

Diagnostic pathways in general practice

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THE new entrant to general practice soon discovers that the traditional diagnostic methods he was taught as a student are impracticable. If he were to take a full history and carry out a thorough examination of each patient he would miss much pathology because he would only have time to examine a small proportion of patients presented to him. It is necessary for each general practitioner to learn a new diagnostic method with which to cope with the numbers presenting in practice. As each doctor learns for himself how to solve this problem considerable variations arise in diagnostic methods among general practitioners even when they are in partnership together (Morrell *et al.*, 1971a).

Workload in general practice (Williams, 1970) is increasing and the time available to carry it out is fixed. Time can be saved by the use of ancillary staff and by good organisation but it remains short. Time must be rationed according to the patient's needs (Hull, 1971a).

There is need for standardisation of diagnostic methods in practice:

- (1) To improve methods.
- (2) To teach methods.

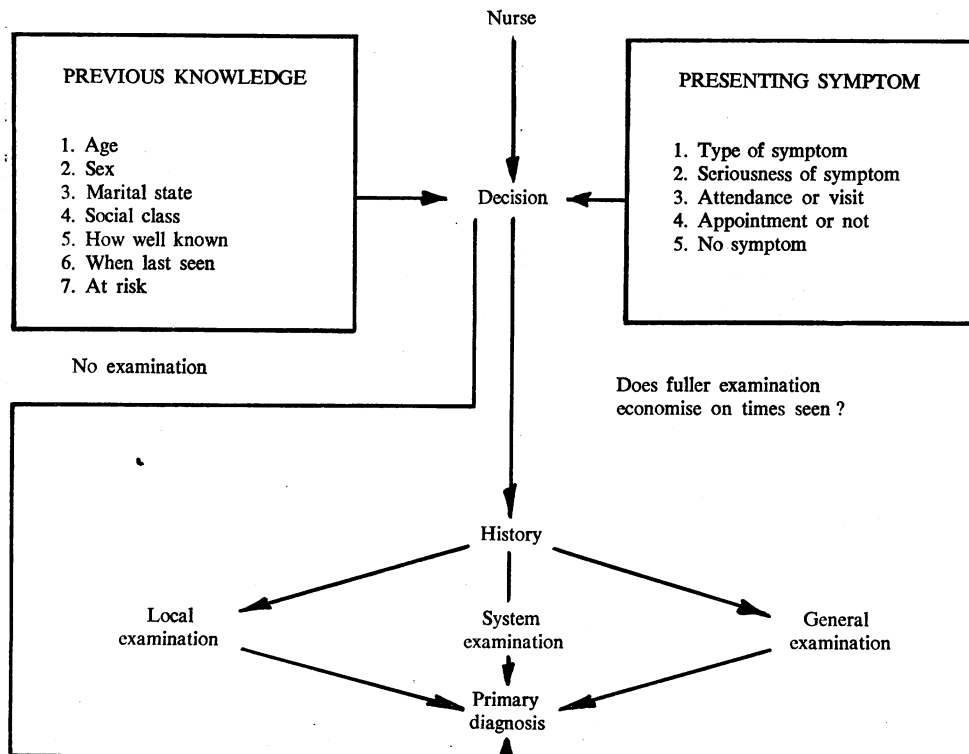


Figure 1
PATHWAYS TO PRIMARY DIAGNOSIS

- (3) To promote further delegation of work, at present regarded to be the responsibility of the doctor, to technical and ancillary staff (Rose, 1971).
- (4) To prepare for the advent of computer assisted diagnosis (Card, 1970; Crombie and Dobell, 1969).

Figure 1 shows the pathways available in reaching primary diagnosis. At the start of each consultation the doctor, armed with knowledge of his patient and the patient's presenting symptom, decides how energetically he will pursue diagnosis. At this point,

TABLE I
THE DOCTORS AND THE PRACTICES

Doctor's code	00	01	02	03	04	05	06
Rural or urban	R	U	R	R	R	U	U
List size	2400	3100	2450	2150	2000	2350	2400
Number in partnership ..	3	3	2	2	1	3	6
Year of qualification ..	1955	1962	1947	1945	1950	1966	1954
Years in practice ..	10	5½	16	21	10	¾	8
Years in present practice ..	10	5½	16	21	8	½	2
Special interests	Research contra- ception psychi- atry	Paedia- trics contra- ception	medicine cardi- ology	psychi- atry anaes- thetics	practice manage- ment farmer's lung	psychi- atry medical educa- tion health educa- tion preven- tive medicine	epidemi- ology child health
Appointments Main .. Branch ..	Yes Yes	Yes Yes	Yes No	Yes No	Yes —	Yes —	Part Yes
Ancillary staff*	2½	6½	3½	3½	2½	7	9
Nurse/health visitor ..	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dr sees own list only ..	No	No	Yes	Yes	Yes	No	No
Access to pathology ..	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Access to x-ray	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: Drs 02 and 03 in partnership together.

*½ denotes part-time staff. Figure refers to whole practice.

he rations the time he will spend on diagnosis. The doctor's knowledge of his patient and the patient's presenting symptoms are shown. The original decision as to how far to pursue diagnosis, or the diagnosis itself may be made by a nurse or other ancillary staff.

