There is a danger that too much emphasis can be placed on patient monitoring, and this results in considerable capital expenditure. There is little evidence of a saving of staff as the result of using such apparatus, and as the machines are not reliable, extra work is often required to maintain their ability to produce satisfactory data. The effort required to acquire such data is often not justified in view of the marginal clinical utility of the information obtained. Such cost benefit considerations must be borne in mind when planning a unit, and in the Appendix we list equipment that we have found to produce most benefit at a modest outlay.

We would like to thank the M.R.C., who supported one of us while working in the unit.

Appendix

Proposed equipment for a four-bed general medical intensive care unit, with a guide to approximate capital expenditure:

	£
4 bedside oscilloscopes (Cambridge)	660
1 large-screen slave oscilloscope (Lan)	355
E.C.G. strip chart recorder (Hewlett-Packard)	390
1 synchronized D.C. defibrillator (Cardiac Recorders)	405
Half Haldane with rebreathing bags (Aimer Ltd.)	25
Dry spirometer (Vitalograph)	100
Wright peak flow meter (Airmed Ltd.)	40
Wright respirometer (B.O.C.)	50
Respirator (Bennett model PR 2)	390
Astrup A.M.I. (Radiometer)	855
2 electric thermometers including four probes (Light Laboratories)	190
Total	3,460

This list is intended as a guide, and the prices are approximate. The individual manufacturers mentioned are those whose equipment we have used and found reliable in service. We do not wish to imply that the items specified are necessarily the most suitable, or the cheapest of their kind.

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Medical Staffing and Training in Chest Diseases

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Summary

A survey of 164 area departments of chest diseases in England and Wales presents details of 321 consultants and 176 chest physicians in other career grades. During the past 10 years there have been 99 consultant and 76 senior hospital medical officer vacancies, with 61 and 23 replacements, respectively, of which only 22 and 8 were whole-time in chest diseases. Of the total, 119 consultants and 45 in other career grades are now aged 55 and over.

In most chest clinics the slowly diminishing work load from tuberculosis has been more than offset by increasing admission of other chest diseases, usually to fewer beds. Many areas need an increase in senior establishment and many require improved clinical facilities; some need both to bring them into line with official policy based on the recommendations of the Scadding report.

During the next five years there will be 52 consultant and 11 other senior career posts in chest diseases vacated through retirement. At least eight consultant appointments a year, in terms of whole-time equivalents, will be mandatory for at least

five years and probably for 10 years to maintain existing standards without allowance for essential improvements or the development of regional thoracic centres.

Present training schemes in the specialty cannot produce more than two or three trained candidates a year for these eight vacancies. The description of prospects in the specialty as "uncertain" deters young doctors from entering it and discovering how broad a spectrum of medicine it embraces. It is urgently necessary for schemes of training to be set up immediately in conjunction with a considerable increase in training posts at senior registrar level embracing both general and chest medicine.

Introduction

Diseases of the respiratory system, and more general disorders presenting with respiratory symptoms, occupy at least one-quarter of the time of general practitioners, and very many such cases demand hospital care. A committee of inquiry, set up by the Central Health Services Council (1968) under the chairmanship of Professor J. G. Scadding, reported that the special treatment of chest diseases would be necessary for the foreseeable future. It recommended that the district general hospital should provide a department of chest disease, that the general staffing of the department should follow the pattern appropriate to other special departments, and that the consultant should be the physician to the chest department, though

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taking some part in the general medical service. These proposals were at once accepted as official policy.

The Scadding report, in effect, established as a desirable norm the pattern of development which had taken place where chest physicians had been enabled to follow the example of the long-established national chest hospitals. Development along these lines was, however, patchy, sporadic, and slow. Examining the situation a year after the acceptance of the report, the Joint Tuberculosis Committee of the British Thoracic and Tuberculosis Association found reason to suspect that the number of chest physicians was being reduced to the point where the service given might become inadequate. There was little evidence in many areas of the establishment of chest departments and clear evidence that some well-developed departments were being abolished, while the number of training posts seemed inadequate to provide necessary replacements.

This survey was therefore carried out during 1969 for the Joint Tuberculosis Committee to define the present age structure of the specialty, to determine what run-down of senior staff had occurred, to assess the probable number of consultant replacements over the next decade in relation to the changing pattern and amount of the work done, and to examine the extent and quality of training posts. Reports came direct to me from 164 area chest departments in England and Wales with details of 321 consultants and 176 in other career grades. The official tables for September 1969 show 326 consultants and 159 other career grades. The survey data are thus virtually complete; the slight excess of other career grades in the survey probably arises from shared appointments between two specialties in the lower grades and does not affect the significant deductions. In 59 of the total of 497 consultants and other career grades in this survey the holder's age was not stated, and to this extent conclusions about age structure and expected retirements will be a slight understatement.

