

# Cost Survey



*A study of the cost of rehabilitation of Spinal Cord Injured patients in Sri Lanka*

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## introduction

Every year in Sri Lanka between 1200 and 1500 people become spinally injured. Ragama Rehabilitation Hospital (RRH) is the only specialist spinal injury rehabilitation unit in the whole country; it is able to accommodate about 100 patients each year.

This means that each year at least 1100 people who are spinally injured do not receive proper rehabilitation. Of these, it is estimated that 70% (about 770 people) will die within one year from complications arising from their spinal cord injury.

The two complications that cause most deaths are **pressure sores** and **Urinary Tract Infections** (UTIs). Both of these complications are entirely preventable with adequate care and education.

## reasons for undertaking a cost survey

The cost survey was undertaken in order to determine how much the rehabilitation of a Spinal Cord Injured patient costs Ragama Rehabilitation Hospital (RRH). From this we have been able to pinpoint areas in which the quality of care of a patient can be increased and the service can be made more efficient.

As the majority of the costs of rehabilitation at Ragama Rehabilitation Hospital are fixed costs, such as staff costs, and utilities, the main factors affecting the cost per patient are the length of rehabilitation and the number of beds in use at RRH. The prevalence of secondary complications affects the length of rehabilitation, and the number of re-admittances and patients unable to be discharged home reduce the overall number of patients able to be rehabilitated.

## benefits of a more efficient service

The aim of rehabilitation is to enable the patient to be physically, socially and mentally reintegrated into society, so that they may play a functional role in the community.

These aims become pointless if the patient feels unable to leave their house once they have been rehabilitated, either because of inadequate urinary management or some other complication like a pressure sore.

With improved patient care and attention to specific areas such as prevention of pressure sores and UTIs the incidence of complications could be reduced with the following benefits to the **hospital**

- Shorter rehabilitation period
- More SCI patients rehabilitated each year
- Less money spent treating secondary complications

With better patient education and provision of appropriate equipment on discharge the service could be further enhanced with these benefits to the **patient**

- Fewer complications  
*enabling people to play a greater role in the community after rehabilitation*
- Fewer patients readmitted for treatment of complications

## summary of findings

Over the past year staff at Ragama Rehabilitation Hospital have worked with Motivation Charitable Trust to upgrade the level of rehabilitation. We are now beginning to see some tangible results. The changes have been far reaching with large reductions in the incidences of pressure sores and UTIs.

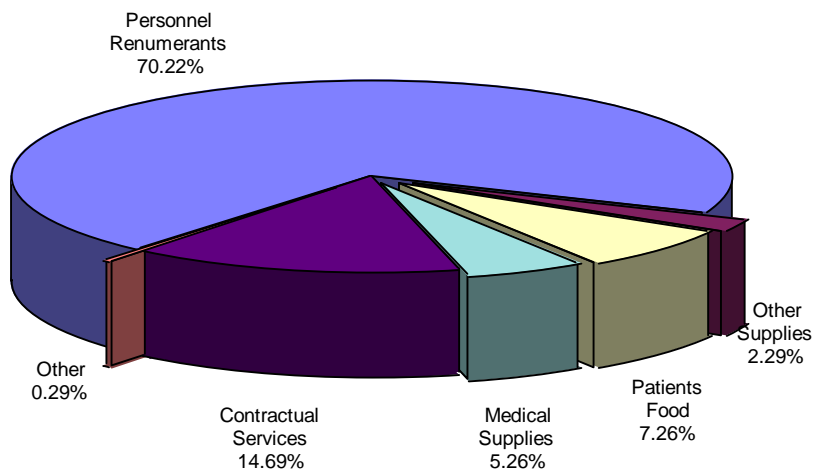
- the number of patients being transferred to other hospitals due to complications has been cut by 80%
- the average length of rehabilitation has been substantially lowered
- the rate of discharge has doubled
- the cost of rehabilitating each patient has been lowered by over \$1,000

All these changes, in conjunction with the reopening of a 22 bed ward will enable more people to have the opportunity to be rehabilitated at Ragama following a spinal cord injury.

## cost of patients at RRH

The average cost per SCI patient per day at RRH is **Rs 469 (US\$6.8)<sup>i</sup>**. 70% of this figure is spent on staff costs.

