

# Middle Articles

## HOSPITAL TOPICS

### Experiences in the First Year of an "Open Door" X-ray Department

P. L. COOK,\* M.B., B.S., D.M.R.D., D.OBST.R.C.O.G.

*Brit. med. J.*, 1966, 2, 351-354

In 1946 the Annual Representative Meeting of the British Medical Association recommended that, wherever possible, hospital departments of pathology and radiology should give direct-access facilities to general practitioners, and this policy has repeatedly been urged at meetings of the Radiologists Group. In spite of this, the "open door" department, as it has come to be known, has been slow to find favour. This is due, in the main, to difficulties in accommodation and staffing, both secretarial and technical, but no doubt also in part to resistance by radiologists and clinicians.

In February 1964 it was decided that the diagnostic x-ray department at the Middlesex Hospital should give direct access to general practitioners, and a letter was sent to 200 doctors in the area. At first the department was open only for limited radiological investigations, but in September 1964 the service was extended, in response to a considerable demand, to include all investigations suitable for out-patients with the exception of barium-enema examinations, where it was felt that the difficulties involved in adequate preparation of the patient were too great. Copies of the instruction sheets normally given to out-patients were sent to the same doctors.

#### Material and Methods

A total of 2,621 examinations were carried out in the first 12 months on 2,400 patients, and the demand is increasing (Table I).

TABLE I.—Number of Patients Attending (February 1964 to January 1965)

February .. 99	May .. 201	August .. 107	November .. 296
March .. 134	June .. 154	September .. 191	December .. 244
April .. 193	July .. 156	October .. 281	January .. 344

Total in first 12 months: 2,400

For the purpose of this analysis the requests were divided into five groups as follows: 1, Chest and ribs. 2, Spine, abdomen, and pelvis. 3, Extremities. 4, Skull, sinuses, face, etc. 5, Special procedures requiring contrast media. This grouping is a slightly modified form of that in the report of the Nuffield Provincial Hospitals Trust.<sup>1</sup> The number of examinations requested in each group is shown in Table II.

Nearly all the film-processing in this department is automatic, and films can be checked by a radiologist for technical adequacy and for the necessity of further views before the patient leaves the hospital. The reporting is done by the consultant staff, and the report is invariably posted to the general practitioner the same day. The special examinations are managed similarly, except that the investigation is carried out and the films are reported by a registrar

\* Senior Registrar in Radiology, the Middlesex Hospital, London. Present address: Clinical Center, National Institutes of Health, Bethesda, Maryland, U.S.A.

or a senior registrar, as indeed are all equivalent referrals from the hospital out-patient department.

Requests for barium-meal examinations have dominated all the other special procedures in group 5, and the most convenient way of dealing with these is to allocate from two to four each day to the radiologist carrying out the morning screening session. The patients arrive at the hospital at 11.15 a.m. and are rarely kept for more than one hour unless a follow-through examination of the small bowel is requested.

TABLE II.—Types of Examination Requested

Group	Feb.-Sept.*		Oct.-Jan.		Total for 1 Year	
	No.	%	No.	%	No.	%
1. Chest	708	52	525	42	1,233	47
2. Spine, including pelvis and hips	301	22	254	20	555	21
3. Extremities	233	17	186	15	419	16
4. Skull, sinuses, etc.	105	8	107	8	212	8
5. Examinations requiring contrast media	8	1	194	15	202	8
Totals	1,355		1,266		2,621	

\* Reason for dividing the year into two unequal periods of eight months and four months is that the service was extended on 1 October to include examinations in group 5.

A copy of each report is kept in the x-ray record department, and it is from these records that the present data have been compiled. Every report has been reviewed. In assessing the positive findings a number of minor abnormalities, often commented on but of no clinical relevance, have been excluded. Examples of these are: (1) calcification in cervical, hilar, or abdominal nodes, peripheral foci, or aortic arch; (2) old rib fractures, deformities, and anomalies; (3) a miscellaneous group of such things as pleural thickening, diaphragmatic tenting, increased vascular markings, kyphosis and scoliosis, lipping of vertebral bodies, Schmorl's nodes, cardiac enlargement or left ventricular prominence, and aortic unfolding, when described as "slight" or "a minor degree."

