- ⁹⁴ Vallota, E. K., Forristal, J., Spitzer, R. E., Davis, N. C., and West, C. D., *Journal of Experimental Medicine*, 1970, 131, 1306.
- ⁹⁵ Thompson, R. A., *British Medical Journal*, 1972, 1, 261.
- ⁹⁶ Thompson, R. A., *Immunology*, 1972, 22, 147.
- ⁹⁷ Cameron, J. S., and Kibukamusoke, J. W., *East African Medical Journal*, 1971, 48, 466.
- ⁹⁸ Soothill, J. F., and Steward, M. W., *Clinical and Experimental Immunology*, 1971, 9, 19.
- ⁹⁹ Ratnoff, O. D., *Advances in Immunology*, 1969, 10, 145.
- ¹⁰⁰ Ratnoff, O. D., in *Immunobiology*, ed. R. A. Good and D. W. Fisher, p. 135. Stamford, Connecticut, Sinauer Associates, 1971.
- ¹⁰¹ McKay, D. G., *American Journal of Pathology*. In press.
- ¹⁰² Webster, M. E., in *Cellular and Humoral Mechanisms in Anaphylaxis and Allergy*, p. 202. Basel, Karger, 1969.
- ¹⁰³ Bokisch, V. A., Müller-Eberhard, H. J., and Cochrane, C. F., *Journal of Experimental Medicine*, 1969, 129, 1109.
- ¹⁰⁴ Mackay, D. G., *American Journal of Pathology*, 1972 (in press).
- ¹⁰⁵ Zimmerman, A., Arrogave, C. M., and Müller-Eberhard, H. J., *Journal of Experimental Medicine*, 1971, 134, 1591.
- ¹⁰⁶ Zimmerman, A., and Müller-Eberhard, H. J., *Journal of Experimental Medicine*, 1971, 134, 1052.
- ¹⁰⁷ Vassalli, P., and McCluskey, R. T., *Rôle des Processus de Coagulation dans les Affections Glomérulaires d'Origine Immunologique*, p. 55. Paris, Flammarion, 1971.
- ¹⁰⁸ Clarkson, A. R., MacDonald, M. K., Petrie, J. J. B., Cash, J. D., and Robson, J. S., *British Medical Journal*, 1971, 3, 447.
- ¹⁰⁹ Hardwicke, J., Soothill, J. F., Square, J. R., and Holti, G., *Lancet*, 1959, 1, 500.
- ¹¹⁰ Wittig, H. J., and Goldman, A. S., *Lancet*, 1970, 1, 542.
- ¹¹¹ Reeves, G. W., et al., in preparation.
- ¹¹² Lewis, E. J., personal communication.
- ¹¹³ Gerber, M. A., and Paronetto, F., *Lancet*, 1971, 2, 1097.
- ¹¹⁴ Ngu, J. L., Barratt, T. M., and Soothill, J. F., *Clinical and Experimental Immunology*, 1970, 6, 109.
- ¹¹⁵ Mallick, N., et al., *Lancet*, 1972, 1, 507.
- ¹¹⁶ Arneil, G. C., *Lancet*, 1961, 2, 1103.
- ¹¹⁷ Beirne, G. L., and Brennan, L. T., *American Society of Nephrology*, abstracts, p. 8.
- ¹¹⁸ Cantrell, E. G., *British Medical Journal*, 1969, 2, 739.
- ¹¹⁹ Allison, A. C., *Lancet*, 1971, 2, 1401.
- ¹²⁰ *Lancet*, 1972, 1, 133.
- ¹²¹ Steinberg, A. D., et al., *Annals of Internal Medicine*, 1971, 75, 165.
- ¹²² Russell, P. J., Hicks, J. D., and Burnet, F. M., *Lancet*, 1966, 1, 1279.
- ¹²³ Schwartz, R., Stack, J., and Dameshek, W., *Proceedings of the Society for Experimental Biology and Medicine*, 1958, 99, 164.
- ¹²⁴ Medical Research Council Working Party, *British Medical Journal*, 1971, 1, 239.
