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Inappropriate use of laboratory services: long term combined approach to modify request patterns

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Abstract

Objective—To see whether changes in request patterns for haematological tests could be influenced in the long term by information released from a haematology department.

Design—Analysis of request patterns by hospital divisions before and after intervention and of costs of intervention and savings achieved.

Setting—Haematology laboratory of an inner city district general hospital.

Interventions—Monthly release of a comparison of clinicians' workload statistics, issue of on call guidelines, and promulgation of information (by seminars and factsheets) on appropriate use of tests.

Main outcome measures—Request patterns before and after intervention.

Results—During the year after intervention requests fell by at least a fifth, and the reduction persisted over the next two years. The reduction was most pronounced in relation to inpatients within the division of medicine, for whom requests fell from an average of 4.0 per patient in the six months before intervention to 2.9 per patient in the six months after.

Conclusions—A definite and sustained reduction in inappropriate requests for laboratory investigations may be achieved by an ongoing policy of intervention including issuing guidelines and factsheets and holding seminars, but a positive attitude among senior consultant staff is crucial.

Introduction

There have been many attempts in the past decade to reduce the amount of inappropriate requests for tests received by hospital clinical laboratories (reviewed by Fraser and Woodford¹). The apparent increase in inappropriate requests stems from several factors,^{2,3} including "routine" diagnostic testing,⁴ fear of censure by seniors,^{5,7} entertainment of obscure diagnoses by junior medical staff,⁵ excessive frequency of repeat tests,⁸ and irrelevant test results stimulating further inappropriate testing.⁹ The gathering momentum of widespread inappropriate testing has been aided by the ever increasing automation of laboratory procedures,¹⁰ which make individual tests fairly cheap and the effort to control inappropriate requests comparatively expensive.

Attempts to control inappropriate requesting have included rationing tests, redesigning request forms, educating about appropriate tests for various conditions, educating about costs, issuing feedback information, and using protocols.¹ Many of these strategies failed completely,^{8,11,12} and those that reduced requests

were often expensive in time and manpower and had no sustained effect once they were withdrawn.¹³⁻¹⁶ This study was set up to see if a process of providing information and feedback to clinicians might be cost effective and retain long term influence.

Methods

All requests and "tests" (see below) received over the previous three and half years by the haematology department of an inner city district general hospital serving a catchment population of 262 000 were analysed. A request was defined according to the Steering Group on Health Services Information's guidelines as a "pathology investigation on a single specimen or a group of related specimens taken from an individual patient and sent to a laboratory department at one time, regardless of the number of tests forming part of that investigation".¹⁷ A "test" was defined as a result or group of results obtained from one manipulation of a specimen. Thus several tests may derive from one request.

The laboratory receives requests from the accident and emergency department; in respect of inpatients and outpatients; from other, outlying hospitals; and from general practitioners. Requests from specific sources were analysed in more detail. Total requests by hospital divisions, split into inpatients and outpatients, were analysed on a monthly basis from February 1987 to December 1989 and compared with inpatient activity taken from deaths and discharges and outpatient activity taken from attendances using information from the patient administration system. On call requests were analysed for the divisions of medicine and surgery on a monthly basis from January 1987 to March 1990. Three tests (full blood count, erythrocyte sedimentation rate, and prothrombin time) carried out for the division of medicine were analysed on a monthly basis from September 1986 to January 1990.

Over eight months between October 1987 and July 1988 several interventions were initiated which might have led to more appropriate use of laboratory facilities. The interventions were costed and were as follows.

(1) From October 1987 each consultant received by post a monthly statement of usage of the laboratory by request and usage of three of the most commonly used tests showing his or her results compared with that of other clinicians subdivided by divisions. From July 1988 this was expanded to include the total cost of the request results provided to his or her clinical team.

(2) From February 1987, after agreement with clinical consultants, on call guidelines were issued to junior medical staff and brought to their attention

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during their introductory lecture. These were based on those described by Lester.¹⁰ Subsequently consultants in the division of medicine received their comparative usage of the on call service on a monthly basis.