TABLE III.—Analysis of Group 1: 1,233 Chest Examinations (Abnormal examinations, 309 (25%). Some showed more than one abnormality)

A. Collapse and/or consolidation	90
B. Tuberculosis	39
Active, 4. Doubtful, 10 (repeat films suggest inactivity). Old calcified and fibrotic, 25.	
C. Other post-inflammatory changes of long standing,—e.g., bronchiectasis or fibrosis	18
D. Carcinoma	14
Primary bronchus, 9 (one previously known but now shown to have metastases). Metastatic deposits, 5 (bony 3, pulmonary 2).	
E. Miscellaneous	85
Cardiac enlargement, 32*. Emphysema, 27. Rib fractures, 6. Pneumothorax, 4. Goitre, 3 (2 with probable retrosternal extension). Aortic aneurysm, 2 (both dissecting). Paget's disease, 2. Diaphragmatic abnormalities, 4 (2 hiatal hernias, 1 eventration, 1 massive herniation of viscera through left dome). Spinal abnormalities, 3 (1 Pott's spine, 1 osteoporotic vertebral collapse, 1 multiple angiomata with collapse). Anterior mediastinal mass, 1. Right aortic arch with retro-oesophageal diverticulum, 1.	
F. Check and follow-up films	63

\* 6 Patients in failure, 2 with mitral-valve disease, 1 with interstitial fibrosis and pulmonary hypertension, 1 with an unsuspected atrial septal defect.

**Group 1 : Chest Examinations**

Table III shows that 25% of the chest examinations revealed an abnormality that could be regarded as significant. This is comparable with the incidence in patients referred to the department from other sources. Most of the follow-up films were taken to check resolution of an inflammatory process or re-expansion following a pneumothorax. A few, however, were of patients who had a known tuberculous history or had recently been discharged from hospital (not necessarily the Middlesex Hospital), having had a chest illness or a post-operative chest complication. Even after eliminating this group, findings were positive in more than 20% of patients, this figure being almost exactly comparable to that reported from the Darbshire House Health Centre,<sup>2</sup> which was regarded as indicating a "reasonably satisfactory standard of proficiency."

Four cases of active tuberculosis and eight new cases of carcinoma of the bronchus were found. These have not been followed, as most were referred to other hospitals for treatment and the follow-up period is too short to be of any value. Previous writers<sup>3</sup> have found that in spite of higher resection rates and lobectomy rates, indicating earlier stages in the natural history of the disease, the long-term survival rates are not significantly altered. The total incidence of bronchial carcinoma in this series is 7.3 per 1,000 and is rather lower than that quoted by Posner, McDowell, and Cross.<sup>4</sup> These authors found an incidence of 9.2 per 1,000 from a similar group of referrals, this being 23 times the detection rate of a routine survey. In the present series, of course, as in theirs, the patients already had respiratory symptoms. However, our figures would seem to confirm their conclusion that "the most economic and valuable method of finding resectable lung-cancer cases is through general practitioners."

In addition to the five patients showing secondary deposits, the possibility of these was suggested in three others (one pulmonary and two bony). Repeat examinations were recommended by the radiologist, but two of these patients have not been seen again, though they may have been referred elsewhere. The third patient was not seen for five months, when he attended the casualty department and was found to have a bronchial carcinoma. This, of course, raises the problem of the correct policy for the radiologist when his recommendations are not acted upon and also points to the lack of liaison between hospital and general practitioner (though in the reverse direction from that usually complained of). Also many of the patients showing acute inflammatory changes were not referred back for the follow-up films that had been suggested by the radiologist, presumably because of clinical resolution. In hospital practice the radiologist commonly sees such lesions that are unresolved or slow to resolve which are due to an undiagnosed carcinoma of bronchus, and perhaps he exercises undue caution as a result.

Finally, in the miscellaneous group, only those patients in whom the cardiac enlargement or emphysematous changes were described as "gross" or "well-marked" have been included.

**Group 2 : Spine, Including Pelvis and Hips**

In Table IV minor degenerative changes were defined as narrowing of a single disc space, usually with lipping of the

TABLE IV.—Analysis of Group 2

Total examinations	.. .. .	555
Abnormal*	.. .. .	233 (42%)
A. Minor degenerative changes	.. .. .	97
B. More severe degenerative changes	.. .. .	81
C. Spondylolisthesis (7 secondary to spondylotic changes and disk degeneration)	.. .. .	8
D. Osteoarthritis of hip	.. .. .	16
E. Miscellaneous	.. .. .	31

\* Some examinations showed more than one abnormality.

adjacent vertebrae but with no evidence of osteophytic encroachment upon the neural foramina. Patients with more than one narrowed disc space or with foraminal narrowing were defined as "more severe." A random sample of the population aged over 50 years would probably produce as high an incidence of spondylotic changes, and it is well known that there is little or no correlation between the severity of symptoms and the x-ray changes. The value of these examinations to the general practitioner is in the exclusion of other conditions.

