THE COSTS OF COMMUNITY AND INSTITUTIONAL CARE OF THE DEPENDENT ELDERLY

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CHAPTER 10

THE COST OF COMMUNITY CARE

10.1 INTRODUCTION

When an elderly person is very dependent and requires a significant amount of personal care, the main alternative to entering a long-stay hospital is to remain at home with help from family carers and the support of community services. As discussed in Chapter 2, Residential Homes offer mainly 'hotel' care, although some personal care is given. In this chapter the resources used in the community care of the dependent elderly are identified and their unit costs are estimated. The resource cost of care received from all sources including informal carer and volunteer help, is estimated for each one of a sample of dependent elderly people living at home. The share of the costs borne by the state, the informal carer and the elderly person is identified.

10.2 COMMUNITY SAMPLE

10.2.1 Target Population

The target population was the dependent elderly people living in the community who are unable to take care of themselves and without the assistance and support of family or community services would require geriatric hospital care. This population is difficult to reach. To do so would
require a house-to-house enquiry to seek out the elderly.¹
A random sample could then be taken with some form of
assessment to screen for dependency. Such an investigation
was beyond the resources of this project. Therefore a
viable alternative was to seek a sample population.

10.2.2 Sample Populations

Three sample populations were considered with a view to
determining how representative they would be of the target
population.

(a) Elderly Using a Community Service

Elderly using the home nursing or some other
service form a population of dependent elderly in the commun-
ity and therefore could be considered as a sample population
for this study. Some screening would be necessary to elim-
inate those who were less dependent than would be usual for
hospital care. The drawback of this sample population how-
ever, is that it cannot include any dependent elderly who
are not receiving community services,² and hence introduces
a downward bias on the estimation of the level of input of
the informal carers, whose contributions substitute for
agency services (Greene, 1983). Hence the applicability of
the results would be restricted to those elderly receiving
the service.

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¹ An alternative is to obtain a list of superannuitants
(those aged 60 or more receiving the state benefit.
All aged people qualify for this benefit.) The Depart-
ment of Social Welfare declined to release addresses of
superannuitants.

² The eventual sample of elderly in the community did
indeed contain elderly who did not receive any formal
community services.
(b) Elderly about to enter Long-term Care

Patients living in the community prior to placement in long-term hospital care could be used as a sample population. Under the mixed public/private provision of hospital beds in Canterbury, this population is in two parts. Those patients applying for care from the public system are placed on a waiting list for a public hospital bed (or a subsidy for a private hospital bed), after being assessed to be in need of hospital care. Patients who wish to use the private hospital system and have been assessed for long-term hospital care are placed on the waiting list of the hospital of their choice.

Using the waiting lists as a sampling frame excludes those elderly who enter long-term care without appearing on a waiting list. They may be few in number but they may, quite possibly, be the most urgent cases. There are also difficulties in combining the public and private hospital waiting lists to represent the sample population. The most serious criticism of this choice of sample population is that it limits the data collection to those families who have made the decision to use long-term hospital care. These families

3 The number of public hospital long-stay beds for the elderly is limited. In 1983/84 there were 202 designated geriatric and 25 long-stay adult beds. The number of subsidies available for private hospital beds was 460.
4 Patients were assessed by the Assessment and Rehabilitation Unit of the CHB.
5 Patients were assessed either by their general practitioner or by the Assessment and Rehabilitation Unit of the CHB.
6 Urgent is in the sense that the social supports have broken down, not because of an acute medical condition.
7 Patients do not wait so long on the private compared to the public system waiting lists.
may be receiving more community services than usual, partly because they have identified themselves but also because the need for long-term care and hence the need for services has been established.

Most important of all however, is that a sample based on this population would exclude those families for whom community care is the preferred choice, i.e. those who will continue with it, rather than using long-term hospital care. The modus operandi of these families may well differ from that of families whose elderly are on a waiting list for long-term care.

(c) Elderly Using Short-stay Hospital Care as Relief for Carer

A number of elderly people live at home but enter hospital for a short period each year to provide relief for their carers in the community. This group could be used as a sample population of dependent elderly in the community. An advantage of this choice is that it allows the sample of elderly people to be observed in both the hospital and community settings and hence comparisons of resource usages and costs of care in each care mode to be made.

A similar criticism can be levelled at this choice of sample population as was made in (a) (relating to a sample population of elderly using a community service), in that there are dependent elderly in the community who do not use the short-stay hospital facility and whose pattern of utilization of agency services and informal carer help may differ from that of the users of the facility.

The major difference between users and non-users of the short-stay hospital is likely to be that arising on account
of the funding system for hospital payment. The Department of Social Welfare operates an 'Alternative Care' scheme under which it funds four weeks of hospital care per year for disabled elderly people (Disabled Persons Community Welfare Act, 1975), to afford relief for the carers in the community. Certain conditions must be met. The elderly person must live with the carer, and a referral from a general practitioner is necessary to establish dependency. Other elderly either because they have no knowledge of the scheme, or because they are not eligible, pay for the hospital care themselves. Entry to the funded scheme is therefore restricted to dependent elderly who have a carer living with them. A sample population of short-stay hospital patients is likely to omit some patients living alone, although it will include those who pay themselves.

Of course it may be that few dependent elderly can in fact manage to live alone. A New Zealand-wide sample survey reported that only seven percent of 'severely disabled' elderly lived alone (Salmond, 1976). Therefore the sample population of short-stay hospital patients would include most of the target population of dependent elderly.

Studies of elderly living in the community have found that persons living alone are less dependent than those living with others. Results for New Zealand showed that only 0.3 percent of elderly living alone were 'severely dependent' compared with 7.43 percent of those living with others.

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8 This would include elderly having a flat or grannie flat on the same section as the carer.

9 The usual reason for ineligibility was that the elderly person did not live with the carer.
(Salmond, 1976). Hence by omitting some elderly who live alone the effect might be to bias the sample towards the most dependent patients. Since the purpose of the study is to compare the costs and resource usages for the dependent elderly in different care settings, this is regarded as a positive effect of this sample population. Not all the results based on such a sample population may be applicable to dependent elderly living alone, but since there are so few very dependent elderly living alone this is not seen as a serious disadvantage.

Choice of Sample Population

On balance the third sample population i.e. the elderly using the short-stay hospital for relief for carers, was found to be the most representative of the target population and this was therefore chosen as the basis for the study. The potential bias of using the results of this sample population as representative of the resource usages and costs of care of the target population must be carefully considered. There are three groups of dependent elderly who will not be represented (or will be under-represented) when using this sample population. The likely effect of this on the sample results as estimators of the target population parameters is now discussed.

(i) Dependent Elderly Living with a Carer

There may be dependent elderly who would be eligible to receive state funding for short-stay hospital care but either are ignorant of the scheme or choose not to take advantage of it. Since it is generally found that those of the higher socio-economic groups are the most informed of services available to them, then they may be over-represent-
ed in the sample population compared to the target population. The effect might be that the sample population leads to an over-estimate of the amount of paid help, or agency help received by the target population. In section 10.2.4, 10.5 and 10.6 the sample is tested with respect to income to determine whether elderly (or their families) in the higher socio-economic groups were over-represented.

In the case of elderly who were aware of the short-stay hospital scheme but preferred not to use it, their costs of care and levels of inputs to care could be expected to be similar, ceteris paribus, to elderly in the sample population, so that the sample results could be used to estimate the values of many of the parameters of all the target population. Other parameters e.g. the level of perceived need for additional services may well differ for users and non-users of the scheme hence the applicability of the sample estimates would be restricted to the users.

(ii) Dependent Elderly Living Alone - apart from the carer

This section of the target population is ineligible to use the state-funded short-stay hospital care. Some will pay for the care themselves, leading to a possible bias of the sample population for the sub-population of elderly living alone such that those with higher incomes may be over-represented. As in (i) this may lead to an overestimate of the level of paid help for elderly who live alone. This is discussed further in sections 10.2.4, 10.5 and 10.6.

(iii) Dependent Elderly Living Alone - without a Carer

Although it has been found that the overwhelming majority of very dependent elderly in New Zealand do not
live alone (Salmond, 1976) and that almost all the dependent elderly have a family member or friend available to them as a 'chief supporter' (Koopman-Boyden and Wells, 1979), there may be elderly living alone who manage by relying on agency services or a variety of help such that the burden of care does not fall on one person. If this is so, then there may be no necessity for 'relief of carer'. These elderly are unlikely to appear in the sample, and their pattern of utilization of help from various sources (agencies, friends, family) is very likely to be different from the sampled elderly, so that the results obtained from the sample would not be applicable to this group. In view of the paucity of community services available, it is unlikely that many very dependent elderly can manage to live at home without access to a carer. Elderly who do so, are likely to be less dependent and their main alternative to home care would be residential home care. Hence many of them may not be in the target population.

Summary of Bias of Sample Population

The sample population chosen leads to the omission of some sections of the target population. The effect of this on the estimation of population parameters, discussed above, may be summarized separately for the two sub-populations i.e. elderly who live with their carers and elderly who live with others.

For elderly living with their carers, who form the majority of the target population, the estimation of most of the population parameters is unlikely to be affected by this choice of sample population. Any bias in the estimation of the remaining parameters is likely to be small. For elderly
in the target population who live alone there may be some overestimation in the use of formal agency services. But since such elderly form the minority of the target population, this is not a serious objection to the use of the sample population. Therefore the short-stay hospital population with its biases will be used as a basis for the estimation of the resource usages and costs of care of the elderly in the community.

10.2.3 Sampling Method

The sample population is all short-stay elderly patients in Christchurch who enter hospital to provide relief for their carers in the community. Two private geriatric hospitals which operate the majority of the short-stay beds in the CHB area were selected for the study. The sampling frame was all short-stay patients admitted to these two hospitals. The sample selected consisted of all short-stay patients who had been admitted during the period between November 1983 and February 1984, with the exception of admissions for acute conditions e.g. post operative care.

10 In 1983/84, the hospitals in question offered between them 41 short-stay beds. One other private hospital offered 11 beds and the remainder kept at most one bed for short-stay patients. At that time there were very few admissions in the public hospital system for relief of carers. Hence most of the elderly receiving state-funding under the Alternative Care Scheme would have stayed at the two hospitals, as would most of those who paid themselves.

11 These patients were omitted from the sample because many of them were not dependent long-term, but only temporarily incapacitated on account of illness or operation; the remainder, though they suffered long-term dependency (and hence belonged to the target population) were not in their usual state of health and hence the care received at that time would not be a good indicator of their on-going care. This is compatible with the sampling of hospital care data in Chapters 8 and 9.
A four month period was chosen to obtain a sample of approximately 100 patients and was timed so that it would include 'young' families (with children) caring for elderly relatives and 'older' families where the carer is typically an elderly spouse or relative.

10.2.4 Elderly Sampled

A total of 98 patients were admitted for short-stay relief care at the two hospitals during the sampling period. These elderly and their families were contacted by letter approximately 3-6 months after the return of the elderly person to the community, in order to request an interview. Twelve of the elderly had died in the intervening period and these cases were excluded from the sample. This left 86 possible cases for interview. Seventy-two interviews were successfully conducted. A detailed breakdown of cases by hospital, showing numbers and reasons for non-interviews are shown in Table 10.1.

12 Randomly sampling through the year would have been logistically difficult and would have extended the period of involvement of the hospitals concerned. Moreover many patients spent two weeks in January/February and two weeks in May/June so that it is likely that a similar set of patients would have been sampled. There is no a priori reason for any bias in terms of dependency of patients, or home circumstances being introduced as a result of the sampling period.

13 The elderly being cared for by 'young' families used the hospital in December or January so that the family could take a holiday during the school vacation; elderly carers would often avoid this time and take their holidays in November or February.

14 Several of the carers were willing to be interviewed but it was not known whether they would properly represent those who were unwilling, nor whether their attitudes to the caring role would have changed since bereavement. Therefore all 12 cases were excluded. It is possible that this may have reduced the average dependency of the final sample.
TABLE 10.1
COMMUNITY INTERVIEWS WITH FAMILIES OF ELDERLY USING SHORT-TERM RELIEF CARE AT TWO HOSPITALS 1983/84

<table>
<thead>
<tr>
<th></th>
<th>Men's hospital</th>
<th>Women's hospital</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total short-stay patients (i)</td>
<td>34</td>
<td>64</td>
<td>98</td>
</tr>
<tr>
<td>Deaths</td>
<td>6</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Interviews possible</td>
<td>28</td>
<td>58</td>
<td>86</td>
</tr>
<tr>
<td>Interviews conducted</td>
<td>26</td>
<td>46</td>
<td>72</td>
</tr>
<tr>
<td>Unable to Contact (ii)</td>
<td>1</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Abandoned (iii)</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Refusals (iv)</td>
<td>0</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Omitted (v)</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

(i) The figures shown are all short-stay patients over the sampling period excluding those receiving post-operative or acute care.
(ii) All of these elderly had gone to long-term care. For some the carer had moved away.
(iii) The elderly person was senile and disrupted the interview. It was not possible to interview her husband alone.
(iv) In all these cases the elderly person still lived in the community.
(v) The man was in long-term care because his wife had suffered an accident. The woman lived in the community. But both she and her carer were hostile.

Admission of the elderly to long-stay hospital care was not a reason in itself for non-interview, (although it proved more difficult to arrange an interview in these circumstances). Indeed excluding these cases might have biased the sample against the most dependent elderly. Including them allowed the opportunity of comparison with cases where the elderly still lived in the community. In 13 of the 72 cases interviews (4 men, 9 women) the elderly person had entered hospital for long-stay care. In these cases information was collected relating to the situation immediately
prior to long-stay hospital admission.

Interviews were conducted with the main carer of the elderly person and where possible with the elderly person. Two questionnaires were administered, one relating to the elderly person, the other to the main carer. The elderly person was present for the carer interview in 13 cases but the carer was contacted afterwards to review sensitive areas. The interviews lasted 1½-2 hours. Information collected on the elderly related to:

- age, sex, disabilities and functional incapacities
- income, accommodation, living arrangements
- use of formal agency services, private paid help,
  informal carer help
- use of medical and therapy services
- expenditure on goods and services on account of disabilities.

The information collected on the main carer related to:

- age, sex
- income, accommodation, living arrangements
- education, training, previous occupation
- help given to elderly
- lost employment opportunities
- problems of caring
- need for further services

15 Elderly in long-stay care were not interviewed, neither were those who were mentally incapacitated or preferred not to have an interview, or were not at home (attending day-care etc.). In most cases where the elderly person was at home, the interviewer introduced herself and outlined the project.
Testing for Sample Bias

In Section 10.2.3 several types of bias that might arise from the choice of sample population were identified. The sample of elderly obtained is now tested to judge whether these biases did in fact occur.

(a) Over-representation of higher income groups

Drawing a sample from elderly who use a service, i.e. the short stay hospital, results in a representative sample of dependent elderly only if all the target population are aware of the service. Since income and knowledge of service are correlated, the sample is now tested for higher than average incomes. The household incomes of the 72 elderly are compared with incomes of households in the general population estimated by the Household Expenditure and Income Survey (1983/84). In Table 10.2 comparisons are shown by age categories of the head of the household, since income is dependent upon age.

The mean reported weekly household income of the sample of 72 households is, at $382.74, substantially less than the Survey's estimated mean weekly income of all households, $440.72. This is not a very useful comparison however, since the age distribution of the head of households in the sample and in the household survey differ. If the mean incomes for head of household age categories in the sample did not differ from those in the general population the expected mean household income of the sample would be

$$\sum y_i h_i$$
TABLE 10.2

COMPARISON OF HOUSEHOLD INCOMES OF SAMPLE WITH THE GENERAL POPULATION, BY AGE OF HEAD OF HOUSEHOLD (1983/84)

<table>
<thead>
<tr>
<th>Age of Head of Household</th>
<th>Sample of elderly</th>
<th>Household Survey*</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Number of Households</td>
<td>Mean Weekly Household Income</td>
</tr>
<tr>
<td>15-24</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>25-29</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>30-39</td>
<td>4</td>
<td>566.50</td>
</tr>
<tr>
<td>40-49</td>
<td>3</td>
<td>751.42</td>
</tr>
<tr>
<td>50-59</td>
<td>10</td>
<td>623.75</td>
</tr>
<tr>
<td>60-64</td>
<td>8</td>
<td>454.88</td>
</tr>
<tr>
<td>65+</td>
<td>47</td>
<td>280.02</td>
</tr>
<tr>
<td>total</td>
<td>72</td>
<td>382.75</td>
</tr>
</tbody>
</table>

* reproduced from Table 21 of the Household Expenditure and Income Survey, 1983/84.

where \( Y_i \) is the population mean weekly household income for age category i and \( h_i \) is the number of households in age category i in the sample.

Using this approach, the expected mean weekly income from the sample, calculated from the Survey should be $349.23. Similarly the expected mean persons per household should be 2.09. The observed mean weekly income of the sampled households $382.75 is therefore higher than that of households in the general population, but the number of persons per household (2.63) is greater. (The latter is because in many cases an elderly person joins an existing household). Comparing the household income per head for the sample ($145), with its expected value from the Survey ($167), the sampled families on average would appear to be lower on the socio-economic scale.

The differences in mean income is not uniform across the age categories. Comparing the means for heads of households aged 65+ in Table 10.2 it can be seen that the mean income for the sample is very similar to that for the New Zealand survey.
Yet the mean number of persons per household for this category is greater for the sample, so that the families sampled (in this category) are in fact less well off than those in the population.

Comparing the other age categories, the mean household income for the lower age categories (30-39, 40-49, 50-59, 60-64) in the sample exceeds those of the New Zealand survey. However the number of persons per household is in all cases greater in the sample, so that household income could be expected to be higher on this account. Households with younger heads represent young families caring for elderly relatives. The income of such families would be augmented by (at least) the National Superannuation income of the elderly person, which was $119 per week in 1983/84. There is some evidence of higher than average incomes for the 40-49 age categories, but since there were only three households in this category it is difficult to draw a general conclusion.

In summary, although a few families had higher than average incomes, the mean household income per person for the sample as a whole was less than that found in the general population (after correcting for age of head of household). Therefore any bias on account of over-representation of families of higher than average incomes should not occur.

(b) Under-representation of Elderly Living Alone

In Section 10.2.3 it was recognised that the sample population might exclude some dependent elderly people living alone. The likely effect on the sample would be firstly to under-represent elderly people living alone. Secondly elderly from the higher income groups may be over-represented.
The sample of 72 elderly people included 7 living alone (9.7%). This is slightly above the 7 percent of elderly persons living alone in New Zealand in 1974 who were found to be severely disabled (Salmond, 1976). The population percentage may have increased over time as a result of the ageing of the population and the 'severely disabled' category of the survey may be a subset of the target population the dependent elderly', so it is difficult to say whether the elderly living alone are represented in sufficient proportion by the sample.

All the 7 in the sample who lived alone had a main carer upon whom they relied for help. Only elderly living very close\footnote{Each case was judged individually. The Department of Social Welfare had funded cases where elderly lived on the same section or next door to the carer but had turned down applications where the carer lived a mile away.} to their carers could obtain state funding for their short-stay hospital care. If all the severely disabled in the community live in this way, then the sample of elderly obtained can fairly represent them. However if some elderly live remote from their carers, access to the short-stay hospital (and thus to the sample) is limited by the ability to pay.

The mean income of the 7 elderly was $153.46 and the standard deviation was $34.08. The nearest category for comparison in the New Zealand Household Expenditure and Income Survey 1983/84, is that of households of one adult not
in the labour force. Seventy percent of this group were retired. The mean weekly income was $160.45. Therefore the elderly in the sample did not on average have higher incomes than other adults not in the labour force. On the other hand their mean weekly income was some $30 above the National Superannuation payment which for many elderly forms their only income.

The income of elderly living alone whose hospital care was funded by the state was compared with those who paid themselves (see Table 10.3). Although the mean income for

<table>
<thead>
<tr>
<th>Method of Payment</th>
<th>Weekly Income of Elderly ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean</td>
</tr>
<tr>
<td>Dept. of Social Welfare</td>
<td>133.08</td>
</tr>
<tr>
<td>Elderly (or family)</td>
<td>168.75</td>
</tr>
</tbody>
</table>

those who paid exceeds that of those who were state funded, the result is not significant at the 0.05 level (the observed student's t value was 1.30 compared to the critical value of 2.01). The sample is too small to make a general statement about the sample population.

In conclusion, although 9.7 percent of the sample lived alone and their mean income was not high compared to the population, half of this group paid for the hospital care themselves. The mean income of the group who paid was higher (though not significantly so, on account of the small sample) than those who were state funded. Therefore the exclusion of elderly living alone, ineligible for state funding and unable
to pay, cannot be ruled out. The elderly in the sample who live alone are so few in number that they may not adequately represent the range of care received by all dependent elderly living alone. Moreover since in every case there was a main carer, this group cannot represent the pattern of utilization of help and services for any dependent elderly who manage without a main carer. Even though the sample may be biased with respect to elderly who live alone, there are so few dependent elderly living alone that estimates from the sample will be close to being unbiased estimates of the parameters for the whole population of dependent elderly in the community.

10.3 INPUTS TO COMMUNITY CARE

The resources for care of the elderly in the community were discussed in Chapter 4. Unlike hospital care where the elderly person relies on one institution to provide the majority of the inputs to care, care in the community is an aggregation of inputs from a variety of sources. In the following sections the inputs to care are organized into groups according to the type of source and facet of care provided. The groups are: Accommodation, Formal Agency Services, Paid Private Help, Informal Care, Medical Care, Health Professional Care.

10.4 ACCOMMODATION COSTS

Accommodation costs fall into two categories: the capital costs of accommodation and living costs.
10.4.1 **Capital Costs of Accommodation**

The capital costs of accommodation are the costs of the provision of land, housing and furniture. In the community these resources may be available just to the elderly person, or they may be shared with others. The capital costs of resource provision will first be estimated. This will be followed by estimates of the cost of the elderly person's share of the resources consumed.

(a) **Land and Buildings**

The elderly in Christchurch live in a wide variety of accommodation. Although the type and size of housing occupied by the elderly has been researched (Scotts, 1979) the cost of the housing has not been estimated.

The government valuation of the property occupied by each of the 72 elderly in the sample was obtained. The timing of these valuations differed. They were therefore standardized to property values pertaining to metropolitan Christchurch in December 1983 by weighting by the ratio of the average selling price of houses (or flats) in December 1983 to the average selling price in the year of valuation. The mean adjusted government valuation so obtained is shown in table 10.4 together with the mean selling price in metropolitan Christchurch, for comparison.

The mean valuation of the properties sampled, $49,196, is close to the $50,725 for property sold in the whole of metropolitan Christchurch, supporting the view that the dependent elderly live in accommodation similar to that of the general population. The mean valuation for flats is slightly low and may be explained by the two grannie flats.
in the sample which had low valuations.

<table>
<thead>
<tr>
<th>MEAN ADJUSTED VALUATIONS OF PROPERTIES</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>OCCUPIED BY SAMPLE OF DEPENDENT ELDERLY,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DECEMBER 1983</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Mean adjusted valuation (sample)</td>
<td>52,928</td>
<td>42,179</td>
</tr>
<tr>
<td>(s.d.)</td>
<td>(31,273)</td>
<td>(13,112)</td>
</tr>
<tr>
<td>number of properties</td>
<td>47</td>
<td>25</td>
</tr>
<tr>
<td>mean selling price*</td>
<td>52,118</td>
<td>46,000</td>
</tr>
<tr>
<td>(Christchurch metropolitan area)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Source: Government Valuation Department.

(b) Furniture

Information on the value of furniture in the households sampled was not obtained. Instead insurance companies were contacted, and data was requested on the insurance valuations of household contents. This information was not available in any detailed form. But one company was able to supply an approximate figure for the typical replacement valuation of the contents of an average household (excluding personal effects). This was $25,000 in 1983/84 and this figure will be used to give an indication of the level of funding required for household contents. The mean number of persons per household is estimated at 2.9 in the year 1983/84 (New Zealand Household Expenditure and Income Survey). Therefore the mean replacement value of furniture per person can be estimated by

\[
\text{household contents valuation per person} = \frac{\$25,000}{2.9} = \$8,621 \text{ per person.}
\]
The indemnity value will be estimated as half\textsuperscript{17} this sum i.e. $4,310 per person.

(c) **Cost of Elderly's share of Housing**

If an elderly person lives alone, the capital cost of accommodation is the whole cost of the property and contents. If the elderly person lives with others then the accommodation resources are shared. Some studies (for example Ward and Daldy, 1982) have argued that in these cases, the cost of accommodation for the elderly person is zero, since the resources would have had to have been provided anyway (for the other members of the household) and because if the elderly person leaves, no savings will be made.

There are two criticisms of the above argument. First of all it fails to take into account the opportunities foregone by a family in sharing a house with an elderly person. Use of certain areas of the house will be denied to them, use of other areas must be shared, and they forgo the option of renting out the portion of the property occupied by the elderly. Secondly it does not acknowledge that without the provision of these resources, community care for the elderly could not take place.

As discussed in Chapter 4 the approach used in this thesis to costing accommodation for the elderly, is to estimate the opportunity cost of the resources used in providing the accommodation. As explained above the opportunity cost is non-zero. In estimating the cost of the elderly's share of the accommodation, the cost should be related to the amount of accommodation found in long-stay private hospitals.
Two ways of apportioning costs were tried. At the time of the community interviews an estimate was made of the fraction of accommodation occupied by the elderly, based on areas of the house which were available to the elderly person. An estimate of the cost of the elderly's share of the property can be obtained by applying this fraction to the adjusted property valuation.

A second estimate (an average cost approach) was obtained by simply sharing the accommodation costs equally between the number of people in the household. The figures obtained for the two estimates for the sampled households are shown in Table 10.5.

**TABLE 10.5**

ESTIMATES OF CAPITAL COST OF ELDERLY'S SHARE OF ACCOMMODATION (BASED ON CAPITAL VALUATIONS) 1983/84

<table>
<thead>
<tr>
<th>Basis of estimation</th>
<th>Houses ($)</th>
<th>Flats ($)</th>
<th>All properties ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) fraction of house occupied</td>
<td>mean cost (s.d.)</td>
<td>21,012 (10,938)</td>
<td>24,471 (10,748)</td>
</tr>
<tr>
<td>(ii) equal share per person</td>
<td>mean cost (s.d.)</td>
<td>19,367 (9,247)</td>
<td>24,471 (10,748)</td>
</tr>
</tbody>
</table>

Cost of furniture

<table>
<thead>
<tr>
<th></th>
<th>Houses ($)</th>
<th>Flats ($)</th>
<th>All properties ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4,310</td>
<td>4,310</td>
<td>4,310</td>
</tr>
</tbody>
</table>

Total cost

<table>
<thead>
<tr>
<th></th>
<th>Houses ($)</th>
<th>Flats ($)</th>
<th>All properties ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i)</td>
<td>25,322</td>
<td>28,781</td>
<td>26,523</td>
</tr>
<tr>
<td>(ii)</td>
<td>23,677</td>
<td>28,781</td>
<td>25,450</td>
</tr>
</tbody>
</table>

(1) All variations are at indemnity not replacement value.
(2) The mean cost for those living alone was $33,114 (s.d. = 15,937)
    The mean cost for those living with others was $21,039 (s.d. = 9,703)
The results for flats are identical, since these properties were occupied either by one person, or two people sharing equally. The estimates differ for houses however, reflecting the fact that the elderly often had use of a disproportionate portion of the shared home. The estimate based on the fraction of space occupied will be used to estimate the cost of accommodation for the elderly since it approximates most closely the consumption of the resource by the elderly. The cost of furniture shown in Table 10.3 is at indemnity, not replacement, value, consistent with the property valuations. Figure 10.1 shows the distribution of the capital cost of the elderly's share of accommodation about the mean value $26,523. The capital cost for elderly living alone (mean $37,424) was higher than for those living with others (mean = $25,349).

(d) Estimating the weekly cost of capital

The capital tied up in accommodation can be converted into an annual cost by amortizing the capital valuation over the life of the asset. The life of buildings will be taken to be 40 years and the life of furniture, 10 years. Land has an infinite life, but since separate valuations for land were not obtained, 40 years will be used as an approximation. The interest rates used in the calculations are five percent and 10 percent. The mean costs of capital per week for the sample taken are shown in Table 10.6. The costs used to estimate the weekly capital costs of community care will be those based on the interest rate of 10 percent.

---

18 The values chosen were the same as those used in costing hospital care, so that cost comparisons could be made.
19 Using 40 years rather than infinity makes very little difference to the results of the computations.
20 This is the interest rate used in the costing of hospital care and is the rate used to evaluate health service projects.
Figure 10.1

DISTRIBUTION OF CAPITAL COST OF ELDERLY'S SHARE OF ACCOMMODATION

Mean = $26,523
s.d. = $10,923

NUMBER OF ELDERLY

CAPITAL COST OF ELDERLY'S SHARE OF ACCOMMODATION ($000)

AMORTIZED WEEKLY COST ($)
The distribution of weekly cost using this interest rate is shown in figure 10.1. The mean weekly cost of capital was

<table>
<thead>
<tr>
<th>interest rate</th>
<th>mean weekly cost of land &amp; buildings ($)</th>
<th>standard deviation weekly cost of furniture ($)</th>
<th>estimate of total weekly cost of capital ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$i = 0.05</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>houses</td>
<td>21.35</td>
<td>11.11</td>
<td>10.73</td>
</tr>
<tr>
<td>flats</td>
<td>24.86</td>
<td>10.92</td>
<td>10.73</td>
</tr>
<tr>
<td>all properties</td>
<td>22.57</td>
<td>11.10</td>
<td>10.73</td>
</tr>
<tr>
<td>$i = 0.10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>houses</td>
<td>40.54</td>
<td>21.10</td>
<td>13.49</td>
</tr>
<tr>
<td>flats</td>
<td>47.21</td>
<td>20.74</td>
<td>13.49</td>
</tr>
<tr>
<td>all properties</td>
<td>42.86</td>
<td>21.07</td>
<td>13.49</td>
</tr>
</tbody>
</table>

(1) all valuations are at indemnity not replacement value.

$56.35. The mean weekly cost for those living alone was $77.38, and $54.09 for those living with others.

10.4.2 Living Costs

Living costs are defined here as the costs incurred in running a household. They include, food, rates, insurance, maintenance, power, household supplies and household services. The expenditure on many of these items for a dependent elderly person could be expected to be similar to that of the elderly in the general population. Therefore estimates of these costs were based on the New Zealand Household Expenditure and Income Survey (1984), and information on actual expenditure by the sampled group was not collected. Those costs which were identified by respondents
as being greater on account of the disability of the elderly person were estimated from the reported expenditure of the sample. Finally, where there might be regional variation in costs, the sampled (Christchurch) costs were used rather than those of the New Zealand Survey.

(a) Types of Costs

The costs falling into the three categories mentioned above are now discussed.

(i) Disability-Related Costs

The sampled households were questioned on household costs which were greater on account of the disability of the elderly person. Fifty-three (74 percent) of the sampled households reported that power costs were greater than they would have been if the elderly person had been fit and well. Actual expenditure on power by the sample is therefore used to estimate the cost for the dependent elderly. Although variations in purchases were reported for other items e.g. five, (seven percent) of households bought different foods to meet the special diet requirements of the dependent elderly person, there were no associated additional costs.

(ii) Costs with Regional Variation

Expenditure on rates varies regionally and in order to obtain results compatible with the costs of hospital care, actual rates paid by the sampled households were used, rather

21 The difference in power costs between cases reporting increased and unchanged power costs was compared for one person and two person households, separately. The results were not significant for either type of household ($F_{15} = 0.64$ and $F_{39} = 1.01$). It could be concluded that increased costs are perceived rather than actual, but a more plausible interpretation is that power use varies, so that low-users must increase their use to meet the requirements of a dependent person, and high-users do not require to do so.
than rates paid in New Zealand in general. Power costs may also vary regionally, as well as with disability and hence actual power costs are used.

(iii) Costs not related to disability or region

Apart from power costs and rates discussed in (i) and (ii) above, all household living costs for the dependent elderly were assumed to be similar to those for other elderly people and were estimated from the New Zealand Household Expenditure and Income Survey (1984).

Information on the expenditure of households containing an elderly person is not directly available. There are several categories in the New Zealand Survey which contain substantial numbers of elderly people. They are: households with one and two adults, neither in the labour force of which 70 percent are aged 65 or more years (Table 3 of the Survey), households where the head is aged 65 or more years (Table 9 of the Survey), and households where the head was retired (Table 11 of the Survey). The second and third categories combined households of varying size and it was not possible (except by requesting a costly run of the data) to obtain breakdowns and therefore identify costs for elderly living alone. For this reason the first category was used as a data source.

(b) Living costs for different households

The estimated expenses for different sizes of households are shown in Table 10.7 (columns A and B). It should be noted that many costs presented in the New Zealand Expenditure Survey are not included here. These are now discussed.
Excluded Costs

(i) **Housing Group**
Rent, capital outlay and mortgage payments are omitted since the capital costs of accommodation are considered separately elsewhere.

(ii) **Household Operation Group**
Furniture and furnishing costs are excluded since they are included in the capital costs section.

(iii) **Apparel Group**
These costs were not included in the costs of hospital care so are excluded here. The full cost of community care would need to take account of them.

(iv) **Transportation Group**
The sampled elderly were unable to drive and travelled infrequently. Essential travel costs (e.g. to the doctors) are considered elsewhere. No further travel costs are included.

(v) **Other Goods Group**
This category contains mainly items related to leisure. They are excluded as was the case in the cost of hospital care in order to make a fair cost comparison. The full cost of care would need to include them.

(vi) **Other Services Group**
The legal and financial services costs are included. Health costs are considered elsewhere. Other costs are excluded consistent with the costing of hospital care.
<table>
<thead>
<tr>
<th>Expenditure Group</th>
<th>Average Cost per person ($)</th>
<th>Marginal Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 adult not in Labour Force</td>
<td>23.00</td>
<td>17.93</td>
</tr>
<tr>
<td>2 adults in Labour Force</td>
<td>5.73C</td>
<td>2.21C(3)</td>
</tr>
<tr>
<td>1 adult in Labour Force</td>
<td>7.94C</td>
<td>3.97C</td>
</tr>
<tr>
<td>2 adults not in Labour Force</td>
<td>20.47</td>
<td>(1.89)</td>
</tr>
<tr>
<td>2 adults in Labour Force</td>
<td>3.97C</td>
<td>1.17</td>
</tr>
<tr>
<td>Maintenance</td>
<td>3.58</td>
<td>2.34</td>
</tr>
<tr>
<td>1 adult in Labour Force</td>
<td>17.64</td>
<td>8.82</td>
</tr>
<tr>
<td>2 adults not in Labour Force</td>
<td>9.39C</td>
<td>1.17</td>
</tr>
<tr>
<td>2 adults in Labour Force</td>
<td>4.69C</td>
<td>4.15</td>
</tr>
<tr>
<td>Power (NZ Survey)</td>
<td>1.37</td>
<td>4.74</td>
</tr>
<tr>
<td>Household Supplies</td>
<td>5.57C(4)</td>
<td>3.82C(5)</td>
</tr>
<tr>
<td>Househo</td>
<td>9.47</td>
<td>2.67</td>
</tr>
<tr>
<td>Power (NZ Survey)</td>
<td>(8.29)</td>
<td>(2.62)</td>
</tr>
<tr>
<td>Household Services</td>
<td>(4.15)</td>
<td>(4.15)</td>
</tr>
<tr>
<td>Total Living Costs</td>
<td>53.45</td>
<td>36.93</td>
</tr>
</tbody>
</table>

1 Figures marked C refer to sample data for Christchurch; other figures relate to New Zealand expenditure.
2 Columns A and B, apart from items marked "C" are based on Table 3 of the NZ Household Expenditure and Income Survey (1984).
3 This is the marginal cost of rates for one person living with one other (e.g. a married couple). The marginal cost of the fifth person in a household (e.g. an elderly person living with a young family) was very similar ($2.11).
4 This expenditure is probably an underestimate because elderly living alone did little or no cooking and laundry.
5 B-A would give the marginal cost of the carer, which may underestimate that of the dependent elderly (who may use more heating). However, since A is itself an underestimate of the cost of the dependent elderly living alone, there is some compensating effect and the amount $3.82 is used as the estimate of the marginal cost of the dependent elderly.
6 The figures in brackets are for comparative purposes only and are not included in the total.
Estimates of living costs of the dependent elderly

The objective is to isolate the living costs for the dependent elderly person from those of other members of the household. The situation of elderly living alone is distinguished from that of an elderly person living with others.

(i) Elderly living alone

In this case, the full household living expenses are incurred for the dependent elderly person. These costs are shown in column A of table 10.7 and will be used to estimate the living costs of dependent elderly living alone.

(ii) Elderly living with others

Two methods of estimating the living costs of the dependent elderly were considered, an average cost and a marginal cost approach.

The average living costs per person for a two-person household can be calculated from column B of table 10.7. These are shown in the third column. Using these as estimates of the living costs of the dependent elderly living with a carer, suffers from the drawback that the dependent elderly person is subsidizing the living costs of the carer.

Another estimate can be derived from the difference between the costs for a two-person and a one-person household [This is B-A, shown in the fourth column]. This is the marginal cost and represents the amount by which the carer's household costs would increase if a dependent elderly person joined the household. If the elderly person is choosing between long-stay hospital care or living in the community with a carer then the marginal cost is the
most appropriate to use, since this sum would be saved if hospital care was chosen. The marginal cost is therefore used to estimate the average living costs of an elderly person living with a carer.

10.5 COSTS OF FORMAL AGENCY SERVICES

A number of support services are available to dependent elderly living at home. They are supplied by public and private (often voluntary) agencies. The services included in this section are those which receive some measure of state funding. In the Canterbury Hospital Board region, these services are: District Nursing, Home Aid, Meals on Wheels, Home Linen, Home Sitter and Day Care. Other services, e.g. home nursing from a private nursing bureau, are considered under Paid Private Help in section 10.6.

Information was obtained on the level of use of the six home services, for each elderly person in the sample. The unit resource cost of supplying each service was estimated. From this an estimate of the cost of the amount of each service received by each elderly person was determined. The results are presented separately for each service in sections 10.5.1 to 10.5.6 below. Finally in section 10.5.7 the total cost for each person sampled, of all the formal agency services is estimated, and the share of the cost borne by the state, the elderly and the family is identified.
10.5.1 District Nursing

1. The District Nursing Service

(a) Operation

The District Nursing Service is offered by the Nurse Maude Association and provides nursing care to people in their own homes. There are two main categories of patients. One group requires care for an acute problem e.g. for an injury or for post-hospital care after an operation. Patients in this category would receive nursing services for a limited period only. A second larger group of patients suffer chronic illness or disability and continue receiving the service indefinitely, although the number of visits may fluctuate as their condition or circumstances change. The dependent elderly belong to this second group.

The caseload varies throughout the year and over time. A study of the caseload in September 1981 (Malcolm and Higgins, 1983) showed there were 1,149 patients of which 80.8 percent were aged 65 or more years. Fifty-seven percent of the caseload had been in receipt of the service (though possibly intermittently) for more than one year, indicating the size of the chronically ill group.

The frequency of visits ranges from once every six weeks to four times each day. The time per visit (including travel time) varies between 15 minutes and an hour. Care given includes bathing and dressing, getting patients up, pressure area care, toileting, wound dressings, injections and assess-

22 In October 1985 the caseload was 911 patients of which 80 percent were elderly (source: Nurse Maude Association).
ment.

(b) Funding

The service is 75 percent funded by the Canterbury Hospital Board. The Nurse Maude Association finances the remainder from trust funds accumulated from donations and bequests.

2. Estimates of Unit Costs 1983/84

The total expenditure on the District Nursing Service in 1983/84 was $1,263,844. The total number of visits was 150,370.

The average cost per visit = \( \frac{\text{total expenditure}}{\text{number of visits}} \)

\[ = \frac{1,263,844}{150,370} \]

\[ = \$8,404.9. \]

The mean time per visit spent in patient contact (excluding travel) has been estimated at 17.1824 minutes (Gilmore, 1982). Since patients receive visits of varying lengths it is necessary to estimate the (variable) cost of each visit.

The cost of a visit can be considered to be the sum of two components, a fixed cost which is incurred regardless of the length of the visit and an additional variable cost which depends on the length of the visit.

In order to estimate these cost components the total expenditure on the service will be split into two. Group A costs are those which will increase if visits become longer; Group B costs are independent of the length of visits.

Costs associated with the number of nurses hired must be apportioned between the Group A and B costs. The cost

of patient contact time belongs to Group A and the cost of travel and administration time to Group B. The percentage of time spent on patient contact is estimated at 61.53 percent (based on Gilmore, 1982) and this figure will be used in the cost estimation.  

The costs associated with the number of nurses hired in 1983/84 were $994,946. Therefore the nursing costs of patient contact can be estimated at \( \frac{61.53 \times 994,946}{100} \) = $612,190

The nursing costs of travel and administration can be estimated at \( \frac{38.47 \times 994,946}{100} \) = $382,756.

Total Group A costs in 1983/84 are estimated by

\[
\begin{align*}
\{ \text{nursing costs of patient contact time} \} &+ \{ \text{cost of dressings and drugs} \} \\
= & \quad \text{612,190} \quad + \quad \text{33,069} \\
= & \quad \text{645,259}
\end{align*}
\]

Total Group B costs in 1983/84 are estimated by

\[
\begin{align*}
\{ \text{nursing costs of time for travel and administration} \} &+ \{ \text{transport costs} \} &+ \{ \text{office costs} \} \\
= & \quad \text{382,756} \quad + \quad \text{153,975} \quad + \quad \text{81,854} \\
= & \quad \text{618,585}
\end{align*}
\]

24 This proportion may change if the mean visit time alters. However, analysis of a sample of 1985 visits showed the percentage of nurse time spent on patient contact, travel and teaching to be 86.75 percent, which is close to the 89.79 percent value arising from the Gilmore study of 1982.