This paper explores factors influencing the doctor in making his primary diagnosis and secondly the methods employed in confirming or refuting it.

Method

In order to explore the diagnostic process in general practice a number of questionnaires (figure 2) were sent to seven doctors in six practices. These forms were initiated for each new consultation except for antenatal, contraceptive or immunological advice. Temporary residents, insurance and other routine examinations as well as casual street consultations were also excluded.

The form is designed to be answered as far as question 15 before examination; questions 16–21 should be completed after examination and the rest of the form completed after four weeks from the date of the original consultation. As the form also provided data for the examination of consultation patterns in differing social groups not all the questions apply to this study. Questions 29–33 were included at the request of one of the participating doctors though data from question 30 have been used.

Data collection started on 1 January, 1970, during an influenza epidemic. The first two weeks of January were used as a pilot period when, despite pressure of work, the questionnaire proved simple to use. After correction of the pilot forms, the study restarted on 1 April, 1970 and continued until each practice had returned 1,000 forms. In some cases forms were lost or rejected and the total number of acceptable returns was 5,936. Coding and error elimination are described elsewhere (Hull, 1971b and c). The data were subsequently punched and analysed by computer.

The practices

After an appeal in an Editorial in *The Journal of the Royal College of General Practitioners* (1969), six practices volunteered, of which three were urban and three rural. In one of the rural practices both partners contributed data (doctors 02 and 03). All the doctors were members or associates of the Royal College of General Practitioners, many were engaged in other research projects and on clinical assistantships. A very high standard of record keeping was achieved producing the excellent return rate of 98.9 per cent of forms.

TABLE II
RESULTS FROM SEVEN DOCTORS

Doctor	Total forms	Days collecting	Daily average	Percentage examinations					Rural or urban
				None	History	Local	System	General	
00	999	93	10.1	1.4	9.8	54.8	21.0	13.0	R
01	999	72	13.9	0.2	19.5	58.6	18.6	3.1	U
02	493	49	10.1	1.0	15.6	48.1	18.7	16.6	R
03	469	72	6.5	4.5	31.1	44.8	13.6	6.0	R
04	979	114	8.8	0.2	6.0	53.2	34.7	5.8	R
05	1001	89	11.2	1.7	32.9	48.6	14.8	2.1	U
06	996	109	9.1	1.2	19.5	58.7	20.0	0.6	U

Results

Table II shows the number of completed forms returned by each doctor and the time spent collecting them. From these the average number of forms per working day may be calculated. Examination (Crombie, 1963) may consist of nothing at all, as in spot diagnosis, of a history only, of local, system, or general examination. When the

frequency of the various types of examination is examined it is seen that there is wide divergence in examination habits between doctors and even between partners (doctors 02 and 03) (Morrell *et al.*, 1971a). There is however an overall similarity between rural and urban doctors.

Table III shows the examination habits of all rural doctors and all urban doctors. It is tempting to explain the higher examination rate by rural doctors in terms of reduced number of new cases seen per day. Later (table XVI) it will be shown that rural doctors follow-up patients more than their urban colleagues and so do not have greater time for examination.

TABLE III
EXAMINATION BY TYPE OF PRACTICE

Type of practice	Total forms	Average per day	None	Percentage examinations			General
				History	Local	System	
Urban	2996	11.1	1.0	24.0	55.3	17.8	1.9
Rural	2940	9.0	1.4	12.9	51.5	24.0	10.1

TABLE IV
EXAMINATION BY AGE

Age	Urban doctors					Total numbers
	Percentage examinations					
	None	History	Local	System	General	
0-5 ..	0.5	15.3	53.2	26.6	4.3	417
5-15 ..	1.1	8.7	70.4	16.9	3.0	473
15-45 ..	1.4	29.4	55.1	13.4	0.7	1312
45-65 ..	1.1	29.7	48.0	19.5	1.8	563
65+ ..	0.0	26.0	46.0	24.2	3.0	231
	Rural doctors					Total numbers
	Percentage examinations					
	None	History	Local	System	General	
0-5 ..	1.4	6.6	51.5	28.3	12.2	361
5-15 ..	0.8	4.5	60.7	26.0	8.0	489
15-45 ..	1.6	18.2	52.0	21.3	7.0	1035
45-65 ..	1.3	15.4	53.5	20.9	9.0	636
65+ ..	1.9	11.5	36.8	29.6	20.3	419

FACTORS INFLUENCING PRIMARY DECISION IN DIAGNOSIS

Figure 1 shows that the decision as to how energetically the doctor will pursue his primary diagnosis is based on weighing his previous knowledge of the patient against the presenting symptom. Factors within each of these headings are now listed and considered in turn:

