

A diagnostic centre for general practitioners: results of individual feedback on diagnostic actions

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SUMMARY. *A diagnostic centre, managing diagnostic tests for general practice, can improve the service provided by primary health care and the communication between general practitioners and specialists. In addition, it can evaluate the use and misuse of tests. This paper describes the work of a diagnostic centre in the Netherlands serving 80 general practitioners. Following the introduction of individual feedback to general practitioners on their use of diagnostic tests there was a decrease in the number of requests for tests.*

Introduction

THERE has been a diagnostic centre in Maastricht, the capital of the Dutch province of Limburg, since 1979. The aims of the centre are to improve the service provided by primary health care and the cooperation between general practitioners and specialists. The centre is located in the university hospital of Maastricht, the only hospital in the area, and serves 80 general practitioners, responsible for a population of approximately 186 000.

The diagnostic centre has a wide range of activities:

- Composing protocols for diagnostic procedures.
- Evaluating the diagnostic work-up[†] of each general practitioner and providing individual feedback. In an earlier questionnaire study the general practitioners had indicated that they would appreciate individual comments rather than group comments (Beusmans G.H.M.I., thesis, University of Limburg, 1986). In 1985 the diagnostic centre started to provide feedback to every general practitioner about his or her use of diagnostic tests, in order to create a more rational and efficient use of diagnostic facilities.
- Consultations by telephone. General practitioners can consult specialists at a time that is convenient for both. Prior to the consultation, the general practitioner is asked for detailed information which the specialist uses to prepare himself for the consultation.
- Initiating and supporting different forms of postgraduate education.
- Initiating and carrying out scientific studies focussing on the relation between primary and secondary health care.

Feedback to general practitioners

At least twice a year each of the 80 general practitioners in the region receives a report containing critical comments on the appropriateness of their requests for diagnostic tests during a month chosen at random. The comments are given by the co-

[†]**work-up:** any or all of the procedures used to assemble data and present a collective picture of a patient's condition in order to reach a diagnosis, often a specific diagnosis to determine a particular course of treatment. The taking of a medical history and the administration of a physical examination and laboratory tests are standard features, but often other specialized examinations are conducted as well. Source: *International dictionary of medicine and biology*. New York: John Wiley, 1986.

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ordinator of the diagnostic centre who is a specialist in internal medicine.

The critical analysis is based on the application forms which are completed by general practitioners when requesting a diagnostic test. The application form lists the categories of tests — clinical chemistry, haematology, serology, virology, faeces tests, urine tests, bacteriology, electrocardiography, radiology, ultrasonography, endoscopy and cytology/histology — and gives details of tests that are available. It also asks for information about the patient including signs, symptoms, possible diagnosis, previous history, drugs prescribed and the reason(s) for the request — to exclude diagnosis, to confirm diagnosis, screening, check-up, requested by patient, checking a known disorder, for reassurance.

The report normally includes the following:

- The total number of tests requested by the general practitioner during the month and a comparison with the number of requests in a previous analysis and with the mean number of requests from all general practitioners.
- A review of the quality and quantity of information about the patient supplied on the application form.
- A discussion about diagnostic tests in general and about several individual patients (their names and date of birth are provided, giving the general practitioner the opportunity to look at the patients' files).
- Comments on strikingly frequent or infrequent requests; incorrect or redundant requests in relation to certain signs or diseases or for specific groups of patients; defined combinations of tests for renal function, liver function, thyroid function and so on; tests which are unnecessary because they result in no change in the general practitioner's management; and the cost of redundant tests.

In addition, test requests for several patients are discussed with special regard to the relevance of requested tests for the complaints or physical signs mentioned; advice about appropriate tests; and suggestions for a different diagnostic work-up.

The report also asks questions about the general practitioner's management after receiving normal or abnormal test results. For example:

'Based on the history (cough, haemoptysis, weight loss, heavy smoking) and results of a physical examination you strongly suspected that Mr A, born in 1934, has lung cancer. For this reason you requested a chest X-ray. The test result was negative. In the light of your suspicion, what was your management after this test result?'

The general practitioners are encouraged to return their answers and to comment on the remarks and suggestions made in the report.

Descriptive study

The suggestions for improvement and remarks contained in the reports are mainly concerned with tests in the fields of clinical chemistry, haematology, serology and bacteriology and with faeces and urine tests. Some general practitioners receive the same comments repeatedly because they continue with a fixed recognizable pattern of requests. Therefore, to discover if there had been any chronological change in patterns of diagnostic requests in the above categories, a descriptive study was performed and during the period 1979-87, data from the diagnostic centre were analysed.

Results of feedback

Most general practitioners appreciated the reports provided by the diagnostic centre. On average 70% answered the questions or gave comments. The reports appeared to have had a marked influence on diagnostic performance. From 1979 to 1984 the number of requests increased but in 1985 there was a slight decrease and in 1986 and 1987 this decrease was much larger (Table 1).

