The costs and service implications of substituting intermediate care for acute hospital care

Leslie Mayhew* and David Lawrence[†,‡]

*Faculty of Actuarial Science and Statistics, Cass Business School, City University, Brent Teaching Primary Care Trust, UK; [†]Health Services Research Unit, London School of Hygiene and Tropical Medicine, London University, UK; [‡]Public Health Department, Brent Teaching Primary Care Trust, UK

Intermediate care is part of a package of initiatives introduced by the UK Government mainly to relieve pressure on acute hospital beds and reduce delayed discharge (bed blocking). Intermediate care involves caring for patients in a range of settings, such as in the home or community or in nursing and residential homes. This paper considers the scope of intermediate care and its role in relation to acute hospital services. In particular, it develops a framework that can be used to inform decisions about the most cost-effective care pathways for given clinical situations, and also for wider planning purposes. It does this by providing a model for evaluating the costs of intermediate care services provided by different agencies and techniques for calibrating the model locally. It finds that consistent application of the techniques over a period of time, coupled with sound planning and accounting, should result in savings to the health economy.

Intermediate care in UK health-care policy

Discussion of intermediate care in the UK goes back to at least 1970.[1] The main aims of intermediate care are to facilitate both the prevention of acute hospital admissions and the early discharge of acute hospital ward patients, by providing equivalent alternatives.[2]

Intermediate care is a central part of the 2000 National Health Service (NHS) plan[3] and the

Leslie Mayhew, Professor, Faculty of Actuarial Science and Statistics, Cass Business School, City University, London and Honorary Consultant, Brent teaching Primary Care Trust. **David Lawrence,** Honorary Senior Lecturer, Health Services Research Unit, London School of Hygiene and Tropical Medicine, London University, and Public Health Department, Brent teaching Primary Care Trust. Correspondence to: David Lawrence, Health Services Research Unit, London School of Hygiene and Tropical Medicine, Keppel St, London WC1E 7HT, UK Email: david.lawrence@lshtm.ac.uk

National Service Framework (NSF) for older people.[4] Standard 3 in the NSF suggests improving access to a new range of intermediate-care services, at home or in designated care settings, so as to promote independence.

Among other things, the NHS plan promised:

- A £900m package of new intermediate-care services by 2004 (p. 14 in PDF of printed version).
- An extra 5000 intermediate-care beds (some in acute hospitals, some in community hospitals and some in redesigned private nursing homes, p. 46).
- 1700 extra non-residential intermediate care places and an incentive fund for joint working with local authorities, which would focus initially on intermediate care (p. 72).

These planned increases in intermediate-care funding are likely to stimulate demand for

other services, putting more pressure on social services and general practice. Acute-, inter-mediate- and primary-care services, therefore, need to be planned together, but there are difficulties in ensuring that any system put in place will work efficiently and effectively and provide value for money, as well as high standards of care.

A key aim of the NSF for older people and the NHS plan is to end widespread delayed discharge ('bed blocking'). Intermediate-care services are seen as an important mechanism for achieving this. The UK Government intro-duced the Community Care (Delayed Dis-charges) Act in 2003, to facilitate this through a system of financial inducements and penal-ties.[5,6]

Under the Act there will be a reimbursement mechanism, whereby local authorities will have to pay acute hospitals for patients whose discharges are delayed, if suitable residential accommodation or the necessary support can-not be provided. This mechanism is not intended as a stand-alone policy, but as part of the wider NSF policy framework. The guidance accompanying the Act makes the motivation clear:

> Effective whole systems capacity planning is key to ensure that older people receive the right care, in the right place, at the right time.[6]

Further guidance from the UK Department of Health states, with respect to delayed discharges:

> The key principle underpinning … effective discharge … is that transitional and intermediate care services are used as effectively as possible.[7]

Beyond the rhetoric of what the policy is supposed to do, practical guidance from the Department of Health on how to use inter-mediate care effectively within the whole system, is lacking. In order to achieve these policy objectives, the relative amounts and mix of cost-effective acute and intermediate 'mod-els of care' will need to be planned and implemented. The problem is therefore how to allocate patients to the most appropriate care pathways (although what is deemed to be appropriate may be constrained by shortages in either capacity or budget). Although there have been reviews of the cost-effectiveness of various intermediate-care models,[8] there is a lack of guidance for planners on how to estimate the economic consequences of chan-ging intermediate-care provision and thus plan the services.

Depending on the care setting, intermediate-care costs could be borne by different provi-ders, including hospital trusts, social services, primary care, the voluntary sector and by informal carers. Since each provider has differ-ent budgetary and other constraints, it is likely that cost decisions taken by one provider alone may be sub-optimal for the whole system. If costs could be made more explicit and a practical tool developed, it should be possible to allocate resources more efficiently than now while taking into account both patients' needs and the support systems available in the home or the community. It could also lead to the creation of fairer reimbursement systems.

