Hospital

Alana Campbell
Cathryn Shapter
Christine Fawcett
David O'Regan

Ingrid McGaughey

Isaac Toello

Joanne Clark

Lisa Davis

Nicole Brown

Rachel Gehrke

Rinku Bhatia

Sarah Fitzhenry

Yana Ochoteco

Eden Rehabilitation Centre

Chris Bryant

Gold Coast Hospital – Southport Campus

Christine Lainson

Leanne Stewart

Greenslopes Private Hospital

Carolyn Wilson

Kathryn Anderson

Madonna Bowers

Megan Keep

Gympie Hospital

Aliese Hoffman

Dr. Eva Salud

Dr. Kenneth Ng

Maree Storrs

Ipswich Hospital

Angela Dicks

Claire Stewart

Deborah Jackson

John Flynn Private Hospital

Esther Forbes

Mackay Base Hospital

Kathryn J Dougan

Peninsula Private Health

Debra Teichmann

Lara Paech

Prince Charles Hospital

Ellen Grant

Greg Morrison

Juliette Mahero

Leah Thompson

Ling Lan

Mia Mariani

Neala Milburn

Tik Chan

Princess Alexandra Hospital

Adriana Hada

Agnieszka Palak

Alison Morgan-Coe

Jenny Kohlhardt

Kathy Clark

Kylie Bower

Maria Draper

Philip Aitken

Queen Elizabeth II Jubilee Hospital

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Jerry Wong

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Katherine Hamilton

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Jillian Richardson

Samantha Date

Townsville Hospital

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Warwick Hospital

Jacinta Fromm

Mary Moulder

SA**Griffith Rehabilitation Hospital**

Lauri Wild

Hampstead Rehabilitation Centre

Catherine Lieu

Debra Ormerod

Rachel Dempsey

Rachel Harling

Dr Ravi Ruberu

Mohammad Gadi

Lyell McEwin Hospital

Chris Borgelt

Christine Groom

Laura Russo

Louis Kariotoglou

Matt Barrett

Megan Kretschmer

Nikki Pelliccia

Repatriation General Hospital

Julie Harding

St Margaret's Rehabilitation Hospital

Cea White

Georgie Tucker

Margaret Manning

Maree Braithwaite

Michelle Hardy

Penny Fisher

Vun Vun Wong

Strathalbyn & District Soldiers' Memorial Hospital

Rebecca Paull

The Memorial Hospital

Ru Kidson

Whyalla Hospital

Tracey Patterson

TAS**Launceston General Hospital**

Lyn Lendvay

North West Regional Hospital

Clare Coates

Eddie Roberts

Jo Lodge

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Brendan Bakes

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Grace Sussmilch

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Tracey Graney

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Christine Schuette
Collette Leech
Daphne Van Patee
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Kat Potter
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Maureen Johns
Olivia Johnstone

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Jenna Lyttle
Johanna Spehr
Josh Naunton
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Tegan McDonald
Steffie Lau
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Naomi Doody
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Sue Summers

Goulburn Valley Hospital

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Gregory Dalley
Johanna Madden
Lina Breik
Marli Kelly
Rachel Smith
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Catherine James
Joanna Cameron
Louise Thorn

Kingston Centre

Brigitte Delpech
Charlotte Botting
Fiona Mason
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Jill Douthie
Josie Sinni
Julia Kawanishi
Julia Paxino

Julie Smith
Julius Ting
Nikita Sundarjee
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Carly Minter
Casey Stubbs
Claire Kent
Julie Beasley
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McKellar Centre, Barwon Health

Carolyn Anniss
Heather Smith
Lorraine Alexander
Michael Bennett
Michaela Murdoch
Natasha Selenitsch
Rebecca Hartwich
Wendy Mahony

Mildura Base Hospital

Jo Cottrell

North Eastern Rehabilitation Centre

Angela Clancey
Brendon Haslam

Peninsula Health - Golf Links Road Rehab

Allison Hocking
Carol Gore
Jessica Anderson
Mehrnoosh McGrath
Nicole Jones
Stephanie Gleeson

Peninsula Health – Rosebud Rehabilitation Unit

Carol Gore
Helen Sheehan
John Pierce
Mangai Murugappan
Michelle Rouxel
Stephanie Gleeson

Peter James Centre

Claire Pearce
Genevieve Kennedy
Kaylene Bradford
Kevin Mulrain
Kylie Rice
Rachel Jamieson
Vanessa Fernandez

