

CREST

CLINICAL RESOURCE EFFICIENCY SUPPORT TEAM

**APPROPRIATENESS
OF
LABORATORY
INVESTIGATIONS**

REPORT OF A CREST WORKING GROUP

September 2000

This report has been produced by CREST (Clinical Resource Efficiency Support Team) which is a small team of Healthcare Professionals, established under the auspices of the Central Medical Advisory Committee, to promote clinical efficiency in the Health Service in Northern Ireland, while ensuring that the highest standard of clinical practice is maintained.

CREST wishes to thank Dr Tom Trinick and the working group for producing this report.

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Report of the CREST Working Group on Appropriateness of Laboratory Investigations

INTRODUCTION

Over the past decade the overall cost of laboratory testing has increased considerably throughout the world¹. Although the unit cost of performing a test has declined, relative to inflation, the number of tests ordered has increased substantially. A large number of these tests are considered inappropriate and a conservative estimate of the excess cost of inappropriate testing is £160m in 1999 in the UK alone^{2,3}. CREST established a Working Group to look at the problems of inappropriate testing and to consider ways of addressing it. The membership of the Working Group is given in [Appendix 1](#).

PURPOSE OF THIS REPORT

Various initiatives have been introduced to control the increase in testing^{4,5,6}, with varying degrees of success. This report identifies a number of strategies, which can help clinicians to investigate appropriately, focusing on those strategies which have been shown to be successful.

A test is appropriate if it allows any of the following:-

- a correct diagnosis to be made;
- suitable therapy to be identified and monitored;
- prognosis to be established.

Testing that is inappropriate has several disadvantages. It is costly because it is wasteful and this wasteful expense may prevent the introduction of newer but more sensitive and specific tests. Additionally, it can delay treatment, cause patient discomfort and by producing false positive results, cause worry for patients and relatives – an important quality issue. From a statistical viewpoint 5% of non-causally related results are expected to be abnormal. In bacteriology, inappropriate laboratory testing may lead to incorrect and increased use of antibiotics with their ensuing side effects and an increase in resistant micro-organisms⁷.

SUMMARY OF KEY POINTS AND KEY RECOMMENDATIONS

Key Points

1. The rising number of inappropriate tests can be slowed down.
2. Accuracy in test requesting will improve appropriate use of tests.
3. The development and easy availability of test protocols improves test use.
4. Feedback of test usage to clinicians reduces inappropriate test requesting.
5. Information technology can make a major contribution.
6. Unique Patient Client Identifier (UPCI) will allow sharing of information.

Key Recommendations

1. The requesting clinician must ensure that request forms are fully completed and the correct sample is sent.
2. Laboratories should be accredited with an appropriate accreditation body.
3. Laboratories have an important educational role. They should maintain close contact with clinicians and publish a user handbook.
4. Information technology will make a significant impact on inappropriate testing and must be adequately resourced.
5. The use of a Unique Patient Client Identifier (UPCI) across the HPSS in Northern Ireland is strongly recommended.
6. The use of agreed evidence-based protocols for investigation is encouraged.
7. Use of bedside testing should only be undertaken in collaboration with the local laboratory.
8. The use of cumulative reports should be encouraged.
9. There should be feedback of laboratory price information to clinicians.
10. Laboratories are encouraged to continue their excellent work with audits.

RESPONSIBILITIES

The proper use of investigations places responsibilities on both the physician and on the laboratory. These will become more overt with the introduction of Clinical Governance.

Responsibilities of the requesting physician.

Clinicians have a responsibility to ensure that all tests requested on behalf of the patients in their care are appropriate. It is important that the test requester has a clear idea of what the test will contribute to patient care. The correct sample should be obtained, at the right time and the patient should be properly prepared in order to obtain the proper sample. Each hospital consultant should ensure junior medical staff understand their particular requesting pattern and the rationale for making such requests.

Responsibilities of the laboratory

The laboratory should seek accreditation from Clinical Pathology Accreditation UK Ltd. This organisation sets a number of standards that can facilitate more appropriate laboratory testing. In particular, results should be returned in good time with interpretative information (reference interval, sensitivities, etc.)

