

Care Provision and Dependency in Long-Stay Institutions*

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Abstract: This paper investigates the empirical relationship between the dependency characteristics of elderly residents and the amount of care provided by health care professionals in a selected number of long-stay institutions in Ireland. The results point to a weakness of the generalised Guttman scale measure of physical dependency in predicting fine levels of care. Only the highest category of the scale has a significant influence on care provision. Other aspects of dependency are also considered in the paper. The most intriguing result arising from the consideration of other dependency variables is the negative relationship between co-operation and care provision. Type of institution also influences the provision of care, demonstrating the importance of the supply-side in models of this type.

I INTRODUCTION

Not enough is known about the process of care of elderly persons in long-stay institutions. In particular, there is only limited information on the relationship between the dependency characteristics of residents and their

*This paper is based on the reworking of data generated by The Economic and Social Research Institute for ESRI General Research Series Paper No. 157. The authors acknowledge the generous support received from The Economic and Social Research Institute, the late John Blackwell and Geraldine Moane, particularly at the design and survey stage of this research. Research assistance from Ms Geraldine O'Shea is acknowledged. Helpful comments were received from Cam Donaldson, Peter Jackson, two anonymous referees, and participants at the Galway Economics Workshop.

use of resources. There are models which qualitatively describe the process of care (Wade, Sawyer and Bell, 1983) but few empirical studies have managed to establish a quantitative basis to test the predictive power of such models. Work has been done on estimating cost functions for long-stay institutions (Darton and Knapp, 1984; Nyman, 1988) but, so far, no study of this type has managed to establish a fine relationship between disaggregated classifications of dependency and resource use. Finding out what long-stay institutions actually do — the process of care — is the first step on the road to determining the best practice in this area, including the important issue of whether some institutions are more cost effective than others in the care they provide to residents.

The focus of this paper is on the relationship between the dependency of old people in long-stay institutions in Ireland and the amount of specified care provided by nurses, attendants and paramedical staff. Specified care covers such activities as, bathing, washing, feeding, mobility assistance and so on. More physically dependent residents are likely to make a greater demand on the time of carers than those who are less dependent. A linear relationship between physical dependency and care was confirmed for Ireland by Blackwell *et al.*, (1992 (Table 6.1)). The current paper is a development of that work, exploring, as it does, the significance of the relationship between categories of dependency and care provision in more detail. The advance on the earlier work lies in the specification of an econometric model, the inclusion of non-physical aspects of dependency in the model, the attempt to identify the significance of each element of dependency, and the integration of institution-type and age into the model.

The standard classical linear regression model is used to explore the relationship between care provision and dependency. The dependent variable in the model is hours of care per week provided by health care professionals. Dependency is defined as the ability of people to look after themselves in a physical, mental and social sense, including some consideration of dependency-related personality traits. Guttman classification of dependency is the primary source for the measurement of physical, activity of daily living-based, dependency. Dummy variables are used to represent the qualitative nature of the dependency information contained in both the Guttman scale and the other measures of dependency.

Section II begins with a discussion on the measurement of dependency. This is followed by an explanation of data sources, spread over three subsections. The theoretical relationship between resource use and the dependency of old people in long-term care is examined in Section IV. The model and results are set out in Sections V and VI. Conclusions are brought together in Section VII.

II THE MEASUREMENT OF DEPENDENCY

Dependency with respect to old people is usually concerned with the ability of people to look after themselves in a basic physical sense, particularly in respect of activities of daily living (Katz *et al.*, 1963; Wright *et al.*, 1981). While the concept defined in this narrow sense does not encompass every aspect of the health levels of people, it can be expected to have some relationship with the state of health in its widest sense, with many forms of dependency reflected, albeit indirectly, in physical scales (Kyle *et al.*, 1987). However, a complete picture of dependency would require some consideration of the multi-dimensional nature of the problem, incorporating some formal treatment of both mental and social functioning, as well as other aspects related to personality and behavioural traits. Fillenbaum (1985) has, for instance, outlined a range of functions for the elderly that should be included if dependency is to be estimated in a comprehensive manner. These functions include: activities of daily living, mental health, physical health, social factors, economic factors, family relationships and housing conditions. The approach taken to the measurement of dependency in this paper is not as broad as Fillenbaum suggests, but an effort is made to include physical, mental, social and behavioural elements of dependency.

Following the successful application of Guttman scales by Williams *et al.*, (1976) and by Wright and his colleagues (1981) on relatively large samples of elderly people, a similar type of scale was used in this study to deal with physical aspects of dependency. The scale was first tested on a pilot study of old people in Institution 1. Fewest errors occurred when the scale items were ordered as shown in Table 1. The basic idea of Guttman scaling is to test the hypothesis that a set of items form a cumulative uni-dimensional scale. The scale suggests that there is an order about the onset of physical dependency, such that if the number of disabilities suffered are known so is the function the person concerned is likely to lose next. The scale was satisfactory in terms of reproducibility and scaleability, achieving conventional levels of significance of greater than 0.9 and 0.6 respectively. The robust nature of the scale was taken as evidence of its suitability for use throughout the study.