1. PATIENTS NAME										2. DATE																
ADDRESS										OCCUPATION AND GRADE																
3. DOCTORS CODE										1	2	21. ESTIMATE CONTRIBUTION OF HEALTH VISITOR/NURSE TO PRIMARY DIAGNOSIS.										31				
4. CASE SERIAL No.										3	4	5	NONE 0 A LITTLE 1 A LOT 2													
5. IF PATIENT ALREADY IN SURVEY GIVE FIRST CASE SERIAL No.										6	7	8	22. WAS PATIENT SEEN MORE THAN ONCE FOR THIS COMPLAINT BY ANY DOCTOR?										33			
6. AGE NEXT BIRTHDAY										10	11		NO 0 YES 1													
7. SEX										12		23. DID DOCTOR REQUEST INVESTIGATION?										34				
MALE 1 FEMALE 0												NO 0 YES 1														
8. MARITAL STATE										13		24. SECOND OPINION										35				
S M W D 0 1 2 3												NO SECOND OPINION 0 SECOND OPINION FROM PARTNER 1 REFERRAL TO OUTPATIENTS 2 ADMISSION TO HOSPITAL 3 DOMICILIARY VISIT 4														
9. SOCIAL CLASS I II III IV V										14		25. SPECIFY HOSPITAL DEPARTMENT INVOLVED IN 24.										36	37			
1 2 3 4 5																										
10. SURGERY ATTENDANCE										16		26. IF PARTNER'S OPINION OR IF PATIENT REFERRED / ADMITTED OR DOMICILIARY WAS THIS FOR HELP IN										38				
HOME VISIT 1 HOSPITAL 2 OTHER 3												DIAGNOSIS 1 OTHER 3 TREATMENT 2														
11. HOW WELL DO YOU KNOW PATIENT										17		27. FINAL DIAGNOSIS (DIAGNOSES) SPECIFY:										40	41	42	43	44
NOT AT ALL 0 SLIGHTLY 1 MODERATELY 2 VERY WELL 3												1														
12. WHEN WAS PATIENT LAST SEEN BY ANY DOCTOR?										18		2										45	46	47	48	49
WITHIN 3 MONTHS 5 BETWEEN 3 AND 12 MONTHS 4 BETWEEN 1 AND 2 YEARS 3 BETWEEN 2 AND 5 YEARS 2 MORE THAN 5 YEARS AGO 1 NEVER 0																										
13. IS PATIENT AT RISK FOR ANY PARTICULAR DISEASE? IF YES SPECIFY:										19		3										50	51	52	53	54
14. PRESENTING SYMPTOM. SPECIFY:										21	22	28. IS FINAL DIAGNOSIS										56				
												SYMPTOMATIC 0 EXCLUSIVE 1 DEFINITIVE 2 PATHOLOGICAL 3														
15. DO YOU REGARD THIS SYMPTOM AS										23		29. MAIN SURGERY 0 BRANCH SURGERY 1										60				
TRIVIAL : 0. MODERATE : 1. SERIOUS : 2																										
16. EXAMINATION										25		30. BY APPOINTMENT (OR CALL DURING WORKING HOURS)										61				
NONE 0 LOCAL 2 HISTORY ONLY 1 SYSTEM 3 GENERAL 4												NO 0 YES 1														
17. SHOULD PATIENT HAVE REPORTED THIS SYMPTOM EARLIER?										26		31. ESTIMATE PSYCHOGENIC COMPONENT IN THIS CASE:										62				
NO 0 YES 1												ENTIRELY PSYCHOGENIC 0 MOSTLY PSYCHOGENIC 1 EQUALLY PSYCHOGENIC AND SOMATIC 2 MOSTLY SOMATIC 3 ENTIRELY SOMATIC 4														
18. PRIMARY DIAGNOSIS (DIAGNOSES) SPECIFY:										27		32. WERE THERE SIGNIFICANT SOCIAL FACTORS?										63				
												NO 0 YES 1														
19. AT WHAT STAGE WAS PRIMARY DIAGNOSIS MADE:										28		33. WAS PSYCHOLOGICAL / SOCIAL COUNSELLING GIVEN?										64				
BEFORE PRESENTING SYMPTOM 0 AFTER PRESENTING SYMPTOM 1 AFTER HISTORY 2 AFTER EXAMINATION 3												NO 0 YES 1														
20. WAS CONSULTATION NECESSARY FOR										30		34.										66				
ORGANIC REASONS 1 PSYCHOLOGICAL REASONS 2 SOCIAL REASONS 3 ADMINISTRATIVE REASONS 4 OR UNNECESSARY 0																						79	80			
																						H	S			

Figure 2. QUESTIONNAIRE USED

Previous knowledge of patient

(1) *Age.* Table IV shows the rates of examination for each age group in urban and rural practices. Fuller examination in town and country is related to the extremes of age, the age group 15-45 having the lowest rate of full examination.

TABLE V
EXAMINATION BY SEX

<i>Urban doctors</i>	<i>Percentage examinations</i>					<i>Total</i>
	<i>Not examined</i>	<i>History</i>	<i>Local</i>	<i>System</i>	<i>General</i>	
Female ..	1.2	26.0	54.8	15.8	2.1	1661
Male ..	0.8	21.4	55.8	20.2	1.7	1335
<i>Rural doctors</i>	<i>Percentage examinations</i>					<i>Total</i>
	<i>Not examined</i>	<i>History</i>	<i>Local</i>	<i>System</i>	<i>General</i>	
Female ..	1.7	15.1	50.2	23.4	9.6	1651
Male ..	1.1	10.2	53.2	24.7	10.8	1289