(3) Memorandums were circulated to all medical staff on certain topics such as the increasing misuse of coagulation screens and the relevance of the erythrocyte sedimentation rate.

(4) Radioassay requests for vitamin B-12 and folate estimations were scrutinised along with clinical details and any recent blood count. If the request seemed inappropriate it was cancelled and the serum kept for four weeks. The clinician was informed by printed note.

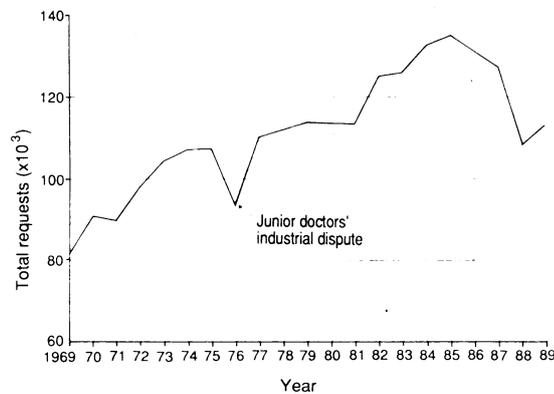


FIG 1—Total requests for haematological tests received yearly during 1969-89

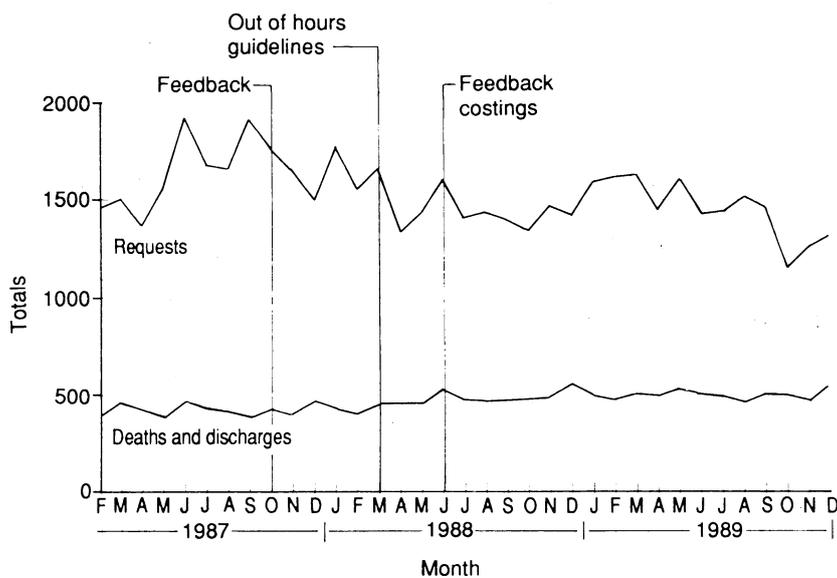


FIG 2—Monthly requests for haematological tests in respect of inpatients in division of medicine compared with deaths and discharges (1987-9)

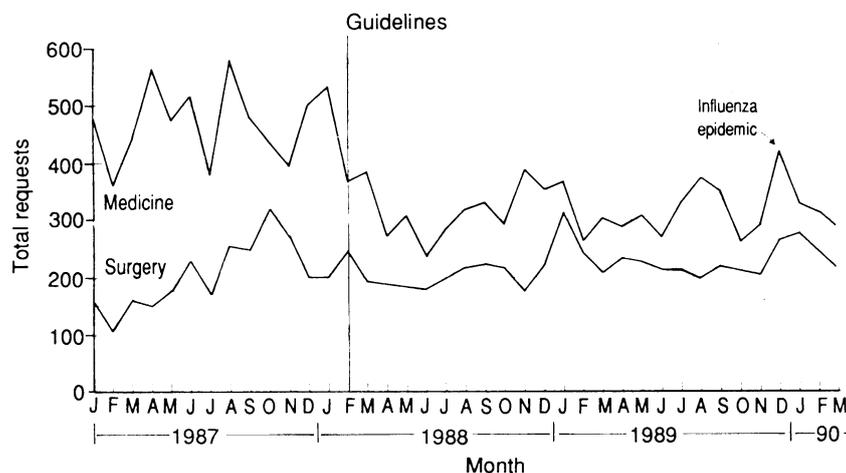


FIG 3—Out of hours requests each month from divisions of medicine and surgery (1987-90)