- ¹²⁵ Cheema, A., Henson, J. B., and Gorham, J. R., *American Journal of Pathology*, 1972, 66, 543.
- ¹²⁶ Szejnbok, M., Stewart, A., Diamond, H., and Kaplan, D., *Arthritis and Rheumatism*, 1971, 14, 639.
- ¹²⁷ Gelfand, M. C., Steinberg, A. D., Nowakowski, H., Nagle, R., and Knepsfield, R. H., *Arthritis and Rheumatism*, 1972, 15, 249.
- ¹²⁸ Cameron, J. S., *Journal of the Royal College of Physicians of London*, 1971, 5, 285.
- ¹²⁹ Cameron, J. S., *Journal of the Royal College of Physicians of London*, 1971, 5, 301.
- ¹³⁰ Black, D. A. K., Rose, G., and Brewer, D. B., *British Medical Journal*, 1970, 3, 421.
- ¹³¹ Sharpstone, P., Ogg, C. S., and Cameron, J. S., *British Medical Journal*, 1972, 1, 259.
- ¹³² Abramowicz, M., et al., *Lancet*, 1970, 1, 959.
- ¹³³ Rose, G., personal communication.
- ¹³⁴ Cochrane, C. G., *Advances in Immunology*, 1968, 9, 97.
- ¹³⁵ Fong, J. S. C., and Good, R. A., *Clinical and Experimental Immunology*, 1972, 10, 127.
- ¹³⁶ McConnell, D. J., et al., *Proceedings of the Society for Experimental Biology and Medicine*, 1965, 119, 652.
- ¹³⁷ Roth, K. L., *Annals of Allergy*, 1965, 23, 83.
- ¹³⁸ Kleinerman, J., *Laboratory Investigation*, 1954, 3, 495.
- ¹³⁹ Halpern, B., Milliez, P., Lagrue, G., Fray, A., and Morand, J. C., *Nature*, 1958, 205, 257.
- ¹⁴⁰ Vassalli, P., and McCluskey, R. T., *American Journal of Medicine*, 1965, 39, 179.
- ¹⁴¹ Naish, P., Penn, G. B., Evans, D. J., and Peters, D. K., in preparation.
- ¹⁴² Kincaid-Smith, P., Saker, B. M., and Fairley, K. F., *Lancet*, 1968, 2, 1360.
- ¹⁴³ Herdman, R. C., et al., *American Journal of Diseases of Children*, 1970, 119, 27.
- ¹⁴⁴ Kincaid-Smith, P., Laver, M. C., Fairley, K. F., and Mathews, D. C., *Medical Journal of Australia*, 1970, 1, 145.
- ¹⁴⁵ Lambert, P. H., (1970). Quoted by Vassalli and McCluskey. 107.
- ¹⁴⁶ McGiven, A. R., *British Journal of Experimental Pathology*, 1967, 48, 552.
- ¹⁴⁷ Baliah, T., and Drummond, K. N., *Proceedings of the Society for Experimental Biology and Medicine*, 1972, 140, 329.
- ¹⁴⁸ Cameron, J. S., and Ogg, C. S., 1972, unpublished.
- ¹⁴⁹ Michielsen, P., Verberckmoes, R., Desmet, V., and Hermerijck, W., *Journal de Urologie et Nephrologie*, 75, 315.
- ¹⁵⁰ Vermeylen, J., Dotremont, G., Gaetano, G. H., Donati, M. B., and Michielsen, P., *European Journal of Clinical and Biological Research*, 1970, 15, 979.
- ¹⁵¹ Vane, J. R., *Nature New Biology*, 1971, 231, 232.
- ¹⁵² Rose, G., and Black, D. A. K., personal communication.
- ¹⁵³ Clarkson, A. R., MacDonald, M. K., Cash, J. D., and Robson, J. S., *British Medical Journal*, 1972, 3, 255.