Originally, sixty-two old people in the study were defined as non-scale types, meaning that they did not conform to the cumulative ordered loss of abilities implied by the Guttman Scale shown above. However, this number was significantly reduced by the procedure of assigning the elderly person without a perfect scale pattern to the rank associated with the perfect scale pattern most similar to their own. Assignment was made on the basis of error minimisation. When more complex non-scale error was present the elderly person was assigned to the relevant scale point which already contained the

Table 1: *Guttman Classification of Dependency*

1.	Cannot bathe without help
2.	Cannot walk outdoors without help
3.	Cannot walk indoors without help
4.	Cannot dress without help
5.	Cannot get out of bed without help
6.	Cannot sit or stand without help
7.	Cannot use the toilet without help
8.	Cannot wash hands and face without help
9.	Cannot feed without help

highest proportion of subjects (Torgerson, 1967). In this manner, fifty-four of the non-scale types were reallocated to Guttman scale points.

The Guttman scale was chosen to represent the degree of disability of the elderly persons, as measured by their abilities on each of the scale items. If, however, the original nine-item scale is used, only a small number of old people are represented at some points of the scale, particularly between scale points 2 and 7, inclusive. To overcome this problem, the scale shown in Table 1 is collapsed to one comprising five items (Table 2). Category A represents elderly persons who have either no disability on any of the scale items or else only have the disability of being unable to bathe without help. Category B represents elderly persons who cannot, without help, walk outdoors and bathe or cannot, without help, walk indoors, walk outdoors, or bathe. Old people classified as Category C dependency represent those who are located between scale points 4 to 7 of the original scale. Category D is equal to scale point 8 of the original scale. Category E is equal to scale point 9 of the original scale.

Table 2: *Adjusted Guttman Scale: Number and Percentage of Institutional Elderly at Each Scale Point*

<i>Category of Dependency</i>	<i>Number of Patients</i>	<i>%</i>
A	65	21.8
B	21	7.0
C	39	13.1
D	48	16.1
E	117	39.3
Non-scale	8	2.7
TOTAL	298	100.0

One would have expected, a priori, that most old people in long-stay care would be very disabled (Wright *et al.*, 1981). It is not surprising, therefore, to find that 55 per cent of the elderly population surveyed can be assigned to the two most dependent categories. What is surprising, however, is that 22 per cent of the old people are either free from disability (as defined by the scale), or have only one disability, that of not being able to bathe without help. Perhaps the reason for this is the uni-dimensional nature of the scale used to measure dependency. Thus far, the measurement of dependency has been confined to physical activities of daily living. The problem with this approach is the omission of many other important attributes of incapacity.

One way of dealing with some of the limitations of uni-dimensional physical scales is to use aggregated cardinally determined point scales to assess severity of condition across a number of different dimensions. The Crichton Royal Behavioural Rating Scale (CRBRS) is a good example of this approach. As used by Evans *et al.*, (1981), the scale has ten dimensions as follows: mobility, orientation, communication, co-operation, restlessness, dressing, feeding, continence, memory and bathing. Wright (1986) is, however, critical of cardinal measurement of this type, on the basis that it assumes that abilities and incapacity are not only cumulative but additive as well. A cardinal scale cannot guarantee homogeneity of dependency across scale points because various combinations of disabilities can yield the same score. There is no doubt, however, that within the objectives of particular studies, the aggregation of point scales can provide useful information (Gibbins *et al.*, 1982). While they are not a solution to the problems of combining scales, they may be a convenient method of making quick progress.

The decision to consider additional aspects of dependency in this study is based on the belief, articulated above, that the physical measures of dependency which make up the Guttman scale are not, on their own, sufficient to capture the multi-dimensional nature of disability. Choosing what additional measures to include is, however, a complex task. The pragmatic approach used in this study is to incorporate those aspects of dependency from the CRBRS scale not already included in the Guttman scale. In all, five additional variables are included in the model. Four of these cover social/behavioural aspects of dependency, dealing with continence, communication, co-operation and restlessness. The fifth is a mental health variable, incorporating the characteristic "memory" and "orientation" from the CRBRS. Each additional indicator was initially measured ordinally from fully able to completely disabled along a four or five point index. However, a simpler, if cruder, profile of dependency can be obtained by dividing each indicator into high and low dependency, with the former representing poor health.

The measurement of dependency is done by nurses. The rating of disability

by the latter opens up the possibility of respondent bias. For instance, there is evidence that health professionals tend to classify health states into more severe categories of dependency than would the patient themselves (Rosser and Watts, 1972). Patient self-rating may, however, be even more unreliable due to incompleteness of coverage. Only the more alert and less frail old people may be able to respond to the questionnaire (Rockwood *et al.*, 1989). Such was the experience in this study (Blackwell *et al.*, 1992). Only 44 per cent of old people were able to respond to questions about their own health. Therefore, for practical reasons, nurse ratings are used to assign dependency.