*Chart 1. Breakdown of patient*



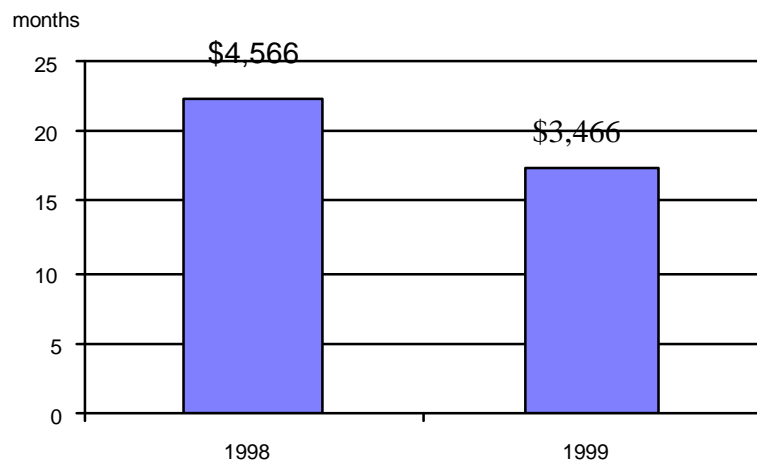
In 1998, the average length of stay of a patient at RRH was 22 months, with an estimated cost to the hospital of **Rs 315,054 (US\$ 4,566)**. There were 16 patients on Ward 8 (a ward for patients who are not able to be discharged) with an average length of stay of 61 months costing **Rs 858,270 (US\$ 12,438)** each.

By 1999, the average length of stay of a patient had been reduced to 17 months with an estimated cost to the hospital of **Rs 239,190 (US\$ 3,466)**. There are now 12 patients on Ward 8 with an average length of stay of 48 months.

By the end of August 1999, it is hoped that all these patients will be able to be discharged leaving the beds will be free for more patients.

If the rehabilitation period could be reduced to six months, it would cost **Rs 84,420 (US\$ 1223)**. *The total cost of rehabilitation including an appropriate wheelchair would be **Rs 92,420 (US\$1,339)***

Table 2: Average length of stay of patients<sup>iiii</sup>



## the cost of complications

Secondary complications put an enormous strain on the rehabilitation system, placing the nursing staff under great pressure and effectively turn a rehabilitation centre into a medical treatment centre, thus distracting it from its main purpose.

### 1. Pressure Sores

People with a spinal cord injury are at a higher risk than other hospital patients of developing pressure sores due to their lack of sensation and movement.

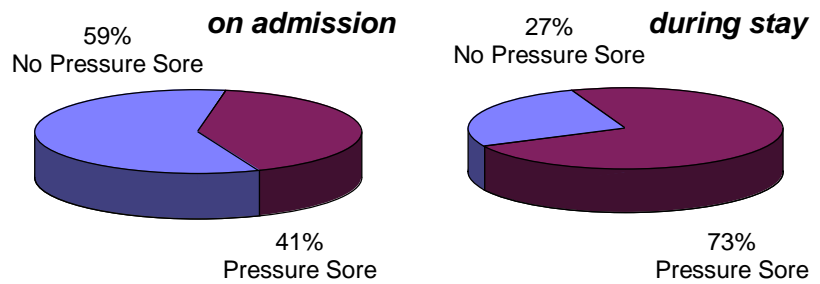


Table 3: 1998 – incidence of pressure sores<sup>iv</sup>

In 1998, the incidence of pressure sores at RRH was very high with 41% of patients being admitted with pressure sores and 73% of patients developing further pressure sores during rehabilitation at RRH.

Pressure Sore management is one of the most expensive areas at Ragama Rehabilitation Hospital.

