AN ANALYSIS OF HOSPITALIZATION INSURANCE SCHEMES

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An analysis has been made of the liabilities and theoretical surpluses of several profit-making hospitalization insurance schemes, that is, schemes which pay a cash benefit on hospitalization as distinct from sickness and whose benefit is not related to the incurrence of hospital fees. The information required for this study has been obtained from the companies concerned (advertisements and correspondence), the Hospital In-patient Enquiry 1970, and the in-patient statistics from the Mental Health Enquiry for the year 1970. By early 1973 six such schemes had been identified, and these, together with the British United Provident Association (BUPA) Hospital Cash Scheme and two schemes of the British Hospitals Contributory Schemes Association (BHCSA), form the subject matter of this study.

PROFIT-MAKING SCHEMES

Two of the six schemes are offered by the same company, that is, London and Edinburgh General Insurance Co. Ltd. (now known as Mercury Insurance Holdings Ltd.), whose parent company is the International Telephone and Telegraph Corporation. Three more schemes are sponsored by American companies—the Gold Shield scheme of the Life Assurance Company of Pennsylvania, the Hospital Money Plan of the Continental Casualty Company, and the Family Cancer Plan of the American Family Life Assurance Company of Columbus, Georgia. The sixth scheme, Hospital Plan, is not provided by a limited company but is underwritten at Lloyds.

THE NON-PROFIT-MAKING SCHEMES

The British United Provident Association, a relative late-comer to the field of hospitalization insurance, announced its scheme in 1972. It is working in partnership with the Clerical Medical and General Life Assurance Society and their scheme is on offer to both existing members of BUPA and

others. The constituent members of the BHCSA had in fact been first in the field. After the first world war, when the voluntary hospitals were in severe financial difficulties, their plight was investigated by the Voluntary Hospitals Committee under Viscount Cave (Ministry of Health, 1921). This Committee reported in 1921 and as a result a scheme was laid before the British Hospitals Association. It was accepted that payments to hospitals should take the form of payments for services rendered and that a proportion of the contribution should be set aside for 'extra-hospital benefits'. These provide cash payments for contributors for such diverse purposes as dentures, spectacles, convalescence, attendance at out-patient departments, and maternity.

A typical scheme in the 1930s would cost the subscriber 3d. per week and would pay any hospital in which he was a patient £2 17s. 6d. per week. The schemes were limited to those earning less than £6 per week if married with dependants, and £4 if single (Hospital Saving Association, 1936). With the coming of the National Health Service in 1948 the original purposes of the schemes, support for the hospitals and insurance against hospital fees, disappeared. However, a number of schemes whose funds were not tied to particular hospitals survived to form the present BHCSA (founded in 1948). These generally provide cash payments for contributors on being admitted to hospital, in addition to the extra hospital benefits mentioned above (Tables I and II).

METHOD OF ANALYSIS

It was decided to examine the commercial and some of the non-profit-making schemes, and to compare the relative benefits obtainable for a number of typical household units of a given size and age structure. The tables of the Hospital In-patient Enquiry for 1970 (HIPE), the Mental Health Enquiry, and the Registrar General's Review for the same year were used to determine the risk that existed of hospitalization in the population as a

