# PRACTICE OBSERVED

# Practice Research

## Laboratory and radiological investigations in general practice

### IV-Results of radiological investigations

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### Introduction

Introduction

In the previous three papers of this study (8 October, p. 1033; 15 October, p. 1111; 22 October, p. 1188) we considered laboratory tests and x ray examinations together under the one beading "investigations." We thought, however, that it was worth while including a section concerned only with the use of radiological investigations to determine how this relatively needs acquired practitioners in Belfast.

Access to chest x ray examinations has been available for over a decade, contrast media studies since the mid 1970s, but skeletal x ray facilities for only the past two years. At what rate, then, are investigations being requested, and does this vary for the different types of x ray examinations? How does the rate of usage vary among general practitioners and among practices, and to what extent do radiological investigations fulfill the general practitioners' expectations of them?

The method of data collection was described (8 October, p 1033). Slight modifications were necessary to measure the general practitioners' expectations and the results of radiological investigations. All x ray films (except chest x ray films taken at the local clinic), are ordered

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on a standard hospital request form. The general practitioner may give details of history, signs and symptoms, and the reason for a ray department of the property of the reason for a ray department by the patient, who is either examined immediately or given an apopointment. Requests for chest a ray examination to be done at the local clinic are made on forms issued by the clinic and posted direct to the clinic by the general practitions from the control of the property of the property of the control of the cont

### TYPES OF RADIOLOGICAL INVESTIGATION REQUESTED

We classified all x ray examinations requested as skeletal (including the skull), contrast media (including intravenous pyelograms), chest (excluding routine and pre-employment x ray films), or others (this

included a few straight abdominal and sinus x ray examinations). Table I gives the numbers in each category requested by each practice requested by that practice. If the total for all the practices is considered skeletal x ray films were the most frequently requested, followed by chest and contrast media examinations. The same vequence held true for all the practices along the result of the practices are practices as the practices are practices. The practices are practices are practices are practices are practices, the precenting usage over three times that for its skeletal x ray examinations. There was also a pronounced statistically singlificant difference among the practices in terms of the percentage usage of each type of x ray examination.

	A	В	B C D		Total	
	No (	Notice	No	No (1)	No.C.	
Skeletal* Contrast* Chest; Others	103 (59) 16 (9) 54 (31) 1 (1)	28 (21) 15 (11) 87 (66) 2 (2)	196 45 82 19 151 35 6 1	185 (50) 67 (18) 108 (29) 9 (3)	512 (46 180 (16 400 (36 18 (2	
Total	174	132	435	369	1110	

\*x\*= 47.5, def - 3, p - 0.001. \*x\*= 11.86, def - 3, p - 0.01. \*x\*= 60.58, def - 3, p - 0.001.

Table II shows the total number of x ray examinations requested of all types, by individual general practitioners and practices. To allow far comparison among general practitioners or practices we expressed the number of x ray examinations requested as per 1000 suggery encounters. To compare with other studies we have also expressed them as per 1000 registered patients.

TABLE II—Rate at which radiological investigations were requested by practice and by general practitioner

		No of a ta	y examinations	requested in	study year
Practice No of surgery encounters		Total No	No per surg	ery 1	per 1000 registered patients
Ä	9 822	174	18		41
A B C D	12 166	132	11		19
C	16 266	435	27		52
D	24 384	369	15		33
Total	62 638	1110	15		36
	e general		ne general intener	Tr	ainee
Total No	No per 1000 encounters	Total No	No per 1000 encounters	Total No*	No per 1000 encounters
41	10	46	21	18	16
87	24	36	29	35	42
38	1.2	13	24	33	31
32	10	15	19	19	18
31	11	39	23	13	14
115	30	18	14		,
137	35	**		26	22
29	íí			21	18
57	16			50	43
26	16 5				
18	5				
52					23 (12)
Mean (SD)	15 (9)		23 (6		23(12)

\*y' = 119 1, dof - 3, p = 0.001
\*Total numbers refer to one year study period except for the trainers who were each

The practices showed a statistically significant difference in the number of x ray examinations requested, with practice C having the highest level of requests (27 1000 surgery encounters a year). This difference is significant even if practice C is omitted and the calculations repeated. Variation among individual general practitioners was considerable. None of the 30 general practitioners studied requested no examinations, but numbers requested ranged from 2 per 1000 series.