25 These costs are for nursing salaries, accounting, clothing, superannuation and laundering of uniforms.

26 The office costs were for clerical salaries, printing, stationery, general expenses, occupancy costs and insurance.
(a) **Fixed Cost per Visit**

The fixed cost per visit can be estimated by

\[
\text{Group B cost} \over \text{number of visits} = \frac{\$618,585}{150,370} + \$4.114 \text{ per visit}
\]

(b) **Additional Variable Cost per Visit**

This cost depends on the length of the visit. The cost for the 'average' visit

\[
= \left\{ \frac{\text{total cost of 'average' visit}}{\text{average time}} \right\} - \left\{ \frac{\text{fixed cost per visit}}{\text{fixed cost of visit}} \right\}
\]

\[
= \$8.405 - \$4.114 = \$4.291.
\]

If the average visit time in 1983/84 is assumed to be the same as in 1982,\textsuperscript{27} then this additional cost is for 17,1824 minutes \(0.286\) hours.

The additional cost per hour of visit

\[
= \frac{\text{average cost}}{\text{average time}} = \frac{\$4.291}{0.286} = \$14.984 \text{ per hour}.
\]

(c) **Total Cost of Visit**

The total cost of a visit of \(T\) hours can be estimated by

\[
\left\{ \frac{\text{fixed cost of visit}}{\text{fixed cost}} \right\} + \left\{ \frac{\text{additional cost per hour}}{\text{additional cost}} \right\} \times T
\]

\[
= \$4.114 + \$14.984 \times T
\]

\textsuperscript{27} The time per visit appears to be relatively stable from year to year. The Malcolm and Higgins (1983) study reports a mean time per visit (including travel) in 1981 of 26 minutes, which is close to the corresponding figure of 22 minutes in 1982 (Gilmore).
Table 10.8 shows the costs of visits of various lengths together with the average cost, for comparison.

**TABLE 10.8**

**ESTIMATED COST OF DISTRICT NURSE VISITS 1983/84**

<table>
<thead>
<tr>
<th>Length of visit (mins)</th>
<th>Fixed Cost of visit ($)</th>
<th>Additional Variable Cost of Visit ($)</th>
<th>Total Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>4.11</td>
<td>3.75</td>
<td>7.87</td>
</tr>
<tr>
<td>30</td>
<td>4.11</td>
<td>7.49</td>
<td>11.61</td>
</tr>
<tr>
<td>45</td>
<td>4.11</td>
<td>11.24</td>
<td>15.35</td>
</tr>
<tr>
<td>60</td>
<td>4.11</td>
<td>14.98</td>
<td>19.10</td>
</tr>
<tr>
<td>mean 17.18</td>
<td>4.11</td>
<td>4.29</td>
<td>8.40</td>
</tr>
</tbody>
</table>

It should be noted that the estimates in Table 10.8 are based on the average wage rates paid during a week. The wage rates are higher at the weekends, therefore the cost of weekend visits would exceed the estimates shown. The cost of weekday visits would be less than in Table 10.8, but only marginally so, since hours worked at the weekends form only a small proportion (10 percent) of the total hours worked. Therefore the estimates of cost obtained here will be used to estimate the cost of weekday visits.
3. Use of the District Nursing Service by the Sample

55, (76.4 percent) of the 72 elderly people in the sample received district nurse visits. Tasks performed were mainly bathing or showering. A few visits were for getting patients up and dressed or putting them to bed. In addition to these tasks, the nurses provided ongoing assessment and monitoring of the patients' condition. The frequency of visits is presented in Table 10.9 from which it can be seen that most people received one or two visits per week. The time per visit varied between 15 and 45 minutes (see Table 10.10), with most of the sample receiving visits up to half an hour's duration.

<p>| TABLE 10.9 |
| FREQUENCY OF DISTRICT NURSE VISITS TO 72 ELDERLY PEOPLE 1983/84 |</p>
<table>
<thead>
<tr>
<th>Frequency of Visits</th>
<th>No. Visits</th>
<th>Once per Month</th>
<th>Once per two Weeks</th>
<th>Visits per Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of elderly</td>
<td>17</td>
<td>1</td>
<td>1</td>
<td>29 18 1 1 1 2 1</td>
</tr>
<tr>
<td>Percentage</td>
<td>23.6</td>
<td>1.4</td>
<td>1.4</td>
<td>40.3 25.0 1.4 1.4 1.4 2.8 1.4</td>
</tr>
</tbody>
</table>

| TABLE 10.10 |
| TIME PER VISIT OF DISTRICT NURSE FOR 72 ELDERLY PEOPLE 1983/84 |
| Length of Visit (mins) | zero | 1-15 | 16-30 | 31-45 |
| Number of elderly     | 17   | 11   | 35    | 9     |
| Percentage            | 23.6 | 15.3 | 48.6  | 12.5  |

The mean length of visit was 20.15 minutes and the standard deviation was 14.19 minutes. The average visit time per user was 26.38 minutes.
4. Estimation of Weekly Cost of District Nurse Visits

The weekly cost of the district nursing service for each elderly person sampled may be estimated from the estimates of the cost per visit, and the information on the level of the service. The distribution of this weekly cost is shown in Table 10.11. The cost ranged from zero to $72 for 71 of the sample. One person received services costing $162.48. The mean cost was $15.63 and the standard deviation was $22.27. The mean cost per user was $20.47, but the typical cost for users was between $8 and $16.

<table>
<thead>
<tr>
<th>Weekly Cost ($)</th>
<th>Number of elderly</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (no service)</td>
<td>17</td>
<td>23.6</td>
</tr>
<tr>
<td>0-8</td>
<td>7</td>
<td>9.7</td>
</tr>
<tr>
<td>8-16</td>
<td>29</td>
<td>40.3</td>
</tr>
<tr>
<td>16-24</td>
<td>11</td>
<td>15.3</td>
</tr>
<tr>
<td>24-32</td>
<td>3</td>
<td>4.2</td>
</tr>
<tr>
<td>32-40</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>40-48</td>
<td>1</td>
<td>1.4</td>
</tr>
<tr>
<td>48-56</td>
<td>1</td>
<td>1.4</td>
</tr>
<tr>
<td>56-64</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>64-72</td>
<td>2</td>
<td>2.8</td>
</tr>
<tr>
<td>160-168</td>
<td>1</td>
<td>1.4</td>
</tr>
<tr>
<td></td>
<td>72</td>
<td>100</td>
</tr>
</tbody>
</table>
10.5.2 Home Aid

1. The Home Aid Service

(a) Operation

The Home Aid Service is run by the Nurse Maude Association and provides a house cleaning service for disabled people. The majority of recipients are elderly and continue with the service long-term.

The need for the service is assessed by Home Aid Supervising personnel. Houses are cleaned weekly or occasionally every two weeks. Either two or three hours of work are allocated.

(b) Funding

The Department of Health subsidizes the service. The recipients are charged a fee per hour of help, but if unable to pay, may apply to the Department of Social Welfare for payment on their behalf.

2. Estimates of the Unit Cost of Home Aid 1983/84

The total expenditure on the service in 1983/84 was $456,620. The total hours of home aid provided were 72,640.

The total number of visits was 27,073

The average length of visit = total hours
= 72,640
= 2.683 hours

28 A parallel service for people discharged from hospital is also administered by the Nurse Maude Association. This provides help for short periods only. The service is free to the clients. All costs are met by the Canterbury Hospital Board.

The mean cost per visit

\[
\text{The mean cost per visit} = \frac{\text{total cost}}{\text{total visits}}
\]

\[
= \frac{456,620}{27,073}
\]

\[
= 16.87
\]

In order to cost the two-hour and three-hour visits, it is necessary to estimate the fixed cost of a visit (incurred regardless of the duration of the visit) and the additional variable cost (dependent on the hours worked). The annual expenditure has therefore been divided into expenditure on fixed and variable costs.

Expenditure on Fixed Costs

\[
= \left\{ \text{Supervising Costs} \right\} + \left\{ \text{Travel Costs} \right\} + \left\{ \text{Office Costs} \right\}
\]

\[
= 38,928 + 37,428 + 43,602
\]

\[
= 119,958
\]

Expenditure on Variable Costs

\[
= \left\{ \text{Wages of Home Aids} \right\} + \left\{ \text{Clothing allowance} \right\}
\]

\[
= 334,630 + 2,032
\]

\[
= 336,662
\]

(a) Fixed Cost of a Visit

The fixed cost of a visit can be estimated by

\[
\text{Expenditure on Fixed Costs, 1983/84} \quad \text{number of visits, 1983/84}
\]

\[
= \frac{119,958}{27,073}
\]

\[
= 4.43 \text{ per visit}
\]

(b) Additional Variable Cost of a Visit

The additional variable cost can be estimated by

\[
\text{Expenditure on Variable Costs, 1983/84} \quad \text{number of hours worked, 1983/84}
\]

30 The office costs were clerical salaries, occupancy costs, general expenses and accounting.
(c) **Total Cost of Visit**

The total cost of a visit = fixed cost + additional variable cost = \$4.43 + \$4.63T,

where T hours is the length of the visit.

The cost of a two-hour visit = \$4.43 + \$9.27 = \$13.70

The cost of a three-hour visit = \$4.43 + \$13.90 = \$18.33

**Sources of Funding**

The Department of Health provides a subsidy equal to 50 percent of home help wages and supervision costs. The total subsidy in 1983/84 was \$186,779. The supervision subsidy amounts to \$0.72 per visit and the wages subsidy to \$2.30 per hour, so that the total subsidy for a two-hour and three-hour visit is \$5.32 and \$7.62 respectively.

The fees charged to clients were \$4 per hour in 1983/84.

The Department of Social Welfare paid \$73,557 of patients' fees in 1983/84 accounting for 25 percent of total fees (or an average of \$2.71 per patient).

Table 10.12 summarizes the costs and subsidies for visits of two and three hours.
TABLE 10.12
ESTIMATES OF COST OF HOME AID VISITS
AND SOURCES OF FUNDING 1983/84

<table>
<thead>
<tr>
<th>Length of Visit (hrs)</th>
<th>Cost per Visit (1) ($)</th>
<th>Dept. of Health Subsidy ($)</th>
<th>Fee to Client ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>13.70</td>
<td>5.32</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>18.33</td>
<td>7.62</td>
<td>12</td>
</tr>
<tr>
<td>mean 2.68</td>
<td>16.87</td>
<td>6.89</td>
<td>10.73(2)</td>
</tr>
</tbody>
</table>

(1) The structure of subsidies and fees implies a slight loss per visit for two-hour visits and a slight profit for three-hour visits.

(2) The Department of Social Welfare paid an average of $2.71 of these fees.
3. Use of the Home Aid Service

Seventeen (23.6 percent) of the sample received the Home Aid Service. The hours of help varied from two hours per fortnight to four-and-a-half hours per week. The most usual level of service was three hours per week. The pattern of use of this service is shown in Table 10.13.

**TABLE 10.13**

LEVEL OF USE OF HOME AID SERVICE
BY 72 ELDERLY PEOPLE, 1983/84

<table>
<thead>
<tr>
<th>Level of Service</th>
<th>Number of Elderly</th>
<th>Percentage</th>
<th>Weekly Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>No service</td>
<td>55</td>
<td>76.4</td>
<td>0</td>
</tr>
<tr>
<td>2 hrs per fortnight</td>
<td>2</td>
<td>2.8</td>
<td>6.85</td>
</tr>
<tr>
<td>2½ hrs per fortnight</td>
<td>1</td>
<td>1.4</td>
<td>8.00</td>
</tr>
<tr>
<td>3 hrs per fortnight</td>
<td>2</td>
<td>2.8</td>
<td>9.16</td>
</tr>
<tr>
<td>2 hrs per week</td>
<td>1</td>
<td>1.4</td>
<td>13.70</td>
</tr>
<tr>
<td>3 hrs per week</td>
<td>10</td>
<td>13.9</td>
<td>18.33</td>
</tr>
<tr>
<td>4½ hrs per week (2 visits)</td>
<td>1</td>
<td>1.4</td>
<td>29.69</td>
</tr>
</tbody>
</table>

4. Estimation of the Weekly Cost of Home Aid Service

The weekly cost of the Home Aid Service received by each member of the sample was calculated. These costs, shown in Table 10.13, range from zero to just under $30 per week. The mean cost per user of the service was $15.69 per week, and the cost per sample member was $3.70 per week.
10.5.3 Meals on Wheels (MOW)

1. The Meals on Wheels Service

(a) Operation

The meals-on-wheels service delivers a hot midday meal on weekdays to people living in their own homes, who are unable to prepare a cooked meal and have no one to assist them. Referrals may be by a general practitioner, social worker, district nurse etc. The majority of the recipients are elderly and once admitted to the service, remain with it long-term. Clients receive between two and five meals each week according to their need. The number received may also be limited by the availability of meals.

The operation of the meals-on-wheels service is shared by several organizations. Twelve hospitals of the Canterbury Hospital Board, and one private hospital (The Nurse Maude Hospital) provide the meals. The CHB's Coordinating Centre for Geriatric and Domiciliary Services manages the file of clients who receive the meals, and also provides the delivery schedules. The Red Cross Society organizes the delivery of the majority of the meals using volunteer drivers. The Nurse Maude District Nursing Association may assess clients' needs to continue receiving the service, after six weeks on the service.

(b) Funding

The costs of the hospitals supplying the meals (with the exception of Nurse Maude Hospital), and the costs of the

---

31 The Red Cross Society organizes the delivery of meals in the Christchurch metropolitan area. Various other voluntary or church-run organizations operate in the rural areas.
Coordinating Centre are met from the budget of the Canterbury Hospital Board. The CHB also contributes to the funding of the activities and inputs to the MOW service provided by the Nurse Maude Association and the Red Cross Society. The volunteer drivers may claim a fixed amount from the Red Cross Society towards petrol costs, but receive no further remuneration. Clients are charged a fee for each meal received. This revenue is retained by the CHB.

2. Estimation of the costs of the MOW Service 1983/84

A total of 192,278 meals-on-wheels were provided in the CHB area in 1983/84. Of these, 188,055 were supplied by CHB hospitals and 4,223 by the Nurse Maude Hospital (Annual Report, CHB, 1984).

A total of 180,830 meals were delivered by the Red Cross Society in the Christchurch metropolitan area. The estimation of the cost per meal which is to follow, refers to the costs of these meals. The costs are divided into the provision and distribution costs.

32 The Nurse Maude Association received $1.35 from the CHB for each meal it provided. The district nursing service (undertaking assessment of need for the MOW Service) is 75 percent funded by the CHB.

33 This information was supplied by the CHB Coordinating Centre.

34 The meals delivered to the Christchurch metropolitan area account for 94 percent of the total. The cost per meal for the remaining six percent, delivered to the rural areas, is unlikely to differ to any great extent with respect to meals provision but the distribution costs are likely to be considerably greater.
(a) **Cost of Meals Provision**

The cost of meals provided by the Nurse Maude Hospital was not available, therefore those costs will be estimated by the CHB supplied MOW costs. It has not been possible to isolate the costs of supplying MOW meals from the costs of all meals prepared in the CHB hospital kitchens, therefore the cost of a MOW meal will be estimated by the average cost of all CHB prepared meals.  

(i) **Food and other supplies**

The total cost to the CHB in 1983/84 for food and other non-salary costs = $3,741,763

The cost nett of MOW specific costs\(^{36}\) = 3,711,955

The total number of meals prepared by the CHB in 1983/84 = 4,083,874

---

\(^{35}\) This assumes that the average cost of a MOW meal does not differ significantly from the average cost per meal calculated over all meals. The two main components of the cost of meals are food and labour. The meals-on-wheels service provides a cooked two-course lunch equivalent to the 'main' in-hospital meal. Therefore the MOW food cost component may be higher than the average food cost per meal computed over all meals, since the latter includes lighter meals e.g. breakfast and tea. On the other hand the labour cost component for meals-on-wheels may be less than for the average meal, since MOW is a week-day service and does not involve the payment of higher weekend wage rates. There is therefore a compensating effect when using the cost components of an average meal to estimate the total cost of a MOW meal. The result is that the estimation error is less than the difference between the individual cost components (of MOW and 'average' meals).

\(^{36}\) MOW specific costs were for the distribution of meals. The largest cost in this category was $24,996 (13 cents per meal).
The average food and supplies cost per meal = $3,711,955

\[ \frac{\$4,083,874}{\$4,083,874} = \$0.9089 \]

The cost of the food and supplies for the 180,830 meals delivered in the Christchurch metropolitan area in 1983/84 is estimated at $0.9089 \times 180,830 = \$164,375

(ii) Salaries

The total salaries of food service staff in all CHB hospitals in 1983/84 = \$7,116,759

Total salaries excluding MOW clerical staff\(^{37,38}\) = \$7,088,647

The average salaries cost per meal = \$7,088,647

\[ \frac{\$4,083,874}{\$4,083,874} = \$1.7358 \]

The cost of salaries for the preparation of MOW meals in the Christchurch metropolitan area in 1983/84 is estimated at $1.7358 \times 180,830 = \$313,885

(b) Cost of Meals Distribution

The following cost estimation refers to the 180,830 meals delivered by the Red Cross Society in the Christchurch metropolitan area.

\(^{37}\) The salaries of the MOW clerical staff are included in the administration costs in the next section.

\(^{38}\) Information on salaries was provided by the Food Service Department of the CHB.
(i) Administration

(1) CHB Coordinating Centre

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>salaries and identifiable expenditure</td>
<td>$35,120</td>
</tr>
<tr>
<td>estimated office occupancy costs</td>
<td>$4,059</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$39,179</strong></td>
</tr>
</tbody>
</table>

(2) Red Cross Society

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>salaries and identifiable expenditure</td>
<td>$13,351</td>
</tr>
<tr>
<td>estimated office occupancy costs</td>
<td>$1,264</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$14,615</strong></td>
</tr>
</tbody>
</table>

An amount $4,812 was paid by the CHB towards these costs (in addition to the 13 cents per meal delivered)

(ii) Transportation

The delivery of meals in the Christchurch metropolitan area is organized into rounds with 10-18 meals to a round. The usual time taken to complete a round is two hours. The round trip varied between 10 and 20 kilometres. The mode was 15 kilometres. Drivers were allowed to claim $1.10 per round towards petrol costs, from the Red Cross Society. The CHB paid the Red Cross Society 13 cents per meal delivered.

---

39 Information on office occupancy costs i.e., rates, electricity, telephone, insurance etc., was not available. The estimates used were 12½ percent of office staff salaries, based on the cost structure of the Home Aid Service, a similar organization.

40 The information on deliveries was provided by the Red Cross Society.
For the Christchurch metropolitan area:
The estimated number of rounds in 1983/84 was 13,052.\(^{41}\)
The average number of meals delivered per round was therefore \(\frac{180,830}{13,052}\), or 13.85.
The estimated total distance travelled \(= 15 \times 13,052\)  
\(= 195,780\) kilometres
The estimated total labour time \(= 2 \times 13,052\)  
\(= 26,104\) hours

The full economic cost of transportation should include the cost of owning and running the vehicles and the cost of the time spent by the drivers. Under the present system the drivers offer their services voluntarily and do not receive payment for their time. Many of them are retired and therefore the opportunity cost of their time, at least for some drivers may be considered to be zero. On the other hand if the meals were delivered by the Hospital Board itself, or by a commercial enterprise, the cost would be much higher. So that the value of the services offered by the volunteer drivers is certainly non-zero.

The present system also makes no provision for the cost of owning and operating delivery vehicles (apart from petrol costs), so that the drivers 'volunteer' this subsidy to the service also. Unlike their labour time contribution which may be 'free' to them, (i.e., there are no associated costs), ownership and non-fuel operating costs do actually occur.

\(^{41}\) Source: Coordinating Centre, CHB.
In order to span the possible interpretation of cost discussed above, three levels of transportation costs are considered in the cost estimation to follow.

(1) **Petrol Costs Only**

This is essentially the system operating at present. Vehicle costs include only petrol costs and driver costs are estimated at zero.

The petrol cost for a small station wagon, a vehicle similar to those used by the volunteer drivers has been estimated at 7 cents per kilometre.\(^{42}\) Using this figure the cost per round may be estimated at \(15 \times \$0.07 = \$1.05\) per round, \((\$0.076\) per meal). The cost for the Christchurch metropolitan area in 1983/84 may be estimated at \(13,052 \times \$1.05 = \$13,705\). [The petrol cost per round \$1.05 is just covered by the amount \$1.10 drivers were eligible to claim from the Red Cross Society].

(2) **Full Vehicle Costs**

This is an extension of the present system. Ownership and full operating costs of vehicles are included, but driver costs are still estimated at zero. The estimation assumes there is an available supply of volunteer drivers.

Estimates of the costs of owning and operating vehicles are compiled by the State Services Commission. They depend upon the size of vehicle and the yearly mileage travelled. Assuming that volunteer drivers travelled between 6,400 and 8,000 kilometres per year,\(^{43}\) the average cost per kilometre

---

\(^{42}\) Source: Public Service Garage.

\(^{43}\) This is a moderate amount of yearly travel. It is unlikely that volunteer drivers would travel the large distances necessary to enable them to have a lower cost per kilometre.
in January 1983 was 27.65 cents. The cost per round can be estimated at $4.15 (or $0.30 per meal). The cost for deliveries to the Christchurch metropolitan area in 1983/84 is estimated at: \(13,052 \times 4.15 = 54,166\).

(3) **Full Vehicle and Driver Costs**

This level of costing includes the cost of paying drivers to deliver the meals. The pay award for drivers in 1983/84 was $201.26 for a forty-hour week. The cost per hour of work was therefore $5.59. Assuming this rate can be applied to the average of two hours a day required for meals-on-wheels delivery (i.e. assuming that the drivers could be employed as drivers elsewhere in the health service for the rest of the day), the cost per round would be $11.18 (i.e. \(2 \times 5.59\)) per round (or $0.81 per meal). The total cost for drivers in the Christchurch area in 1983/84 is estimated at: \(13,052 \times 11.18 = 145,921\).

If the vehicles used for deliveries could be used for other purposes during the day, then the vehicle cost would reduce to 23.30 cents per kilometre (the rate for yearly travel exceeding 12,800 kilometres). However if the vehicles remained idle the cost per kilometre would increase to 31.40 cents (the rate for annual travel of 3,750 kilometres). The cost per meal in each case would be 25.23 cents and 34.01 cents respectively.

In the absence of any information on the probable other use of vehicles, the rate chosen for this estimation is the same as that for the volunteer drivers i.e., 27.65 cents per

---

44 An allowance has been made for paid holidays.
kilometre, or 29.94 cents per meal.

The estimated total cost of deliveries in the Christchurch area in 1983/84 = cost of drivers + cost of vehicles = $145,921 + $54,166 = $200,087, for the year. The cost per round = $11.18 + $4.15 = $15.33. The cost per meal = $0.81 + $0.30 = $1.10.

(c) Total Cost of MOW Service 1983/84 (Christchurch metropolitan area)45

The costs obtained using the three methods of estimating transportation costs are presented in Table 10.14.

<table>
<thead>
<tr>
<th>Meals Provision</th>
<th>Food &amp; Supplies</th>
<th>Annual Cost ($</th>
<th>Cost per Meal ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>164,375</td>
<td>0.91</td>
</tr>
<tr>
<td></td>
<td></td>
<td>313,885</td>
<td>1.74</td>
</tr>
</tbody>
</table>

| Distribution Administration | Coordinating Centre | 39,179 | 0.22 |
|                            | Red Cross Society  | 14,615 | 0.08 |
| Transportation             | (i) Petrol Costs only | 13,705 | 0.08 |
|                            | (ii) Full Vehicle Costs | 54,166 | 0.30 |
|                            | (iii) Full Vehicle & Driver Costs | 200,087 | 1.10 |
| Total Cost                 | (i) 545,759 | 3.02 |
|                            | (ii) 586,219 | 3.25 |
|                            | (iii) 732,141 | 4.05 |

(1) The figures in this table refer to the costs of the 180,830 meals delivered in the Christchurch metropolitan area (see footnote 45)

45 The full cost for the CHB area would include the cost of the 11,448 meals delivered to rural areas.
(d) **Excluded Costs**

The estimates of costs just obtained exclude some inputs to the MOW service. These are now considered.

(i) **Assessment of clients**

Recipients of the MOW service may be assessed after six weeks to determine whether the service should be continued. Expenditure on assessments is approximately $8,000 per year (or 4 cents per meal delivered). Since elderly people in this study continue with this service long-term then only one assessment is made per person and the cost per meal is negligible.

(ii) **Central Administration Costs**

Engineering and maintenance costs will be incurred at the food services premises of the Canterbury Hospital Board. It has not been possible to identify these costs, but the cost per meal (when over 4 million meals are prepared annually) is unlikely to significantly effect the estimates derived.

(iii) **Power Costs**

The power costs of meals preparation were unobtainable. Rough estimates from commercial kitchens of power costs are 10 cents per meal. The costs derived may therefore underestimate the true cost by this amount.

(iv) **Capital Costs**

The two main components of capital costs arise from the provision of kitchens and offices. Estimates of these costs have not been obtained but if the capital costs were spread over the life of these assets and averaged over
the meals prepared in this time, the contribution to cost would be a small component of the cost per meal.

(e) Sources of Funding 1983/84

(i) Meals Provision

The estimated cost of meals provision (but not distribution) is $2.65 per meal. In the year 1983/84, each client was charged $0.90 per meal. The remainder of the cost of supplying a meal, $1.75, was met by the CHB.46

(ii) Meals Distribution

The cost of the Coordinating Centre, $0.22 per meal, was met by the CHB. The CHB paid $4,812, and also 13 cents per meal, to the Red Cross Society to cover administration and petrol costs. The drivers were entitled to claim $1.10 per round from the Red Cross Society, which just covers petrol costs (estimated at $1.05 per round), but which falls well short of the full vehicle cost of $4.15 per round. Hence the drivers subsidize the service by $3.05 per round ($0.22 per meal) by offering free use of their vehicles. If the labour time of the drivers is valued at the normal wage rates for drivers, the 'value' per round is $11.18 ($0.81 per meal) and the total subsidy from the driver is increased to $14.23 per round ($1.03 per meal).

The sources of funding for 1983/84 are shown in Tables 10.15 and 10.16.

46 The Nurse Maude Hospital contributed $1.3 (=$2.65-$1.35) for each of the 4,223 meals it provided, assuming its cost of meals was similar to that of the CHB.
TABLE 10.15
MOW SOURCES OF FUNDING 1983/84

<table>
<thead>
<tr>
<th>Basis of Estimation</th>
<th>Source of Funding ($)</th>
<th>Total* Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Recipients</td>
<td>CHB</td>
</tr>
<tr>
<td>(i)</td>
<td>162,747</td>
<td>383,012</td>
</tr>
<tr>
<td>(ii)</td>
<td>162,747</td>
<td>383,012</td>
</tr>
<tr>
<td>(iii)</td>
<td>162,747</td>
<td>383,012</td>
</tr>
</tbody>
</table>

* City deliveries only, see footnote 45 for rural area costs.

TABLE 10.16
MOW SOURCES OF FUNDING, PER MEAL 1983/84

<table>
<thead>
<tr>
<th>Basis of Estimation</th>
<th>Source of Funding ($ per meal served)</th>
<th>Total Cost of Meal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Recipients</td>
<td>CHB</td>
</tr>
<tr>
<td>(i)</td>
<td>0.90</td>
<td>2.12</td>
</tr>
<tr>
<td>(ii)</td>
<td>0.90</td>
<td>2.12</td>
</tr>
<tr>
<td>(iii)</td>
<td>0.90</td>
<td>2.12</td>
</tr>
</tbody>
</table>

(i) Volunteer drivers, free use of vehicles (except petrol)
(ii) Volunteer drivers, full vehicle costs
(iii) costs include full vehicle and driver costs.

3. Use of the Meals on Wheels Service

Ten (13.9 percent) of the sample received the meals on wheels service. The number of meals per week varied between two and five (see Table 10.17).

4. Estimation of the Weekly Cost of Meals on Wheels

The weekly cost of the meals on wheels service for the sample was estimated using the cost per meal, $4.05, derived in section 2(b)(ii)(3) above i.e., including full vehicle and driver costs. The mean cost per person was $2.025 per week and the standard deviation was $5.27. The mean cost per user was $14.58. The distribution
of costs is shown in Table 10.18.

<table>
<thead>
<tr>
<th>Number of Meals per week</th>
<th>Weekly Cost</th>
<th>Number of Elderly</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>62</td>
</tr>
<tr>
<td>2</td>
<td>8.10</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>12.15</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>16.20</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>20.25</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>72</td>
</tr>
</tbody>
</table>
10.5.4 Home Linen

1. The Home Linen Service

   (a) Operation

   The Home Linen service handles the laundering of sheets and towels for people living in their own homes. The Canterbury Hospital Board supplies the linen used, and the laundering takes place in the CHB's Central Laundry. The Nurse Maude Association administers the service and transports the linen between the CHB Central Laundry and the households. Most households are visited weekly.

   (b) Funding

   Clients are charged a small fee by the Nurse Maude Association for the service, and the Canterbury Hospital Board reimburses costs in excess of this revenue.

2. Estimation of Unit Costs of Home Linen 1983/84

   A total of 9,370 visits to households were made in 1983/84. The average number of cases was 218.

   (a) Distribution

   The expenditure by the Nurse Maude Association on administering the service and on collection and deliveries in 1983/84 was $24,558. The average cost per visit = \(\frac{24,558}{9,370} = \$2.62\).

   (b) Supplies and Laundry

   In order to estimate the amount of laundry per visit a sample of four weeks' dispatches from the laundry in 1984 was analysed. The mean weight of clean linen dispatched was 471.25 kilograms per week.
The estimated weight of linen per year = \( 471.25 \times 52 = 24,505 \) kilograms. The mean weight per visit = \( 24,505 = \frac{9,370}{2.615} \) kilograms. The cost of supplying and laundering linen at the Central Laundry has been estimated at \$0.75\) per kilogram (see Chapter 8). The estimated annual cost at the laundry = \$24,505 \times 0.75 = \$18,379\). The estimated cost per visit = \$18,379 = \frac{1.96}{9,370}\).

(c) Total Estimated Costs

The total estimated cost = \{distribution costs\} + \{laundry costs\} = \$24,558 + \$18,379 = \$42,937\). The estimated cost per visit = \$4.58\). Table 10.18 summarizes the costs of the Home Linen Service.

<table>
<thead>
<tr>
<th>TABLE 10.18</th>
<th>ESTIMATED COST OF HOME LINEN SERVICE 1983/84</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Cost ($)</td>
<td>Cost per Visit ($)</td>
</tr>
<tr>
<td>Administration, Distribution</td>
<td>24,558</td>
</tr>
<tr>
<td>Supplies and Laundry</td>
<td>18,379</td>
</tr>
<tr>
<td>Total Cost</td>
<td>42,937</td>
</tr>
</tbody>
</table>

(d) Sources of Funding 1983/84

Revenue of \$1,094\) was received in 1983/84 from recipients of the service, who were charged 1 cent per item supplied. The remainder of the cost, \$41,843\) was met by the CHB. Table 10.19 shows the level of funding per visit.
3. Use of the Home Linen Service

Ten (13.9 per cent) of the sample used the Home Linen Service. One visit per week was received in each case.

4. Estimation of the Weekly Cost of the Home Linen Service

The cost per week of the Home Linen Service for the whole sample was $0.64 (standard deviation = $1.59). The cost per user was $4.58.
10.5.5 Home Sitter

1. The Home Sitter Service

(a) Operation

The Home Sitter Service is offered by the Nurse Maude Association. It began as a night sitter service for families caring for terminally ill patients in order to afford the carer some sleep. It has since been extended and offers day sitters for chronically ill patients to provide daytime relief for the family carers.

The night sitter stays with the patient for eight hours. A patient usually receives this service between one and three nights each week according to need and the availability of sitters.

The day service is usually received once a week, though a few patients are visited more often. The length of visit varies between two and eight hours. The mean time per visit was estimated at 4.34 hours based on visits made in March 1984. The majority of visits were between three and four hours.

The caseload for each service is small and varies from month to month. Thirty-two patients received day sitters in April 1984; 20 patients received night sitters. Exceptionally a patient would receive both services.

---

47 A sample of three weeks in 1984 showed that patients received on average 2.23 visits per week. Exceptionally four or five visits were made during a week.

48 The mean weekly number of visits per patient was 1.12 based on a three-week sample in 1984, excluding dialysis patients.

49 A small number of dialysis patients receive eight hour visits three times each week.

50 A total of 577.75 hours were worked for 133 visits (Source: Nurse Maude Association).
Tasks performed by home sitters are for the care of the patient e.g. toileting, washing, etc., and do not include household tasks.

(b) Funding

The service is fully funded by the Canterbury Hospital Board.

2. Estimation of Unit Costs of Home Sitter Service 1983/84

The total expenditure on the Home Sitter Service in 1983/84 was $137,556. The total number of visits was 2,581 comprising 1,282 in the day and 1,299 at night (Annual Report, Canterbury Hospital Board, 1984).

The average cost per visit ($53.29) is of limited use in estimating the cost of a visit, for two reasons. Firstly, the length of visit varies, particularly between day and night visits. Secondly, the home sitter wage rates differ according to when the visit is made (i.e. day, night, weekend). The total expenditure on sitter salaries in 1983/84 was $113,248, ($43.88 per visit). The remaining costs can be considered as fixed costs. The (variable) cost of a visit is a share of these fixed costs plus an additional (variable) cost covering the wages paid to the sitter.

51 Source: Nurse Maude Association.

52 The prevailing hourly wage rates in 1983/84 were:
$4.917 (day) 6 a.m.-10 p.m. Monday-Friday
$6.147 (night) 10 p.m.-6 a.m. Monday-Friday
$7.377 (Sat.) midnight Friday to midnight Saturday
$9.836 (Sun.) midnight Saturday to midnight Sunday.
(a) **Fixed Cost per Visit**

Expenditure on fixed costs 1983/84

\[
= \left( \text{travel costs} \right) + \left( \text{office costs} \right)_{53} + \left( \text{clothing costs} \right)_{54}
\]

\[
= $17,077 + $6,694 + $537
\]

\[
= $24,308
\]

The fixed cost per visit = $24,308 \[2,581\]

\[
= $9.42
\]

(b) **Additional Variable Cost per Visit**

This is the salary paid to the home sitter and depends upon the hours worked (T) for the visit, and the wage rates for those hours

\[
\text{additional variable cost} = \sum w_i T_i
\]

where \( T = \sum T_i \) = hours worked for the visit, and \( w_1, w_2 \ldots \) are the appropriate wage rates.

The additional variable costs for visits at different times of the week are shown in table 10.20.

(c) **Total Cost of a Visit**

The total cost of a visit of T hours

\[
= \left( \text{fixed cost of visit} \right) + \left( \text{additional variable cost} \right)
\]

\[
= 9.42 + \sum w_i T_i
\]

The cost for visits of various durations at different times of the week are shown in table 10.21.

---

53 Office costs include clerical salaries and general expenses.

54 Clothing is not strictly a fixed cost but it is such a small sum it has been included here.
### TABLE 10.20
**ADDITIONAL VARIABLE COST OF HOME SITTER VISIT**

<table>
<thead>
<tr>
<th>Time of Visit</th>
<th>Additional Variable Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DAY</strong></td>
<td></td>
</tr>
<tr>
<td>Mon. - Fri.</td>
<td>4.92 T</td>
</tr>
<tr>
<td>Sat.</td>
<td>7.38 T</td>
</tr>
<tr>
<td>Sun.</td>
<td>9.84 T</td>
</tr>
<tr>
<td><strong>NIGHT</strong></td>
<td></td>
</tr>
<tr>
<td>Mon. - Thurs.</td>
<td>49.18</td>
</tr>
<tr>
<td>Fri.</td>
<td>56.58</td>
</tr>
<tr>
<td>Sat.</td>
<td>73.77</td>
</tr>
<tr>
<td>Sun.</td>
<td>56.58</td>
</tr>
</tbody>
</table>

* The costs are for day visits of T hours duration.
** The costs are for night visits of 8 hours duration.

### TABLE 10.21
**COST OF HOME SITTER VISITS 1983/84**

<table>
<thead>
<tr>
<th>Time of Visit</th>
<th>Length of Visit (hours)</th>
<th>Fixed Cost of Visit ($)</th>
<th>Additional Variable Cost ($)</th>
<th>Total Cost of Visit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DAY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mon-Fri</td>
<td>2</td>
<td>9.42</td>
<td>9.84</td>
<td>19.25</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>9.42</td>
<td>14.75</td>
<td>24.17</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>9.42</td>
<td>19.67</td>
<td>29.09</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>9.42</td>
<td>29.51</td>
<td>38.93</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>9.42</td>
<td>39.34</td>
<td>48.76</td>
</tr>
<tr>
<td>Sat.</td>
<td>4</td>
<td>9.42</td>
<td>29.51</td>
<td>38.93</td>
</tr>
<tr>
<td>Sun.</td>
<td>4</td>
<td>9.42</td>
<td>39.34</td>
<td>48.76</td>
</tr>
<tr>
<td><strong>NIGHT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mon-Thurs</td>
<td>8</td>
<td>9.42</td>
<td>49.18</td>
<td>58.60</td>
</tr>
<tr>
<td>Fri.</td>
<td>8</td>
<td>9.42</td>
<td>56.56</td>
<td>65.98</td>
</tr>
<tr>
<td>Sat.</td>
<td>8</td>
<td>9.42</td>
<td>73.77</td>
<td>83.19</td>
</tr>
<tr>
<td>Sun.</td>
<td>8</td>
<td>9.42</td>
<td>56.56</td>
<td>65.98</td>
</tr>
</tbody>
</table>
3. **Use of Home Sitter Service**

Only one elderly person in the sample received the home sitter service on a regular basis. (One other person had received the service during an illness). One visit of six hours was received on a regular weekly basis.

4. **Costs of the Home Sitter Service**

The cost of the service supplied to the one user was $42.61 per week. The cost per sample member was therefore $0.59.
10.5.6 Day Care

1. Day Care Services

(a) Operation

Day care services for the dependent elderly are offered by a number of public and private hospitals, residential homes and community organizations. Care is available between six and nine hours each weekday. Various therapies and programs of activities are offered and a hot midday meal is usually supplied. Facilities for bathing, or showering are sometimes offered. Transport between the day care centre and the person's home is often available.

(b) Funding

Day care offered by privately run organizations receives no public funding towards operating costs.\(^{55}\) Clients pay a fee which includes a meal. An additional charge is made if transport is required.

Clients using day care at public hospitals or community centres also pay a fee but it is much less than that charged for private day care and does not reflect the full cost. Volunteer help is used by some centres.

2. Estimation of Unit Cost of Day Care Services in 1983/84

Apart from one service which relied heavily on volunteer help, all day care was offered by organizations already caring for long-stay residents or patients, and the day care clients joined in with the residents' program of activities. It was therefore difficult to isolate the costs attributable

\(^{55}\) Funds are available from the Department of Health for capital expenditure.
just to the day care clients, and this was not attempted. Instead, the charges made by the non-profit-making private institutions were used to estimate the cost of day care.

The most usual fee of the non-profit-making institutions was $6 per day plus $1 for transport and these values were used as the cost estimates.

3. Use of Day Care Services

Fourteen, (19.4 percent) of the sampled elderly 11 men and three women used day care services. The pattern of use is shown in Table 10.22. The mean number of visits per user was 1.41 per week.

| TABLE 10.22 |
| USE OF DAY CARE SERVICES BY 72 SAMPLED ELDERLY 1983/84 |

<table>
<thead>
<tr>
<th>Number of Visits</th>
<th>0</th>
<th>Once per 4 weeks</th>
<th>Visits per week 1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of elderly</td>
<td>58</td>
<td>3</td>
<td>6</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>72</td>
</tr>
<tr>
<td>Weekly Cost ($)</td>
<td>0</td>
<td>1.62</td>
<td>7</td>
<td>14</td>
<td>21</td>
<td>28</td>
<td></td>
</tr>
</tbody>
</table>

4. Cost of Day Care Services 1983/84

The distribution of weekly cost for the 72 elderly in the sample is shown in Table 10.22. The mean cost per user was $9.87 per week and the mean cost per sample member was $1.92 per week. The mean charge per user was $5.36 per week ($3.80 per visit). Although men were more likely to use the day care services, the frequency of visits was less than for the women so that there was no significant difference in the weekly cost.
10.5.7 Total Cost of Formal Agency Services

(a) Resource Cost of all formal agency services

The mean costs per sample member, for each agency service estimated in the preceding sections, are summarized in Table 10.23. It can be seen that on average the major input of the formal agencies is home nursing. However when the cost per user is considered, substantial inputs to some clients from other agencies become apparent. The cost of all formal agency services received by the sample averaged $24.51 per person.

The costs per service and costs per user of table 10.23 could have arisen from several patterns of resource use, ranging from a situation where many services are used by a 'core' of people to one where the services are spread thinly over a large number of people. In order to explore this aspect of service use, the number of services used by each person was calculated and is shown in Table 10.24. No one received all services. Indeed the maximum number of services was three. The majority of the sample used one or two services only. Ten people (13.9 percent) received no agency services at all. The mean number of services used was 1.49 with a standard deviation of 0.92. This would seem to be a modest level of service use, for a group of elderly who were sufficiently dependent to be eligible for (and to use) the short-stay hospital 'relief for carer' facility. All but one of the sample were unable to manage any heavy household tasks or to cook a main meal; only seven were able to bath without help and most (90 percent) could not be left alone for more than half a day (see Chapter 7) so that there
TABLE 10.23

WEEKLY RESOURCE COST OF FORMAL AGENCY SERVICES
RECEIVED BY 72 ELDERLY 1983/84

<table>
<thead>
<tr>
<th>SERVICE</th>
<th>Mean Cost per person ($ per week)</th>
<th>Number of Users</th>
<th>Mean Cost per user ($ per week)</th>
</tr>
</thead>
<tbody>
<tr>
<td>District Nurse</td>
<td>15.63</td>
<td>55</td>
<td>20.47</td>
</tr>
<tr>
<td>Home Aid</td>
<td>3.70</td>
<td>17</td>
<td>15.69</td>
</tr>
<tr>
<td>Meals on Wheels</td>
<td>2.03</td>
<td>10</td>
<td>14.58</td>
</tr>
<tr>
<td>Home Linen</td>
<td>0.64</td>
<td>10</td>
<td>4.58</td>
</tr>
<tr>
<td>Home Sitter</td>
<td>0.59</td>
<td>1</td>
<td>42.61</td>
</tr>
<tr>
<td>Day Care</td>
<td>1.92</td>
<td>14</td>
<td>9.87</td>
</tr>
<tr>
<td>Total</td>
<td>24.51</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

TABLE 10.24

NUMBER OF FORMAL AGENCY SERVICES
USED BY 72 ELDERLY 1983/84

<table>
<thead>
<tr>
<th>Number of Services</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4 or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Elderly</td>
<td>10</td>
<td>28</td>
<td>23</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>Percentage</td>
<td>13.9</td>
<td>38.9</td>
<td>31.9</td>
<td>15.3</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

would be a substantial need for assistance. From the above analysis it seems that the formal agencies meet only a fraction of the need for services, and that the main source of help for this sample of elderly is elsewhere.