III THE DATA BASE

3.1 *Profile of the Institutions*

The data used here were generated by a survey carried out in four long-stay institutions in Ireland by The Economic and Social Research Institute during 1989/90. The institutions were selected by a committee of experts (which included the authors of this paper) in the field of care of the elderly on the basis of their general representativeness of the type of long-stay care available in the country. It is acknowledged that this method of selection may introduce some bias into the study, but resources were not available to survey the greater number of institutions which a random selection would warrant. In any case, there was unanimous agreement that the institutions selected were typical of the different types of long-stay care available in the country. The relevant management authority in each institution chosen for inclusion in the study was written to with a view to eliciting their co-operation in the study. In no case was co-operation refused.

There are a number of important differences among the institutions chosen for inclusion in the study (Blackwell *et al.*, 1992). Principal among these is variation in the mix of dependency. Institution 2 stands out in this regard, with only 7 per cent of old people in the lowest category of dependency, markedly lower than the corresponding proportion in Institutions 1, 3 and 4, at 23, 21 and 38 per cent respectively. The explanation for the variation in the mix of dependency is related to differences among the institutions with respect to admissions procedures, rehabilitation programmes and community support. In respect of each of these factors, Institution 2 again stands apart. Institution 2 is dedicated to the rehabilitation of as many of its residents as is possible, unlike the other institutions which, to varying degrees, tend to emphasise long-stay care more than rehabilitation. Institution 2 also has a day hospital attached to the long-stay unit, thereby facilitating easier discharge and continuity of care for old people in the immediate hinterland. None of the other institutions is associated with day hospital provision.

Finally, admissions procedures appear to be more rigorous in Institution 2. Two consultant geriatricians oversee the process of admission, assessment and rehabilitation at the hospital. None of the remaining institutions have a full-time consultant geriatrician involved in the process of care. Indeed, medical care for residents in Institutions 3 and 4 is left to a part-time medical officer.

3.2 *Selecting Patients*

The sample of residents taken from each of the four institutions is divided into two categories: those patients who are defined as being on the boundary separating community from institutional care and the rest of the patient population (Table 3). In Institution 1, at the pilot stage of the project, the marginal group was defined as the last forty admissions prior to the commencement of the study. For each of the remaining institutions, the marginal group comprised the total number of old people aged 65 years and over admitted to the institution in the two months prior to the study. The reason for the change in definition was that it became apparent at the pilot stage that some of the last forty admissions admitted to Institution 1 included non-geriatric cases, some of whom required acute medical care rather than long-term care.

Elderly residents who were not members of the marginal group, i.e., those

Table 3: *The Number of Cases in the Sample*

<i>Institution</i>	<i>Most Recent Admissions</i> ¹	<i>Long-Term Residents</i> ²	<i>Total Number of Cases</i>
1	36	69	105
2	40	37	77
3	9	53	62
4	17	54	71
TOTAL	102	213	315 ³
	32%	68%	100%

Notes: 1 Comprising those people over 65 admitted in the two months prior to commencement of the study in Institutions 2, 3, 4 and the last forty admissions in Institution 1.

2 Those in for longer than two months in Institutions 2, 3, 4 and those not part of the last forty admissions in Institution 1.

3 Seventeen cases were subsequently dropped from the analysis either because they were less than 65 years of age or because they were acute rather than long-stay.

who were in for longer than two months or not part of the last forty admissions in Institution 1, were systematically sampled using a one-in-three sampling fraction across all four institutions. The distinction between the two groups was made in order to ensure that recent admissions were adequately represented in the sample, thereby making it less likely that very long-term residents would be over-represented in the analysis. There were other reasons for dividing the sample in this way but these concern aspects of the analysis not relevant to this paper. For instance, the distinction between marginal cases and the rest is important, if one is concerned with placement and the development of a boundary of care model (O'Shea and Corcoran, 1990).

3.3 *Generating Care Estimates*

The presence of "joint costs" in long-stay institutions complicates the generation of data on care provision. A good deal of ambiguity surrounds the specification of labour contracts within long-stay institutions, so that it is not always clear who, does what, for whom, at what time. There are care regimes, of course, but, more often than not, immediate patient need determines the form and timing of care interventions. For the purposes of this study, information on caring within the institutions was collected from senior nurses and paramedical personnel with immediate responsibility for the organisation and delivery of care to resident elderly persons. Asking people to estimate the demands placed on their time, and that of their colleagues and subordinates, by the care needs of particular residents, is a relatively crude way of eliciting information. Mistakes are likely to be made because of the large number of cases in the study and the heavy work-load of the people providing the estimates. The presence of an experienced researcher in the institutions during the data collection stage of the research is likely to have reduced the likelihood of reporting errors, but not to have eliminated them entirely.

The alternative approach of asking nursing and attendant staff to keep detailed time diaries or time budgets (Nissel and Bonnerjea, 1982) was not a feasible option. Long-stay institutions have a much more complex socio-temporal order than households (Zerubavel, 1979). Within the latter, caring occurs typically on a one-to-one basis whose continuity is largely unbroken. In institutions, caring is a matter of relationships between collectivities and occurs on the discontinuous basis of shift working. Trying to use time budgets in such a setting, with a relatively large sample of elderly persons, would have required resources for data collection, processing and analysis which were not available. It may also have represented an onerous, and thereby unacceptable, burden on hospital staff whose co-operation was crucial to the

collection of any data. It should also be borne in mind that the fieldwork for this study was taking place shortly after major cutbacks in public health care expenditure and the laying off of part-time and temporary staff in hospitals. In such circumstances, asking carers to fill in detailed time-budgets was likely to cause some concern among staff and perhaps lead to spurious responses.

