Selecting and Evaluating a Referral Laboratory; Approved Guideline

This guideline provides an outline of reasons and criteria for choosing a referral laboratory. A checklist for evaluating potential referral laboratories is included to assist in the decision process.
NCCLS is an international, interdisciplinary, nonprofit, standards-developing and educational organization that promotes the development and use of voluntary consensus standards and guidelines within the healthcare community. It is recognized worldwide for the application of its unique consensus process in the development of standards and guidelines for patient testing and related healthcare issues. NCCLS is based on the principle that consensus is an effective and cost-effective way to improve patient testing and healthcare services.

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- The revision of documents in response to comments by users
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Healthcare professionals in all specialities are urged to volunteer for participation in NCCLS projects. Please contact the NCCLS Executive Offices for additional information on committee participation.
Selecting and Evaluating a Referral Laboratory; Approved Guideline

Abstract

This guideline, Selecting and Evaluating a Referral Laboratory; Approved Guideline (NCCLS document GP9-A), provides reasonable objective criteria to assist laboratory managers and directors with choosing a referral laboratory. The subcommittee that developed this guideline was comprised of laboratory professionals from commercial and state referral laboratories, government agencies, accrediting bodies, and hospitals and medical centers. With the benefit of this broad-based experience, we attempted to provide, primarily to laboratory managers and directors, an easily implemented, but thorough, procedure for evaluating and choosing a laboratory where routine or special analyses could be carried out most effectively. In Section 2, the guideline outlines the reasons for choosing a referral laboratory, and in Section 3, the criteria for selection. The document also contains a checklist, many of whose points correspond to the selection criteria covered in Section 3.


THE NCCLS consensus process, which is the mechanism for moving a document through two or more levels of review by the healthcare community, is an ongoing process. Users should expect revised editions of any given document. Because rapid changes in technology may affect the procedures, methods, and protocols in a standard or guideline, users should replace outdated editions with the current editions of NCCLS documents. Current editions are listed in the NCCLS Catalog, which is distributed to member organizations, and to nonmembers on request. If your organization is not a member and would like to become one, and to request a copy of the NCCLS Catalog, contact the NCCLS Executive Offices. Telephone: 610.688.0100; Fax: 610.688.0700; E-Mail: exoffice@nccls.org.
Selecting and Evaluating a Referral Laboratory; Approved Guideline

Volume 18  Number 15

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Foreword

A clinical laboratory often requires the assistance of an outside facility or facilities to perform unique or unusual services, as a backup service, or for routine services that the referring (primary) laboratory does not perform. Choosing a referral laboratory can be tedious, time-consuming, and difficult. It requires thorough research into the options available to today’s laboratory director. This universal need for referral laboratory services underscores the need for guidelines to follow when choosing these services.

Deciding which laboratory to use can be based on several factors (e.g., references, cost, turnaround time, salesperson claims, proficiency, proximity, or "gut feelings"). Frequently it is only one of these criteria that is the deciding factor. While the cost of referral laboratory services may be an important consideration, the selection of a referral laboratory should be based primarily on the quality of services provided.

This guideline outlines steps to be used when evaluating a referral laboratory. The reasons for choosing a referral laboratory are outlined in Section 2. The criteria for selection are presented in Section 3 and includes information on how to evaluate the quality of referral laboratory services, facilities, equipment, personnel, quality control protocol, quality assurance/improvement activities, and instrument maintenance. This is followed by information on evaluating referral laboratories with regard to efficiency, scope of testing, specimen collection, test ordering, transportation, turnaround time, and result reporting.

This guideline will be useful and applicable both for selecting a referral laboratory and for the ongoing monitoring and evaluation of the selected laboratory.

Key Words

Referring (primary) laboratory, quality control, evaluation, selection.
Selecting and Evaluating a Referral Laboratory; Approved Guideline

1 Introduction

Nearly every clinical laboratory must use the services of a referral laboratory to process some portion of its workload; no formal and generally available criteria or guidelines have been developed to help in the selection process. The director of the referring laboratory is responsible for selecting a referral laboratory and for its ongoing evaluation based on objective evidence of acceptable quality and responsiveness in consultation with the institutional medical staff or physician clients where appropriate.

Laboratories that must select a referral laboratory will benefit from guidance which emphasizes comprehensive yet relevant criteria. Potential referral laboratories can also use guidance to evaluate internal operations and their ability to meet the needs of the primary referring laboratory.