The number of services received is a crude way to measure the contribution to care of the elderly from formal agencies, because the intensity of service may vary between recipients. The total cost of formal agency services incorporates both intensity of service and number of services. The distribution of this cost over the sample members is shown in figure 10.2.
The total weekly cost of formal agency services ranged from zero to $162.48, with a mean of $24.51 and a standard deviation of $24.98. The mean cost omitting the outlying observation of $162.48 was $22.57 per week. The overwhelming majority of the sample (86 percent) received services costing under $40 per week.

The cost analysis confirms the conclusion that agency services provide only part of the care of elderly people living in the community. A basic package of weekly services (e.g. one half-hour visit from a nurse, two hours of home aid, one laundry visit, three meals-on-wheels, two hours of home sitter and one day care visit) which would meet minimal domestic and hygiene needs would cost $68.29, far in excess of the mean value of $24.51. This basic package would be insufficient to meet needs for toileting, dressing, eating assistance required by many of the sample. The remaining care needs for many of the sample after allowing for formal agency help, would be substantial.

(b) **Share of formal agency cost borne by the state**

The formal agency services receive some measure of state funding, although this varies between the services so that the state contribution to an individual depends upon the 'package' of services received. The share of the total resource cost of agency services borne by the state was calculated for each member of the sample. The distribution of this share is shown in Table 10.25. The mean state contribution to cost was $16.4 per week and the standard deviation was $18.17. Ten people received no state funding (since they did not receive any of the formal agency services).
Figure 10.2

WEEKLY RESOURCE COST OF FORMAL
AGENCY CARE 1983/84

NUMBER
OF ELDERLY

Mean = $24.51
s.d. = $24.98

10 elderly received no agency care
For the majority of the sample, (89 percent), the state contribution was under $30 per week. For 40 percent of the sample it was under $10 per week.

(c) Cost of formal agency services by patient disability

The analysis of the use of formal agency services presented so far, has revealed some variation between individual sample members with respect to both the number of services and the amount of each service received. It is of interest to ascertain whether this variation is related to the dependency of the recipient. In order to explore this aspect of service use, the mean cost of agency services was calculated for people at each level of mobility and toileting ability.\(^{56,57}\) In addition, a linear regression was per-

---

56 Mobility was selected since it is commonly used as an indicator of dependency for geriatric patients; toileting was selected since it was shown (in chapter 7) to be the most important variable in explaining the variation in direct nursing care time in hospital.

57 The scores for all disability measures increase with increasing disability.
formed relating the total weekly cost of agency services for a person, with functional incapacity measures, disability measures,57,58 and variables representing sex, age, the elderly person's income, and whether the elderly person lived alone. The results of these analyses are presented in Tables 10.26 to 10.28. The outlying observation with an agency cost of $161.48 has been excluded.

### TABLE 10.26

COST OF AGENCY SERVICES BY LEVEL OF MOBILITY FOR 71 ELDERLY PEOPLE 1983/84

<table>
<thead>
<tr>
<th>Mobility</th>
<th>Mean Cost of Agency Services ($ per week)</th>
<th>Standard Deviation ($ per week)</th>
<th>Number of elderly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walks unaided</td>
<td>20.60</td>
<td>20.43</td>
<td>20</td>
</tr>
<tr>
<td>Walks with aid</td>
<td>23.68</td>
<td>19.55</td>
<td>43</td>
</tr>
<tr>
<td>Walks with person</td>
<td>2.90</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Chair fast</td>
<td>26.23</td>
<td>7.61</td>
<td>6</td>
</tr>
<tr>
<td>Bed fast*</td>
<td>11.61</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>All sample*</td>
<td>22.57</td>
<td>18.89</td>
<td>71</td>
</tr>
</tbody>
</table>

* excluding one outlier.

An analysis of variance of agency cost by level of mobility for all 72 observations resulted in a value of F of 4.06 which was significant at the 5 percent (p = 0.0052). However when the outlier was removed, the observed value of the statistic F dropped to 0.49 which was not significant (observed p = 0.74). Therefore the data did not show the cost of agency services to be related to the level of mobility of the recipient.

58 Functional incapacity measures were: mobility outside and inside, vision, hearing, mental capacity, bowel and urinary incontinence. Disability measures were: bathing, dressing, washing, toileting, eating, getting up, going to bed, transferring, shopping, cleaning, laundry, cooking, taking medication (see Appendix 1).
Table 10.27 shows the cost of agency services by level of toileting ability. An analysis of variance with all 72 observations resulted in a value of the statistic $F$ of 2.53 which was significant at the 5 percent level ($p = 0.0482$). When the outlier was removed the observed value of $F$ was 3.91, significant at the 1 percent level (observed $p = 0.0065$). Therefore the data indicated a relationship between total agency cost and toileting ability.

Separate analyses of variance were performed for the cost of each formal agency service. The results are presented in Table 10.28. Variable TOILET was significantly positively related to four of the service costs. The cost of the Home Aid service was not related to toileting ability. Since there was only one user of the Home Sitter service it was not possible to test the relationship between its cost and the disability measures. Variable MOBILITY was significantly positively related to the cost of the Home Linen.
service only. All users of the Home Aid service were mobile/unaided or with aids) and the average cost was higher for those using aids ($4.55 compared to $3.55 per week) though not significantly so.

TABLE 10.28
VALUES OF F OBTAINED FROM ANALYSIS OF VARIANCE OF COST OF INDIVIDUAL SERVICES WITH MOBILITY AND TOILETING MEASURES OF 71 ELDERLY USERS 1983/84

<table>
<thead>
<tr>
<th>Service</th>
<th>Disability measure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MOBILITY</td>
</tr>
<tr>
<td>Home Nurse</td>
<td>0.36</td>
</tr>
<tr>
<td>Home Aid</td>
<td>0.64</td>
</tr>
<tr>
<td>Meals-on-wheels</td>
<td>0.09</td>
</tr>
<tr>
<td>Home Linen</td>
<td>2.12*</td>
</tr>
<tr>
<td>Day Care</td>
<td>0.61</td>
</tr>
<tr>
<td>Home Sitter (1)</td>
<td>0.62</td>
</tr>
</tbody>
</table>

* significant at the .05 level (1 tail test)
** " " " .025 " (1 " " )
*** " " " .01 " (1 " " )
(1) There was only one user of this service. The user could walk and toilet unaided.

TABLE 10.29
SIGNIFICANT COEFFICIENTS OF REGRESSION OF COST OF AGENCY SERVICES ON MEASURES OF PATIENT DEPENDENCY FOR 7159 ELDERLY PEOPLE 1983/84

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONSTANT</td>
<td>34.25</td>
<td>7.01</td>
<td>4.89**</td>
</tr>
<tr>
<td>TOILET</td>
<td>7.81</td>
<td>1.44</td>
<td>5.42**</td>
</tr>
<tr>
<td>TRANSFER</td>
<td>-13.83</td>
<td>6.20</td>
<td>-2.23*</td>
</tr>
<tr>
<td>GOBEDIK</td>
<td>-11.15</td>
<td>5.54</td>
<td>-2.01*</td>
</tr>
</tbody>
</table>

\[ R^2 = 0.31 \]

* significant at the .05 level
** significant at the .01 level

59 When all 72 observations were included, variable CATH was highly significant. The outlier who used a catheter, had a high use of nursing services.
A regression of the total cost of agency services on measures of patient dependency (see footnote 58 for a list of the variables) produced only three significant coefficients (see Table 10.29). They were: TOILET, already discussed, GOBED a variable reflecting assistance required to go to bed at night and TRANSFER which indicates help for daytime transfers e.g. from one chair to another. The variable TOILET by itself explained 17.5 percent of the variance in total agency cost; the three variables together had an $R^2$ of 0.31. Variables GOBED and TRANSFER had negative coefficients, which is unexpected and for which there is no obvious explanation. Both variables measure some aspect of mobility. MOBILITY itself had a negative but insignificant coefficient, therefore the effect is consistent. It may be that carers of immobile people seek less help or services than those caring for mobile people, since the perceived 'burden of care' is less. The demand by the elderly for some services may be less if the person is immobile. This could be the case for example for day care services which several carers reported as being inappropriate or 'too much hassle to use' for chairfast or bedfast elderly. But it is hard to substantiate a case for other services.

The conclusion from the above analyses is that the total input of agency services to the care of the elderly in the observed sample, is positively related to the need for toilet help, as was the case for the input of direct nursing care for the samples of patients in hospital (see Chapter 7). There is also some evidence that it is negatively related to some measures of mobility.
It may be noted that agency help is only one source of care for the elderly. The others (discussed later in this chapter) are informal care from family and friends, and paid private help. Both of these substitute for agency care. All three sources of care are a function of the disability of the patient, so that a fuller model of care would be a three equation system, relating the amount of care from each source to disability measures and other exogeneous variables e.g. sex, age, income, living arrangements etc. It could be hypothesised that the amount of care from one source is to some extent determined by the amount of care from the other two, for example that informal care is a function of agency care and paid private help. The observed values of help from each source are thus determined jointly by the set of three simultaneous equations. It is possible that simultaneous equation bias in the estimates of coefficients could result from using a single equation model. The estimates would be biased and inconsistent. This may be the cause of the unexpected negative coefficients obtained above. Whether such bias has indeed occurred depends upon the structure of the model. The specification of a model representing the relationship between agency care and informal care is discussed in the appendix to this chapter.

(d) Cost of formal agency services for elderly about to enter long-stay care

Although the sample was drawn from elderly living in the community, 13 of the sample had entered long-stay care institutions by the time of the data collection. The information on care received, referred to the situation prior to
entering the institution 60 (see 10.2.4). The use and cost of formal agency services for this group were compared to those of the elderly remaining in the community. The results are presented in Table 10.30. Although both the number of services received and the cost of services was higher for those elderly who had entered long-stay hospitals, the difference was not significant. (The values of $F$ were 0.797

<table>
<thead>
<tr>
<th>Location of Elderly</th>
<th>Weekly Number of Services mean</th>
<th>Weekly Cost of Formal Agency Services mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remaining in Community (1)</td>
<td>1.44</td>
<td>21.40</td>
</tr>
<tr>
<td>Hospital Long-stay care</td>
<td>1.69</td>
<td>27.75</td>
</tr>
<tr>
<td>All sample (1)</td>
<td>1.49</td>
<td>22.57</td>
</tr>
</tbody>
</table>

(p = 0.3753) and 1.203 (p = 0.2766) respectively).

60 In these cases the accuracy of the information was subject to the ability of the carer to recall the use of services. Since agency services are generally at a specified level over a number of months and the elderly person had entered long-term care only a few weeks before the interview, recall was not difficult. In addition the level of use of the district nurse service was obtained direct from nursing records.
(e) Cost of formal agency services for people living alone

Investigations of the use of support services by the elderly have shown that dependent elderly living alone have a higher use of these services than those who live with others (e.g. Scotts, 1979). The pattern of service use by living arrangement for the 72 elderly sampled in this study is shown in Table 10.31. There is no significant difference between the use of services for people living alone or with others ($X^2 = 1.51$ and $p = 0.68$). The mean cost of formal

<table>
<thead>
<tr>
<th>TABLE 10.31</th>
</tr>
</thead>
<tbody>
<tr>
<td>PATTERN OF SERVICE USE BY LIVING ARRANGEMENT, FOR 72 ELDERLY 1983/84</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Living Arrangement</th>
<th>Percentage of sample using x services</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$x = 0$</td>
</tr>
<tr>
<td>Lives alone</td>
<td>14.3</td>
</tr>
<tr>
<td>Lives with others</td>
<td>13.8</td>
</tr>
<tr>
<td>Total sample</td>
<td>13.9</td>
</tr>
</tbody>
</table>

agency services by living arrangement is shown in Table 10.32. The cost for people who live alone is less than for those who do not, but the difference is not significant (observed $F$ is 0.241 and $p = 0.6247$). If the outlier (with a cost of $162.48$) is removed, the mean weekly cost for those elderly living with others is $22.84$ which still exceeds the cost for those living alone. This analysis has neglected to take account of any differences in disability levels between the two groups. If the people living alone were less dependent than those living with others, then their use of agency services would be relatively greater,
with respect to a given dependency level.

### TABLE 10.32

**COST OF FORMAL AGENCY SERVICES, BY LIVING ARRANGEMENT, FOR 72 ELDERLY 1983/84**

<table>
<thead>
<tr>
<th>Living Arrangements</th>
<th>Mean Cost of Agency Services ($ per week)</th>
<th>s.d. ($ per week)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lives alone</td>
<td>20.08</td>
<td>16.50</td>
<td>7</td>
</tr>
<tr>
<td>Lives with others</td>
<td>24.99</td>
<td>25.77</td>
<td>65</td>
</tr>
<tr>
<td>Total sample</td>
<td>24.51</td>
<td>24.98</td>
<td>72</td>
</tr>
</tbody>
</table>

The mean mobility and toileting ability levels for the two subgroups are shown in Table 10.33, together with the values of F from the analyses of variance. The results of the F test are that the level of mobility is not significantly different between elderly living alone and with others, but toileting ability is. Hence although the mean service use was not significantly different between the two subgroups it may be relatively higher since people living alone were less dependent than those living with others.

**TABLE 10.33**

**DISABILITY LEVELS⁽¹⁾ BY LIVING ARRANGEMENT**

<table>
<thead>
<tr>
<th>Living Arrangement</th>
<th>Level of Mobility mean</th>
<th>s.d.</th>
<th>Toileting ability mean</th>
<th>s.d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lives alone</td>
<td>1.86</td>
<td>1.07</td>
<td>1.29</td>
<td>0.49</td>
</tr>
<tr>
<td>Lives with others</td>
<td>2.00</td>
<td>0.94</td>
<td>2.75</td>
<td>1.97</td>
</tr>
<tr>
<td>All sample</td>
<td>1.99</td>
<td>0.94</td>
<td>2.61</td>
<td>1.89</td>
</tr>
</tbody>
</table>

⁽¹⁾ high values relate to greater disability.

The regression of weekly agency cost on functional
incapacity and disability measures described in (c) above, included a variable ALONE. Under the hypothesis that people living alone use more agency services, for a given level of disability than those living with others, this coefficient would be expected to have a significant negative coefficient. The estimated coefficient for the regression described in (c) was not significantly different from zero.

For this sample of elderly then, the level of use of agency services for those living alone was not significantly higher than for those who lived with others. Since, as was discussed in section 10.2.2 the sample population comprised elderly with access to a carer, this result does not contradict the generally held view that service use for people living alone is higher. Rather it illustrates that elderly with access to a carer, even if not within the same household, exhibit a level of use of services not significantly different from those who live with their carers. This level of use may be different from that of elderly who live alone without access to a carer, and therefore cannot necessarily be used as an estimate of service use for all elderly living alone.

(f) Cost of formal agency services by sex of elderly

There was no significant difference between the mean cost of formal agency services received by men and women (p = 0.43).

61 ALONE = 1 if person lives alone; ALONE = 2 otherwise.
10.6 PAID PRIVATE HELP

Paid help for the elderly is available from private agencies and individuals. 17 (23.6 percent) of the 72 elderly in the sample used private paid help on a regular basis. The services purchased are shown in Table 10.34. Some of these services are similar to those provided by the state-subsidized formal agencies e.g. home nurse, neighbourhood meals. But others were more flexible e.g. privately purchased domestic help often included meals preparation in addition to house cleaning. The most used service was gardening.

TABLE 10.34
USE OF PAID PRIVATE HELP BY 72 ELDERLY 1983/84

<table>
<thead>
<tr>
<th>Service Provided</th>
<th>Number of elderly using service</th>
</tr>
</thead>
<tbody>
<tr>
<td>home nurse</td>
<td>1</td>
</tr>
<tr>
<td>domestic help</td>
<td>6</td>
</tr>
<tr>
<td>private sitter</td>
<td>4</td>
</tr>
<tr>
<td>gardening</td>
<td>8</td>
</tr>
<tr>
<td>neighbourhood meals</td>
<td>1</td>
</tr>
</tbody>
</table>

The average cost of paid help ranged from zero to $48 per week with a mean of $3.11 per sample member and a standard deviation of $8.80. The mean cost per user of paid help was $13.18 per week.

The mean cost of paid help for people who lived alone was $2.43 per week (s.d. = $4.38) which was not significantly different from the mean of $3.18 (s.d. = $9.16) for people who lived with others. (F = 0.046, p = 0.83). The mean cost for those who had gone to long-stay hospitals was $0.50 per week (s.d. = $1.26) which was not significantly differ-
ent from the mean of $3.69 (s.d. = $9.62) for those remaining in the community.

10.7 COST OF INFORMAL CARE

Informal care was defined in chapter 2 as unpaid help provided by family and friends. Usually the responsibility of the care of an elderly person falls to one person, termed the main carer, and this applied for the sample discussed here. Information was obtained from the main carer on all help from family and friends. Data was collected on the nature of the tasks, the frequency they were undertaken and the time spent. The tasks were grouped into personal care, domestic care and 'other' care.

10.7.1 Problems of Measurement

Three areas of difficulty were identified in trying to measure the level of informal care. They were the problem of obtaining accurate data, the carer effect and the joint product effect. The implication of each of these on the reliability and usefulness of collected data on informal care are now considered and methods to improve the usefulness are discussed.

(a) Problems of obtaining accurate data

Information on informal care for each elderly person was gathered during an interview with the main carer (followed up by telephone contact with other persons offering informal care). This method relies for its accuracy on accurate recall by the respondent. The level of accuracy can be expected to be high for the list of care tasks per-
formed (since the interviewer would use a check list of
tasks) and for the frequency of most care tasks, but lower
for the time taken to perform the tasks.

Carers might be expected to give accurate estimates of
frequencies and time spent on domestic tasks since these
are often performed at a programmed time each week (e.g.
laundry, house cleaning) and the time spent is substantial
and is unlikely to vary very much from week to week.
Personal care tasks (e.g. toileting) may be more variable,
in terms of frequency and duration. Some tasks take only a
few minutes. For these reasons, the accuracy of recall of
personal care time may be poor. Since the more dependent
elderly require more help with personal care than the less
dependent (all needed help with domestic care - see chapter
7) this method of data collection has the unfortunate pro-
perty that the accuracy may be less for the more dependent
person. In order to improve the accuracy, care diaries were
given to the main carer, in cases where a substantial amount
of personal care took place. Carers were requested to detail
all care given to the elderly person over a 24-hour period.
[This was an attempt to collect similar information to that
obtained on nursing care time in hospital]. The success of
this procedure was variable. Although some carers gave
detailed accounts of the care given, others omitted care
tasks. This might be expected since the carer was complet-
ing only one care diary (whereas the nurse completed many
and so improved her accuracy^62). Insufficient resources

^62 There was the additional difficulty, that some carers
felt that enumerating care tasks was in a way suggesting
that the care was a burden and were concerned lest the
elderly person took this view.
were available to place a trained observer in the household and training the carers was impracticable, but even if a complete and accurate record of care had been obtained, it would have been of limited value because of the carer effect.

(b) **Carer Effect**

The time spent by informal carers on tasks for the elderly depend upon the elderly's need for help due to disabilities. It became clear as the interviews proceeded that the time spent was also a function of the carer. To some extent this was due to the health or age of the carer. Many of the main carers were elderly spouses who would take longer than a younger person to perform a task. There were also some differences due to different levels of care (e.g. frequency of house cleaning, bathing, etc.). In some cases extra care was given because the carer was at home, had time to spare and was inclined to spend it on the elderly person. To some extent this 'carer effect' occurs in hospital care of the elderly. But it would be to a much more limited extent. Hospital nurses are fit and healthy and are trained to do tasks efficiently. With many patients to care for, the time spent with an individual cannot be unduly prolonged above the 'necessary' task time.

Observed care times are useful to compare the burden of care, or the contribution to care, between carers, but obscure the comparison between patients. Moreover if, as in this thesis, the care time is to be costed, a different rate would have to be used for different types of carers (e.g. young fit efficient carer, elderly inefficient carer, indulgent carer, etc....).
In order to correct for the carer effect, standard task times were used. Estimates of standard task times were obtained from a subset of cases where the carer was fit and healthy. For this reason the actual times spent by some carers could be higher than the values used in the analysis.

(c) Joint Product Effect

A further problem was in identifying the portion of a task time spent for the elderly person when the task was jointly for other members of the household. This problem did not arise for personal care tasks since these are performed just for the elderly person. But some domestic care tasks, e.g., cooking, laundry, etc., can be for several people at the same time.

Two standard times for domestic tasks were estimated. The first, used when a domestic task was performed just for the elderly person, was the whole time for the separate task (e.g., a separate meal or shopping). The second, used when the task was done for several people, was the additional time for the elderly person (e.g., the time to clean the elderly person's room or to cook for an additional person). This marginal approach recognizes that the care can take place only with a carer and produces estimates of time which would be saved by the carer if the elderly person were to enter a long-stay institution. These estimates are usually less than the time that would be required to look after an elderly person singly, i.e., there are savings by pooling the elderly's care tasks with those of other members of the
household. Since this is the way that care is generally offered, this method seems appropriate.

10.7.2 Personal Care Time

(a) Care Tasks Provided

Personal care includes assisting the elderly person to wash, eat, bath, toilet, dress and walk. The number of cases where informal carer help was given for different care tasks is shown in Table 10.35. This closely matches the need for help (shown in the last column of the table) except for bathing help, for which many elderly relied upon the district nurse.

TABLE 10.35
PERSONAL CARE TASKS PROVIDED BY INFORMAL CARERS OF 72 ELDERLY IN THE COMMUNITY 1983/84

<table>
<thead>
<tr>
<th>Care Task</th>
<th>Number of Cases where Informal Help Given</th>
<th>%age</th>
<th>Number of Elderly Requiring Help</th>
<th>%age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bathing</td>
<td>20</td>
<td>27.8</td>
<td>65</td>
<td>90.3</td>
</tr>
<tr>
<td>Dressing (1)</td>
<td>42</td>
<td>58.3</td>
<td>39</td>
<td>54.2</td>
</tr>
<tr>
<td>Toileting</td>
<td>30</td>
<td>41.7</td>
<td>31</td>
<td>43.1</td>
</tr>
<tr>
<td>Going to bed (1)</td>
<td>33</td>
<td>45.8</td>
<td>26</td>
<td>36.1</td>
</tr>
<tr>
<td>Getting up</td>
<td>22</td>
<td>30.6</td>
<td>22</td>
<td>30.6</td>
</tr>
<tr>
<td>Transferring</td>
<td>16</td>
<td>22.2</td>
<td>17</td>
<td>23.6</td>
</tr>
<tr>
<td>Washing (face) (1)</td>
<td>18</td>
<td>25.0</td>
<td>15</td>
<td>20.8</td>
</tr>
<tr>
<td>Pressure area care</td>
<td>8</td>
<td>11.1</td>
<td>9</td>
<td>12.5</td>
</tr>
<tr>
<td>Feeding (1)</td>
<td>11</td>
<td>15.3</td>
<td>5</td>
<td>6.9</td>
</tr>
<tr>
<td>Taking medication</td>
<td>47</td>
<td>65.3</td>
<td>56</td>
<td>77.8</td>
</tr>
</tbody>
</table>

(1) For these activities help was given in some cases where the elderly person could normally manage: dressing: although some elderly could dress themselves, they occasionally required help with a particular garment.

The estimates of times for those elderly living alone would be greater than those living with others, but even in these cases some pooling of tasks took place, e.g. cooking.
going to bed: some carers supervised the elderly going to bed and made sure items were at hand.
washing: the carer might wash the face at night; the elderly in the morning.
feeding: sometimes help was given with the cutting up of food.
In estimating the time spent on care, only activities performed on a regular basis were included.

This incidence of informal help may be compared with that found by Koopman-Boyden and Wells (1979) (in a study of referrals to the geriatric assessment and rehabilitation unit in Christchurch). The incidence is greater (than the Koopman-Boyden and Wells study) for all tasks except bathing, the rate for their sample being 39.5 percent compared to 27.8 percent (in Table 10.35) for the 72 sampled elderly considered here.

Table 10.35 depicts only whether informal carers assisted with a task and it does not follow that this was the only source of help. Other sources of personal care would be a private nurse or the district nurse. Apart from taking medication and bathing, the tasks in Table 10.35 are daily activities so that if help was required it would be needed every day (sometimes several times a day). Fifty-four elderly (75 percent of the sample) required help with at least one of these eight daily activities, therefore if they received this help from formal sources, daily visits at least would be required. The analysis of the use of the district nurse showed that there were only six cases where the number of visits was more than two per week (Table 10.9). Only one elderly person used a private nurse (Table 10.34) and four visits a week were received. Hence it is clear that the informal carers provided the majority of help with
(b) Standard Times for Personal Care Tasks

A subset of cases where the carer was fit and healthy were used to obtain estimates of standard times for care tasks. These estimates are shown in Table 10.36.

(c) Weekly Time Spent on Personal Care

The standard times were used as estimates of the task times unless it could be established that the actual time taken would differ on account of the disability of the patient. Using the tasks times and the reported frequency of help with the care tasks, estimates of the input of informal carers to the personal care of the elderly were obtained. The unit of measurement is termed 'standard hours', so that the estimates are of the time required for a fit carer to do the work. The mean weekly informal care time spent on personal care was 4.93 standard hours with a standard deviation of 5.24. The maximum input was 21.83 standard

TABLE 10.36

STANDARD TIMES FOR PERSONAL CARE OF THE ELDERLY UNDERTAKEN BY INFORMAL CARERS

<table>
<thead>
<tr>
<th>Care Task</th>
<th>Standard Time (minutes per occasion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bathing</td>
<td>30 (10*)</td>
</tr>
<tr>
<td>Dressing</td>
<td>20</td>
</tr>
<tr>
<td>Toileting</td>
<td>10</td>
</tr>
<tr>
<td>Undressing</td>
<td>10</td>
</tr>
<tr>
<td>Going to bed</td>
<td>5</td>
</tr>
<tr>
<td>Getting up</td>
<td>5</td>
</tr>
<tr>
<td>Transferring</td>
<td>5</td>
</tr>
<tr>
<td>Washing (face and hands)</td>
<td>10</td>
</tr>
<tr>
<td>Pressure area care</td>
<td>10</td>
</tr>
<tr>
<td>Feeding</td>
<td>10</td>
</tr>
<tr>
<td>Taking medication</td>
<td>2</td>
</tr>
</tbody>
</table>

* the time reduced to 10 minutes if help was needed only to get in and out.
hours per week. The distribution of informal carer input to personal care is shown in figure 10.3, and portrays substantial variation.

The sample may be divided into two groups. The first group is the 32 who received up to two hours of personal care per week (including six elderly who received no personal care). This level of input may be regarded as modest. The remaining 40 cases make up a second more diverse group who received a wide range of care which averaged 8.32 hours per week, a substantial input of care. Included in these 40 are nine cases (12½ percent of the total 72) who received over 14 hours of care.

The informal care input was aggregated over all informal carers including the main carer, so that the time spent for each elderly person may have been shared between several carers. The mean input of the main carer was 4.82 standard hours (compared to the aggregate input of personal care from all informal care sources of 4.93 standard hours). This does not rule out the possibility of main carers receiving substantial amounts of informal carer support in a few cases, but it is clear that, on average, almost all informal carer personal care of the elderly was undertaken by the main carers.

10.7.3 Domestic Care Time

(a) Care Tasks Provided

Domestic care includes laundry, cooking, shopping and housecleaning. Although some of the elderly could manage 'light' tasks in these categories, e.g. prepare a cup of tea or wash dishes, all required substantial domestic help.
Figure 10.3

DISTRIBUTION OF INPUT TO PERSONAL CARE BY INFORMAL CARERS OF 72 ELDERLY IN THE COMMUNITY 1983/84

mean input = 4.93 standard hours
s.d. = 5.24 standard hours

mean cost = $24.25
s.d. = $25.78

WEEKLY PERSONAL CARE GIVEN (Hours)

6 elderly received no personal care

IMPUTED WEEKLY COST ($)
($4.917 per standard hour)
The number of cases where informal carer help was given for specific tasks is shown in Table 10.37.

**TABLE 10.37**

DOMESTIC CARE TASKS PROVIDED BY INFORMAL CARERS OF 72 ELDERLY IN THE COMMUNITY 1983/84

<table>
<thead>
<tr>
<th>Care Task</th>
<th>Number of Cases where Informal Help Given</th>
<th>Number of Elderly Requiring Help</th>
<th>Number of Elderly Completely Dependent in the Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shopping</td>
<td>69</td>
<td>95.8</td>
<td>72</td>
</tr>
<tr>
<td>Laundry</td>
<td>72</td>
<td>100.0</td>
<td>71</td>
</tr>
<tr>
<td>Cleaning</td>
<td>67</td>
<td>93.1</td>
<td>72</td>
</tr>
<tr>
<td>Cooking</td>
<td>69</td>
<td>95.8</td>
<td>71</td>
</tr>
</tbody>
</table>

It is clear from Table 10.37 that in almost every case where help was required for a domestic task, some contribution to that help came from an informal carer. Taking into account the small number of elderly people receiving agency or paid help with these tasks (Tables 10.23 and 10.34) it follows that in the majority of cases, informal carer assistance was the only source of help. In many of the cases where other sources of help were used, these were supplemented by the informal carers.

**(b) Standard Times for Domestic Care Tasks**

The standard times used are the estimates of the time required by a fit and healthy person to complete the care task. Two standard times are used for each task. The first pertains to the situation where the carer incorporates domestic care for the elderly with that for other members of the family. The standard time is the estimate of the marginal time spent for the elderly person (e.g. time to prepare an extra serving of a meal, to launder another set
of clothes etc.). A second estimate is used for the cases where the task is performed separately and entirely for the elderly person (e.g. a separate meal from the rest of the family). The second estimate would apply in most cases where the elderly person lives alone. Both sets of time estimates for domestic care tasks are presented in Table 10.38. The estimates used represent the time required to do essential household tasks, maintaining a reasonable level of hygiene. The minimum time spent on the domestic care of a completely dependent elderly person by informal carers, if no agency or other help was received, would be eight hours per week.

(c) Weekly Time Spent on Domestic Care

The standard times for domestic care tasks in Table 10.38 were used to estimate the input to domestic care of the elderly from informal carers, based on the reported help given. The estimates were modified to take account of additional work arising from the disability of the elderly person e.g., additional laundry because of incontinence. As for personal care time, domestic care time was measured in 'standard hours'. The mean time per week was 8.27 standard hours with a standard deviation of 2.72. The minimum input was 0.5 and the maximum input was 14.50 standard hours of domestic care. The distribution of input to domestic care by informal carers is shown in figure 10.4. In 56 cases (78 percent of the total) informal carer domestic help is eight or more standard hours per week. Therefore in these cases the elderly person relies almost entirely on informal carers for domestic help. An analysis of domestic help
Figure 10.4

DISTRIBUTION OF INPUT TO DOMESTIC CARE
BY INFORMAL CARERS OF 72 ELDERLY IN THE COMMUNITY 1983/84

mean input = 8.27
standard hours
s.d. = 2.72
standard hours
mean cost = $36.36
s.d. = $11.95

WEEKLY DOMESTIC CARE GIVEN (standard hours)

IMPUTED WEEKLY COST ($) ($4.394 per standard hour)
TABLE 10.38
STANDARD TIMES FOR DOMESTIC CARE
TASKS PERFORMED FOR THE ELDERLY BY THEIR
INFORMAL CARERS

<table>
<thead>
<tr>
<th>Care Task</th>
<th>Jointly with family marginal time (hours/week)</th>
<th>Separately for elderly time (hours/week)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shopping</td>
<td>0 (i)</td>
<td>1</td>
</tr>
<tr>
<td>Laundry</td>
<td>½ (1½) (ii)</td>
<td>1</td>
</tr>
<tr>
<td>Cleaning</td>
<td>½</td>
<td>2</td>
</tr>
<tr>
<td>Cooking</td>
<td>7</td>
<td>12½</td>
</tr>
</tbody>
</table>

(i) Carers reported that household shopping for an extra person did not significantly increase the time spent.
(ii) Laundry time was increased to 1½ hours if elderly was incontinent.
(iii) Cleaning time allowed once weekly cleaning of an extra room if the elderly lived with the carer, or the cleaning of a small flat if the elderly person lived alone.
(iv) Cooking time allowed was ½ hour per main meal and two ¼ hours for two light meals each day, for meals cooked jointly with the family, and increased to 1 hour per main meal, and ¼ hour and ½ hour for two light meals, where the cooking was done separately.

given by the 'main carer' resulted in a mean of 7.5 standard hours per week (s.d. = 2.69). When this figure is compared to the average of 8.27 standard hours per elderly person, expended collectively by all informal carers it is clear that the burden of care falls largely on one person.

10.7.4 Other Informal Care Time

The preceding sections have dealt with the amount of personal care and domestic care provided by informal carers of the elderly. These forms of care account for most of the care time expended by the carers. However, help with a number of other tasks was reported and this is now considered.
(a) Care Tasks Provided

In addition to the personal and domestic care tasks, help was also given with finance and gardening. In some cases time was spent giving company to the elderly person and also 'keeping an eye on' or supervising when no specific care task was being undertaken. The number of cases where these types of help were given, is shown in Table 10.39.

TABLE 10.39
OTHER CARE TASKS PROVIDED BY INFORMAL CARERS OF 72 ELDERLY IN THE COMMUNITY 1983/84

<table>
<thead>
<tr>
<th>Care Task</th>
<th>Number of Cases where Informal Help Given</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finance</td>
<td>66</td>
<td>100</td>
</tr>
<tr>
<td>Gardening</td>
<td>68</td>
<td>91.7</td>
</tr>
<tr>
<td>'Keeping an eye' on</td>
<td>58</td>
<td>80.6</td>
</tr>
<tr>
<td>Giving company to</td>
<td>51</td>
<td>70.8</td>
</tr>
</tbody>
</table>

Nearly all the elderly sampled received help from their carers with financial matters, e.g. collecting pensions and superannuation and the payment of bills. Most received help with gardening. Those who did not, relied on paid help. Several carers reported that they 'kept an eye on' or supervised the elderly person, and that this was in addition to the personal or domestic care tasks. In some cases, supervision was constant throughout the elderly person's waking hours. In other cases, carers 'checked on' the elderly person periodically. Although the actual time spent checking was itself minimal the constraint of having to be present in the household for large parts of the day (and night) was
an added duty of the carers, and indeed was often perceived as the most difficult and burdensome aspect of caring.

In order to measure the level of supervision required, carers were asked for how long the elderly person could be left unattended. This information is presented in Table 10.40.

The vast majority of the sample (65, or 90 percent) could not be left for a whole day. Only 14 of the sample used day care services hence many of the carers would be unable to have a day out unless another (informal) carer was available. 18 elderly (25 percent of the sample) could not be left alone for even two hours. Only one person received the home sitter service and three others used a private sitter.

<table>
<thead>
<tr>
<th>Period can be left unattended</th>
<th>Number of cases</th>
<th>Supervision Required</th>
<th>Number of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 or 3 days</td>
<td>2</td>
<td>can be left</td>
<td>9</td>
</tr>
<tr>
<td>one day</td>
<td>5</td>
<td>alone</td>
<td></td>
</tr>
<tr>
<td>half a day</td>
<td>17</td>
<td>requires person</td>
<td>63</td>
</tr>
<tr>
<td>2 hours</td>
<td>30</td>
<td>on premises</td>
<td></td>
</tr>
<tr>
<td>half an hour</td>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>never</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>total</td>
<td>72</td>
<td>total</td>
<td>72</td>
</tr>
</tbody>
</table>

It is clear that the informal carers were the main source of the supervision required by the elderly.
(b) **Standard Times for Other Care Tasks**

(i) **Finance**

The reported help with finance was almost invariably an hour each fortnight and this was used as the standard time for this task.

(ii) **Gardening**

The elderly in the sample lived in different types of housing with sections of various sizes. Therefore the time spent by the carers on this task, differed. Consistent with the costing of domestic care in section 10.7.3, the intention was to obtain an estimate of the marginal cost of gardening for another member of the household. The standard time used was half an hour per week.64

(iii) **Supervision**

One approach to estimating time spent on supervision would be to allow the whole period over which supervision was given (less the time spent on specific care tasks). The argument would be that the carer had to be 'on hand' just to supervise for these hours. If no carer were available and agency help had to be used for supervision then this type of approach would be appropriate.65 It would be applicable in the carer situation if the carer never wished

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64 This was the difference between the typical times spent on gardening for a one person and two person ownership flat.

65 This supervision could be a very expensive input in the home situation. However a supervision or 'checking' service (analogous to the hospital ward rounds at night) could reduce the costs per person.
to be at home (in the case of a carer living with an elderly person) or if the carer spent longer at the elderly's household than required for care tasks, in order to supervise (in the case of a carer living apart from the elderly). This was not the case for the carers sampled. The frequency of visits of carers living apart from the elderly depended upon the need for care tasks. Many of the carers who lived with the elderly were retired and would normally spend large parts of the week at home. Even those who worked would be at home at the weekends, in the evenings and during the night.

The method of estimation of the input to (and cost of) supervision needs to distinguish between those occasions when the carer would have been at home anyway and those when s(he) would not.

The method of estimation to be used here, assumes that the marginal input of supervision time when the carer would anyway have been at home is zero. The marginal input of supervision when the carer would have wished to have left the household is equal to the period of supervision. Three reasons for leaving the household are considered. They are: to work, to take some recreation and to do some essential tasks e.g. shopping, banking, etc.

Carers differ with respect to age, sex and behaviour so that the times they would like to leave the household for recreation also differ. Some minimum relief time is there-

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66 The duration of the visit was often extended, but for social rather than supervisory reasons.
fore suggested as a standard. The minimum relief time, for recuperation and recreation purposes, used in the subsequent analysis is one whole day each week. There is no sociological basis for this, other than that people in the paid labour force would have at least one day off each week. In addition to this, one two-hour period is allowed each week to shop for essential items.

If the comparison with people in the paid labour force is pursued further, a vacation would be allowed. All of the elderly sampled were in fact using the "Alternative Care Scheme" which provides four weeks relief for the carers. Therefore an allowance for this, need not be made under informal carer input.

In the case of carers who would work (or increase their work) if they were not caring for the elderly, they would need to leave the household for a number of hours in addition to those allowed for recreation and shopping. The reported hours of such carers will be used in the analysis.

(iv) Giving Company

Carers frequently recorded giving company to the elderly person. It is unclear whether this is an 'input' to care in the true sense. In many cases the carer would share the benefits of conversation and other joint activities, particularly where the elderly is a spouse or other close relative. There would naturally be a great variety in the periods carers might spend with the elderly if the elderly were not dependent, so that it would be difficult to separate out a portion of 'contact time' which is due to the disabilities of
the elderly. No attempt was made to evaluate this input for hospital care (e.g. the visiting time of relatives of the elderly) and consistent with this, and on account of the points made above, informal carer time spent on 'giving company' to elderly in the community is not included in the analysis.

(c) Weekly Time Spent on 'Other' Care

(i) Finance

66 of the elderly received informal carer help with finances. The time allowed for this task was one-quarter hour per week. Therefore the mean time per elderly person was 0.23 hours per week.

(ii) Gardening

64 of the elderly received informal carer help with gardening. The time allowed was half-an-hour per week. Therefore the mean time per elderly person was 0.44 hours per week.

(iii) Supervision

65 of the sampled elderly could not be left unattended for a whole day and 18 could not be left even for two hours (see Table 10.40). Not all these cases would require the 'time off' allowances of one day and 2 hours (discussed in (b)) since day care and home sitters were sometimes used. A distinction must be made, however, between those cases where the carer used day care and sitter services in order to work and those where the services were used to allow the carer some relief. A breakdown of the use of these services by the employment status of the carer is shown in Table 10.41. From this table it can be seen that 57, (79%) of the sampled cases would re-
TABLE 10.41
USE OF DAY CARE AND HOME SITTER SERVICES TO PROVIDE RELIEF FOR CARERS OF ELDERLY IN THE COMMUNITY 1983/84

<table>
<thead>
<tr>
<th></th>
<th>carer not in paid employment</th>
<th>carer in paid employment</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>sufficient relief day care used</td>
<td>8(i)</td>
<td>0(ii)</td>
<td>8</td>
</tr>
<tr>
<td>insufficient relief day care</td>
<td>45</td>
<td>12</td>
<td>57</td>
</tr>
<tr>
<td>total cases: elderly could not be left for whole day</td>
<td>53</td>
<td>12</td>
<td>65</td>
</tr>
<tr>
<td>sufficient relief sitter used</td>
<td>2</td>
<td>0(iii)</td>
<td>2</td>
</tr>
<tr>
<td>insufficient relief sitter</td>
<td>11</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>total cases: elderly could not be left for 2 hours</td>
<td>13</td>
<td>5</td>
<td>18</td>
</tr>
<tr>
<td>total cases</td>
<td>60</td>
<td>12</td>
<td>72</td>
</tr>
</tbody>
</table>

(i) A further 3 cases used day care but only once per 4 weeks
(ii) Although 3 cases used day care this was sufficient only to allow the carer to work.
(iii) There were 3 cases using home sitters but this allowed the carer to work and was insufficient for recreation.

quire the 'day off' allowance and 16 cases (22 percent) would require the 'two hour' allowance.

It is interesting to compare the shortfall in relief for those carers who work with those who do not. 100 percent of the cases where carers worked required one-day relief compared to 75 percent for non-workers. The figures for the two-hour relief were 42 percent and 18 percent for workers and non-workers respectively. The carers who worked, no doubt obtained benefits (monetary and non-monetary) by working, but had less relief time for recreation on the average than those
who did not work. Nonetheless the shortfall for both groups was high and it could be argued that the unmet need of the non-working carers was as serious as for the working carers since they were unable to leave the household for large parts of the week.

Table 10.42 compares the need for supervision of elderly cared for by working and non-working main carers. The supervision requirements of elderly cared for by carers in the paid labour force were on average higher than where the carer was not employed.