In addition there should be service level agreements between users and the laboratory, which give details of the range and number of tests contracted for and also detail the quality standards agreed, in terms of speed of response and other quality measures. Advice on test interpretation should be available at all times. The laboratory should give advice on the best use of tests, by publishing a user handbook, which can usefully be augmented by a regular newsletter.

Confidentiality of laboratory results must be assured. The laboratory should take a lead in education and be involved in the induction programme for new junior medical staff to the hospital. In addition to practical details about specimen collection, the induction course should encourage the proper use of laboratory tests. The laboratory should support continuing professional development for clinicians whenever the opportunity arises.

USE OF INFORMATION SYSTEMS AND TECHNOLOGY

Information systems technology (IS/IT), properly introduced and adequately resourced, holds the promise of greatly improving the use of laboratory investigations. The Department of Health in England has set out an information strategy, which addresses the IS/IT needs of the health service⁸ and the Northern Ireland strategy is expected next year. One major problem lies in patient identification. Patients in each general practice, in each hospital and in departments within hospitals have patient identification numbers linked to their demographic details - name, address, GP, etc. Often these are incomplete or out of date. Across Northern Ireland a project is underway to develop a Unique Patient Client Identifier (UPCI) for each person to use in the Health and Social Services. This will be a 10 digit unstructured number, unique to each individual and used from birth to death. Laboratories may choose to acquire the UPCI number in requesting tests – to ensure correct identity and effective communication to the professional initiating the investigation.

This would then mean that patient information is not entered into laboratory computers under different identifiers. This number may then be used in a bar code or similar machine-readable format to further reduce mistakes at test requesting. Tests requested from Casualty Departments are especially prone to errors in patient identification and IT can help in this area.

It is highly desirable that IS/IT is used to provide results on a computer screen at the ward, surgery or outpatient desk. Tests requested by the patient's General Practitioner or Hospital Consultant should be available to both, so reducing duplication.

Ward and clinic ordering of tests by computer is essential to improve the accuracy, speed and appropriateness of investigation. This is known as "ward order comms" (OCM). It reduces the potential for errors as the computer guides the requester, speeds analysis at the laboratory as samples can be placed directly onto instruments and greatly reduces the possibility of mistakes. OCM facilities allow a check on the frequency of testing by informing the requester when the test was last requested. It is common to have the same test request from the A&E department, the admitting ward and other doctors giving additional clinical opinions.

Information systems and technology can be used to give feedback to the requester. In particular it allows feedback on unsatisfactory sample collection, for example, unsatisfactory cervical smears.

USE OF PROTOCOLS FOR INVESTIGATION

One of the most effective measures of curtailing inappropriate testing is the use of clinical practice protocols⁹. The use and availability of protocols is greatly improved through IS/IT. However, these protocols must be readily available and in a user-friendly form^{10,11}. It may be that the Path.Finder system, a computerised information system in use in the Ulster Hospital, providing information in an easily accessible manner, will allow information to be accessed during the patient-doctor consultation. The key to the successful implementation of this approach is accessibility. Protocols must be agreed with the laboratory and are especially important for chronic conditions, high volume conditions, screening and monitoring (for example diabetes mellitus and thyroid disease). These protocols can be audited and compliance with agreed standards measured.

Simple checks on the appropriateness of tests can be made at the stage of ordering an investigation through an OCM system. Additionally it is at this stage that microbiological information, for example, can be given from the computer terminal. Computerised information systems allow rule-based decisions to be implemented, which can be of great help in certain circumstances.

Going one step further, the recent report of an expert system (the laboratory advisory system) to assist the clinician in test selection and result interpretation throughout the laboratory investigation of the patient, holds great promise¹². However it is unlikely, with limited health service resources, that expert systems are a realistic option in the near future. At present laboratories undertake extra tests if these are appropriate in the light of clinical information and the results obtained. It is highly desirable that laboratories continue this practice.

