

TERTIARY SERVICES

ISSUES PAPER

Spinal Cord Injury Rehabilitation Services

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FOREWORD

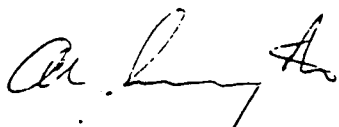
I am pleased to release the following document which is one of a series of eight issues papers released by the Tertiary Services Review Committee as part of the review of tertiary services. The series of issues papers cover:

- bone marrow transplant services
- coronary artery revascularisation and cardiac transplantation services
- liver transplant services
- neurosurgical services
- neonatal intensive care services
- oncology services
- renal services and
- spinal cord injury rehabilitation services.

I would like to acknowledge the invaluable contributions that specialist clinicians have made to the development of these papers by contributions to initial data collection and review of clinical information.

Tertiary services raise important issues for regional health authorities (RHAs), providers, clinicians and for the people who use the services. By definition they are high cost services provided in a limited number of centres. In order to manage resources, RHAs have a common interest in co-ordinating the purchase of these services. They must ensure appropriate access for people, even though some services are provided at only one or two centres in New Zealand or - in the case of liver transplants - from Australia. They also need to consider the provision of services locally - for people discharged from the spinal units, for example, or for people using dialysis services. They need to encourage clinicians and providers to develop clinical access criteria, so that the people most likely to benefit from the services have priority access. The services can only be provided where a full range of supporting services is available. Any changes to the distribution of tertiary services has implications for Crown health enterprises and, possibly, the viability of related services.

Your feedback on the issues papers will help to produce configuration options and to shape the delivery of tertiary services in New Zealand. For the RHAs and the Ministry of Health, the first objective is to ensure that we have the best information available and have identified the key issues for each service. The issues papers, as the first step in the consultation process, are intended to ensure this. It is important that providers, clinicians and consumer groups examine and comment on the data and the assumptions in the papers because they will form the basis for decisions about the future purchase of these services. Following feedback on the options papers RHAs will then make recommendations on their purchasing intentions for tertiary services to the Minister of Health.



David Smyth
Acting Director General of Health
Convenor, Tertiary Services Committee

8 May 1995

TERTIARY SERVICES

ISSUES PAPER

Spinal Injury Rehabilitation Services

INTRODUCTION

This paper is one of a series of issues papers that has been drafted by the Ministry of Health for the Tertiary Services Review Committee, representing the four regional health authorities (RHAs), the Core Services Committee and the Ministry. It contributes to the process that will lead to recommendations on the purchase and provision of specific tertiary services in New Zealand. This paper sets out the key features of spinal injury rehabilitation services in New Zealand; and it identifies key issues that need to be considered before options for the future configuration of spinal injury rehabilitation services can be developed.

Your feedback on the following would be appreciated:

- is the information in the report correct?
- is there additional information that should be included?
- have all of the important issues been identified?
- your comments on the issues
- your comments on the quality measures.

The data contained in this report is the best available at the time of writing. Please examine the data and provide us with any additional information that is available to fill gaps or improve the accuracy of the data.

The paper is being circulated to RHAs, the providers of the services, groups representing clinicians and interested consumer groups.

**Comments on the issues raised in the paper are requested by Friday
23 June 1995.**

Once comments have been received, the RHAs will develop options papers and will seek comments on these. There will be a number of options papers. RHAs will be consulting providers, clinician groups and their communities about the options. The RHAs are intending to advise the Minister of Health by the end of August about their proposals for the future purchase of these services. This will allow the Government time to consider

the issues and, if it wishes, to respond to the advice through the *1996/97 Policy Guidelines for Regional Health Authorities*. The Policy Guidelines are due to be released by the end of November 1995.

The first section of the paper summarises the key features and key issues to be considered. The second section comments on current services and trends in service provision in more detail; the third section discusses issues that affect service configuration, including the linkage between volumes and quality outcomes and the fourth section identifies quality measures. The issues on which the Tertiary Services Committee is seeking comment are highlighted throughout the paper.