The miscellaneous group included eight patients with osteoporotic or metastatic vertebral collapse, six with Pager's disease, and five each showing sacroiliitis or juvenile osteochondrosis of the spine.

**Group 3 : Extremities**

Whenever possible, patients with bony injuries (Table V) were referred by the radiologist to the casualty department. The direct service relieved congestion in casualty and saved the patient's time. The injuries were all relatively minor, usually small avulsed bony fragments, and many could be treated satisfactorily by a general practitioner, particularly if he visited the x-ray department to see the films with a radiologist. Not one doctor did this. The treatment of a patient, even with a minor injury, by the combined efforts of a radiologist, who never sees him, and a general practitioner, who never sees the radiographs, is an unhappy concept.

TABLE V.—Analysis of Group 3

Total examinations	.. .. .	419
Abnormal	.. .. .	126 (30%)
A. Osteoarthritis	.. .. .	66
B. Minor bony injury	.. .. .	23
C. Miscellaneous	.. .. .	37

The miscellaneous group included patients with osteoporosis, rheumatoid or gouty arthritis, various osteochondritic spurs and exostoses, and one patient with an osteosarcoma of the humerus.

**Group 4 : Sinuses and Skull**

Radiological evidence of sinusitis in any general sample of the population is very high and the figures in Table VI reflect this. Major sinus infection was defined as pansinusitis or gross involvement of one group of sinuses with total opacification or evidence of a fluid level. The main value of radiography is the confirmation of the clinical diagnosis and the exclusion of more severe conditions.

TABLE VI.—Analysis of Group 4

Total examinations	.. .. .	212
Abnormal	.. .. .	92 (43%)
A. Minor sinus infection	.. .. .	38
B. Major sinus infection	.. .. .	47
C. Miscellaneous	.. .. .	7

The miscellaneous group included facial bony injuries, one case of osteomyelitis of the mandible, and one case of acromegaly.

**Group 5 : Contrast Media**

In Table VII is given an analysis of examinations requiring contrast media.

Table VII shows a very high incidence of positive findings; rather higher for all the examinations than in a similar number of patients referred from the out-patient department. Our impression is that the incidence is falling slightly in the second year, and this is to be followed. In spite of this success rate, the continuing concern of hospital clinicians is that the practitioner may attribute a greater reliability to radiology than is justified, particularly in deciding the value and significance of a negative report.

TABLE VII.—Analysis of Group 5 (202 Examinations)

A. Cholecystograms	.. .. .	25
Normal	.. .. .	21
Abnormal (calculi; seen on the plain film in three cases)	.. .. .	4
B. Intravenous pyelograms	.. .. .	22
Normal (one showing gall-stones)	.. .. .	17
Abnormal	.. .. .	5
Well-functioning pelvic kidney	.. .. .	1
Absent left kidney (confirmed by cystoscopy)	.. .. .	1
Duplex kidney with double ureteric opening into bladder and a calculus in the upper pole	.. .. .	1
Chronic pyelonephritis	.. .. .	1
Ureteric calculus without obstruction	.. .. .	1
C. Barium studies	.. .. .	155
Barium swallow, 9. Barium swallow and meal, 2. Barium meal, 142. Barium meal and follow-through, 2.	.. .. .	86
Normal	.. .. .	69
Abnormal (44%)—some examinations showed more than one abnormality	.. .. .	8
1. Gastric ulcer	.. .. .	14
2. Duodenal ulcer crater	.. .. .	20
3. Scarring or irritability of duodenal cap	.. .. .	24
Three with evidence of pyloric obstruction	.. .. .	2
4. Hiatus hernia or reflux	.. .. .	1
Two with evidence of reflux oesophagitis	.. .. .	3
5. Gastric carcinoma	.. .. .	1
6. Polya gastrectomy	.. .. .	3
7. Diverticula	.. .. .	
Oesophageal, 1. Gastric, 1. Duodenal and jejunal, 1.	.. .. .	

### General Practitioners

It is difficult precisely to give either the number of general practitioners using the service or the number of patients referred by individual doctors. This is due to several factors. There are a large number of group practices in the area, and cross-cover is given between neighbouring practices during holiday or illness. Individual doctors work from several branch surgeries, and during the summer there are numerous locum appointments, the holders of which often move from practice to practice in the central London area. Wherever possible, allowance has been made for these factors.

Approximately 240 doctors have referred patients during the year, giving an average of 10 patients per doctor. But some interesting facts emerge when a closer examination is made. Approximately 150 doctors referred fewer than 10 patients; many fewer than five. Some of these doctors were probably locums and others were in practice in the outer suburbs or at distances up to 100 miles (160 km.), their patients being commuters to London. Obviously, individual doctors did not refer many such patients.