continued on page 199

TABLE I
TERMS AND CONDITIONS OF POLICIES

Scheme	Benefit per Day	Causes excluded	Maximum Benefit	Private Wards and Nursing Homes covered?	Commencement of Cover	Pre-existing Conditions covered?	Restrictions on Enrolment	Other Comments
(A) Profit oriented schemes								
1 Continental Casualty Coy. ¹	Adults £5 Children £1	Mental illness, acts of war, civil disorder, alcoholism, drug addiction, congenital abnormalities of dependant children, participation in private and childbirth.	365 days	Yes	Immediate for new conditions	After 12 months	None for members of group. Cover terminates for females at 60, males 65	Group enrolment scheme, e.g. Law Society members. World wide protection
2 Family Cancer Plan (American Family Life Assurance Coy of Columbus, Georgia, USA)	Each person First 30 days: £13.35 Next 30 days: £6.69 Next 60 days: £5.00 Next 370 days: £3.33	Skin cancer, all other causes except internal malignant disease	£3,000, i.e. 720 days benefit	Yes	After 120 days. If cancer is diagnosed before this time premiums are refunded	No	Anyone who has ever suffered from an internal cancer	
3 Gold Shield Life Assurance Coy of Pennsylvania	£5 per person covered	Mental disorder, acts of war, convalescence, pregnancy, childbirth, miscarriage, drugs, alcoholism, and see 'Other Comments'	100 weeks £3,500	Probably	Immediate for new conditions	After 2 years	None	Excludes treatment in geriatric wards, sanatoria, convalescent homes, long-stay units. Includes overseas cover
4 Hospital Plan (Lloyds) ^{1,2}	£3 per contributor £2 per spouse £1 per child Double benefit for cancer and heart attack. Reduced by 1/3 at age 65	Acts of war, civil disorder, etc., mental disorder, alcoholism, drug addiction, and see 'Other Comments'. Pregnancy or any consequence thereof except on 'At Family or Husband and Wife plans'	£2,100 (all family)	Private, yes, unless out of 2 nominated in policy.	New accidents and other illness after 30 days. Childbirth or pregnancy after 10 months	After 2 years	None	Excludes treatment in geriatric wards, sanatoria, convalescent homes, long-stay units. Double benefit when husband and wife both hospitalized due to injury
5 London and Edinburgh Extra Cash	(1) Adults £5 Children £2.50 (2) Adults £3.33 Children £1.67 (Confinement £25)	Mental illness, acts of war, civil disorder, abortion, miscarriage, drugs, alcoholism, and see 'Other Comments'. Pregnancy or any consequence thereof except on 'At Family or Husband and Wife plans'	No limit	Yes	Immediate for new conditions after 10 months	After 2 years	Anyone who has ever suffered from an internal cancer or hospital cover refused for reasons of health	Double benefit if husband and wife both hospitalized due to injury. £500 for loss of hand, eye, or foot. £1,000 for loss of 2 hands, eyes, feet
6 London and Edinburgh Refund of Premiums	(1) Adults £5 Children £2.50 (2) Adults £3.33 Children £1.67	War or civil strife, mental disorder, pregnancy, miscarriage, childbirth, abortion, intoxication	No limit	Yes	Immediate for new conditions	After 2 years	As above	As 5 (1) above
(B) Non-profit-making provident association	£3 per person covered	Childbirth or pregnancy, except when due to abnormality	52 weeks out of 78 for any one except for mental illness—26 weeks during life of an enrolled person	Yes	Immediate for BUPA members otherwise immediate for 30 days for other illness. Abnormalities of pregnancy after 12 months	Possibly, depending on special terms of enrolment	Restrictions may be placed on medical conditions	Overseas cover for 12 months provided medical conditions for groups and by 20-25% for company schemes
7 BUPA Hospital Cash Plan (Clerical, Medical & General Life Assurance Society)	£3 per contributor £1.50 spouse £1.50 children (maternity grant £30 whether in hospital or not)	None, but see 'Maximum Benefit'	91 days in any one contribution year; 20 weeks in 3 years to single payment of £50	Yes (also follow-up home treatment hospital treatment)	Immediate for six months for other conditions	No	Must be 'in good health'	Additional benefits—optical, dental, convalescence, consultation fees, convalescence
(C) British Hospitals Contributory Schemes Association	£3 per contributor, £1.50 spouse £1.50 children	None	10 weeks in a year, 20 weeks in 3 years	Yes	After six months for private contributors, three months for group contributors	Yes provided 'not awaiting hospital treatment'	Must be 'in good health'	Additional benefits—out-patient grants, optical, dental, surgical appliances, convalescence, specialists' fees, convalescence
8 Hospital Saving Association Crown Plan	£3 per contributor, £1.50 spouse £1.50 children	None	10 weeks in a year, 20 weeks in 3 years	Yes	After six months for private contributors, three months for group contributors	Yes provided 'not awaiting hospital treatment'	Must be 'in good health'	Additional benefits—out-patient grants, optical, dental, surgical appliances, convalescence, specialists' fees, convalescence
9 Sheffield and District Co-operative Hospital Services Council Inc.	£3 per contributor, £1.50 spouse £1.50 children	None	10 weeks in a year, 20 weeks in 3 years	Yes	After six months for private contributors, three months for group contributors	Yes provided 'not awaiting hospital treatment'	Must be 'in good health'	Additional benefits—out-patient grants, optical, dental, surgical appliances, convalescence, specialists' fees, convalescence

¹Benefit those quoted are available at approximately double the premiums. ²Benefit those quoted are available at approximately half the premiums.

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TABLE II

PREMIUMS PER ANNUM

(1) CONTINENTAL CASUALTY CO.

Member's Age	Premiums per Member of Group (e.g., Law Society)			
	Members only Cover		Families Cover	
	Male	Female	Member and Spouse	Member, Spouse and all Children
<35 ..	£ 7.00	£ 8.00	£ 15.00	£ 18.80
35-44 ..	9.00	11.00	20.00	24.80
45-54 ..	14.00	17.00	31.00	35.40
55-64* ..	28.00	25.00	53.00	56.40

* Female cover terminates at age 60
Male cover terminates at age 65

(2) FAMILY CANCER PLAN

Individual premium £6

Family premium £10. This covers mother, father, and all unmarried children under 18.

(3) GOLD SHIELD

Premiums vary according to age of covered individual at the time of enrolment. *No increase with age.*

Age at Enrolment of each Individual Covered	Annual Premium per Person covered
0-18	£ 12.60
19-39	19.20
40-54	24.00
55-64	28.80
65-74	38.40
75+	50.40

(4) HOSPITAL PLAN

	Annual Premiums, All Ages
	£
Individuals ..	18.00
Husband and wife ..	33.00
All family* ..	47.40
One-parent family ..	33.00

* All family, i.e., husband, wife, and all children under 18 unmarried and living at home. New babies from age 3 months.

(5) LONDON AND EDINBURGH: EXTRA CASH PLAN

Age of Each Person covered on Enrolment	Premiums per Annum per Person covered	
	£5 p.d. Benefit	£3.33 p.d. Benefit
18-39 ..	£ 16.50	£ 11.00
40-54 ..	20.90	14.30
55-64 ..	25.30	17.05
65-74 ..	31.90	22.00
75-84 ..	42.90	29.70
85+ ..	53.90	36.85
Maternity Benefit ..	5.50	5.50
All children in family aged 1 mth-18 yr ..	11.00	7.15

These premiums are increased by one eleventh if they are paid monthly, and do not increase with age after enrolment.