Please forward comments on this issues paper to:

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Section 1

SPINAL INJURY REHABILITATION SERVICES

SUMMARY OF KEY FEATURES AND ISSUES

- This paper focuses on integrated spinal cord injury services.
- Spinal injury rehabilitation services are provided:
 - during the acute phase by most medium to large hospitals, in the form of stabilisation surgery
 - by the spinal units at Otara and Burwood (although the RHAs do not at present purchase follow-up services from the Otara unit).
- The two spinal units also provide some services for head injury, spina bifida and multiple sclerosis, which suggests that there is spare capacity in the spinal cord injury rehabilitation services.
- The two spinal units have catchment areas north and south of a line between Napier and New Plymouth.
- There have been between 80 and 125 new spinal cord injury admissions each year between 1987-1994.
- Motor vehicle accidents and sporting injuries account for 70 percent of the admissions. The other major cause of admissions is older people having falls. The numbers of admissions have not, so far, reflected reductions in the number of sporting and motor vehicle accidents.
- Little change in volumes is projected, although the growth of the population in the north will need to be taken into account when the distribution of the services is being considered.
- There is an established link between the volume of services (provided in a centre that has comprehensive specialised rehabilitation with the necessary cluster of related services and the quality of patient outcomes.

Before options are developed for the future purchase of spinal injury rehabilitation services, further consideration of the following issues is necessary:

- There is no system for credentialling providers of services in the acute phase and outcomes are known to be variable. There are no agreed protocols for the continuum of services from the site of injury to transfer to a specialised spinal injuries unit. Is there a necessity to formalise the management of this component of rehabilitation by credentialling, or is it more appropriate to ensure that

providers of acute services are required to maintain a particular throughput to maintain skills? What is the most appropriate process for ensuring that these protocols are established?

- The difference between the service provided at the Otago Spinal Unit and the Burwood Spinal Unit may reflect several historical issues in the purchase of services. This has meant that when comparing the two services provided, there are differences in the type and extent of the service offered. For example, there is no co-ordination of long term follow-up services from the Otago unit. How should this issue be addressed?
- Historically there has been very little interaction between the two providers of spinal cord injury rehabilitation services and this may have contributed to the differences in service provision. Is it appropriate for the service providers to work more closely together? How could the two units best interact to ensure that there is more information sharing in the future?
- Could the initial two year period of the long term follow-up phase, after the first follow-up visit, be as effectively provided by supported outreach rather than the client returning to the primary rehabilitation provider? What impact would specifically trained resource people, working in the community and linked to the client by a co-ordinated resource network, have on the need for long term follow-up regimes?
- Would most New Zealanders (and their families) prefer to travel a longer distance for extended primary rehabilitation in one comprehensive regional service with potentially greater quality outcomes, rather having a comprehensive service closer to home for potentially lesser quality outcomes?
- Are the quality measures outlined suitable for measuring the quality of a comprehensive spinal injury rehabilitation service and, if so should providers of spinal injury rehabilitation services be required to collect data on these quality measures? How should the results be used?

Section 2

CURRENT SPINAL INJURY REHABILITATION SERVICES AND TRENDS IN SERVICE PROVISION

This report sets out to answer two sets of questions:

- what are the current volumes of spinal injury rehabilitation services undertaken in New Zealand and what levels are projected over the next five years?
- what linkage is there between service volumes and the various dimensions of quality?

Information in the paper is based on:

- a literature review
- questionnaires which were answered by clinicians during the initial tertiary review process
- telephone interviews with managers and clinicians involved with the service
- visits to service providers of primary rehabilitation and follow-up for acute spinal cord injury
- contributions of the participants at a workshop on quality measures for spinal cord injury rehabilitation services (SCIRS) and the optimal configuration of the service.

DESCRIPTION OF THE SERVICE

Definitions

(1) Acute spinal cord injury

Acute spinal cord injury (ASCI) is defined as an insult to the spinal column resulting in the sudden onset of a disturbance of motor and/or sensory neurological function. This damage may or may not be associated with damage to the bony, muscular or ligamentous constituents of the spinal column. It is distinguished from peripheral or segmental nerve injury which may accompany spinal cord damage. ASCI is commonly precipitated by trauma but may also be due to non-traumatic causes. Impairment may occur which is secondary to the initial trauma. The non-traumatic causes of spinal cord injury are conditions such as Paget's disease, multiple sclerosis, spinal stenosis, disc protrusion and tumours. As well, infections, secondary myelopathies and congenital malformations such as spina bifida can bring about impairment. The specific needs of clients with these conditions are not considered in this report.¹

(2) A spinal cord injuries rehabilitation service

A spinal cord injuries rehabilitation service (SCIRS) is an intensive, specialised service provided to those people who have suffered spinal cord damage due to accident or some other condition. A SCIRS should be comprehensive and fully integrated and should incorporate the acute phase, primary rehabilitation, the transition phase and long-term rehabilitation. Each phase involves specific needs assessment for the client and requires different resources to facilitate rehabilitation. The working group on SCIRS agreed that describing the service in terms of the different phases in rehabilitation was appropriate but there was also a need for providers and purchasers to facilitate a "seamless" transition for the client between the phases.