<table>
<thead>
<tr>
<th></th>
<th>carer not in paid employment</th>
<th>carer in paid employment</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elderly could not be left for whole day</td>
<td>53 (88)</td>
<td>12 (100)</td>
<td>65 (90)</td>
</tr>
<tr>
<td>Elderly could not be left for 2 hours</td>
<td>13 (22)</td>
<td>5 (42)</td>
<td>18 (25)</td>
</tr>
<tr>
<td>total cases</td>
<td>60 (100)</td>
<td>12 (100)</td>
<td>72 (100)</td>
</tr>
</tbody>
</table>

Carers were asked if they would work or increase their work if they were not caring for the elderly. The results are summarized in Table 10.43. Only 8 of the 60 carers not employed (i.e. 13 percent) and 4 of those currently working (i.e. 33 percent) gave a positive response to this question. The additional hours and expected extra income are very similar for each group, but the resultant employment situation would differ. The 8 carers not in paid employment would (on average) wish for part-time work. The 4 carers already work-
ing, worked on average 14.5 hours per week for an average income of $79.8. They would wish to increase their workload to 36.2 hours per week (for a total earned income of $252.5) which is closer on average to full-time work. This may be compared to the 25 hours worked on average by the remaining (8) carers who were satisfied with the hours worked and had a mean earned income of $207.6 per week.

TABLE 10.43

EMPLOYMENT OPPORTUNITIES AND INCOME FOREGONE BY CARERS OF THE ELDERLY IN THE COMMUNITY 1983/84

<table>
<thead>
<tr>
<th>Carer not in paid employment</th>
<th>Carer in paid employment</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number who would work/increase work</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>mean additional hours per week (standard deviation)</td>
<td>26.5</td>
<td>21.7</td>
</tr>
<tr>
<td>mean expected additional weekly income ($) (standard deviation)</td>
<td>172.1</td>
<td>172.7</td>
</tr>
</tbody>
</table>

10.7.5 Cost of Components of Informal Care

(a) Costing Informal Care

Several methods of costing informal care and the advantages of each were discussed in chapter 4. Three methods will be used here. The care will be costed at zero for use in analyses relating to cash flows. Secondly the informal care will be costed at the wage rate paid to the type of labour that could be employed to do the task. These second estimates termed 'imputed costs' will be used to represent the 'volume' of care contributed by the carer. The wage rates will be applied to the 'standard times' required to do the task, i.e.
the time taken by a fit and able carer. In practice a spectrum of times is expended on the same task, dependent upon the ability or health appropriate to the carers. The use of a standard task time allows one wage rate to be used.

The third method discussed in chapter 4, is the opportunity cost of care, whereby the cost of care reflects the income foregone by the carer. Estimates calculated on this basis are useful in comparing the contribution among carers. They have the disadvantage of distorting the comparison of costs among the elderly, since the costs reflect the characteristics of the carers with respect to the capacity for employment and earning potential, as well as the elderly's need for assistance. Such estimates do, however, contain information about the loss to society of carers being unable to join the paid workforce.

The cost of informal care using method 1 is zero. The imputed costs of method 2 will be estimated in the following section. The opportunity costs of method 3 are estimated in section 10.7.6.

(b) **Imputed Costs of Care**

The imputed costs are estimated for each component of informal care received by the sample of 72 elderly people.

(i) **Imputed Cost of Personal Care**

The wage rate of the home sitter was selected as the most appropriate for personal care time. The home sitter service provided personal rather than domestic care. The standard (non-weekend, non-overtime) wage rate was used, i.e. $4.917 per hour. On this basis the mean imputed cost of personal care time was $24.25 per week with a standard deviation of $25.78. The highest cost was $107.35. (The distribution
of cost is shown in figure 10.3). These estimates will be used to measure the input of personal care of informal carers of the elderly. No allowance has been made for travel therefore the costs are appropriate for a carer in the same household or living very close to the elderly (e.g. a grannie flat).

The costs as calculated do not represent the whole cost of hiring labour for personal care, since the normal time wage rate has been used. Although very little care took place at night, some care was given at weekends when wage rates are typically higher. A better estimate of the cost of hiring labour could be obtained by allowing 1/7 of the care time to be costed at time and a half (Saturday rate) and 1/7 at double time (Sunday rate). This increases the average wage rate to $5.971 per hour, and the estimate of average weekly cost to $29.44. Travel costs may also have to be included, particularly if the care could not be organized within blocks of time.

(ii) Imputed Cost of Domestic Care

The wage rate of the home aid personnel was used to cost domestic care time. The standard rate was $4.395 per hour. The mean imputed cost of domestic care undertaken by informal carers was $36.37 per week. The distribution of cost is shown in figure 10.4. The imputed cost ranged from $2.20 to $63.73 per week.

67 The costs derived here could not be used to estimate the cost of hiring help because the domestic care times used are in most cases marginal times to care for the elderly whilst doing other household tasks for the rest of the family. The appropriate times to use would be the time to care for one person singly. The resulting cost would be much higher.
(iii) **Imputed Cost of Other Informal Care**

(1) **Financial Matters**

The help with financial matters was costed at $4.4 per hour. The cost was therefore $1.10 for the 66 cases where informal care was given and zero otherwise.

The mean cost was $1.01 per elderly person per week.

(2) **Gardening**

The gardening help was costed at $5 per hour. The weekly cost of informal carer help with this task was $2.50 for the 64 cases where help was given and zero for the remaining 8 cases.

The mean weekly cost was $2.22 per elderly person.

(3) **Supervising**

The day off allowed for recreational purposes was costed at the cost of day care which is the alternative to informal carer help. The cost of day care was $7 per day (including transport), but this includes the cost of a meal, meal preparation and some personal care of the elderly, e.g. toileting. The food cost of a meal is estimated at $0.91 (from the cost of a meals on wheels meal - see 10.14). The imputed cost of main meal preparation is $2.20 (using the standard time of half-an-hour from table 10.38 and the domestic task wage rate of $4.395 per hour). The imputed cost of two toiletings is $1.64 (using the standard time of 10 minutes from table 10.36 and the personal care wage rate). If any of these three services were normally provided in the home situation, the additional cost of one day's relief would be reduced by their costs. Since a meal was always provided,
the additional cost of one day's relief would be $6.09, $3.89 (if a meal was prepared) or $2.25 (if a meal was prepared and toileting help given).

Day relief would only be necessary, where the elderly could not be left for one day (65 cases) and where day care was not already used sufficiently to give one day's relief each week. Only 57 cases satisfied these two conditions (see Table 10.41). In 32 of these cases a meal was prepared so that the cost per week of day relief was $3.89\(^{68}\) and in 22 cases toileting help was also given so that the cost was $2.25. The average weekly additional cost of day relief for the whole sample was estimated at $2.52 per person.\(^{69}\) This is a very small sum and if it truly reflects the additional cost of using day care, it is hard to understand why day care is not used more widely. The benefit to the carer must surely exceed the cost. Part of the explanation could be that there are hidden costs associated with the social and practical difficulties of using the service. The elderly person may prefer to stay at home and the carer may be reluctant to try

\(^{68}\) In three cases the mean weekly additional cost of day relief was reduced to 75 percent of the cost, since one day's relief per month was already obtained by the use of day care.

\(^{69}\) The unit costs used here are relatively low because they are based on day care as an alternative to care in the home. Day care is a relatively inexpensive form of care since supervision costs are shared among many elderly. The cost of bringing someone into the household for day relief would of course be much more expensive, e.g. seven hours at the home sitter rate, which would be $35.54 per day. It should also be mentioned here that the estimate of the fee for day care ($7) may underestimate the cost of provision of the service since there is the possibility of subsidization of day care from in-patients at the hospitals where day care was offered. The $7 charge probably reflects the marginal cost of day care patients.
and persuade him or her of the benefits, particularly when some of the benefits are to the carer. Several carers expressed this view. Moreover in some cases carers felt that the effort involved in getting the elderly person ready for day care was too much (in addition to an already substantial workload).

The two-hour relief time was costed at the home sitter wage rate of $4.935 per hour. It is assumed that the carer would not be spared any care tasks other than supervision during a two-hour period, so that the full cost would apply. There were 18 cases where the elderly person could not be left for two hours and in 16 of these home sitters were not used. The cost per week for two-hour relief for these 16 cases would be $9.87. The mean cost per sample member was $2.32.

If holiday relief is also included then the cost of care in the community would apply for 48 weeks in the year. The cost of hospital care, estimated at $281 per week, per patient, for the community sample for short-stay patients would apply for the other four weeks. Since hospital care substitutes for the full cost of community care, (not just informal care cost) a discussion of holiday relief is deferred until Chapter 11 which compares costs of different modes of care.

70 This does not include capital costs or the cost of services provided from sources outside the hospital e.g. general practitioner and prescription costs. This estimate is based on the mean direct nursing care time (61 minutes) of the community sample whilst in hospital (see Chapter 7) and uses the cost estimates in Table 9.12 of Chapter 9).
10.7.6 **Total Cost of Informal Care**

(a) **Estimates of the Total Cost of Informal Care**

Three estimates of the total cost of informal care are presented corresponding to the three methods of costing of section 10.7.5.

(i) **Financial Cost of Informal Care**

The first estimate of the total cost of informal care based on the cash flows is of course zero.

(ii) **Total Imputed Cost of Informal Care**

The second estimate is the total imputed cost, based on the wage rates applicable to the different tasks undertaken by the informal carers. The estimates of the imputed cost for each type of care task, (obtained in section 10.7.5)

<table>
<thead>
<tr>
<th>TABLE 10.44</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AVERAGE IMPUTED COST OF INFORMAL CARER HELP GIVEN TO 72 ELDERLY IN THE COMMUNITY 1983/84</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Care Tasks</th>
<th>Mean Weekly Imputed Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Care</td>
<td>24.25</td>
</tr>
<tr>
<td>Domestic Care</td>
<td>36.37</td>
</tr>
<tr>
<td>Financial Help</td>
<td>1.01</td>
</tr>
<tr>
<td>Gardening</td>
<td>2.22</td>
</tr>
<tr>
<td>Additional Supervision</td>
<td>4.84(1)</td>
</tr>
<tr>
<td><strong>Total Imputed Cost</strong></td>
<td><strong>68.69</strong></td>
</tr>
</tbody>
</table>

(1) This estimate may be regarded as a lower bound on the imputed cost, to the carer, of supervision, since it was calculated on the assumption that day care (to provide day relief for carers) was a viable option in all cases. Yet in those cases where the carer felt that day care was not a realistic proposition (e.g. because the elderly person preferred to stay at home) the cost of the alternative source of day relief, the home sitter, would be much higher ($35.54, instead of $7 per day). Exact knowledge of the number of cases in this category was not available, so, as an approximation, the 51 cases (see Table 10.41) where day relief was required but day care had not been used, were assumed to face the higher cost. A second estimate of the mean cost of day relief was calculated on this basis and came to $23.38 per week. The estimate of the mean cost of supervision increases
(1) (cont.) to $25.70 per week. This estimate incorporates some of the hidden costs of using day care, and may be nearer to the perceived cost (to the carer), of supervision. But since day care is available in the area (and since it may be possible to arrange some help for the carer in organizing the elderly person to use it) the original estimate of supervision cost ($4.84) will be used in subsequent analyses.

were summed to give an estimate of total imputed cost. The average contribution from each task is shown in Table 10.44. The distribution of the imputed cost for the 72 elderly sampled is shown in figure 10.5. The imputed weekly cost of informal care ranges from $6.89 to $166.99. The mean weekly cost is $68.69 and the standard deviation is $32.30.
Figure 10.5

THE DISTRIBUTION OF IMPUTED COST
OF INFORMAL CARER HELP TO 72 ELDERLY
1983/84

mean = $68.69
s.d. = $32.30
(iii) **Opportunity Cost of Informal Care**

A third method of estimating the cost of informal care is based on earnings foregone by the carers on account of caring for the elderly. Information on additional income opportunities of the carers, if they ceased providing care is provided in table 10.43. There were 12 main carers (all of them women) who would earn more. The weekly additional income ranged from $26 to $385 with a mean of $172.30 and a standard deviation of $116.2. For the other 60 cases (9 male, 51 female carers) the cost is zero. Hence the mean cost per case of the informal care given by the main carer is $28.72 per week. This is in effect an estimate of the loss to the workforce of carers staying at home. It reflects the age, sex and occupational 'mix' of the sampled carers, and the accuracy of using this figure as an estimate of informal carer cost for the elderly in general, would be limited by the closeness of these and other characteristics of the carers to the carer population generally (and also by how well the elderly sampled here, matched the population of dependent elderly in the community).

---

71 Information on income lost from employment given up in order to care for the elderly, was also collected. The mean lost income was $163.7 per week (s.d. = $139) and ranged from $15 to $385. In 6 cases the income lost corresponded to the additional income that could be earned.

72 Informal care was given by others, in addition to the main carer, so it is possible that they may also have suffered some loss in earnings potential. However, the majority of the informal care was given by the main carers, so any such earnings loss would be minimal.

73 The mean age of the carers was 64. There were 33 carers aged less than 60.
The additional income which could be earned by the 12 carers ($172.31 per week) is far greater than the cost of day care (which would be $35 for a 5 day week). Yet day care is not being used to the extent that it might, to allow carers to work. The reasons for this may be similar to those considered when discussing the low usage of day care to give carers recreation time. The hidden costs of using day care exceed the benefits of the additional income which might be earned. The other alternative which would allow the carer to work, the home sitter service, is not available for this purpose and a private sitter service would be very expensive to the user (about $5 per hour or $175 per week). If it is assumed that day care is not a realistic option to allow the 12 carers to increase their income, then the cost per week of a private sitter to cover the average of 24.9 extra working hours (see table 10.43) required would be $124.5 per week. This cost would consume much of the additional income.

It may also be argued that the benefits to the elderly person of being at home with the carer may be perceived (by the carer) to be of greater value than the additional income (or at least of greater value than additional income less the cost of obtaining substitute care for the elderly person).

(b) Imputed Cost of Informal Carer Help by Characteristics of Main Carer

(i) Sex of Main Carer

The cases were divided into two groups according to the sex of the main carer. The mean imputed cost of all informal care and the imputed cost of the main carer and 'other carer' contributions were calculated for each group. The results
are shown in table 10.45.

TABLE 10.45

IMPUTED COST OF INFORMAL CARER HELP BY SEX OF MAIN CARERS OF 72 ELDERLY 1983/84

<table>
<thead>
<tr>
<th>Source of Care</th>
<th>Male main carer</th>
<th>Female main carer</th>
<th>All cases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean (s.d.)</td>
<td>mean (s.d.)</td>
<td>mean (s.d.)</td>
</tr>
<tr>
<td>Main carer</td>
<td>56.67 (37.78)</td>
<td>65.58 (32.74)</td>
<td>64.73 (33.36)</td>
</tr>
<tr>
<td>Other carers</td>
<td>8.26 (16.74)</td>
<td>3.35 (6.94)</td>
<td>3.97 (8.64)</td>
</tr>
<tr>
<td>All carers</td>
<td>64.94 (34.70)</td>
<td>69.23 (32.21)</td>
<td>68.69 (32.30)</td>
</tr>
<tr>
<td>Number of cases</td>
<td>9</td>
<td>63</td>
<td>72</td>
</tr>
</tbody>
</table>

63 main carers (87.5 per cent of the total) were women; the other nine were men. Although the mean imputed cost of all informal care was greater in those cases where the carer was a woman ($69.23 compared to $64.94) signifying that the elderly in these cases were more dependent, the difference was not significant ($p = 0.71$). The volume of informal care is similar for both groups.

The imputed cost of the care given by female main carers ($65.88) exceeded the contribution of the male main carers ($56.67) and the female main carers received less support than did the male carers. Neither of these differences were significant. Closer investigation of the types of help given by main and other carers revealed some interesting results (see tables 10.46 and 10.47).

The time spent on personal care by male and female carers is very similar, although the male carers received more supporting help from other carers ($p = 0.084$). In the case of
domestic care, female carers spend over two hours per week more than the male carers, a difference which was highly significant (p=0.035). Female carers received only half as much help from other carers as did male carers, but this difference was not significant.

TABLE 10.46

COMPARISON OF RELATIVE INPUTS TO PERSONAL CARE FROM MAIN CARERS AND OTHER CARERS BY SEX OF MAIN CARER

<table>
<thead>
<tr>
<th>Source of care</th>
<th>Male main carer</th>
<th>Female main carer</th>
<th>All cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main carer</td>
<td>4.70 (6.06)</td>
<td>4.82 (5.13)</td>
<td>4.81 (5.24)</td>
</tr>
<tr>
<td>Other carer</td>
<td>0.42 (1.25)</td>
<td>0.08 (0.35)</td>
<td>0.12 (0.54)</td>
</tr>
<tr>
<td>All carers</td>
<td>5.12 (5.91)</td>
<td>4.90 (5.19)</td>
<td>4.93 (5.29)</td>
</tr>
</tbody>
</table>

TABLE 10.47

COMPARISON OF RELATIVE INPUTS TO DOMESTIC CARE FROM MAIN CARERS AND OTHER CARERS BY SEX OF MAIN CARER

<table>
<thead>
<tr>
<th>Source of care</th>
<th>Male main carer</th>
<th>Female main carer</th>
<th>All cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main carer</td>
<td>5.75 (3.47)</td>
<td>7.76 (2.49)</td>
<td>7.51 (2.62)</td>
</tr>
<tr>
<td>Other carer</td>
<td>1.42 (2.83)</td>
<td>0.67 (1.45)</td>
<td>0.76 (1.67)</td>
</tr>
<tr>
<td>All carers</td>
<td>7.17 (2.86)</td>
<td>8.43 (2.68)</td>
<td>8.27 (2.70)</td>
</tr>
</tbody>
</table>
(ii) Age of Main Carer

The imputed cost of personal care, the hours spent on personal and domestic tasks by main carers and other carers were compared for different age categories of main carers. There was no evidence of any significant relationship between age of the main carer and any of these variables.

Main carers were classified into two age groups (under 60 years, termed 'younger' carers and 60 years or over, termed 'older' carers), and the effects of age and sex on the hours spent on types of tasks were considered together (see tables 10.48 and 10.49). The older carers spent more

<table>
<thead>
<tr>
<th>TABLE 10.48</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPARISON OF RELATIVE INPUTS TO PERSONAL CARE FROM CARERS BY AGE AND SEX OF MAIN CARER</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age of main carer</th>
<th>Source of care</th>
<th>Male</th>
<th>Female</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Main carer</td>
<td>0.08</td>
<td>4.20</td>
<td>3.95</td>
</tr>
<tr>
<td></td>
<td>Other carers</td>
<td>0.00</td>
<td>0.15</td>
<td>0.14</td>
</tr>
<tr>
<td>Younger</td>
<td>Number of cases</td>
<td>2</td>
<td>31</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>Mean weekly time contributed (standard hours)</td>
<td>-------</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Older</td>
<td>6.02</td>
<td>5.42</td>
<td>5.53</td>
</tr>
<tr>
<td></td>
<td>Other carers</td>
<td>0.54</td>
<td>0.16</td>
<td>0.11</td>
</tr>
<tr>
<td></td>
<td>Number of cases</td>
<td>7</td>
<td>32</td>
<td>39</td>
</tr>
</tbody>
</table>

Younger female carers contributed more personal and domestic care than their male peers. The results are not significant, probably on account of the very few young
TABLE 10.49

COMPARISON OF RELATIVE INPUTS TO DOMESTIC CARE FROM CARERS BY AGE AND SEX OF MAIN CARER

<table>
<thead>
<tr>
<th>Age of main carer</th>
<th>Source of care</th>
<th>Male Main carer</th>
<th>Female Main carer</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Younger</td>
<td>Main carer</td>
<td>7.37</td>
<td>8.24</td>
<td>8.19</td>
</tr>
<tr>
<td></td>
<td>Other carers</td>
<td>0.00</td>
<td>0.65</td>
<td>0.61</td>
</tr>
<tr>
<td></td>
<td>All carers</td>
<td>7.37</td>
<td>8.89</td>
<td>8.80</td>
</tr>
<tr>
<td>Number of cases</td>
<td></td>
<td>2</td>
<td>31</td>
<td>33</td>
</tr>
<tr>
<td>Older</td>
<td>Main carers</td>
<td>5.29</td>
<td>7.29</td>
<td>6.93</td>
</tr>
<tr>
<td></td>
<td>Other carers</td>
<td>1.82</td>
<td>0.69</td>
<td>0.89</td>
</tr>
<tr>
<td></td>
<td>All carers</td>
<td>7.11</td>
<td>7.98</td>
<td>7.82</td>
</tr>
<tr>
<td>Number of cases</td>
<td></td>
<td>7</td>
<td>32</td>
<td>39</td>
</tr>
</tbody>
</table>

male carers (there were two). The older male and female carers contributed similar amounts to personal care, but domestic care time for the older women was significantly greater (p=0.037) than for the older men and averaged two hours more. The older men also received just significantly more support (p=0.087) from other carers for personal care tasks. These findings are consistent with those of tables 10.46 and 10.47 and show some substitution between main and supporting carers. This substitution is sex and age related, older male carers (the spouses of the dependent elderly) receiving the most support. The sources of the supporting informal care were documented at the time of the interview and the most common source was from daughters of the elderly. The results above show that daughter assistance substitutes to a greater extent for father-help than it does for mother-help.
(iii) Employment status of main carer

Twelve main carers were employed. One might expect the amount of agency or paid help to be greater in these cases and the informal carer contribution to be less. Table 10.50 compares the contribution of informal care by employment status of the main carer. The results do not support the hypothesis. In fact the informal carer contribution is numerically greater for those cases where the carer is employed. The difference in total cost is not quite significant (p=0.052) but the domestic care and supervision components of cost are significantly higher. One cannot assume that the main carer is herself providing the informal care. Other informal carers may have undertaken some tasks so that the main carer could work. But certainly the care has not been shifted to agencies or sources of paid help.

A comparison of the mean personal and domestic care time spent by working and non-working carers is shown in table 10.51. From this it can be seen that the mean times spent

<table>
<thead>
<tr>
<th>Care Task</th>
<th>Mean Weekly Imputed Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Main Carer employed</td>
</tr>
<tr>
<td>Personal Care</td>
<td>30.90</td>
</tr>
<tr>
<td>Domestic Care</td>
<td>43.37</td>
</tr>
<tr>
<td>Financial help</td>
<td>1.10</td>
</tr>
<tr>
<td>Gardening</td>
<td>2.50</td>
</tr>
<tr>
<td>Additional supervision</td>
<td>7.30</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>85.18</strong></td>
</tr>
</tbody>
</table>

* Significant at the .05 level
by working carers exceed those of the non-working carers.  

TABLE 10.51

COMPARISON OF PERSONAL AND DOMESTIC CARE TIME OF THE ELDERLY SPENT BY WORKING AND NON-WORKING CARERS

<table>
<thead>
<tr>
<th></th>
<th>Standard hours per week</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>personal care</td>
<td>domestic care</td>
</tr>
<tr>
<td></td>
<td>mean</td>
<td>s.d.</td>
</tr>
<tr>
<td>Main carer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>employed</td>
<td>6.08</td>
<td>7.38</td>
</tr>
<tr>
<td>not employed</td>
<td>4.56</td>
<td>4.70</td>
</tr>
<tr>
<td>All main carers</td>
<td>4.81</td>
<td>5.21</td>
</tr>
</tbody>
</table>

The difference is significant for domestic care (p=0.0305) but not for personal care (p=0.3595). This seemingly paradoxical result may be accounted for by the fact that the carers in employment were predominantly younger women, who have already been shown to have the highest domestic care input of all main carers (see table 10.49). The results show that working carers are themselves contributing at least as much to the care of the elderly as non-working carers. When this contribution is considered in addition to the hours spent on paid work, the burden on these working carers is considerable.

It must be remembered that the care times are expressed in standard hours so that the actual hours of working carers may not exceed the actual hours of the non-working carers, particularly since the non-working carers were on average older.
(c) **Imputed Cost of Informal Carer Help by Patient Disability**

In section 10.5.7 the relationship between the cost of formal agency services and dependency measures of the elderly was explored and it was found that there was some positive relationship \( (R^2 = 0.31) \). This analysis is now repeated for informal care costs. Tables 10.52 and 10.53 compare the imputed cost of informal care for different levels of mobility and toileting ability.

**TABLE 10.52**

**IMPUTED COST OF INFORMAL CARE BY LEVEL OF MOBILITY FOR 72 ELDERLY PEOPLE 1983/84**

<table>
<thead>
<tr>
<th>Mobility</th>
<th>Mean Cost of Informal Care ($ per week)</th>
<th>Standard Deviation ($ per week)</th>
<th>Number of Elderly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walks unaided</td>
<td>52.87</td>
<td>20.29</td>
<td>20</td>
</tr>
<tr>
<td>Walks with aid</td>
<td>69.65</td>
<td>30.63</td>
<td>43</td>
</tr>
<tr>
<td>Walks with person</td>
<td>73.79</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Chairfast</td>
<td>100.70</td>
<td>46.46</td>
<td>6</td>
</tr>
<tr>
<td>Bedfast</td>
<td>107.78</td>
<td>42.27</td>
<td>2</td>
</tr>
<tr>
<td>All sample</td>
<td>68.69</td>
<td>32.30</td>
<td>72</td>
</tr>
</tbody>
</table>

An analysis of variance for the breakdown of cost by mobility resulted in a value of \( F \) of 3.997 which was highly significant \( (p=0.0057) \). The \( F \) value for the comparison of cost by toileting ability was 25.08 which was also highly significant \( (p=.0000) \). Therefore the data strongly support the view that the level of informal care was related to patient disability.
TABLE 10.53

IMPUTED COST OF INFORMAL CARE BY ABILITY TO TOILET, FOR 72 ELDERLY PEOPLE 1983/84

<table>
<thead>
<tr>
<th>Toileting Ability</th>
<th>Mean Cost of Informal Care ($ per week)</th>
<th>Standard Deviation ($ per week)</th>
<th>Number of Elderly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toilets unaided</td>
<td>49.29</td>
<td>15.75</td>
<td>31</td>
</tr>
<tr>
<td>Uses commode unaided</td>
<td>49.72</td>
<td>18.98</td>
<td>10</td>
</tr>
<tr>
<td>Needs night help only</td>
<td>50.75</td>
<td>32.58</td>
<td>2</td>
</tr>
<tr>
<td>Needs day help only</td>
<td>86.26</td>
<td>21.54</td>
<td>17</td>
</tr>
<tr>
<td>Needs help both day and night</td>
<td>112.73</td>
<td>30.88</td>
<td>12</td>
</tr>
<tr>
<td>All Sample</td>
<td>68.69</td>
<td>32.30</td>
<td>72</td>
</tr>
</tbody>
</table>

A regression analysis was performed on measures of patient dependency (see footnote 58 for a list of variables), and some variables representing carer characteristics which might affect the level of informal care. The 'carer variables' were the age, sex, and employment status of the main carer. The value of $R^2$ obtained was 0.82. The significant variables were: TOILET, WASH, GO BED and BINC (measure of bowel incontinence, see appendix 1). The coefficients had the expected positive sign (see Table 10.54). The four variables by themselves explained 72 percent of the variation in informal care. The results show that the amount of informal care is related to the level of disability of the elderly being cared for and contrasts with the result for agency care where the value of $R^2$ was only 0.31 (see section 10.5.7).

75 Variable MOBILITY was not significant. This is not inconsistent with Table 10.49. Increased care arising from mobility problems are expressed via needs for help with self-care, represented by the disability variables. The same result was obtained for nursing care in hospital (see chapter 7).

76 This is contrary to the results of the regression of agency care on the same variables (see Table 10.29 in section 10.5.7).
TABLE 10.54
SIGNIFICANT COEFFICIENTS OF REGRESSION OF IMPUTED COST OF INFORMAL CARE ON MEASURES OF PATIENT DEPENDENCY FOR 72 ELDERLY PEOPLE 1983/84

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONSTANT</td>
<td>-79.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOILET</td>
<td>4.47</td>
<td>2.21</td>
<td>2.02 *</td>
</tr>
<tr>
<td>WASH</td>
<td>22.01</td>
<td>9.81</td>
<td>2.24 **</td>
</tr>
<tr>
<td>GOBED</td>
<td>20.81</td>
<td>10.51</td>
<td>1.98 *</td>
</tr>
<tr>
<td>BINC</td>
<td>10.69</td>
<td>5.22</td>
<td>2.05 *</td>
</tr>
</tbody>
</table>

* significant at the .05 level (1 tail test)
** significant at the .025 level (1 tail test)

None of the 'carer' variables had significant coefficients (although the signs were as expected i.e. negative for age and positive for sex and employment status). Care must be taken when interpreting this result. The dependent variable was the total imputed cost of informal care from all sources. The independent 'carer' variables related to the age, sex and employment status of the main carer. The correct inference is that the total informal care received by the elderly does not vary by these characteristics of the main carer, after allowing for differences in patient disabilities. It does not preclude substitution within a group of informal carers of an elderly person on account of the sex, age or employment status of the main carer. Therefore it does not conflict with the substitution effects found in (b) above.

The regression analysis was repeated using the imputed cost of informal care provided by the main carer as the dependent variable. The value of $R^2$ was 0.82. The significant coefficients are shown in table 10.55.
TABLE 10.55

SIGNIFICANT COEFFICIENTS OF REGRESSION OF IMPUTED COST OF MAIN CARER INFORMAL CARE ON MEASURES OF PATIENT DEPENDENCY FOR 72 ELDERLY PEOPLE 1983/84

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONSTANT</td>
<td>-66.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AGE</td>
<td>1.03</td>
<td>0.49</td>
<td>2.10  **</td>
</tr>
<tr>
<td>VISION</td>
<td>-8.94</td>
<td>3.68</td>
<td>-1.92 *</td>
</tr>
<tr>
<td>TOILET</td>
<td>3.98</td>
<td>2.19</td>
<td>1.81  *</td>
</tr>
<tr>
<td>WASH</td>
<td>28.64</td>
<td>9.72</td>
<td>2.95  **</td>
</tr>
<tr>
<td>GOBED</td>
<td>22.40</td>
<td>10.42</td>
<td>2.15  **</td>
</tr>
</tbody>
</table>

* Significant at the .05 level (1 tail test)
** Significant at the .025 level (1 tail test)

The results differed from the regression of total informal care in that the age of the elderly person was significant with a positive coefficient. The main carers provide more care to older people, after allowing for differences in disability. A tentative explanation would be that as a person becomes older, relatives and friends become fewer, so that the main carer is left to supply all the informal care. The variable VISION was also significant. There is no obvious explanation for the negative sign of this coefficient.

The coefficients of the carer variables were again not significant. The input of informal care by the main carer is thus related to the level of disability of the elderly person being cared for and there is no significant residual effect due to the age, sex or employment status of the main carer. The carer effects found in (b) can therefore be explained in terms of the disabilities of the elderly e.g. the elderly being cared for by women are more dependent than those being cared for by men.
(d) **Imputed Cost of Informal Carer Help for Elderly now in Long-Term Care**

The imputed cost of informal care was calculated for those elderly who had since entered long-stay institutions to test whether the burden on the informal carers was greater than for the rest of the sample. The results are shown in table 10.56.

**TABLE 10.56**

**IMPUTED COST OF INFORMAL CARE FOR ELDERLY SINCE IN LONG-TERM CARE 1983/84**

<table>
<thead>
<tr>
<th>Location</th>
<th>Weekly Imputed Cost of Informal Care ($)</th>
<th>Mean</th>
<th>s.d.</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Still in the Community</td>
<td></td>
<td>65.76</td>
<td>30.34</td>
<td>59</td>
</tr>
<tr>
<td>In Long-Term Care</td>
<td></td>
<td>81.98</td>
<td>38.61</td>
<td>13</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>68.69</td>
<td>32.36</td>
<td>72</td>
</tr>
</tbody>
</table>

Although the cost of informal care was greater for those who had entered long-stay care, it was not significantly so (p=0.1019).

(e) **Imputed Cost of Informal Carer Help for People Living Alone**

The imputed cost of informal care for elderly living alone was compared to that of elderly living with others. The results are presented in table 10.57 and show that those living alone received substantially less informal care than those living with others. This difference was highly significant (p=0.0028). This result may be on account of differences in disability levels of the two groups or
TABLE 10.57
IMPUTED COST OF INFORMAL CARE FOR ELDERLY LIVING ALONE 1983/84

<table>
<thead>
<tr>
<th>Living arrangements</th>
<th>Weekly imputed cost of informal care ($)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alone</td>
<td>34.78, 22.27</td>
<td>7</td>
</tr>
<tr>
<td>With others</td>
<td>72.35, 31.17</td>
<td>65</td>
</tr>
<tr>
<td>Total</td>
<td>68.69, 32.30</td>
<td>72</td>
</tr>
</tbody>
</table>

It could be that informal care is more easily obtainable when the elderly lives with the carer.

It was shown in section 10.5.7 (Table 10.33) that the elderly living alone were less dependent with respect to toileting ability than elderly who lived with others. Variable TOILET was found to be significant in explaining the total imputed cost of informal care (Table 10.51). Therefore the lower disability of the elderly living alone may explain the lower level of informal care. This conclusion is supported by the fact that variable ALONE (see footnote 61), representing the living arrangements of the elderly, was one of the independent variables in the regression and had an insignificant coefficient. Therefore the conclusion is that although elderly people living alone (in this sample), received less informal care, this was on account of their lower needs, rather than the unavailability or unwillingness of informal carers to help them.

(f) Imputed Cost of Informal Carer Help by Sex of Elderly

There was no significant difference (p = 0.16) between the mean imputed cost of informal care received by men and women. Variable SEX was included in the regression of informal care cost on patient disabilities and its coefficient was not significantly different from zero. This is consistent with the results of Chapter 7 which found very little difference between the disability levels of men and women in the community.
10.8 MEDICAL CARE

Elderly in the community receive medical care from their general practitioners (G.P's). The resources to be considered in this section are those associated with the general practitioner service. Privately purchased non-prescription medications will also be included.

10.8.1 G.P. Consultations

(a) Use of G.P. Resource

Information was obtained, from the main carers, on the frequency of G.P. consultations, for each member of the sample. The mean number of consultations per year was 9.72 with a standard deviation of 8.45. The distribution of number of consultations is presented in figure 10.6 and shows a wide variation of behaviour with two modes at 6 and 12 visits per year. In fact a quarter of the sample saw their doctor every month, and another quarter, every two months.

The mean number of consultations is (at 9.72) higher than the estimate of 7.9 for all elderly \(^\text{77}\) people in Christchurch, \(^\text{78}\) obtained by Malcolm (1979). This is as expected, since the sample of 72 dependent elderly suffered from chronic diseases and medical conditions and would

\(^{77}\) The estimate by Malcolm for the total population was 3.7.

\(^{78}\) Similar results were obtained from a New Zealand study (Clinical Services Division, Dept. of Health 1982). The elderly visited the doctor 6.7 times per year compared to 3.9 for the general population.
FREQUENCY OF G.P. CONSULTATIONS FOR 72 SAMPLED ELDERLY IN THE COMMUNITY 1983/84

mean = 9.72 visits per year
s.d. = 8.45

ANNUAL NUMBER OF CONSULTATIONS
require a greater level of medical services than the elderly population in general. 79

(b) Cost per G.P. Consultation

The Department of Health pays a subsidy (the general medical services (GMS) benefit), to the G.P., towards the cost of each consultation. The amount in 1983/84 was $3 for consultations at the surgery and $4 for home visits. In addition, doctors charge a fee to the patient. The fees vary from doctor to doctor and also depend upon the length, timing and place of consultation. Usually the fee is higher if the doctor makes a home visit. Sometimes no fee is charged (the cost being covered by the GMS benefit).

Table 10.58 compares the average fees paid by patients who normally saw their doctors at home with those who normally visited the surgery. The fee for a home visit was slightly more but the difference was not significant. The mean

TABLE 10.58

DOCTORS FEES CHARGED TO 72 ELDERLY PEOPLE IN THE COMMUNITY 1983/84

<table>
<thead>
<tr>
<th>Normal Place of Consultation</th>
<th>Patient's home</th>
<th>Doctor's surgery</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Fee per visit ($)</td>
<td>8.52</td>
<td>7.96</td>
<td>8.28</td>
</tr>
<tr>
<td>(s.d.)</td>
<td>(3.35)</td>
<td>(2.17)</td>
<td>(2.91)</td>
</tr>
<tr>
<td>Mean visits in a year</td>
<td>12.02</td>
<td>6.50</td>
<td>9.72</td>
</tr>
<tr>
<td>(s.d.)</td>
<td>(10.14)</td>
<td>(3.34)</td>
<td>(8.45)</td>
</tr>
<tr>
<td>Mean payment per week ($)</td>
<td>1.67</td>
<td>1.09*</td>
<td>1.43</td>
</tr>
<tr>
<td>(s.d.)</td>
<td>(1.53)</td>
<td>(0.60)</td>
<td>(1.24)</td>
</tr>
<tr>
<td>Number of elderly</td>
<td>42</td>
<td>30</td>
<td>72</td>
</tr>
</tbody>
</table>

* includes cost of transport for patient

79 There may also have been an increase in GP consultations for all the elderly since 1976/77 (the year of the Malcolm study) on account of the increase in GP's per head of population, but the effect of this would be small (also see footnote 80).
consultation fee over all the sampled elderly was $8.28 with a standard deviation of $2.91. The distribution of average fee for each patient is shown in figure 10.7. The fees ranged from zero to $15. Elderly who visited the surgery also incurred a transportation cost. This averaged $0.90 per consultation.

A further cost associated with GP consultations is the practice nurse. At the time of the data collection the whole of practice nurse salaries were paid by the Department of Health.

The expenditure on salaries in 1983/84 = $13,368,035
Estimated population of NZ = 3,230,000
Estimated annual number of consultations
per person = 80
= 3.9
Estimated total number of consultations in 1983/84 = 3.9 x 3,230,000
Estimated Cost of Practice Nurse per consultation
= \frac{\text{annual salaries}}{\text{total number of consultations}}
= \frac{$13,368,035}{3.9 \times 3,230,000}
= $1.061

The number of consultations depends upon the availability of GP's and may have increased since 1980/81, with the rise in GP's. The population per GP fell from 1800 in 1979/80 to 1694 in 1980/81 and the mean number of consultations per person increased from 3.8 to 3.9. The population per GP in 1983/84 was about 1600 so that the mean number of consultations may have increased to 4.0. The resultant cost of the practice nurse would be 1.035 i.e. the effect is minimal.
Figure 10.7

AVERAGE FEE CHARGED TO 72 ELDERLY IN THE COMMUNITY FOR G.P. CONSULTATIONS 1983/84

NUMBER OF ELDERLY

mean = $8.28
s.d. = $2.91

normally home visit

normally visits surgery

AVERAGE FEE FOR G.P. CONSULTATION ($)
(c) **Weekly Cost of GP Service**

The cost of the GP service will be separated out into the cost to the patient and the cost to the state.

(i) **Cost to the patient**

The weekly cost to the patient of the GP service depends upon the frequency of consultations and the fee per visit. The average cost to the patient of using the service was $74.26 per year or $1.43 per week with a standard deviation of $1.24. (This includes a transportation charge for visits to the surgery). The cost ranged from zero to $9.69 per week. The distribution of patient costs is shown in table 10.59.

**TABLE 10.59**

**DISTRIBUTION OF WEEKLY COST TO PATIENT OF USING GP SERVICE. SAMPLE OF 72 ELDERLY PEOPLE 1983/84**

<table>
<thead>
<tr>
<th>Weekly Cost ($)</th>
<th>Normal Place of Visit</th>
<th>Number of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Patient's Home</td>
<td>Doctor's Surgery</td>
</tr>
<tr>
<td>0-1</td>
<td>13</td>
<td>16</td>
</tr>
<tr>
<td>1-2</td>
<td>19</td>
<td>11</td>
</tr>
<tr>
<td>2-3</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>3-4</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>9-10</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Number of Cases</td>
<td>42</td>
<td>30</td>
</tr>
</tbody>
</table>

The average cost for patients who normally saw the doctor in their own homes was $1.67 per week compared to $1.09 per week for those who normally visited the surgery. This difference was significant (p=.05) and was due to the greater number of consultations for the 'home' group which were 12.02 per year compared to only 6.50 for the 'surgery' group (see table 10.58). This difference was highly significant (p=.005).
(ii) Cost to the State

The Department of Health contribution to the cost of each consultation was $4.06 if at the doctor's surgery and $5.06 for a home visit. The resultant mean cost per patient was $46.49 per year or $0.89 per week.

(iii) Total Cost of GP Service

The full cost of the GP service was $120.75 per patient per year or $2.32 per patient per week.

10.8.2 Pharmaceuticals and Dressings

The major source of pharmaceuticals for elderly in the community are those prescribed by their general practitioners. Private purchases of over-the-counter medicines may also be made.

(a) Non-prescribed medications

Data was not collected on purchases of drugs by the sampled elderly. The cost will be estimated from the results of the Household Income and Expenditure Survey (1984). The weekly amount spent on medical goods in households of non-working adults (table 3 of the survey) was $0.61 for a one-adult and $1.29 for a two-adult household. The estimate of weekly cost for the sampled elderly will be taken at $0.61.

(b) Prescribed Medications

Information on the number, type and cost of the medications prescribed for the sampled elderly was not collected. The estimate of the cost of prescribed medications will be estimated from published data on the cost of pharmaceuticals. In 1983/84 the whole cost of prescribed medications
was borne by the Department of Health.

The total cost\textsuperscript{81} of prescribed pharmaceuticals in 1983/84

\[ = \$223,789,000 \]

The average number\textsuperscript{81} of prescription items per person

\[ = 9.37 \]

The average cost\textsuperscript{81} per item

\[ = \$7.31 \]

The estimated New Zealand Population\textsuperscript{82} in 1984

\[ = 3,265,500 \]

The average cost per person

\[ = \frac{223,789,000}{3,265,500} \]

\[ = \$68.53 \]

Expenditure has been found to vary with age. A study of 1979/80 expenditure by Sutton (1983) produced the following ratios of expenditure on pharmaceuticals for different age categories (see table 10.60).