Both questionnaire and budget, or time diary, approaches to the tracking of time allocation to care of old people in institutions have their advantages and disadvantages. The choice is between tighter measurement with a smaller sample, looser measurement with a large number of cases, or avoiding quantification altogether. In the context within which the present study was carried out, the second of these options appeared, on balance, to be the best choice.

IV DEPENDENCY AND CARE PROVISION: THE FRAMEWORK

It is difficult to make precise statements about what might constitute the optimal provision of nursing and attendant care for old people in long-stay care. Too much care can lead to a resident becoming institutionalised sooner than they might have. Too little care negates the purpose and benefits of being in care in the first place. All of this makes the enforcement of contracts very difficult in long-stay care since they are not very well specified to begin with. Providers (mainly nurses) have a lot of control over their own time and how they spend it helping old people in their care. The first step, therefore, to improving our knowledge of technical efficiency is to examine the actual process of care in institutions.

A number of questions arise with respect to the care of old people in institutions; What kind of care do they get? For how long? How often? and With respect to what activities? The responses to these questions have a major bearing on the cost of care. A hypothetical relationship between category of dependency and average resource use is shown in Figure 1 for two long-stay hospitals, X and Y. It is assumed that resource use and hence costs increases in both hospitals as dependency gets worse. Resource use at all levels is, however, assumed to be higher in Hospital Y than in Hospital X. If dependency has been measured correctly and there is no difference in the case mix of dependency, or in the technology between the two hospitals, then other factors must be causing the observed difference in costs. A major difficulty, however, is that one cannot say for sure which long-stay hospital is providing the optimal level of care. It may be, for instance, that the less expensive form of care also produces inferior outcomes.

The situation is even more complicated if some long-stay hospitals

Average Resource Use/Costs

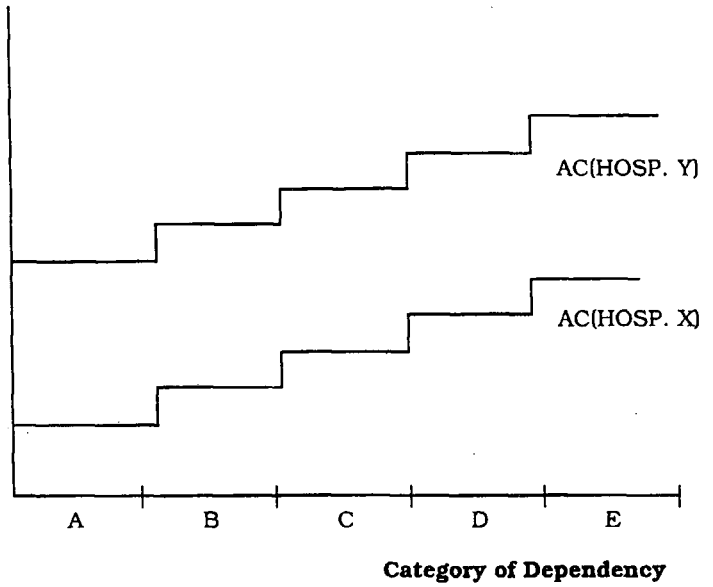


Figure 1: *Costs and Dependency in Long-stay Care: A Positive Relationship Between Costs and Dependency in Both Hospitals*

Average Resource Use/Costs

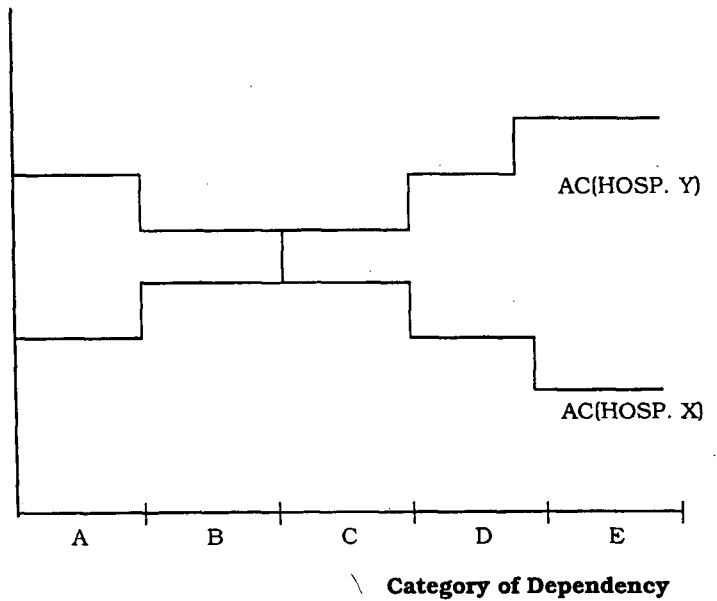


Figure 2: *Costs and Dependency in Long-stay Care: A Negative Relationship Between Costs and Dependency in Hospital X; a Positive Relationship in Hospital Y*