(3) The acute phase

The acute phase is defined as the time from the injury until the patient is sufficiently stable for transfer to a specialised primary rehabilitation unit. The aim in this phase is to ensure that risks are minimised and that potential function is maintained so as to ensure the best possible outcome is achieved during rehabilitation. Treatment includes surgical stabilisation and stabilisation of other physical systems, particularly when there are co-existent multiple injuries.

The risk to the client during this phase is that further injury can occur through inexperienced handling during removal from the site of injury or later, and inadequate surgical intervention.

(4) The primary rehabilitation phase

The primary rehabilitation phase is the time from admission to a specialised unit until discharge. The survival rates of people with disabling spinal cord injury has altered markedly due to identification of the need for designated units that dealt specifically with people with spinal cord impairment.

The aims of primary rehabilitation are to:

- improve quality of life
- allow the person with a disability to participate in society in a manner appropriate to their age, culture, gender and individual interests throughout their life
- deliver consistent, secure, cost effective services⁶
- ensure the client enters the next stage of rehabilitation when they, in agreement with health professionals, are capable of functioning safely.

(5) The transition phase

The transition phase is an integral part of the primary rehabilitation phase. The aim of this phase is to enable a person with spinal cord impairment to return to their own

home/social environments, experience life outside of the spinal unit and to explore different living options. The ASCI unit staff should be available at this stage if needed.

(6) Long term follow-up

The aim of this phase is to assist the client to maintain their quality of life and to resume their usual social roles. Careful rehabilitation and long-term follow-up in the community with access to appropriate service have been estimated to reduce mortality significantly for those with a spinal injury. It is estimated that 50 percent of tetraplegics would die before the average age of their non-disabled peers if they did not have access to rehabilitation and long-term follow-up. It is estimated that another 25 percent would require permanent hospital care. Ten percent of paraplegics would die and a further 20 percent would require permanent hospital care.¹ Other estimates of the effectiveness of urological and skin care procedures indicate that there is a 90 percent decrease in readmission for UTI and a decrease of 50 percent for skin breakdown.

Long-term follow-up can also be divided into two phases: two to three years following discharge from a specialised unit and follow-up after that period of time.

(7) High cost, low volume services

The supra-specialist low volume, high cost services associated with SCIRS are procedures such as complex spinal surgery, Brindley implants and tendon transfer techniques. These techniques are highly specialised and may require to be carried out at one centre to maintain quality outcomes.

Current service configuration and volumes

The acute phase is currently undertaken at most medium to large hospitals in New Zealand. These hospitals have a surgeon who is prepared to carry out stabilisation surgery. There is no system for credentialling providers of the acute phase and the outcome is known to be variable. There are no agreed protocols for the continuum from the site of injury to transfer to a specialised spinal injuries unit.

There are two units in New Zealand offering a range of services for acute rehabilitation following spinal injury. These centres are located in South Auckland at the Otago Spinal Unit, and in Christchurch at the Burwood Spinal Unit.

In the past, the spinal units have had catchment areas designated by a line between Napier and New Plymouth. Those people with spinal cord injuries who live north of this line receive primary rehabilitation and limited needs-based follow-up at the Otago Spinal Unit. An initial 3 month follow-up reassessment is offered. Access to further follow-up is available but is not co-ordinated from the Otago unit. Those who live south of the line receive primary rehabilitation and needs- and protocol-based follow-up at the Burwood Spinal Unit. Fifty percent of the clients admitted to Burwood for primary rehabilitation

are from Canterbury and 50 percent are from the remainder of the southern half of the country.