There is a long history of research into care-delivery planning models for older people that fall under the generic heading of the 'Balance of Care' model (BoC).[9–11] However, as far as we know, only Bowen and Forte[12] have published applications of the BoC framework to inter-mediate care.

Aim of this paper

The aim of this paper is to demonstrate the practical application of a model specifically designed for use for intermediate care. This model is an extension of the framework in Bowen and Forte.[12] We use this model to estimate the changes in provision and costs of intermediate care due to reductions in acute hospital care through prevented admission and early discharge.

Four specific questions are addressed in this paper:

1. What are the costs of different inter-mediate-care packages for any given level of need (assuming an outcome of equiva-lent or reasonable quality to the alternative of acute care) and where the costs fall in terms of various organizations or indivi-duals?
2. For categories of patients whose medical and personal needs could be met in different settings, whether it is more cost effective to meet those needs in an intermediate-care setting (including at home or in a nursing home) or an acute hospital?

81

3. What are the implications for budgets arising from cost sharing among the various statutory and voluntary service providers?
4. What are the effects of reduced acute care on physical and human resources needed for intermediate care?

In the following section, we describe how intermediate care fits within the wider health- and social-care system; we then describe the methodology used to make our planning approach operational and follow this with the main results. A concluding section discusses the issues raised.

The functions of intermediate care in the health- and social-care system

This section compares the roles of the various service elements and structures within the health- and social-care system. Figure 1 shows a simplified model of how intermediate care straddles a number of organizational boundaries and services. The primary-care trust, successor organization to an English health authority, sits in the middle. Its role is to commission, co-ordinate and manage the intermediate-care activity, interfacing with other NHSs, Local Government, voluntary and private sectors.

The primary care part of the health-care system is the first point of contact for patients. The focus of care is the person or whole family, continual throughout life, and therefore including responsibility for the continuing care of disabled people.

The function of secondary care in acute hospitals is to treat body systems of people who are acutely medically unstable and/or who need intensive, highly technical medical interventions.[13] It is short term and usually accessed through referral from a primary-care setting.

Intermediate care differs from secondary care in that it is 'whole person' oriented, for patients whose medical condition is relatively stable. It differs from primary care in that it is short term and is a referred service. Intermediate care may be delivered in a number of settings, including acute or community hospitals (with medical cover by acute hospital trusts or family doctors/general practitioners [GPs]), day centres, patients' homes or private sector residential or nursing homes (See Appendix 1).

The intermediate care part of this classification fits one set of criteria used in Steiner's definitions of intermediate care.[7]

One basis for intermediate-care planning is:

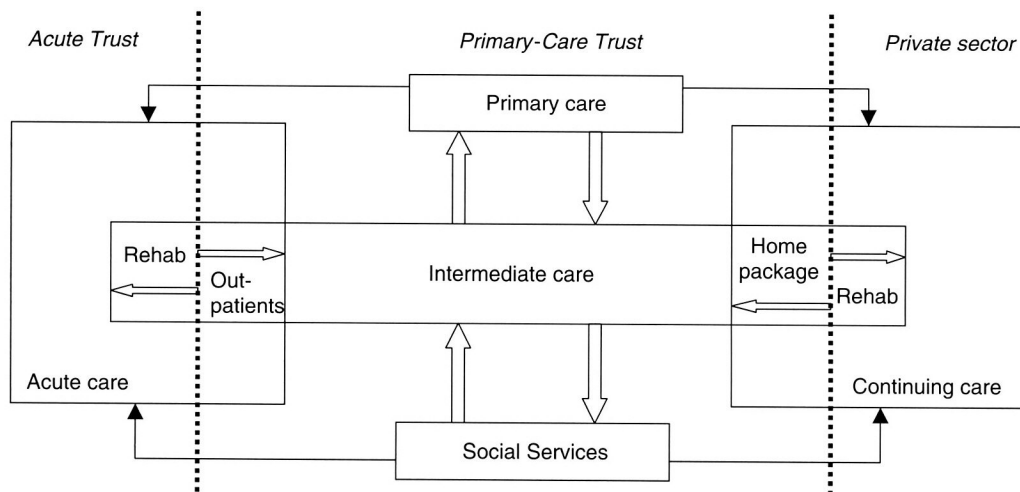- measure needs of patients in a health-care system in terms of the above classification,

Figure 1 *A model of local health-care providers, showing intermediate care in relation to organizational boundaries and health- and social-care activity. (An Acute Trust is a hospital. A Primary-Care Trust provides community nursing and other services and for the purpose of illustration, is taken to include the family doctor service (general practice). Some primary-care trusts will join with social service departments to provide social care.)*

- develop detailed models of care required to meet those needs,
- quantify the activity, resources and costs required to meet those needs.