\textbf{TABLE 10.60}

\begin{center}
\begin{tabular}{|c|c|}
\hline
Age category (years) & Ratio of expenditure \\
\hline
0-14 & 1 \\
15-64 & 1.6 \\
65+ & 5.4 \\
\hline
\end{tabular}
\end{center}

\* Source: Sutton 1983.

If the assumption is made that the ratio of expenditure for each age group is the same over time then the annual


expenditure per head of population by age category may be estimated (see table 10.61). If the average cost per prescription item is assumed to be invariant of age (i.e. $7.31 per item) then the average number of items prescribed for each category may also be estimated.

TABLE 10.61
ESTIMATED ANNUAL EXPENDITURE ON PHARMACEUTICALS AND NUMBER OF ITEMS PRESCRIBED BY AGE CATEGORY 1983/84

<table>
<thead>
<tr>
<th>Age Category (years)</th>
<th>Population*</th>
<th>Expenditure per head ($)</th>
<th>Number of Prescribed Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-14</td>
<td>821,160</td>
<td>37.33</td>
<td>5.11</td>
</tr>
<tr>
<td>15-64</td>
<td>2,112,080</td>
<td>59.73</td>
<td>8.17</td>
</tr>
<tr>
<td>65+</td>
<td>332,260</td>
<td>201.59</td>
<td>27.58</td>
</tr>
<tr>
<td>All</td>
<td>3,265,500</td>
<td>68.53</td>
<td>9.37</td>
</tr>
</tbody>
</table>


The actual cost of prescribed medications for the 72 sampled elderly depends upon the exact medications prescribed. Only seven of the sample did not receive medication long-term and even for these the cost would not be zero. The method used to estimate the cost for each person was to link it to the number of GP consultations, assuming a constant cost per consultation.

The mean number of consultations for all the elderly was estimated by Malcolm (1979) to be 7.9 per year. From table 10.57 the annual cost of the medications was $201.59. Therefore the mean cost of pharmaceuticals per consultation may be estimated at $25.52.

The mean number of consultations for the 72 sampled elderly was 9.72 so that the mean cost of prescribed drugs
may be estimated at $248 per year or $4.77 per week. The standard deviation was estimated at $4.15. The estimated cost ranged from $0.49 to $24.54 per week.

(c) Total Cost of Medications

The estimated mean weekly cost of medication including non-prescribed drugs was $5.38.

10.8.3 Total Medical Costs

The estimates of the cost of the GP service and medications were summed to provide an estimate of the total cost of medical care (see table 10.62). The mean resource cost of medical care per patient was $7.70 per week (standard deviation = $5.81). The resource cost of individual patients ranged from $1.43 to $39.71 per week.

<table>
<thead>
<tr>
<th>Cost of GP consultations</th>
<th>1.43</th>
<th>0.89</th>
<th>2.32</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of pharmaceuticals</td>
<td>0.61</td>
<td>4.77</td>
<td>5.38</td>
</tr>
</tbody>
</table>

Total for Source 2.04 5.66 7.70

The medical costs are for the ongoing care of the elderly. As was the case for the costing of long-stay hospital care of the elderly, the cost of specialist care or general hospital care for acute medical conditions is not included. It is assumed that access to such care would be similar in all modes of care i.e. community or institutional and therefore the costs need not be included in any cost comparison.
The mean contribution by the state was $5.66 per week (standard deviation = $4.98) and ranged from $0.57 to $29.40. The state funding averaged 73.5% of the resource cost per patient. Almost all of this (84.3 percent) was spent on pharmaceuticals. The patient contributed $2.04 on average per week i.e. 26.5 percent of the resource cost. The majority of this (70.1 percent) was spent on G.P. consultations.

10.9 OTHER HEALTH PROFESSIONAL CARE

A combination of state-provided and private health professional services are available to people living in the community. The services used by the sampled elderly were physiotherapy, occupational therapy and chiropody. These are now considered.

10.9.1 Domiciliary Physiotherapy

Domiciliary Physiotherapy is provided by the Canterbury Hospital Board at no charge to the client.

(a) Estimate of Cost per Visit

A total of 4,652 visits were made by the domiciliary physiotherapists in 1983/84 (Annual Report - Canterbury Hospital Board, 1984). Some visits were to rest and residential homes and to general practitioners (termed liaison visits), others were to patients in their own homes. The mean expenditure on salaries and incidental items\textsuperscript{84} in 1983/84 was $9.75 per visit.

The time spent for a visit depends upon the type of visit and the treatment given. A study of the time utilization

\textsuperscript{84} This includes office expenses. Source: Canterbury Hospital Board.
of domiciliary physiotherapists estimated the mean visit time to patients at 23.4 minutes and the mean liaison visit at 13.8 minutes (Fox and Barnett, 1984), but liaison visits accounted for only eight percent of all visiting time (and only 4.69 percent of the total workload), therefore the amount $9.75 will be used to estimate the average cost (of this component of expenditure) for visits to patients.

The mean distance travelled per visit has been estimated at 6.9 kilometres (Fox and Barnett, 1984). The cost of transport per visit, using a rate of 23.30 cents per kilometre, is estimated at $1.61. The estimate of the total cost is $11.36 per visit.

(b) Use of Service

Only three of the 72 elderly in the sample, used the service on a regular basis. Two people received a 20 minute visit each week; the third received one 10 minute visit each fortnight.

(c) Estimation of weekly cost of Physiotherapy

The cost of the weekly 20 minute visits was estimated by the mean cost per visit i.e. $11.36 per week. The cost of the 10 minute visit was estimated at $6.48 per visit or $3.24 per week. The mean cost of physiotherapy per sample member was 0.36 per week.

85 This is the rate applicable for a small station wagon travelling over 12,800 kilometres each year (Source: State Services Commission).

86 This estimate is the sum of the travel cost ($1.61 per visit) and half of the salaries cost (i.e. $4.9 per visit).
10.9.2 Domiciliary Occupational Therapy

The Canterbury Hospital Board operates a domiciliary occupational therapy service. Patients requiring therapy, (e.g. after a stroke) are visited in their own homes. The therapist will organize the installation of appropriate equipment and aids (e.g. hand rails), set up a program of therapy for the patient, and continue to visit until the program is established. Thereafter the patient is responsible for continuing any activities (e.g. craftwork). This is in contrast to the hospital situation where a regular program of group activity is usually provided, by trained occupational therapists or aids.

Some members of the sample had received services from the occupational therapist in the past (and one was, at the time of the data collection), but since the services of the domiciliary occupational therapist do not form part of the continuing care of the elderly, the cost will not be included here.

Some elderly people may participate in group programs at day care centres or craft centres. But since most of these are not run by trained occupational therapists they may not properly be included under occupational therapy.

87 The exception is day care offered by a hospital. The cost of day care has already been considered in section 10.5.6.
10.9.3 **Chiropody**

The Canterbury Hospital Board has a domiciliary chiropody service, visiting patients in rest homes. Very few patients are seen in their own homes. Some private Chiropodists will make home visits. There is no state subsidy for this service. The patient is charged a fee. Ten (13.9 percent) of the sampled elderly used a home chiropodist on a regular basis. The frequency of visit varied but most people were visited every 6-8 weeks.

A range of fees were charged, typically $8-$10 per visit. The mean cost per user was $51.20 per year or $0.98 per week. The mean cost of chiropody per sample member was $0.14 per week.

10.9.4 **Total Cost of Other Health Professional Care**

The mean cost of other health professional care was $0.50 per person per week of which $0.36 was funded by the state.
10.10 TOTAL COST OF COMMUNITY CARE

The total cost of community care may be obtained from the estimates of the costs of components of care derived in the previous sections. Three estimates of total cost, corresponding to the three methods of estimating informal care costs (see Section 10.7.6) will be calculated but only two of them will be used in the subsequent analysis.

10.10.1 Total Resource Cost of Community Care

The total resource cost of community care is estimated by including the value of all inputs to care regardless of whether any cash outflows take place. Two estimates are presented. The first is based on the valuation of informal carer time at the wage rate appropriate to the task being executed; the second by valuing informal carer time by the income foregone by being unable to fully participate in the paid labour force. The second estimate has the drawback that it reflects the characteristics of the carer as much as the dependency of the elderly (see 10.7.6) and hence this estimate will not be used as the basis for any analysis.

Table 10.63 shows the estimates of the components of cost and of the total resource cost of community care, per person. The total resource cost averaged $198.67 per week (valuing informal carer time at wage rates appropriate to the task). Using the opportunity cost of employment foregone approach, the estimate was $158.70 per week. The total operating (i.e. non-capital) cost is estimated at $142.32 per week of which $134.12 are non-medical costs.

Separate estimates have been presented according to the living arrangement of the elderly person. For those living
alone, the capital cost and living cost components are greater, but the informal carer cost is less \(^{88}\) than those who live with others. The resulting total resource cost is very similar for each group.

**TABLE 10.63**

**WEEKLY RESOURCE COST OF COMMUNITY CARE PER PERSON FOR 72 DEPENDENT ELDERLY 1984/85**

<table>
<thead>
<tr>
<th>Component of Cost</th>
<th>Mean Weekly Resource Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lives Alone</td>
</tr>
<tr>
<td>Living cost (^{1})</td>
<td>52.28</td>
</tr>
<tr>
<td>Agency cost</td>
<td>20.08</td>
</tr>
<tr>
<td>Paid help</td>
<td>2.43</td>
</tr>
<tr>
<td>Informal care</td>
<td>34.78</td>
</tr>
<tr>
<td>Non-Medical Operating Costs</td>
<td>109.57</td>
</tr>
<tr>
<td>Medical Health Professional</td>
<td>6.88</td>
</tr>
<tr>
<td>Medical Operating Costs</td>
<td>0.25</td>
</tr>
<tr>
<td>Total Operating Cost</td>
<td>116.70</td>
</tr>
<tr>
<td>Capital Cost (^{4})</td>
<td>77.38</td>
</tr>
<tr>
<td>Total Resource Cost</td>
<td>194.08</td>
</tr>
<tr>
<td>Number of elderly</td>
<td>7</td>
</tr>
</tbody>
</table>

\(^{1}\) The estimates here differ from those of table 10.7 in section 10.4.2. The figures here do not include the food cost of meals taken at day care or from the meals on wheels service in order to avoid double counting.

\(^{2}\) These estimates are based on the valuation of informal care time at wage rates appropriate to the task.

\(^{3}\) These estimates are based on the valuation of informal care time by the income foregone by the carer.

\(^{4}\) The figures presented are the weekly cost of capital using an interest rate of 10 percent.

\(^{88}\) This is because for the group of elderly sampled, those living alone were less dependent than those living with others (see section 10.5.7).
The capital cost varied between individual elderly. This was on account of the location, size and quality of accommodation occupied and was not related to disability. Since this study is concerned with costs which vary on account of disability, the variation in capital cost is not considered here.

Figure 10.8 illustrates the relative contributions of each type of care: Living, Agency, Informal Care and Medical Services, to the non-capital costs of $142.32 per person.

Informal care is the largest single component, accounting for 48.2 percent or almost half of the total. Living costs account for 26.6 percent, agency care 17.2 percent, medical services 5.8 percent and paid help only 2.2 percent.

The distribution of the resource operating cost for individual elderly is shown in figure 10.9. This cost ranged from $74 to $355 with a mean of $142.32 and a standard deviation of $47.88. The variation may perhaps be explained by the disability levels of the elderly and this will be explored in section 10.10.3. The variation in resource operating cost can be split into its components. Information on this is summarized in Table 10.64. It is clear from this that figure 10.8, which shows the relative inputs of each type of care on the average, masks a very considerable variation in the 'mix' of inputs for individual elderly. The major opportunity for substitution, and one that reflects the policy on community care, is between agency care and informal care. The resource cost of informal care input is on the average 2.8 times the resource cost of agency-provided care (see Table 10.64) but may differ for individual cases. A scattergram of the resource cost of agency and informal care for individual elderly is shown in figure 10.10 and does not indicate any relationship
INPUTS TO COMMUNITY CARE OF THE ELDERLY 1983/84 - PERCENTAGE CONTRIBUTION TO RESOURCE OPERATING COSTS (1) OF EACH INPUT TO CARE (2)

\[
\begin{align*}
\text{total resource cost} & = \$142.32 \text{ per week per person} \\
\end{align*}
\]

(1) The figures in brackets are the mean resource costs of each input to care, per elderly person per week.

(2) The percentages are \( \frac{\text{resource cost of inputs to care}}{\text{total resource operating cost}} \) per elderly person.
Figure 10.9

DISTRIBUTION OF WEEKLY RESOURCE (1) OPERATING COSTS (2) FOR 72 DEPENDENT ELDERLY 1983/84

NUMBER OF ELDERLY

mean = $142.32
s.d. = $ 47.88

OPERATING COSTS ($ per week)

(1) The informal care cost component is valued at the wage rate appropriate to the task.

(2) Capital costs are excluded. The mean capital cost was $56.35 per week.
TABLE 10.64
VARIATION OF COMPONENTS OF WEEKLY RESOURCE(1) OPERATING COST OF COMMUNITY CARE OF 72 DEPENDENT ELDERLY 1983/84

<table>
<thead>
<tr>
<th>Weekly cost, per person ($)</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Living Cost</td>
<td>37.81</td>
<td>4.95</td>
<td>32.38</td>
<td>53.45</td>
</tr>
<tr>
<td>Agency Cost</td>
<td>24.51</td>
<td>24.98</td>
<td>0.00</td>
<td>162.48</td>
</tr>
<tr>
<td>Paid Help</td>
<td>3.11</td>
<td>8.80</td>
<td>0.00</td>
<td>48.00</td>
</tr>
<tr>
<td>Informal Care(1)</td>
<td>68.69</td>
<td>32.30</td>
<td>6.89</td>
<td>166.99</td>
</tr>
<tr>
<td>Non-Medical Operating Cost</td>
<td>134.12</td>
<td>46.43</td>
<td>69.95</td>
<td>339.58</td>
</tr>
<tr>
<td>Medical</td>
<td>7.70</td>
<td>5.81</td>
<td>1.43</td>
<td>39.71</td>
</tr>
<tr>
<td>Health Professional</td>
<td>0.50</td>
<td>2.06</td>
<td>0.00</td>
<td>12.90</td>
</tr>
<tr>
<td>Medical Operating Cost</td>
<td>8.20</td>
<td>6.98</td>
<td>1.43</td>
<td>52.61</td>
</tr>
<tr>
<td>Total Operating Cost</td>
<td>142.32</td>
<td>47.88</td>
<td>73.59</td>
<td>355.48</td>
</tr>
</tbody>
</table>

(1) Informal Care and Volunteer time is valued at the wage rate appropriate to the task.

between the two variables. The same level of agency services are being provided for elderly who receive widely varying amounts of informal care.

Table 10.65 shows the mean resource cost of agency care as the informal care resource cost increases. An analysis of variance resulted in an F value of 0.846. There was no significant difference (p = 0.57) in the level of agency care for the different groups. Whatever is the policy of community care, it does not result in significantly more agency care being received as the level of informal care increases.

89 The Correlation coefficient was 0.10 which was not significantly different from zero (p = 0.20).
Figure 10.10  AGENCY V. INFORMAL INPUTS TO CARE

- 1 observation
- 2 observations

N = 72
### TABLE 10.65

**AGENCY CARE BY THE LEVEL OF INFORMAL CARE FOR 71 ELDERLY IN THE COMMUNITY 1983/84**

<table>
<thead>
<tr>
<th>Informal Care (Resource Cost, $, per week)</th>
<th>Agency Care</th>
<th>Standard deviation</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-20</td>
<td>15.71</td>
<td>15.77</td>
<td>2</td>
</tr>
<tr>
<td>20-40</td>
<td>25.81</td>
<td>16.71</td>
<td>9</td>
</tr>
<tr>
<td>40-60</td>
<td>19.64</td>
<td>17.02</td>
<td>25</td>
</tr>
<tr>
<td>60-80</td>
<td>17.78</td>
<td>18.89</td>
<td>14</td>
</tr>
<tr>
<td>80-100</td>
<td>32.83</td>
<td>27.83</td>
<td>11</td>
</tr>
<tr>
<td>100-120</td>
<td>22.68</td>
<td>8.62</td>
<td>5</td>
</tr>
<tr>
<td>120-140</td>
<td>13.71</td>
<td>19.40</td>
<td>2</td>
</tr>
<tr>
<td>140-160</td>
<td>27.56</td>
<td>6.15</td>
<td>2</td>
</tr>
<tr>
<td>160-180</td>
<td>41.79</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

All Sample* 22.57 19.06 71

* excludes outlier with agency cost of $162.48.
10.10.2 Total Expenditure on Community Care

The third estimate of the total cost of community care is the expenditure on care. Under this approach the cost of informal carer time is zero. The cost of the help given by the volunteer drivers for meals on wheels is also zero. The mean non-medical operating costs expenditure is $65.11 per week and the total operating cost expenditure is $73.31 per week. The capital cost component is $56.35 (i.e. the same as for the resource cost approach).

The distribution of operating cost expenditure is shown in figure 10.11. In comparing with the resource cost approach (figure 10.9) the expenditure estimate of cost is much lower, the mean being about half of the resource cost mean ($73 compared to $142). Moreover the variation in cost is much less. The standard deviation is now $28 (compared to $48 for the resource cost). The weekly operating cost expenditure ranges from $40.57 to $217.81, but 96 percent of the sample have expenditures less than $120 per week.

<table>
<thead>
<tr>
<th>Mean Weekly Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Living Cost</td>
</tr>
<tr>
<td>Agency Cost</td>
</tr>
<tr>
<td>Paid Help</td>
</tr>
<tr>
<td>Informal Care</td>
</tr>
<tr>
<td>Non-Medical Operating Costs</td>
</tr>
<tr>
<td>Medical Operating Cost</td>
</tr>
<tr>
<td>Total Operating Cost</td>
</tr>
</tbody>
</table>
WEEKLY OPERATING EXPENDITURE ON CARE OF 72 ELDERLY IN THE COMMUNITY 1983/84

NUMBER OF ELDERLY

mean = $73.31
s.d. = $28.23

WEEKLY OPERATING EXPENDITURE ($)
10.10.3 Cost and Disability

The relationship between cost and disability was explored. Two estimates of cost were used: the resource\(^90\) cost and the expenditure.

(a) Resource Cost and Disability

<table>
<thead>
<tr>
<th>Mobility</th>
<th>Weekly resource operating cost ($)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walks unaided</td>
<td>120.19</td>
<td>20</td>
</tr>
<tr>
<td>Walks with aids</td>
<td>141.37</td>
<td>43</td>
</tr>
<tr>
<td>Walks with person</td>
<td>120.55</td>
<td>1</td>
</tr>
<tr>
<td>Chairfast</td>
<td>193.03</td>
<td>6</td>
</tr>
<tr>
<td>Bedfast*</td>
<td>130.31</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mobility</th>
<th>Weekly resource operating cost ($)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>All sample*</td>
<td>139.32</td>
<td>71</td>
</tr>
</tbody>
</table>

* Excludes outlier with a cost of $355.48.

The mean weekly resource operating costs were compared for different mobility and toileting groups (see Tables 10.67 and 10.68). The value of F resulting from the analysis of variance was 4.55 when comparing the mean resource cost by mobility, and 35.26 for the comparison by toileting ability groups. These values were highly significant (p = 0.0026 and p = 0.000 respectively). The evidence supports the view that the total resource cost increases with increasing disability.

\(^90\) Informal Care and Volunteer Help is valued at the wage rate appropriate to the task.
TABLE 10.68
WEEKLY RESOURCE OPERATING COST BY TOILETING ABILITY
FOR 71 ELDERLY IN THE COMMUNITY 1983/84

<table>
<thead>
<tr>
<th>Toileting Ability</th>
<th>Weekly resource operating cost ($)</th>
<th>mean</th>
<th>standard deviation</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toilets unaided</td>
<td>112.26</td>
<td>18.75</td>
<td></td>
<td>31</td>
</tr>
<tr>
<td>Uses commode unaided</td>
<td>118.68</td>
<td>11.71</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Needs night help only*</td>
<td>152.86</td>
<td>23.25</td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>Needs day help only</td>
<td>201.89</td>
<td>38.62</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Needs help both day and night</td>
<td>176.72</td>
<td>30.22</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>All sample*</td>
<td>139.32</td>
<td>23.74</td>
<td></td>
<td>71</td>
</tr>
</tbody>
</table>

* Excludes outlier with a cost of $355.48.

A regression analysis of total resource operating cost on age, sex, measures of functional capacity and patient dependency (see footnote 58 for a list of variables) resulted in a value of $R^2$ of 0.75. The significant variables were: TOILET, WASH, BATH and BINC (measure of bowel incontinence, see appendix 1), and their coefficients are shown in Table 10.69.

TABLE 10.69
SIGNIFICANT COEFFICIENTS OF REGRESSION OF TOTAL RESOURCE OPERATING COST ON MEASURES OF PATIENT DEPENDENCY FOR 71 ELDERLY PEOPLE(1), 1983/84

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONSTANT</td>
<td>38.58</td>
<td>12.24</td>
<td>3.15 ***</td>
</tr>
<tr>
<td>TOILET</td>
<td>10.53</td>
<td>1.76</td>
<td>6.00 ***</td>
</tr>
<tr>
<td>WASH</td>
<td>34.96</td>
<td>7.85</td>
<td>4.46 ***</td>
</tr>
<tr>
<td>BATH</td>
<td>7.69</td>
<td>3.61</td>
<td>2.13 **</td>
</tr>
<tr>
<td>BINC</td>
<td>7.95</td>
<td>4.08</td>
<td>1.95 *</td>
</tr>
</tbody>
</table>

* Significant at the 0.05 level (1 tail test)
** Significant at the 0.025 level (1 tail test)
*** Significant at the 0.000 level
(1) This excludes the outlier.
The total resource operating cost includes the living cost which differs according to living arrangement (i.e. alone or with others - see 10.4.2). A regression of total resource operating cost, net of living costs, on the same set of dependent variables, produced a somewhat better fit. The value of $R^2$ was 0.77. The significant coefficients are shown in Table 10.70. This is an improvement of the value of $R^2$ of 0.72 obtained when regressing the cost of informal care on

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONSTANT</td>
<td>-22.00</td>
<td>15.03</td>
<td>-1.46</td>
</tr>
<tr>
<td>TOILET</td>
<td>10.30</td>
<td>1.78</td>
<td>5.79 **</td>
</tr>
<tr>
<td>WASH</td>
<td>38.26</td>
<td>7.97</td>
<td>4.80 **</td>
</tr>
<tr>
<td>BATH</td>
<td>7.54</td>
<td>3.64</td>
<td>2.07 *</td>
</tr>
<tr>
<td>BINC</td>
<td>8.98</td>
<td>4.07</td>
<td>2.21 *</td>
</tr>
<tr>
<td>PACARE</td>
<td>16.61</td>
<td>8.21</td>
<td>2.02 *</td>
</tr>
</tbody>
</table>

* Significant at the 0.025 level (1 tail test)
** Significant at the 0.0000 level
(1) The dependent variable was resource operating costs exclusive of living costs.

measures of disability (see section 10.7.6(c)). This may indicate that there is some substitution between informal care and other sources of help (i.e. paid help and agency care).

In section 10.5.7 it was shown that the cost of agency care increased as toileting ability decreased. Table 10.71 compares the resource costs of agency care and informal care by toileting ability. Informal care is on average 75 percent
<table>
<thead>
<tr>
<th>Toileting Ability</th>
<th>Mean Cost of Agency Services ($)</th>
<th>Mean Cost of Informal Care ($)</th>
<th>Sum of Costs ($)</th>
<th>Informal Costs (%)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toilets unaided</td>
<td>16.05</td>
<td>49.29</td>
<td>65.34</td>
<td>75.44</td>
<td>31</td>
</tr>
<tr>
<td>Uses commode unaided</td>
<td>19.55</td>
<td>49.72</td>
<td>69.27</td>
<td>71.78</td>
<td>10</td>
</tr>
<tr>
<td>Needs night help</td>
<td>25.04</td>
<td>79.03</td>
<td>104.07</td>
<td>75.94</td>
<td>16</td>
</tr>
<tr>
<td>Needs day help*</td>
<td>33.57</td>
<td>112.73</td>
<td>146.30</td>
<td>77.05</td>
<td>12</td>
</tr>
<tr>
<td>Needs help day and night</td>
<td>52.83</td>
<td>82.89</td>
<td>135.72</td>
<td>61.08</td>
<td>2</td>
</tr>
<tr>
<td>All sample*</td>
<td>22.57</td>
<td>67.72</td>
<td>90.29</td>
<td>75.00</td>
<td>71</td>
</tr>
</tbody>
</table>

* Excludes 1 outlier
of the sum of the resource costs from the two inputs of care. Although both agency care and informal care respond to greater toileting disability, the response of agency care is much weaker so that the mean resource cost of informal care for each group remains around 75 percent. The absolute level of agency services is small, so that for very disabled elderly, the quantity of care remaining (undertaken by the informal carers) would be considerable. Any substitution of agency care for informal care would appear to be limited.

(b) Expenditure and Disability

The weekly operating expenditure was compared for the mobility and toileting groups (see Tables 10.72 and 10.73). There was no significant difference between the mean expenditure of the mobility groups ($F = 1.988$, $p = 0.1065$) but

<table>
<thead>
<tr>
<th>Mobility</th>
<th>Weekly operating expenditure ($)</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>$n$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walks unaided</td>
<td>67.02</td>
<td>19.59</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Walks with aid</td>
<td>71.42</td>
<td>23.21</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>Walks with person</td>
<td>46.76</td>
<td>0.00</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Chairfast</td>
<td>91.64</td>
<td>18.38</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Bedfast*</td>
<td>52.42</td>
<td>0.00</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>All sample*</td>
<td>71.27</td>
<td>22.49</td>
<td>71</td>
<td></td>
</tr>
</tbody>
</table>

* excludes outlier with expenditure of $217.81.

The informal cost percentage ranged from 20.4 to 100 with a mean of 75.6 and a standard deviation of 17.8.
TABLE 10.73
OPERATING EXPENDITURE BY TOILETING ABILITY FOR 71 ELDERLY IN THE COMMUNITY 1983/84

<table>
<thead>
<tr>
<th>Toileting Ability</th>
<th>Weekly operating expenditure ($)</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toilets unaided</td>
<td></td>
<td>62.90</td>
<td>15.35</td>
<td>31</td>
</tr>
<tr>
<td>Uses commode unaided</td>
<td></td>
<td>67.71</td>
<td>13.12</td>
<td>10</td>
</tr>
<tr>
<td>Needs night help*</td>
<td></td>
<td>73.47</td>
<td>26.70</td>
<td>16</td>
</tr>
<tr>
<td>Needs day help</td>
<td></td>
<td>89.48</td>
<td>27.59</td>
<td>12</td>
</tr>
<tr>
<td>Needs help day and night</td>
<td></td>
<td>91.91</td>
<td>22.80</td>
<td>2</td>
</tr>
<tr>
<td>All sample*</td>
<td></td>
<td>71.27</td>
<td>20.67</td>
<td>71</td>
</tr>
</tbody>
</table>

* Excludes one outlier with expenditure of $217.81.

Expenditure increased as the level of toileting disability increased (F = 4.216, p = 0.0042). A regression of the expenditure on measures of patient dependency resulted in a value of $R^2$ of only 0.38. Therefore expenditure on care seems to be related only weakly to measures of patient dependency.

These results illustrate the difference between the two approaches to estimating cost i.e. the expenditure approach and the resource cost approach. The difference between the two is almost entirely accounted for by the unpaid informal carer help. Informal care responds to the level of patient dependency so that although the relationship between expenditure and disability is weak, the relationship between resource cost and disability is strong.

92 The significant variables were TOILET VISION GETUP and BATH (see Appendix 1). Variable ALONE was also significant but this was on account of the higher living costs of people who lived alone. A regression of expenditure less living costs resulted in an $R^2$ of 0.37, and variable ALONE was not significant.
10.11 HOW COST IS SHARED

In Section 10.10 the total cost of community care was estimated by aggregating the estimates of the costs of all the inputs to care i.e. accommodation, agency care, paid private help, informal care and medical care. Some of these inputs are provided by the state; others by the elderly and family. In this section the share of cost to the state sector, the family sector (which includes the elderly person) and the voluntary sector will be identified.

The concept of cost can be expressed both in terms of expenditure incurred or in the wider context of the value of resources contributed to the care of the elderly. Therefore both the expenditure approach and the resource cost approach will be employed in the estimation of cost to the various sectors.

As in Section 10.10, only non-capital costs will be considered; the capital costs (of accommodation) falling mainly on the family. 93

10.11.1 Resource Cost Approach

The resource cost approach recognizes the inputs in the form of informal care and volunteer provided resources in addition to those inputs for which monetary payments are made. The mean weekly value of the resources contributed by the

93 The state funded the cost of some house alterations and personal aids (e.g. ramps, wheelchairs, handrails etc). These costs are very small compared with the cost of land, housing and furniture (see Section 10.4.1) provided in most cases by the family. (Only one elderly occupied a state house).
various sectors is shown in Table 10.74. The mean family resource cost is $115.67 and is made up of the cost of services provided directly by the family (i.e. living costs and informal care, which are valued at $106.50) plus the cost of paid private help and the part-payments for some state-provided services (e.g. meals on wheels, home aid etc.). The state resource cost is $22.42 per week and the resource cost for the voluntary sector is $4.23.

**TABLE 10.74**

**MEAN WEEKLY RESOURCE COST(1) BY SECTORS FOR CARE OF 72 DEPENDENT ELDERLY 1983/84**

<table>
<thead>
<tr>
<th>Sector</th>
<th>Non-medical ($)</th>
<th>Medical ($)</th>
<th>Total(1) from Sector ($)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>16.40</td>
<td>6.02</td>
<td>22.42</td>
<td>15.7</td>
</tr>
<tr>
<td>Family</td>
<td>113.49</td>
<td>2.18</td>
<td>115.67</td>
<td>81.3</td>
</tr>
<tr>
<td>Voluntary</td>
<td>4.23</td>
<td>0</td>
<td>4.23</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Total(1)</strong></td>
<td><strong>134.12</strong></td>
<td><strong>8.20</strong></td>
<td><strong>142.32</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

(1) This includes only non-capital costs.

Table 10.74 shows the resource cost to each sector for the average case. There was considerable variation from this for individual cases. The distributions of the state resource cost and family resource cost are shown in figures 10.12 and 10.13 respectively. The weekly state resource cost ranged from $2.28 to $137.15, with a standard deviation of $20.31. For the majority (83 percent) of the sample the state resource cost was under $30 per week. The resource cost for the family ranged from $64.17 to $219.41 per week, and the standard deviation was $33.40.
Figure 10.12

RESOURCE COSTS\(^{(1)}\)\(^{(2)}\) BORNE BY THE STATE IN THE CARE OF 72 ELDERLY IN THE COMMUNITY 1983/84

Mean = $22.42
S.d. = $20.31

(1) Exclusive of capital costs

(2) Resource costs are equal to expenditure by the state since all inputs to care involved monetary payment
Figure 10.13

RESOURCE COSTS (1) BORNE BY THE FAMILY IN THE CARE OF 72 ELDERLY IN THE COMMUNITY 1983/84

NUMBER OF ELDERLY

mean = $115.67
s.d. = $33.40

WEEKLY RESOURCE COSTS TO FAMILY ($) (1) Exclusive of capital costs
10.11.2 Family v. State Resource Cost

The relative contributions to the total resource cost of the family and the state are of particular interest since they indicate how the responsibility of community care of the elderly is shared. The results (last column of Table 10.74) show that the majority of the total resource cost (81.3 percent) is contributed by the family, compared to 15.7 percent by the state and three percent by the voluntary sector. The state however carries the major share (73.4 percent) of medical costs.

The relative shares of the family and state varied from case to case. The state's share varied from 2.7 percent to 37.4 percent and the family's share from 58.6 percent to 97.3 percent.

The relationship between the value of the inputs of the family and the state was investigated. A scattergram (Figure 10.14) of the state and the family resource cost indicated no relationship between the two variables. Indeed families with a wide range of resource costs received the same support from the state (analogous to the informal v. agency care inputs of 10.10.1). The most obvious inference from Figure 10.14 is that there is a ceiling on state spending of care of the elderly in the community.

A formal test was conducted of whether the mean state resource cost differed as the family resource cost increased. Although the mean state cost increases numerically as the

94 The correlation coefficient was 0.20 which was just significantly different from zero (p = 0.046).
Figure 10.14  STATE V. FAMILY RESOURCE COST OF CARE

N = 72
family resource cost increases, (see Table 10.75), the difference between the state costs for the different categories was not significant ($F = 0.50, p = 0.81$). The evidence leads

TABLE 10.75

MEAN STATE COST BY FAMILY RESOURCE COST OF CARE FOR 71 ELDERLY 1983/84

<table>
<thead>
<tr>
<th>Family Cost ($)</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>60-80</td>
<td>14.97</td>
<td>13.43</td>
<td>6</td>
</tr>
<tr>
<td>80-100</td>
<td>18.31</td>
<td>10.77</td>
<td>22</td>
</tr>
<tr>
<td>100-120</td>
<td>22.09</td>
<td>17.68</td>
<td>20</td>
</tr>
<tr>
<td>120-140</td>
<td>23.22</td>
<td>23.11</td>
<td>10</td>
</tr>
<tr>
<td>140-160</td>
<td>20.36</td>
<td>5.58</td>
<td>6</td>
</tr>
<tr>
<td>160-180</td>
<td>28.54</td>
<td>19.16</td>
<td>3</td>
</tr>
<tr>
<td>180-200</td>
<td>25.74</td>
<td>9.04</td>
<td>4</td>
</tr>
<tr>
<td>Total*</td>
<td>20.81</td>
<td>15.09</td>
<td>71</td>
</tr>
</tbody>
</table>

* Excludes 1 outlier.

to the conclusion that some families are facing high resource costs in the care of their elderly, yet receiving very little state support in return. Conversely families making much less of a contribution receive a similar level of state support. Having regard to the relationship established between informal care (the major constituent of the resource cost to the family) and patient disability, (see section 10.76), the cases where the family resource cost is high, represent the most dependent elderly. Even for this group, the majority of the resource cost of care falls on the family.
10.11.3 Expenditure Approach

The narrower interpretation of cost to the state, the family and the voluntary sector is the actual expenditure incurred on care of the elderly. The mean weekly expenditures

<table>
<thead>
<tr>
<th>Sector</th>
<th>Living</th>
<th>Medical Services</th>
<th>Disability related Services</th>
<th>Total from Source</th>
<th>%age</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>0.00</td>
<td>6.02</td>
<td>16.40</td>
<td>22.42</td>
<td>30.6</td>
</tr>
<tr>
<td>Family</td>
<td>37.81</td>
<td>2.18</td>
<td>6.99</td>
<td>46.98</td>
<td>64.1</td>
</tr>
<tr>
<td>Voluntary</td>
<td>0.00</td>
<td>0.00</td>
<td>3.91</td>
<td>3.91</td>
<td>5.3</td>
</tr>
<tr>
<td>Total</td>
<td>37.81</td>
<td>8.20</td>
<td>27.30</td>
<td>73.31</td>
<td>100</td>
</tr>
</tbody>
</table>

per case incurred by each sector on various services are shown in Table 10.76. The state expenditure is equal to the resource cost to the state (see Table 10.74) since all inputs by the state involve monetary payments. The expenditures by the family and voluntary sectors are less than their resource costs, since they provide unpaid care.

The state spends on average $22.42 per case per week, of which $6.02 is on medical services. The family spends $46.98, of which $37.81 is on living costs. The family has the greatest share (64.1 percent) of total expenditure but it could be argued that much of this would be spent anyway regardless of disability. The cost of the disability-related services incurred by the family ($6.99 per week, on average) is additional expenditure on account of disability. On average
the state spends more than twice that of the family on these services.

These results highlight the differences between the resource cost and expenditure approaches to measuring how costs are shared. The expenditure approach ignores the informal carer contribution, with the result that the family's measured share of total inputs drops from 81.3 percent to 64.1 percent and the state's share correspondingly increases (from 15.7 percent to 30.6 percent). If families purchased services instead of providing them, 'free', then the two approaches would give similar results. But families caring for more disabled people respond by offering more informal care. This 'reaction' is hidden when using the expenditure approach and hence this approach provides a limited analysis of the situation. It under-represents the level of care being consumed by the elderly and gives little indication of the additional funds that might be required to provide relief for the carers.

The contribution to total expenditure by the state, family and voluntary sector varied between elderly people in the sample (see Table 10.77). The distribution of family expenditure (Figure 10.15) shows that some families are incurring quite substantial expenses in the care of the elderly.

Table 10.78 compares the mean state expenditure for categories of family expenditure. Although the mean state expenditure rises as family expenditure rises, the result was not quite significant \((F = 2.713, p = 0.0517)\). In section 10.11.2 it was shown that the state did not fund significantly more services for families with high resource costs of care. The result just obtained goes further than this to say that the state is not spending significantly more on services even
EXPENDITURE \(^{(1)}\) INCURRED BY THE FAMILY IN THE CARE OF 72 ELDERLY IN THE COMMUNITY 1983/84

Figure 10.15

NUMBER OF ELDERLY

WEEKLY EXPENDITURE BY THE FAMILY ($)

mean = $46.98
s.d. = $11.76

(1) Non-capital expenditure only
TABLE 10.77

VARIATION IN CONTRIBUTION OF WEEKLY EXPENDITURE ON CARE
OF 72 DEPENDENT ELDERLY IN THE COMMUNITY 1983/84

<table>
<thead>
<tr>
<th>Sector</th>
<th>Mean</th>
<th>Weekly Expenditure, per person ($)</th>
<th>Standard Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>22.42</td>
<td>20.31</td>
<td>2.28</td>
<td>137.15</td>
<td></td>
</tr>
<tr>
<td>Family</td>
<td>46.98</td>
<td>11.26</td>
<td>37.77</td>
<td>98.25</td>
<td></td>
</tr>
<tr>
<td>Voluntary</td>
<td>3.91</td>
<td>5.57</td>
<td>0.00</td>
<td>40.62</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>73.31</td>
<td>28.23</td>
<td>40.57</td>
<td>217.81</td>
<td></td>
</tr>
</tbody>
</table>

TABLE 10.78

MEAN WEEKLY STATE EXPENDITURE BY FAMILY
EXPENDITURE ON CARE OF 71 ELDERLY
1983/84

<table>
<thead>
<tr>
<th>Family Expenditure</th>
<th>State Expenditure, per person ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>20-40</td>
<td>14.82</td>
</tr>
<tr>
<td>40-60</td>
<td>23.58</td>
</tr>
<tr>
<td>60-80</td>
<td>29.80</td>
</tr>
<tr>
<td>80-100</td>
<td>17.05</td>
</tr>
<tr>
<td>Total*</td>
<td>20.81</td>
</tr>
</tbody>
</table>

* Excludes 1 outlier.

for those families who are incurring high levels of expenditure on the care of the elderly.

10.11.3 Share of Cost and Disability

In this section the way cost is shared between the family and the state in the care of elderly of different disabilities, is explored. The cost sharing is examined using both the resource cost and expenditure approaches to cost estimation.

Whatever the overall level of state funding of community
care of the elderly, one would expect a policy of resource allocation which allocated more funds to those elderly who were most disabled. The cost to the state is the same under both the resource cost and expenditure approaches, since all inputs to care by the state involve monetary payments.

**TABLE 10.79**

MEAN WEEKLY RESOURCE COST FOR THE FAMILY AND THE STATE - BY TOILETING ABILITY OF 71 ELDERLY 1983/84

<table>
<thead>
<tr>
<th>Toileting Ability</th>
<th>State ($)</th>
<th>Family ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Standard Deviation</td>
</tr>
<tr>
<td>Toilets unaided</td>
<td>15.41</td>
<td>11.37</td>
</tr>
<tr>
<td>Uses commode unaided</td>
<td>19.39</td>
<td>4.64</td>
</tr>
<tr>
<td>Needs night help only*</td>
<td>22.42</td>
<td>17.04</td>
</tr>
<tr>
<td>Needs day help only</td>
<td>30.86</td>
<td>19.15</td>
</tr>
<tr>
<td>Needs help day and night</td>
<td>38.25</td>
<td>26.18</td>
</tr>
<tr>
<td>All sample*</td>
<td>20.81</td>
<td>15.09</td>
</tr>
</tbody>
</table>

* Excludes 1 outlier.

Table 10.79 shows the way resource costs are shared for elderly of different toileting ability. State expenditure increases as toileting ability decreases. The increase in expenditure is statistically significant ($F = 3.494, p = 0.012$) but is small, hence resource costs remaining for the family may still be substantial. Family resource costs also increase as toileting ability decreases ($F = 30.31, p = 0.000$). But the response of the family is much greater than that of the state i.e. as disability increases the additional resource cost for the family is more than the additional cost for the state.

Table 10.80 shows the mean weekly expenditure (per elderly
TABLE 10.80
WEEKLY EXPENDITURE OF THE FAMILY(1) AND THE STATE - BY TOILETING ABILITY OF 71 ELDERLY 1983/84

<table>
<thead>
<tr>
<th>Toileting Ability</th>
<th>Weekly Expenditure - per elderly person</th>
<th>State ($)</th>
<th>Family(1) ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Standard Deviation</td>
<td>Mean</td>
</tr>
<tr>
<td>Toilets unaided</td>
<td>15.41</td>
<td>11.37</td>
<td>6.10</td>
</tr>
<tr>
<td>Uses commode unaided</td>
<td>19.39</td>
<td>4.64</td>
<td>5.78</td>
</tr>
<tr>
<td>Needs night help only(2)</td>
<td>22.42</td>
<td>17.04</td>
<td>11.81</td>
</tr>
<tr>
<td>Needs day help only</td>
<td>30.86</td>
<td>19.15</td>
<td>16.57</td>
</tr>
<tr>
<td>Needs help day and night</td>
<td>38.25</td>
<td>26.18</td>
<td>11.19</td>
</tr>
<tr>
<td>All sample(2)</td>
<td>20.81</td>
<td>15.09</td>
<td>9.25</td>
</tr>
</tbody>
</table>

(1) Exclusive of living costs.
(2) Excludes one outlier.

person) by the family and the state for different toileting categories of the elderly. In the case of family expenditure, the living costs have been excluded, so that the relationship with toileting ability is not distorted by the living arrangements of the elderly. Family expenditure increases significantly with decreasing toileting ability \( (F = 3.92, p = 0.0068) \).