How Many Acute Beds Do We Really Need?

MARK WHEELER

British Medical Journal, 1972, 4, 220-223

Summary

At the end of 1972 two new "best-buy" district general hospitals should open at Bury St. Edmunds and Frimley, eventually serving their catchment areas at a ratio of two acute beds per 1,000 population. This study shows that one of these areas is already operating below this projected target as a result of a considerable decline in the bed ratio over the past decade. Drastic shortening of the average length of stay has permitted an increase in admission rates from 60 to 79 per 1,000 population over the decade, while costs per case measured at constant prices have fallen. These changes have taken place more rapidly than in the U.K. generally. The evidence points to the pattern of clinical management as the main reason for this and suggests that similar gains could be achieved on a national scale, even without waiting for new buildings and expanded community services.

Introduction

The opening later this year of new district general hospitals at Bury St. Edmunds and Frimley will mark one of the most

significant policy innovations in the history of the National Health Service—the implementation of a standard of two acute beds per 1,000 population, thereby shifting the emphasis between institutional and community care. If this standard were adopted nationally clinicians would lose 50,000 of the 150,000 beds now allocated to acute specialties, and the Liverpool and North-West Metropolitan hospital regions would have their existing acute beds cut by half. The reduction of bed norms would curb the soaring costs of building and running acute hospitals and free resources for the competing claims of advances in medical technology and the neglected areas of long-stay care.

The full impact of the hospitals now being commissioned will not be apparent for many years. Nevertheless a situation of declining bed ratio accessible to investigation was found in Bury itself, where one of the new hospitals will replace the existing West Suffolk General. Preliminary examination suggested that there had already been a substantial reduction in the acute bed ratio. It was therefore decided to review the development of the West Suffolk General over the previous decade from the available documentary sources in the hope that it would yield useful pointers to the future effects of the "best-buy" scheme on patterns of clinical management and patient care.

Nationally, there has been a slow decline in the provision of acute beds, from 3.9 per 1,000 population in 1949 to 3.6 in 1959 and 3.2 in 1971. The number required has been the subject of continual debate. During the 1950s a number of

studies using the critical number technique found that the number of acute beds needed was very close to the number then in use.^{1,2,3} This was hardly surprising since, as Forsyth and Logan pointed out,⁴ the technique involves calculating the bed requirement for the current case load at the current length of stay and with occupancy at or close to current levels; it is essentially a measure of use. Despite the failure to develop a theoretically sound method of estimating the need for beds, a consensus grew that fewer beds would suffice. The 1962 *Hospital Plan* briefly reviewed the literature and concluded that 3.3 acute beds per 1,000 population represented "the normal limit of requirements."⁵ No lower limit was specified, implying that experimentation with lower ratios would be welcomed. The 1966 revision of the *Hospital Plan* reiterated the arguments in favour of fewer beds.⁶

In April 1968 the then Minister of Health, Mr. Kenneth Robinson, announced the decision to establish new district general hospitals at Bury St. Edmunds and Frimley. These projects were to embody a number of original features,⁷ notably the adoption of a standard of two acute beds per 1,000 population. This assumed both greater liaison with improved community health services and an increased tempo of work, made possible by a treatment core more powerful than is normally associated with the planned bed complement. The selection of Bury St. Edmunds was favoured by the existence of an early-discharge scheme.

Research Setting

The West Suffolk Hospital Management Committee administers a mixed group which originally served an area coinciding approximately with the administrative county of West Suffolk. In 1967 part of the former South-West General Hospitals group, consisting of hospitals at Newmarket and Saffron Walden, was incorporated in the West Suffolk group. The patient traffic pattern has been little altered as a result; the West Suffolk General still provides a district hospital service only to the original area of the group (see Fig. 1). The

FIG. 1—Hospital provision in West Suffolk area. Hospital of West Suffolk group: ○ = acute; □ = geriatric; ■ = mental; ▢ = mental subnormality. ○ = Major acute hospital of neighbouring group. ▽ = Expanded town. △ = other town. Dotted line indicates approximate boundary of West Suffolk General catchment area.

western fringe of the area is served by acute beds at Newmarket and Saffron Walden (and in other groups) as formerly. At St. Leonards Hospital, Sudbury, there are 42 acute beds staffed by general practitioners with consultant cover from Bury. Until 1966 there were 12 general-practitioner beds at the Thetford Cottage Hospital, which is now used only for outpatient services. There are no preconvalescent beds in the group.