Present Staffing Structure

In August 1969, 119 consultants and 45 in other career grades were aged 55 and over; 50 consultants and 19 in other career grades were aged 60 and over (Table I). How the age structure has changed since 1959 is shown in Table II. Consultants, all senior hospital medical officers, and medical assistants are combined because many transfers occurred between

these groups during the period. Overall, chest physicians under age 50 declined by 236, despite the inclusion of 13 recently recruited medical assistants below age 40, whereas those aged 50 and over increased by only 43.

The figures for retirements and replacements of consultants and senior hospital medical officers during the past 10 years are given in Table III. Some consultant chest physicians have been replaced by part-time senior hospital medical officers,

TABLE III—Retirements and Replacements of Chest Physicians 1959-69

Grade	Resignations	Replacements				
		Consultant Chest Physicians	Physicians with General Sessions	General Physicians	Medical Assistants	Junior Grades, Locums, etc.
Consultant ..	99	22	26	13		
S.H.M.O.* ..	76	8	7		8	6
Total ..	175	30	33	13	8	6

medical assistants, long-term locums, junior grades—often also employed on other fields, such as geriatrics—and general-practitioner assistants. The pruning was severe, with 175 senior vacancies and only 90 replacements, many of them part-time. It was done by not filling posts coming vacant by retirement. Some pruning was certainly justified. The staffing structure was degraded as well as pruned, perhaps in order to get pairs of hands to keep things going in a specialty in which career prospects were officially described as uncertain.

Pattern of Work

Those chest departments which have developed on the lines accepted as desirable by the Scadding committee, under the direction of consultants whose background of general medicine is reinforced by specialized training and experience in chest diseases, now handle a spectrum of medicine broad enough to provide a challenge to the keenest clinician. The care of this wide range of disorders with its associated social and environmental problems has more than outweighed the slowly diminishing work load from tuberculosis. Skill, experience, and interest in tuberculosis will nevertheless be needed for many years to come.

The survey data show that our experience in Oxford is representative of the development which has taken place in the more fortunate departments. The Oxford unit is unusual in being part of a teaching hospital group with students attached to the firm throughout the year. In all other respects it is an area service department which has developed very much on "Scadding" lines since 1950.

Between 1960 and 1969 the population served rose from 351,551 to 429,700 and available beds were reduced from 112 to 77. Admissions for tuberculosis fell from 201 to 87, while admissions for non-tuberculous conditions rose from 282 to 493. Bed utilization overall improved from 4.3 to 7.5 cases per bed per year. The graph of falling tuberculosis cases and rising non-tuberculous cases has been linear since 1956. The range of work is broadly classified in Table IV, in which, of course, the groups of "systemic disorders" and "other cases" conceal the most difficult diagnostic problems. Non-tuberculous cases are rarely in hospital for more than four weeks. The ratio of admissions to deaths shows that the unit deals with a great deal more than terminal care, and though there is a high proportion of cases in the older age groups it is in no sense a geriatric unit.

Available beds were reduced from 73 to 59 in December 1969. Fifty-nine beds dealt with 516 admissions during the first nine months of 1970 as compared with 426 admissions to

TABLE I—Chest Physicians in Post August 1969 by Age and Grading

	30—	35—	40—	45—	50—	55—	60—	65	Age Not Stated	Total
Consultant ..	1	8	15	65	88	69	43	7	25	321
S.H.M.O.* (allowance) ..			2	6	12	14	9		2	45
S.H.M.O. ..			7	11	19	9	7	1	9	63
Medical Assistant ..	7	6	9	13	5	3	1	1	23	68
Senior Registrar ..	7	1								8
Registrar ..	26	4		1		1			25	57

*Senior hospital medical officer.

TABLE II—Age Distribution of Chest Physicians

Age	Consultants, S.H.M.O.s, and Medical Assistants									Change 1959-69
	1959	1960	1961	1962	1963	1964	1965	1966	1969	
Under 40 ..	88	66	51	35	24	10	8	6	22	- 66
40-49 ..	298	307	300	291	262	237	208	163	128	-170
50-59 ..	194	190	198	194	211	230	248	266	219	+ 25
60 and over ..	51	55	61	72	76	80	81	83	69	+ 18
Not stated ..									59	
Total ..	631	618	610	592	573	557	545	518	497	-134

Figures for 1959-66 from Dr. V. H. Springett's memorandum. Figures for 1969 from present survey.

TABLE IV—Chest Diseases Department, Oxford. Admissions 1960-69

	1960		1969	
	No. of Admissions	No. of Admissions	No. of Deaths	
Tuberculous	201	87	2	
Non-tuberculous	282	493	73	
Lung cancer	84	161	48	
Other malignant	5	20	7	
Acute infections	42	50	4	
Cardiorespiratory failure	68	132	8	
Acute bronchitis	8	28		
Asthma	9	17		
Bronchiectasis	2	13	1	
Systemic disorders	7	13		
Spontaneous pneumothorax	7	2		
Sarcoidosis	1	10		
Pulmonary embolism	49	47	5	
Other causes				
Total	483	580	75	
Available beds	112	77		
Cases per bed	4.3	7.5		

73 beds in the corresponding period of 1969. The techniques involved, both diagnostic and therapeutic, become steadily more sophisticated. The proportion of cases demanding more intensive care or investigation rises steadily.