**Pressure Sores increase hospital costs by:**

**1. Use of Dressings**

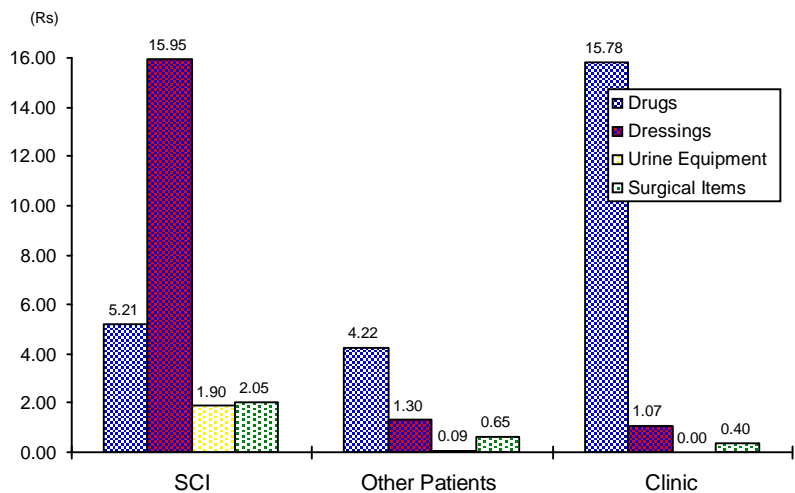


Table 4: 1998 - Cost of consumables per patient per day<sup>v</sup>

In chart 4 we can see that in 1998 over 12 times as much was spent on dressings for SCI patients than for non-SCI patients

at RRH. The high expenditure was primarily caused by the prevalence of pressure sores. The figure would have been higher still, however the most expensive dressings used in pressure sore management (Duoderm), are donated.

## **2. Increased Length of Stay**

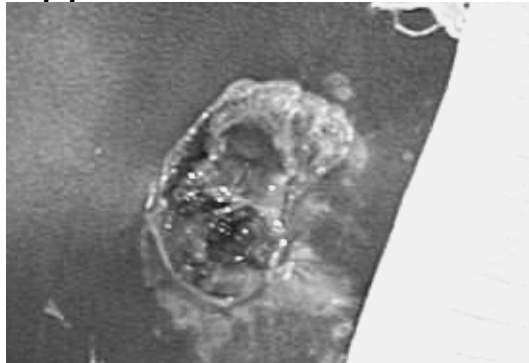
A patient cannot be mobilised in a wheelchair, until any existing pressure sores on weight bearing bones have healed. Most of the pressure sores at RRH fall into this category and patients cannot begin their rehabilitation until they have been mobilised. If they develop a pressure sore during the course of their rehabilitation, the likelihood is that they will stop attending physiotherapy and occupational therapy until the sore has healed, thereby lengthening their stay at RRH.

### ***medium pressure sores***



These pressure sores will take approximately 6 weeks to heal. During this time the patient will cost RRH **Rs 19,715 (US\$ 285)**

### ***deep pressure sore***



This pressure sore may take up to a year to heal, costing the hospital **Rs 171,338 (US\$ 2,483)** to look after the patient

**3. Re-admittance.** If an SCI patient is discharged without adequate education on prevention of pressure sores, and appropriate pressure relief equipment (mattresses and cushions) they are at risk of developing a pressure sore, and eventually may need to be readmitted to hospital. By the time a patient is readmitted with a pressure sore, it is likely that it will have developed into a deep wound taking on average 6 months to one year to heal, which would cost at least **Rs 85,669 (US\$ 1,241)**

**4. Surgery.** In the worst cases, a patient will need plastic surgery to enable a pressure sore to heal, thus inducing all the associated costs of surgery, and a period of recovery in hospital.

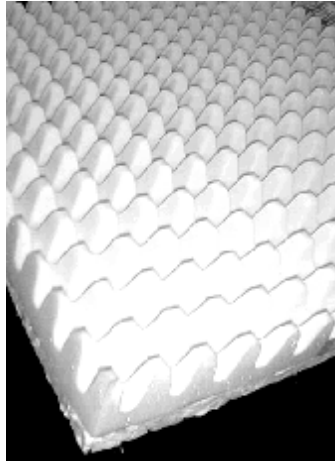
***case study - abdul carder***



Abdul Carder is a 20 year old tetraplegic who has been injured for 2 years and 6 months. Since his injury he has developed **13 pressure sores**, all of which occurred whilst he was in hospital. Due to the sores, he has been permanently on bed rest for the whole of this period and has not even begun his rehabilitation.