Requests and tests were analysed before and after these interventions to see if there had been any measurable effect and, if so, whether this had persisted in the long term (greater than one year). The cost benefit was compared with the manpower cost in the time and money that it took to institute these interventions and maintain them.

Data analysis was carried out on a DEC Data-systems minicomputer (Digital Equipment Company Ltd, Reading) using MUMPS software running Telepath's pathology system (Telepath Systems Ltd, Birmingham) and on an IBM compatible personal computer using Smartware Version 3.1 (Informix Software Ltd, Middlesex) incorporating the Telepath pathology data management module. The costing method applied was initially used by Tarbit for costing clinical biochemistry services but proved to be transferable for use in haematology.¹⁸ The method provides a means of apportioning both direct and indirect costs for consumables and labour by individual test and requests. The request can be further broken down into routine and out of hours costs. This method integrated well with the Telepath pathology system.

Results

There was a decline in total requests from all sources in 1988 (fig 1). This was maintained in 1989 despite the transfer of requests to the laboratory from a peripheral ear, nose, and throat centre. The most striking effect of the interventions was on requests in respect of inpatients in the division of medicine (fig 2). Requests fell from an average of 4.0 per patient in the six months before intervention to an average of 2.9 per patient in the six months after. There was no detectable effect on inpatient requests from the division of surgery, which remained at a ratio of 2.7, nor on those from obstetrics and gynaecology.

A reduction in obstetric and gynaecology outpatient requests from 1650 a month to 1000 a month resulted from an agreement with the division of obstetrics that two blood counts during pregnancy were adequate in normal circumstances rather than testing routinely at each attendance. The outpatient request ratio was unaffected in the divisions of medicine and surgery.

On call requests from the division of medicine fell by 38% after the introduction of guidelines, and this effect was maintained. There was no detectable effect on requests from the division of surgery (fig 3).

Analysis of specific tests within the division of medicine showed a fall in estimations of erythrocyte sedimentation rate over the period and a similar trend in respect of full blood counts and prothrombin times (fig 4). Requests for vitamin B-12 and folate estimations fell by some 20-25% whereas only 9% were held back. There was a subsequent demand to analyse specimens withheld in 1% of cases.

The spreadsheet containing the request patterns of consultants took four hours to set up. The subsequent analysis of costs of each request and test took roughly 80 hours of a mid-grade medical laboratory scientific officer's time. Subsequent data collection and distribution took one and a half hours of a medical laboratory scientific officer's time and one hour of secretarial time a week. Consultant memos (roughly three a year), lectures (about two a year), and scrutinising vitamin B-12 and folate requests took an average of one hour a week. Estimated savings amounted to £18 100 a year (table).

Discussion

This study has shown a positive and prolonged effect of intervention on influencing requests for hospital haematology laboratory services. The most substantial