Since 1950 East Anglia has experienced more rapid population growth than any other English region. In the past decade the increase between the censuses in West Suffolk averaged 2½% annually, about five times the national average,⁸ largely owing to voluntary immigration. Several local authorities in and bordering West Suffolk are now housing overspill population by agreement with the Greater London Council.⁹

Sources and Methods

The principal sources for the review were the annual returns to the Department of Health and Social Security of patients, costing and staff, and the *Hospital In-Patient Enquiry* records for selected years, supplemented from 1967 onwards by hospital activity analysis data. The data from the inpatient inquiry provided the basis for the calculation of effective catchment populations, using the method described by Bailey.¹⁰ The data for single years were used to establish the trend of the catchment population for all acute specialties combined; the catchment populations for the individual specialties, which provide the denominators for the admission rates and bed ratios (Table III), were obtained by combining the inpatient inquiry samples for three successive years.

A composite measure of the output of the hospital was required for comparison with resource inputs to assess changes in the efficiency of the hospital's operations. The solution adopted here was to assign to the several components of the case-load weights derived from those used to assess nurse staffing ratios—200 per inpatient case, five per casualty attendance, three per outpatient attendance. On the basis of this measure the increase in the case load recorded in this instance was virtually identical with the increase in inpatient numbers alone.

It has always been difficult to make comparisons of hospital costs over a period of time because of price inflation. The Department of Health and Social Security have produced a series of price indices for items of hospital supplies and a composite hospital price index covering all supplies and wages. It is acknowledged that the composite index somewhat overstates the rise in prices; it has been recalculated for the purpose of the present exercise.

Results

Bed/Population Ratio.—The acute bed/population ratio declined from 2.36 per 1,000 population in 1960 to 1.92 in 1969 (see Fig. 2) as a result of rapid population growth in the area served by the hospital combined with nearly static provision of beds. The increase in the effective catchment population may be attributed entirely to the growth of numbers resident in the administrative districts traditionally regarded as con-

FIG. 2—Declining acute bed/population ratio in West Suffolk catchment area 1960-9. —x—x— = Acute beds/1,000 catchment population. - - - - - = Acute beds available. —o—o— = Catchment population.

stituting the West Suffolk General's catchment area. There was no suggestion of an extension of the catchment boundary (except possibly in ophthalmology), as would have been indicated by a rising proportion of admissions to the West Suffolk General from administrative districts on the periphery of the traditional catchment area.

Admission Rates.—Despite the decline in the bed/population ratio the rate of inpatient admission increased, from 60 discharges and deaths per 1,000 population in 1960 to 69 in 1967 and 79 in 1969. This achievement was made possible by a rapid increase in the absolute number of admissions to the West Suffolk General. Discharges and deaths in medical and surgical specialties increased by 56% between 1960 and 1969, and in all specialties, including obstetrics and special care babies, by 70% over the same period. The increase is all the more remarkable in that it dates only from 1963—there were actually fewer inpatients treated in 1962 than in 1960.

Throughput.—The increase in inpatient numbers was the result of two developments—a small increase in the number of beds and a very large increase in the throughput (that is, discharges and deaths per available bed per year). In seeking to explain the change in throughput it became apparent that of its two components occupancy contributed nothing to the improvement and the entire effect could be attributed to a steady and substantial reduction in average length of stay in each specialty (see Table I).

TABLE I—Bed Use and Availability, by Specialty, at West Suffolk General Hospital, 1960 and 1969

Specialty	Average No. of Available Beds		Throughput Discharges and Deaths per Available Bed per Year		% Occupancy		Average Length of Stay in Days	
	1960	1969	1960	1969	1960	1969	1960	1969
General medicine ..	58.8	54.8	13.8	25.3	89.2	100.0	23.6	14.4
Paediatrics ..	20.0	20.2	10.6	24.1	31.3	44.1	10.8	6.7
General surgery ..	50.5	47.6	24.8	34.1	87.4	78.1	12.9	8.3
E.N.T. surgery ..	7.7	11.5	62.6	50.9	61.2	52.9	3.8	3.8
Orthopaedic surgery	27.7	37.1	31.3	32.7	103.0*	107.0*	12.0	12.0
Ophthalmology ..	10.1	10.9	22.9	38.1	82.6	72.5	13.2	7.0
Dentistry ..	2.0	4.0	48.5	49.3	30.0	20.0	2.3	1.4
Gynaecology ..	26.0	26.0	15.5	34.1	49.4	65.0	11.7	6.8
All acute ..	202.8	212.1						

Source: Summary Hospital Form 3.