The rest of the paper uses these three steps.

Methods

Care needs and the development of the model

Workshops were held in 2001 in the London Borough of Brent (Brent has a population of over 260,000 and is mainly served by three major acute hospitals), involving a range of health and other professionals. The aims of the workshops were:

- to classify into categories, patients in the 75 + age range who have needs which would benefit from intermediate care;
- to define levels of services for various intermediate-care packages, e.g. hours a week of nurse visits, social services, case management and to split these by provider.

The workshops agreed on the following patient categories that typified the range of intermediate-care needs likely to be met in practice and the approximate time in days for which care would be necessary. These categories were informed by those developed at an earlier workshop at the Department of Health in July 2000:[12]

- P1: a patient in a mild confusional state and/or slightly frail for whom a medical diagnosis has been made but for whom a hospital is not absolutely necessary, i.e. admission prevention (up to seven days intermediate care required).
- P2: a patient with a more severe medical condition or who has undergone surgery, but who is making a good recovery (up to seven days intermediate care required).
- P3: a severely arthritic patient recovering from a fall or fracture, possibly with multiple pathologies (up to 14 days intermediate care required).
- P4: a patient recovering from a moderate stroke (up to 28 days intermediate care required).
- P5: a patient who had a severe stroke (up to 42 days intermediate care required).

Note that these are archetypes, not precise definitions. They are also prescribed on the basis of a limit (e.g. up to seven days) rather than as an 'average'. Patients with other conditions requiring similar care, but discharged from a range of acute hospital specialties, could also fall into these categories. With input from the professionals at the workshops and the help of finance departments, the service support needed for each patient category P1–P5 was then quantified and costed.

The workshops defined 12 different care packages. For patient category P1, preventative admission, two packages are specified, one for each sub-category P1 (a) and P1 (b). These patient sub-categories are not alternatives, but variants that depend on whether support from the Community Rehabilitation Team (CRT) or the Community Care Team (CCT) is more appropriate. The CCT is able to deal with acute exacerbations of chronic conditions requiring some nursing input, whereas the CRT deals with patients whose admission could be prevented through rehabilitation and socially-oriented care. For categories P2–P4, also there are also two packages for each category, one for each sub-category, (a) and (b). Again these sub-categories are not alternatives, but are variants that depend on whether there is a fit carer in the patient's home. P2 packages are for up to seven days, P3 packages up to 14 days, and P4 up to 28 days.

For P5 there are also two variants, sub-categories (a) and (b), depending on whether a patient requires input from a geriatrician or a psychiatric nurse, i.e. cases where cognitive impairment has been diagnosed. Only for P5 is each variant further subdivided into two alternative care packages: 'home plus nursing home', or 'nursing home only'.

For P5 care packages, it cannot be assumed that nursing home capacity will necessarily be available locally (this is the case in Brent) and so both 'nursing home only' and 'home plus nursing home' alternatives were calculated.

The cost of institutional care, i.e. in a nursing or residential home, is assumed to be met by the health- and social-care system and not by the individual. This will be the case while the spell of intermediate care lasts, but longer continuing-care stays could be subject to a means test.

In all, 16 service support elements were identified, ranging from medical and nursing services to personal care (including meals on

wheels), and the volume of service input agreed for each patient category and care package was calculated. Units were expressed in hours per week, cost per bed-day or units of the service consumed (e.g. meals).

The analysis used a mixture of costs: (1) estimated locally through discussions with finance departments of the local organizations involved; (2) applying costs provided nationally by the NHS, to local acute care costs by specialty in each hospital. Other places will have different cost structures from those used here but the principles and the framework are applicable to most health-care systems.

Cost estimates were carried out on a consistent full economic costing basis where possible. For example, for services delivered by professionals such as nurses and GPs we took account of the direct salary costs, on-costs including employers' National Insurance contributions, and agreed on allowances for overheads and depreciation. For private-sector providers we used the published prices. For voluntary-sector providers we took the advice of people attending the workshop.

Quantifying costs and resources

1. Comparing the costs of the 12 intermediate-care packages: The support levels and daily costs, broken down by service and service provider, were calculated for each of the 12 care packages. These were based on data derived from the workshops and discussions with local finance departments.