concentrate caring resources on low dependent patients in the hope of slowing down the onset of greater disability. This possibility is explored in Figure 2, where, on this occasion, the assumption is that Hospital X concentrates most of its resources on low dependent old people, with the result that it has a declining average cost schedule. In contrast, Hospital Y allocates the bulk of its resources to patients who are most severely disabled and, consequently, has an increasing cost schedule. However, once again, there is no way of knowing which hospital is providing the best care, at least not until the output side of the relationship has been quantified. Identifying what long-stay hospitals actually do is, however, the first step towards a definition of optimal practice. This is the concern of the remainder of the paper.

V CARING AND DEPENDENCY: THE MODEL

Care provision, aggregated across all staff, and measured in terms of time spent per week, is regressed, using an Ordinary Least Squares (OLS) estimation procedure, on the five Guttman categories of dependency, the additional dependency indicators taken from the CRBRS, age, and institutional type. Dummy variables are used to allow for the inclusion of qualitative variables in the classical linear regression model, yielding standard OLS results. The problem of multicollinearity, which is common to dummy variable analysis, is reduced by using one of the categories of dependency as the intercept (Balestra, 1990). The choice of category to fulfil this function is dictated primarily by a priori considerations. In this study the lowest level of dependency is used as the benchmark classification. The reason for this is, primarily, ease of interpretation, given the problems associated with alternative options such as average dependency. It is difficult to define, let alone interpret, what is meant by average in terms of dependency characteristics. At least, using the lowest dependency as a benchmark, the hypothesis that old people with greater dependency receive more hours of care can be tested, and is relatively easy to understand. It is, of course, possible to run the model to take account of average behaviour. This can be done by fitting the regression with the sum of the weighted coefficients of the category dummy variables constrained to zero (Suits, 1957; Kennedy, 1992).

$$\begin{aligned}
 \text{HC} = & \alpha_1 + \beta_1 \text{ Catg B} + \beta_2 \text{ Catg C} + \beta_3 \text{ Catg D} + \beta_4 \text{ Catg E} \\
 & + \phi_1 \text{INC} + \phi_2 \text{MH} + \phi_3 \text{Comm} + \phi_4 \text{Co-op} + \phi_5 \text{Rest} \\
 & + \gamma_1 I_2 + \gamma_2 I_3 + \gamma_3 I_4 + g_1 \text{Age}_1 + g_2 \text{Age}_2 + \varepsilon
 \end{aligned} \tag{1}$$

In Equation (1), the intercept term is defined as old people in Guttman category of dependency A, resident in Institution 1, aged between 65 and 74

years, and enjoying good health on each of the additional health indicators specified in the model. Significance, if and when it occurs, must be interpreted in the context of this benchmark category. The inclusion of age as an independent variable may, at first sight, appear unnecessary, since any relationship between age and resource use may already be captured by the dependency variables. However, just as the Guttman categories of dependency cannot be expected to capture all elements of health status, neither is it likely that all of the influence of age is accounted for by the dependency variables. Age is divided into three categories: 65-74 which is included as part of the intercept term; 75-84 equal to Age_1 and 85+ equal to Age_2 .

The hypothesis to be tested in the model is that care provision increases as severity of dependency worsens along the Guttman scale, i.e., as one moves from Category A to Category E (Wright *et al.*, 1981; Blackwell *et al.*, 1992). Similarly, the expectation is that poor health status on the additional indicators (continence, mental health, communication, co-operation and restlessness) will also raise the quantity of care provided by hospital staff. Age is also expected to increase care provision.

Of course, greater disability on the Guttman categories could conceivably lead to less care (Figure 2). This situation could arise if providers decided to concentrate most caring resources on those old people "not too far gone" to benefit from a caring intervention. Scarce resources may force providers to consider the relative net benefits of spending more time with less dependent residents rather than with severely dependent patients. More resources expended on the former may prevent, or at least slow down, their entry into the severely dependent category. Neither can one rule out entirely the possibility that patients with certain behavioural/personality traits, such as uncommunicativeness or uncooperativeness, may receive less attention from caring staff because of these particular characteristics. The absence of comparative published evidence in this area makes a priori reasoning difficult and essentially speculative.

The model can also be adjusted to allow for interaction between categories of Guttman dependency and each additional health indicator. So far, the effect of any pair of values of dummy variables is assumed to be the sum of two separate effects, with the differential effect of each of the additional health indicators held constant across category of dependency. This means, for example, if average hours of care is higher when patients are incontinent, this effect is constant whatever the category of dependency of the patients. This assumption may not always be tenable. For instance, the influence of incontinence on hours of care for patients in Category A may be different from the effect of incontinence on caring hours provided to patients in Category E. Similarly, there may be multiplicative relationships between

category of dependency and each of the additional indicators, as well as among the latter. Interaction terms are not included in the results presented here; where we did test for them, they were quite weak, and the results in terms of the key variables of interest were not affected.