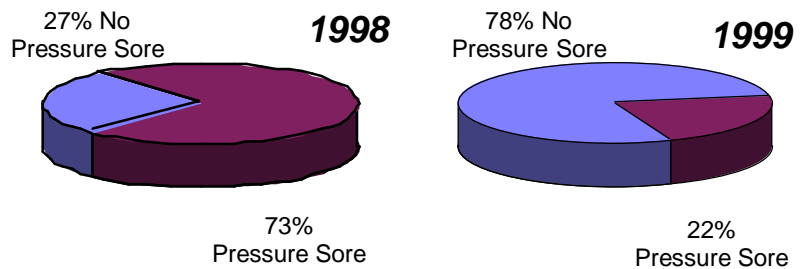
To date his care has cost the Sri Lankan health service **Rs 427,172 (US\$6,675)**. He will be in hospital for at least one more year which will cost **Rs 171,338 (US\$2,677)**

***Pressure Relief Mattress***



- This pressure relieving mattress costs **Rs 3,700**
- The mattress would last for at least one year
- An 8 month rehab period with the provision of 2 pressure relief mattresses would have cost **Rs 118,660 (\$1,854)**

***changes during the past year***



*Table 5: incidence of pressure sores during stay at RRH*

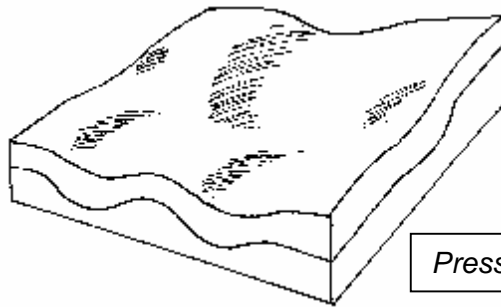
During the past year, Motivation Charitable Trust and RRH together have designed and employed a strategy that has effectively lowered the incidence of pressure sores:

- Education of patients (and attendants) in pressure sore prevention techniques as soon as they are admitted



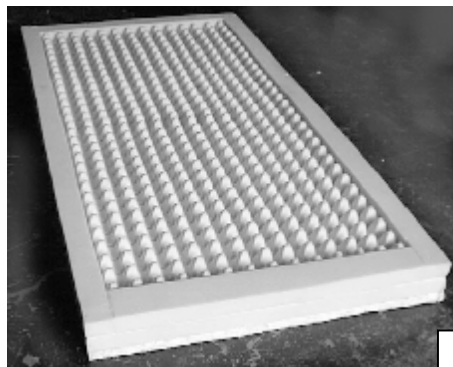
*Teaching a patient how to check his skin*

- Education of nurse trainers in better pressure sore prevention techniques and patient education
- Design and production of a low cost pressure relieving cushions for distribution and use with wheelchairs



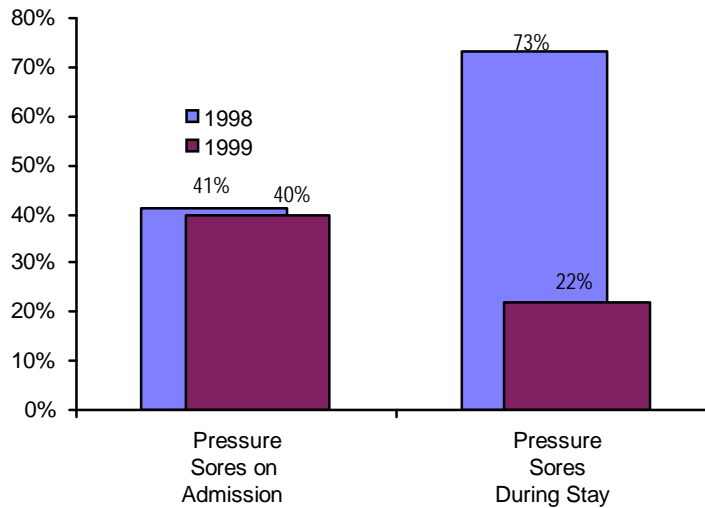
*Pressure relieving cushion*

- Provision of low cost pressure relieving mattresses at Ragama Rehabilitation Hospital.