(6) LONDON AND EDINBURGH: REFUND OF PREMIUM PLAN

Age of Each Person covered on Enrolment	Premium per Annum per Person covered on enrolment	
	£5 p.d. Benefit	£3.33 p.d. Benefit
18-39 ..	£ 22.80	£ 15.00
40-54 ..	27.60	18.60
55-64 ..	31.20	21.00
65-74 ..	38.40	25.80
75-84 ..	51.50	34.20
85+ ..	63.60	42.60
All children in family ..	13.80	9.00

Premiums do not increase with age after enrolment.

(7) BUPA

Age of Each Person covered	Premiums per Person covered per Annum	
	£6 p.d. Benefit	£3 p.d. Benefit
0-17 ..	£ 9.60	£ 4.80
18-44 ..	14.40	7.20
45-55 ..	19.20	9.60
60+ ..	31.20	15.60

Age limit for joining is 60 except for current BUPA members.

(8) HSA CROWN PLAN

Premium is £13 per annum per 'contributor', and this covers himself, his wife, and his children aged less than 16 years. The age limit for joining the scheme is 60 years, but contributors may continue in the scheme after that age.

(9) SHEFFIELD AND DISTRICT CONVALESCENT AND HOSPITAL SERVICES COUNCIL

Premium is £5.20 per annum per 'contributor'; this covers himself, his dependent wife, and dependent children under 18 years residing with the contributor. 'Dependent' means not normally employed. Age limit for joining the scheme is 65 years, but contributors may continue in the scheme after that age.

continued from page 197

whole. The analysis of the liabilities and standardized gross surplus of the various schemes for each household unit is based on the formula given below. It should be noted that this formula does not estimate profit net of administrative costs and tax liabilities.

Standardized gross surplus =

$$\left\{ P - \sum_j \sum_i \frac{m}{j} \frac{n}{i} MDS_{ij} \times DR_{ij} \times BR_{ij} \right\} \times 100$$

where P = annual premium per subscriber

MDS = mean duration of stay (spell)

DR = annual discharge rate

BR = benefit rate

for i^{th} eligible cause and j^{th} member of the household unit.

The standardized gross surplus used to compare the schemes is obtained by multiplying for an eligible cause the mean duration of stay (*MDS*) by the discharge rate (*DR*), which gives the annual bed days per person. This multiplied by the benefit rate (*BR*) gives the benefit liability (*BL*). These calculations are repeated for all relevant causes for each of the persons covered. If we subtract the total benefit liability from the premium (*P*) we obtain the gross surplus. This multiplied by 100 and divided by the premium gives the standardized gross surplus for an annual premium of £100 (for a worked example see Appendix 3).

The mean duration of stay in the HIPE tables is based on patient-spells in hospital, not on the length of time spent in hospital by individual patients. For example, a patient who had three spells in hospital in one year of 4, 10, and 11 days would be represented in the HIPE tables (e.g., table 9):

(1) by adding 25 days to the total number of days spent in hospital to be distributed over three spells (if there were no other spells to be accounted for in his age, marital status, and diagnostic grouping, we would therefore observe a mean duration of stay (spell) for this group of 8.3), and

(2) by adding three more discharges to the number recorded. Continuing our example mentioned under (1), the discharge rate would be $(3/Y) \times 10,000$ where *Y* is the total number of people in England and Wales in the age/marital status cohort under consideration.

Most schemes, however, place an upper limit on their liability to the subscriber or an insured member of the household unit. For this reason the calculation of the theoretical liability of the scheme for each eligible cause will tend to overestimate the actual liability.

The Mental Health Enquiry statistics, on the other hand, do enumerate the actual patients but do not differentiate by marital status. Therefore the annual bed-days spent in psychiatric hospitals for each

individual cannot be calculated by $\sum_i^n MDS_{ij} \times DR_{ij}$,

and the following method has been used instead:

$$\text{Annual bed-days in psychiatric hospitals per person} = \frac{NH \times M \times 365}{NP}$$

where *NH* = number of people in this age/sex group in psychiatric hospitals or units on 31 December 1970 whose stay is less than one year

M = percentage of *NH* of given marital status in psychiatric beds in 'other' units in this age/sex category

NP = number of people in this age/sex/marital status group in the whole population.

(*M* is derived in the absence of information to the contrary on the assumption that the proportion of married and unmarried is the same in psychiatric hospitals and units as among those being treated for psychiatric illness in general wards.)

All schemes known to us which do pay a benefit for mental disorder will not effectively accept liability for a stay of longer than one year. It is for this reason that *NH* refers to the number of people in psychiatric hospitals whose stay is less than one year. It can be seen that even this statistic will overestimate the theoretical liability because the maximum benefit allowed by any scheme is 26 weeks in any one year. Unfortunately, HIPE does not permit such an allowance to be made for patients with mental disorder whose stay is in a general hospital.