The total costs for each care package were then split between community health services, social services and the voluntary sector, depending on whose responsibility they fell under. Any hours not covered by statutory, voluntary or private services were the responsibility of informal carers or of the individual concerned (self-care). In the present model these costs have been omitted.

2. Comparative costs of acute hospital clinical specialty and intermediate care: We calculated costs per inpatient day, using nationally available NHS cost data, for each acute-care clinical specialty of each local hospital and averaged the specialty costs across these hospitals.

Not all patients will use each intermediate-care package for the maximum number of days possible in that package. In these cases, costs are reduced *pro-rata*. We assumed a one-to-one substitution for each day of acute care by one day of intermediate care. Sheppard and Iliffe[14] found that patients do not necessarily take longer to recover (provided the standards of care are equivalent) if they are discharged earlier from acute care into 'hospital at home' care, so that this assumption seems reasonable. The model can be run varying this assumption as part of a what-if planning exercise.

We then compared the daily hospital specialty cost with the daily intermediate-care cost for each of the 12 intermediate-care packages. Results were calculated showing which was the cheapest, hospital or various kinds of intermediate care. In the relevant results table, if a cell entry is 'C' then the cheapest is community care, if it is 'H' it is a hospital, if it is 'N' it is a nursing home and if C|N then it is the 'home plus nursing home'. If there is no entry, for example in the 'prevented admissions' column, it means that intermediate care is not a practical alternative, for example, for a surgery case.

3. Potential cost savings to the health economy of pursuing various policies when increasing intermediate care use: Increasing intermediate-care supply might be intended to: (1) increase admissions to intermediate care directly from the community to reduce unmet need there; (2) prevent admissions and reduce lengths of stay at hospitals, to enable them to increase other admissions; (3) prevent some admissions and reduce lengths of hospital stay without additional admissions, so as to save costs.

Possible benefits of this intermediate-care strategy are:

- *Reductions in admissions using the 'preventive package'*. This arises mainly because fewer people would need to be admitted following attendance at A&E, although our analysis suggests the likely numbers would be small and depend on improved co-ordination between A&E and rehabilitation teams.
- *Improved efficiency*. There are potential cost savings from transferring patients into lower-cost environments as long as it is clinically safe to do so. Increased hospital admissions can then be achieved through shorter lengths of stay. Waiting lists for planned admissions could also benefit from improved throughput.
- *Faster recovery*. Some patients prefer to be at home rather than in hospital and some patients may recover more quickly there.

Here we only consider case 3 above, in which there is no overall increase in acute hospital admissions or overall health-care budget, but simply a transfer of patients into intermediate care with a consequent transfer of costs. It is assumed that inter-mediate-care providers would be allocated more funds from the overall health- and social-care budget, at the expense of acute hospital budgets. This scenario primarily addresses efficiency issues, where savings generated as a result could be re-directed and used to make other improvements to the services.

Consider the case of improved efficiency achieved through shorter lengths of stay. If we assume no increase in hospital admissions and only allow lengths of stay to vary then it is straightforward to show the potential impacts on annual budgets for acute and community care. However, as well as the previous assumption that discharging patients earlier than usual has no adverse impact on their speed of recovery, mechanisms to identify and transfer patients promptly and efficiently will need to exist in hospital and intermediate care.

We also made the following assumptions:

- The percentage discharges for each patient category P1–P5 are as in Bowen and Forte:[12] P1 (10%), P2 (20%), P3 (30%), P4 (30%) and P5 (10%). Where there is more than one alternative or variant-care package in a category, these percentages are split equally. For example under P3 we allocated 15% to each of the variants with or without a fit carer; under P5 we allocated 2.5% to each of the four sub-categories.
- Any additional intermediate-care costs are split between community health services, social services and the voluntary sector along the lines set out in the results (Tables 1a and 1b).
- Savings to the health economy are achieved through assumed average reductions in hospital lengths of stay of one or five or seven days. Table 3 shows the results of this analysis.

The model calculates the costs and savings as follows. Where the intermediate-care package is cheaper than the acute care alternative, intermediate-care costs are calculated by multi-plying the numbers of discharges in each specialty by the reduction in hospital length of stay and the daily cost of the intermediate-care package. Annual intermediate-care costs are then aggregated across specialties, split up and allocated to the intermediate-care provi-ders, including the voluntary sector, *pro rata* to each provider's input.

Acute hospital costs are reduced by subtract-ing the annual value of the bed-days saved from acute providers in each specialty, and then aggregating savings across all specialties. As all local acute hospitals in Brent are being re-built, all costs can be assumed to be variable and therefore the use of average rather than marginal costs is justified.