Royal Melbourne Hospital

Brinda Thirugnanam
Edwin Luk
Louisa Ng
Nina Zhang
Pearl Chung
Sook Fan Wong

Royal Talbot Hospital

Jane Conidaris
Joanna Cameron
Lisa Sherry

St George's Hospital

Jane Beilken
Jill Collins
Julie Elliott
Robert Mehan

St John of God Bendigo

Dr Debbie Kesper
Gillian Deason

St Vincent's Hospital

Meg Mackenzie

Sunshine Hospital

Amanda McAliece
Carmel Toohill
Danielle Jackson
Jane Tillyard
Jessica Valentine
Melissa Ho
Ngoc Le
Renee Gill
Sally Howard
Shakuntala Francis

Wangaratta Hospital

Kim Brown
Yogavelli Naidoo

Warrnambool Hospital, Southwest Healthcare

Katrina Mckerlie
Patrick Groot

WA**Albany Hospital**

Natalie Florence Galantino

Bentley Hospital

Annette Taylor

Kieran English

Bunbury Regional Hospital

Pat O'Leary

Fremantle Hospital

Anne Judge

John Harris

Geraldton Regional Hospital

Ashleigh Whyte

Calvin Soong

Chloe Serafini

Di Franklin

Hendrina Marais

Vanessa Parker

Zaminah Khadaroo

Hollywood Private Hospital

Liz Higham

Meg Ledger

Tracey Sariago

Osborne Park Hospital

Angela Cream

Anita Jennings

Catherine Viandante

Chris Bourgault

Deborah West

Jessica Nolan

Kimberly Keeley

Lisa Majteles

Melissa Daines

Patricia Morgan

Royal Perth Hospital - Shenton Park Campus

Alisha Anderson

Bev Hardcastle

David Harrison

Swan Kalamunda Districts Hospital

Naanke Noordzy

Pauline Saunders

Appendix 5.2 Audit questions Organisational Survey

SECTION 1 Organisation of Care

- 1.1 Auditor Details
Auditor Name
Auditor email
Auditor contact number
- 1.2 Auditor Discipline
Doctor/Nurse/Manager/Physiotherapist/
Occupational therapist/Social worker/Speech
pathologist/Dietitian/Psychologist/Other
- 1.3 Name of Hospital
- 1.4 State of Australia
- 1.5 Which of the following best describes the
rehabilitation service at your site:
- Free-standing rehabilitation hospital
 - Rehabilitation ward within acute hospital in
same building of same health campus
 - Rehabilitation ward within acute hospital in
separate buildings of same health campus
 - Rehabilitation service within acute hospital
(no designated beds)
- 1.6 How many beds are dedicated for inpatient
rehabilitation at your site?
- 1.7 Does your site have a dedicated stroke
rehabilitation unit? Yes/No
- 1.7.1 If yes, how many beds are in your
dedicated stroke rehabilitation unit?
- 1.8 Does your site have designated beds for stroke
rehabilitation? Yes/No
- 1.8.1 If yes, how many designated stroke beds
are there?
- 1.9 How many stroke rehabilitation patients (patients
coded with a rehabilitation episode-type):
- Are currently in all your inpatient
rehabilitation beds today?
 - Were admitted to your site last year?
 - Are currently in your dedicated stroke
rehabilitation unit today?
 - Were admitted to your dedicated stroke
rehabilitation unit last year (approximately)?

- 1.10 Please select any of the following equipment and
facilities that are available for stroke rehabilitation
patients at your hospital:

Facilities:

- Therapy gymnasium
- Therapy kitchen
- Therapy bathroom
- Dining room
- Recreation room
- Dedicated private room for family conferences
and/or cognitive/speech/counselling therapy
- Independent living unit/room

Equipment:

- Robotic equipment
- Supported body weight device over treadmill
- Supported body weight device over ground
- Functional electrical stimulation
- Upright cycle
- Recumbent cycle
- Upper limb ergometer
- Free weights/weights unit
- Alternative and Augmentative Communication
Devices (high and/or low tech devices)
- Nintendo Wii™

SECTION 2 Communication, assessment and therapy

- 2.1 Who is responsible for making the decision
as to which patients are suitable for rehabilitation
at your hospital? (Tick all that apply)
- Acute physician
 - Post acute physician (rehabilitation physician,
geriatrician)
 - Nurse
 - Multidisciplinary team
 - Other team member