VI RESULTS AND DISCUSSION

The results are shown in Table 4. The overall equation is significant at the level of 1 per cent and explains 29 per cent of the variability in care provision. The most striking aspect of the results is the general weakness of the Guttman scale measure of dependency in predicting the level of care. The measure accounts for less than half of the variance explained by the model, which is rather disappointing in the context of an a priori expectation that there would be something approaching a linear relationship between the two. Moreover, all of the work is done by the most dependent category in the scale (Category E) in comparison with the others. In practice, the scale works as a dichotomy (E versus the rest) rather than as a five category scale. There appears to be a critical mass of specified caring associated with relatively low levels of dependency. Major differences do not emerge until very high levels of dependency are reached. The question now is what does determine the level of observed care, given that physical dependency, as measured by a cumulative Guttman scale, accounts for so little of the variance explained by the model.

The inclusion of the additional health indicators, incorporating mental, social and behavioural aspects of dependency does shed more light on caring relationships. The most striking result is that the positive relationship between care and dependency does not hold for each additional indicator in the model. In particular, uncooperativeness significantly (at the level of 1 per cent) reduces the provision of specified care by 9 hours. For the purpose of the study, uncooperativeness is defined as someone who requires frequent encouragement or persuasion to do things, or who rejects assistance, or who shows independent but ill-directed activity, or someone completely resistant or withdrawn. For any given level of dependency, difficult residents, defined in terms of the above, get less care and assistance from staff than those who are more co-operative and compliant. Care staff do not, it seems, waste too much time trying to coerce or cajole elderly residents who are seen as unco-operative.

The relationship between co-operativeness and care provision is likely to be an exceedingly complex one. Co-operativeness is, in the first instance, a behavioural trait linked to personality, but it is also likely to be affected by the set of environmental circumstances surrounding the caring relationship.

Table 4: *The Relationship Between Care Provision and Dependency, Age, and Institution*

<i>Independent Variable</i>	<i>Eqn. (1) Coefficient (t statistic)</i>
Catg. of Dependency A (Intercept)	6.05 (1.07)
Catg. of Dependency B	0.51 (0.08)
Catg. of Dependency C	4.01 (0.83)
Catg. of Dependency D	2.86 (0.61)
Catg. of Dependency E	11.20** (2.46)
Incontinence	5.79 (1.49)
Mental Health	1.43 (0.35)
Communication	7.47 (1.65)
Co-operation	-9.23* (-2.89)
Restlessness	-0.11 (-0.03)
Age A ₁	-1.60 (-0.33)
Age A ₂	0.64 (0.18)
Hospital 2	17.70* (3.92)
Hospital 3	6.61 (1.30)
Hospital 4	-1.60 (-0.33)
Adjusted R ²	0.29
F	6.95
P	<.001

*Significant at 0.01 level; **Significant at 0.05 level.

Its influence on dependency is, therefore, likely to be indirect. Co-operation between people in any situation is, of course, likely to depend on the circumstances of the interaction and the nature and form of the interpersonal relationship between the parties at the time. The situation is, however, more complicated when there is dependency on one side of the relationship and power on the other. Such circumstances exist, by and large, in long-stay institutions, wherein nurses are in charge and have to make decisions on the level of assistance to provide to residents. Nurses usually have choices about how to react and behave, and rarely respond in a mechanistic manner to patient needs or characteristics. As Miller (1984) confirms, nurses use various strategies when dealing with dependency needs, not all of which are of equal benefit to the patient, and not all of which may constitute quality care.

Patient dependency is, of course, likely to be influenced by the process of institutionalisation itself. There are four models which seek to describe in a qualitative way the process of care in long-stay institutions (Wade, Sawyer and Bell, 1983). The "supportive" model of care is characterised by consultation and involvement of the elderly in the care regime. The process is consumer oriented with much of the impetus for activities originating with the elderly person. The "protective" model also encourages some degree of choice and consultation but within the frontiers laid down by staff. Even more constrained is the "controlled" model of care in which the patient is completely subordinate to the care regime. Most restrictive of all, however, is the "restrained" model which operates purely for the convenience of care staff. According to Wright (1985), patients or residents cared for under this approach are deprived of choice and are essentially "batch processed". Several studies have shown that a shift away from provider controlled institutional regimes to a less structured, more informal and co-operative environment has very positive affects on patient involvement in the process of their own care leading, in some cases, to early discharge (Adams *et al.*, 1979; McIntosh, 1983).

This study did not set out to categorise care regimes in the four institutions within the framework of the Wade *et al.* (1983) classification. The qualitative information that was collected suggests, however, that care regimes across institutions varied between the "protective" and the "controlled", with residents having little influence on the process of care. To what extent this might lead patients to become uncooperative is difficult to tell, but it is likely that institutionalisation and the type of care on offer does influence the behaviour of residents, as well as carers. Certainly, uncooperativeness is a feature in all of the institutions. Almost two-fifths of residents across the four institutions are classified as uncooperative, ranging from a

low of 32 per cent in Institution 4 to a high of 44 per cent in Institution 1. The extent of the problem suggests that personality characteristics, when combined with institutional factors, may be a significant element influencing carer-resident relationships in long-stay units.