We also calculated the average number of hospital days likely to be saved in practice, by analysing average lengths of stay by destination on discharge, and assuming a specific (and different) reduction in stay for each destination. We used data on live dis-charges for the financial years 1997–98 to 2000–01 for the age groups 75 +, and all age groups.

The great majority of discharges were to places of usual residence. We assumed that intermediate care would reduce these, on average, by one day. The small percentage of patients who are discharged, either to other NHS hospitals or into long-term care, have much longer average lengths of stay, partly due to delayed discharge. Here we assumed that there would be a saving of three and 10 days, respectively.

4. Physical resources needed in intermediate care after reduction in length of hospital stay: The additional physical resources that would be needed to support these discharged patients were calculated, using as illustration a five-day reduction in average length of stay in the 75 + age group. First, the units of care in each service category were weighted by the proportion of patients discharged into each care package, to give the weighted average unit of care per day. Second, the weighted average cost per care day was then obtained by multiplying this by the unit cost of the service. Third, the weighted average unit of care per day was converted into the appropriate units of physical resources (nurses, care places or meals). Finally, the additional resources were converted into a total cost per week, and hence cost per year per service.

85

Table 1a *Care package costs for patient categories P1 to P3*

Number (1)	Service description	(2) Unit definition	(3) Unit cost £s	(4) P1 Prevented admission CRT (a) £s	(5) P1 Prevented admission CRT+CCT (b) £s	(6) P2 Fit carer (a) £s	(7) P2 Frail or no carer (b) £s	(8) P3 Fit carer (a) £s	(9) P3 Frail or no carer (b) £s
1	Day hospital	Days	53	27	27	0	27	0	53
2	Community nurse	Hours	25	49	25	37	37	98	98
3	Community psychiatric nurse	Hours	25	3	3	0	3	3	3
4	Independent nursing home	Days	71	0	0	0	0	0	0
5	Home care (including home care co-ordinator)	Hours	23	473	355	0	158	315	630
6	Specialist nurse	Hours	25	12	12	12	12	25	25
7	Meals on wheels	Meals	5	35	35	0	35	70	70
8	Specialist geriatrician	Hours	73	18	18	0	0	36	36
9	Rehabilitation beds fast track	Days	284	0	0	0	0	0	0
10	Rehabilitation beds	Days	284	0	0	0	0	0	0
11	Community rehabilitation team	Hours	67	670	335*	201	335	1407	1876
12	Collaborative care team	Hours	67	0	335*	469	938	0	0
13	Other voluntary support services	Hours	15	45	45	90	90	60	60
14	Care manager	Hours	22	22	22	22	22	65	65
15	Night support	Hours	18	113	113	0	180	180	1261
16	GP workload	Hours	44	11	11	0	11	44	44
	Cost per package			1477	1334	831	1847	2303	4221
	Cost per patient day of which:			211	191	119	264	165	301
	Community health			113	109	103	195	115	152
	Social services (incl. out of pocket expenses)			76	59	3	31	32	55
	Voluntary sector			23	23	13	39	17	94

*This package uses both CRT and CCT. (1)–(9) are column numbers. CCT=Collaborative Care Team, which is run by the acute hospital and facilitates early discharge and admission prevention. CRT=Community Rehabilitation Team, which is run by the Brent Primary Care Trust and accepts patients from the community and from the CCT; 'P' represents the patient category. Each intermediate-care package is specified up to a limited number of days as follows: P1 ≤7 days; P2 ≤7 days; P3 ≤14 days; P4 ≤28 days; P5 ≤42 days

The columns from left to right show:
- descriptions of each package covered by intermediate care, column (1),
- the unit definition – days, hours or meals, column (2),
- the unit cost of each component service measured in the relevant unit, column (3), 2000 prices,
- the total cost of each service contained in each care package during the relevant period (7, 14, 28, 42 days), columns (4)–(9).

To obtain the quantum of service provided by each service it is necessary to divide the total cost, from columns (4)–(9), by the unit cost of the service, shown in column (3). For example, the quantum of service of a specialist nurse, to prevent an admission for a P1 (a) patient, would be £12 (column 4) divided by 25 (column 3)=1/2 h, over a seven-day period (all figures are rounded)

The average cost per package per care day and the split between the three principal suppliers – community health services, social services, and the voluntary sector, based on ownership of the service, columns (4)–(9), are shown in the bottom four rows