- 2.2 Does your site formally document regular multidisciplinary team meetings (case-conferences)? Yes/No
- If yes,
- 2.2.1 How often are these meetings held _ days per month.
- 2.2.2 Which of the following disciplines regularly attend the meetings?
 Rehabilitation physician/Geriatrician/General medical physician/Neurologist/General practitioner/visiting medical officers/Nurse/Occupational therapist/Physiotherapist/Speech pathologist/Dietitian/Psychologist/Social Worker/Pharmacist/Other
- 2.3 Does your site have a formal process for goal-setting with patients? Yes/No
- 2.4 How does your hospital usually establish patient-directed goals? (Select one only)
- a. Patient interviewed by each discipline only
- b. Goals discussed and reviewed at team meeting after patient meets with each discipline separately
- c. Patient and full multidisciplinary team set goals together
- d. Ad hoc – no consistent process used
- e. Goals not patient-directed at this hospital
- f. Other
- 2.5 Does your site provide group therapy? Yes/No
- 2.5.1 If yes, please specify the types of group therapy provided at your site? Free text box
- 2.6 Is group circuit class training used as a method to increase amount of practice? Yes/No
- If yes, please specify how often this therapy is used: Always/Usually/Sometimes/Rarely
- 2.7 Is speech therapy for dysphagia or communication difficulties provided as much as can be tolerated (aiming for at least 2 hours per week)? Yes/No
- If yes, please specify how often this therapy is used: Always/Usually/Sometimes/Rarely
- 2.8 Is provision made during the day for patients to practice skills learnt in therapy sessions? This could involve staff, family or self practice. Yes/No.
- If yes, please specify how often this therapy is used: Always/Usually/Sometimes/Rarely

- 2.9 Does your team use any of the following interventions for the listed impairments?
- If yes, please indicate how often this therapy technique is used for patients with this impairment: Always/Usually/Sometimes/Rarely

a. Sensory impairment

Sensory-specific training/related training Yes/No

If yes please specify how often each therapy is used: Always/Usually/Sometimes/Rarely

Cutaneous electrical stimulation in conjunction with conventional therapy Yes/No

If yes please specify how often each therapy is used: Always/Usually/Sometimes/Rarely

b. Hypertonicity (Spasticity)

Botulinum Toxin (Type A) Yes/No

If yes please specify how often each therapy is used: Always/Usually/Sometimes/Rarely

Electrical Stimulation and/or Electromyograph (EMG) biofeedback Yes/No

If yes please specify how often each therapy is used: Always/Usually/Sometimes/Rarely

c. Shoulder subluxation and/or pain

Firm management devices used Yes/No

If yes please specify how often each therapy is used: Always/Usually/Sometimes/Rarely

Electrical Stimulation used Yes/No

If yes please specify how often each therapy is used: Always/Usually/Sometimes/Rarely

Education and training for staff, carers or patient Yes/No

If yes please specify how often each therapy is used: Always/Usually/Sometimes/Rarely

Shoulder strapping (for management of shoulder pain only) Yes/No

If yes please specify how often each therapy is used: Always/Usually/Sometimes/Rarely

d. Difficulty standing/sitting or standing from a seated position without assistance

Task-specific practice with feedback provided Yes/No

If yes please specify how often each therapy is used: Always/Usually/Sometimes/Rarely

e. Upper limb impairment

Repetitive Task-specific training Yes/No

If yes please specify how often each therapy is used: Always/Usually/Sometimes/Rarely

EMG biofeedback Yes/No

If yes please specify how often each therapy is used: Always/Usually/Sometimes/Rarely

Robot-assisted reaching Yes/No

If yes please specify how often each therapy is used: Always/Usually/Sometimes/Rarely

Constraint-induced movement therapy for specific people Yes/No

If yes please specify how often each therapy is used: Always/Usually/Sometimes/Rarely

Mental practice Yes/No

If yes please specify how often each therapy is used: Always/Usually/Sometimes/Rarely

Mechanical-assisted training Yes/No

If yes please specify how often each therapy is used: Always/Usually/Sometimes/Rarely

Electrical stimulation Yes/No

If yes please specify how often each therapy is used: Always/Usually/Sometimes/Rarely

Mirror therapy Yes/No

If yes please specify how often each therapy is used: Always/Usually/Sometimes/Rarely

Bilateral training Yes/No

If yes please specify how often each therapy is used: Always/Usually/Sometimes/Rarely

f. Difficulty with Activities of Daily Living

Occupational therapy Yes/No

If yes please specify how often each therapy is used: Always/Usually/Sometimes/Rarely

Multidisciplinary interventions targeting ADL Yes/No

If yes please specify how often each therapy is used: Always/Usually/Sometimes/Rarely

g. Difficulty with executive functions /attention/ concentration /memory

Cognitive interventions Yes/No

If yes please specify how often each therapy is used: Always/Usually/Sometimes/Rarely

External cues used as strategy training Yes/No

If yes please specify how often each therapy is used: Always/Usually/Sometimes/Rarely

h. Unilateral spatial neglect

Simple cues Yes/No

If yes please specify how often each therapy is used: Always/Usually/Sometimes/Rarely

Visual scanning training in addition to sensory stimulation Yes/No

If yes please specify how often each therapy is used: Always/Usually/Sometimes/Rarely

Prism adaptation Yes/No

If yes please specify how often each therapy is used: Always/Usually/Sometimes/Rarely

Eye patching Yes/No

If yes please specify how often each therapy is used: Always/Usually/Sometimes/Rarely