TABLE VI
PRESENTING SYMPTOMS RELATED TO SEX AND DEGREE OF EXAMINATION

<i>Symptom</i>	<i>Per cent system plus per cent general</i>		<i>Per cent all symptoms</i>	
	<i>Urban</i>	<i>Rural</i>	<i>Female</i>	<i>Male</i>
Cough	42.1	68.2	13.1	18.7
Abdominal pain	58.1	83.0	4.0	4.9
“ D & V ”	34.4	52.8	3.7	4.2
“ Poorly ”	23.2	59.1	4.0	4.2
Chest pain	64.0	78.4	1.3	2.2
Fever	39.2	90.9	1.2	3.0

(2) *Sex.* Table V shows that although there is little overall difference in examination rates by sex, if system and general examination percentage are looked at together men are examined more fully than women. A similar finding appeared in the earlier survey (Hull, 1969a and b) and was explained by men complaining more frequently of those symptoms requiring full examination. Table VI shows the six symptoms which were associated with high rates of system and general examination with their urban and rural examination rates. These are contrasted with the percentage incidence of these symptoms in each sex. In every case there is a higher incidence of the symptom in males. This supports the earlier finding that examination rates by sex are probably related to symptoms.

(3) *Marital state.* Table VII shows examination rates for the marital states. The

TABLE VII
EXAMINATION BY MARITAL STATE

	<i>Urban doctors</i>					<i>Total</i>
	<i>Not examined</i>	<i>History</i>	<i>Local</i>	<i>System</i>	<i>General</i>	
Single ..	1.0	17.5	61.1	18.0	2.5	1408
Married ..	1.1	29.5	50.5	17.4	1.4	1409
Widowed ..	0.0	31.1	44.8	21.6	2.6	116
Divorced ..	1.6	31.7	50.8	15.9	0.0	63
	<i>Rural doctors</i>					<i>Total</i>
Single ..	1.3	9.1	56.4	24.6	8.7	1226
Married ..	1.3	15.4	50.1	23.8	9.4	1452
Widowed ..	3.2	15.1	37.4	24.2	20.1	219
Divorced ..	0.0	27.9	32.6	16.3	23.3	43

TABLE VIII
EXAMINATION BY SOCIAL CLASS

<i>Urban</i>						
<i>Social class</i>	<i>Not examined</i>	<i>History</i>	<i>Local</i>	<i>System</i>	<i>General</i>	<i>Total</i>
Unclassified	0.0	48.2	33.3	14.8	3.7	27
I	1.5	16.0	60.2	19.3	3.0	269
II	0.9	20.0	57.5	19.4	2.1	659
III	1.0	26.0	55.5	15.7	1.9	1630
IV	0.9	26.6	48.0	23.6	0.9	229
V	1.5	19.8	54.2	24.4	0.0	131
Armed service	2.0	39.2	41.2	13.7	3.9	51
<i>Rural</i>						
Unclassified	0.0	0.0	60.0	40.0	0.0	5
I	3.0	10.6	52.3	22.0	12.1	132
II	0.6	11.0	53.1	25.6	9.7	986
III	1.9	13.5	50.3	24.2	10.1	1184
IV	1.4	17.8	53.4	17.8	9.6	365
V	1.4	11.3	47.9	28.6	10.8	213
Armed service	1.8	16.4	49.1	20.0	12.7	55

figures for divorcees are too low for inferences to be drawn. The high figure for examination of widows is probably related to age rather than marital state.

(4) *Social class (Registrar General, 1966; Hull, 1972).* Table VIII shows that in urban areas system examination is commoner among social classes IV and V but that general examination shows a social gradient from Class I to Class V. There is no definite pattern in the rural portion of the table. Social Class IV, however, shows a much lower rate of system examination, a similar finding was shown in the earlier survey (Hull, 1969b) the figures are small but the consistently low examination in this group is unexplained.

TABLE IX
KNOWLEDGE OF PATIENT RELATED TO EXAMINATION

<i>Urban</i>						
	<i>Not examined</i>	<i>History</i>	<i>Local</i>	<i>System</i>	<i>General</i>	<i>Total</i>
Not known ..	1.0	25.3	54.9	16.2	2.7	1009
Known slightly	0.8	24.0	55.3	18.3	1.6	960
Known moderately	1.3	22.1	56.7	18.6	1.3	795
Known well ..	1.3	24.2	51.9	19.9	2.6	231
<i>Rural</i>						
Not known ..	1.4	12.2	52.3	20.7	13.5	222
Known slightly	1.9	11.7	53.9	19.2	13.3	308
Known moderately	0.9	11.7	52.4	25.2	9.7	637
Known well ..	1.5	13.7	50.7	24.8	9.3	1771

(5) *Extent of doctor's knowledge of patient.* Table IX shows the relationship between the doctor's knowledge of his patient and examination rates; and the greater knowledge of patients by rural doctors (Hull, 1972). In rural practice there is a higher rate of general examination in the unknown or little known patients. Knowledge of the patient appears to have little effect on examination in urban practice.

(6) *Time when patient was previously seen.* There was little difference in examination in relation to when the patient was last seen in either rural or urban practice though rural patients who had never been seen had a high rate of system and general examination.

(7) *At risk.* Table X shows that when the doctor considered his patient to be at risk because of previous illness, examination was higher in both country and town. A higher proportion were considered at risk in the country probably because of the rural doctor's better knowledge of his patients.