1.1 Scope

This document provides guidance which emphasizes relevant and comprehensive criteria to aid laboratories in the process of selecting a referral laboratory. Similarly, potential referral laboratories will benefit from having a set of guideposts emphasizing relevant criteria accepted by consensus, to aid in evaluating and improving the quality of their operations.

This guideline presents objective criteria for choosing a referral laboratory and it provides a checklist to facilitate the process of selection.

2 Reasons for Choosing a Referral Laboratory

Common reasons for sending specimens to a referral laboratory are:

2.1 Unique or Unusual Service

The referral laboratory may provide a "one-of-a-kind" analysis or perform tests that are requested infrequently of the primary laboratory.

A referral laboratory might also be asked to confirm unusual or unexpected results obtained by the primary laboratory.

2.2 Backup Service

The referral laboratory may be asked to provide both routine and esoteric services when a short-term interruption of service at the referring laboratory is caused by instrument breakdown, unavailability of personnel, sudden increase in volume, or any other unscheduled or unanticipated situation.

2.3 Routine Service

The referral laboratory may perform routine tests on an ongoing basis tests which may be fundamental services but are not duplicated by the referring laboratory; or routine tests not performed during normal hours of operation such as nights, holidays, and weekends.

3 Criteria for Selection

Regardless of the nature of referral services requested by the primary laboratory, the selection criteria fall into three major related areas: quality of laboratory service, cost effectiveness, and efficiency of service. While the cost of referral laboratory services may be an important consideration, the selection of a referral laboratory should be based primarily on the quality of services provided.

3.1 Quality of Referral Laboratory Service

Although the assessment of quality is difficult, an objective evaluation can be made using a systematic approach. The referral laboratory should expect, permit, and encourage an on-site evaluation of its facility. On-site laboratory evaluation during peak operating hours is recommended and appropriate. Consider the following criteria in evaluating quality.

3.1.1 Facilities and Equipment

(1) Determine whether the equipment, supplies, and instrumentation are consistent with the scope and volume of testing being conducted.

(2) During an on-site visit, examine the physical facility, general level of
housekeeping, adherence to sound laboratory safety principles, and appearance, attitude, and general demeanor of the laboratory staff. Although the latter is a subjective determination, the decorum of the laboratory may significantly influence the quality of laboratory work.

3.1.2 Availability of Documents

The referral laboratory should willingly demonstrate the quality of its service by supplying information in several categories of laboratory operation. If the referring laboratory desires to review any documents or manuals, this may be accomplished during the onsite visit of the referral laboratory.

3.1.2.1 Personnel

Inspect the qualifications of the referral laboratory’s director, professional staff, and consultants. Information should include but not be limited to:

(1) Educational experience
(2) Licensure, when appropriate
(3) Certification
(4) Participation in continuing educational activities
(5) Significant areas of special expertise.

3.1.2.2 Internal Quality Control

Review records of internal quality control programs, including:

(1) Appropriateness and quality of test materials
(2) Frequency of insertion of appropriate quality control materials into test runs
(3) Tolerance limits
(4) Appropriate statistical records
(5) Procedure manuals and the related section of the Evaluation Checklist to determine whether the procedure manuals meet the guidelines of NCCLS document GP2 Clinical Laboratory Procedure Manuals.

Also review test procedures in use.

3.1.2.3 External Quality Assessment Activities (EQAS)

(1) The referral laboratory should provide the records of its participation in pertinent interlaboratory proficiency testing programs.
(2) A documented program for review of proficiency test results and a record of any corrective action taken should be available.
(3) If requested, the laboratory should agree to split testing of specimens by the prospective referring laboratory.
(4) Information on participation in voluntary accreditation programs and certification or licensure, where appropriate, by various governmental/regulatory agencies should also be made available.
(5) The referring laboratory must ascertain that the referral laboratory is certified/accredited/licensed where required and appropriate.*

3.1.2.4 Instrument Maintenance

(1) Examine documents on routine instrument maintenance and repair records.
(2) Determine whether the instrumentation in use is appropriate for the scope and volume of testing being referred.

3.1.2.5 Client Satisfaction

Although reputation may be a very subjective indicator of quality, valuable information may be gained from current clients. The referral laboratory should provide the names of clients...

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* In the United States, the referral laboratory must be CLIA-88 certified for high complexity testing in the specialty/subspecialty where required and appropriate.
as references. The referral laboratory should also be willing to describe its internal program to assess and assure client satisfaction.