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encounters to 43 per 1000 encounters, both extenses are provided by trainers but the full time general practitioners showed a similar range. By grouping general practitioners in dentical time, part time, range. By grouping general practitioners into full time, part time of 23 recounts for groups showed as in identical mean number of 23 recounts for groups showed the state of 23 recounts for groups and the state of 23 recounts for groups and the groups of 23 recounts for groups are shown as the state of 24 recounts for groups are shown as the state of 25 recounts for gro

## REASONS FOR REQUESTING RADIOLOGICAL INVESTIGATIONS

BEADONS FOR REQUESTING BADIOLOGICAL INVESTIGATIONS. Each x ray examination requested was classified as follows: (a) to exclude specific disease; (b) to exclude non-specific disease; (c) to confirm a disgrayons. This allowed us to see whether the general practitioniers were using x ray examinations mainly to exclude disease see the confirmation of the confirmation custed between specific and non-specific exclusion rates. We used practice data rather than figures for individual general practiones because the confirmation of the confirmation o

TABLE III—X ray examination usage ratios

	Practice				
	A	В	С	D	Tota
Exclusion c	онбеталь	on of dues	110		
No of x ray examinations requested to exclude disease No of x ray examinations requested	139	90	315	261	805
to confirm disease Ratio	35 3 97	2 14	120 2 63	108 2 42	305 2 64
x* - 6 5, dc	f - 3, not	significa	nt		
Specific x	en-specifi	e exclune			
No of a ray examinations requested to exclude specific disease No of a ray examinations requested	76	28	156	169	429
to exclude non-specific disease Ratio	1 21	0.45	0.98	1 84	376 1 14
z1 = 33 49	dof = 3,	p = 0.001			

(ii) Ratio of specific to non-pecific exclusion—Table III shows that there was a statistically significant difference among the practices in the number of a ray examination used to exclude specific disease relative to non-specific disease. Practice D showed almost twice as much specific exclusion, practices A and C almost equal usage of specific and non-specific exclusion.

## OUTCOME OF RADIOLOGICAL INVESTIGATIONS

	Practice				
	A	В	С	D	Total
Total No of x ray examinations requested	174	132	435	369	1110
No giving abnormal result   No giving expected	40 : 22 9.	37 ,28 0;	126 (29.0)	102 (27.6)	305 (27.5
result whether normal or abnormal	149 (85.6)	107 (81.1)	385 (88 5:	309 (83.7.	950 (85 6

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each practice the percentage of radiological requests that gave the result the general practitioner was expecting (this included cases agreed a practitioner was expecting the state of the property of the pr

TABLE V-Expectation and outcome (figures in parentheses are percentages)

Results		Total			
	A	В	С	D	Lotai
Excluded specific disease*	69 (40)	25 (19)	144 (33)	153 .41:	391 (35
Excluded non- specific disease! Confirmed	55 (32)	55 (42)	143 (33)	81 (22)	334 (30
diagnosis:	25 (14)	27 (21)	98 (23)	75 (20)	225 (20
Failed to exclude specific disease Failed to exclude	7 (4)	3 (2)	12 (3)	16 (4)	38 (3
non-specific	8 (5)	7 (5)	16 (4)	11 (3)	42 :4
Failed to confirm diagnosis	10 (6)	15 (11)	22 (5)	33 (9)	80   7
Total	174	132	435	369	1110

were used successfully to exclude specific or non-specific disease. The difference between the practices in the proportion of a ray examination that excluded specific disease was tastiscally significant inations. That excluded non-specific disease was table significant inations that excluded non-specific disease was also significant. There was no significant difference among the practices in the proportion of x ray examinations that confirmed a diagnosis, failed to exclude a specific disease, or failed to exclude an on-specific disease. The difference among the practices in the proportion of x ray examination that tailed to confirm a diagnosis was just significant; p < 0.05.

### Discussion

### NUMBER AND TYPE OF X RAY EXAMINATION REQUESTED

With the exception of practice B all the practices had the same rank order of requests; skeletal examinations were most often requested, followed by chest and then contrast media examinations. Comparing the total percentage of usage by all the practice for each kind where the practice for each kind where the contrast media examinations. Comparing the total percentage of usage by all the practice of requests for skeletal xray examinations—40°, compared with 34°, 30°, and 24° — and a lower rate of requests for contrast investigations—16°, compared with 20°, 30°, and 19°. The use of chest x ray examinations—50° —was closely smillar to that found by Smith [19°], and Anderson (27°). The total of the through the property of the pr

Smith 199 (2) and address (22) you dower man that country Wallace 32.