PRESENTING SYMPTOM

1. *Type of symptom*

Presenting symptom, the reason why the patient consults the doctor is a vital point in the decision as to how to examine (Bain and Spaulding, 1967; Morrell *et al.*, 1971b).

TABLE X
EXAMINATION OF PATIENT AT RISK

<i>Urban</i>						
	<i>Not examined</i>	<i>History</i>	<i>Local</i>	<i>System</i>	<i>General</i>	<i>Total</i>
Not at risk ..	0.9	23.3	57.0	16.9	1.9	2630
At risk ..	2.2	28.4	42.6	24.3	2.5	366
<i>Rural</i>						
Not at risk ..	1.5	12.6	54.5	22.2	9.3	2378
At risk ..	1.1	14.2	39.1	31.9	13.7	562

TABLE XI
EXAMINATION (SYSTEM AND GENERAL) RATES FOR 12 COMMONEST SYMPTOMS

<i>Symptom</i>	<i>Urban</i>		<i>Rural</i>	
	<i>Total</i>	<i>System and general</i>	<i>Total</i>	<i>System and general</i>
Cough	447	42.1	431	68.2
Skin	373	5.7	411	12.2
Throat	250	4.0	203	19.7
Skeletal pain	321	7.8	344	22.7
Abdominal pain	141	58.1	118	83.0
Ears	162	0.6	153	10.5
Injury	53	9.4	138	5.8
Eye	124	0.0	120	5.8
"D & V"	125	34.4	106	52.8
"Poorly"	146	23.2	98	59.1
Depression	82	4.9	93	8.6
Gynaecology	89	23.6	81	38.3

Table XI shows the 12 commonest presenting symptoms which together make up 77 per cent of all symptoms. Examination rates, here shown as the combined rate for system and general examination are generally higher in rural areas except for injury. This symptom is very low in towns possibly because of the proximity of hospital casualty departments. The finding of full examination in urban practice suggests that the more serious accidents may be seen by the general practitioner while the minor ones go directly to hospital. In rural practice the whole spectrum of injury, much of it trivial, reports to the doctor's surgery. Urban examination rates are especially low for throat and ear symptoms and for skeletal pain.

2. Seriousness of symptom

Table XII shows the relationship of examinations to symptoms which were classed by the doctor as trivial, moderate or serious. Rural doctors seemed to class symptoms as either trivial or serious while urban doctors allotted more symptoms to the moderate group. As expected fullness of examination increases with the doctor's view of the severity of the symptom.

TABLE XII
EXAMINATION BY SEVERITY OF SYMPTOM

<i>Urban</i>						
	<i>Not examined</i>	<i>History</i>	<i>Local</i>	<i>System</i>	<i>General</i>	<i>Total</i>
Trivial ..	1.5	27.7	62.3	8.2	0.4	1225
Moderate ..	0.8	21.8	52.0	23.2	2.3	1693
Severe ..	0.0	12.8	16.7	52.6	17.9	78
<i>Rural</i>						
Trivial ..	1.3	10.4	61.1	20.5	6.7	1911
Moderate ..	1.8	18.3	37.3	30.1	12.5	841
Severe ..	1.1	14.9	17.6	32.4	34.0	188

TABLE XIII
EXAMINATION BY SITE OF CONSULTATION

<i>Urban</i>						
	<i>Not examined</i>	<i>History</i>	<i>Local</i>	<i>System</i>	<i>General</i>	<i>Total</i>
Surgery ..	1.2	26.2	57.9	13.9	0.9	2596
Home ..	0.3	9.7	37.2	43.8	9.0	390
Hospital ..	0.0	0.0	80.0	20.0	0.0	5
Other ..	0.0	0.0	80.0	20.0	0.0	5
<i>Rural</i>						
Surgery ..	1.3	14.4	55.9	20.6	7.7	2286
Home ..	0.6	7.3	36.2	36.7	19.3	632
Hospital ..	0.0	14.3	57.1	28.6	0.0	7
Other ..	57.2	21.4	21.4	0.0	0.0	14

3. Presenting site of symptom

Table XIII shows examination rates for surgery attendance, home visit, hospital visit and others. There is a much higher visiting rate in rural areas, though this has fallen

since the earlier survey (Marsh, 1968). In both town and country examination tends to be fuller in the patient's home. Examination is often more difficult in the home than in the surgery where the light is good and everything is to hand; nevertheless examination rate is higher at home. This may be because the patient is more seriously ill, because he is already in bed and so easily examined, or because the doctor having spent time in getting to the patient carries out a full examination to justify the time spent.

TABLE XIV
RELATION BETWEEN APPOINTMENT OR LATE CALL AND EXAMINATION

<i>Urban</i>						
	<i>No examination</i>	<i>History</i>	<i>Local</i>	<i>System</i>	<i>General</i>	<i>Total</i>
Appointment ..	1.1	25.3	55.1	17.0	1.6	2570
No appointment ..	0.9	16.2	56.2	22.4	4.2	425
<i>Rural</i>						
Appointment ..	1.6	14.0	49.8	24.7	9.9	2512
No appointment ..	0.7	6.5	61.4	19.9	11.4	428

TABLE XV
EXAMINATION WHEN NO PRESENTING SYMPTOM

	<i>No examination</i>	<i>History</i>	<i>Local</i>	<i>System</i>	<i>General</i>	<i>Total</i>
Urban	0.0	66.7	22.2	11.1	0.0	9
Rural	21.7	26.1	21.7	13.0	17.4	23

5. Appointment (or call during working hours)

Table XIV shows that a similar proportion of patients see the doctor without an appointment or call out of hours in both town and country. Such people regard their symptoms as serious but because they have to be fitted in between patients who have an appointment the doctor may have little time to spend on them. In the urban practices those without appointment are more fully examined (system and general=26.6 without and 18.6 with appointment). In rural practice the general examination rate is higher for non-appointments but the combined system and general is lower.