As both HIPE and the Mental Health Enquiry provide data only for relatively comprehensive age groups, linear interpolation has been used to calculate the liability of a scheme for a particular household unit (see Appendix 1). Most schemes exclude certain conditions, especially mental disorder and pregnancy (see Table I and Appendix 2). This has been allowed for in the tables. Two schemes (Hospital Plan and Gold Shield) exclude all patients in geriatric wards. At the same time Hospital Plan offers double benefits for patients with cancer or heart attack. We are informed, however, that patients with heart attack or cancer who happen to be placed in geriatric wards are excluded from benefits. Our data do not allow this condition to be taken into account. Pre-existing illness, variously defined, is excluded from several schemes either for a period or altogether. This cannot be calculated exactly and so has been ignored, as have the exclusions for alcoholism and drug addiction. The effect of ignoring these exclusions is to make the calculated resultant gross profit appear rather lower than it actually is in practice.

ESTIMATES OF STANDARDIZED GROSS SURPLUS

It can be seen from Tables III and IV that all schemes make a considerable profit on subscribers who are less than 35 on entry (assumed to be the male in the case of a family), except for the Sheffield and District scheme, and even here its only loss is for families where the male's age ranges from 20

TABLE III
STANDARDIZED GROSS SURPLUSES FOR SINGLE PERSONS

Age (yrs)	Sex	Continental Casualty	Family Cancer [†]	Gold Shield [§]	Hospital Plan	London & Edinburgh Extra Cash Plan [§]	London & Edinburgh Refund of Premiums [§]	BUPA Hospital Cash	HSA Crown Plan	Sheffield & DHCS
20-24	M	67.54	98.68	88.17	92.32	86.23	90.03	70.88	89.01	59.67
	F	69.24	99.01	87.19	86.98	85.08	89.21	66.70	81.17	42.20
25-34	M	52.73	97.51	82.77	88.72	79.95	85.48	41.62	84.43	19.25
	F	50.69	96.48	79.45	82.60	76.09	82.69	43.44	89.39	8.50
35-44	M	45.95	92.89	77.49	82.67	73.99	81.57	23.79	78.40	-5.52
	F	19.75	82.54	59.13	67.24	52.79	66.55	-4.52	55.19	-49.26
45-64	M	34.65	41.18	67.49	49.10	40.59	53.32	6.90	39.11	-98.74
	F	57.99*	48.94	80.74	68.73	61.82	70.00	3.80	58.41	-32.37
65-74	M	—	-48.05	75.94†	40.67†	7.83	23.43	-30.00	-34.82	-290.00
	F	—	3.43	93.4†	83.72†	47.53	56.43	23.15	22.08	-130.54
75+	M	—	-96.37	—	—	-29.37	-9.78	-130.95	-160.20	-610.68
	F	—	-11.10	—	—	-2.51	13.77	-98.11	-104.99	-494.34

* Females to age 60 only

† Family Cancer Plan based on maximum benefit only

‡ All persons aged over 65

§ Based on persons entering the scheme at the ages given. See Table V

TABLE IV
STANDARDIZED GROSS SURPLUSES FOR HOUSEHOLDS

Age of Male Subscriber (years)	Ages of Other Members of Household	Continental Casualty	Family* Cancer	Gold Shield	Hospital Plan	London & Edinburgh Extra Cash Plan	London & Edinburgh Refund of Premium	BUPA Hospital Cash	HSA Crown Plan	Sheffield & DHCS
22.5 ..	F20.5	76.26	98.71	90.57	78.13	89.21	92.19	80.18	57.39	−0.57
30 ..	F28 B5 G3	71.41	96.04	81.28	87.04	81.72	86.46	79.82	64.64	8.04
40 ..	F38 B15 G13	72.96	90.25	85.88	90.41	83.28	87.44	83.51	73.53	20.42
55 ..	F53	78.76	61.12	80.49	81.12	75.31	80.68	80.42	62.93	−12.35
70 ..	F68	—	10.12	86.61	87.41	63.15	69.47	74.63	38.60	−119.96

*Family Cancer Plan based on maximum benefit only

to 24. The loss of -£0.57 is explained because this scheme admits pregnancy as an eligible cause. The standardized gross surplus ranges from £99.00 for single females aged 20-24 in the Family Cancer Plan to £41.62 for single males aged 25-34 in BUPA. Most of the commercial schemes make a profit on the subscribers aged over 35; but the surplus varies greatly, the highest being +£92.89 (Family Cancer Plan, single males aged 35-44) and the lowest being -£96.37 (Family Cancer Plan, single males aged 75+).

It is interesting to note that for nearly every scheme the profit earned per subscriber does fall with an increase in the age of subscribers. To this extent the commercial schemes are countenancing a certain amount of cross-subsidization among age groups. The cross-subsidization implicit in many non-profit-making schemes is especially noticeable in the case of the Sheffield and District scheme. The London-based Hospital Savings Association Crown

Plan manages to avoid a certain amount of cross-subsidization by providing a terminal grant for all causes associated with chronic conditions. Hospital Plan and Gold Shield Plan avoid a certain degree of cross-subsidization by excluding people hospitalized in geriatric wards. As nearly all schemes disallow pre-existing conditions and set an upper limit to the benefit payable, such measures are most likely to discriminate against the elderly and therefore reduce the effective cross-subsidization among age groups. The BHCSA schemes offer considerable benefits to subscribers over and above the in-patient grants. These include grants towards the cost of spectacles, dentures, home helps, etc. This, for instance, in the standard HSA scheme amounts to an extra 50% of the total benefits paid out for hospitalization (Hospital Saving Association, 1972).

The estimates given above refer to standardized gross surpluses and not to profit margins.