A small number of Otago clients (five in the first six months of 1992) receive follow-up treatments at Burwood. These treatments include reassessments, reproductive advice and low volume, high cost, specialised surgery. Referral is made to these services through a general practitioner and is available to all clients on request. There is no co-ordination for these services from the Otago unit. The difference between the service provided at the Otago Spinal Unit and the Burwood Spinal Unit may reflect several historical issues. It is suggested that these are:

- the management styles applied to the provision of spinal cord injury services centred at the Otago Spinal Unit; and
- the current purchasing arrangements for the provision of a comprehensive service.

Changing management structures, the appointment of care co-ordinators and goal setting for the Otago Spinal Unit indicate that with purchasers' support, the service will be improved to the extent that differences in services provided by the two units will reduce over time.

In addition to spinal cord injury services, the spinal units provide services for those with related disabilities such as those with head injury and spinal cord impairment due to other causes. It is also proposed to improve the services for those with spinal impairment due to spina bifida, multiple sclerosis and other spinal conditions. At present these services are fragmented. This suggests that there is some spare capacity in each SCIRS.

Table 1 Number of first admissions for ASCI to Otago and Burwood Spinal Units from 1987 to 1989 and from 1991 to 1994

Year of admission	Otago	Burwood
1987	64	46
1988	73	40
1989	66	64
1991/1992	55	36
1992/1993	46	36
1993/1994	51	65

Key issues

- There is no system for credentialling providers of the acute phase and outcomes are known to be variable. There are no agreed protocols for the continuum from the site of injury to transfer to a specialised spinal injuries unit.
- There is no co-ordination of long term follow-up services from the Otago unit. The difference between the service provided at the Otago Spinal Unit and the Burwood Spinal Unit may reflect several historical issues.

- Historically there has been very little interaction between the providers of spinal cord injury rehabilitation services and this may also have contributed to the differences in service provision.

Factors influencing future volumes

Future levels of spinal cord injury rehabilitation services are likely to be affected by:

- population factors
- trends in service provision
- new technology
- clinical access criteria
- comparison of current New Zealand levels with international levels of service provision.

(1) Population factors

Most clients entering the spinal injury rehabilitation service are between 18 and 25 years of age. Motor vehicle accidents and sporting accidents account for 70 percent of the clients in the spinal units. In young children the predominant cause of spinal injury is road or pedestrian accidents. In young and middle aged adults, the causes of admission are usually motor vehicle accident whereas in older adults the major causes of acute spinal cord injury are falls in the home.

More men than women sustain spinal cord injury. Overall, the ratio of men to women is 1.7:1 but this varies for different age groups. For example, one research group in America compared a group of individuals over 55 years of age with a group aged under 55 who were admitted to SCIRS. They observed that in the older age group:

- there were 29 percent more women than men
- pre-existing medical disorders were 87 percent more common
- associated injuries were 55 percent more common
- incomplete quadriplegia was 63 percent more common
- falls, as a cause of injury, were 53 percent more common.³

(2) Trends in service provision

Trends in SCIR services can be approximated by a review of the number of people admitted to the spinal units. The total number of first admissions declined between 1987 and 1992/3 by 34 percent but rose by 50 percent between 1992/3 and 1993/4 (Table 1). This trend is not reflected in the declines in road traffic accidents (Table 2) or in sports injuries (Table 3). Over the last six years there has been a 12.5 percent decline in total road traffic accidents and a 17 percent decline in fatal accidents. Sporting accidents claims on ARCI have decreased by 26 percent between 1991 and 1994.

Table 2 Number of road traffic accidents from 1988 to 1993

Year	Road Traffic Accidents	Fatal accidents	Total
1988	11936	624	12560
1989	11395	646	12041
1990	12179	637	12816
1991	11609	554	12163
1992	11093	542	11636
1993	10477	517	10994

Table 3 The number of sporting accidents between 1991-1994

Year	Total number of ACC claims for sporting accidents
1991	27,969
1992	26,179
1994	20,643

(3) Technology issues

The impact of public education programmes in areas such as road safety and sports safety may ultimately impact on the number of people entering the service.

Technological advances in the rehabilitation of people with spinal cord injury include surgical interventions for bladder control and tendon transplant to increase hand and arm movement for tetraplegics. Functional electrical stimulation (FES) used for walking may also affect outcomes for clients following ASCI. At present there are limited applications for these technologies and FES as a walking technology is not available in New Zealand.

(4) Conclusions

Various factors contribute to assumptions about future volumes of acute spinal cord injury rehabilitation services.