Institutional type is also likely to have an impact on care provision. When separate regressions were run for each hospital, containing only the dependency variables, there were differences across institutions in the number of care hours provided to people in the benchmark category of dependency. These equations are not shown in this paper but provide the background for the introduction of the dummies for institutional type shown in Equation (1) of Table 4. The role of the supply side in influencing the structure and process of care in acute care settings has long been recognised by economists and policy-makers alike. The recognition that unexplained variation in rates of activity exists among broadly similar acute hospitals has led to experimentation with incentive and payment systems such as Diagnostic Related Groups (DRGs), among other approaches, in many countries in recent years. It is likely that the amount and pattern of care in the long-stay sector is also, at least partly, determined by institutional factors, rather than being the sole consequence of the dependency characteristics of residents. The model allows us to explore whether type of institution influences the amount and pattern of long-term care available to old people. No inference about efficiency can, of course, be made from the results. Care estimates are only one aspect of the efficiency equation. Without information on health outcomes it is impossible to say whether more or less care, or the substitution of one form of care for another, improves the health and well-being of old people.

The coefficients for the different care institutions turn out to be important, but only in the sense that Institution 2 differs so much from the other three. The significance of Institution 2 reflects the impact of the approach to care in that institution, which is focused to a much greater extent than in the other institutions on rehabilitation and the return of old people to the community. Put simply, it is more difficult to get into Institution 2, and easier to get back out, if admitted, than it is elsewhere. The high level of throughput associated with rehabilitation beds in Institution 2 reflects the ethos of care of its staff. When asked about the nature of their work, staff in Institution 2 tended to put most emphasis on the continuum of care for old people, and on the role of assessment and rehabilitation in keeping people out of long-stay beds (Blackwell *et al.*, 1992). The view taken by the consultant geriatricians in the institution is that unless comprehensive assessment and rehabilitation are available, programmes of care of the elderly will be ineffective. Of the four institutions in the study, Institution 2 is the only one with a significant rehabilitation programme. It has also got much more developed community

care support structures in its immediate hinterland than exist in the areas surrounding the other institutions.

The availability of resources has a major influence on the type and amount of care available in institutions. The philosophy of care is "interventionist" in Institution 2, but this is matched by the availability of adequate resources in the areas of nursing, paramedical provision, rehabilitation beds, day hospital places and community support. Without such resources, the emphasis on the continuum of care in Institution 2 would remain an aspiration rather than a reality. The other institutions are simply not in a position to provide the same intensity and mix of care as is available in Institution 2. While the findings of the qualitative interviews from these institutions suggest that staff aspire to a more intensive use of resources and higher levels of throughput, the reality is, for Institutions 3 and 4 in particular, that they are not in a position to do so. The empirical findings discussed above confirm the importance of the supply side in influencing the nature and amount of care available to residents in long-stay institutions. The data is picking up the more intensive concentration of nursing and paramedical resources on rehabilitation activity in Institution 2.

VII CONCLUSION

The relationship between care provision and dependency has been considered in this paper. For the high dependency Guttman category, the conventional wisdom is confirmed: there is a positive and significant relationship between care and physical dependency. However, the results point to a weakness of the generalised Guttman scale in predicting fine levels of care. All of the work is done by the highest category of dependency in the scale in comparison with the others. This suggests that there may be a minimum critical mass of caring required for elderly residents, irrespective of level of dependency. Moreover, significant differences in care provision may only occur at very high levels of physical dependency. This in turn means that relatively crude divisions of dependency into low/medium and high may suffice for the allocation of public funding to long-stay institutions providing care to old people.

One of the most interesting findings to emerge from the data is the implication that the personality characteristics and behavioural traits of residents may influence the amount of care provided by staff in long-stay institutions. In particular, residents who are uncooperative may receive less care for any given level of dependency. This result is not surprising perhaps, once it is acknowledged that nursing staff do not necessarily respond in a mechanistic way to patient need and have considerable scope in their

approach to dealing with individual residents. Almost two-fifths of residents in the study are categorised as uncooperative. The level of uncooperativeness may be linked to the type of institutional control exercised in the institutions, which is largely of a "protective" and "controlled" variety, with little opportunity for residents to influence the organisation and provision of care. This points to the need for much more research on what goes on inside long-stay institutions. If regimes of care influence care provision, then we need to know what affect, if any, this has on health outcomes. At the very least, some formal mechanism is required to elicit the views of residents on the process of care in institutions. Currently, too little attention is paid to the views of long-stay residents.

The influence of the supply side is given more formal recognition in the results for institutional type, particularly in the fact that Institution 2 differs so much from the other three institutions. Assessment, rehabilitation and the continuum of care is emphasised much more in Institution 2 than at the other sites. The result is a much more intensive use of resources in that institution, leading to a higher level of throughput and a more interventionist philosophy with respect to care. This approach to care in Institution 2 is facilitated by the availability of significantly more resources than in the other institutions, thus making it easier to achieve stated objectives with respect to patient care.