Administration costs may be estimated to lie in the range of 10% to 25%, but it is not possible to be more precise as their fixed-cost element expressed as a percentage of premiums will vary according to the number of subscribers enrolled. The Sheffield and District scheme claim 145,000 subscribers (Sheffield and District Hospital and Convalescent Services Council Inc., 1972). London and Edinburgh and Hospital Plan managements claim 50,000 each (Ennis, 1973). It is reasonable to argue that there are economies of scale available to Sheffield and District which are not available to London and Edinburgh and Hospital Plan. Sheffield and District's administrative costs have fallen from 24.9% in 1957, when its membership was 27,177, to 11.3% when its membership in 1972 was 145,000 (Sheffield and District Hospital and Convalescent Services Council Inc., 1972). Therefore more of the standardized gross surplus will be required to cover administrative costs for the two commercial schemes than for the Sheffield and District scheme.

The BHCSA schemes enjoy a tax advantage in that they have mutual status as non-profit-making organizations which do not pay tax on their excess of premium income over expenditure provided they conform to the limits prescribed in Sect. 345 of the Income and Corporation Taxes Act 1970. They do, however, pay tax on their investment income, and their advantage would be lost should they have a deficit.

One of the London and Edinburgh schemes offers a refund of premiums for an insured member if no claim is made within a 10-year period. The premiums for this scheme are among the highest we have discovered, and if an individual single man in the 25-34 age cohort were to invest his premiums to yield 5% real growth the present value of the annual premiums of £22.80 invested would be £176.05 ($= 22.80 \times 7.72173$, where 7.72173 is the present value of a 10-year annuity of £1). This compares with £139.97, which is the present value of the premiums on being refunded after a claim-free period. This latter figure, however, should be weighted by the probability of a given individual not being hospitalized over the 10-year period. We did not have access to record linkage data which would allow calculation of the probability of *not* being hospitalized. We have estimated this indirectly from age, sex, and marital status specific discharge rates. Such an estimate cannot take account of the influence for an individual of his previous medical history.

The calculation of the expected value of the scheme to an individual was completed by weighting the present value of the benefits which he receives

when hospitalized by the probability of being hospitalized. The expected value of the total refunded over a 10-year period for a single man in the 25-34 age range is £108.40.

Obviously this calculation is only illustrative from the point of view of an individual because it makes no allowance for his conditional probability deviating from that of the whole cohort. Also no allowance has been made for changes in medical practice or morbidity over the 10-year period. The same figures, however, when related to a scheme which has enrolled a broad cross-section of the community from this particular age-cohort, would yield a standardized gross surplus of £38.42 for a series of 10 annual premiums of £100. This figure should be compared with the one derived in Table III of £85.48. For a full explanation of how these estimates were arrived at see Appendix 4.

DISCUSSION

Considerable doubts about the profit-making schemes have been voiced recently in the national press, and in March 1973 Michael Cocks, Member of Parliament for Bristol South, introduced a Bill under the 10-minute rule 'to prohibit insurance companies from offering cash payments for hospitalization only, rather than the full period of the illness suffered; and to require insurance companies advertising health or illness policies to publish prominently with such advertisements sufficient actuarial and other relevant information to enable the general public to reach a reasonable judgment on the value of such policies' (Hansard, 1973). This Bill has not been given a second reading. From an individual's point of view hospitalization benefit schemes can be criticized on two counts:

- (a) the schemes are unsatisfactory because they do not meet the true costs of illness, and
- (b) leaving aside the fact that benefit is related to the length of stay in hospital and not to the length of illness, current medical practice is changing over time in such a way that a scheme's perceived benefit will almost certainly be less than the actual benefit.

As far as (a) is concerned, a distinction must be drawn between individuals seeking cover who are working or fully employed looking after dependants and those who are not. Both have got to meet certain small costs associated with a spell in hospital—extra comforts, new pyjamas, etc. Little evidence is available as yet on the total costs to the patient of a spell in hospital (the results of the forthcoming St. Thomas's Hospital study will provide much needed evidence on this matter). The major cost

faced by the former group is the loss of potential earnings. These may be quite considerable, especially if the individual depends solely on State-operated contributory schemes. For a worker with a wife and two dependent children taking home £40 a week the drop in earnings would be of the order of 30%. In the case of those who are looking after dependants (children, elderly relatives, etc.) the main cost associated with illness is the cost of finding suitable substitutes to look after the family. In each group, however, incapacitation may not require a stay in hospital, and even if it does, the stay in hospital may be relatively short compared with the total length of the illness. Days spent in hospital for men of working age account for less than one thirteenth of all certified sickness absence.

Those who do not have these responsibilities are mainly retired people and pensioners for whom the financial costs of illness may not be considerable. If illness does result in hospitalization the costs to be met may still be quite negligible as most pensions will be paid regardless of the place of treatment, the exceptions being supplementary pension and retirement or widow's pension. Supplementary pension will be stopped immediately the patient enters hospital, and retirement or widow's pension will be stopped after a stay of longer than six weeks in hospital. The main cost which has to be met by pensioners is the fixed cost associated with keeping a home together. The point at issue, however, is that the majority of pensioners live at income levels considerably below the average for those of working age. For this reason a pensioner in receipt of the benefits on offer would most probably enjoy an increase in income while in hospital. In a real sense, therefore, the schemes cannot be considered as providing insurance against a quantifiable loss but rather as a means of gambling for the elderly. See (b) below.