If the diagnostic tests are examined more closely the influence of the feedback can be seen (Table 2). For example, when determining renal function, tests for serum creatinine level and serum level urea were usually used. It was repeatedly stated in the feedback that the serum creatinine level was sufficient and as a result of this the number of serum urea determinations for the 80 doctors decreased from 2883 in 1984 to 256 in 1987 (Table 2).^{1,2}

For complaints about joints serological tests for rheumatic diseases were often requested — mostly at the instance of the patient. In the feedback it was repeatedly stated that Rose-Waaler and latex fixation tests have a low predictive value for excluding or demonstrating rheumatoid arthritis in general practice. Over the period 1984–87 the number of Rose-Waaler and latex fixation tests decreased from 1188 and 1133 respectively to 406 and 381 respectively (Table 2).^{3,4}

Patients less than 40 years of age with vague and non-specific complaints and without abnormal findings on physical examination, regularly underwent several screening procedures. A frequent combination was: erythrocyte sedimentation rate, blood smear, serum glucose, serum creatinine and liver function tests. In this group of patients, abnormal results were rare and general practitioners were advised to omit this group of screening tests as far as possible. Between 1984 and 1987 the number of requests for these tests decreased (Table 2).

Discussion

The results of this study show an overall decrease in the number of requests for diagnostic tests between 1979 and 1987. This was not the main aim of the diagnostic centre but a more rational and efficient use of diagnostic tests does seem to lead to lower use. In the feedback provided to the doctors, comments are given on obvious instances of unnecessary requests and the fall in these unnecessary requests can indeed be seen as a positive effect.

Not all general practitioners respond to feedback in the same way. A questionnaire survey revealed a strong positive correlation between a positive appreciation of protocols from the diagnostic centre and a low use of diagnostic tests.⁵ The findings of this study, however, reveal only limited information about the effects of feedback and further research is needed.

The number of requests is influenced by many factors. For example, the decrease in the number of serum glucose tests was less than expected, presumably because in recent years there had been a move to look after patients with diabetes mellitus type

Table 2. Number of requests by the 80 doctors for tests discussed in feedback in 1984 and 1987.

| Test | Number of requests | | Percentage decrease |
|-------------------------------------|--------------------|--------|---------------------|
| | 1984 | 1987 | |
| Serum urea | 2883 | 256 | 91 |
| Rose-Waaler test | 1188 | 406 | 66 |
| Latex fixation test | 1133 | 381 | 66 |
| Blood smear | 11 320 | 5920 | 48 |
| Alkaline phosphatase level | 5347 | 3010 | 44 |
| Aspartate aminotransferase level | 2207 | 1232 | 44 |
| Alanine aminotransferase level | 5545 | 3187 | 43 |
| White blood cell count | 11 753 | 7007 | 40 |
| Gamma glutamyl transpeptidase level | 6136 | 4036 | 34 |
| Haemoglobin | 12 293 | 8373 | 32 |
| Erythrocyte sedimentation rate | 13 749 | 10 096 | 27 |
| Serum creatinine | 5370 | 4208 | 22 |
| Serum glucose | 8224 | 7450 | 9 |

2 in primary rather than secondary care. To what extent individual feedback caused the decrease in use of diagnostic tests seen in this study and to what extent other factors, such as postgraduate education contributed is not yet clear. Research in this field is needed and a study, in cooperation with the Ministry of Public Health is in preparation.

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Table 1. Total number of applications for diagnostic tests over the period 1979–87 by the 80 general practitioners.^a

| Type of test | Number of applications | | | | | | | |
|--------------------|------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| | 1979 ^b | 1980 ^c | 1982 ^d | 1983 ^b | 1984 ^b | 1985 ^b | 1986 ^e | 1987 ^b |
| Clinical chemistry | 46 156 | 44 328 | 49 108 | 45 537 | 51 775 | 46 569 | 39 576 | 34 928 |
| Haematology | 44 172 | 41 236 | 48 072 | 52 948 | 59 556 | 53 437 | 45 913 | 38 496 |
| Serology/virology | 10 329 | 8572 | 8724 | 8192 | 8554 | 7329 | 5518 | 4866 |
| Urine/faeces tests | 2212 | 1848 | 2524 | 3858 | 4137 | 3559 | 3328 | 2918 |
| Bacteriology | 1256 | 1272 | 2172 | 1679 | 1845 | 2558 | 2508 | 2614 |
| Total | 104 125 | 97 256 | 110 600 | 112 214 | 125 867 | 113 452 | 96 843 | 83 822 |

^aData for 1981 were not analysed. ^bRecorded over 12 months. ^cRecorded over three months; ^dfour months; ^eeight months and adjusted to 12 months.