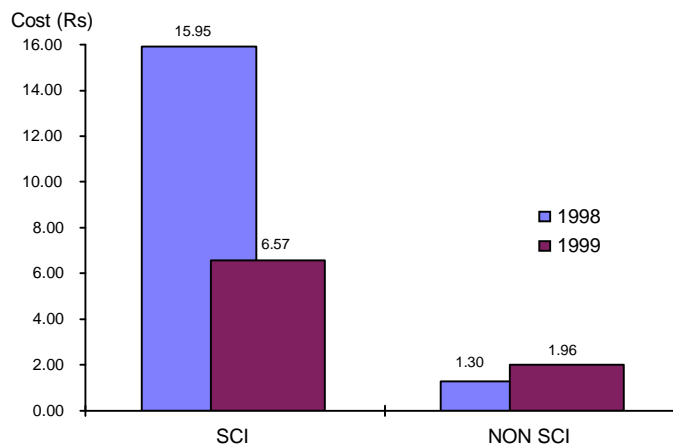
*pressure relieving mattress*

*results*



*Table 6: Incidence of pressure sores at RRH*

Whilst the incidence of pressure sores on admission has remained at the same level, indicating no change in external factors; the number of patients developing pressure sores during rehabilitation at RRH has dropped by 70%.



*Table 7: expenditure on dressings for SCI patients*

Reflecting the large drop in the number of pressure sores to be treated, the expenditure on dressings for SCI patients has been reduced by nearly 60% to just over 3 times the expenditure for non SCI patients.

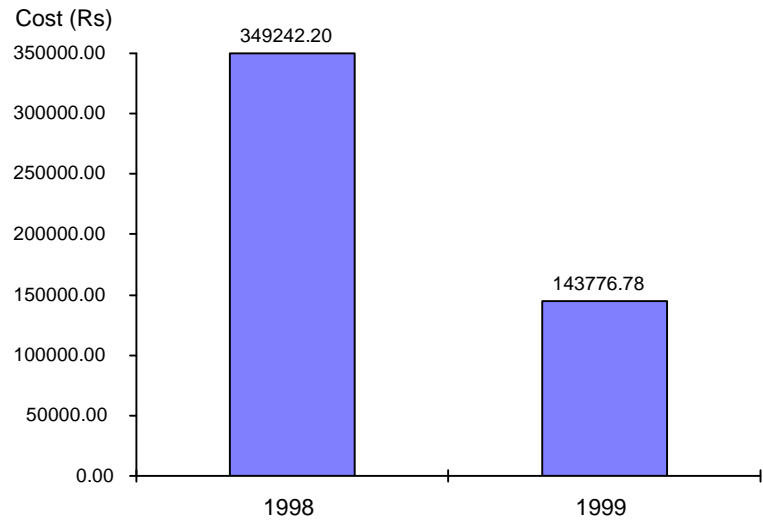


Table 8: annual expenditure on dressings

The overall expenditure on dressings for SCI patients per year has been reduced in one year, by nearly 60% saving **Rs 205,465 (US\$ 2977)**. This directly reflects the lower incidence of pressure sores in SCI patients.

## 2. Urinary Tract Infections (UTIs)

Urinary infections are a frequent complication amongst spinal cord injured people, due to the need for careful bladder management after spinal cord injury. UTIs are one of the most common reasons that a patient will need to be transferred to another hospital from RRH for more acute care.

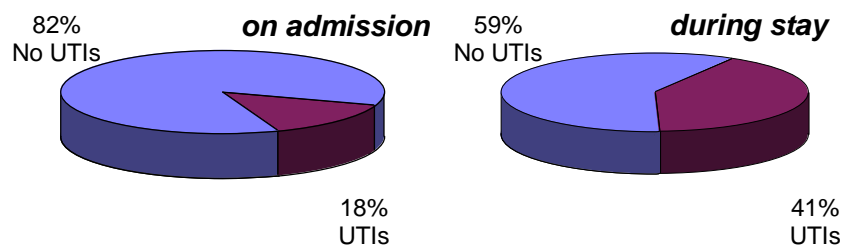


Table 9: 1998 – incidence of UTIs at RRH<sup>vi</sup>

As can be seen from the charts, in 1998 18% of patients admitted to RRH had a UTI and 41% of patients developed UTIs during their rehabilitation process.

**UTIs increase hospital costs by:**

2. **Increased use of catheters** When catheters block, leading to UTIs, they are changed more frequently.