- Admission rates to SCIRS do not exhibit any particular trend but have tended to remain between 80 and 125 new admissions per year (Table 1).
- New Zealand's population is expected to grow by 0.9 percent over the next five years but there are significant regional differences. The population is expected to grow by 3 to 4 percent in the North Health catchment, to remain relatively static in the Midland and Southern regions and to grow slightly in the Central region. The impact of this change in population may not substantially affect the number of admissions to the current services but may affect planning of the future distribution of services.

- The number of people over the age of 65 years of age will increase over the next 10 years.
- The number road traffic accidents and sporting accidents have declined and will probably continue to decline with new initiatives in road and sports safety.

From these factors it can be estimated that there is unlikely to be a significant change in the nature and number of the client group that will sustain spinal cord injuries. There may be a slight increase in the number of first admissions in the Auckland region but this is unlikely to be significant. From some regions there may be a decrease in admissions. The continued decline in the numbers of people sustaining significant spinal injury due to sporting and road traffic accidents may have some impact on admission numbers in the future however there is no direct correlation with the incidence of accidents and the rate of admission to a spinal injury rehabilitation service. It is assumed that there will continue to be between 80 and 125 new admissions per year. This projection does not take account of future decisions RHAs may make about the relative priority of spinal injury rehabilitation services compared to other services, nor does it attempt to estimate changes in volumes that could result from extending the same approach to service delivery to all people with non injury related spinal cord injury.

Key issues

- The decline in the number of accidents may eventually have an impact on the number of admissions. Does this mean we should be planning for less spinal cord injury rehabilitation services in the future?

Section 3

FACTORS INFLUENCING THE CONFIGURATION OF SERVICES

The configuration of spinal injury rehabilitation services will be influenced by:

- the link between service volumes and quality outcomes
- the distribution of interdependent services
- the principles for purchase decisions and
- quality measures for spinal injury rehabilitation services.

(1) The link between service volumes and quality outcomes

Volume/quality relationships have been identified in the international literature. The literature suggests that the minimum recommended throughput is 20 patients per year in a unit which is staffed by specialist nursing, medical and allied health professionals. There is a defined "cluster effect" which has been identified in outcomes of clients from units where all services such as urology, specialised orthopaedic surgery, ICU and advanced diagnostic facilities are available.

In Australia it has been estimated that an ASCI unit should have no fewer than 30 beds to maintain clinical expertise and quality of care. The mean incidence of ASCI in New Zealand is 24-30/million population per year, compared to 20-40/million population per year in Australia. With the minimum throughput requirement the existing service providers receive enough new admissions to optimise outcomes.¹

There is sufficient volume of SCIRS in New Zealand to ensure there is adequate throughput to benefit from a "cluster effect" and to achieve favourable outcomes in two units. There is, however, some indication that each unit has the capacity to expand. This suggests that there may be some economies of scale if services were reconfigured.

The level of service varies in that Otago does not provide long-term follow-up. It is not clear if long-term follow-up for all clients improves overall outcomes but it is the view of rehabilitation specialists that long term follow up has significant advantages for clients. Access to reassessment was discussed at the working group meeting and it was agreed that it was important that access to physical and psychological reassessment is improved.

(2) The distribution of interdependent services

The interdependencies for a comprehensive spinal cord injury rehabilitation service vary for each phase of rehabilitation. The interdependencies in each phase of rehabilitation are outlined in the context of "inputs" detailed in Section 4.

(3) The principles for purchase decisions

The *Policy Guidelines for RHAs* set out principles for purchase decisions. They also signal the Government's expectation that RHAs will apply these principles and clarify the purchase trade-offs they make. These principles are:

- equity
- effectiveness
- efficiency
- safety
- acceptability and
- risk management.

Equity focuses on fair distribution of services in relation to people's needs, in terms of their ability to benefit from services. A key issue relates to improving equality of access in terms of waiting times, geographical access and affordability, according to people's ability to benefit from the services. *Effectiveness* focuses on ensuring that services result in better health outcomes. The main concerns are that services target people's needs, are clinically sound and are co-ordinated. The *efficiency* principle recognises that resources are limited and choices have to be made between different services. Key issues include improving cost-effectiveness, minimising costs and encouraging innovation; and encouraging comparisons of relative costs and benefits across services. The *safety* principle is concerned with purchasers adopting strategies that seek to protect service users from avoidable harm. The *acceptability* principle is closely linked with people's values and perceptions. Well-being is affected by the way services are purchased and provided. For the community, acceptability includes proper consultation. *Risk management* involves managing service risks to populations and service users, as well as ensuring that objectives are achieved to the extent possible within available funding.