Much more significantly, two doctors referred 20% of the total patients in the first period of eight months and more than 33% came from five practitioners. Even during the second period of four months, when the service had been extended and had become more widely known, these same five doctors still provided more than 25% of the total. There were a few days when individual doctors referred up to 10 patients, and it is difficult not to conclude that the service was being overused on these occasions.

Rarely, requests have been received for the films to be sent to the general practitioner. This has raised difficulties as the department does not have sufficient secretarial staff and the cost of postage is considerable. No financial contribution towards additional expenses has been made by the Ministry of Health.

The requests were of a high standard and usually accompanied by clear and precise statements of the clinical indications and the information required. No examples came to our notice of repetitious requests following examination at other hospitals.

### Discussion

There can be no doubt that the open-access policy is right in principle. The quality of the requests, the incidence of positive findings, and the rapidly increasing demand all point to this.

The problems are mainly those of communication,<sup>5</sup> and it is disappointing that more general practitioners do not contact the department to look at the films or discuss the case.

It is also obvious that the radiologist must reserve the right to refer patients direct to other hospital departments because of the increased possibility of error following correspondence. These problems will be less marked in a hospital with a more clearly defined hinterland and with perhaps a better tradition of liaison than one of the London teaching hospitals, which are, perhaps inevitably, more remote from the community in which they stand. In reviewing the reports it has been noticed that most radiologists use a different reporting technique for general-practitioner patients. There are fewer statements of appearances without following conclusions or advice. When doubts exist in the radiologist's mind they should not be given without further comment. To a hospital colleague the significance of such reports is more readily appreciated, and, in addition, the ease of contact with the radiologist lessens difficulties.

With the possible exception already noted, there is no evidence of excessive demands. While perhaps one would not go so far as previous writers who state that there is "no abuse"<sup>2</sup> or that abuse is "so rare as to be negligible,"<sup>6</sup> it is true that most doctors use the service with discrimination. The overall estimate made by Eimerl<sup>7</sup> of one x-ray examination for every 20 patients per year would seem to be a good working figure.

The total number of patients attending this department in 1964 was 61,191 and the number of examinations carried out was 74,245. The general-practitioner service therefore represents about 4% of this total. No attempt has been made to allocate units to the extra work, because of the lack of general acceptance of their value. However, owing to the complexity of many of the hospital investigations the average number of units per hospital patient was 2.7. As there is a great preponderance of chest examinations in the general-practitioner patients the average number of units per patient must be less than 2. Therefore the increase in the amount of work or time is probably about 3%. Provisional totals for the second year in progress indicate that this figure will probably be doubled, but this still falls well short of the 10–11% suggested by other writers.<sup>2,7</sup> There has been no decline in the referrals from the out-patient department, and the increase in the total work of the x-ray department in 1963–4 is almost an exact reflection of the additional general-practitioner patients, the years 1960–3 having shown no significant variation.

Concern has been expressed because of the numbers of children and adolescents sent for x-ray examinations unnecessarily.<sup>8</sup> This has not been our experience, and these groups together make up only 1% of the total, none of the requests appearing to be ill-considered. Indeed, the general level of the requests conforms very well to the recommendations of the Adrian Committee Second Report.<sup>9</sup>

It may seem unfortunate that a full appointment system was not instituted. A survey of the work of the department was carried out before starting the service, and on the basis of this study the practitioners were asked to refer patients at the periods of minimum work load. The continuing increase in numbers, with up to 50 extra telephone calls a day, would have imposed an intolerable burden on the secretarial staff, which has not been increased. There has been no evidence of long waiting-times, but on a few days patients have arrived faster than they could be dealt with, with aggravation of the peak loads already existing.<sup>10</sup> An appointment system, if workable, could lead to more control over the variations in the work load and make the department as a whole run more smoothly.<sup>11</sup> The special procedures, such as barium meals, are of course conducted by appointment.

Other writers have concluded that the service avoids delay because a patient, when sent to the out-patient department, will already have undergone some of the necessary x-ray examinations.<sup>5</sup> This may be so if the patient attends the

out-patient department at the same hospital. There is some evidence that a few patients attended other hospitals, and, as requests had not been received for the films, these have presumably been repeated, with unnecessary irradiation and expense. This is the result of dealing with so many patients whose homes are not near the hospital. It also implies that open-access facilities were not available at the other hospital and argues for a more general adoption of the service. At this hospital the advantages of attending the out-patient department with films already available are not great, because many out-patient clinics depend upon the capacity of the x-ray department to return a patient with reported films well within an hour. A patient may well spend more time at the hospital, including the travelling-time, if referred by a general practitioner first to the x-ray department and then to the out-patient department. This would not be true of a department where the radiologist could not provide full-time cover, and such a prompt service was therefore not possible.