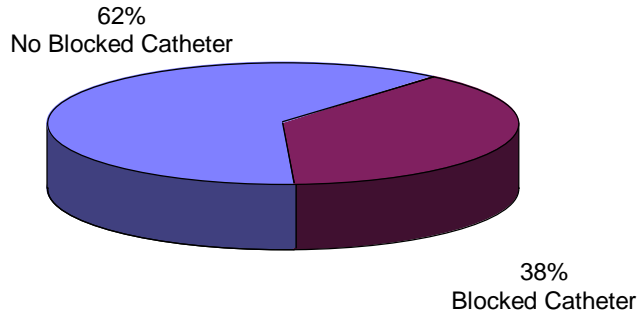


Table 10: 1998 - incidence of catheter blockage

In 1998 38% of patients had blocked catheters necessitating new catheters to be inserted more frequently.

3. **Use of Drugs** Patients with UTIs are prescribed antibiotics to treat urinary tract infections.

4. **Increasing Length of Stay.** UTIs lead to reduced skin tolerance putting the patient at greater risk of developing pressure sores.

5. **Transfer to another hospital** In the most severe cases of UTIs, a patient will need to be transferred to another hospital where more intensive care can be given.

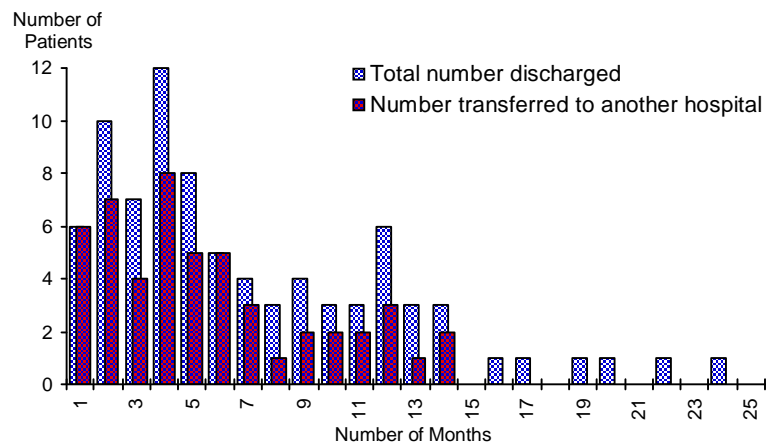


Table 11: 1998 - place of discharge<sup>vii</sup>

In 1999 51% of SCI patients discharged from RRH were actually transferred to another hospital, most commonly for treatment of a severe UTI. As these patients were not transferred with any advice about how to manage an SCI patient, many returned to RRH to continue their rehabilitation having developed other complications such as pressure sores and contractures.

26% of the patients being admitted to RRH were actually being *re-admitted* to RRH following treatment of complications at another hospital.

6. **Re-admittance.** If an SCI patient is discharged without adequate education on prevention of UTIs, and appropriate urinary management they are at risk of developing a UTI, and may eventually need to be readmitted to a hospital.

In 1998 4% of the patients being admitted were patients re-admitted from home following complications at home.

7. **Complications** If a UTI is left untreated the patient may develop complications such as renal failure that are more expensive to treat and can lead to death.

### *changes during the past year*

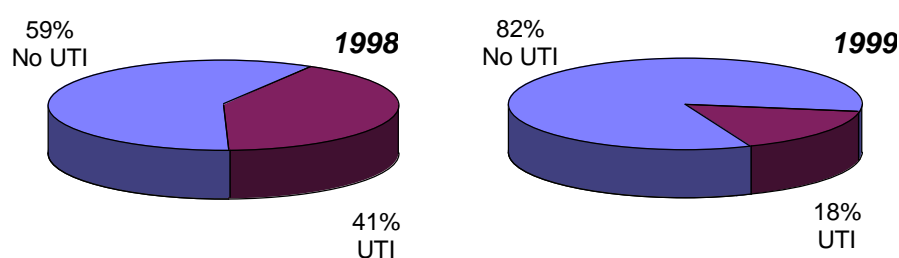


Table 12: UTIs during stay

Over the past 12 months, RRH together with Motivation Charitable Trust, has designed and implemented a strategy to lower the incidence of UTIs in Spinal patients at RRH :