As was the case for state expenditure, the sums involved, and therefore the increases in expenditure with increasing disability, are small. Tables 10.79 and 10.80 illustrate the difference between the resource cost and expenditure cost approaches, when costing community care of the elderly. Greater disability results in significant additional expenditure both for the state and the family. But these increases are small, particularly for the family. The effect on the family of increased disability is seen in the level of informal carer input rather than as cash outgoings. Costing informal care
allows this informal input to be measured and the real contribution to care by the family, fairly assessed.

10.12 SUMMARY

The level of inputs to care from all sources have been measured for each of 72 dependent elderly people living in the community. The inputs were categorized into six groups: accommodation, formal agency services, paid private help, informal care and health professional care.

The data collection revealed a substantial input of informal care. The time spent by informal carers was measured in standard hours (being the time for a fit person to do the work). The mean time spent on personal care was almost five hours per week per elderly person; the mean time on domestic care was over eight hours per week. Hence, on average, 13 hours of informal care was given per week. The maximum observed was over 30 hours. This time was for essential care tasks only and did not include the supervision requirements of many of the elderly sampled.

97.6 percent of the personal care and 90.8 percent of the domestic care was undertaken by the main carer. Most (63 of the 72) main carers were women and it was found that women carers completed on average two hours per week more on domestic care for the elderly in their care than did the male carers.

In contrast, the inputs from formal agency care were much lower. Most elderly (70.8 percent) received only one or two services. The most used service (55 cases) was the district nurse. Ten elderly received no formal agency services at all. Less than a quarter of the sample used paid private
help. The observed level of input of agency care was insufficient to meet the care needs of many of the sample, and it is clear that they would have relied heavily on the main carers.

The total cost of all resources used by individual elderly has been estimated in two ways. Using the resource cost approach whereby all resources are valued regardless of whether any cash payment is incurred, the mean resource cost of care (for non-capital items) was estimated at $142.32 per week with a standard deviation of $47.88. The informal care was valued at $68.69 and was the largest single component of this cost, accounting for 48.2 percent of the total. The resource cost of formal agency care was $24.51 (17.2 percent of the total). On average, for every dollar of agency care, the informal carers contributed care 'worth' $2.8. The resource cost of paid private help was on average $3.11 per week. Using the expenditure approach to cost estimation, whereby only transactions involving cash outflows are considered, the mean weekly expenditure was estimated at $73.31 with a standard deviation of $28.23. The mean capital cost was estimated at $56.35 per week.

The total cost estimates were disaggregated in order to identify the share of cost to various sectors. Using the resource cost approach, the family carried the main share of cost (81.3 percent of non-capital costs). The share to the state formed 15.7 percent. However the state funded most (73.4 percent) of medical services costs. Using the expenditure approach the share of cost to the family dropped to 64.1 percent, and the state's share accordingly became 30.6 percent. The major part of family expenditure was living
costs. Only $7 per week on average was spent by the family on disability-related services, compared to over $16 by the state. This may be contrasted with the imputed value ($68.69) of the informal care provided by the family.

The total resource operating cost varied between individuals and was related to the level of patient disabilities. A regression model with four independent variables explained 75 percent of the variation in cost. The cost of informal care was also related to patient disability measures ($R^2 = 0.72$) but the relationship between the cost of agency provided services and disability measures was poor ($R^2 = 0.31$). The level of agency-provided services did not rise significantly with the level of informal carer services. In terms of the provision of care, elderly with the greatest disability received very little in the way of extra services from the state. The informal carers responded to their greater needs.

The relationship between the expenditure on care and disability measures was weakly positive ($R^2 = 0.38$). Neither the state nor the family increased expenditure markedly as disability increased.

The results show the importance of costing informal inputs to care when costing care in the community. The results of the analysis based on the resource cost approach are quite different from those of the expenditure approach. The informal carer input is crucial to care in the community. It is this source of care which responds to the increasing disability of the elderly. The size of the informal carer input is an indication of the level of state services which could be offered.
The data have highlighted the burden of care falling to the informal carers, and the shortfall, under the current policy of community care, in the state's easing of that burden as disability increases.

The relationships between informal carer input, agency input and disability levels may be used as a basis for policy making leading to the development of 'needs-based' and therefore more equitable allocations of state funds.
APPENDIX TO CHAPTER 10

A SIMULTANEOUS EQUATION MODEL OF COMMUNITY CARE

In sections 10.5.7 and 10.7.6 the relationship of agency care and informal care with patient disability levels were estimated separately using Ordinary Least Squares Regression Analysis. Mention was made (in section 10.5.7) that a more appropriate model of the supply of care would involve a set of equations. Such a model is now presented.

The total supply of care $Sc$ in the community to an individual is made up of agency care ($A$) informal care ($I$) and private paid help ($P$) as follows:

$$Sc = A + I + P$$

$Sc$ may be hypothesized to be related to dependency i.e.

$$Sc = f (\text{disability levels})$$

and in section 10.10.3 a model of the total cost of care and disability levels was estimated. It may also be hypothesized that the components of care are functions of disability and other patient characteristics and also of each other

$$A = f (\text{disability levels, age, alone, } P, I)$$

$$I = f (\text{disability levels, alone, distance from carer } A, P)$$

$$P = f (\text{disability levels, income, I, A})$$

Using Ordinary Least Squares to estimate these equations separately results in biased and inconsistent estimators of the coefficients and this may explain the negative coefficients
found in the estimation of the agency equation in 10.5.7. The model needs to be specified with sufficient explanatory variables particular to each equation to meet the rank and order conditions for identification. Then an appropriate simultaneous equation technique may be applied. For example it may be argued that age of the elderly and whether (s)he lives alone might influence agency care; distance from carer and age of carer may influence informal care, and income may influence the amount of paid help.

Such a model was estimated by Greene (1983) using three stage least squares. There were two equations in the model, explaining formal and informal support. The dependent variables were measured in terms of the number of areas of support which does not capture the full variation of the actual amount of support. Of particular interest are the coefficients of formal and informal support in the separate equations. Greene's estimation resulted in negative values for each of these coefficients (as expected) but the coefficient of formal care (in the equation for informal care) was greater than 1. This implies a substantial substitution effect of formal for informal care such that informal carers reduce the number of areas in which they offer help. The result does not necessarily imply that the total care is less, since the dependent variable was number of areas of support rather than amount of care. Estimation of a model with measured amount of care as the dependent variable would provide information on the total care given and would be useful for the planning of community services.

The resulting estimated equations by Greene had values of $R^2$ of 0.28 for formal care and 0.41 for informal care,
and the most significant coefficients in each equation were the ADL coefficients i.e. both formal and informal care respond to unmet need for care but the response of informal care is strong. The research presented here confirms this latter result.
# CHAPTER 11

## COST COMPARISONS BETWEEN MODES OF CARE

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</tr>
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<td></td>
</tr>
</tbody>
</table>
CHAPTER 11

COST COMPARISONS BETWEEN MODES OF CARE

11.1 INTRODUCTION

In chapter 1 the factors responsible for the emergence of the problem of planning for the provision of care for the dependent elderly were described. The increasing proportion of elderly in the population at a time when spending on health services is constrained, has focused attention on the comparative costs of care for the dependent elderly in different care environments. In particular there has been much debate on the cost of institutional versus community care and on the relative costs of institutional long-term care provided by the public and private sector (see chapter 5).

An underlying problem of these cost analyses is that the average dependency of the client populations, in the various modes of care, may be too dissimilar to form a proper basis for comparisons using average costs of care (Rayner and Green, 1984). A mode of care may appear cheaper, wholly or partly on account of the lower average dependency of the elderly in that mode of care, (relative to that of elderly in other care modes). This was discussed extensively in chapter 3. The objective of comparing costs is to enable the most efficient form of care to be identified so that savings in the total cost of care can be achieved.¹ This will only be possible if

¹ This is not to say that the very cheapest form of care would always be selected. Efficiency involves output as well as input i.e. quality of care as well as cost, a 'value for money' concept (see chapter 3).
the estimated costs of a mode of care apply to the group of elderly under consideration. If, as it has been shown clearly in chapters 8 - 10, that the cost of care, in each mode of care, i.e. community, public and private hospital, varies by the level of dependency of the elderly person, and (in chapter 7) that persons of a wide range of dependency are to be found in each mode of care, then account must be taken in any cost comparison between modes of care, of the average dependency of the elderly, in order that potential savings may be realized.

In this chapter the disability-related estimates of cost derived in chapters 8 - 10 will be used to compare the cost between modes of care. Two comparisons will be made: between public and private hospital long-stay care, and between community and private hospital care. The cost comparisons will take into account differences in the average dependency of elderly in the various care environments.

11.2 PUBLIC AND PRIVATE HOSPITAL LONG-STAY CARE

The rationale for comparing the costs of long-stay patients in public and private hospital is that these patients belong to the same population (of dependent elderly) and could be cared for in either of these modes of care. (This assumes that the admission criteria are the same or similar in each type of hospital.) The debate on public sector versus private

---

2 There are differences in some cases. Patients requesting a public hospital bed, or a subsidized private hospital bed, face the same admission criteria i.e. assessment by a Hospital Board geriatrician. Patients requesting a private hospital bed, without the subsidy, are assessed by their general practitioner. 57.4 percent of private hospital beds were subsidized by the Canterbury Hospital Board in 1983/84. The percentage has since increased.
sector provision of long-term care was described in chapter 3. Advocates of private hospital care argue that the private sector is more efficient and hence is a better use of resources. Those in favour of public sector provision are concerned about problems of access to care in the private sector for elderly who cannot pay, and contend that private hospital costs are lower, because the most dependent elderly are cared for in the public sector.

11.2.1 Comparison of average costs per patient

Estimates for long-stay patients of the average weekly cost per occupied bed for various services in the sampled hospitals are shown in Table 11.1.

For private hospital care, the figures presented are based on the estimates of Table 9.6 of chapter 9. The private hospitals sampled contained a mix of long and short-stay patients and it was shown in chapter 7 (section 7.4.2) that the long-stay patients consumed significantly more nursing care than the short-stay patients (96 minutes per day compared to 68 minutes per day). As a result the mean nursing cost for long-stay patients would be higher than the average taken over all patients in the hospitals sampled. The mean nursing cost for long-stay patients was estimated at $207.61 per week using the estimating equation\(^3\) shown in Table 9.12.

There may be other categories of cost for which the cost of the long-stay patient differed from the average. For

\[ \text{Weekly nursing cost per patient} = 99.26 + 68.26t \]

where \(t\) is the hours of direct nursing care received in 24 hours.
example laundry costs may be higher on account of the greater prevalence of incontinence in the long-stay group (see Table 7.4 in chapter 7). But since the usage of laundry services by individual patients in private hospital was not investigated, it is not possible to estimate the likely increase in cost for the long-stay patients. For this reason the average laundry cost over all patients is used as the estimate. The costs of other 'hotel' services for the long-stay patient are assumed not to differ from the average and the estimates are taken directly from Table 9.6.

The medical costs for the private hospital patients include the costs of services provided outside the hospital e.g. general practitioner and pharmaceutical services, in order to make a fair comparison between public and private hospital care. The level of use of general practitioner services was one consultation each two weeks (see 9.6.1) which was typical for long-stay patients.

For public hospital care, the mean costs of each service for long-stay patients are taken directly from Table 8.15 of chapter 8.

When comparing the costs of public and private hospital long-stay care (Table 11.1), the cost of every category of expenditure included under operating costs is higher for public hospital care. The total operating costs in public hospital exceed those in private hospital by $109 per week. The higher (by $73) hotel cost in public hospital accounts for most of this difference. Nursing costs account for $31 and medical care the remaining $5.

Although the operating costs for public hospital care exceed those of private hospital care by this substantial
<table>
<thead>
<tr>
<th>Resource</th>
<th>Public</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food and catering</td>
<td>41.84</td>
<td>34.61</td>
</tr>
<tr>
<td>Energy</td>
<td>17.65</td>
<td>13.64</td>
</tr>
<tr>
<td>Administration</td>
<td>15.38</td>
<td>10.61</td>
</tr>
<tr>
<td>Cleaning</td>
<td>26.83</td>
<td>24.58</td>
</tr>
<tr>
<td>Orderlies (goods movements)</td>
<td>12.49</td>
<td>-</td>
</tr>
<tr>
<td>Telephone/rates/postage/insurance</td>
<td>8.55</td>
<td>6.87</td>
</tr>
<tr>
<td>Laundry</td>
<td>27.75</td>
<td>10.94</td>
</tr>
<tr>
<td>Gardening</td>
<td>8.18</td>
<td>-</td>
</tr>
<tr>
<td>Works maintenance</td>
<td>8.89</td>
<td>9.48</td>
</tr>
<tr>
<td>Central engineering</td>
<td>9.90</td>
<td>-</td>
</tr>
<tr>
<td>Supplies (non-medical)</td>
<td>2.41</td>
<td>1.78</td>
</tr>
<tr>
<td><strong>Total Hotel</strong></td>
<td>185.56</td>
<td>112.51</td>
</tr>
<tr>
<td>Nursing(1)</td>
<td>239.18(2)</td>
<td>207.61(4)</td>
</tr>
<tr>
<td>Medical services(3)</td>
<td>18.75</td>
<td>13.94</td>
</tr>
<tr>
<td><strong>Total operating costs</strong></td>
<td>443.49</td>
<td>334.06</td>
</tr>
<tr>
<td>Capital costs(5)</td>
<td>26.11</td>
<td>91.27</td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td>469.60</td>
<td>425.33</td>
</tr>
</tbody>
</table>

(1) The expenditures quoted here are on nursing salaries. Since nurses undertake a range of duties in addition to nursing care per se e.g. administration and domestic tasks, these expenditures are not equivalent to the cost of nursing care.

(2) This nursing cost includes a small amount, $3.66 for the patient movements carried out by orderlies.

(3) This includes the cost of doctors, therapists, pharmaceuticals and dressings used in the regular, ongoing care of the elderly. It does not include the cost of specialist medical treatment for acute conditions e.g. surgery.

(4) This includes the cost of some services provided from outside the hospital i.e. general practitioners and prescribed pharmaceuticals.

(5) The estimates shown are the annual equivalents of the market valuations (see 8.4.1 and 9.4.1).
amount, the difference in total cost per week is only $44 per patient. This is on account of the higher average capital costs of the private hospitals, which were $65 (per patient per week) more than those of the public hospital. No reliable inference can be drawn from this difference in capital costs, with respect to the costs of public and private hospital care in general, for two reasons. Firstly there are problems in obtaining meaningful estimates of capital valuations of hospitals, since there may be no ready market for buildings of this type. Secondly one would expect large variations in capital costs due to the age and locations of the hospitals, so that with sample sizes of only 1 and 2 hospitals the resultant estimates of average capital costs are likely to be inaccurate, and hence liable to make population inferences very misleading. Therefore the comparison of costs will be confined to operating costs.

The variation in operating costs between individual long-stay patients in the public and private hospitals sampled, is shown in Table 11.2. The estimates are based on the direct nursing care consumed. The estimating equations are those developed in chapters 8 and 9 (see Tables 8.21 and 9.12) i.e. Estimated weekly operating cost is given by:

$225.70 + $68.26t in the private hospitals
and $262.14 + $76.16t in the public hospitals,
for a patient receiving t hours of direct nursing care per day.

---

4 This was particularly the case for the public hospital which was very old.
5 It must be admitted, however, that some costs included in operating costs e.g. heating and maintenance may also reflect the age and other characteristics of the hospitals sampled.
TABLE 11.2
ESTIMATES OF WEEKLY OPERATING COSTS FOR LONG-STAY PATIENTS IN A SAMPLE OF PUBLIC AND PRIVATE GERIATRIC HOSPITALS 1983/84

<table>
<thead>
<tr>
<th></th>
<th>Public Hospital</th>
<th>Private Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>443</td>
<td>334</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>90</td>
<td>84</td>
</tr>
<tr>
<td>Range</td>
<td>275-664</td>
<td>243-574</td>
</tr>
</tbody>
</table>

There are several possible explanations for the higher public hospital operating costs. Three are considered here: The first explanation is that the patients in public hospital are more dependent, therefore requiring a higher and more costly level of care. A second explanation is that the public hospital provides a higher standard of care than the private hospitals for patients of equivalent dependency. Lastly the private hospitals may be relatively more efficient. These three phenomena are not mutually exclusive. It is likely that each contributes to the cost differentials observed. The presence of one or more of the three phenomena will have an effect on the level of consumption of various resources, particularly the nursing resource. Greater patient dependency would, ceteris paribus, involve more nursing resources, laundry and medical services. A higher standard of care would be reflected in the level of nursing resources and also in some of the 'hotel' costs. Greater efficiency would result in reduced levels of these resources.
11.2.2 Differences in Patient Dependency

It was clearly established in Chapter 7 on patient dependency (section 7.4.1) that the public hospital patients were significantly more dependent on all assessment items than were the long-stay patients in private hospital (see Table 7.2). The expected usage of resources may be consequently greater and this may therefore explain the higher public hospital costs.

Greater patient dependency may affect the use of many resources, to a greater or lesser degree.

The relationship between direct nursing care and patient dependency was established in Chapter 7 (sections 7.5 and 7.6) and therefore it is clear that the quantity of the nursing resource would be higher for patients of greater dependency. Other resources which may increase would be laundry services and medical services. It is possible that some other 'hotel' resources e.g. cleaning or heating would also be higher, but the effect is likely to be less marked, and the analysis to follow is limited to the three resources mentioned.

The possibility that greater dependency would result in greater resource use, was explored by estimating what the costs of the public hospital patients would be if they were cared for in private hospital, but continued to receive the same quantities of services as they had been given in public hospital. This approach leaves aside the question of whether this amount of services is appropriate for the public hospital patients. In so doing, the standard of care in public hospital is maintained. Differences in standard of care are considered in section 11.2.3.

The public hospital patients received on average 140
minutes (i.e. 2.33 hours) per day of direct nursing care (compared to the 96 minutes (1.60 hours) per day for the long-stay private hospital patients). The nursing cost of providing 2.33 hours in private hospital may be estimated from the equation relating nursing cost to direct care time (see footnote 3). This estimate is $254 per patient per week. This is greater than the nursing cost in public hospital, and this is attributable to the higher domestic component in the workload of private hospital nurses.

The use of laundry services and therefore the laundry cost, for the public hospital patients if in private hospital, may be higher than the average for private hospital patients, because incontinence was more prevalent among the public hospital patients (see Table 7.1 in chapter 7). Medical costs may also be greater, to cover increased need for medical services e.g. physiotherapy and occupational therapy. Any relationships between dependency and medical or laundry costs have not been estimated for the private hospitals, hence it is not possible to reliably predict what these costs ought to be for the more dependent public hospital patients. A lower bound on these costs would be the mean expenditure for the private hospital patients. An upper bound would be the mean expenditure in the public hospital.

It is assumed that the other components of cost in private hospital care (these are all under hotel services e.g. energy, cleaning etc...) would be left relatively unchanged by the presence of the more dependent public hospital patients.6

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6 In order to ensure the standard of public hospital care, with respect to these hotel services, is met in private hospital, it is assumed that the standard of care (for these services) does not differ significantly in the two modes of care.
Estimates of total costs of the public hospital patients, if they were placed in private hospital, are shown in Table 11.3. Two estimates are shown, based on the upper and lower bound estimates for laundry and medical costs.

Using the lower bound estimates for medical and laundry costs i.e. correcting only for the higher nursing consumption of the more dependent public hospital patients, the estimate of total cost of care in private hospital is $384 per week. When comparing this with the mean cost in public hospital, $443, the cost differential is now $59, compared to the $109 when comparing the raw estimates of Table 11.1.

Using the upper bound estimates, the estimated cost in private hospital was $406 per week and the cost differential between public and private hospital care is $37.

At least half of the perceived cost difference between public and private hospital care has been explained by the higher average levels of direct nursing care and other disability-related inputs in public hospital. (The remaining difference is mainly due to the higher hotel costs in public hospital care.) It cannot be concluded at this point that all of the cost difference explained by the higher inputs in public hospital can be accounted for by the greater dependency of the public hospital patients (compared with the private hospital patients). The standard of care offered and the efficiency with which it is provided will also play a part. These aspects are explored in the following two sections. But if the private hospitals were to care for the public hospital patients (rather than their existing patients) and give them the same direct nursing care (and laundry and medical services) as they had received in public hospital, the average private hospital costs
are estimated to increase by between $50 and $72 per patient per week.

### TABLE 11.3

**PREDICTION OF WEEKLY COSTS OF PUBLIC HOSPITAL PATIENTS IF PLACED IN PRIVATE HOSPITAL - PUBLIC HOSPITAL LEVEL OF CARE**

<table>
<thead>
<tr>
<th>Public Hospital Patients</th>
<th>Private Hospital Patients (long-stay)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual resource use (in public hospital)</td>
<td>Predicted resource use (in private hospital)</td>
</tr>
<tr>
<td>(L(1))</td>
<td>(y(2))</td>
</tr>
<tr>
<td>(\text{mean direct nursing care (hrs per day)})</td>
<td>2.33</td>
</tr>
<tr>
<td>(\text{Cost per patient per week})</td>
<td>239</td>
</tr>
<tr>
<td>(\text{Nursing cost ($)})</td>
<td>185</td>
</tr>
<tr>
<td>(\text{Hotel cost ($)})</td>
<td>19</td>
</tr>
<tr>
<td>(\text{Medical cost ($)})</td>
<td></td>
</tr>
<tr>
<td>(\text{Total Cost ($)})</td>
<td>443</td>
</tr>
</tbody>
</table>

(1) This method allows expenditure on laundry and medical costs equal to that incurred in private hospital (i.e. $11 and $14).

(2) This method allows expenditure on laundry and medical costs equal to that incurred in public hospital (i.e. $28 and $19).

11.2.3 Differences in Standard of Care

The level of consumption of resources in hospital care depends upon the care policy of the hospital, in addition to the dependency of the patients. Patients of the same level of dependency receive differing amounts of nursing care and other resources in different hospitals. Therefore in attempting...
to explain the difference in cost between public and private hospital care, the standards of care in each care mode must be examined.

(a) **Standards of Care in Public and Private Hospital**

The standard of care will be considered for each of the three sectors of care: hotel, nursing and medical services.

(i) **Nursing Services**

Information was collected on the frequency with which various nursing tasks should be performed for both long and short-stay patients according to the guidelines operating in the sampled hospitals. This is presented in Table 11.4.

<table>
<thead>
<tr>
<th>Nursing Task</th>
<th>Public Hospital</th>
<th>Private Hospital</th>
<th>BLCP2</th>
<th>BLCP1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bathing (1)</td>
<td>3+ (2)</td>
<td>2+ (2)</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Washing (3)</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Toileting</td>
<td>6</td>
<td>6</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Turning</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Teeth</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

(1) This relates to frequency per week.
(2) Incontinent patients were bathed more frequently.
(3) This is basic washing. Washing after toileting etc. is in addition to this.

The frequencies relate to the patients' waking day. The care policies of the public and private hospitals are identical except in relation to bathing. Data was collected on the actual number of baths and showers given for each of the patients sampled. A mean number of 3.08 per week per patient were given in the public hospital and 2.87 in the private
hospitals (for long-stay patients). Hence the care policies result in actual bathing frequencies which are closer for the long-stay patients in the two types of hospitals than is indicated by the standards. The private hospital patients are still bathed less often but this could be due in part to their lower level of incontinence.

Care policies used in Australia (BLCP1), and in England (BLCP2) described by Rhys Hearn (1983) are shown for comparison. The care policies for the public and private hospitals sampled were between these Base Line Care Policies.

The nursing resources provided in the sampled hospitals are shown in Table 11.5. The total nursing staff per patient

<table>
<thead>
<tr>
<th>Type of Staff</th>
<th>Nursing Staff to Patient Ratios</th>
<th>Public Hospital</th>
<th>Private Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registered General Nurses</td>
<td>0.16 (2)</td>
<td>0.35</td>
<td></td>
</tr>
<tr>
<td>Other categories of nurses</td>
<td>0.59 (2)</td>
<td>0.45</td>
<td></td>
</tr>
<tr>
<td>Total nursing staff</td>
<td>0.75</td>
<td>0.79</td>
<td></td>
</tr>
</tbody>
</table>

(1) This includes nurse aides and registered enrolled nurses. (2) One third of this group were registered enrolled nurses.

in each hospital is similar, even though the public hospital patients are more dependent. The number of staff of various grades differ. In public hospital there were fewer registered general nurses per patient. The ratio of registered general nurses to other categories of nurses was 1 to 3.60, whilst
in private hospital it was 1 to 1.28. However there were substantial numbers of state enrolled nurses in public hospital (0.20 per occupied bed) and very few in private hospital. When these are taken from the 'other' category, the number of nurse aides per occupied bed is 0.39. Hence the composition of nursing staff is not as dissimilar as it first appears, and the quality of nursing care should be of a comparable standard.

The direct nursing care consumed by public hospital patients was far greater than that for the private hospital patients. The proportion of nurses' workload expended on direct care was 0.69 in the public hospital and 0.50 in the private hospital (compared with 0.66 observed under BLCP2 (Rhy-Hearn 1983)). The nursing staff in private hospital spent more time on domestic duties. Public hospital nurses had more support e.g. from orderlies.

(ii) Medical services

The supply of three services considered here: doctor, therapy and drugs, were organized differently. In public hospital all three services were provided from within the hospital; in private hospital the doctors and drugs were extra-hospital, from the community primary care system.

This resulted in a different type of access to these services. Doctors in public hospital made regular rounds

7 State enrolled nurses have undergone up to two years' training and have a formal qualification. They may undertake specific nursing tasks but must be under the supervision of a general registered nurse.

8 The average cost of providing one hour on the ward was almost identical ($9.97 in public and $9.75 in private hospital) demonstrating that the average composition of staff was very similar.
TABLE 11.6
WEEKLY EXPENDITURE PER PATIENT ON MEDICAL SERVICES
IN PUBLIC AND PRIVATE HOSPITALS

<table>
<thead>
<tr>
<th>Service</th>
<th>Public Hospital</th>
<th>Private Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctor</td>
<td>2.90</td>
<td>4.53(1)</td>
</tr>
<tr>
<td>Drugs</td>
<td>7.69</td>
<td>8.11(2)</td>
</tr>
<tr>
<td>Occupational therapy</td>
<td>4.36</td>
<td>1.30</td>
</tr>
<tr>
<td>Physiotherapy</td>
<td>2.97(3)</td>
<td></td>
</tr>
<tr>
<td>Other services</td>
<td>0.83</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18.75</strong></td>
<td><strong>13.94</strong></td>
</tr>
</tbody>
</table>

(1) Estimate based on 'typical' level of contact of fortnightly consultations, half of which result in prescriptions. This cost includes the cost of practice nurses.

(2) Estimate based on 13 prescriptions per year.

(3) These services were social work and chiropody.

and so were readily available for patients. On the other hand the general practitioners serving private hospitals could be called in when necessary (and some of them would also call weekly) so that the eventual level of access may have been comparable. Since no detailed information was available on actual doctor consultations for individual patients in either mode of care, this cannot be tested.

Table 11.6 shows the expenditure on each medical service in the sampled hospitals. It should be noted that all the public costs represent actual expenditure, whereas the expenditure on doctors and drugs for private hospital patients has been estimated from national data based on a typical number of consultations (see section 9.6 and also the footnotes to Table 11.6).

The expenditure on occupational and physical therapy in the private hospitals sampled was only a fraction of that in public hospital. The public hospital had a regular program.
of occupational therapy which each patient attended each week­day. Most patients in public hospital also received some physiotherapy. In contrast these services were provided to a much less extent in the private hospitals sampled, hence the level of care was lower. This is not a general statement about all private hospitals. The analysis of a larger sample of private hospitals (see section 9.9.2) showed that there was a large variation in the provision of therapy services (see Table 9.13). These results are compatible with those of King Fletcher and Main (1985) who surveyed all geriatric hospitals in a region of South New Zealand and found that "stand alone" private hospitals (such as those on which this cost data is based) had less therapy services than public geriatric hospitals or private hospitals which were part of a complex (i.e. attached to a residential home). It should be noted however that the private hospitals made extensive use of volunteer programs for recreational therapy e.g. crafts, but since these did not necessarily involve trained personnel they are not included here.

(iii) Hotel services

Information was obtained on the level of some hotel services. This is presented in Table 11.7. The provision of food and drink are similar in each hospital, although the type of food may differ. The linen service is at a higher level in public hospital. In part, this may be on account of the larger proportion of incontinent patients.

A limited amount of information on other hotel services was collected. The frequency of cleaning was comparable, each hospital receiving daily cleaning (though lighter at weekends). The public hospital had larger gardens so in this
TABLE 11.7
FREQUENCY OF HOTEL SERVICES FOR A SAMPLE OF PUBLIC AND PRIVATE HOSPITALS

<table>
<thead>
<tr>
<th>Hotel Service</th>
<th>Public Hospital</th>
<th>Private Hospital</th>
<th>BLCP2</th>
<th>BLCP1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bed changing(1)</td>
<td>3+</td>
<td>1+</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Meals(2)</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Drinks(3)</td>
<td>7+</td>
<td>5+</td>
<td>7</td>
<td>12</td>
</tr>
</tbody>
</table>

(1) The figures are the frequencies per week. This was the base level: incontinent patients had their sheets changed more often. No data was available for BLCP1 or BLCP2.
(2) All patients who were able, went to the dining room for two meals. Snacks were also served.
(3) In addition to drinks rounds, jugs of water were available on lockers.

(b) Predicting Cost of Public Hospital Patients Under Private Hospital Standards of Care

A second set of estimates of the cost of care, in private hospital, of the public hospital patients, was based on the standard of care they would receive in the private hospital setting. Only three indicators of standard of care are considered: nursing care, medical care and laundry services. The other resources used in hospital e.g. cleaning, energy etc. reflect the quality of 'hotel' care. The output of these facilities (in terms of warmth, cleanliness etc.) was not measured. The costs reflect only the input. The resulting output or standard, depends on the efficiency. Efficiency is discussed in section 11.2.4. In this section (as in 11.2.2) the standard of these hotel services is assumed to be not significantly different in private or public hospital.
The usages of the three resources to be considered as indicators of the standard of care are also a function of the level of patient dependency, hence the greater average dependency of the public hospital patients must be taken into account when predicting their resource use in private hospital.

(i) Estimated nursing costs

The regression model of section 7.6.2 (equation 7.2) was used to estimate the mean direct nursing care that would be consumed in private hospital, by the public hospital patients. The estimating equation was:

\[ T_{\text{TIME}} = -37.04 + 10.40 \text{TOILET} + 7.22 \text{MENTAL} + 9.96 \text{BHELP} + 12.74 \text{PACARE} + 18.73 \text{DRESS} + 12.92 \text{WASH} - 8.49 \text{SEX} \]

The estimated mean direct care time was 165 minutes or 2.76 hours. The resulting estimated nursing costs are now $287 per patient per week. The standard error of the predictor was estimated at 0.19 hours. Therefore the standard error of the estimated weekly nursing costs was $13.

The predicted mean direct nursing time in private hospital for the public hospital patients is more (by 25 minutes per day) than those patients received in public hospital. This difference is significant (a 95 percent confidence interval for the predicted direct care time is 2.39 to 3.13 hours per day. The actual time in public hospital was 2.33 hours). This indicates that the level of nursing care was higher in private hospital. This conforms to the principle that private

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9 The coefficients differ slightly from those of Table 7.18 since the model was estimated using variable SEX instead of HOSP.
enterprises must provide services to meet the expectations of their paying customers. If those customers are not satisfied they can take their business elsewhere. Users (without the Hospital Board Subsidy) of private geriatric hospitals are those who can afford to pay. They are often well educated and from the professional classes. They and their families are discriminating consumers, critical of the care provided. When considering long-stay care for an elderly relative, the families shop around the private hospitals before making a choice. After admission of the elderly person such families are well able to voice their criticisms if they are dissatisfied. In contrast the patients in public hospital had been 'placed' by the health authorities. There were few public hospitals, so the choice was restricted, and since they were run by the same organization (the Hospital Board) they were operated on the same lines and thus there was little difference between them. The families of elderly in public hospital care were presumably no less diligent about their elderly receiving good care, but if they were dissatisfied, major changes could not be effected easily or quickly. The public hospitals did not have business managers or a similar person responsible for the whole finance of the hospital. Extra funds could not be easily obtained. In fact for nursing care the public hospitals worked to a budget, determined annually, so that it would be difficult to provide extra nursing care.

(ii) Estimated laundry and medical costs

Since the consumption of medical and laundry services for individual patients in private hospital was not investigated, it was not possible to distinguish between resource use on account of disability and on account of care policy.
Therefore it is difficult to estimate what the level of these services would be for the public hospital patients. Certainly they would not be less than the mean cost per patient for the patients in private hospital. Therefore as in section 11.2.2, the mean cost of laundry and medical services in private hospital is used as the lower bound. The public hospital laundry and medical costs are taken as an upper bound.10

(iii) Estimated total cost per patient

The resulting mean costs for the lower and upper bound cases ($413 and $435) are shown in Table 11.8. The mean costs of the actual resources used by the public and private hospital subgroups in their own care settings ($443 and $334, respectively) are shown for comparison.

The gap between the cost of private and public hospital care has narrowed further by taking into account level of care and patient dependency. The cost difference is now estimated to be between $8 and $30 per patient per week, for the care of the public hospital patients.

This cost comparison has been based upon the public hospital patients consuming an average of 2.76 hours of direct nursing care per patient per day in private hospital (at a cost of $287 per week). This prediction is itself a random variable subject to error. A 95 percent confidence interval for the estimated weekly cost of nursing for public hospital patients

10 In fact the laundry cost in private hospital would be unlikely to reach the public hospital cost ($27.75) since the cost for the private hospital patients ($10.94) was much less than the cost for the male patients in public hospital ($21.24), whose level of incontinence was similar (see chapter 7, Table 7.3).
TABLE 11.8

PREDICTION OF WEEKLY COSTS OF PUBLIC HOSPITAL PATIENTS IF PLACED IN PRIVATE HOSPITAL - PRIVATE HOSPITAL LEVEL OF CARE

<table>
<thead>
<tr>
<th>Public Hospital Patients</th>
<th>Private Hospital Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual resource use</td>
<td>Predicted resource use</td>
</tr>
<tr>
<td>use (in public hospital)</td>
<td>(in private hospital)</td>
</tr>
<tr>
<td>Mean direct nursing care (hours per day)</td>
<td>2.33</td>
</tr>
<tr>
<td>Cost per patient per week</td>
<td>239</td>
</tr>
<tr>
<td>Nursing cost ($)</td>
<td>185</td>
</tr>
<tr>
<td>Hotel cost ($)</td>
<td>19</td>
</tr>
<tr>
<td>Medical cost ($)</td>
<td>443</td>
</tr>
</tbody>
</table>

(1) This method allows expenditure on laundry and medical costs equal to that incurred in private hospital (i.e. $11 and $14).

(2) This method allows expenditure on laundry and medical costs equal to that incurred in public hospital (i.e. $28 and $19).

(3) This is the nursing care which would be received in the private hospital by patients of the same average level of dependency as that of the public hospital patients.

(if in private hospital) is from $261 to $313 per patient.

The resulting confidence interval for total cost would be $387 to $439, using the lower bound costs, and $409 to $461, using the upper bound costs. Comparing these values with the actual cost in public hospital ($443) it is not possible to reject the null hypothesis that there is no difference between the total cost of private and public hospital care.

There are several assumptions implicit to the cost analysis above. The validity of these assumptions is consid-
ered in the appendix to this chapter, with the outcome that the conclusion above still holds i.e. if the private hospitals were to apply their own care policy to the care of the public hospital patients, these patients would receive more direct nursing care than they had received in public hospital. The resulting cost per patient would approach or could even exceed the per patient cost in public hospital.

In section 11.2.2 it could not be concluded that the higher levels of disability-related inputs (e.g. direct nursing care, which was 2.33 hours per patient) in public hospital were wholly on account of the greater dependency of the patients. The cost analysis above has taken into account patient dependency with respect to the use of direct nursing care and has shown that (at least) 2.33 hours of direct nursing care would also be provided in private hospital, for patients of the dependency of the public hospital patients. Hence we can conclude that the higher costs of the disability-related inputs (estimated to be between $50 and $72 per patient per week more) in public hospital are due to the greater average dependency of the patients. This result serves to show that using average costs to make cost comparisons between modes of mode is not a valid basis for comparison when the patient populations exhibit significant dependency differences.

A second result from the cost analysis above, is that the private hospitals would provide more direct nursing care than the public hospital (for the public hospital patients), leading to higher nursing costs. Since the total cost of this care in private hospital has been shown to be close to the public hospital cost, then it follows that the remaining costs (mainly hotel costs) are much less. Hence the composition of
total cost with respect to the nursing and non-nursing components are quite different in the two modes of care. This point is discussed in the next section.

11.2.4 Differences in Efficiency

Each hospital has features which dictate the level of efficiency of caring for patients. Such features include the type of staff employed, the morale of staff, the layout of the wards, the organization of ward procedures etc. In order to compare the efficiency of two hospitals it would be necessary to conduct an experiment whereby the same patients (or matched patients) were cared for by each hospital, at the same level of care. The data on costs which has been collected has been on patients at different levels of dependencies and the hospitals have offered different levels of care. Hence the effect of efficiency is confounded with these other effects. There is thus an identification problem when trying to estimate the effect of efficiency on cost.

The problem of identification has been partly overcome by using the relationship between direct nursing care and patient dependency (estimated in Chapter 7), to correct for differences in patient dependency and standard of care, with respect to the costs of nursing. Furthermore the effects of dependency and standard of care on two other cost items: laundry and medical services have also been considered. It has been assumed that the usage of other resources is not influenced significantly by differences in patient dependency and that the standards of care achieved by these other resources are compatible. Any residual differences in costs which occur after taking into account differences in patient dependency and standards of care may be attributed to efficiency effects.
The analysis of 11.2.3 has shown that the private hospital care policy applied to the public hospital patients would result in a total cost of care per patient very similar to that incurred in public hospital. Hence it appears that overall, the level of efficiency of the public and private hospitals is similar. However, closer examination of the constituents of costs reveals some important differences.

It was noted at the end of section 11.2.2 that although the total costs in each type of hospital are similar, these totals are formed in quite different ways. In private hospital, nursing costs are higher than in public hospital, for patients of the same average dependency, but the cost of hotel services is lower (see Table 11.8). Higher costs may result from a higher standard of care or lower efficiency (or a combination of both). These possibilities will now be discussed for the two sectors of care: hotel care and nursing care.

(a) Nursing care

From Table 11.8, the predicted nursing cost in private hospital when caring for the public hospital patients is $48 per patient per week more than the nursing cost in public hospital. The question is, to what extent is this attributable to a higher standard of care i.e. more or higher quality nursing care, and to what extent does it represent an efficiency loss i.e. similar care at a higher cost.

The quality of nursing care has already been considered in terms of the level of nursing staff employed (see section 11.2.2) and has been found to be comparable in each mode of care. It has been shown however that more direct nursing care (2.76 hours compared to 2.33 hours per day) would be provided in private hospital. The cost of this additional nursing care is $29 per patient per week.
The total nursing cost in private hospital would be higher on account of the difference between the job specifications of nursing staff in public and private hospital. The private hospital nurses perform more domestic tasks. An upper bound on the cost of this extra domestic work is $23, being the difference between the fixed cost components of nursing care in public and private hospital.\textsuperscript{11}

The cost of the additional direct nursing care in private hospital and the cost of the extra domestic work, is $52, which is in excess of the $48 difference between the nursing costs in public and private hospital. Hence it can be concluded that the higher nursing costs in private hospital are due to the larger quantity of direct care given to patients and therefore there is no efficiency loss (compared with the provision of nursing care in public hospital).

The question remains as to whether the higher input of direct nursing care in private hospital is appropriate or necessary, particularly when the public hospital provided less. That it is provided in the private sector is itself of interest. There may have been a consumer push for more nursing care, the need for nursing care being the reason for admission in the first place. Moreover when a satisfactory level of hotel services is provided by all private hospitals, the amount of nursing care becomes the yardstick for differentiating between them. It may also be noted that the 'provision of nursing care' is a differentiated product, able to

\textsuperscript{11} The weekly nursing costs were estimated by $99.26 + $68.26t in private hospital and $76.27 + $69.82t in public hospital for a patient receiving t hours of direct nursing care per day.
be offered at different levels (In section 9.9.2, Table 9.13, the cost of nursing care varied between six private hospitals). Finally the actual level of direct nursing care may be a function of the nursing staff available (as well as the dependency of the patients) an effect discussed by Jelinek (1967). There were certain standards, set by the Department of Health which influenced the number of nurses hired i.e. that registered nurses should be on duty at all times and that the ratio of the number of registered nurses to patients should be at least 1 to 5. This aspect has not been fully explored and the number of unregistered nurses must also play a part in the total input of nursing resources. Yet it is possible that these conditions lead to high nurse staffing levels in private hospitals relative to the dependency of patients being cared for, (compared to public hospitals) and allow the private hospitals to provide more direct care. The nursing hours available 'on the ward' per patient in public hospital were 3.373 (see Table 8.16) which were only 0.523 hours (31.41 minutes) per patient above the 2.850 hours available in the private hospitals. Yet their patients were considerably more dependent.

(b) Hotel services

The hotel costs in private hospital (for the care of the public hospital patients) were lower than the costs in public hospital by between $56 and $73 per patient per week (depending upon the estimated laundry cost – see Table

12 This is an average over the hours available in the two private hospitals (see Table 9.7) weighted by the number of male and female patients in public hospital.
11.8). Up to $23 of this difference may be attributed to the lower level of domestic support services for nurses in private hospital but this still leaves from $33 to $50 to explain. The higher hotel costs in public hospital could be due to a higher standard of hotel care or to inefficiencies in care provision. The standard of hotel care in each type of hospital was compared in section 11.2.3 and was found to be similar except for laundry services. The frequency of bed-changing was lower in private hospital (see Table 11.7), but this could be a reflection of the lower levels of incontinence of the patients. It would be possible, with an extra $17 (the difference in laundry costs) for the private hospital to offer the same level of service as the public hospital patients received. Therefore there is no evidence that the additional $33 in public hospital brought more or better hotel care. Furthermore, for the same arguments considered in nursing care above, the consumers of private hospital care would be unlikely to accept a lower standard. Therefore a more likely explanation is that the public hospital is less efficient at providing hotel services.