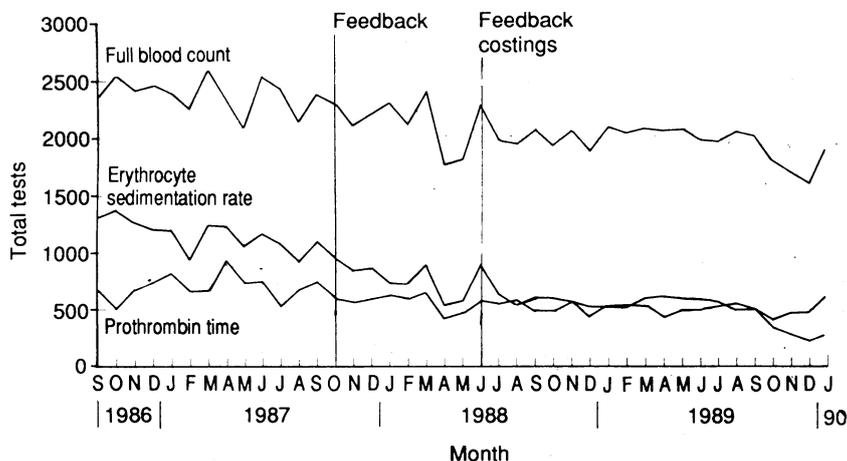


FIG 4—Full blood counts and measurements of erythrocyte sedimentation rate and prothrombin time carried out monthly for division of medicine (1986-90)

Setting up costs, ongoing costs, and estimated savings yearly

	£
Setting up costs:	
84 Hours of grade 2 medical laboratory scientific officer time at £7.20/h	604.80
5 Hours of consultant time at £17.30/h	86.50
2 Hours secretary time at £3.80/h	7.60
Total	698.90
Ongoing costs/year:	
1½ Hours of grade 2 medical laboratory scientific officer time/week × 52	561.60
1 Hour of consultant time/week × 52	899.60
1 Hour of secretary time/week × 52	197.60
Total	1658.80
Estimated savings/year:	
1 Whole time equivalent medical laboratory scientific officer	10 600.00
Consumables on 15 000 requests a year at 50p/request	7 500.00
Total	18 100.00

response was achieved by the junior medical staff in the division of medicine, the heaviest users of the service, whose level of experience and types of patients seen were leading to more inappropriate use of investigations. Before the issue of guidelines it was estimated that up to 40% of on call requests may have been inappropriate, which was very close to the 38% reduction subsequently achieved. This was despite poor attendance by juniors at initial three monthly guideline review meetings and the indication by questionnaire that they rarely consulted the guidelines. The principle of guidelines was brought to the attention of each change of house staff during their introductory lecture.

Total requests in respect of inpatients in the division of medicine also fell. This resulted from an increased awareness by junior clinical staff of audit, not only through memorandums and guidelines but also by virtue of the positive attitudes of their consultant staff, who were issued with the monthly statements. Memorandums were specifically seen to reduce tests of sedimentation rate, which were often coupled with requests for blood counts automatically, and prothrombin and partial thromboplastin time tests, which were often coupled together inappropriately—for example, in paracetamol overdose—when a prothrombin time test would suffice. Other interventions also helped achieve reductions such as a simple change of protocol in the antenatal clinic. The lack of effect on requests from the division of surgery may have been related to the low level of usage, and in respect of outpatients because of appropriate usage by consultant staff initially.

This study may have had some effect because it included a combined approach with education, issue of

guidelines, positive feedback, and a continuing process. Other studies have shown some advantages of these individually. Fowkes *et al* achieved an immediate 64% reduction in haematological and biochemical requests with the use of guidelines and review of notes.¹⁶ Active feedback has been shown to work and be more successful than passive feedback,¹⁹ especially when clinicians are shown comparative data of usage with their peers,^{15, 20} and long term approaches²¹ have been shown to be more effective than short term studies,¹³ which are often viewed as experimental. This study also coincided with, or maybe was instrumental in, a steady change of senior and junior clinicians' attitudes towards more effective use of hospital resources. This would explain the continued decline in some test requests long after the introduction of intervention. A positive attitude by senior clinicians has been recognised as crucial for the success of any method.^{22, 23}

The intervention in this study required little in manpower or monetary resources and led not only to financial savings but to more effective use of medical laboratory scientific officers' time. The time and resource spent in educating new junior staff could be circumvented by appropriate instruction at medical school. If topics on resource management and medical audit entered the curriculum future junior staff would already be conscious of the appropriate use of resources. With the impending changes brought about by the government's white paper²⁴ there is evidence that present changing attitudes among senior clinicians are beginning to allow previous strategies to succeed,^{25, 26} and possibly the time is ripe to try again.

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