- Education of nurse trainers in better urinary management techniques and patient education



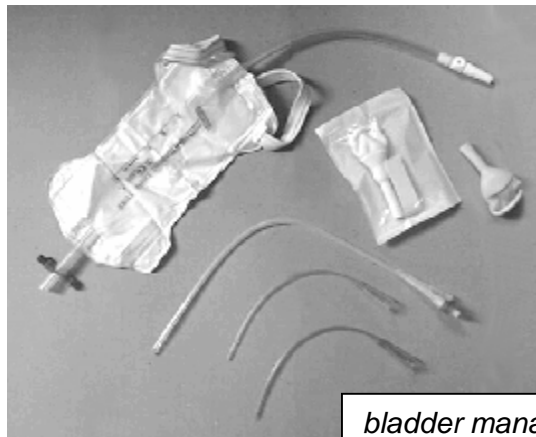
*a nurse trainer teaches bladder management*

- Improved infection control



*improved hand washing technique*

- Provision of more appropriate urinary equipment, both at Ragama and after discharge.



*bladder management equipment*

**results**

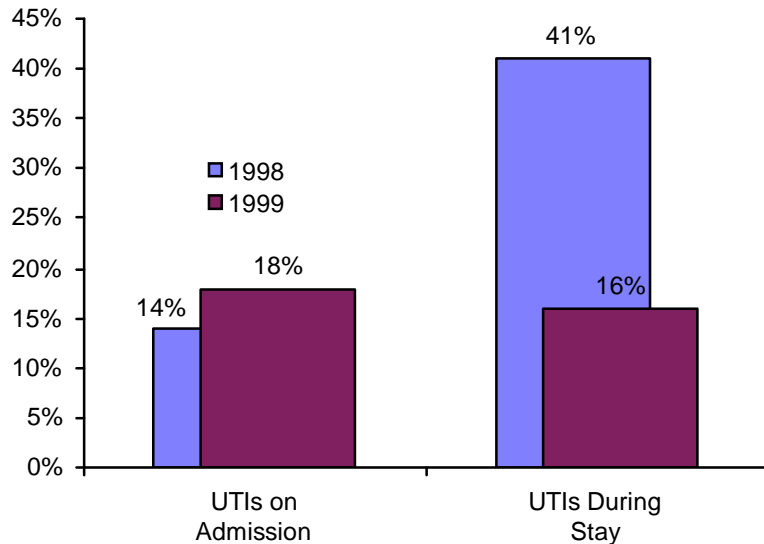


Table 13: incidence of UTIs at RRH

Whilst the level of UTIs on admission has increased slightly (patient notes have become more detailed and accurate so the actual incidence may well have remained the same), indicating no change in external factors; the level of UTIs during the rehabilitation process has been cut by 61%.

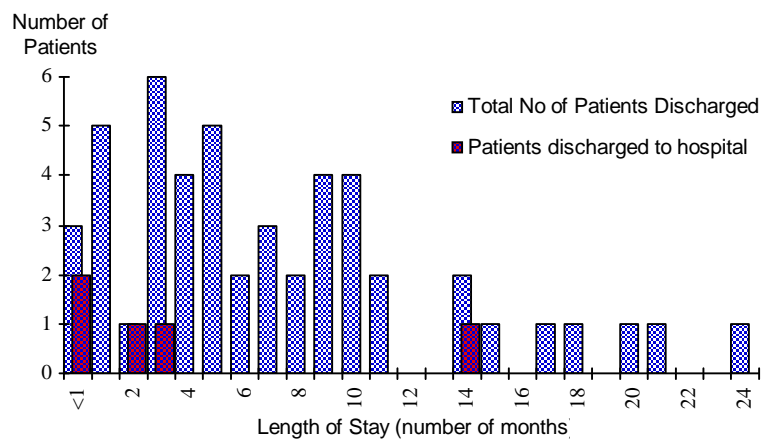
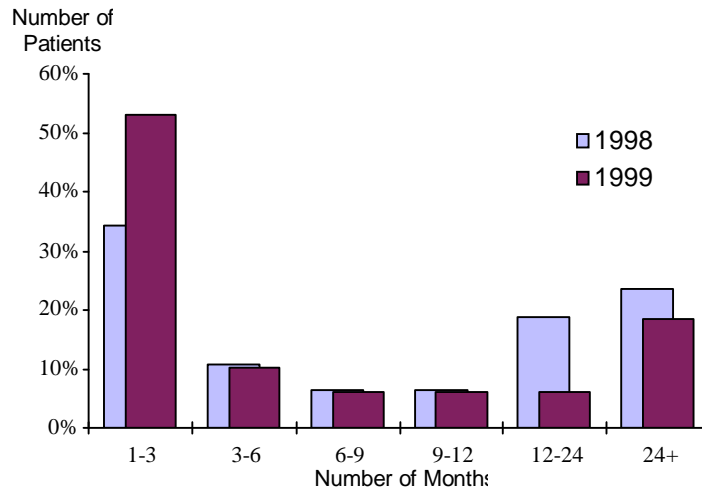