Referring to the costs for individual hotel services in each type of hospital (Table 11.1) and omitting costs of domestic services which private hospital nurses might be responsible for (i.e. orderlies and food and catering), it can be seen that maintenance, laundry and administration account for most of the extra hotel costs in public hospital. These services were provided centrally for the public hospital (by the Hospital Board), with no one having responsibility for expenditure in just this hospital. In fact the accounting system in operation at the time of the data collection
was not sufficiently detailed to allow expenditure on centrally provided services for an individual hospital to be ascertained. In contrast, in private hospital, separate records of expenditure for each hospital were kept for most services, and management was responsible for all costs incurred. Therefore although some of the higher public hospital hotel costs may have been unavoidable in the short run (e.g. the older public hospital may have been more expensive to heat etc.) the organizational structure and accounting methods may have played its part in reducing efficiency in the provision of hotel care, by if not hindering, at least not facilitating, cost control. The management structure in the private hospital provided the framework for monitoring costs and keeping a tight rein on resource use.

11.2.5 Differences in Nursing Care by Patient Dependency

In section 11.2.3 it was shown that the public hospital patients would receive more direct nursing care on average in private hospital than they had received in public hospital. In this section the nature of this result is explored, in particular whether the effect is uniform across all patients or whether it is linked in some way to level of dependency.

Figure 11.1 compares the actual direct nursing care received in public hospital with the predicted direct nursing care time in private hospital, for each of the 117 public hospital patients. The predictions were obtained from the

13 Estimates of expenditure on centrally provided services for the public hospital were conservative in order not to weaken the analysis of comparison of costs.
Figure 11.1  DIRECT CARE TIMES PREDICTED (IN PRIVATE HOSPITAL) AND OBSERVED (IN PUBLIC HOSPITAL) OF PUBLIC HOSPITAL PATIENTS

- TPREDPR: Predicted direct care time in private hospital (minutes in 24 hours)
- TPUB: Observed direct care time in public hospital (minutes in 24 hours)

Regression line: TPREDPR = TPUB

Legend:
- ○: 1 observation
- ×: 2 observations

N = 117
estimating equation 11.1, in section 11.2.3.

By comparing the observations with the line \( y = x \), it can be seen that for most of the lower values of direct nursing care time, the predicted time in private hospital exceeds the actual time in public hospital. This is the case for 87 percent of the patients who received up to three hours of direct nursing care in public hospital. Whereas for those patients receiving more than three hours, the reverse is the case. 74 percent of these would receive less care in private hospitals. Hence the differing care policies in public and private hospital do not seem to increase the direct nursing time per patient by the same amount (i.e. a simple upward shift of the data). In order to explore the effect of the private hospital care policy, a regression of the predicted care time in private hospital \( (TPREDPR) \), was performed, using the observed public hospital care time as the independent variable, \( (TPUB) \). The resulting estimated linear relationship was:

\[
TPREDPR = 77.76 + 0.53TPUB \\
(7.54) \quad (0.05)
\]

\[ R^2 = 0.51 \]

Both variables were measured in minutes per 24 hours. The standard errors of the estimates are shown in brackets. If the effect of private hospital care policy had been to add 25 minutes to the care time of each patient, the slope coefficient would have been zero. A 95 percent confidence interval for the slope is \([0.43 \text{ to } 0.63]\) which is not consistent with this hypothesis. Rather, the evidence is that the effect of care policy in private hospital is related to the care time received in public hospital \( (R^2 = 0.51) \). Since the
actual care time in public hospital has been shown to be related to measures of patient disability (section 7.6.3), then the effect of private hospital care policy is also related to patient dependency. There is an indication that the more heavily dependent patients would receive less direct care time in private hospital than they would in public hospital, but this conclusion is tentative since there were fewer observations in the very dependent categories and because the error of estimation using the private hospital model is high in this range.\textsuperscript{14}

Figure 11.2 shows the predicted direct care time in both public and private hospital (using the models developed in sections 7.6.2 and 7.6.3) for the combined data sets, i.e. 316 patients (117 in public and 199 in private hospital). Once again the line $y = x$ is shown for comparison.

The regression of predicted direct care time in private hospital, $T_{PR}$, on the predicted direct care time in public hospital, $T_{PUB}$, resulted in the following equation:


t_{PR} = 31.61 + 0.88t_{PUB} \ldots
\begin{align*}
R^2 &= 0.82
\end{align*}

The standard errors of the estimated coefficients are shown in brackets. The choice of independent variable is arbitrary so that the proper estimation procedure would be orthogonal regression. The orthogonal regression line lies

\textsuperscript{14} The standard error of prediction for a predicted care time of 240 minutes was 52 minutes, whereas the prediction error for a predicted care time of 76.28 minutes was 32.71 minutes (see Table 7.19).
between the two regression lines obtained by interchanging the dependent and independent variables (Malinvaud, 1970). The estimated equation with TPREDPR as the independent variable was:

\[
TPREDPUB = -13.97 + 0.92TPREDPR \quad \ldots \quad 11.4
\]

\[
R^2 = 0.82
\]

or \[
TPREDPR = 15.14 + 1.08TPREDPUB
\]

Both the regression lines are shown in figure 11.2. Both lie above the line \( y = x \), for the range of values observed. From the above analysis it may be concluded that it is not possible to reject the hypothesis that the slope of the orthogonal regression line is 1. Therefore from the evidence considered, the difference between private and public hospital care is not related to patient dependency. In private hospital each patient receives a fixed amount more nursing care than would be received in public hospital. The amount is estimated to be between 15 and 32 minutes per day. This conclusion is limited to the disability variables included in the private and public hospital models.

11.2.6 State Expenditure in Public and Private Hospital Care

In public hospital care the full cost falls on the state. In private hospital care the state pays a daily patient benefit for all patients and a portion of (extra hospital) medical services costs. Private hospital patients are charged a fee; but some patients receive an (income tested) state subsidy towards their fees. The contribution by the state to the cost of care in each type of hospital is presented in Table 11.9. The estimates shown for private hospitals are those determined in section 9.10.3, and the mean ($220) is based on the propor-
Figure 11.2 PREDICTED DIRECT CARE TIME IN PUBLIC AND PRIVATE HOSPITAL FOR 316 PUBLIC AND PRIVATE HOSPITAL PATIENTS

N = 316
(117 public patients)
(199 private patients)
TABLE 11.9
STATE EXPENDITURE ON PUBLIC AND PRIVATE
LONG-STAY HOSPITAL CARE 1983/84

<table>
<thead>
<tr>
<th>State Cost per patient per week ($)</th>
<th>Public Hospital</th>
<th>Private Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Cost</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mean</td>
<td>443</td>
<td>220(1)</td>
</tr>
<tr>
<td>range</td>
<td>275-664(2)</td>
<td>175-332(3)</td>
</tr>
<tr>
<td>Capital cost</td>
<td>26</td>
<td>48(4)</td>
</tr>
</tbody>
</table>

(1) Estimated from the average subsidy $78.16 paid to 460 subsidized patients (out of a total of 801) in 1983/84.
(2) Cost is related to income of patient and is not related to dependency.
(3) Cost is related to patient dependency.
(4) This subsidy is paid only to non-profit making hospitals.

The proportion of subsidized patients in 1983/84 (57.4 percent). This proportion has since increased hence the mean will now be greater. The actual operating costs in private hospital, ranged from $243 to $574 per week depending on the disability of the patient. Hence the share to the state could range from 30.5 percent to 136.6 percent.

11.2.7 Summary of Cost Comparison between Public and Private Hospital

Comparing the average costs per long-stay patient, the cost in public hospital exceeds that in private hospital by $109 per patient per week. This difference reflects the greater dependency of the public hospital patients, and differences in the care policies and efficiencies in the two modes of care.

In order to estimate the contribution of these three factors to the difference in cost, two cost comparisons were undertaken, in which the actual cost of patients in public
hospital care were compared with an estimate of the cost of these same patients if they were in private hospital. The first estimate was based on the patients receiving the same quantity of nursing time, and other dependency-linked inputs, as they had received in public hospital; the second estimate was based on their receiving care equivalent to that given to private hospital patients of the same dependency. In each case the estimated cost of care in private hospital was cheaper than the actual cost in public hospital. The difference in cost was estimated to be between $37 and $59 based on the first method of estimation and between $8 and $30 based on the second method.

The main reason why costs in public hospital were higher, was because of the greater dependency of their patients. If the private hospitals had to care for patients of this level of dependency, providing the public hospital level of disability related inputs, their costs would increase by between $50 and $72 per patient per week (to become $384 to $406). These results show the importance of taking into account differences in the disability of patient populations when comparing costs between modes of care.

If private hospitals cared for the public hospital patients in the same way as they did their own patients they would provide on the average more direct nursing care, (than those patients actually received in public hospital). It is estimated that this effect would be uniform over all patients i.e. all patients would receive a fixed extra amount of care.

In view of the estimation error in the predicted direct nursing care in private hospital, the total cost (based on this greater amount of direct nursing care) could approach or even
exceed the cost of care in public hospital.

Although the private hospital would spend more on nursing care, the cost of hotel services was much (at least $33) less than in public hospital. In this area the private hospital was more efficient and if savings could be made in public hospital it is the hotel services, particularly those provided centrally (to all hospitals in the region), where economies might be possible. Changes to the organizational structure and accounting methods would facilitate such economies.

These results may be compared with those of Ward and Daldy (1982) who found that the average cost of public hospital care was greater than private hospital care. They estimated that public geriatric hospital care was 16.8 percent more, and that care in geriatric wards of a public hospital was 45.6 percent more than private hospital care. The results obtained above show public hospital to be 32.6 percent more expensive than private hospital. The estimates of the cost of centrally provided public hospital services differed. Ward and Daldy apportioned these costs according to the average occupied beds (apart from laundry cost). The estimates used in chapter 8 were more conservative (see section 8.4.2, Table 8.11). Using the average occupied beds to apportion costs, the cost of centrally provided services increases to $91.08 and the estimate of the cost of public hospital care increases by $33.14 to $476 per patient per week. This is 42.5 percent more than the cost of private hospital care.
11.3 COMMUNITY AND PRIVATE HOSPITAL CARE

The difficulty, when comparing costs between institutions and community care, arising from differences between the average level of dependency of elderly in each mode of care, has already been discussed. A random sample of dependent elderly in the community will have a lower average dependency than a sample of hospital patients. Cost comparisons based on these samples may lead to misleading conclusions. The amount by which home care is cheaper may be over-estimated, part of the lower home care costs being due to the lower dependency of the elderly in the community. One way of overcoming this problem is to observe the same group of elderly in both modes of care, thus removing the need to correct for dependency differences. This was the approach used in this project.

The sample of 72 dependent elderly in the community which formed the basis for the costing of community care of chapter 10, were drawn from the short-stay patients at the private hospitals sampled (see section 10.2). The purpose of their hospital stay was to provide relief for their carers in the community. The nursing care consumed while in hospital was recorded, and using the estimates of private hospital costs derived in chapter 9, it is possible to estimate their costs in the hospital environment. Hence for this sample of elderly it is possible to contrast the actual costs in both community and hospital care.

The patients sampled may be considered to be 'at the margin' of home and hospital care in the sense described by Mooney (1978) i.e. they were a group of elderly in the community who were sufficiently dependent to consider hospital care
(in fact 13 of the 72 sampled had entered long-stay hospital care by the time of the community data collection). Moreover, the levels of disabilities and consumption of nursing care by the community sample overlapped with those of the long-stay private hospital patients (see Table 7.4 and figures 7.2 and 7.3).

A further difficulty in cost comparisons between home and hospital care is that some care given in the community is not paid, so that this form of input does not enter into estimates of cost based on payments. In chapter 10, the cost of community care included estimates of the cost of the unpaid inputs and the comparison of the costs of home and hospital care which is to follow, utilizes these estimates and hence acknowledges the contribution of the informal carers to care in the community.

11.3.1 Comparison of Average Costs Per Patient

The estimated mean costs per person, for the 72 sampled elderly in the community and hospital care are shown in Table 11.9. The costs of community care are those estimated using the resource cost approach (see section 10.10) i.e. they include the imputed value of informal carer and other unpaid help. The hospital costs are based on the estimates derived in chapter 9 (see Table 9.11). The estimate of nursing cost was based on the direct nursing care consumed by the community sample. The mean direct care time for the whole sample was 61 minutes and the estimated nursing cost was $168.66 per person per week. (The mean direct care times for elderly living alone and with others were 38.57 and 62.72 minutes respectively and the associated estimates of nursing costs were $143.14 and $170.62). The other costs of care i.e. capita
costs, cost of medical and hotel care, were assumed not to differ from those of the long-stay patients and the estimates of those costs are taken directly from Table 9.11. The resulting estimate of total cost for the community sample whilst in hospital is $386.38 per person per week. This is $39 less than the cost of a long-stay patient in private hospital (Table 11.1). The lower cost is on account of the lower quantity of direct nursing care consumed by the short-stay patients, i.e. 61 minutes per day compared to 96 minutes per day for the long-stay patients (see Table 7.7).

The costs are presented separately for elderly who live alone and those who live with others. Community care is cheaper for both groups, the cost difference averaging $166.78 per person per week for people living alone, and $189.18 for those living with others. Operating cost 'savings' by being in the community are almost the same for each group ($153 for those who live alone and $152 for those who live with

TABLE 11.9
MEAN WEEKLY COST OF COMMUNITY\(^{(1)}\) AND HOSPITAL CARE FOR 72 DEPENDENT ELDERLY 1983/84

<table>
<thead>
<tr>
<th>Hospital care</th>
<th>Operating costs</th>
<th>Capital costs</th>
<th>Total cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lives alone</td>
<td>269.59</td>
<td>91.27</td>
<td>360.86</td>
</tr>
<tr>
<td>Lives with others</td>
<td>297.07</td>
<td>91.27</td>
<td>388.34</td>
</tr>
<tr>
<td>All</td>
<td>295.11</td>
<td>91.27</td>
<td>386.38</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Community care</th>
<th>Operating costs</th>
<th>Capital costs</th>
<th>Total cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lives alone</td>
<td>116.70</td>
<td>77.38</td>
<td>194.08</td>
</tr>
<tr>
<td>Lives with others</td>
<td>145.08</td>
<td>54.08</td>
<td>199.16</td>
</tr>
<tr>
<td>All</td>
<td>142.32</td>
<td>56.35</td>
<td>198.67</td>
</tr>
</tbody>
</table>

\(^{(1)}\) This is the resource cost of Community Care.
others), but the savings in capital costs in the community are less for those who live alone. For the whole sample of elderly, the capital costs of community care were $35 less than those of hospital care, and the operating costs of community care were $153 less, making community care $188 cheaper (per person per week) than hospital care.

In Table 11.10 the operating costs have been disaggregated into service categories, so that the costs of community and hospital care can be compared more closely, and to highlight the areas where community care is cheaper. As before, the resource costs of community care are presented, but in addition, the expenditure in community care is shown.

The costs of each hotel service in hospital care are the average costs over all patients i.e. both long-stay and short-stay in the private hospitals sampled (see Table 9.11). Since the short-stay patients were less dependent than the long-stay patients (see Table 7.4), some of these estimates e.g. laundry cost, included in domestic costs may be too high.

There are doubtless inconsistencies in the categorization e.g. there are some administration costs for agency services included in the domestic cost of community care so that the comparisons cannot be made precisely. It seems that when comparing hotel costs and using the resource cost of community care there is little difference for domestic\textsuperscript{15}, gardening/maintenance and telephone/services costs. The difference of $27 in hotel costs is made up largely of energy and administration cost differences. In fact the hotel cost difference

\textsuperscript{15} This includes food, cleaning and laundry services.
TABLE 11.10  
ESTIMATES OF AVERAGE WEEKLY OPERATING COST OF CARE  
IN PRIVATE HOSPITAL AND IN THE COMMUNITY FOR  
SAMPLE OF 72 ELDERLY 1983/84  

<table>
<thead>
<tr>
<th></th>
<th>Hospital</th>
<th>Resource Cost</th>
<th>Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic (1)</td>
<td>70.13(2)</td>
<td>62.05</td>
<td>25.36</td>
</tr>
<tr>
<td>Energy</td>
<td>13.64</td>
<td>3.99</td>
<td>3.99</td>
</tr>
<tr>
<td>Administration</td>
<td>10.61</td>
<td>1.01</td>
<td>0.00</td>
</tr>
<tr>
<td>Telephone/rates/postage/</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>insurance</td>
<td>6.87</td>
<td>6.61</td>
<td>6.61</td>
</tr>
<tr>
<td>Gardening/maintenance</td>
<td>9.48</td>
<td>10.71</td>
<td>8.49</td>
</tr>
<tr>
<td>Supplies</td>
<td>1.78</td>
<td>1.31</td>
<td>1.31</td>
</tr>
<tr>
<td>Total Hotel</td>
<td>112.51(3)</td>
<td>85.68</td>
<td>45.76</td>
</tr>
<tr>
<td>Nursing</td>
<td>168.66(4)</td>
<td>48.44</td>
<td>19.35</td>
</tr>
<tr>
<td>Medical services</td>
<td>13.94(6)</td>
<td>8.20</td>
<td>8.20</td>
</tr>
<tr>
<td>Total operating costs</td>
<td>295.11</td>
<td>142.32</td>
<td>73.31</td>
</tr>
</tbody>
</table>

(1) This includes the provision of food, laundry and cleaning services.  
(2) This does not include the cost (estimated at $70) of domestic care carried out by nurses.  
(3) This is the average cost for all patients in the private hospitals sampled.  
(4) This cost is the nursing salaries cost, estimated by $99.26 + $68.26t (see Table 9.11) for a value of t of 1.02 hours of direct nursing care. It includes the cost of indirect care i.e. domestic work (estimated at $62) and administration, supervision etc., carried out by nurses.  
(5) This cost was estimated from the costs of the district nurse, home sitter and nursing care component of day care, plus the imputed value of the personal care and supervision carried out by the informal carers.  
(6) This is the estimated cost for the long-stay patients.

is much more than this since there is a domestic cost component in the nursing cost (some domestic duties being carried out by the nursing staff). The cost of this is estimated

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16 Only 50 percent of nurses' time in private hospitals was spent on direct care. The remainder was spent on patient supervision, administration and domestic duties.
to be $62 per patient per week. The total hotel cost in hospital including this cost, is $174 per week, which is $89 more than the hotel cost of community care. Some part of these extra hotel costs of hospital care may be accounted for by having to accommodate and manage a working environment for the staff, but the major factor is the cost of domestic care carried out by the nurses.

Comparing the nursing costs, the resource cost of community care appears to be $120 per week cheaper than the costs of nursing care in hospital. In view of the domestic component of cost within nursing cost (mentioned above) the cost difference of nursing care would not be as great as it appears from Table 11.5. Subtracting the domestic care component of nursing salaries ($62 the cost of nursing care (i.e. direct care, administration and supervision) in hospital is $104 which is $58 per patient per week more than the cost of nursing care in the community.

The difference in medical services cost was almost $6. But little significance can be attached to this since the estimate of the cost of medical services is the estimate based on typical use of G.P. services by long-stay patients which was 26 consultations per year. The mean number of consultations for the community sample (when living at home) was 9.72 (see section 10.8.1). The community sample was less dependent than the long-stay patients and there is no evidence that the usage of medical services in the hospital environment would have been as great.18

17 This estimate is based on a domestic care component of 80% of total indirect care casted out at the nurse aide rate. The cost of domestic care is $15 per patient per week more than in public hospital which is compatible with the 'up to $23' cost difference estimated in section 11.2.4.

18 It must be remembered that in private geriatric hospitals, patients receive G.P. services (rather than those of a hospital doctor), often continuing with their own G.P. It is difficult to say whether visits would increase or decrease relative to the number of visits received in the community.
When using the expenditures as estimates of cost in the community, the cost differences between community and hospital care are much greater. The hotel cost difference is $67; the nursing cost difference is $143. The total expenditure on community care is only $73 which is $222 per patient per week less than the cost of hospital care. Expenditure on community care is only 25 percent of the cost of hospital care. This result may be compared with that of Ward and Daldy (1982) who found that the cost of private hospital care was $112 per week more than expenditure on community care, ($202 compared to approximately $90 for elderly receiving a 'high level' of home care). Expenditure on community care from that study was estimated to be 45 percent of the cost of hospital care, a higher percentage than that found here. There are two differences between the estimation methods used. Firstly in this study living costs were estimated conservatively for the dependent elderly compared to the elderly in general (e.g. costs of holidays, travel etc., were excluded). Secondly the costs of community services were for those actually received, whereas in the Ward and Daldy study, the costs were of 'level 3' home care, a package of care considered appropriate for elderly who were sufficiently dependent for hospital care.

In the following section the provision of care in the community and hospital for the 72 sampled elderly are compared in an attempt to explain some of the differences in the costs of care. This is a similar exercise to that undertaken for the comparison of private and public hospital care. But (unlike the hospitals' comparison) the costing methods used for community care and private hospital care differed. The resource usages for many services in the community were
marginal (e.g. domestic care, supervision etc.), rather than average, and the unit costs of resources were low (e.g. for personal care the wage rate of a home sitter, rather than a qualified nurse was used). For these reasons the comparison of costs between home and hospital care is less precise than that between private and public hospital care.

11.3.2 Differences in Standard of Care

The total cost of care in hospital and in the community is a function of the quantity of resources consumed and the unit costs of those resources. Both of these may indicate the standard of care being provided. In this section these two measures are considered for each facet of care i.e. nursing care, hotel care and medical care.

(a) Nursing Care

Direct and indirect care are considered separately.

(i) Direct Nursing Care

Direct nursing care in hospital averaged 61 minutes per day or 7.12 hours per week for the 72 patients sampled. In the community the main sources of this type of care were the personal care component of informal care (which averaged 4.93 standard hours per week) and the district nursing time (mean, 0.50 hours per week). Other sources of personal care were parts of the day care service, home sitters and (one case only) a private nurse. The contribution to mean nursing care per patient over the 72 cases from these other services is very small. Therefore the average direct nursing care time in the community is unlikely to be more than five and a half hours per week for this group of patients. This is 21 percent less than the seven hours consumed in hospital.

The care policies at home and in hospital may differ.
But many tasks involved in direct nursing care are essential e.g. toileting; others would be undertaken with similar frequency at home or in hospital e.g. feeding, washing. For bathing however the hospital had a policy of bathing patients at least twice a week whilst at home the norm was once a week, usually by the district nurse. The mean number of baths or showers received in hospital by the short-stay patients was in fact 2.89 per week. This difference in care policy would account for some (about half) of the one and a half hour difference in direct nursing care consumed, but even after allowing for this, hospital care would provide about 45 minutes per week (13.6 percent) more direct nursing care than that received at home. This may be due in part to physical differences between the home and hospital care environments, so that patients in hospital may require help with tasks they could have managed at home (e.g. for toileting, the distances to facilities may be greater in hospital). Another factor may be that care in hospital is organized into regular regimes of care (e.g. toileting rounds) so that there is less possibility of adjusting the level of care downwards to the individual patient. In contrast, in the home situation, the package of care received, is tailored to the individual concerned. Moreover, economies of scale (which might have produced efficiencies in the use of the hospital nurse), are not possible for direct care, since the patients are a set of 'one-off' individuals. Therefore there are no savings to be made, (when providing direct nursing care resources), by caring for several patients rather than one. The effect then of 'extra' direct nursing care in hospital, is felt in toto, on the use of the nursing resource, and in the eventual cost.
Even if the input of direct nursing care in the community were to equal that in hospital, the cost (of direct nursing care) in the community would still be less, because of the unit costs of the nursing resource in the two environments.

In hospital each additional hour of direct nursing care costs $9.75 (see Table 11.11) whereas at home the imputed value of one hour of personal care was $4.92. The hospital rate is higher, partly because it incorporates the cost of covering holidays and days off, but the main difference is on account of the greater skill and possibly efficiency of the hospital nurse compared with the informal carer.

The marginal cost of one hour of the district nursing service is $14.92. This is the cost of *lengthening an existing* visit by one hour. This exceeds the marginal cost of direct care in private hospital (the reason being that district nurses are all fully registered, whereas hospital nursing staff include nurse aides who receive lower rates of pay.

The mix of personnel in community care (i.e. district nurse and informal carer) is such that the average cost of direct care is $7.35 per hour compared with $9.75 in hospital. There is an externality effect in the provision of direct nursing care in hospital in that, while a trained nurse is performing a care task, she is at the same time monitoring the patient's condition and checking for problems, so that the

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19 The cost of four weeks alternative care is an equivalent cost for community care. This is considered in 11.3.6. The cost of one day and one two-hour period free each week, $4.84, was allowed in the total resource cost of care in the community. This covers relief from all tasks i.e. domestic and personal care.
TABLE 11.11
WEEKLY COST OF DIRECT NURSING CARE RECEIVED
AT HOME AND IN HOSPITAL, PER PATIENT FOR
72 DEPENDENT ELDERLY 1983/84

<table>
<thead>
<tr>
<th>Source of Direct Nursing Care</th>
<th>Weekly Cost ($)</th>
<th>Weekly Time (hours)</th>
<th>Average Cost per hour ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informal carer</td>
<td>24.25</td>
<td>4.93</td>
<td>4.92</td>
</tr>
<tr>
<td>District nurse</td>
<td>15.63</td>
<td>0.50</td>
<td>31.26</td>
</tr>
<tr>
<td>Total (1) Community</td>
<td>39.88</td>
<td>5.43</td>
<td>7.35</td>
</tr>
<tr>
<td>Private Hospital</td>
<td>69.40</td>
<td>7.12</td>
<td>9.75</td>
</tr>
</tbody>
</table>

(1) This total excludes the direct nursing care components of day care, sitters, and paid private nurses. The effect on total cost and total direct care is minimal.
(2) This assumes extra care is given in the same proportions as care currently received.

higher unit cost in hospital reflects this higher standard of care. On the other hand there may be benefits of being cared for by a relative rather than a nurse. No allowance for this has been made in the imputed value of informal carer time.

The amount of direct care given by registered general nurses in hospital was estimated at 3.15 hours per week compared to 0.50 in the community. If the trained nurse component of care in the community (i.e. the district nurse input) were to be increased, substituting for some informal care, then the cost would be $10 for every additional hour (i.e. 14.92-4.92) assuming that this could be achieved by extending existing visits. Providing more visits would be much more expensive.

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20 This is based on the proportion of registered general nurses in the total staff, assuming all staff spend the same proportion of their time on direct care.
(ii) Indirect Nursing Care

The three main components of indirect care are supervision, administration and domestic care. The domestic care undertaken by nurses will be considered with other domestic services in the next section.

Unlike direct nursing care, there are possibilities of economies of scale in the provision of supervision. One nurse may supervise several patients (e.g. at night), yet each patient receives supervision. Provided the patient - nurse ratio is not too high, so that a nurse can meet a patient's needs within a reasonable time, then the quality of supervision in hospital where a nurse is shared by several patients, is not less than the supervision received at home in the one-to-one situation. For the sample of community patients considered, supervision at home was not provided at all times, (e.g. some carers felt they were able to go out for a few hours) and night supervision was provided by the presence of the carer in the house, but asleep. In hospital, nurses were on duty at all times, so that 24-hour supervision was provided. If some patients do not need this supervision, they receive it any way, so that in this sense supervisory care shares the difficulty of direct nursing care in adjusting the level of care downwards to the patient's needs.

Administration by nurses is divided into the management of the nursing staff, and patient management. The objective is to work out and deliver an appropriate package of care for the patient. The district nurse performs a similar function in the community but in a much more limited way. Since she visits only once or twice a week she cannot monitor the patient as closely as in hospital and since she has no author-
ity over the carer she cannot control the type of care given during the remainder of the week.21 The carer herself has the responsibility of providing good care and on calling upon extra services where necessary (e.g. doctor or therapists). But it cannot be assumed that the combined activities of carers and district nurses in the community would produce the same care plan as would the hospital ward sister, so that in this respect the standard of care in home and hospital may be different. Moreover even if the two parties selected identical treatment or change of treatment for the patient the more limited resource provision in the community (e.g. of physiotherapists and occupational therapists) may preclude the implementation of care plans in community identical to those in hospital.

The cost of administration and supervision in private hospital was estimated at $38 per patient per week (being the residual after deducting direct nursing care costs and the cost of domestic tasks by nurses from the total cost of $169). The administrative cost is unlikely to be more than 10 percent of the total nurse salaries (i.e. $17) so that supervision costs per patient are something in excess of $21 per week. This is the cost of nursing time which is not taken up with specific tasks. Of course supervision is given at all times. There are externalities in the provision of nursing care i.e. a nurse supervises several patients while she is attending to one patient (or performing a domestic task). The result of economies of scale and the externality effect is that the

---

21 In the vast majority of cases considered, the carers had tremendous respect for the district nurses and would follow through a prescribed care plan.
marginal cost of supervision per patient in hospital is very low.

In the home situation, supervision provided during periods when the care would normally have been at home was costed at zero. A small part of the $4.84 cost of 'relief' time each week was allowed for periods when the carer would be outside the home (see section 10.74). This is a marginal approach to cost estimation and rests upon the assumption that carers of the elderly are at home for large parts of the day and ignores any set-up costs involved (e.g. loss of work), or loss of recreation time (apart from the one-day relief each week allowed). If the carer is absent from the home for large parts of the day or night then the unit cost of providing supervision would be non-zero. Day-time supervision could be arranged relatively cheaply during weekdays using day-care services, but supervision at weekends and during the night would be at least $6.15 per hour (the night sitter wage rate) and would be very costly compared with the cost of supervision in hospital.

(b) Hotel Care

The cost of hotel services in hospital is $175 per patient per week (including the $62 estimate of the cost of domestic work carried out by nurse aides), which is $89 per week more than the resource cost of 'hotel' care in the community.

The cost of domestic care in hospital ($132 compared to $62 in the home) is responsible for most of the difference in hotel costs. Domestic care includes the provision of laundry, food and cleaning services. The laundry cost in hospital may be an over estimate for the short-stay patients (who were less
incontinent than the average patient) but since this was only $11 (see Table 11.1) any error is unlikely to significantly affect the results.

The standards of laundry and food provision at home were similar to those in private hospital (see Table 11.7), but the standard of cleaning was lower. The cost estimation of chapter 10 was based on a thorough clean once each week in community care, whereas in hospital the frequency was five times each week. Moreover although the unit cost of goods and materials for domestic services (food, etc.) were similar for the hospital and the community, the unit cost of labour in hospital was higher, particularly for domestic care undertaken by the nurse aides, for which the cost of each hour worked was $7.64 compared to $4.92 used in the resource cost of home care. It may be postulated that the hospital could have saved money by employing more domestic support but the externality effect of nurses must be borne in mind i.e. the nurses doing domestic tasks were 'at hand' for patients. Therefore they were at the same time providing patient supervision which in effect reduces the real cost of their domestic work. It could be argued that the marginal cost of this domestic work is zero. On the other hand nurse aides were never in sole supervision of patients. Registered nurses were always on duty. The presence of the nurse aides would alleviate the work of the registered nurse, but not eliminate the need for registered nurses entirely.

22 The cost of food etc. was estimated at home by the marginal cost, whereas in hospital the average cost was used. The marginal and average costs of these commodities in hospital would be similar in view of the number of patients.

23 The Dept. of Health regulations stipulated that registered general nurses be on duty at all times.
so that this argument, (that the marginal cost of domestic work by nurses is zero) cannot be followed to its absolute limit.

The lower standard of (at least some components of) hotel care and the lower unit costs of labour used in costing community care provide some explanation of the lower estimated hotel costs in the community. There is yet another difference which relates to the way the standards are achieved. In the home situation an elderly person may contribute in some way to household domestic tasks e.g. by making a cup of tea or doing a little dusting etc... In hospital this (usually) does not take place. Each patient would receive a minimum level of domestic care regardless of his or her ability to do domestic tasks.

Apart from the higher domestic cost component, there are two other categories of hotel care for which the costs are higher in hospital compared to the community. These are administration and energy. The energy cost in hospital was $13.64 per patient per week compared to only $3.99 at home, a difference of almost $10. The energy costs in the home were estimated from the cost of having a second person in a household (for households mainly of elderly people, see section 10.4.2). This is a marginal cost approach. The energy cost in hospital was the average cost per patient, which may be larger than the marginal cost. However the energy cost for a person living alone at home was only $5.57 (see Table 10.7) so this is not the full explanation.

Administration costs in hospital were $10.61, whereas at home they were only $1.01. The home cost is an under-estimate since the administration of some services (e.g. meals on
wheels etc.) is included under domestic care, but nonetheless the administration cost in hospital would still exceed that at home. As was mentioned in 11.3.1 the higher administration cost in hospital would be incurred to manage the large number of staff employed to provide hospital care. This factor may also contribute towards the higher energy and domestic care costs since working accommodation (offices; nurse dining rooms etc.) must be serviced.

Several contributing factors have been suggested for the higher hotel costs in hospital care compared to community care. Part of the difference is a function of the method of costing community care, which involved a marginal cost approach, and used low unit costs of labour. Differences in efficiency in the two modes of care have not been discussed. Because of the differing estimation methods used in home and hospital care, the comparison of costs is not sufficiently precise to permit reliable statements to be made suggesting the use of resources is inefficient in hospital compared to the home situation.

(c) Medical Care

The cost of medical services was $8.20 in the home. Most of this cost was for G.P. consultations, which averaged 9.72 per year, per person. Other costs were for prescribed pharmaceuticals, and a small amount of therapy care. In hospital, the cost of medical services was $13.94 for the long-stay patients, based on 26 G.P. consultations each year. Only half of these consultations resulted in prescriptions (see section 9.6.1) hence the average cost per consultation including pharmaceuticals, $25.0, was lower than the cost, which came to almost $40, in the community where the prescribing rate per consultation was 0.74. There is no information
available on the utilization of G.P. services in hospital by the sample of patients under discussion. If the level of contact in the community was maintained in hospital care then the cost of the G.P. service in hospital would be very similar to that in the community.\(^\text{24}\)

The use of physiotherapy and occupational therapy in the community was very low and this is reflected in the cost, which was $0.36 compared with $1.03 per patient per week in private hospital. Domiciliary therapy services are in short supply and access to this form of care in the community is very limited compared with the situation in hospital.

11.3.3 Differences in Cost for Individual Patients

The cost comparison in section 11.3.1 found that the resource cost of community care (i.e. including the value of informal help) was $153 per patient per week cheaper than hospital care. Expenditure on community care was $222 per patient per week less than hospital care. These results are the average, per patient sampled. In this section the variation of this cost difference is explained over the sample of patients, to investigate whether the cost differential is the same for each patient or whether there is some link between cost difference and patient dependency.

The variation in (non-capital) costs between individual elderly for each mode of care is shown in Table 11.12. The two estimates of the costs of community care are shown i.e. the

\(^{24}\) One difference that would remain would be that all G.P. consultations for the hospital patient would take place at the hospital whereas some patients at home would have consultations at the G.P.'s surgery, at a lower cost.
TABLE 11.12
ESTIMATES OF WEEKLY NON-CAPITAL COSTS OF HOME AND HOSPITAL CARE FOR 72 COMMUNITY BASED ELDERLY 1983/84

<table>
<thead>
<tr>
<th></th>
<th>Community Care</th>
<th>Hospital Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) Resource Cost ($)</td>
<td>142</td>
<td>73</td>
</tr>
<tr>
<td>Mean</td>
<td>142</td>
<td>73</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>48</td>
<td>28</td>
</tr>
<tr>
<td>Range</td>
<td>74-355</td>
<td>40-217</td>
</tr>
<tr>
<td>(ii) Expenditure</td>
<td>295</td>
<td>46</td>
</tr>
<tr>
<td>Mean</td>
<td>142</td>
<td>73</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>48</td>
<td>28</td>
</tr>
<tr>
<td>Range</td>
<td>74-355</td>
<td>40-217</td>
</tr>
<tr>
<td>(i) Resource Cost ($)</td>
<td>295</td>
<td>46</td>
</tr>
<tr>
<td>Mean</td>
<td>142</td>
<td>73</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>48</td>
<td>28</td>
</tr>
<tr>
<td>Range</td>
<td>74-355</td>
<td>40-217</td>
</tr>
</tbody>
</table>

resource cost and the expenditure.

Figure 11.3 shows the weekly resource costs in the community and the weekly cost in private hospital for each of the 72 elderly sampled. Community care was cheaper for all 72 patients sampled but clearly there was wide variation in the cost differential. The cost difference for individual patients ranged from $46.18 to $264.49, with a mean of $152.06 and a standard deviation of $43.85.

Regression analysis was used to estimate an equation relating the community resource cost, COMRESC with the private hospital cost, PRCOST. The equation was:

\[
\text{COMRESC} = -31.31 + 0.59 \times \text{PRCOST}
\]  

\[(11.5)\]

\[R^2 = 0.31\]

This regression line is shown on the graph. If community care had been a constant amount cheaper than hospital care, the coefficient of PRCOST would have been 1. The value of t to test this hypothesis is 3.92 which is highly significant \(p < 0.0005\). The evidence suggests that the gap between the cost of home and hospital care increases, as hospital costs
Figure 11.3 COMMUNITY RESOURCE COST V. HOSPITAL COST

![Graph showing the relationship between weekly community resource cost and weekly hospital cost with a regression line.](image)

Figure 11.3 COMMUNITY EXPENDITURE V. HOSPITAL COST

![Graph showing the relationship between weekly community expenditure and weekly hospital cost with a regression line.](image)
increase.

The expenditure on community care is shown against the cost of hospital care in figure 11.4. The gap between hospital care and community expenditure diverges even more than that for community resource cost (and hospital cost). As was shown in chapter 10 (section 10.10.3), expenditure is only weakly responsive to dependency. The informal care component takes the observations closer to the line where community cost is equal to hospital cost.

Figure 11.5 shows the resource cost of home care against direct nursing time in hospital. Since direct nursing time is related to the levels of patient disabilities, it is a proxy for dependency. The equation\textsuperscript{25} of the regression line relating community resource cost \( \text{COMRESC} \) to \( \text{TNTIME} \) the minutes of direct nursing care received in hospital was:

\[
\text{COMRESC} = 101.81 + 0.67 \times \text{TNTIME} \quad (0.67) (0.12) \\
R^2 = 0.31
\]

and may be compared with the equation determining the cost in private hospital.\textsuperscript{26}

\[
\text{PRCOST} = 225.71 + 1.14 \times \text{TNTIME} \quad (11.7)
\]

As dependency increases, so \( \text{TNTIME} \) increases, but the slope of the hospital cost equation is greater so that for patients of higher dependency, the difference between the cost of home care and hospital care is larger.

\textsuperscript{25} This is a restatement of equation 11.5, using the relationship between \( \text{PRCOST} \) and \( \text{TNTIME} \) (equation 11.7).

\textsuperscript{26} This is the equation used in section 9.12, with \( \text{TNTIME} \) measured in minutes (i.e. \( \text{TNTIME} = t/60 \)).
The mean costs of home and hospital care for the sampled group, $142 and $295, are shown in figure 11.5. The sampled group can be considered to be at the margin of home and hospital care. The average hospital cost for this group $295, is less than the mean cost of long-stay hospital patients (which was $334). Therefore using the mean cost difference i.e. $153 to estimate the 'savings' for an individual being in community care is more accurate than using the mean hospital cost of the long-stay patients. But nonetheless it can be seen from figure 11.5 that the actual hospital cost for individual elderly varies considerably about this mean.

If the comparison had been made between variable community costs and average hospital costs (as in Ward and Daldy, 1982) then the gap between home and hospital costs would have been underestimated ($A_2C_2$ instead of $A_2D_2$ in figure 11.5), for the very dependent elderly (because the costs of hospital care for this group far exceed the average hospital cost) and the gap in cost would have been overestimated ($A_1D_1$ instead of $A_1B_1$) for the least dependent elderly (who cost much less to care for in hospital than the average hospital patient). Such results could influence policy in favour of community care for the less dependent elderly because it appears so much cheaper. In fact if such 'less dependent' patients in hospital were cared for at home, very little nursing time would be saved in hospital, and the 'savings' would be less than anticipated.

27 The average cost of community care for the sampled group can also be expected to be greater than the average cost of all disabled elderly in the community, since all the elderly sampled required some personal care as well as domestic care, whereas there are many more elderly in the community who are disabled, with respect to domestic tasks only.
Figure 11.5  COMMUNITY RESOURCE COST BY DIRECT NURSING CARE IN HOSPITAL

- Mean hospital cost (long-stay patients) $334
- Mean hospital cost (short-stay patients) $295
- Mean community resource cost $142
In the case of the very dependent patients, the variable hospital costs used in the comparison have focussed on just how expensive hospital care is, for these patients, compared to community care. For example, for a patient who requires 180 minutes of direct nursing care per day the weekly hospital cost is $430 and the community resource cost is estimated (using the regression equation) to be $222. Expenditure in the community is estimated at $100. Therefore it is desirable from the perspective of total resource provision that very dependent elderly be cared for at home rather than in hospital.

11.3.4 State Expenditure on Community and Hospital Care

Table 11.3 shows the state expenditure on community care of the 72 sampled elderly. The state expenditure if those elderly were to be cared for in private hospital is also shown (for this estimation an assumption has been made about the income of the community sample - see footnote (1) to Table 11.13). Figure 11.6 shows the state expenditure on community care for each of the 72 sampled elderly, and the estimated state cost of hospital care. The estimated state expenditure on hospital care ranged between $175 and $332, dependent upon the Hospital Board subsidy paid. In contrast the state contribution in the community averaged $22 and was under $75 in all but one of the cases sampled. These figures may be compared to the total cost of care for individ-

28 The equation relating community expenditure COMEXP, to hospital cost, PR_COST, is:

$$COMEXP = 13.98 + 0.20 \text{PR_COST}.$$
TABLE 11.13

STATE EXPENDiture ON COMMUNITY AND HOSPITAL CARE FOR 72 DEPENDENT ELDERLY 1983/84

<table>
<thead>
<tr>
<th>Weekly Expenditure per person ($)</th>
<th>Community Care</th>
<th>Hospital Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Cost:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mean</td>
<td>22</td>
<td>220 (1)</td>
</tr>
<tr>
<td>standard deviation</td>
<td>10</td>
<td>not known (3)</td>
</tr>
<tr>
<td>range</td>
<td>2-137 (2)</td>
<td>175-333</td>
</tr>
<tr>
<td>Capital Cost:</td>
<td>0 (4)</td>
<td>48</td>
</tr>
</tbody>
</table>

(1) The income distribution of the 72 sampled elderly is assumed not to differ significantly from that of the long-stay patients in private hospital. Therefore the mean subsidy paid would be the same (see Table 11.9).