Mental imagery training or structured feedback Yes/No

If yes please specify how often each therapy is used: Always/Usually/Sometimes/Rarely

i. Aphasia

Treatment of aspects of language (including phonological and semantic deficits, sentence-level processing, reading and writing) following models derived from cognitive neuropsychology Yes/No

If yes please specify how often each therapy is used: Always/Usually/
Sometimes/Rarely

Constraint-induced therapy Yes/No

If yes please specify how often each therapy is used: Always/Usually/
Sometimes/Rarely

Use of gestures Yes/No

If yes please specify how often each therapy is used: Always/Usually/
Sometimes/Rarely

Supported conversation techniques Yes/No

If yes please specify how often each therapy is used: Always/Usually/
Sometimes/Rarely

Delivery of therapy programs via computer Yes/No

If yes please specify how often each therapy is used: Always/Usually/
Sometimes/Rarely

Group therapy Yes/No

If yes please specify how often each therapy is used: Always/Usually/
Sometimes/Rarely

j. Dysarthria

Biofeedback or a voice amplifier to change intensity and increase loudness Yes/No

If yes please specify how often each therapy is used: Always/Usually/
Sometimes/Rarely

Intensive therapy aiming to increase loudness (e.g. Lee Silverman Voice Treatment) Yes/No

If yes please specify how often each therapy is used: Always/Usually/
Sometimes/Rarely

Use of strategies such as decreased rate, overarticulation and gesture Yes/No

If yes please specify how often each therapy is used: Always/Usually/
Sometimes/Rarely

Oral musculature exercises Yes/No

If yes please specify how often each therapy is used: Always/Usually/
Sometimes/Rarely

Sometimes/Rarely

Augmentative and Alternative and Communication devices used Yes/No

If yes please specify how often each therapy is used: Always/Usually/
Sometimes/Rarely

k. Dysphagia

Compensatory strategies such as positioning, therapeutic manoeuvres or modification of food and fluids Yes/No

If yes please specify how often each therapy is used: Always/Usually/
Sometimes/Rarely

Therapy targeting specific muscle groups (e.g. Shaker therapy) Yes/No

If yes please specify how often each therapy is used: Always/Usually/
Sometimes/Rarely

Thermo-tactile stimulation Yes/No

If yes please specify how often each therapy is used: Always/Usually/
Sometimes/Rarely

Electrical stimulation Yes/No

If yes please specify how often each therapy is used: Always/Usually/
Sometimes/Rarely

l. Mood impairment***Prevention of depression after stroke***

Psychological interventions (e.g. problem solving and motivational interviewing) Yes/No

If yes please specify how often each therapy is used: Always/Usually/
Sometimes/Rarely

Treatment of depression after stroke

Antidepressants Yes/No

If yes please specify how often each therapy is used: Always/Usually/
Sometimes/Rarely

Psychological interventions (e.g. Cognitive behaviour therapy) Yes/No

If yes please specify how often each therapy is used: Always/Usually/
Sometimes/Rarely

m. Urinary incontinence

An individualised prompted or scheduled voiding regimen Yes/No

If yes please specify how often each therapy is used: Always/Usually/
Sometimes/Rarely

Anticholinergic drugs Yes/No

If yes please specify how often each therapy is used; Always/Usually/
Sometimes/Rarely

Containment aids if continence is unachievable Yes/No

If yes, please specify how often this therapy is used; Always/Usually/
Sometimes/Rarely

Documented continence management plan Yes/No

If yes please specify how often each therapy is used; Always/Usually/
Sometimes/Rarely

n. Urinary retention

Intermittent Indwelling catheter (IDC) Yes/No

If yes please specify how often each therapy is used: Always/Usually/
Sometimes/Rarely

Documented continence management plan Yes/No

If yes please specify how often each therapy is used: Always/Usually/
Sometimes/Rarely

o. Cardiovascular fitness

Fitness training? Yes/No

If yes please specify how often each therapy is used: Always/Usually/
Sometimes/Rarely

p. Contracture (prevention and management)

Conventional therapy (ie. early tailored interventions)? Yes/No

If yes please specify how often each therapy is used: Always/Usually/
Sometimes/Rarely

Routine use of splints or prolonged positioning of muscles in a lengthened position Yes/No

If yes please specify how often each therapy is used: Always/Usually/
Sometimes/Rarely

Serial casting (for severe, persistent contracture) Yes/No

If yes please specify how often each therapy is used: Always/Usually/
Sometimes/Rarely

q. Difficulties with community transport and mobility post discharge

Tailored strategies implemented (e.g. escorted outdoor journeys) Yes/No

If yes please specify how often each therapy is used: Always/Usually/
Sometimes/Rarely

Provision of information about local transport options/alternatives Yes/No

If yes please specify how often each therapy is used: Always/Usually/
Sometimes/Rarely