Two final points may be made in connection with (a). Most schemes are sufficiently inflexible with regard to the scale of benefits on offer to necessitate someone who wishes to maintain a certain income level to search among the different schemes rather than pay a different scale of premiums. (The chief exception is London and Edinburgh which does allow subscribers to pay half or double the premiums normally quoted for approximately half or double the benefits.) Secondly, the exclusion of certain causes by most schemes serves to reduce the value of the insurance on offer (and to increase the prospect of the scheme becoming a 'gamble').

The second main criticism (b) arises from the fact that the mean length of hospital stay (for all causes) has declined from 20.1 days in 1951 to 13.9 in 1971 (Figure). The total number of hospital beds is about

FIGURE Mean duration of stay, males, all causes except psychiatry, England and Wales, 1957-70.

the same as in 1948 when the total population of England and Wales was 10% smaller. This does not necessarily reflect a decrease of morbidity but a change of policy in favour of reducing the length of stay. This is shown by the fact that hospitalization rates per 10,000 males went up from 668 to 780 between 1957 and 1967. It is to be noted that English lengths of stay are still above North American levels. The public's conception of the risk of being hospitalized almost inevitably will be related to the situation ruling sometime in the past (if indeed it does relate to anything measurable).

HIPE makes it clear that regional differences in lengths of stay and discharge rates are still clearly observable. To the extent that the national figures are brought more closely in line with the lowest regional figures now prevailing, it is clear that actual benefit liability of a scheme will be reduced over time. The difference between the public's perception of its hospitalization risk and the actual risk involved must largely account for the high profitability of the commercial schemes. Even though it has been argued that current medical practice favours fewer spells of shorter duration, it must be allowed that an element of extra demand for hospital beds might be generated by some patients (especially those of pensionable age) who would receive considerable cash payments if in hospital, but not if they were sick at home. This danger has been noted by the British Medical Association in its rejection of any such scheme for its own members. To the extent that this extra demand does appear it will put more pressure on the rationing process for hospital beds.

One further point needs to be considered: the advantage to the patient of extra benefit for hospitalization due to cancer is questionable. Enquiries have shown that doctors do not generally tell their patients this diagnosis but cloak it in euphemisms. In a recent enquiry it was discovered that in only 13% of a series of 279 people who died of cancer did the doctor discuss the diagnosis with the patient (Ward, 1973).

An interesting legal point arises here. Does a doctor whose patient has cancer and who would be able to claim extra benefits if hospitalized owe a duty to the patient to inform him of his condition? Lord Justice Edmund Davies, speaking extra-judicially (1973), has suggested that while generally no duty to inform a patient of his condition exists, nevertheless there may be circumstances in which '.... he is legally obliged to tell the whole truth and nothing but the truth'. He was speaking of cases in which patients might make certain property dispositions dependent on the doctor's diagnosis, but the present case appears to be analogous.

CONCLUSION

It is possible to gain some idea of the profits of the commercial schemes from the gross surpluses. These are over 90% for some groups, and even with an administrative cost of 20% are still substantial. The estimates of gross surplus we have given are not based on the returns of the companies themselves but on the assumption that their subscribers are a fair cross-section and that their hospitalization pattern conforms to the average. It may be argued that given

the current level of premiums the commercial schemes need a healthy surplus on their younger subscribers to cover the deficits which are incurred with older age groups. It might be maintained, therefore, that if the schemes were assessed over the lifetime of the subscriber the present value of the standardized year surplus would yield a rate of profit which is more normal for the insurance industry. In fact, for a single man who enrolls at the age of 20 for 49 years, the present value (at a 5% rate of interest) of the commercial scheme's standardized gross surplus income stream ranges from £909.63 to £1490.60 (see Table V).

Another variant of this argument would admit that the profits are above normal taken over the lifetime of an individual, but would maintain that the current level of premiums is justified because of the element of self-selection. In other words, schemes are not likely to enrol a random sample of the entire population but rather a biased sample which includes more high-risk groups than normal, e.g., the elderly and the unmarried. The experience of some of the BHCSA schemes contradicts this view. For instance, the HSA scheme, according to our calculations, shows a relatively small theoretical profit, or even deficit on some groups, and yet its published accounts are in a healthy state (Hospital Savings Association, 1972). On this basis it would seem that if the actual profits of the commercial scheme were known they could be considerably higher. The interesting question which remains to be answered is why other insurance companies do not join the market. It is usually argued that competition among insurance companies serves to drive down profit rates, and yet this does not appear to have happened

TABLE V
PRESENT VALUE OF STANDARDIZED GROSS SURPLUS FOR A SINGLE MAN OVER AGE SPAN 20-69

	Continental Casualty (to age 65)	Family Cancer Plan	Gold Shield	Hospital Plan	London & Edinburgh Extra Cash Plan	BUPA Hospital Cash Plan	HSA Crown Plan	Sheffield and District
Present value of income stream	909.63 (955.11)	1490.60 (1565.13)	1236.24* (1298.05*)	1443.82 (1516.01)	1153.18* (1210.84*)	657.98 (690.88)	1314.53 (1380.26)	-148.81 (-156.25)

SOURCE: Table III, except for figures marked *, in which case the standardized gross surplus has been recalculated on the assumption that the premium rates are maintained at the rate appropriate to the year of entry.