REFERENCES

- ADAMS, J., J.E. DAVIES, and J. NORTHWOOD, 1979. "A Change of Scene — Ridge Hill, A Home not a Ward", *Nursing Times*, 27 Sept., pp. 1,659-1,661; 4 Oct., pp. 1,726-1,727; 11 Oct., pp. 1,769-1,770.
- BALESTRA, P., 1990. "Dummy Variables", in J. Eatwell, M. Milgate and P. Newman (eds.), *Econometrics: The New Palgrave*, London: Macmillan Reference Books.
- BLACKWELL, J., E. O'SHEA, G. MOANE, and P. MURRAY, 1992. *Care Provision and Cost Measurement: Dependent Elderly People at Home and in Geriatric Hospitals*, General Research Series, Paper No. 157, Dublin: The Economic and Social Research Institute.
- DARTON, R., and M. KNAPP, 1984. "The Cost of Residential Care for the Elderly: The Effects of Dependency, Design and Social Environment", *Ageing and Society*, Vol. 4, No. 2, pp. 157-183.
- EVANS, G., B. HUGHES, D. WILKIN, and D. JOLLEY, 1981. *The Management of Mental and Physical Impairment in Non-Specialist Residential Homes for the Elderly*, Manchester: University of Manchester Departments of Psychiatry and Community Medicine.
- FILLENBAUM, G., 1985. *The Wellbeing of the Elderly: Approaches to Multi-dimensional Assessment*, Geneva: World Health Organisation.
- GIBBINS, F.J., M. LEE, P.R. DAVISON, *et al.*, 1982. "Augmented Home Nursing as an Alternative to Hospital Care for Chronic Elderly Invalids," *British Medical Journal*, Vol. 284, pp. 330-333.

- KENNEDY, P., 1992. *A Guide to Econometrics*, Oxford: Basil Blackwell, pp. 216-227.
- KATZ, S., A.B. FORD, R.W. MOSKOWITZ, B.A. JACKSON, and M.W. JAFFE, 1963. "Studies in the Illness of the Aged — The Index of Independence in Activities of Daily Living", *Journal of the American Medical Association*, Vol. 185, pp. 914-919.
- KYLE, D.R., M.F. DRUMMOND, and D.M.O. WHITE, 1987. "The Hereford Department for Mental Health for the Elderly: A Preliminary Evaluation", *Community Medicine*, Vol. 9, pp. 35-46.
- McINTOSH, J.B., 1983. "Experimental Care for the Elderly", *Nursing Times Occasional Papers*, Vol. 79, p. 25, 14 Sept.
- MILLER, A., 1984. "Nurse-Patient Dependency — A Review of Different Approaches with Particular Reference to Studies on the Dependency of Elderly Patients", *Journal of Advanced Nursing*, Vol. 9, pp. 479-486.
- NISSEL, M., and L. BONNERJEA, 1982. *Family Care of the Handicapped Elderly: Who Pays?* London: Policy Studies Institute.
- NYMAN, J.A., 1988. "The Marginal Cost of Nursing Home Care", *Journal of Health Economics*, Vol. 7, pp. 393-412.
- O'SHEA, E., and R. CORCORAN, 1990. "Balance of Care Considerations for Elderly Persons: Dependency, Placement and Opportunity Costs", *Applied Economics*, Vol. 22, pp. 1,167-1,180.
- ROCKWOOD, K., P. STOLEE, D. ROBERTSON, and E. SHILLINGTON, 1989. "Response Bias in a Health Status Survey of Elderly People", *Age and Ageing*, Vol. 18, pp. 177-182.
- ROSSER, R.M., and V.C. WATTS, 1972. "The Measurement of Hospital Output", *International Journal of Epidemiology*, Vol. 1, pp. 361-368.
- SUITS, D.B., 1957. "Use of Dummy Variables in Regression Equations", *Journal of the American Statistical Association*, Vol. 52, pp. 548-551.
- TORGERSON, W.S., 1967. *Theory and Methods of Scaling*, New York: Wiley, pp. 299-333.
- WADE, B., L. SAWYER, and J. BELL, 1983. *Dependency with Dignity*, Occasional Papers in Social Administration, London: 68 Bedford Square Press.
- WILLIAMS, R.G.A., M. JOHNSON, L.A. WILLIS, and A.E. BENNETT, 1976. "Disability: A Model and Measurement Technique", *British Journal of Preventive and Social Medicine*, Vol. 30, pp. 71-78.
- WRIGHT, K.G., J.A. CAIRNES, and M.C. SNELL, 1981. *Costing Care: The Costs of Alternative Patterns of Care for the Elderly*, Sheffield: Unit for Social Services Research, University of Sheffield.
- WRIGHT, K., 1985. *Contractual Arrangements for Geriatric Care in Private Nursing Homes*, Discussion Paper, No. 4, York: University of York.
- WRIGHT, K.G., 1986. *Economic Aspects of Strategies for the Health Care of the Elderly*, York: University of York.
- ZERUBAVEL, E., 1979. *Patterns of Time in Hospital Life. A Sociological Perspective*, Chicago: University of Chicago Press.