2.10 What patient outcome measures are collected routinely?

a. Functional Independence Measure (FIM)

b. Barthel Index (BI)

c. Motor Assessment Scale (MAS)

d. Scandinavian Stroke Scale (SSS)

e. Modified Rankin Scale (mRS)

2.11 Does your hospital provide patient education prior to discharge? Yes No

If yes how is it provided? Tick all that apply

- Written or audio visual resources
- Individual verbal session
- Group session

SECTION 3 Workforce**3.1 Please identify which of the following health professionals are actively involved in the rehabilitation management of stroke patients at your hospital? Yes/No**

3.1.1 Rehabilitation physician

3.1.2 Geriatrician

3.1.3 General medical physician

3.1.4 Neurologist

3.1.5 General practitioner/visiting medical officers

3.1.6 Rehabilitation nurse

3.1.7 Clinical nurse consultant

3.1.8 Clinical nurse specialist

3.1.9 Physiotherapist

3.1.10 Speech pathologist

3.1.11 Dietitian

3.1.12 Social worker

- 3.1.13 Occupational therapist
 - 3.1.14 Clinical psychology
 - 3.1.15 Neuropsychologist
 - 3.1.16 Recreational therapist
 - 3.1.17 Diversional therapist
 - 3.1.18 Allied health assistant/therapy assistant
 - 3.1.19 Medical resident
 - 3.1.20 Stroke liaison officer/stroke care coordinator
- If other please specify

3.2 Which of the following is the medical leader responsible for the management of your stroke rehabilitation patients? Please indicate whether this is a formal recognition (a defined process exists), or whether this person usually assumes the responsibility. Select one box only

- 3.2.1 Rehabilitation physician
- 3.2.2 Geriatrician
- 3.2.3 General medical physician
- 3.2.4 Neurologist
- 3.2.5 General practitioner/visiting medical officers

3.3 Do you have staff members with greater than 3 years experience in stroke rehabilitation from each of the following disciplines: Yes/No/Not on staff

- 3.3.1 Rehabilitation physician
 - 3.3.2 Geriatrician
 - 3.3.3 General medical physician
 - 3.3.4 Neurologist
 - 3.3.5 General practitioner/visiting medical officers
 - 3.3.6 Rehabilitation Nurse
 - 3.3.7 Clinical nurse consultant
 - 3.3.8 Clinical nurse specialist
 - 3.3.9 Occupational therapist
 - 3.3.10 Physiotherapist
 - 3.3.11 Speech pathologist
 - 3.3.12 Dietitian
 - 3.3.13 Social worker
 - 3.3.14 Clinical psychologist
 - 3.3.15 Neuropsychologist
 - 3.3.16 Recreational therapist
 - 3.3.17 Diversional Therapist
 - 3.1.18 Allied health assistant/therapy assistant
 - 3.1.19 Stroke liaison officer/stroke care coordinator
- If other, please specify

- 3.4 Is there a program for the continuing education of staff relating to the management of stroke?
Yes/No
- 3.5 How many stroke-specific clinical research studies are currently conducted at your hospital?
Acute/Rehab/Prevention/Other/Tota

SECTION 4 Post-discharge services

Does your site have access to community rehabilitation via:

- 4.1 Outpatients Yes/No
 - 4.1.1 If yes, what is the average waiting time to access this service?
 - 4.1.2 How many days per week is this service available?
 - 4.1.3 Please select the frequency of availability of the following disciplines for this service: 7 days per week/6 days per week/5 days per week/4 days per week/3 days per week/2 days per week/ 1 day per week/ rarely/ never
 - 4.1.4 Physiotherapy/Occupational therapy/ Speech pathology/Nursing/Dietetics/ Psychology/Social work/Other
- 4.2 Day hospital Yes/No
 - 4.2.1 If yes, what is the average waiting time to access this service?
 - 4.2.2 How many days per week is this service available?
 - 4.2.3 Please select the frequency of availability of the following disciplines for this service: 7 days per week/6 days per week/5 days per week/4 days per week/3 days per week/2 days per week/ 1 day per week/ rarely/never
 - 4.2.4 Physiotherapy/Occupational therapy/ Speech pathology/Nursing/Dietetics/ Psychology/Social work/Other
- 4.3. Community-based rehabilitation provided in the home Yes/No
 - 4.3.1 If yes, what is the average waiting time to access this service?
 - 4.3.2 How many days per week is this service available?