The problem of providing a diagnostic service for the general practitioner will be altered with the increasing advent of health centres. Should these be diagnostic centres based on the Corby model, with attending consultants? Or should they be health centres like Tamworth, with no diagnostic facilities but closely linked to a hospital where such facilities already exist? The problems of communication between practitioner and radiologist would be fewer at the former<sup>12</sup> but at the expense of considerable duplication of costly equipment. The demands of different regions with varying population densities may require that both types of centre be used. With increasing experience of the working of the system the difficulties of personal contact may be lessened.

### Summary

A description and an analysis of the first year's experience of a general-practitioner service in Central London are given.

As determined by the continually increasing demand for the service, it has given satisfaction to the general practitioner. It is mainly used with discrimination, but a large proportion of the extra work load on the x-ray department comes from a relatively small group of doctors, among whom there is some evidence of overuse. In spite of this, the detection of significant abnormalities remains at as high a level as referrals of similar patients from the out-patient or casualty departments of the hospital. The detection rate for bronchial carcinoma in this series was 7.3 per 1,000, confirming the conclusion of previous authors that referral by general practitioners is the most economical and valuable method of finding resectable cases.

Most of the disadvantages stem from poor liaison between hospital and doctor. General practitioners almost never visited the department, and the paradoxical isolation of a hospital in Central London is only a partial reason for this.

The problems of future policy are briefly discussed. There is no single answer, and the needs of each area should be assessed with a pragmatic and flexible attitude before deciding the appropriate type of general-practitioner centre.

### REFERENCES

- <sup>1</sup> *The Organization of Diagnostic X-ray Departments*, 1962, p. 23. Oxford University Press, London.
- <sup>2</sup> *J. Coll. gen. Practit.*, 1957, 4, 1.
- <sup>3</sup> Posner, E., McDowell, L. A., and Cross, K. W., *Brit. med. J.*, 1959, 1, 1213.
- <sup>4</sup> ——— *ibid.*, 1963, 2, 1156.
- <sup>5</sup> Steiner, R. E., *Proc. roy. Soc. Med.*, 1965, 58, 448.
- <sup>6</sup> *The Organization of Diagnostic X-ray Departments*, 1962, p. 71. Oxford University Press, London.
- <sup>7</sup> Godber, G. E., *Brit. med. J.*, 1961, 2, 843.
- <sup>8</sup> Rose, J. A. G. F., *Brit. med. J. Suppl.*, 1961, 2, 27.
- <sup>9</sup> *Radiological Hazards to Patients*, Second Report of the Adrian Committee, 1960, p. 46. H.M.S.O., London.
- <sup>10</sup> *The Organization of Diagnostic X-ray Departments*, 1962, p. 55. Oxford University Press, London.
- <sup>11</sup> *Ibid.*, p. 70.
- <sup>12</sup> Hunt, J. H., *Lancet*, 1955, 2, 681.

## MEDICAL HISTORY

### Elizabeth Garrett Anderson Hospital Centenary

JANET AITKEN, M.D., F.R.C.P.

*Brit. med. J.*, 1966, 2, 354-355

The early history of this hospital was dependent on one person—Elizabeth Garrett, the first woman to obtain a modern qualification to practise medicine in the British Isles.

Women have practised the healing arts in every age from the ancient civilizations of Assyria, Egypt, India to modern times. In the Middle Ages their reputation for skill as healers of the sick varied considerably. In the 12th century the newly founded universities of Europe and Britain were not open to women, except in Italy, and hence it is only in Italy that women doctors were academically famous and a number became professors of medicine. By the 19th century the ancient concept of women as physicians had ceased to exist in this country, and so Elizabeth Garrett's announcement that she intended to become a doctor of medicine was received with astonishment as well as with a good deal of disapproval.

Elizabeth Garrett was born in 1836, and had the good fortune to be a member of an enlightened family where boys and girls enjoyed egalitarian treatment, which was an unusual feature of family life of the time. Accordingly, she received a good education and seems to have been satisfied with her lot until the age of 25. About this time she stayed in London at the home of a married sister to whom she was deeply attached, and in her house met many of the outstandingly independent women of the day. Frequent contact with these women awakened her own desires to achieve something in life. She told her parents that she wanted to become a doctor and begged them to try to understand the painful restlessness and weariness of energies unused.

After overcoming his initial prejudices her father did everything in his power to help her, and the story of how she