* Occupancies over 100% cate borrowing of beds from other specialties.

Ambulatory Patients.—There was a parallel increase in the number of ambulatory patients. New outpatients increased by 43% over the period and new casualty patients by 115%, outstripping the rate of population growth in the area. Although the absolute numbers involved remained small there was a fivefold increase in patients admitted for day surgery.

Medical Service Departments.—One explanation of the rising tempo of work and shorter stays at the West Suffolk General might have been an increase in the intensity of investigation and treatment, as indicated by rising units of diagnostic and therapeutic measures per case. This explanation did not hold (except in pathology, where the number of weighted requests rather more than doubled over the period, exceeding the growth of case load). In radiology inpatient units increased pro rata with the increase in inpatients, and outpatient units pro rata with the rise in outpatient numbers, while in physiotherapy, occupational therapy, chiropody, E.C.G., and surgical appliances the indicators of output all showed rather smaller increases than in the number of patients attending the hospital. The alternative explanation of shorter stay is a change in the practice of clinical management. The medical staff believe that investigation and treatment at the West Suffolk General have always been brisk and that it is the period of convalescence which has been reduced.

Efficiency of Operation.—It was expected that there would be progressively greater efficiency in the hospital's operation over the period, the measure of efficiency being the relative

increase in the case load and resource inputs. Barr adopted this approach in his study of the hospital service over the period 1951-66 and concluded that there had been no striking improvement in the efficiency of the service as a whole.¹¹ With staffing and costing taken as the best indicators of resource inputs it was hypothesized that there would be smaller increases in the manpower employed at the West Suffolk General than in the case load, and, on the financial side, that unit costs would fall over time when measured at constant prices. Beresford and Griffiths¹² showed by a cross-sectional study an inverse relation between throughput and cost per case; this study provided an opportunity to prove that the relation held over time.

Manpower.—The composite case load was found to have increased by 69% over the period, virtually identical with the increase in the inpatient case load alone. The total number of staff (expressed in whole-time equivalents) employed at the hospital increased by 64% over the decade, but this figure was heavily weighted by the huge increase in nursing staff, which has more than doubled, partly in anticipation of the increased staffing requirements of the new hospital. Not only was the increment in total manpower heavily weighted by the less well-paid nursing staff but within the body of nursing staff the increase was greatest among the lower grades; auxiliaries, pupils, and enrolled nurses constituted 16% of the nursing staff in 1960 and 33% in 1969. There has therefore been some dilution of the manpower mix (though the absolute number of skilled workers has increased), so that the figure of 64% overstates the real addition to the supply of skills. By this criterion there was a modest gain in efficiency.

Costs.—Cost per inpatient case and cost per new outpatient fell over the period when measured at constant prices (Table II shows). The discrepancy between the increment of total finance (35%) and total manpower (64%) may be attributed

TABLE II—Costs of West Suffolk General Hospital for Financial Years 1960-1 and 1968-9

	1960-1 (£)	1968-9 (£)	% Difference
Total net recurrent cost at current prices ..	350,002	685,427	+95.8
Total net recurrent cost at constant 1960-1 prices ..	360,002	473,361	+35.3
Cost per inpatient case at constant 1960-1 prices ..	54.41	45.64	-16.2
Cost per new outpatient at constant 1960-1 prices ..	6.27	4.68	-25.4

Source: Annual costing returns.

to the proportionately smaller rise in non-staff costs and to the dilution of the manpower mix. By the financial yardstick there has been a rather more substantial gain in efficiency. Even so, the economy in total resource consumption is still understated. The hospital costing system ignores the cost of capital tied up in buildings and fixed equipment, and thereafter fails to record the benefit of using these fixed overheads for a larger number of cases as throughput increases. At current construction costs a rise in throughput from 20 to 30 cases per bed per year saves around £10 per case from this source alone. Crude as these comparisons are, they both point to an appreciable gain in the economy of resource use over a period of rising activity.