- 4.3.3 Please select the frequency of availability of the following disciplines for this service:
7 days per week/6 days per week/5 days per week/4 days per week/3 days per week/2 days per week/ 1 day per week/ rarely/never
- 4.3.4 Physiotherapy/Occupational therapy/
Speech pathology/Nursing/Dietetics/
Psychology/Social work/Other
- 4.4. **Early Supported Discharge Yes/No**
- 4.4.1 If yes, is this a true replacement for inpatient rehabilitation? Yes/No
- 4.4.2 If yes, what is the average waiting time to access this service?
- 4.4.3 How many days per week is this service available?
- 4.4.4 Please select the frequency of availability of the following disciplines for this service:
7 days per week/6 days per week/5 days per week/4 days per week/3 days per week/2 days per week/ 1 day per week/
rarely/never
- 4.4.5 Physiotherapy/Occupational therapy/
Speech pathology/Nursing/Dietetics/
Psychology/Social work/Other
- 4.5 Does your site offer a key contact person (in the hospital) for patients/carers to access for post discharge queries and post discharge support? Yes/No
- 4.6 Does your site have protocols guiding discharge planning for your stroke rehabilitation patients? Yes/No
- 4.7 Does your site routinely provide a care plan to patients on discharge? Yes/No

Clinical Audit

Auditor Information

Auditor details: Free Text

Auditor name

Auditor email

Auditor contact number

Discipline: Select one only

Doctor/Nurse/Physiotherapist/Occupational therapist/Social Worker/Speech pathologist/Dietitian/Psychologist/Manager/Other

Patient Demographics

The person is of Aboriginal or Torres Strait Islander origin:
Select one only

Aboriginal but not Torres Strait Islander origin/
Torres Strait Islander but not Aboriginal origin/Both
Aboriginal and Torres Strait Islander origin/Neither
Aboriginal nor Torres Strait Islander origin/Not
stated/inadequately described

What is the person's date of birth? DDMMYYYY

What is the person's gender? Male/Female/Indeterminate/
Not stated/inadequately defined

Is the person from a Non-English Speaking Background
(NESB) with a requirement for an interpreter? Yes/No

SECTION 1 Episode Details

1.1 Date of stroke DDMMYYYY/Unknown

1.2 What was the stroke type?

Ischaemic/Haemorrhagic/Unknown

1.3 What date was the patient admitted to the
rehabilitation facility? DDMMYYYY

1.4 Where did the patient come from? Select one
only

- Acute hospital – Stroke Unit
- Acute hospital – Acute inpatient ward
- Acute hospital – Unknown ward
- Rehabilitation ward
- General practitioner referral
- Other
- Unknown

1.5 Admission Functional Status

1.5.1 On admission to the rehabilitation facility
what is the patient's modified Rankin score?
Scores of 0 through to 5 (or not known for
very rare cases) Score/Unknown

Algorithm for calculating Modified Rankin Score.
(Yes/No/Unknown for the following)

- Can the patient walk on their own (i.e.
without the assistance of another person,
but may include walking aid)?
- If the patient can't walk on their own can
they walk if someone is helping them?
- If the patient can walk on their own
(includes walking aids) do they need help
with simple usual personal activities (toilet,
bathing, dressing, cooking, household
tasks, simple finances)?

– If the patient can perform simple personal activities do they need help with more complex usual activities (driving, golf, finances, household bills, work tasks?)

If the patient has no disability do they have any symptoms?

1.5.2 On admission to the rehabilitation facility what is the patient's total FIM score?
Figure/unknown

1.6 Where was this patient treated?

Dedicated stroke rehabilitation unit
Neurorehabilitation unit
Mixed rehabilitation ward

1.7 Was the patient assessed by each of the following team members, and if yes, what date was the patient first assessed: (DD/MM/YYYY)

- 1.7.1 Physiotherapy Yes/No / Not required/
Therapist not on staff/Assessed by team member before admission/Unknown
- 1.7.2 Occupational therapy Yes/No / Not required/
Therapist not on staff/Assessed by team member before admission/Unknown
- 1.7.3 Speech pathology Yes/No / Not required/
Therapist not on staff/Assessed by team member before admission/Unknown
- 1.7.4 Social work
Yes/No/ Not required/ Therapist not on staff/ Assessed by team member before admission/ Unknown
- 1.7.5 Dietetics
Yes/No/ Not required/ Therapist not on staff/ Assessed by team member before admission/ Unknown
- 1.7.6 Psychology
Yes/No/ Not required/ Therapist not on staff/ Assessed by team member before admission/Unknown

1.8 What is the date of discharge? DD/MM/YYYY

1.9 What was the discharge destination?

Select one only

- Private residence
- High-level supported residential care
- Low-level supported residential care
- Statistical discharge
- Died in hospital
- Other

1.9.1 If discharged to private residence:

1.9.1.1 Please describe the level of support if discharged to private residence? Select one only

- Lives alone (no formal supports)
- Lives alone (formal supports)
- Lives with others (no formal supports)
- Lives with others (formal supports)

1.9.1.2 Indicate if this is the same level of support as previous status before stroke (if known).

Change from previous/No change from previous/Unknown

1.10 Discharge Functional Status

1.10.1 On discharge from the rehabilitation facility what is the patient's modified Rankin score? Scores of 0 through to 6 (or not known for very rare cases) Score/Unknown