3.1.2.6 Other Quality Assurance/Improvement Issues

All laboratories should have a program to assess quality, identify opportunities for improvement, and implement improvements. The best laboratories actively involve all employees in quality planning and assurance activities. A review of quality assurance/meetings may demonstrate the types of issues discussed and how resolution was achieved by the laboratory.

3.2 Efficiency of Referral Laboratory Service

When evaluating acceptable efficiency of a referral laboratory, the scope of available testing, specimen collection procedures, test ordering, transportation, turnaround time, and reporting of results, including critical (imminently life threatening) values, should be considered. The acceptability of each of these elements will vary depending on the individual needs of the referring laboratory.

3.2.1 Scope of Available Testing

The importance of the variety of tests offered by a referral laboratory will be greatly influenced by individual requirements. Some referring laboratories may need a specialty laboratory offering very limited procedures, while others will seek a facility with a full range of services. Before selecting a referral laboratory, clearly define specific needs. An acceptable referral laboratory may have to refer to another laboratory in order to provide complete referral needs. If the referral laboratory refers specimens to another laboratory, the laboratory(ies) should be identified, their qualifications should be made available, and their name should appear on the report form.

3.2.2 Specimen Collection and Test Ordering

The referral laboratory should provide comprehensive instructions for properly preparing patients and collecting specimens, including:

1. Quantity of specimen required
2. Special handling needs, including separate pediatric requirements if indicated
3. Labeling
4. Use of anticoagulants or preservatives
5. Desired clinical information.

The actual procedure for test ordering should be clearly defined. The referral laboratory should have clearly defined criteria for unacceptable specimens and should document its adherence to its policy for rejecting specimens. Changes in specimen requirements should be communicated to referring laboratories in advance. In addition, the referral laboratory should define the mechanism whereby the client is notified of changes in normal reference ranges and must include these changes in current reports.

3.2.3 Transportation

The method of transporting specimens from the referring to the referral laboratory should be clearly defined. If a courier service is used, establish satisfactory pick-up schedules. The mechanism of specimen transport must satisfy the requirements of the referring laboratory and ensure the integrity of patient specimens. Special requirements, such as for transportation of frozen specimens, should be addressed and clearly defined.

3.2.4 Turnaround Time

Although the needs of an individual referring laboratory may vary, the expected interval from receipt of specimen to reporting of results should be published. Unanticipated delays in reporting results should be communicated to the referring laboratory. Current or former clients should be consulted to document the referral laboratory’s compliance with its stated policy. If limiting specific testing to certain days of the week will impact turnaround time, this information should be available to the referring laboratory.

3.2.5 Communications Systems

Referral laboratories should use a standardized order entry or results reporting communication
protocol/systems. Communication capabilities should be acceptable to meet the needs of the referring laboratory (e.g., bi-directional interfaces, result printer, and referral laboratory computer connection).

3.2.6 Reporting of Results and Interpretations

The importance of the method of reporting test results will depend on the needs of the prospective client laboratory.

Note: *Timely communication* is a significant issue in all relationships between the referring and the referral laboratories.

(1) Automated data communication systems may be required by some clients while others may need less sophisticated reporting methods. Referral laboratory reports should indicate the name of the referring laboratory and the name and address of the laboratory where the tests were actually carried out, whether the reports are charted directly or recopied.

(2) Reports, whether written, printed, electronic, or verbal, should include age and sex adjusted reference ranges and/or other therapeutic or diagnostic reference ranges, where possible.

(3) Critical (imminently life threatening) values should be immediately communicated to the referring laboratory. Other unexpected or unusual results should be communicated in a timely fashion in the context of the clinical findings.

(4) The referral laboratory should respond promptly to inquiries concerning test results.

(5) The referral laboratory should also provide the client with expert consulting service if necessary.

(6) The referral laboratory should also provide the client with its written policies for dealing with inappropriate/compromised specimens.

(7) The referral laboratory must have a policy concerning corrected and amended reports.

(8) The referral laboratory should have a written policy concerning direct reporting of results to patients which cites as appropriate, any local, state, or federal regulations which may be applicable. This policy should be provided to the referring laboratory.

4 Summary

The needs of the laboratory seeking the services of a referral laboratory may vary widely. The primary referring laboratory should therefore clearly understand its own requirements before initiating the selection process. The referring laboratory should evaluate all areas where referral testing may be required. It may be necessary to select more than one referral laboratory to ensure acceptable testing in all required areas.