ASSUMPTIONS: (1) A rate of interest of 5% has been assumed.

(2) The figures in parentheses are derived on the assumption that the premiums are paid at the beginning of the year; the unbracketed figures are based on the assumption that the premiums are paid at the year-end.

INTERPRETATION

Unlike life assurance, when a company contracts with a policy holder to offer cover at the rate quoted on the policy unless the policy holder cancels the policy, hospitalization insurance is offered on the basis that premium and benefit rates are open to negotiation each year. Two managements, however, do offer a concession to existing subscribers, which is that they can renew their policies at the current rate for their age on first entry. Therefore the figures quoted in Table V no more than indicate the effect of underlying trends given that there is no change in morbidity, medical practice, premium, and benefit rates. That is to say, the figures represent merely an extrapolation into the future based on current trends and policy. The management of each scheme can, therefore, alter the terms of contracts on renewal with a view to influencing the present value of each policy and hence the overall profitability of the scheme.

in this case. Is it due to the exercise of moral restraint on the part of the other companies? It must be noted, however, that more competitive rates leading to the enrolment of more people cannot necessarily be regarded as being 'a good thing' in the national context, because it may increase the demand for hospital beds.

The demand for these schemes may reflect attitudes and beliefs which are not necessarily appropriate today. As we have seen, the benefits to be gained on hospitalization are minimal compared with the total costs to the patient of illness—most of which occurs outside hospital.

We have already noted that for some (if not all) households the benefits payable could over-compensate them for the financial loss associated directly with the period of hospitalization. For this reason there will be an inducement for the insured to make an additional claim on the supply of scarce hospital beds. This feature raises an important issue as far as the National Health Service is concerned, especially at a time when the supply of hospital beds per head of the population is falling. This factor cannot be estimated on the basis of current data but would require further investigation.

Although this paper concentrates on commercial schemes, the non-profit-making BHCSA is now moving into areas of comparable benefits and their role may need to be re-assessed. Sir Keith Joseph, speaking at Wolverhampton in September 1971, suggested, for instance, that the areas of greatest need were no longer the acute but the chronic and geriatric patients (BHCSA, 1972). There may be a case for enquiring into the schemes as a whole, bearing in mind the changed circumstances of the seventies. The members of BHCSA could, of course, extend their existing schemes to provide insurance for the full length of illness.* A more radical alternative would be to introduce contributory schemes whose specific aim would be to extend provision of community care for non-acute conditions.

* At least one BHCSA scheme—the Bristol Contributory Welfare Association—offers a cash benefit of £3 per week for the contributor only for certificated illness at home payable from the fourth day of absence from work up to a maximum of the first 13 weeks of illness (after which £1.50 per week is payable for the second 13 weeks of illness). The subscription is 30p weekly, which also entitles the contributor (and his spouse) to various other cash benefits including hospitalization benefit. Another scheme—Merseyside Hospitals Council—is also preparing to introduce benefit for illness at home in October 1973 (Dodd, 1972). It is also interesting to note that the Bristol scheme offers attractive daily cash benefits for in-hospital stays (up to £7.14 for subscribers seeking cover for themselves alone for a weekly subscription of 20p). These cash benefits are payable only for stays of three days or more, an important limitation, as this accounts for one-tenth of patient spells, according to HIPE.

SUMMARY

Nine schemes which offer cash benefits on hospitalization have been examined, six commercial (mainly American-based) and three non-profit-making. The benefits offered, the premiums payable, and the conditions imposed have been analysed together with the probabilities of hospitalization for each group of people at risk. The theoretical gross profits to the operators range from 99% on a young person entering one of the schemes to a deficit on some of the elderly. The social, financial, and administrative implications of the schemes are considered.

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APPENDIX 1

SOURCES OF DATA AND METHOD OF INTERPOLATION

TABLES I AND II

Advertisements placed in the national press, circulars, and communications with the management of the schemes covered.

TABLES III AND IV

(1) Report on Hospital In-patient Enquiry 1970, Part 1 Tables, HMSO, table 9. Linear interpolation has been used to obtain the statistics for married women and dependent children. In all cases it has been assumed that the typical age of each age group was that of the cell mid-point. Chronic sick have been estimated on the basis of table 12 which does not allow the estimates of bed-days per annum per person to be differentiated according to marital status. Geriatric patients have been treated similarly.

(2) Psychiatric hospitals and units in England and Wales; in-patient statistics from the Mental Health Enquiry for the year 1970. Department of Health and Social Security, Statistical and Research Report Series No. 4. London, HMSO, 1972, Table 4. Linear interpolation was again used to obtain statistics for married women and dependent children. As noted in the text, this source does not allow the estimates of bed-days per annum per person to be differentiated according to marital status. Such figures were obtained by estimating the proportion of a given marital status occupying beds in non-psychiatric hospitals diagnosed as having a mental disorder.

(3) The Registrar General's Statistical Review of England and Wales for the year 1970. Office of Population Censuses and Surveys. London, HMSO, 1972 Part II Tables, Population, Tables A2, A3(a).