Algorithm for calculating Modified Rankin Score

- 1.10.1.1 Is this patient alive?
- 1.10.1.2 Can the patient walk on their own (i.e. without the assistance of another person, but may include walking aid)?
- 1.10.1.3 If the patient can't walk on their own can they walk if someone is helping them?
- 1.10.1.4 If the patient can walk on their own (includes walking aids) do they need help with simple usual personal activities (toilet, bathing, dressing, cooking, household tasks, simple finances)?
- 1.10.1.5 If the patient can perform simple personal activities do they need help with more complex usual activities (driving, golf, finances, household bills, work tasks)?
- 1.10.1.6 If the patient has no disability do they have any symptoms?

1.10.2 On discharge from the rehabilitation facility what is the patient's total FIM score?
Figure/unknown

1.10.3 On discharge from the rehabilitation facility what is the patient's total FIM score?
Score/Unknown

Was the patient referred for further rehabilitation following discharge? Yes/No/Not documented

1.11 Please select the type of further rehabilitation this patient was referred to

- Community rehabilitation
- Outpatient rehabilitation
- Other inpatient rehabilitation
- GEM unit
- Transitional service (please specify)

SECTION 2 Management of the consequences of stroke

2.1 Did the patient have difficulty walking independently on admission? Yes/No/No but paraplegic, amputee etc/ Not assessed/ Not documented

- 2.1.1 Did management include any of the following:
- a. Tailored, repetitive practice of walking (or components of walking)
 - b. Cueing of cadence
 - c. Mechanically assisted gait (via treadmill or other mechanical or robotic device)
 - d. Joint position biofeedback
 - e. Other therapy Yes/No

2.2 Did the patient have difficulty with Activities of Daily Living? Yes/No/ Not assessed/ Not documented

- 2.2.1 Did management include:
- Task specific practice
 - Trained use of appropriate aids
 - Other

2.3 Did the patient have aphasia? Yes/No/Not assessed/Not documented

- 2.3.1 Did the patient receive any of the following treatments?
- a. Alternative means of communication (e.g. gestures, drawing, writing, use of augmentative and alternative communication devices)
 - b. Phonological & semantic interventions,
 - c. Constraint-induced language therapy
 - d. Supported conversation techniques

- e. Delivery of therapy programs via computer,
- f. Group therapy (e.g. conversation groups)
- g. Other therapy

2.4 Did the patient have neglect/inattention? Yes/No/Not assessed/Not documented

- 2.4.1 Did management include;
- a. Visual scanning training with sensory stimulation
 - b. Prism adaptation
 - c. Eye patching
 - d. Simple cues to draw attention to the affected side
 - e. Mental imagery training or structured feedback
 - f. Other therapy

2.5 Did the patient have nutrition complications? Yes/No/Not assessed/Not documented

- 2.5.1 If Yes, did management include any of the following
- a. Ongoing monitoring by a dietitian
 - b. Nutritional supplementation for those whose nutritional status was poor or deteriorating
 - c. Alternative feeding (then specify NG feeding or PEG)

2.6 Was the patients upper limb assessed Yes/No/Not documented

- 2.6.1 If yes indicate which assessment measures were used (tick all that apply)
- a. Upper limb component of the Motor Assessment Scale: UL-MAS
 - b. 9 hole peg test: 9HPT
 - c. Other please specify
- 2.6.2 Did the patient have difficulty using their upper limb? Yes/No/Not documented
- 2.6.2.1 Did management include any of the following:
- a. Constraint-induced movement therapy (in selected people)
 - b. Repetitive task-specific training
 - c. Mechanically assisted training (need help notes to specify)
 - d. Other therapy

2.7 Was the patient's mood assessed? Yes/No/Not documented

- 2.7.1 Indicate which assessment measures was used (tick all that apply);
- Geriatric Depression Scale: GDS
 - Hospital and Depression Scale: HADS
 - Other please specify
- 2.7.2 Did the patient have a mood impairment (depression, emotional lability or anxiety)? Yes/No/Not documented
- 2.7.2.1 If the patient had a mood impairment, did management include;
- Antidepressants
 - Psychological (e.g. Cognitive-behavioural) interventions
 - Other therapy

2.8 Was the patient assessed for incontinence: Yes/No/Not documented

- 2.8.1 If yes indicate which assessment measures was used (tick all that apply)
- Non-standardised Bladder function chart
 - Post-void residual scan
 - FIM subset
 - Other please specify
- 2.8.2 Did the patient have urinary incontinence? Yes/No
- 2.8.2.1 If yes, does a continence management plan exist? Yes/No/Not documented