The referring laboratory must select a referral laboratory that meets the current standards of clinical laboratory practices. Useful selection criteria permit a systematic evaluation and are sufficiently flexible to satisfy the divergent needs of individual laboratories. These guidelines will facilitate a systematic assessment of both the quality and efficiency of potential referral laboratory services.

It should be noted that evaluation of a referral laboratory must be an ongoing process, and it is therefore suggested that the referring laboratory set up meetings at regular intervals with the referral laboratory to review all of the above.

The Appendix which follows was designed to assist in the process of selection both on-site and off-site, and may be useful in the ongoing evaluation of referral laboratory services.
Appendix. Referral Laboratory Evaluation Checklist
(This checklist is designed to provide a guide and contains suggestions for useful areas of inquiry during the evaluation process. It is not intended to be a scoring system.)

I. Licensure/Certification/Accreditation

<table>
<thead>
<tr>
<th>Authority</th>
<th>Accreditation or Certification #</th>
<th>Expires</th>
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</thead>
<tbody>
<tr>
<td>College of American Pathologists</td>
<td></td>
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<tr>
<td>Commission on Office Laboratory Accreditation</td>
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<tr>
<td>Joint Commission on Accreditation of Health Care Organizations</td>
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<tr>
<td>Health Care Financing Administration Regulations for Medicare, Medicaid, and CLIA Program</td>
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<tr>
<td>American Association of Blood Banks</td>
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<tr>
<td>State of ________ (if applicable)</td>
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<tr>
<td>Municipality of ________ (if applicable)</td>
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<tr>
<td>Other Applicable International Accrediting Agencies</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As appropriate, reviewed documents pertaining to Licensure/Certification/Accreditation

II. Laboratory Director

Name(s)

Credentials

Involvement:  
- Active Full-Time  
- Active Part-Time  
- Consultant

III. Personnel (See Section 3.1.2.1)

Resumes/curricula vitae obtained on all key technical directors
- Yes  
- No

Number of:  
- Technicians  
- Technologists  
- Doctoral Level Scientists

Number of Full Time Employees (FTE)

Does the laboratory have a qualified supervisor during all hours of operation?
- Yes  
- No

Are specific staff members assigned to assist you at all times?
- Yes  
- No
Does the technical staff have expertise in the areas required?
Yes _____ No _____

Does the technical staff receive continuing education on ongoing basis and is it documented?
Yes _____ No _____

IV. Internal Quality Control Activities (See Section 3.1.2.2)

Is there a written, organized, and comprehensive Quality Control program and is it properly documented?
Yes _____ No _____

Are procedure manuals standardized and complete and are all procedures reviewed annually according to NCCLS document GP2 Clinical Laboratory Technical Procedure Manuals?
Yes _____ No _____

Are test materials (reagents, standards, controls, equipment, and methodology) appropriate for the type(s) of test(s) being performed?
Yes _____ No _____

Are standards and controls used in appropriate frequency?
Yes _____ No _____

Are tolerance limits established for procedures?
Yes _____ No _____

Is there a process for remedial action when tolerance limits are exceeded?
Yes _____ No _____

Are adequate statistical data produced?
Yes _____ No _____

Are instruments receiving timely preventive maintenance and is maintenance recorded properly?
Yes _____ No _____

V. External Quality Assessment (See Section 3.1.2.3)

Reviewed results of most recent proficiency testing?
Yes _____ No _____

For deficiencies noted in the above, were appropriate and timely corrective actions taken?
Yes _____ No _____

Will the referral laboratory agree to "split trials" to compare their results with current laboratory being utilized?
Yes _____ No _____
VI. **Reputation (See Section 3.1.2.5)**

Will the laboratory provide a list of clients for you to contact?

Yes _____ No _____

Length of time served by laboratory _______________________

Type of client (e.g., hospital, POL, independent laboratory) ____________________________

General observation of client regarding service:
Poor ____ Average ____ Above Average ____ Superior ____

Does the referral laboratory have a program to assess and assure client satisfaction?

Yes _____ No _____

VII. **Efficiency of Referral Service**

A. **Scope of Available Testing (See Section 3.2.1)**

Does the laboratory offer a sufficient range of services to satisfy client?

Yes ____ No _____

(If no, the referring laboratory may choose to end the evaluation.)