Table 1b *Care package costs for patient categories P4 and P5*

Number	(1) Service description	(2) Unit definition	(3) Unit cost £s	(4) P4 Fit carer (a) £s	(5) P4 Frail or no carer (b) £s	(6) P5 Home and nursing home (a) £s	(7) P5 Home and nursing home (b) £s	(8) P5 Nursing home only (a) £s	(9) P5 Nursing home only (b) £s
1	Day hospital	Days	53	0	106	0	159	0	159
2	Community nurse	Hours	25	196	196	882	882	0	0
3	Community psychiatric nurse	Hours	25	0	12	0	18	0	18
4	Independent nursing home	Days	71	0	0	429	429	3000	3000
5	Home care (including home care co-ordinator)	Hours	23	1891	1891	4727	4727	0	0
6	Specialist nurse	Hours	25	0	49	0	74	0	74
7	Meals on wheels	Meals	5	0	70	210	210	0	0
8	Specialist geriatrician	Hours	73	0	73	0	109	0	109
9	Rehabilitation beds fast track	Days	284	0	1988	0	0	0	0
10	Rehabilitation beds	Days	284	0	1988	0	0	0	0
11	Community Rehab team	Hours	67	1340	1340	804	804	0	402
12	Collaborative care team	Hours	67	0	0	0	0	0	0
13	Other voluntary support services	Hours	15	0	240	0	360	0	90
14	Care manager	Hours	22	130	130	260	260	0	65
15	Night support	Hours	18	0	144	324	324	0	0
16	GP workload	Hours	44	175	175	262	262	262	262
	Cost per package			3732	8402	7899	8619	3262	4180
	Cost per patient day of which:			133	300	205	205	78	100
	Community health			61	212	46	55	6	24
	Social services (including out of pocket expenses)			72	75	134	134	71	73
	Voluntary sector			0	14	8	16	0	2

(1)–(9) are column numbers. CCT=Collaborative Care Team, which is run by the acute hospital and facilitates early discharge and admission prevention. CRT=Community Rehabilitation Team, which is run by the Brent Primary Care Trust and accepts patients from the community and from the CCT. For columns (6)–(9), P5, (a)=patients without cognitive impairment, (b)=patients with cognitive impairment

87

Results

1. Comparing the costs of intermediate care packages

The results show that (Tables 1a and 1b):

1. Many services may be involved in any one package, the costs varying considerably depending on the need and the setting, either at home or in a nursing home. These costs typically fall on different providers in different proportions.
2. Admission prevention packages (patient category P1) require complex support and are more expensive per day than some post-discharge care packages.
3. If there is no carer or no fit care at home care, costs are more than double because of the need to provide night-nursing cover. This arises in patient categories P2–P4, (a) and (b).
4. In patient category P5, nursing home is invariably cheaper than home plus nursing home.
5. In P5, having a cognitive impairment does not appreciably increase the costs of a nursing home care package.

2. Comparative costs of acute hospital clinical specialty and intermediate care, after admission

The likely demand for intermediate care will be broadly related to the number of patients discharged from each acute specialty (Tables 2a and 2b). Column (2) of Tables 2a and 2b gives the average weekly number of live discharges from 10 of the most common speciality groupings for the 75 + age group in the main hospitals concerned. Column (3) shows the average cost of a hospital bed-day in each speciality, based on the then-current cost estimates.

There are three important observations from Tables 2a and 2b:

1. After hospital admission, intermediate care is usually a cheaper alternative to continuing acute ward care, when analysed on a comparable basis. The savings can range up to several hundred pounds a day in extreme cases. This applies to care packages involving nursing homes as well as to domiciliary care packages.
2. When hospital care is compared with domiciliary care, in certain circumstances acute hospital care can be more cost-efficient. This is most apparent in geriatrics, mainly where there is no carer or only a frail carer at home, but also applies to a few other specialties as well. However, acute hospital care is not cheaper when compared with nursing home care.
3. Based on the frequency of weekly discharges, the majority of potential demand for intermediate care is likely to be generated from a small number of specialties.

Table 2a *Comparative costs of hospital versus intermediate care for patient categories P1 to P3*

(1) Hospital specialties	(2) Discharges per week (Brent patients)	(3) Cost per bed-day £s	(4) P1 CRT (a)	(5) P1 CRT+CCT (b)	(6) P2 Fit carer (a)	(7) P2 Frail or no carer (b)	(8) P3 Fit carer (a)	(9) P3 Frail or no carer (b)
Geriatric medicine	14	150	H	H	C	H	H	H
General medicine	11	412	C	C	C	C	C	C
General surgery and other surgical, nec	10	309	—	—	C	C	C	C
Trauma and orthopaedics	5	275	—	—	C	C	C	H
Urology	3	384	—	—	C	C	C	C
Other medical, nec	3	243	C	C	C	H	C	H
Cardiology	3	433	—	—	C	C	C	C
Gastroenterology	1	348	—	—	C	C	C	C
Haematology	1	291	—	—	C	C	C	H
Gynaecology	1	359	—	—	C	C	C	C