SECTION 3 Complications

3.1 On admission to rehabilitation did the patient have any of the following complications?

- Aspiration pneumonia Yes/No
- Deep Vein Thrombosis (DVT) Yes/No
- Falls Yes/No
- Fever Yes/No
- Pressure sores Yes/No
- Shoulder subluxation Yes/No
- Shoulder pain Yes/No
- Urinary tract infection Yes/No
- Contracture Yes/No
- Malnutrition Yes/No

3.2 During the rehabilitation stay did the patient develop any of the following new complications? Aspiration pneumonia Yes/No

- Deep Vein Thrombosis (DVT) Yes/No
- Falls Yes/No
- Fever Yes/No
- Pressure sores Yes/No
- Shoulder subluxation Yes/No
- Shoulder pain Yes/No
- Urinary tract infection Yes/No
- Contracture Yes/No
- Malnutrition Yes/No

SECTION 4 Communication and support for patient and family/carer

- 4.1 Did the team meet with the patient to discuss management? Yes/No/No, but met with family
- 4.2 Were goals set with input from the team and patient? Yes/No/No, but met with family
- 4.3 During the rehabilitation stay did the patient and family/carer receive tailored information regarding stroke rehabilitation and recovery (using relevant language or formats)? Yes/No
- 4.3.1 If yes how was this provided? (tick all that apply)
- Written or audio visual resources
 - Individual verbal session
 - Group session
- 4.4 Was formal counselling offered to the stroke survivor? Yes/No/No, but
- 4.5 Was formal counselling offered to the family/carer? Yes/No/No, but

SECTION 5 Secondary Prevention

5.1 Was the patient discharged on the following medications?

- 5.1.1 Antithrombotics Yes/No
- 5.1.1.1 If yes, mark all that apply below. Aspirin/Clopidogrel/Dipyridamole MR/Warfarin/Other anticoagulant (please specify)/Other
- 5.1.1.2 If no, select reason. Contraindicated/Patient refused/Under review/No reason given

- 5.1.2 Antihypertensives Yes/No
- 5.1.2.1 If yes, mark all that apply below
ACE inhibitor/Angiotensin-II
receptor antagonists/Alpha
blocker/Beta blocker/Calcium
channel blocker/Thiazide
diuretic/Other
- 5.1.2.2 If no, select reason
Contraindicated/Patient refused/
Under review/No reason given
- 5.1.3 Lipid-lowering treatment Yes/No
- 5.1.3.1 If yes, mark all that apply
Statin/Other
- 5.1.3.2 If no, select reason:
Contraindicated/Patient refused/
Under review/No reason given
- 5.2 Is there evidence of patient education about
behaviour change for modifiable risk factors prior
to discharge? Yes/No/No, but/Not documented

SECTION 6 Discharge planning and transfer of care

- 6.1 Was a discharge care plan outlining post
discharge care in the community developed with
input from the team and the patient? Yes/No/No,
but
- 6.2 Was a home assessment carried out? Yes/No/Not
required
- 6.3 Was the general practitioner (GP) and/or
community providers provided with a copy of the
discharge summary Yes/No
- 6.4 Did the patient receive the contact details of
someone in the hospital for any post-discharge
questions? Yes/No/No, but provided to family
- 6.5 Does the patient have a carer? Yes/No
- 6.5.1 Did the carer receive relevant training before
the patient was discharged? Yes/No/No,
but
- 6.5.2 Did the carer identify and discuss the post-
discharge needs (e.g. physical, emotional,
social) with the team? Yes/No/No, but
- 6.5.3 Was the carer provided with information
about peer support resources prior to
patient's discharge? Yes/No/Not
documented

SECTION 7 Community re-integration and long-term recovery

- 7.1 Was the patient made aware of the availability
of generic self-management programs before
discharge from hospital? Yes/No/No, but
- 7.2 Was the patient asked if they wanted to return
to driving? Yes/No/No, but/Not documented
If yes, did the patient want to return to driving?
Yes/No
Informed of restrictions to driving post stroke?
Yes/No/Not documented
Provided with information about the process
to return to driving? Yes/No/Not documented
Referred for driving assessment Yes/No/Not
documented
- 7.3 Was the patient asked if they wanted to return
to work? Yes/No/No, but/Not documented
- 7.3.1 Did the patient want to return to work?
Yes/No
- 7.3.1.1 If Yes, was the patient informed
of services to assist with return
to work? Yes/No/Not
documented
- 7.4 With regard to sexuality, was the patient offered
either of the following?
- 7.4.1 The opportunity to discuss issues relating
to sexuality Yes/No
- 7.4.2 Written information addressing issues
relating to sexuality post stroke Yes/No
- 7.5 Was the patient provided with information about
peer support (e.g. availability and benefits of local
stroke support groups or other sources of peer
support such as NSF StrokeConnect online
support)? Yes/No/No, but/Not documented

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