Discussion

Each of the trends which have been noted of the West Suffolk General—declining bed/population ratio, improved staffing, rising admission rates, and increased throughput deriving from shorter average length of stay—can be seen in the national figures for the decade. What is distinctive about the West Suffolk General is the greater rapidity of change. Bearing in mind the difficulties of interhospital comparison stemming from variable specialty composition, the following statements roughly summarize the position. Starting with lower acute bed

provision, the West Suffolk ratio had declined by a fifth while the national ratio has declined by only a tenth. Even so the differential in admission rates has been slightly narrowed. Over the same period throughput at West Suffolk increased by half, compared with an improvement of one-third nationally. By 1969 acute bed provision across the country was 50% higher than in West Suffolk, but admissions were only 20% higher. Tables III and IV make these comparisons more precisely but less comprehensively on a specialty basis.

How has this performance been achieved? West Suffolk "manages" with less than two acute beds per 1,000 population because it has below-average admission rates and above-

TABLE III—Available Beds and Admissions per Thousand Catchment Population, Selected Specialties, West Suffolk and England and Wales 1969

Specialty	Available Beds per Thousand Population		Discharges and Deaths per Thousand Population	
	West Suffolk	England and Wales	West Suffolk	England and Wales
General medicine ..	0.48	0.67	12.1	14.4
Paediatrics ..	0.15	0.13	3.7	3.6
General surgery ..	0.43	0.67	14.8	20.4
E.N.T. surgery ..	0.09	0.13	4.7	6.3
Orthopaedic surgery ..	0.24	0.40	7.9	7.9
Ophthalmology ..	0.06	0.09	2.4	2.4
Dentistry ..	0.03	0.01	1.5	1.1
Gynaecology ..	0.23	0.22	8.0	9.3

Source: Hospital In-Patient Enquiry data and Summary Hospital Form 3.

TABLE IV—Throughput, Occupancy, and Length of Stay by Specialty, West Suffolk General and All Regional Board Hospitals, 1969

Specialty	Throughput Discharges and Deaths per Available Bed per Year		% Occupancy		Average Length of Stay in Days	
	West Suffolk	All R.H.B.	West Suffolk	All R.H.B.	West Suffolk	All R.H.B.
General medicine ..	25.3	21.3	100.0*	88.1	14.4	15.1
Paediatrics ..	24.1	27.3	44.1	61.3	6.7	8.2
General surgery ..	34.1	30.9	78.1	80.9	8.3	9.6
E.N.T. surgery ..	50.9	47.7	52.9	59.6	3.8	4.6
Orthopaedic surgery ..	32.7	19.7	107.0*	86.5	12.0	16.0
Ophthalmology ..	38.1	25.3	72.5	68.8	7.0	9.9
Dentistry ..	49.3	80.8	20.0	64.2	1.4	2.9
Gynaecology ..	34.1	43.1	65.0	82.1	6.8	7.0

Source: Summary Hospital Form 3.

* Occupancies over 100% indicate borrowing of beds from other specialties.

average throughputs. But how may these be explained? This investigation was not specifically designed to produce answers to these questions, but some relevant if fragmentary evidence was obtained.

LOWER ADMISSION RATES

Lower admission rates could be explained by each or a combination of the following.

(a) Lower morbidity. In the absence of direct evidence the occupational distribution in this area of agriculture and light industry may favour this explanation; offsetting it is the higher proportion of the aged in the West Suffolk population.

(b) Morbidity not expressed as patient demand. The report that most patients requiring prostatectomy are admitted in a state of acute retention may be indicative of a general reluctance to seek medical care.

(c) Demand expressed, but unmet, appearing as lengthening waiting lists. On this point the evidence is clear; relative to annual admissions numbers on the waiting list in West Suffolk are half the national average and have been falling in recent years.