USE OF BEDSIDE TESTING

Bedside testing has a role to play under certain circumstances. However it will usually be more expensive and is invariably more open to error. There are several guidelines available for bedside testing from the Association of Clinical Biochemists¹³ and the Institute of Biomedical Scientists¹⁴ and these should be followed. This is a rapidly changing area, dependent on technology.

Equipment for near patient testing must only be bought and used on the advice of the local laboratory and with their co-operation and support. The use of bedside equipment has implications for manpower, in a busy unit, which are often not considered at the outset. The use of bedside testing requires a discipline from users and if accreditation of bedside equipment becomes a reality this issue will have to be properly addressed. Local standardisation of equipment for the same assay (e.g. blood glucose) within a hospital is very important. Additionally, a training scheme for the equipment should be introduced with refresher courses at intervals, and ward quality control procedures, as well as external quality control procedures should be organised. A recent audit showed the value of good training in the use of bedside equipment¹⁵.

The training scheme should cover the following areas:

- Safe sample collection and disposal, including health and safety aspects.
- Basic principles of analysis.
- Use of the instrument including calibration, quality control, cleaning and troubleshooting.
- Documentation of results.
- Consequences of improper use.

LABORATORY METHODS OF PRESENTING INFORMATION

The laboratory should present results clearly and legibly. The use of cumulative reports, where suitable, should be encouraged. For example, this is especially important in chronic conditions such as diabetes, with the current HBA_{1c} and the previous two or three values, to allow easy visualisation of trends. The same would apply for thyroid disease and for tumour markers. The laboratory computer can be programmed to print out the last few results each time, saving the clinician the trouble of sorting through large and unmanageable charts.

As discussed above it is also possible to merge results from both GP and hospital on the same request form. However, for this to happen there must be complete certainty as to the patient's identity.

USE OF FEEDBACK ON TEST USAGE TO CLINICIANS.

Feedback to individual clinicians, on their test usage, has been shown to curb the rise in test requesting. There are two sorts of feedback that are of value. Firstly, printing the test cost on each result form provides a visual impact of the effect of unnecessary requesting. It dispels myths as to the test cost and the cumulative test costs can be fed back independently to the clinician. Secondly, test usage can be fed back in anonymised form to each referring clinician, giving their standing against their peer group. This is a powerful method of informing and is amenable to automation. The anonymised and confidential nature of the feedback is vital.

AUDIT OF LABORATORY TESTS

Audit had always been an important component of laboratory practice, with extensive external quality assurance programmes. Additionally the audit technique is useful to determine how helpful a given test or test panel is for patient management. Audits may involve the laboratory alone and may include clinical staff input in assessing the appropriateness of the tests and test panels offered by the laboratory.

OTHER OPTIONS

Disease screening is very important, but inappropriate or untimely testing can be unhelpful. Records for the recall of patients for testing should be held on a computer and the records must be accurate.

Patients can move home or change their name and technology should ensure these problems can be overcome more easily than at present.

The extension of Order Communications facilities to GPs would be highly desirable. Electronic delivery of results to the ward and to General Practitioners' surgeries would speed the return of results. In hospitals the use of vacuum tube systems to deliver samples to the laboratory would also be extremely useful in reducing the response time, especially out of hours and at weekends. The timely return of results reduces the likelihood of inappropriate testing.

It may be appropriate for some patients to be responsible for testing and to keep their own test results. The use of smart cards to carry information could usefully extend this approach. Any move in this direction needs to be implemented carefully and with safeguards. With adequate patient education and in selected circumstances this may be appropriate.

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USEFUL INTERNET ADDRESSES

Association of Clinical Biochemists	http://www.acb.org.uk
Association of Clinical Pathologists	http://pathologists.org.uk
Clinical Resource Efficiency Support Team	http://www.n-i.nhs.uk/crest
Royal College of Pathologists	http://rcpath.org.uk
National Institute for Clinical Excellence (NICE now includes audit)	http://www.nice.org.uk
Scottish Intercollegiate Guidelines Network	http://www.show.scot.nhs.uk /sign/home.htm

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APPENDIX 1

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