(2) There was one case where expenditure was $137; for the other 71 cases it was under $75.

(3) This cost is related to income of patient, not to patient dependency.

(4) There were some costs e.g. suspensory loans for house alterations and the cost of wheelchairs, sticks etc. The average cost per person per week is small and has not been estimated.

State expenditure on community care was less than 63 percent of total expenditure (and was less than 48 percent in all but one case) whereas the state contribution to hospital care could be between 34 percent and 146 percent of total cost.

The estimated mean state expenditure per person for private hospital care of the 72 sampled elderly is ten times the state expenditure per person in community care. There is thus a sufficient margin of cost to enable substantial increases in state expenditure on community care, before

29 Since the state subsidy was sufficient to cover the average patient fee, the total state expenditure could be higher than the actual cost for a particular patient if that patient were less dependent than the average patient at the hospital concerned.
Figure 11.6 STATE EXPENDITURE ON COMMUNITY CARE BY DIRECT NURSING CARE IN HOSPITAL

- State cost in private hospital
  - Fully subsidized patient: $332
  - Non CHB subsidy patient: $175

- Direct care time in hospital (minutes in 24 hours)
  - 0 to 400 minutes

Symbols:
- @ 1 observation
- X 2 observations
- △ 3 observations
the cost approaches that of hospital care. Research has shown that higher provision of community services delays or reduces admission to long-stay institutions (Challis and Davies, 1981, Hendrikson, Lund and Stromgard, 1984, and Hughes, Cordray and Spiker, 1984). From the public purse point of view there are thus incentives to increase state expenditure on community care and offer additional community services.

Taking the wider view, of the total cost of care borne by all sectors of society, this cost, as estimated, is also less, for community rather than hospital care, and the 'savings' are higher for the very dependent elderly, (who have very high hospital costs). There is therefore an even stronger argument for increased state expenditure for the very dependent elderly.

Research has shown that elderly people prefer to stay at home rather than enter long-stay institutional care (Scotts, 1979). There is thus some intrinsic value to the elderly of staying at home and living a 'normal' life. In addition to this benefit there is also evidence that increasing the community services to elderly who live at home reduces mortality (Challis and Davies, 1981, Hendrikson, Lund and Stromgard, 1984, Weissert, Wan, Livieratos and Pellegrino, 1980) and increases the perception of physical well-being (Hughes, Cordray and Spiker, 1984). There are therefore benefits to the elderly of expanding community services.

Any expansion of community services will involve more than just increased state expenditure. The disadvantages of the organization, delivery and method of funding community support services, described in Chapter 3, i.e. as a set of separate services, will have to be overcome. Two of the
studies cited above were model programs and all four incorporated substantial changes in the method of provision of community services. Suggestions to improve the system of community care in New Zealand are considered in Chapter 12.

11.3.5 Hospital Relief for Carer Scheme

The sample of elderly in the community were selected from a group of elderly using the 'Relief for Carer' scheme, under which the elderly person receives four weeks' care in hospital free of charge, so that the carer in the community may rest. The cost of this hospital care has not been taken into consideration. In effect a separate mode of care is being offered i.e. 48 weeks at home and four weeks in hospital. In this section the cost of this mode of care will be estimated.

The modes of care being considered is a convex combination of home and hospital care, therefore the associated cost will fall in between the cost of home care and the cost in hospital. The mean cost in hospital of the 72 elderly sampled was $281.16 per week exclusive of extra-hospital medical care. The cost of medical care will be estimated at $8.20, equal to that incurred in the community. The resource cost of community care is $142.32 per week. Using these estimates for the costs of each mode of care, and weighting by the number of weeks in each mode of care, the cost of the care combination may be estimated. Two estimates are shown based on the resource cost and expenditure approaches to community costing. The weighted cost of care using the resource cost approach is $153.63 per week and using the expenditure approach is $89.93 per week. The state expenditure for each week of community care was $22.42. Hence by offering this scheme,
### TABLE 11.14
ESTIMATES OF COST FOR RELIEF FOR CARER SCHEME
COST PER WEEK ($)

<table>
<thead>
<tr>
<th></th>
<th>Community</th>
<th>Hospital</th>
<th>Weighted Cost (1)</th>
<th>Weighted Expenditure (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>22.42</td>
<td>287.18(3)</td>
<td>42.79(3)</td>
<td>42.79(3)</td>
</tr>
<tr>
<td>Family</td>
<td>115.67</td>
<td>2.18</td>
<td>106.94</td>
<td>43.53</td>
</tr>
<tr>
<td>Voluntary</td>
<td>4.23</td>
<td>0.00</td>
<td>3.90</td>
<td>3.61</td>
</tr>
<tr>
<td>Total</td>
<td>142.32</td>
<td>289.36</td>
<td>153.63</td>
<td>89.93</td>
</tr>
</tbody>
</table>

(1) This estimate uses the resource cost of community care.
(2) This estimate uses community expenditure $73.31 instead of the resource cost.
(3) In fact the state contribution is more than this because the state pays the average hospital cost, $321 per week. This increases the weighted cost to the state by $3.

the state has almost doubled its expenditure.

#### 11.3.6 Summary of Cost Comparisons of Community and Hospital Care

The costs of care in the community and in hospital have been compared for a sample of 72 elderly people. Estimating the costs for the same group of elderly in each mode of care removed the necessity for correcting for differences between the average dependency of elderly in each care environment. Expenditure (non-capital) on community care, $73.31 per patient, was $222 per week less than the $295 per week cost of hospital care. Using the resource cost of community care, whereby the imputed value of informal care help is included in community costs, the gap between the cost of home and hospital care narrowed to $153 per patient per week. The capital costs of home care were on average $35 per week less than those of hospital care.

The actual cost differentials obtained, depends to some extent on the method of costing community care, particularly
with regard to the choice of the unit costs of informal carer time. Notwithstanding this, several factors were found to contribute to the higher hospital costs. The standard of care was higher e.g. the frequency of baths and room-cleaning were both higher in hospital; therapy services were more readily available. The average unit cost of labour was higher reflecting the greater expertise and training of the hospital staff. A further factor considered was the inflexible nature of hospital care in that care cannot be given below some specified level e.g. all patients have night supervision; no patient contributes to domestic tasks herself.

The cost differential was not uniform over all patients. The cost difference ranged between $46 and $264 per week and the mean cost difference was greater for the more dependent elderly compared with those less dependent. This result shows that for the very dependent patients, spending on community care could be increased substantially before the cost approached that of hospital care.
ASSUMPTIONS OF ESTIMATION OF COST OF PUBLIC HOSPITAL PATIENTS IN PRIVATE HOSPITAL

In section 11.2.3 the cost of the public hospital patients, if they were to be cared for in private hospital, under the private hospital care policy, was estimated. Several assumptions were implicit to the estimation procedure. These assumptions are now considered. Two assumptions relate to the use of the private hospital nursing care model, to predict the direct care which would be received by the public hospital patients in the private hospital care setting.

Firstly the disability assessments of the public hospital patients which were fed into the model of nursing care were obtained in the public hospital setting. For these assessments to be compatible with assessments in the private hospital setting it must be assumed that the assessors (the senior nursing staff) would interpret the assessment instrument in a similar fashion and that any differences in the physical characteristics of the hospitals would not be sufficient to lead to significant differences in the assessments obtained. Since the senior nursing staff in each type of hospital had undergone similar training and shared similar work experience (several of the private hospital nursing staff had previously held senior positions in public hospitals) there is no reason to suspect any assessor bias. With regard to the physical characteristics of the buildings, the public hospital was larger but both types of hospital were divided into wards of comparable size (24-36 patients in the private hospital wards; 35 in the public) with similar facilities, so that
the effect on patient assessment of any differences is likely
to be small.1

The second assumption refers to using the private hospital
nursing care model outside the range of the sample data on
which it was estimated. The nature of the relationship be-
tween nursing care and disability may change if the nursing
staff in private hospitals were faced with the care of the
public hospital patients, who were as a whole much more depend-
ent than the patients they usually cared for. In fact,
although on average the public hospital patients were more
dependent than the private hospital patients, there was an
overlap of patients in the two modes of care (see section
7.4, Table 7.1) so that the private hospital model was esti-
mated over the range of patients to be found in public
hospital. In conclusion having considered the assumptions,
the use of the private hospital model would seem to be justi-
fied and the prediction of the direct nursing care time at
2.76 hours per patient, for the public hospital patients
to be reliable.

An assumption implicit in the prediction of the cost
in private hospital of the public hospital patients, is the
independence of the cost components. The response of each
cost component to the more dependent public hospital patients
have been considered separately. Yet (as was found in the
cost analysis of a number of private hospitals in section

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1 The assessment item, used in the model, which is most
likely to be sensitive to physical differences between
the buildings is toileting ability. Even if the private
hospital facilities were such that each public hospital
patient would score one point less on this item, the
estimated per patient cost would be reduced by only
$11.38. Since most public hospital patients were not
self-mobile, the effect on toileting scores and hence
cost would be much less than this.
9.9.2) there may be some substitution between cost components. The upper bound estimates of Table 11.3 were based on 2.76 hours of direct nursing care, (a higher consumption than in public hospital) and the public hospital expenditure on therapy, which exceeded the private hospital expenditure. It may be that with this high level of occupational and physiotherapy the nursing care consumption could be reduced (or vice versa), hence the upper bound estimate on total cost $435, would not be achieved. A revised upper bound estimate using the private hospital expenditure on therapy and other medical services would be $430. The revised confidence interval for total cost taking into account the error in the predicted nursing care is $404 to $456 per week. The conclusion that we cannot reject the hypothesis that there is no difference between the cost of public and private hospital care, remains unchanged.

Finally when estimating the nursing costs for the public hospital patients in private hospital, the estimates were:

predicted nursing costs = 99.26 + 68.26 t

This assumes that the two constants in the equation remain unchanged when the average dependency of patients increases. The first coefficient relates to the cost of indirect care. It is the product of the amount of indirect care and the average cost per hour of providing it. The amount of indirect care is unlikely to change substantially. This was discussed in sections 8.5.4 and 9.5.4. Connor, Flagle, Hsieh, Preston and Singer (1961) found that indirect care was not related to patient dependency. The cost per hour of indirect care depends upon the composition of staff doing the work. Since domestic work would continue to be
done primarily by aides, and administration by registered
nurses, the cost per hour is unlikely to change significantly.
Therefore the predicted cost of indirect care is a reasonable
estimate.

The second coefficient relates to the cost of direct
care. If the public hospitals supplied more direct care
per patient by employing nurse aides rather than a 'mix' of
staff in proportion to those already working at the hospital,
then the additional direct care would be at the nurse aide
rate i.e. $53.65 per hour. This is method BI of estimation
in section 9.5.5). The cost of the additional 1.16 hours
of care (i.e. 2.76-1.60) would be $62 rather than $79. The
estimated nursing costs for the public hospital patients
in private hospital would reduce (by $17) to $270 per patient
per week. The 95 percent confidence interval for this estimate
would be $260 to $280. The predicted total cost per patient
would reduce to $418 with a 95 percent confidence interval
of $398 to $438. The mean cost of public hospital care ($443)
is now just outside these limits.

It is not possible to predict precisely the composition
of nursing staff the private hospitals would provide to care
for patients of a higher average dependency. It is likely
that the actual strategy would fall somewhere between the
two extremes considered i.e. keeping the composition of staff
the same, or drastically altering it by hiring only nurse
aides as additional staff. Whatever the strategy, the total
cost of private hospital care is approaching the cost of
public hospital care and some strategies could result in
costs which exceeded it.

There are other costs incurred when a patient is in
long-stay hospital care, beyond those considered here. These include the cost of personal items (clothes, toiletries etc.) and the cost of specialist medical treatment. It has been assumed in the cost comparison that these costs are the same in public and private hospital. In particular when estimating the costs of medical care in sections 8.6 and 9.6 it was assumed that access to specialist medical facilities, e.g. major surgery, was similar in each mode of care. This has not been investigated, but it would seem to be a reasonable assumption. One possible difference could be the choice of medical facility, i.e. public or private. It may be that private hospital long-stay patients may be more likely (than patients in public hospital) to use private hospitals for surgery. The costs of surgical procedures and the share of these costs borne by the state would then differ.
CHAPTER 12

MAIN FINDINGS, CONCLUSIONS AND POLICY IMPLICATIONS

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12.1 SUMMARY OF RESEARCH

The objectives of the research (stated in Chapter 1) were to ascertain whether the costs of care of the dependent elderly varied between patients within a particular care environment, and if so to develop estimates of individual patient cost (in a particular care environment) which reflected the disability of the patient. Three care environments were to be considered: private hospital, public hospital and the community. The disability-related cost estimates would enable meaningful comparisons of the costs of care to be made, which took account of differences in the average level of dependency of elderly in each mode of care.

Three samples of elderly were taken, one in each mode of care. All resources used as inputs to care were measured and costed. For the costing of community care this included the estimation of the imputed value of those resources for which no cash payments were made i.e. informal carer help.

The dependency of patients was measured using 18 assessment items of functional capacity and self-care disability (see Appendix 1). A wide range of dependency was observed in each mode of care. The average level of dependency of public hospital long-stay patients was significantly higher than that of the private hospital long-stay patients, on account of the very dependent women in public hospital. The long-stay private hospital patients were in turn more dependent than the community based elderly. There was however considerable overlap be-
between private and public hospital patients and community based and private hospital patients.

In hospital care, the resources used were examined to identify those which were likely to vary with patient dependency, and also formed a significant proportion of total costs. Nursing care satisfied both these criteria. It accounted for 63 percent of (non-capital) costs in private hospital and 54 percent in public hospital. A body of literature existed (discussed in Chapter 6) which established the relationship between patient dependency and the direct (individual patient) care component of nursing care.

The direct nursing care consumed by patients in public and private hospital was measured. Models were developed which related the consumption of direct nursing care to measures of patient disabilities. The method of estimation used was weighted least squares, since one of the necessary assumptions of the ordinary least squares estimating procedure i.e. homoscedasticity of errors, was found to be violated, in that the variance of the care times increased with increasing dependency. For private hospital care a model with seven independent variables explained 73 percent of the variation in direct nursing care; in public hospital care, a model of the same form, with six independent variables explained 66 percent of the variation.

Direct nursing care formed 69 percent of the nurse workload in public hospital, and 50 percent in private hospital. The cost of the direct nursing care consumed by each patient was estimated. The cost of other resources used in hospital was assumed not to vary significantly between patients and was estimated by the average \(^1\) (for the particular hospital). In

\(^1\) Laundry cost was allowed to vary in public hospital.
this way estimates of the cost of care, for individual patients, in public and private hospital, were obtained, which were functions of the amount of direct nursing care consumed by the individual patient (Chapters 8 and 9). Since direct nursing care had been related to measures of patient disability, the direct nursing care is a proxy for patient dependency and therefore the estimates of cost for individual patients are dependency-linked estimates.

The costing analysis identified nursing care as the major determinant of the variation between patients in the cost of long-stay geriatric hospital care. The estimates of the cost of care for individual patients in public hospital, based on the direct nursing care consumed, ranged from $275 to $664 per week with a mean of $443 and a standard deviation of $90. The cost of care for long-stay patients in private hospital ranged from $243 to $574 per week with a mean of $335 and a standard deviation of $84. For half the patients in each mode of care the individual cost differed from the average cost by more than $50 per week. The wide range of disabilities observed in both public and private hospital leading to a variable consumption (between patients) of nursing care, establishes the need for variable rather than average cost estimates in planning for the care of the elderly.

For community care (Chapter 10) two approaches to costing were used, the resource cost approach which included the value of unpaid inputs to care, and the expenditure approach which considered only those inputs for which payments were made.

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2 Variation in use of medical and therapy services would not lead to substantial additional variation in total cost between patients.
Using the resource cost approach, the mean cost of community care was $142 per week with a standard deviation of $48 and ranged from $74 to $355. The mean expenditure was $73 with a standard deviation of $28 and ranged from $40 to $217. Informal (unpaid) care was found to be the largest single component of cost accounting for 48 percent of the total resource cost.

A model was developed relating the total resource cost in the community to patient disability measures, resulting in an $R^2$ of 0.82. Models relating informal carer input and formal agency input to the patient disability levels resulted in $R^2$ of 0.72 and 0.31 respectively showing that the informal care component responded strongly to the disability of the elderly person, whereas the formal agency input responded only weakly.

The sources of funding of community care were analysed. The family, state and voluntary sectors contributed 81.3, 15.7, and 3.0 percent respectively of the total resource cost per elderly person and 64.1, 30.6, and 5.3, percent of total expenditure. These results of the costing of community care emphasize the value of including the cost of informal care in the total cost. The effect of greater disability, in terms of increased usages of resources, is not reflected in the expenditure on care, but in the cost of informal care.

The dependency-linked cost estimates were used to compare the cost of care in each care environment (Chapter 11). Two comparisons were made: between public and private hospital long stay care, and between community and private hospital care.

The average (non-capital) cost of public hospital care was $109 more than that of private hospital care, but at least half of this cost difference is on account of the greater average dependency of the public hospital patients. Furthermore, the
private hospital model (relating direct nursing care to patient disabilities) predicted that the amount of direct nursing care given to the public hospital patients if in private hospital would exceed (by 25 minutes per patient per day) the amount consumed in public hospital. If this is taken into account the average cost of private hospital care for these patients could approach or even exceed the cost in public hospital. Even so, the hotel cost component of private hospital care would be less (by at least $33 per patient per week) than that of public hospital care. The public hospital appears to be a more efficient provider of nursing care and a less efficient provider of hotel care. The organization of the provision of centrally-provided hotel resources (rather than those provided "on-site") in public hospital, was identified as a factor of likely significance to the higher public hospital hotel costs.

The cost of community and private hospital care was estimated for the same group of elderly, hence removing the need to correct for differences in the average dependency of the patients. The cost of hospital care for this group was $295 per patient per week (which was $39 less than the cost of the (more dependent) long-stay patients. Their care in the community was $153 per person per week cheaper than their hospital care, using the resource cost approach, (and $222 cheaper using the expenditure approach). The difference for individual elderly ranged from $46 to $264 per week and increased with increasing dependency. Hence the savings to be gained by caring for very dependent elderly at home rather than...

---

3 These elderly used the private hospital for a short-stay to provide relief for their carers in the community.
in hospital were substantial, more than would be suggested by a
cost comparison using average hospital costs. Conversely the
savings by caring for less dependent elderly at home, rather
than in hospital were less than would be indicated if their
hospital costs had been estimated by the average hospital cost.

12.2 APPLICATION OF RESULTS

The results are of immediate application to the particular
hospitals and the region (Christchurch) on which they were
based.

12.2.1 Nurse Staffing Levels in Hospital Care

The average dependency of patients in public hospital
differed significantly between wards yet the nurse staffing
levels on each ward were the same (see Appendix to Chapter 8).
There is a need to build patient dependency into the determin-
ation of ward staffing levels. The model relating direct nurs-
ing care could be used to develop a more rational basis for
staffing the wards.

The average dependency of patients in the private hospital
for men did not differ significantly from that of patients in
the women's hospital, yet the staffing level was higher (see
Appendix to Chapter 9). The men's hospital was smaller and
therefore a higher level of nursing input per patient may have
been inevitable (e.g. to ensure 24 hour supervision) but this
aspect could be explored.

In both public and private hospital, it was found that th
variation between patients in the direct care time consumed by
patients of the same level of dependency, was greater for the
very dependent patients. Therefore in addition to providing
nursing resources for the average expected workload, hospitals
caring for very dependent patients must make some provision for this high variability (see section 7.7). The prediction errors estimated for the models relating direct nursing care to patient disabilities (see Tables 7.19 and 7.25) would assist in this planning process.

12.2.2 Provision of Private and Public Hospital Care

The research has shown that for the sampled hospitals, the cost of private hospital long-stay care is less than the cost of public hospital long-stay care, but that the patients are on average less dependent. This result is also true for all of Christchurch. The cost comparison can be made from the private hospital fees in section 9.2.1 and the public hospital costs in section 8.2.2. A survey of patients in the region found a lower average dependency for patients in private compared to public hospitals (Sainsbury, Fox and Shelton 1986). The results raise several questions of interest to planners.

Firstly is the current division of patients between the private and public sectors satisfactory? If it is not then the access of patients to, and the funding of patients in, private hospital care need to be reassessed. Differential access to each type of care and the system of state funding of private hospital care were discussed in section 3.1, and neither of these are conducive to increasing the average dependency. The Health Department funding will be discussed in section 12.3.2. In addition to this form of state funding the Hospital Board pays a patient subsidy (for approved patient up to the value of the average fee, yet the cost for individual elderly people may far exceed the average fee (which is based on the patients already in the hospital). A variable subsidy
based on patient dependency would help to close the gap between the type of patients cared for in public and private hospitals.

The research has shown that the lower dependency of the private hospital patients is not the full explanation for their lower costs. This raises questions about the standard of care. The research has established that the standard of care is not lower and in fact the private hospitals gave more direct nursing care (for a patient of a particular level of dependency). The determination of an 'appropriate' or 'correct' amount of direct nursing care for a patient of a particular disability is outside the scope of this study. But since the hospitals sampled were offering different levels of nursing care for similar patients, this aspect could be investigated. One outcome might be that the level of nurse staffing in public hospital would be increased.

Finally since the lower private hospital costs cannot be fully explained by the type of patients cared for and the standard of care then the conclusion is that there are some efficiencies in the provision of care in private hospitals. The analysis showed that the 'hotel' resources centrally provided by the Hospital Board (to all public hospitals in the region) were mainly responsible for the residual higher public hospital costs (after taking account of patient dependency differences). This raises the question of how these resource are managed.

Individual hospitals are not in control of the provision

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4 The Hospital Board has the necessary information on patient dependency upon which to select a subsidy for a particular patient, since that patient has to be assessed by the Board Geriatrician.
of these resources, nor is the hospital accountable for the associated costs incurred. Savings made in the use of these resources cannot be used to purchase other services the hospital would wish to have. Hence there is little incentive for efficiency. Moreover those responsible for the provision of these resources are remote from the hospital and not necessarily in the best position to suggest where savings could be made. A fruitful area for exploration would be the development of a management structure which gave responsibility to one person based at a hospital, for total expenditure on all resources used at that hospital. This would be a similar role to that undertaken by a business manager in private hospital care. The accounting system would have to be more detailed than the system in operation at the time this research was conducted, in order to allow identification of the cost to the individual hospital, of centrally provided services.

The results show that savings in the cost of nursing resources in public geriatric hospital seem unlikely. In fact there may be a case for increasing the nursing input. The most likely area for potential cost reduction is in the cost of hotel services, particularly those provided centrally. Creation of a business manager responsible for all costs at a hospital (including those of centrally-provided services) may be a mechanism for reducing overall costs.

12.2.3 Organization of Community Services

The research has shown that elderly who are very dependent receive very little additional support-services from the state, compared with elderly who are less dependent, with the result that even greater demands are placed on the informal carers
(usually relatives). The provision of formal agency services need to be organized so that the total input of all community services to a particular person, responds more strongly to the dependency of the person. In order that this can be achieved, the provision of services needs to be integrated. A patient record system is required so that providers of each service are aware of other services an elderly person receives. A consistent (between services) disability assessment instrument is required. Allowable 'packages' of care need to be developed appropriate for elderly at particular levels of dependency. Funding of all state provided services needs to be out of the same purse to allow substitution between services. An accounting system which enables expenditure on a person to be estimated with reasonable accuracy, would allow the opportunity for a consumer to suggest other services (s) he might wish to 'trade' for those provided in the recommended package. It would also assist in planning budgets for future years.

12.2.4 Provision of Community and Hospital Care

The analysis of the costs of home and hospital care using disability related cost estimates, showed that although home care was cheaper than hospital care in all cases, the potential savings (by keeping a person at home) were not so great for the lower dependency elderly, as they were for the very dependent elderly. (This is because the very dependent elderly are very expensive to care for in hospital, whereas the hospital cost for the less dependent are lower). Taking a global view, considering the total cost over all sectors of society, more can be spent on community support services for the very dependent elderly, since the opportunity cost of hospital care in these cases is so high. Moreover since the state
bears a greater proportion of the total costs for institutional relative to community care, the state can afford to increase its expenditure on community services for these very dependent cases. In conjunction with increased expenditure considerable reorganization of community services is required as discussed in the previous section to ensure that the services reach the appropriate population.

12.3 POLICY IMPLICATIONS

The results of the research have wider implications for the funding of geriatric care, beyond that of the particular hospitals and region which were sampled.

12.3.1 Application of Results to other Regions

The applications discussed in sections 12.2.1 to 12.2.4 i.e.

(a) Nurse Staffing Levels
(b) Public versus Private Hospital Long-Stay Care
(c) Organization of Community Services
(d) Home versus Hospital Care

may well be appropriate in other regions. For example Ward and Daldy (1982) found private hospitals costs were lower than public hospital costs in the Waikato area. Early research on patients in institutional care (Salmond 1976) showed that, in most regions, public hospital patients were more dependent than private hospital patients. Recent research in the Otago area by Campbell, Shelton, Caradoc-Davies and Fanning (1984) found the same result. In order to properly compare the cost of home and institutional care or public and private hospital care, the dependency of the patients in each mode of care
would have to be measured and disability-related costs estimated, in order to correct for differences in average dependency between patients in different modes of care.

Recent research by King, Fletcher and Main (1985) of all geriatric hospitals in several regions of south New Zealand did not find any significant difference between the average dependency of patients in public and private hospitals. But there was considerable variation between hospitals of the same type. There are therefore implications for the staffing and funding of both private and public hospitals (see 12.2.2 and 12.3.2).

12.3.1 Public Funding of Private Hospitals

The Department of Health contributes to the cost of geriatric care in private hospitals by the payment of a patient subsidy (the daily bed benefit) which is a fixed amount regardless of the dependency of the patient. The remainder of the cost is met by patients who are charged a fee which is also a fixed amount (for a particular hospital). The requirement for nursing resources depends on the disability mix of the patients being cared for. An increased proportion of very dependent patients could have a pronounced effect on cost particularly for a small hospital. The results of the research presented here, indicate the need for a variable, dependency-linked bed subsidy. This would reimburse those hospitals caring for patients who are on average of a higher level of dependency than those of other private hospitals and it would enable hospitals to respond to increased dependency by provid-

Some patients occupy fully subsidized beds, their fee being paid by the regional Hospital Board.
12.3.3 Planning for Increased Dependency

The proportion of elderly in the total population and the proportion of the very old (those over 75) is increasing and will continue to do so for some time. As a result the numbers of dependent elderly are increasing, outpacing the growth in the provision of institutional beds. The effect is an increase in the average level of dependency of patients in long-stay care. This is because elderly who are no longer able to enter hospital are likely to be on average less dependent than the average hospital patient. The very dependent continue to be admitted. This has already been documented in one area of New Zealand (Campbell, Bunyan, Shelton and Caradoc-Davies (1986)) and can be seen to be occurring in other regions by comparing the results of recent surveys (King, Fletcher and Main (1985), Sainsbury, Fox and Shelton (1986)) with those of earlier research (Salmond, (1976)).

It also follows that the average dependency of elderly living at home must be increasing, since those people who would in the past have entered institutions but in the future must stay at home are likely to belong to the most dependent sections of the elderly in the community.

There is thus a twofold effect: an increased demand for hospital nursing resources, coupled with an increased demand for community support services. This is at a time when funding for health care is constrained. Dependency-linked cost

6 Of course a variable subsidy could also be paid at the regional level i.e. from the Hospital Board (see 12.2.2) but this would apply only to Board-subsidized patients.
estimates need to be developed to provide a vehicle for planning for the expected increases in the costs of care in the future.

12.3.4 Emphasis on Community Care

Community care has been advocated as the preferred choice by elderly people. It is also considered to be a cheaper option than institutional care and is seen as the possible answer to the problem of caring for the increased numbers of dependent elderly in the population over the next decades.

This research has shown that the full cost of community care (i.e. including the cost of unpaid help) is less than the cost of hospital care. But it has also found that 'savings' are positively related to the dependency of the elderly i.e. savings for the less dependent elderly are less than those for the very dependent elderly. Furthermore community care transfers a large part of the cost of care to the elderly and their families. These aspects need to be taken into account when implementing a policy which emphasises community care.

An emphasis on community care has the same implications on the provision of community and hospital care as those discussed in 12.3.3 (resulting from the proportion of elderly in the population increasing at a rate faster than the increase in hospital beds) i.e. the average costs per person in community and in hospital care will rise. [This is because the 'marginal' patients who would under a policy of community care, stay at home rather than enter hospital, are more dependent than the average person in the community, but less dependent than the average patient in hospital.]

For a given population of dependent elderly, a policy emphasising community care would produce overall savings in the total provision of care, since fewer hospital beds would
be required. But sufficient community support services would have to be provided to ensure that elderly could stay at home and the number of hospital beds was actually reduced.

This would be facilitated by bringing together state expenditure on institutional and community care under one budget, so that savings from reducing hospital beds could be put into providing additional community support services.

Since the proportion of elderly in the population is increasing it may not be possible to reduce hospital beds by much, or indeed at all. Therefore the argument focuses on reducing the rate of increase of hospital beds.

Although a policy emphasising community care would achieve a lower total cost, this total is the sum of costs borne by all sectors of society and it does not follow that the cost to every sector would be reduced. Such a policy transfers a large part of the total cost to the family, compared to a policy of institutional care. (This is in contrast to the A.C.C. (Accident Compensation) scheme where the state funds the whole cost of institutional or community care for people disabled due to accidents). Moreover the family cost, in the care of the elderly, under the current provision of community services, increases with increasing dependency. The share of cost to the state, however, is much less for community, rather than institutional care and there is therefore an incentive for the state to spend more on community services (particularly for very dependent elderly). The ability to reduce institutional beds or delay hospital admissions by increasing community services, depends firstly upon the availability of carers and secondly on providing services which allow them to continue in this role. Of course the first factor depends
upon the second, and research needs to be done and account taken of the results concerning what services could be offered and how they should be organized (e.g. Sanford, 1975, Packwood 1980), the difficulties for the carer (e.g. Koopman-Boyden and Wells, 1979, and Gillear, Gillear, Gledhill and Whittick, 1984) and on society's perception of the caring role (e.g. West, Illsley and Kelman, 1984). The 'relief-for-carer' scheme is one example of a useful support service, but many others are possible.

12.4 CONCLUSION

The research presented here, on the costs of care of dependent elderly in hospital and in the community has two distinguishing features. Firstly the estimates of the cost of care for individual elderly in each care environment were variable costs, related to patient dependency, rather than average costs. Secondly the cost of community care included the cost of unpaid informal carer help.

The analysis of the variability of the cost of care for individual patients demonstrates the importance of taking into account the level of dependency when estimating the costs of care of the elderly. The costs of care in both public and private hospitals have been shown not to be a fixed amount per patient but to vary with the level of patient disabilities. Inclusion of the informal care component has identified the contribution of informal carers to care in the community and enabled the total resource costs to be estimated. The total resource cost for elderly in the community also varies with the level of patient, but this is mainly due to the informal care
component. Hence the informal care cost reflects the increasing costs to the family as dependency increases. The ability of the average cost to precisely estimate the cost for particular patients depends upon the heterogeneity with respect to disability of the patient population. The average cost can be used in the estimation of total cost for groups of patients only so long as the average dependency remains stable. For estimation of the cost for individual patients or patient groups with dependencies different from the average, the disability-related cost is a more precise estimator.

The results of the research have implications for the funding of both community and hospital care. The variation in costs between patients in hospital indicates a need for a variable, dependency-linked, state subsidy of patients in private hospitals rather than the present fixed subsidy.

The variation in resource costs between elderly people in the community (particularly the informal care component) indicates that the level of state-funded community support services should be linked to the dependency of the recipient in order that the carers in the community be given adequate relief.

A variable cost estimator enables meaningful comparisons to be made between the cost of modes of care e.g. public and private hospitals, or community and hospital care, and to predict likely savings which might eventuate if particular groups of elderly were in the future to enter a different mode of care.

The increasing elderly in the population coupled with the lower rate of increase of long-stay hospital beds has led to a higher average level of dependency of patients in long-stay hospital care. There is thus an increased need for nursing
resources per hospital bed provided now, compared with in the past. An emphasis on community rather than hospital care will accentuate this trend. As a result the average cost of care in hospital and in the community will rise. Variable cost estimators can be used to estimate the increase in these costs and to assist in the planning of resources for care of the dependent elderly under this and other policies.
APPENDIX 1

DATA COLLECTION FORMS

(a) PATIENT ASSESSMENT FORM - PRIVATE HOSPITAL

HOSPITAL ____________ SISTER ____________ WARD ____________

NAME: ____________ long-term ____ short-term ____

post-operative care _____ AGE: _____

A. MOBILITY

1. Walks unaided
2. Walks with an aid
3. Walks with an assistant (e.g. from one room to another)
4. Mainly mobile - needs a wheelchair at times
5. Chairfast - not mobile; can take a few steps with help of assistant; spends large part of day in chair
6. Bedfast
7. Mobile in wheelchair

B. VISION (with glasses if worn)

1. Normal
2. Fair
3. Poor

C. HEARING

1. Normal
2. Fair
3. Poor

D. INCONTINENCE (urinary)

1. Continent
2. Accidents
3. Often incontinent

Da. CATHETER

1. No
2. Yes

Db. INCONTINENCE (bowel)

1. Continent
2. Sometimes incontinent, not every day
3. Often incontinent (every day)
E. MENTAL CAPACITY
   1. Not impaired
   2. Forgetful
   3. Confused at times
   4. Disturbed behaviour

F. DRESSING
   1. Can dress unaided
   2. Needs help to dress

G. FEEDING
   1. Can eat and drink unaided
   2. Needs food cut up
   3. Needs to be fed

H. BATHING
   1. Can bath without help
   2. Needs help to get in/out
   3. Needs to be bathed

I. WASHING
   1. Can wash hands and face
   2. Needs to be washed

J. TOILETING
   1. Can get to toilet without help
   2. Can get to commode without help
   3. Needs help in day only
   4. Needs help at night only
   5. Needs help both day and night

K. PRESSURE AREA CARE
   1. Does not require
   2. Requires once or twice a day
   3. Requires more than twice a day

L. NUMBER OF NURSES REQUIRED FOR CARE
   1. One nurse
   2. One nurse mainly; two nurses required once or twice a day (e.g. for getting up or going to bed)
   3. Needs two nurses for substantial part of care

M. CIRCLE ACTIVITIES WHERE TWO NURSES NEEDED
   1. Getting up
   2. Getting dressed
   3. Feeding
   4. Bathing
   5. Washing
   6. Toileting
   7. Pressure area care
   8. Going to bed
N. WEIGHT OF PATIENT

1. Normal
2. Overweight

O. MENTAL STATE

1. Normal
2. Depressed

NOTES:

1. In order to obtain the scales used in the regression model the responses were modified where appropriate according to the number of nurses required, using the replies to question M. Thus, for example, DRESSING:
   1. can dress unaided
   2. needs help of one person to dress
   3. needs help of two persons to dress.

2. The table below contains the values of Kappa and weighted Kappa (Cohen, J. 1960, 1968), measures of inter-rater reliability, calculated from 24 patients in one ward who were assessed by two ward sisters, independently, but on the same day.

<table>
<thead>
<tr>
<th></th>
<th>Kappa</th>
<th>Weighted Kappa</th>
</tr>
</thead>
<tbody>
<tr>
<td>mobility</td>
<td>.83</td>
<td>.95</td>
</tr>
<tr>
<td>vision</td>
<td>.36</td>
<td>.38</td>
</tr>
<tr>
<td>hearing</td>
<td>.58</td>
<td>.63</td>
</tr>
<tr>
<td>incontinence</td>
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<td>.96</td>
</tr>
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<td>1</td>
</tr>
<tr>
<td>mental capacity</td>
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<td>.60</td>
</tr>
<tr>
<td>dressing</td>
<td>.83</td>
<td>.83</td>
</tr>
<tr>
<td>feeding</td>
<td>.81</td>
<td>.87</td>
</tr>
<tr>
<td>bathing</td>
<td>.29</td>
<td>.42</td>
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<tr>
<td>washing</td>
<td>.65</td>
<td>.65</td>
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<tr>
<td>toileting</td>
<td>.69</td>
<td>.77</td>
</tr>
<tr>
<td>pressure area care</td>
<td>.28</td>
<td>.38</td>
</tr>
<tr>
<td>nurses required for care</td>
<td>.89</td>
<td>.93</td>
</tr>
</tbody>
</table>
(b) PATIENT ASSESSMENT FORM - PUBLIC HOSPITAL

*** PLEASE COMPLETE THIS FORM ON THE SAME DAY 
AS CARE IS MONITORED ***

HOSPITAL WARD SISTER

NAME OF RESIDENT

AGE SEX 1. MALE 2. FEMALE

TYPE OF CARE 1. Short-stay
   (a) Post-operative
   (b) Relief for carer
   (c) Other, please state

2. Long-stay

MEDICAL DIAGNOSIS. Give main diagnoses.

   Asterisk (*) any which are short-term (e.g. wounds, recent operations)

MEDICATIONS - number of times administered per day.

DRESSINGS - give details, frequency of application per day.

SPECIAL TREATMENTS

COMMENTS

NOTE: To ensure confidentiality this form will be detached 
from the completed assessment.
PLEASE DESCRIBE THE USUAL STATE OF THE PATIENT.

<table>
<thead>
<tr>
<th>OFFICE USE ONLY</th>
<th>Columns</th>
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</thead>
<tbody>
<tr>
<td>Care Location</td>
<td>(1)</td>
</tr>
<tr>
<td>I.D.</td>
<td>(2-5)</td>
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<tr>
<td>sex</td>
<td>(6)</td>
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<td>type</td>
<td>(7)</td>
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<td>age</td>
<td>(8-10)</td>
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</tbody>
</table>

Functional Capacity

(I) MOBILITY (outside)
1. can walk to end of street without help
2. can get into gardens without help
3. cannot go out without help

(II) MOBILITY (inside)
1. walks unaided
2. walks with an aid (stick/frame)
3. walks with help of one/two* assistant/s (*delete appropriately)
4. mainly mobile, with aid/assistant*, needs a wheelchair at times (*delete one)
5. chairfast - not mobile (a) cannot stand (b) can take a few steps
6. bedfast
7. self mobile in wheelchair

(III) VISION (with glasses if worn)
1. Good
2. Fair
3. Poor
4. Blind
5. Not possible to determine
(IV) HEARING
1. Good
2. Fair
3. Poor
4. Deaf
5. Don't know

(V) INCONTINENCE (urinary)
1. Continent
2. Accidents
3. Night incontinence only
4. Incontinent

(VI) CATHETER/URIDOME
1. No
2. Yes

(VII) INCONTINENCE (bowel)
1. Continent
2. Accidents
3. Regularly incontinent

(VIII) MENTAL CAPACITY
1. Not impaired
2. Forgetful
3. Confused
4. Disturbed behaviour
5. Unresponsive

(IX) WEIGHT
1. Normal
2. Overweight
(X) MENTAL STATE
1. Normal
2. Depressed/Anxious
3. Don't know

(XI) WANDERING
1. Does not wander
2. Occasional and brief wandering
3. Persistently wanders

Personal Care
(I) DRESSING
1. Can dress unaided
2. Needs a little help to dress
3. Totally dependent
Number of persons required to dress ___

(II) FEEDING
1. Can eat and drink unaided
2. Needs food cut up or specially prepared
3. Needs to be fed
Number of persons required to feed ___

(III) BATHING/SHOWERING
1. Can bath/shower without help
2. Needs help to get in/out
3. Needs to be bathed/showered
Number of persons required to bath ___
(IV) WASHING
1. Can wash hands and face
2. Needs to be washed
Number of persons required to wash ___

(V) TOILETING
1. Can get to toilet without help
2. Can get to commode without help
3. Needs help in day only
4. Needs help at night only
5. Needs help both day and night
Number of persons required to toilet ___

(VI) PRESSURE AREA CARE
1. Does not require
2. Requires once or twice a day
3. Requires more than twice a day
Number of persons required for P.A. care ___

(VII) GETTING UP
1. Independent
2. Needs help (1 person)
3. Needs help (2 persons)

(VIII) GOING TO BED
1. Independent
2. Needs help (1 person)
3. Needs help (2 persons)
(IX) TRANSFERRING (from one chair to another)
1. Independent
2. Needs help (1 person)
3. Needs help (2 persons)
4. Does not transfer i.e. bedfast

(X) TAKING MEDICATION
1. Independent
2. Able if laid out
3. Unreliable, must be administered

(XI) NUMBER OF NURSES REQUIRED FOR CARE
1. One nurse
2. One nurse mainly; two nurses required once or twice a day (e.g. for getting up or going to bed)
3. Needs two nurses for substantial part of care

(XII) CHECKING
Does the patient need checking to make sure s/he is alright in addition to when meals are served or rounds are made for toileting/turning etc.
1. No, these checks are sufficient
2. Yes, needs checks additional to these.
(C) DIRECT NURSING CARE IN HOSPITAL

24-HOUR LOG OF CARE

Name of patient: ___________________ Date of monitoring ______

This sheet is a complete record of all care received by the patient over a 24-hour period beginning at 6.45 a.m.

Instructions:

Each time a care task is performed for this patient note below:

(1) the nature of the work e.g. dressing, bathing, toileting, giving medication, assisting with walking, etc.
(2) the time you started and finished the task.
(3) the number of patients who shared in this time. Usually this will be one but sometimes a task is performed for several patients and it is not possible to separate out this patient's share e.g. if 4 patients are fed over a 20 minute period, then enter 4.
(4) the number of nurses involved in the task.

<table>
<thead>
<tr>
<th>Care Task (Brief description)</th>
<th>Start Time</th>
<th>Finish Time</th>
<th>Number of Patients*</th>
<th>Number of Nurses</th>
<th>Initials of Staff**</th>
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</thead>
<tbody>
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</table>

* where possible try to isolate the time given just to this patient.
** if two staff were required, put initials of both.
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