Does the laboratory perform a sufficient volume of all procedures that client will refer to be proficient?

Yes ____ No _____

B. **Specimen Collection/Test Ordering (See Section 3.2.2)**

Does the laboratory clearly define in writing comprehensive instructions for preparation and collection of specimens as well as criteria for rejection of unsatisfactory specimens?

Yes ____ No _____

C. **Transportation (See Section 3.2.3)**

Does the laboratory clearly define in writing comprehensive instructions for transport and shipment of specimens to include:

- Preparation _______
- Packaging _______
- Labeling _______
- Storage _______
- Pick-up Times _______

What procedures do they follow if an emergency is identified by the client?

D. **Turnaround Time (See Section 3.2.4)**

Does the laboratory provide a written statement of expected turnaround time for every procedure performed?

Yes _____ No _____

E. **Communications Systems**

Does the referral laboratory use a standardized order entry or results reporting communication protocol/system?
F. Results Reporting (See Section 3.2.6)

1. Critical Values
   Obtain written protocol for what critical values are called, the mechanism, and the timing.

2. Report Review
   Does the laboratory have a mechanism whereby data which are generated are reviewed for possible errors?
   Yes ____  No ____  
   (If no, the referring laboratory may choose to end the evaluation.)

3. Does the laboratory respond promptly to inquiries concerning test results and provide expert consultative service if necessary?

4. Does the laboratory have a written policy for dealing with inappropriate/compromised specimens?

5. Does the laboratory have a policy concerning corrected and amended reports?

6. Does the laboratory have a policy for reporting results directly to the patients?

VIII. Consultation

Does the laboratory provide client consultation services on a daily basis as follows:

Client Services  Yes ____  No ____
Technical Services Yes ____  No ____
Medical Consultation  Yes ____  No ____

Are these services available to you 24 hours a day?
Yes ____  No ____
Summary of Comments and Subcommittee Responses

GP9-T: Selecting and Evaluating a Referral Laboratory; Tentative Guideline

General

1. This document does a good job of overall referral issues.

   - The subcommittee appreciates the comment.

2. This appears to be a one-time selection process. Criteria for ongoing or annual (biannual) evaluation may be beneficial.

   - The subcommittee revised the Introduction to emphasize that this document can be used for selecting a referral laboratory and for its ongoing evaluation. The last sentence of Section 4 has also been revised to emphasize that the checklist can be used for the ongoing evaluation of a referral laboratory as well as assist in the selection process.

3. The document might be reorganized at the strategic level with information categorized into three broad activities: *(The commenter provided examples of these activities)*
   - Risk Management
   - Quality Assurance
   - Utilization Review

   - While the subcommittee believes the commenter’s examples of risk management, quality assurance, and utilization review are valid, these activities are beyond the scope of the document. However, where appropriate and in the interest of the referring laboratory, the process of selecting a referral laboratory may include considerations related to risk management and utilization review.

4. The document could be broadened to proceed from its initial goal of effective evaluation to include the following phases:
   - Appropriateness of Referral
   - Initial Evaluation
   - Negotiation and Assignment of Responsibility and Authority
   - Implementation
   - Ongoing Surveillance

   Choosing and using a reference laboratory should be done as if it were a new instrument being brought into the laboratory proper.

   - The subcommittee believes the document addresses these issues. Emphasis has been added to the Foreword, Introduction, and Section 4 that this document can also be used for ongoing evaluation of referral laboratories.

Scope

5. The scope of the project should be slightly expanded with comment on economic factors.

   - Section 3 has been revised and states that the selection criteria for a referral laboratory fall into three major related areas: quality of laboratory service, cost effectiveness, and efficiency of service. These issues are also addressed in the Foreword.
6. Add a section for periodic evaluation after the initial selection.

- See response to Comment 2.

7. The scope should be expanded to include directions for creating both a request for proposal for reference laboratory services and for evaluating bids received using predetermined criteria addressing both quality and pricing of services offered. Quality assurance and adequate supervisory oversight must be assured for all operating shifts.

- The subcommittee believes these issues are adequately addressed in Section 3 (Criteria for Selection) and Section 3.1 (Quality of Referral Laboratory Service.)

Section 3.0

8. Client sensitivity and a good support system (client services) should be added to the criteria for selection described in Section 3.0.

- The following sentence has been added to Section 3.1.2.5: (See text in that Section). As a result of this change, another question has been added to Section VI of the checklist.