The relation between duration of availability of open access relatives and level of demands wincertain, but there seems to expected a grantale increase in the two of x ray facilities over the first four years of open access, the biggest increase occurring between the first and second year? Wallace et al. reported a decrease in demand over the first three years of open access facilities in Cardiff, the referral rate being highest in the first IB months. I exist looked at the use of contrast radiography in Bellast between 1973 (when first available) and 1975, reporting

an increase in demand between 1973 and 1974 and a decrease in 1975.

an increase in demand between 1973 and 1974 and a decrease in 1975.

It seems that the high rate of use of skeletal x ray examinations (available to our group of Belfast general practitioners for only two years) may reflect the overall "peak" usage rates reported in the other studies. Whether the rate of requests for skeletal x ray examinations will now decline remain to be seen. The general practitioners in this study were willing to use x ray for the properties of the properties of the properties of the properties of the general practitioners in this study were willing to use x ray for the properties of the properties of the properties of the general practitioners in this study were willing to use x ray for the properties of the properties of the properties of the practices were for chronic conditions, such as osteoarthritis, rather than for acute pisodes such as uspecties from all the practices were for chronic conditions, such as osteoarthritis, rather than for acute pisodes such as uspected fracture, which were referred direct to the local accident and emergency department. On the properties of the propert

RATE OF REQUESTS FOR EXAMINATIONS

The overall rate of requests for x ray examinations for the four practices (30 1000 registered patients a year) was much lower than rates reported in some studies (Smith) average of 72 1000; Liboyd '74 1000; Barber 191 1000.). The request rate in our study was only marginally higher than rates reported in which the properties of the results of

be less well known in the practice and spends less time in contact with patients than the full time general practitioners. He or she will be less familiar with individual patients and their history and may need to make greater use of laboratory and radiological investigations. This may help to explain the noticeably higher rate of requests for a convenience of the proportion of part time general practitioners and trainers to full time general practitioners and trainers to full time general practitioners than the other practices.

RATIO OF EXCLESION TO CONFIRMATION OF DISEASE
Our results show that each practice used a ray examination to exclude disease at least twice as often as to confirm a diagnosis. Annua the many factors that govern a general practitioner's choice of which patients to send for examination in the reassurance provided by a negative result, which may be therapeutic for dector and patients. The general practitioners in this study seemed to endorse this approach. They were also aware that radiological (and other) investigations could be used to, for instance, end a particular constitution. "We must wait for the result of this x ray examination before proceeding further."

## RATIO OF SPECIFIC TO NON-SPECIFIC EXCLUSION

BATIO OF SPECIFIC TO NON-SPECIFIC EXCLUSION.

The ratios of specific to non-specific exclusion showed a tendency for x ray examinations to be used more non-specifically relative to all investigations. Spec 15 October, p 1111, where 28 of the 30 general practitioners showed at least twice as much specific use of investigations. Contrast media examinations were used very specifically, whereas skeletal and requests. This is in keeping with the fact that relatively few common diseases are apt to be uncovered by contrast media examinations.

common diseases are apt to be uncovered by contrast media examinations.

The higher non-specific usage of x ray examinations may have been due partly to the extra constraints operating on the general practitioner filling in a request form for an x ray examination for the partle of the partle of the general practitioners for the partle of the partle o

OUTCOME

The percentage of x ray examinations that showed an abnormal result was consistent among the four practices. The percentage for all four practices (27.5°), was lower than that reported by Anderson' and Smith, 'but closely similar to that reported by Maderson' and Smith,' but closely similar to that reported by Wallace et al.' Cook,' and Mair et al.' Our practices' lower figure for abnormal results reflects the use to which they put x rays—that is, they expected to exclude disease on average two and a half times as often as they expected to confirm a diagnosis. Anderson' and Davis and Williams' pointed out the naivety of placing too much weight on the proportions of positive and negative results, as positive ones, especially for ressuring the patient. A normal result cannot be said to indicate an unnecessary x ray examination in many cases. A high percentage of the general practitioners had x ray results as expected—that is, confirming their initial

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diagnosis of abnormal or normal—and this may well be a better criterion against which to assess usage.

Others have reported on the number of patients who had an Others have reported on the number of patients who had an other state of the patients of the patients. Allowing for the few patients in our study who had more than one examination, our overall practic figure of 85.6° expected results compares with 57° exported by Smith! and 55° by the well of the patients of the patients in our study stated their expectation for each 1 ray examination retrospectively. Faced with a known result it may have been difficult to be exceptively. Faced with a known result it may have been difficult to be exceptively for the patients of the patients when all patients were of the patients referred and took a minimum of the patients time and effort; such use of normal results can hardly be characterised as unnecessary work. Furthermore, open access to a ray facilities reduces workload for many of the hospital

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