APPENDIX 2

ELIGIBLE AND INELIGIBLE CAUSES AND CONDITIONS

Where named conditions have been excluded from benefit, or treated differently, e.g., by being eligible for double benefit, an adjustment has been made as far as possible in the calculations. In cases when it has not been possible from the Hospital In-patient Enquiry tables to calculate exactly the element concerned, e.g., 'alcoholism', the particular cause has not been excluded from the calculations. This has the effect of over-stating the relevant company's liability and consequently understating its theoretical gross surplus.

'All causes'	All diagnostic groupings nos. A1 to A150 in Table 9 of HIPE. Also psychiatric illness in psychiatric hospitals.
Mental disorder or mental illness	(a) Includes 'Mental Disorders' in HIPE A69 to A71. (b) All patients in psychiatric hospitals as enumerated in Mental Health Enquiry.
'Cancer'	Includes all malignant neoplasms (A45-58) and leukaemia (A59).
Heart attack	This is covered by acute myocardial infarction (A83a).
Tuberculosis	HIPE A6 to A10. All tuberculosis.
Chronic sick and geriatric	Includes persons in chronic sick and geriatric departments enumerated in Table 12 HIPE. It has not been possible to discover the proportion of chronic sick patients being nursed in other units. Table 12 does not differentiate by marital status; therefore it has been assumed that the spells enumerated are equally divided between married and non-married.
'Drug addiction', 'Narcotics', 'Alcoholism'	There is no differentiation in the HIPE tables between maliciously self-administered poisons and accidental or iatrogenic intoxication. Consequently these conditions have not been subtracted.
Pregnancy and childbirth	This is assumed to mean Conditions of pregnancy, childbirth and puerperium (A112-A118, Y60-Y61).
Abnormality of pregnancy or childbirth	Includes Toxaemia of pregnancy and puerperium (A112), Haemorrhage of pregnancy and childbirth (A113), Other pregnancy complications (A117a), Other and unspecified abortions (A115), Other complications of childbirth or puerperium (A116, A117b).

APPENDIX 3

EXAMPLE OF CALCULATIONS: SINGLE WOMEN AGED 45-64 'HOSPITAL PLAN'

Causes	Mean Duration of Stay (days) (A)	Discharge Rate per 10,000 Population (B)	Annual Bed Days per Person (C = A × B/10 ⁴)	Benefit Rate per Day (D)	Benefit Liability per Annum (E = C × D)	Premium per Annum (F)	Gross Profit per Person per Annum (G = F - E)	Standardized Gross Profit per Person (H = G × 100/F)
All causes	21.9	829.1	1.8157	—	—	—	—	—
Mental disorder	41.1	12.1	0.0497	—	—	—	—	—
All causes excluding Mental disorder	—	—	1.766	3	5.298	—	—	—
Cancer	23.4	97.7	0.2286	3	0.6858	—	—	—
Heart attack	23.5	16.4	0.0385	3	0.1155	—	—	—
					6.0993	—	—	—
Geriatric wards*	226.5	6.9	0.15628	(3)	(0.46885)	—	—	—
All excluding geriatric					5.6304	18	12.3696	68.72

* This calculation is based on the assumption that *no* cancer or heart attack is treated in geriatric wards. The calculation therefore underestimates the gross profit. Cancer and heart attack have been included in All Causes and again separately because they qualify for double benefits.

APPENDIX 4

THE LONDON AND EDINBURGH REFUND OF PREMIUM SCHEME

The expected value of the scheme, E, may be expressed by the following expression:

$$E = \sum_{i=1}^n \frac{P_i}{(1+r)^i} - \sum_{j=0}^n Pr(h_j) PV(R_j)$$

where P_i is the premium paid in year i

r is the rate of interest

$Pr(h_j)$ is the probability of being hospitalized j years out of n

$PV(R_j)$ is the present value of the sums refunded given that the subscriber has been hospitalized for j years out of n

n is the number of claim-free years which must elapse before the premiums are refunded (= 10)

The expected value of the scheme is derived by expressing the premium paid in present value terms and subtracting from this the expected value of the total refunded over the period n . The data available do not allow the calculation directly of the second expression on the right-hand side of the expression. If we assume that

(1) the probability of being hospitalized in one year is statistically independent of the probability of being hospitalized in any other year,

(2) the population's morbidity does not change over the n years, and

(3) the scheme has enrolled an unbiased sample of the population, then

$$Pr(h_j) = Pr(h_i)^j Pr(\bar{h}_i)^{n-j} \binom{n}{j}$$

where $Pr(h_i)$ and $Pr(\bar{h}_i)$ are the probabilities of being or not being hospitalized in year i respectively.

$$Pr(h_i) = \frac{N_h}{NP} = \frac{S_h}{NP} \cdot \frac{1}{\eta}$$

Where N_h is the number of persons belonging to the cohort hospitalized in year i

S_h is the number of spells attributable to the cohort (an estimate of 1.23 was derived from Acheson and Barr (1965))

η is the number of spells per patient

NP is the population at risk

If $j = 0$ then $R_0 = \sum_{i=1}^{10} P_i$ and hence $PV(R_0)$ may

be obtained; if $j \neq 0$ then,

$$R_j = \frac{ABD \times 365 \times \eta \times BR}{S_h}$$

where ABD is the average number of beds used daily for all eligible causes

BR is the benefit rate

$PV(R_j)$ was obtained by assuming that the claims were randomly distributed throughout the 10-year period

E was calculated to be 67.64 for a member of the single male cohort aged 25-34 (given $r = 0.05$).