9. The laboratory must be accredited/licensed by an appropriate overwatch agency; regarding 3.1.2, the referral laboratory must provide documentation attesting to accreditation/licensure.

- In Section 3.1.2.3, External Quality Assessment Activities, a number (5) has been added which states: The referring laboratory must ascertain that the referral laboratory is certified/accredited/licensed where required and appropriate. The following footnote accompanies this statement: In the United States, the referral laboratory must be CLIA-88 certified for high complexity testing in the specialty/subspecialty where required and appropriate.

10. Add at the end of the sentence and at a cost effective level.

- Section 3 has been revised to read: ...the selection criteria fall into three major related areas: quality of laboratory service, cost effectiveness, and efficiency of service. The issue of cost is also addressed in the Foreword.

11. The Instrument Maintenance section should be deleted from the criteria for selection.

- The subcommittee believes this section is appropriate and does not detract from the document.

12. Frequently, the physician will ask for an unusual test with no defined normal ranges or established track record. Addressing these issues may help laboratories deal better with these problems.

- The subcommittee considers this beyond the scope of the document. The referral laboratory should communicate to the physician that unusual tests may not have established reference ranges.
Section 3.1.1

13. On-site laboratory evaluation during peak operating hours is strongly recommended for reasons stated and to determine adequacy of supervision.

- The following sentence has been added to Section 3.1: On-site laboratory evaluation during peak operating hours is recommended and appropriate.

Section 3.1.2.1

14. Appropriate supervisory oversight on all shifts and adjusted to test volume is very important.

- The subcommittee believes this could be verified during an on-site laboratory evaluation during peak operating hours which is mentioned in Section 3.1. Also in Figure 1 (now the Appendix), III, one of the questions inquires: Does the laboratory have a qualified supervisor during all hours of operation?

Section 3.1.2.2

15. I feel that not only should test procedures be reviewed but also method development procedures. To do so, I look at a representative sample of method development reports and evaluate their expectations for accuracy, etc., for re-evaluation and for evaluation of the clinical relevance of the method (as distinct from the clinical relevance of the analyte as addressed in comment #6 and 3.1.2.2(5).

- The subcommittee considers review of method development procedures beyond the scope of the document. (In the United States, review of method development procedures is included in the requirements for CLIA certification. See response to Comment 9.)

Section 3.1.2.3

16. External quality assurance should apply to all operating shifts, especially evening shifts, with documentation.

- The subcommittee agrees with the comment. Review of external quality assurance/improvement is included in the requirements for certification/accreditation/licensure. See response to Comment 9.

Section 3.2.5(3)

17. Communication of panic values must be fully documented including when and to whom the information was given.

- The subcommittee believes this issue is beyond the scope of the document. Documentation requirements are imposed on referral laboratories by licensing and accrediting agencies.

Figure 1 (now the Appendix)

18. VII.D: The following question should be added: Does the laboratory notify you of test delays or changes as or before they occur?

- The following sentence has been added to Section 3.2.4: Unanticipated delays in reporting results should be communicated to the referring laboratory. Additional revisions concerning communications between the referring and the referral laboratory have also been made.
19. The Referral Laboratory Evaluation Checklist at the end of the document could be developed into a detailed project management flowchart that includes a set of general procedures and forms codifying the informational contents of the main document. This would assure that all important initial and ongoing data are collected, reviewed, and acted on when included in the structure of the referring laboratory’s quality assurance/improvement and risk management program.

- The subcommittee encourages the users of this document to modify the Referral Laboratory Evaluation Checklist as necessary to accommodate their needs.

Summary of Comments

20. I agree with the Committee that a section on contract negotiation is outside the scope of the guideline; however, there should be some mention of economic considerations. The low bid may not be best for all. Some pricing arrangements may be illegal or even bean counters are not always right.

- Section 3 has been revised to include cost effectiveness and also to emphasize that selection of a referral laboratory should be based primarily on the quality of services provided. The issue of cost is also addressed in the Foreword.
Related NCCLS Publications


H18-A  Procedures for the Handling and Processing of Blood Specimens; Approved Guideline (1990).  Addresses the multiple factors associated with the handling and processing of blood specimens, factors which can introduce test result imprecision or systematic bias.

* Proposed- and tentative-level documents are being advanced through the NCCLS consensus process; therefore, readers should refer to the most recent editions.