Services that provide prolonged or emergency treatment would need to be provided relatively close to the clients residence, services that are semi-urgent and provide short term treatment could be provided by a relatively small number of centres. Follow up for aftercare could be provided locally.

The acute phase of a spinal cord injury services should be provided as close to the accident site as possible. The primary rehabilitation stage could be provided in only one centre to ensure quality outcomes but the long term nature of this phase of treatment will mean that geographical access is a major consideration. The transition and long term follow up could be provided in more than one centre. There may be a trade off between geographical access and the suggested quality comprehensive national service could provide.

Other purchasing interests. ACC has a direct interest in outcomes for spinal cord injured claimants and services related to those claimants. There is significant support of these claimants from the ARCI scheme over the longer term. ACC share an interest with the health section in ensuring that providers manage their services in a way which will

return an individual to his or her pre-injury situation as soon as possible. The ACC is investigating ways of participating in the purchase of, and in some instances the provision of, some spinal injury rehabilitation services. For some services this will require strengthening of some currently provided services.

Conclusions

It can be concluded that minimum volume throughput is achieved by both of the existing service providers. Given the long periods in the primary rehabilitation phase needed to ensure that the best possible outcome is achieved, consideration must be given to access to services both for the client and those from their social environment. The present configuration of the services, supported by appropriate community-based services, may be appropriate to ensure that access is maintained. Concerns about the purchasing arrangements for a comprehensive service need addressing to ensure that all the purchase principles are met.

Key issues

- Could the initial two year period of the long term follow-up phase, after the first follow-up visit, be as effectively provided by supported outreach rather than the client returning to the primary rehabilitation provider? What impact would specifically trained resource people, working in the community and linked to the client by a co-ordinated resource network, have on the need for rigid long term follow-up regimes?
- Would most New Zealanders (and their families) prefer to travel a longer distance for extended primary rehabilitation in one comprehensive regional service with potentially greater quality outcomes, rather having a comprehensive service closer to home for potentially lesser quality outcomes?

SECTION 4

QUALITY MEASURES

Definitions

Terms used to describe quality measures vary. For the purposes of measuring the quality of tertiary services we have used the following definitions.

(1) Output measures

Outputs refer to the results achieved by a unit of care. Measuring the quality of outputs measures the clinical performance related to an output. It includes immediate survival rates post surgery, readmission rates, complication rates, length of stay and so on.

(2) Outcome measures

An outcome is the long term effect of an output on a person's health and well being. Outcome measures include long term morbidity rates and assessment of patient satisfaction and health status.

(3) Inputs

Patient inputs can have a considerable bearing on the quality of outputs and outcomes of an intervention. They refer to biological, social and psychological variability of individuals. Measurable patient inputs include severity of illness, the presence of co-morbidities, ethnicity and socio-economic status. Institutional inputs can impact on the quality of outputs and outcomes. Institutional inputs include clinical/surgical skill, quality of anaesthetic support, technical support, quality of post operative nursing care, physiotherapy, rehabilitation and support services. Institutional inputs include the link between volume and outcome.

Quality measures in use

The following quality measures are currently collected in part by both of the existing SCIRS providers. In addition the list includes the quality measures agreed by consensus at the working group meeting for SCIRS held on the 15 March at the Ministry of Health.

(1) Output quality measures

Acute phase

- mortality rates
- morbidity rates including the incidence of skin breakdown, infections, contractures, additional fractures and burns

Primary Rehabilitation

- mortality rates
- morbidity rates including the incidence of skin breakdown, urinary tract infection, chest infections, deep vein thrombosis, pulmonary embolism, iatrogenic injury such as fractures and burns
- average length of stay

Additional output quality measures recommended at the working group meeting were:

- the length of time the client spent in the primary rehabilitation phase. A suggested benchmark was four to six weeks for paraplegics and six to eight weeks for tetraplegics
- time spent by the client in the transition phase

The transition phase

- time spent in the transition phase
- re-entry to primary rehabilitation

Long-term follow-up

- mortality rates
- morbidity rates including the incidence of skin breakdown, infections, and complications such as renal/bladder complications,
- unplanned readmission and reason.