(d) Demand met elsewhere in the health and welfare complex. Evidence on the rate of utilization of other services is not available, but there is some evidence of the rate of provision. General practitioners' lists in West Suffolk average 2,393 against 2,478 nationally¹³; expenditure on health and welfare services is £3,933 per 1,000 population in West Suffolk against an average of £4,652 nationally¹⁴; and there are 13.4 long-stay

beds per 1,000 population aged 65 and over compared with 9.8 in England and Wales.

(e) Demand is met by ambulatory hospital treatment. The West Suffolk medical staff believe that the load is taken up in day surgery and the outpatient department, where many investigations and treatments are performed which elsewhere would occasion inpatient admission. If this is so an explanation is required for the observation that outpatient attendance is relatively even less frequent at West Suffolk than inpatient admission.

HIGHER THROUGHPUT

Higher throughput clearly turns on shorter length of stay, there being little variation in occupancy. Shorter stays might be explained by one or a combination of the following. (a) Variations in case-mix by diagnosis. No systematic comparison has been attempted; a preliminary comparison of the surgical case load did not support this hypothesis. (b) Variations in case-mix by severity. No direct evidence exists. On a-priori grounds it might be supposed that where admission rates are relatively low severity would be greater. (c) Variations in clinical management. The institution of an early discharge scheme for surgical patients gives formal expression to one of the innovations. On the evidence of one hospital it is not clear how much the increase in staff, particularly nursing staff, contributed to shorter stays.

Any conclusion from such incomplete evidence must be tentative. Nevertheless, probably the main factor underlying the performance of the West Suffolk General has been the adoption by its clinicians of practices which successfully economize on the use of beds. Despite the gaps in the evidence pointing to the need for further research the results of this review are decidedly auspicious both for the viability of the "best-buy" hospital in West Suffolk and for the hospital service as a whole. It has already been possible to meet the expressed needs of the case load with fewer beds than are ultimately planned—and this in advance of major developments in community care or the building of new facilities, and with the added bonus of greater economy of operation. The opportunity exists for similar results to be obtained on a national scale.

I would like to acknowledge the help I received in the course of this study from the medical staff of the West Suffolk General; Mr. P. M. Cooke, Mr. F. J. Rich, and the staff of the West Suffolk H.M.C.; Dr. G. D. Duncan and the staff of the East Anglian R.H.B.; Dr. A. B. Harrington, Dr. G. K. Matthew, Mr. K. A. Sidford, and Mr. J. S. F. Blanchard of the D.H.S.S.; and my colleagues at the Organization of Medical Care Unit under Professor R. F. L. Logan, to whom requests for reprints should be sent.

References

- Nuffield Provincial Hospital Trust, *Studies in Hospital Function and Design*. London, Oxford University Press, 1955.
- Barr, A., *Lancet*, 1957, 2, 1105.
- Forsyth, G., and Logan, R. F. L., *Demand for Medical Care*. London, Oxford University Press, for Nuffield Provincial Hospitals Trust, 1962.
- Forsyth, G., and Logan, R. F. L., in *Towards a Measure of Medical Care*, London, Oxford University Press, for Nuffield Provincial Hospitals Trust, 1962.
- Ministry of Health, *Hospital Plan for England and Wales*, Cmnd. 1604. London, H.M.S.O., 1962.
- Ministry of Health, *Hospital Building Programme*, Cmnd. 3000. London, H.M.S.O., 1966.
- Ministry of Health, *Rationalization of Planning and Design*, 1968.
- Office of Population Censuses and Surveys, *Census 1971, Preliminary Report*. London, H.M.S.O., 1972.
- Department of Economic Affairs, *East Anglia, a Study. First Report of East Anglia Planning Council*. London, H.M.S.O., 1968.
- Bailey, N. J. T., *Applied Statistics*, 1956, 5, 146.
- Barr, A., *Lancet*, 1968, 1, 353.
- Beresford, J. C., and Griffiths, D. A. T., *Hospital*, 1970, 66, 48.
- Department of Health and Social Security, *Annual Report 1970*. London, H.M.S.O., 1971.
- Institute of Municipal Treasurers and Accountants, *Local Health Services Statistics 1969-70, Welfare Services Statistics 1969-70*. London, I.M.T.A., 1971.