(1)–(9) are column numbers. C=community care is cheaper, H=hospital care is cheaper. CCT=Collaborative Care Team. CRT=Community Rehabilitation Team. '—'= not applicable; nec=not elsewhere classified

Table 2b *Comparative costs of hospital versus intermediate care for patient categories P4-P5*

(1) Hospital specialties	(2) Discharges per week (Brent patients)	(3) Cost per bed-day £s	(4) P4 Fit carer (a)	(5) P4 Frail or no carer (b)	(6) P5 Home plus Nursing home (a)	(7) P5 Home plus Nursing home (b)	(8) P5 Nursing home only (a)	(9) P5 Nursing home only (b)
Geriatric medicine	14	150	C	H	H	H	N	N
General medicine	11	412	C	C	CIN	CIN	N	N
General surgery and other surgical, nec	10	309	C	C	CIN	CIN	N	N
Trauma and orthopaedics	5	275	C	H	CIN	CIN	N	N
Urology	3	384	C	C	CIN	CIN	N	N
Other medical, nec	3	243	C	H	CIN	CIN	N	N
Cardiology	3	433	C	C	CIN	CIN	N	N
Gastroenterology	1	348	C	C	CIN	CIN	N	N
Haematology	1	291	C	H	CIN	CIN	N	N
Gynaecology	1	359	C	C	CIN	CIN	N	N

(1)–(9) are column numbers. C=community care is cheaper, H=hospital care is cheaper, N=nursing home is cheaper, CIN=combined community–nursing home is cheaper. CCT=Collaborative Care Team. CRT=Community Rehabilitation Team. nec=not elsewhere classified. For columns (6)–(9), P5, (a)=patients without cognitive impairment, (b)=patients with cognitive impairment

Table 3 *Impact on providers' budgets and on the health economy from a switch to intermediate care for Brent patients discharged from local hospitals*

Average reduction in length of stay (days)	Hospital trusts serving Brent (£ms/year)	Community health (£ms/year)	Social services (£ms/year)	Voluntary sector (£ms/year)	Total intermediate care (£ms/year)	Health economy (net) (£ms/year)
1	−0.58	0.23	0.098	0.06	0.39	−0.19
5	−2.91	1.17	0.49	0.3	1.96	−0.95
7	−4.07	1.64	0.69	0.42	2.33	−1.32

Negative=net saving

89

3. Potential cost savings to the health economy when increasing intermediate-care use

There are small but worthwhile savings to the local health economy when costs and savings are combined (Table 3). Using our assumption that one day's intermediate care replaces one acute day's stay, an average reduction of one day in an acute hospital stay produces an annual saving of about £0.58m in hospital costs, but about £0.39m would be needed to finance extra intermediate care. After taking all provider costs into account, a net saving to the economy of about £0.19m per annum is obtained, increasing to £1.32m if average lengths of hospital stay are reduced by seven days (Table 3).

These results cannot indicate whether the organizational (or other) aspects, such as reliability or capacity, are feasible. For example, if there was ample nursing home capacity, intermediate-care providers may prefer 'nursing home only' to 'home plus nursing home'. In this case, slightly higher savings to the health economy would be possible. These are important issues that would need to be addressed in practice.

The above illustrations are based on assumed savings in average lengths of stay of one, or five or seven days. Using further assumptions (see the methods section, end of sub-section 3), the average days saved in practice per admission were calculated to be 1.4 days for patients aged 75 and over and 1.1 days for all age groups, although we believe these findings to be conservative. Applying a one-day reduction in length of stay (which is also conservative) to the whole of England, for discharges of people aged 75 and over, would give an annual saving to the health economy of around £100m. If our analysis were to be applied to all the age groups, the savings would be higher still.

4. Physical resources implied

The discharges per week by specialty in Tables 2a and 2b provide an indication of the likely caseload for intermediate care at a point in time. Table 4 shows the additional physical resources that would be needed in each agency to support these patients, using as illustration a five-day reduction in average length of stay in the 75+ age group. The five-day reduction produces a £1.96m increase in intermediate-care costs, which corresponds to the same figure in the total cost of intermediate care column of Table 3.

The main resource costs fall on: the community rehabilitation team, 1.08 weighted average hours per day and requiring 5.3 whole time equivalents (WTEs) to meet demand; home care, 1.81 weighted average hours per day and 8.8 WTEs; night support 1.43 weighted average hours per day and seven WTEs; and the collaborative care team 0.34 weighted average hours per day and 1.6 WTEs. Based on this scenario, an additional 27.8 WTE staff would be needed based on all services, 26 more care places in nursing homes and day hospitals, and 126 more meals a day would be needed.