6. No presenting symptom

There is no presenting symptom when a doctor initiates a consultation for example, when he notices that a mother who has brought a child looks ill. Table XV shows that although it was uncommon for a doctor to initiate a consultation, this happened more often in the country. This may be because the rural doctor's greater knowledge of his patients allows him to notice changes in their appearance. The figures are small but suggest that rural doctors once having initiated a consultation follow it up with a fuller examination.

Nurse or health visitor contribution to primary diagnosis

Where a practice or attached nurse or health visitor sees the patient first, she may

help the doctor to reach his primary diagnosis. Although all practices had such ancillary help, little use was made of their diagnostic ability. In urban practice, nurses helped diagnosis in 0.6 per cent of cases and in rural practice in 1.2 per cent.

Does examination reduce consultations?

It might be argued that a full examination at the first consultation might obviate the need for the patient to return. Table XVI shows that in both town and country, patients whom the doctor asks to see him again have a higher rate for full examination at first consultation.

Table XVI also shows that follow-up rate for rural practitioners is greater than for their urban colleagues (compare with table III).

TABLE XVI
FOLLOW-UP RATES RELATED TO EXAMINATION

Urban						
	No examination	History	Local	System	General	Total
Seen once ..	1.1	23.7	57.8	15.8	1.6	2311
Seen again ..	0.7	24.8	46.7	24.7	3.1	685
Rural						
Seen once ..	1.4	13.6	57.1	21.4	6.5	1842
Seen again ..	1.5	11.7	42.2	28.4	16.2	1089

Primary to final diagnosis

When the primary diagnosis has been made, the doctor has to make a second decision.

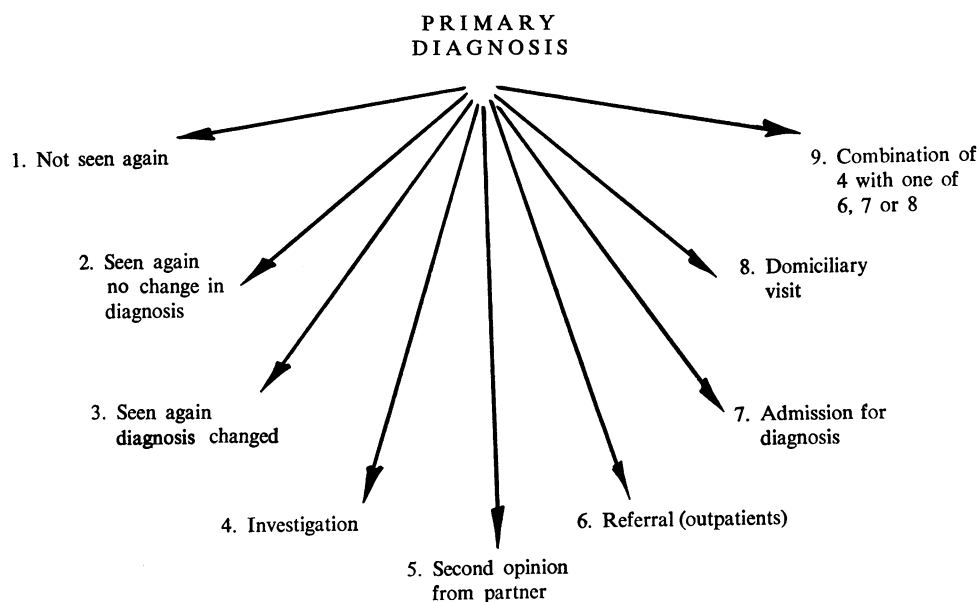


Figure 3.
PATHWAYS FROM PRIMARY TO FINAL DIAGNOSIS.

He must now decide whether he is satisfied by his primary diagnosis or whether he must spend more time and energy testing it. Figure 3 shows the possible courses open in reaching final diagnosis and table XVII shows the way the seven doctors in the survey used these pathways. Again there is considerable variation, not only between doctors but between partners (02, 03) but there is concordance between the urban doctors on one hand and the rural doctors on the other.