The outstanding community service of such developed chest units is concerned with the chronic respiratory disorders, a previously neglected but important economic problem in which the past 20 years have seen advances in the understanding of basic pathogenesis, epidemiology, and control originating in the major thoracic centres and being put into practice in the field. Controlled therapeutic trials, epidemiological surveys, and other co-ordinated research activities operate all the time with peculiar ease and efficiency because of the unique national liaison which exists between chest clinics and chest physicians. The mutual stimulus between major centres and peripheral departments works both ways.

The best chest departments are very good. Unfortunately their number is far too small. No fewer than 32 of the 164 departments surveyed reported a serious falling off in standards. Many more reported a work load made unreasonable by staff reductions. More work less well done was a common complaint, and many consultants are frustrated by lack of encouragement or means to develop on the right lines.

Future Senior Staffing Needs

Expected vacancies due to retirements are easily and accurately assessable. Whether those vacancies should be filled needs detailed knowledge of local needs and priorities. The information gathered in this survey gives a strong impression that further pruning of the consultant establishment should be very limited. There are certainly many areas needing an increase in senior staffing, many needing improved clinical facilities, and some needing both to bring them within sight of implementing the official plan of development.

Nevertheless, the criteria applied in this analysis for estimating future consultant needs have been rigorous. No

case has been included where the statistical data are incomplete. Impending vacancies for 1969-74 and an estimate of the need for replacement are shown in Table V under three headings: those where the data supplied leave no doubt that a retiring doctor must be replaced by a consultant, those where the position is uncertain, and those where it seems that replacement may not be necessary. The figures refer only to whole-time equivalents and make no allowance for areas needing clinical upgrading or for the needs of future regional thoracic centres. At the lowest estimate, to maintain the service only at its present level there will be 37 essential consultant appointments in the next five years, and this figure is certainly an understatement.

Training of Future Chest Physicians

Training facilities for registrars are reported from many areas. Some are systematic, far more are sporadic, and many amount only to leave to attend occasional lectures or demonstrations. Six areas have training links for registrars with teaching hospitals, two have registrars combining chest and general medicine with evidence of planned training. There are, of course, many registrars doing dual-duty posts. Few of these could properly be regarded as training posts.

The path to consultant status is, however, through the senior registrar grade, and the training period must be divided between the specialty and general medicine. Eight senior registrar posts in chest diseases are reported. Only three of these approach the standards laid down by the Royal College of Physicians. Planned rotational training, or general medical training at senior registrar level with special options including chest medicine, seems to be totally lacking. Present training arrangements, including those of London, Edinburgh, and the whole provincial chest service of England and Wales, could at most provide three properly trained senior registrar candidates for an absolute minimum of eight consultant vacancies a year.

Conclusions

The concern which led the Joint Tuberculosis Committee to instigate this survey is fully justified by the facts presented. The number of young physicians undergoing proper training in thoracic medicine is nowhere near enough to ensure maintenance of the specialty as older consultants retire, without any allowance for development in the backward areas. Prospects for advancement to consultant rank have been described in the official returns as "uncertain." Young doctors seeking a career in hospital medicine have, not unreasonably, equated "uncertain" with "unlikely," and have thereby been discouraged from discovering the real challenge and interest of a fully developed modern department of chest diseases, nor can they discover this if development is strangled or the department is relegated to the hospital backwoods. Wherever good chest departments have been developed the need for their services has become very clear. It is urgently necessary that development in accordance with official policy should take place where it has been lacking, that the future needs for consultants in the specialty should be made clear to potential candidates, and that the essential and considerable increase in truly comprehensive training posts, mainly at senior registrar level, should start as quickly as possible.

This survey was carried out on behalf of the Joint Tuberculosis Committee of the British Thoracic and Tuberculosis Association and is published at the Committee's request. Thanks are due to the representatives of regional thoracic associations on the Committee and to chest physicians throughout England and Wales for their help in the collection of information. The figures for 1959-66 given in Table II were kindly supplied by Dr. V. H. Springett.

Reference

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TABLE V—Expected Retirements of Consultant and Senior Hospital Medical Officer Chest Physicians 1969-74 and Estimate of Replacement Requirements

	Retirements		Consultant Appointments		
	Consultants	S.H.M.O.s and Medical Assistants	Essential	Uncertain	Improbable
1969 ..	7		4	2	1*
1970 ..	13	3	10	2	4
1971 ..	4	1	4		1
1972 ..	14	6	9	5	6
1973 ..	5		3	2	
1974 ..	9	1	7	2	1
	52	11	37	13	13

These figures represent whole-time equivalents. Essential replacements include only those areas where the present evidence appears unequivocal. There will be 5 consultant vacancies requiring consultant replacement in East Anglia during the next 10 years. Twenty-five consultants and 11 senior hospital medical officers whose age was not given are excluded.

* General Physician required.