(2) Outcome measures

Outcome measures that are used by the service providers are limited in their scope. These include:

- functional independence measurements (FIMS)
- patient satisfaction surveys. It was suggested by the working group that the current client satisfaction survey could be developed so that each phase can be measured.

In the *primary rehabilitation phase* the client survey assesses the client's perceptions of their involvement in negotiating their own contract, knowledge of their treatment and whether they thought they were appropriately treated. In the *transition phase* the client survey should aim to examine the clients perceptions of their transit back into the community by incorporating the clients perceptions of their discharge plan and their perceptions of their accessibility to a support network. In the *long-term follow-up phase* the client satisfaction survey should examine the perceptions of the client to access to resources, flexibility of services and range of choices that the client has for follow-up and problem-solving in the community.

(3) Process measures

Process measures used by the units are similar. The value of process quality measures should be seen in the context of outputs and outcomes. These are:

- interdisciplinary meetings held on a weekly basis. These meetings integrate the inputs of the staff to co-ordinate the care of the individual
- family meetings are also held with the aim of informing and co-ordinating the individual's rehabilitation with care givers and family members.

The working group suggested several other process measures for each phase of rehabilitation even though it was generally agreed that the emphasis of new measures should be placed on output and outcome quality measures. These additional measures were:

- in the *acute phase*, intensive care units dealing with the injured person maintain close contact with the spinal injury unit and have defined protocols for treatment and care of the spinally injured person
- waiting times to see a specialist for those with spinal impairment. The suggested benchmark was 24 hours
- in the *primary rehabilitation phase* the use of an agreed scale to measure independence and capability
- individualised contracts between the client and the provider
- research undertaken in a unit should be centred on the improvement of the service to the client. Projects could be retrospective or prospective client-centred research or bio engineering methodologies
- teaching programs should be available for carers, staff working in the unit and staff working in the community. Teaching programs should incorporate the philosophy of the unit so that the service is consistently provided in the community
- in the *transitional phase* there should be an audit of the ability of the client to manage in their own home environment following discharge, that there is a comprehensive assessment of support needs is undertaken before discharge
- in the *long-term rehabilitation phase* specialist reassessment should be carried out at three months, six months, 12 months and 24 months. An information network that is culturally appropriate and recognises individuality should be available to all clients in the community. Individualised follow-up should continue as required incorporating measurements of physical and psychological well-being such as renal/urological function, skin care and musculoskeletal conditions such as bone density, tendon flexibility and vocational and social needs.

(4) Inputs

In the *acute phase* of rehabilitation the inputs identified inputs are:

- specialist staff trained in safe evacuation and transportation of the injured person to an acute provider
- transfer for stabilisation is to skilled and credentialled practitioners who have sufficient throughput to maintain skills, as well as diagnostic and intensive care facilities at Level VI in the New Zealand role delineation model
- there is access to staff from a specialised spinal cord injury service. In some units the staff from the unit are able to make contact and participate in the care of the spinal injured person during their time in the ICU. This has the effect of integrating care and ensuring that rehabilitation begins as soon as practicable.

In the *primary rehabilitation phase* there are:

- on-site access to medical staff including a Spinal Cord Rehabilitation Specialist and Urologist
- there be access to a spinal surgeon, neurosurgery, neurology, plastic surgery and diagnostic facilities such as MRI and laboratory facilities
- there is on-site specialist spinal and rehabilitation nursing, physiotherapy, occupational therapy, social work, speech therapy, psychology
- in addition to fully serviced in-patient beds, facilities at the unit should include gymnasium, transitional living accommodation and whanau/family accommodation
- management structures within the unit should incorporate the co-ordination of medical, nursing and other health professional input so that accountability is based within the framework of the team.

In *all phases of rehabilitation* inputs should include:

- access to on-going expertise in life skills such as vocational assessment, psychological support, ARCI support and in the maintenance of physical well-being such as bladder management and pain management
- a service delivered in a culturally appropriate manner.

Key Issue

Are the quality measures listed above suitable for measuring the quality of a comprehensive spinal injury rehabilitation service, if so should providers of spinal injury rehabilitation services be required to collect data on these quality measures and how should the results be used?

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