Discussion and conclusions

The framework presented here is a quite general practical planning tool, although it would need to be adapted to other local health-care environments and the names of the services might be different. Currently, the concept of intermediate care has theoretical credibility but is some way from achieving its full potential in practice. To achieve its potential, each service provider would have to fulfil certain tasks. Hospitals would have to reduce lengths of stay, and intermediate-care providers would have to choose the most cost-effective package in the given circumstances and provide a prompt and responsive service.

Organizational changes are also required, such as strengthening current information sharing and consultation arrangements between primary care and secondary care on the one hand and social services on the other, especially in the area of needs assessment. Better information is needed for capacity planning, needs assessment and day-to-day management. There would also be a need for improved liaison with local nursing and residential homes as well as corresponding changes in capacity which would require private sector investment.

Further issues that would need to be taken into consideration include:

- the possible need for house adaptations, a cost generally met by social services or individual patients;
- the costs of additional patient transport services;
- the additional costs which would also fall on to informal carers, e.g., their time and possible losses of earnings.

90

Table 4 *The impact of a five-day reduction in length of stay on individual service units and costs*

Service description	Unit definition	Unit costs £s	Wtd* average units of care per day	Cost per care day	Whole time equivalents†	Care places	Meals/day	Cost per wk £s	Cost per year £000s
Day hospital	Days	53	0.04	2.08		7		376	19.5
Community nurse	Hours	25	0.28	6.83	1.4			1232	64.1
Community psych. nurse	Hours	25	0.01	0.24	0.0			43	2.3
Independent nursing home	Days	71	0.06	4.08		10		737	38.3
Home care (incl. home care co-ordinator)	Hours	23	1.81	40.80	8.8			7365	383.0
Specialist nurse	Hours	25	0.06	1.49	0.3			269	14.0
Meals on wheels	Meals	5	0.70	3.50			126	632	32.9
Specialist geriatrician	Hours	73	0.02	1.69	0.1			305	15.9
Rehabilitation beds fast track	Days	284	0.03	7.10		5		1282	66.6
Rehabilitation beds	Days	284	0.03	7.10		5		1282	66.6
Community rehab team	Hours	67	1.08	72.50	5.3			13,087	680.5
Collaborative care team	Hours	67	0.34	22.49	1.6			4060	211.1
Other vol/stat support services	Hours	15	0.40	6.05	2.0			1093	56.8
Care manager	Hours	22	0.19	4.07	0.9			734	38.7
Night support	Hours	18	1.43	25.66	7.0			4632	240.9
GP workload	Hours	44	0.08	3.43	0.4			620	32.3
		Total	6.54	209.13	27.8	26	126	37,747.7	1962.9

*Wtd=weighted
†Assumes a 37-h working week

91

Actual savings in practice would be somewhat less than indicated here as we have used average hospital specialty costs which are spread evenly throughout the length of stay, whereas costs of the first few days' stay are higher than the average and these would still be borne by the hospital.

Acknowledgements

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Appendix 1

Classifying primary, intermediate and secondary care

Acute care	Intermediate care	Primary care
In critical care wards	*In rehabilitation in acute hospitals*	*In nursing homes*
Care setting—secondary	Care setting—secondary	Care setting—primary
Treatment focus—survival	Treatment focus—assessment/ rehabilitation	Treatment focus—maintenance
Treatment—short term	Treatment—short term	Treatment—long term
Medical condition—very unstable	Medical condition—stabilizing	Medical condition—stable short term
Treatment type—very high tech	Treatment type—medium tech	Treatment type—low tech
Service intensity—very high	Service intensity—high/medium	Service intensity—medium
Nursing condition—very unstable	Nursing condition—unstable	Nursing condition—stable short term
Functional dependency—very high	Functional dependency—high	Functional dependency—high

Appendix 1 *continued*

Acute care	Intermediate care	Primary care
In acute wards	*In community hospitals, nursing/ residential homes or at home*	*In residential homes or at home*
Care setting—secondary	Care setting—mixed	Care setting—primary
Treatment focus—medical stabilization/assessment/ treatment	Treatment focus—assessment, rehabilitation	Treatment focus—maintenance
Treatment—short term	Treatment—short term	Treatment—long term
Medical condition—unstable	Medical condition—not very unstable	Medical condition—stable
Treatment type—high/medium tech	Treatment type—medium/low tech	Treatment type—low tech
Service intensity—high/medium	Service intensity—medium	Service intensity—medium/low
Nursing condition—unstable	Nursing condition—unstable	Nursing condition—stable
Functional dependency—high/ medium	Functional dependency—high/ medium	Functional dependency—medium/ low