Table 14: 1999 - place of discharge

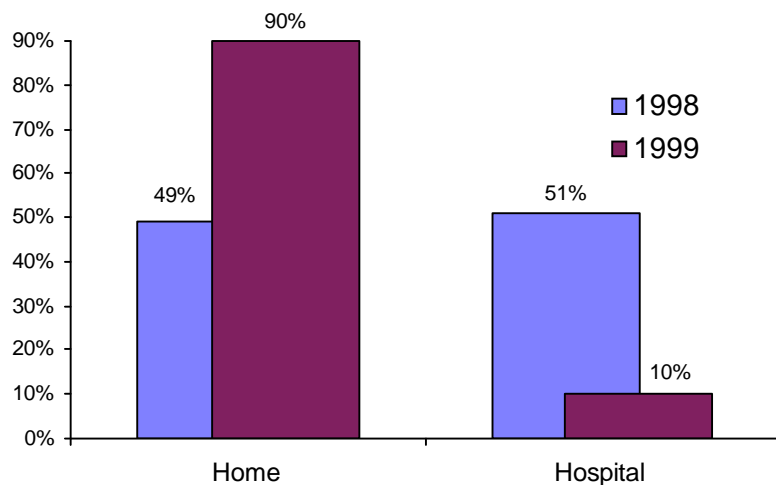
As the incidence of UTIs has dropped, the number of patients needing to be transferred to other hospitals for more intensive treatment has also dropped.

## conclusion



*Chart 15. time between injury and admission*

As the rate of discharge has increased over the past year, the rate of admission has also risen and now over 50% of patients are being admitted to RRH within 3 months of their injury, before they have time to develop severe complications.



*Table 14: place of discharge*

During the past year the percentage of patients discharged home rather to another hospital has increased from below half to 90%. This reflects the much lower incidence of complications, notably pressure sores and UTIs, and shows that RRH is now functioning as a centre for rehabilitation.

## notes

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<sup>i</sup> Hospital day to day running costs were calculated using RRH 1997 financial data. Costs weighted between inpatients and outpatients according to floor space each patient uses giving inpatients an overall weighting of 98%

<sup>ii</sup> Length of stay was calculated using data collected from ex patient notes (100 sets 1998, 50 sets 1999) and long stay patients. Patients that were readmitted to RRH had an average length of stay before transfer to another hospital added.

<sup>iii</sup> The cost has been kept static

<sup>iv</sup> Incidence of pressure sores on admission was calculated using ex-patient notes (100 sets 1998, 50 sets 1999). Incidence of pressure sores during stay 1998 was calculated from a survey undertaken by Nurse Trainers at RRH.

<sup>v</sup> Drugs, Dressings, Urinary Equipment and Surgical Items costs were calculated using a current price list from the MSD and information from RRH dispensary showing how much of each item was issued to each ward over 3 months. Bulk consumable drugs costs were split evenly between all patients. Wards 6 and 7 were not included when calculating comparative costs of SCI and non-SCI patients as they are mixed wards.

<sup>vi</sup> Incidence of UTIs on admission was calculated using ex-patient notes (100 sets 1998, 50 sets 1999). Incidence of UTIs during stay was calculated using ex-patient notes (100 sets 1998, 50 sets 1999).

<sup>vii</sup> Place of discharge was calculated using ex-patient notes (100 sets 1998, 50 sets 1999)