TABLE XVII
PERCENTAGE USE OF DIFFERENT PATHWAYS

Pathway	00	01	02	03	04	05	06	U	R
1. Not seen again	68.1	85.0	66.5	55.2	58.7	72.6	73.8	77.1	62.7
2. Seen again, diagnosis unchanged	30.8	13.6	31.7	42.2	39.7	25.0	21.8	21.3	34.6
3. Seen again, diagnosis changed ..	1.1	1.4	1.8	2.6	1.6	2.4	4.4	2.7	1.6
4. Investigation	9.5	3.9	4.5	1.5	17.9	7.1	4.2	5.1	10.2
5. Second opinion from partner for diagnosis	0.3	0.0	0.2	0.0	<i>Single handed</i>	0.2	0.0	0.1	0.1
6. Referral to outpatient for diagnosis	1.0	0.7	0.6	0.2	0.4	0.8	1.6	1.0	0.6
7. Admission for diagnosis ..	0.4	0.1	0.8	0.2	0.0	0.0	0.7	0.3	0.3
8. Domiciliary visit for diagnosis ..	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.1
9. Combination of 4 with 6, 7 or 8	0.6	0.2	1.0	2.3	0.9	1.1	1.1	0.8	1.1
All referrals to consultants ..	2.1	1.1	2.6	2.7	1.3	1.9	3.4	2.1	2.1

In both urban and rural practice only 2.1 per cent of patients consulting the doctor are referred for diagnosis by consultants. A primary diagnosis is considered as wrong when the final diagnosis has been changed from the primary diagnosis—when such a change has occurred after referral it is assumed that the second opinion has altered the diagnosis. Sometimes the general practitioner may have corrected the diagnosis himself before referral: such cases cannot be extracted from the data. It is thus true to say that no more than 2.1 per cent of patients presenting to the doctor are referred to a consultant for diagnosis.

Pathway 1. When a patient is only seen once the diagnosis cannot be changed. This is commoner in urban practice.

Pathway 2. When the patient is seen again, the diagnosis may be changed because of further thought on the part of the diagnostician, a trial of therapy, or the natural development of the disease. More patients were seen for a second time in rural practice.

Pathway 3. When the patient had been seen a second time the primary diagnosis was altered more often in urban practice. This may be related to the lower rate of full examination at first consultation; it suggests a need for greater follow-up of urban patients.

Pathway 4. Investigation rate in rural areas is twice that of urban areas despite increased distance from hospital.

Pathway 5. Although the easiest method of obtaining a second opinion is by asking

a partner, this method is rarely used. The figure for rural practice may be understated as one rural practitioner was single-handed.

Pathway 6. Referral to outpatient departments for diagnosis is the same in rural and urban areas (referral for therapy or any other reason is excluded).

Pathway 7. Urgent admission for diagnosis is used rarely and at similar rate in town and country.

Pathway 8. Domiciliary visits are rarely used for diagnosis especially in towns. Smith and Blythe (1971) found them common in the country.

Pathway 9. The remaining group includes those patients which were investigated and referred to a consultant. This group was slightly higher in the country, as would be expected in view of the country doctor's higher investigation rate.

TABLE XVIII
EXAMINATION RATES FOR ALL PATIENTS INVESTIGATED

	<i>No examination</i>	<i>History</i>	<i>Local</i>	<i>System</i>	<i>General</i>	<i>Total</i>
Urban ..	1.5	30.4	40.2	25.8	2.1	194
Rural ..	1.0	8.4	33.0	34.5	23.1	403

TABLE XIX
INVESTIGATION AND REFERRAL RATES FOR TOP 12 SYMPTOMS (URBAN AND RURAL)

<i>Symptom</i>	<i>Urban</i>			<i>Rural</i>		
	<i>Total</i>	<i>Percentage investigated</i>	<i>Percentage referred for diagnosis</i>	<i>Total</i>	<i>Percentage investigated</i>	<i>Percentage referred for diagnosis</i>
Cough	447	2.0	0.7	431	7.9	0.7
Skin	373	1.9	1.3	411	6.6	0.5
Throat	250	5.2	0.0	203	23.2	0.5
Skeletal pain ..	321	9.7	4.1	344	18.6	1.6
Ears	162	4.3	1.3	153	2.6	0.0
Abdominal pain ..	141	9.9	2.1	118	28.0	10.0
Injury	53	3.8	2.0	138	7.2	7.2
Eye	124	3.2	4.8	120	5.8	3.3
"D & V"	125	4.8	2.4	106	6.6	0.0
"Poorly"	146	9.6	0.6	98	21.4	0.0
Depression	82	1.2	3.7	93	5.4	1.1
Gynaecology ..	89	28.1	4.4	81	37.0	2.5

TABLE XX
EXAMINATION RATES FOR PATIENTS REFERRED FOR DIAGNOSIS

	<i>No examination</i>	<i>History</i>	<i>Local</i>	<i>System</i>	<i>General</i>	<i>Total</i>
Urban ..	1.5	18.2	50.0	25.8	4.5	66
Rural ..	3.1	6.3	35.9	23.4	31.3	64

TABLE XXI
REASONS FOR REFERRAL

	<i>Urban</i>	<i>Rural</i>
Referred for diagnosis ..	66	64
Referred for treatment ..	126	161
Other reason for referral ..	5	5
TOTAL	197	230

TABLE XXII
HOSPITAL DEPARTMENTS INVOLVED IN SECOND OPINION

<i>Hospital department</i>	<i>Urban</i>				<i>Rural</i>			
	<i>Out-patients</i>	<i>Admission</i>	<i>Domicil. visit</i>	<i>Total</i>	<i>Out-patients</i>	<i>Admission</i>	<i>Domicil. visit</i>	<i>Total</i>
Medical	6	11	1	18	18	14	3	35
Surgical	41	7	2	50	36	18	0	54
Casualty	7	0	0	7	24	2	0	26
Orthopaedic	16	0	0	16	19	2	0	21
Dermatology	15	0	0	15	6	0	3	9
ENT	14	0	1	15	14	0	0	14
Gynaecology or obstetrics	10	2	0	12	11	5	1	17
Psychiatric	4	1	1	6	1	0	1	2
Eye	13	0	1	14	14	1	1	16
Chest	1	0	0	1	5	0	0	5
Physiotherapy	7	0	0	7	7	0	0	7
Neurology	4	1	0	5	1	0	1	2
Paediatric	0	3	0	3	1	3	0	4
Other	15	4	0	19	7	0	1	8
TOTAL	153	29	6	188	164	45	11	220

Investigation

Table XVIII shows the relation between investigation and examination. In rural practice investigation is used as an adjunct to examination. In urban practice investigation appears to be used instead of examination.

Table XIX shows investigation rates for urban and rural practice in relation to the 12 commonest symptoms. Investigation is commoner for all symptoms except those related to ears in country practice.

Referral

Table XX shows the relation between examination and referral. Rural practitioners carry out fuller examination on patients they refer than do urban practitioners.

Table XIX shows wide differences in referral patterns between urban and rural doctors in relation to presenting symptom.

Table XXI shows the reason for referral. There were slightly more referrals in rural practice the excess being all referrals for treatment.

Table XXII shows the hospital department to which referrals were made. In both urban and rural practice the general surgical department was the speciality most used. The variation between urban and rural referral by hospital department are probably not significant as there is considerable variation in which hospital department is used between doctors even when in the same partnership (Hopkins, 1956; Evans *et al.*, 1967; Morrell *et al.*, 1971). This is probably related to the individual doctor's special interests which may also account for the difference in referral patterns in relation to symptoms.

Summary

A survey studying diagnostic pathways in general practice is described. Seven doctors in six practices collected a total of 5,936 records of new consultations. Computer analysis of these revealed:

1. Great variation between methods of examination between doctors and even between partners in the same practice.
2. Rural doctors examine more fully than urban doctors.
3. Previous knowledge of the patient by the doctor influences the doctor's decision how to examine his patients. The following variables were studied:
 - (a) Age. Young and old are more fully examined than middle age groups.
 - (b) Sex. Males are examined more fully than females, probably because they complain more of symptoms suggesting full examination.
 - (c) Marital state. Widows have a high rate of full examination—this is probably related more to age than marital state.
 - (d) Social class. There is a gradient from high social class to low for full examination in urban practice. In rural areas social class IV appears to be under-examined.
 - (e) Where the patient is little known he is examined more fully in rural areas. The doctor's knowledge, or lack of it, does not influence examination in urban practice.
 - (f) Examination rates were not related to how recently the patient was last seen.
 - (g) Examination was fuller when the patient was known to be at risk because of previous medical history.
4. Presenting symptom influences the doctor's decision to examine:
 - (a) Examination varied considerably with the type of symptom,

- (b) The more serious the symptom, the more often the doctor examined fully.
 - (c) Fuller examination was commoner at home visits.
 - (d) In urban areas the patient was more fully examined when he did not have an appointment. In rural practice those without appointment were examined less.
 - (e) In the small group where there was no presenting symptom (i.e. doctor-initiated consultations) examination was fuller in the country.
5. Very little diagnostic assistance was received from practice nurses.
 6. Fuller examination at first consultation does not economise on the number of times a patient is seen—in fact it seems to increase the likelihood of follow-up.

When methods of verification of the primary diagnosis and establishing a final diagnosis were examined the following facts appeared:

1. More patients are followed-up in the country, so allowing revision of diagnosis.
2. Such revision of diagnosis was commoner in urban practice though fewer patients were seen again.
3. Rural investigation rate is twice that of urban practices.
4. Little use is made of doctor's partners in verification of primary diagnosis in both town and country.
5. Referral rates (for diagnosis only) were 2·1 per cent in both urban and rural practice.
6. Admission for diagnosis is rarely used and is the same in rural and urban areas.
7. Domiciliary visits are rare especially in towns.
8. In rural areas investigation is used as an adjunct to examination; in urban areas investigation appears to replace examination.
9. In rural practice referred patients are more fully examined than non-referred patients. In urban practice referral appears to replace examination in many cases.
10. Referrals show different patterns in relation to symptoms and hospital speciality involved; this is probably related to individual doctors and their special interests.

Addendum

A list of the definitions used is available from the author.

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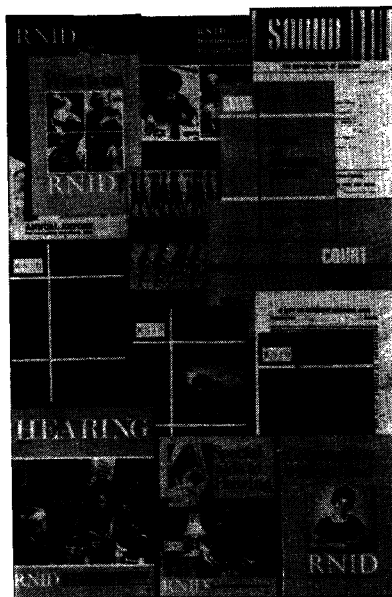
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