Specimen Collection & Handling
With DLO, you’re good to GO

At DLO, we understand how critical each specimen and test result can be in managing your patients’ health. We take all possible care to maintain specimen integrity from the moment it is picked up through test completion. Specimens are picked up, packaged, tracked and delivered directly to the laboratory by our reliable, efficient Route Service Representatives (RSRs), thereby minimizing the need for follow-up, thus freeing time for your staff.

About this section

This section will acquaint you with DLO’s specimen-handling process.

Electronic resources for testing and specimen collection

- Quest’s Test Center
- Directory of Services
- IntelliTest Manager
- Virtual Test Guide on DLOlab.com

Specimen Handling and Transport Overview

Blood Specimen Collection

Microbiology Specimen Collection

Cytology Specimen Collection

For additional assistance with test ordering, please contact DLO’s Customer Support Center at 800.891.2917, option 2.
Specimen Collection & Handling

Quality results depend on quality specimens

Quality results begin with the manner in which specimens are collected and prepared for testing. With a comprehensive menu of more than 3,500 tests, DLO performs testing on a wide range of sample types. Properly collecting and preparing patient specimens ensures you get the results you need to care for your patients.

Specimen Collection Requirements

Refer to the digital tools explained below for expanded instructions on patient preparation and laboratory specimen collection procedures for individual tests.

**Test Center**
Information on all tests offered
QuestDiagnostics.com/Testcenter

**DLO’s Virtual Test Guide**
Complete test and specimen collection guide for frequently ordered & DLO specific tests
DLOlab.com/virtual-test-guide

**Directory of Services**
Testing and specimen collection information with helpful explanations for standard DLO policies and procedures
QuestDiagnostics.com/Directoryofservices

**Intellitest Manager**
On-line tool to access new test information, test updates and changes
IntellitestManager.com

**Care360 Labs & Meds**
View specimen collection requirements at time of order processing

Specimen requirements include information such as specimen volume collection and transport containers as well as transport temperature.

**Adequate specimen volume** must be submitted for analysis. The volume listed is enough for initial analysis as well as for any confirmatory tests that must be performed. If an inadequate specimen is submitted, we may not be able to perform the initial test or required confirmatory procedures.

Patient Preparation

Many tests require that the patient be prepared in some specific way to ensure useful results. Please refer to the digital tools previously explained or call Customer Services for clarification of any patient preparation that might be needed.

A **fasting specimen is preferred** for the majority of tests performed on serum, plasma, or whole blood. Non-fasting specimens often contain fat particles that can interfere with many analytical procedures.

Supplies

**Specimen collection devices supplied by DLO are only to be used for the collection of specimens for testing through DLO.** Supplies are not to be used to store or dispose of biological materials, including sharp instruments, or for any activity not connected with the collection of specimens for testing through DLO.

**Specimens collected and/or transported in expired collection or transport devices may be rejected.** Routinely check to ensure your supplies are not outdated.

Health and Safety Precautions

Specimens should be handled in a safe manner and according to applicable legal requirements or guidance. Information on safe specimen handling may be obtained from the US Occupational Safety and Health Administration (OSHA) and the Centers for Disease Control and Prevention (CDC).

Additional Details and Instructions

- Specimen collection and handling should always take place using Universal Precautions.
- Specimens should never be frozen in glass tubes
- Needles or syringes should never be submitted to the laboratory.

**DLO reserves the right to refuse to accept any transports that pose a safety hazard to its employees.**
Improved access to Quest’s latest testing information

Quest Diagnostics’ website provides a wealth of information for providers. Quest’s Test Center and/or Directory of Services are resources available for testing information. Links to both can be found on DLOlab’s homepage, in the Tools and Resources for Providers and throughout the Virtual Test Guide. The Directory of Services can also be accessed through a link on the left navigation menu in the Test Center.

Test Center provides comprehensive information for all tests available through DLO.

- Search engine dedicated to the Test Center
- DLO/Quest test name
- Test code(s)
- Billing CPT code(s)
- Additional testing or reflex criteria
- Methodology
- Limitations
- Reference ranges
- Clinical significance
- Link to FAQs, algorithms, test reference material or related articles
- Preferred and acceptable alternative specimens
- Links to related sections of QuestDiagnostics.com

The Directory of Services (DOS) can be accessed through the Test Center homepage. More information on the Directory of Services on page 12.
**Quest Directory of Services**

Improved on-line access to the latest test information

Experience the new digital directory.

With the **Test Directory of Services** (DOS), healthcare providers now have immediate on-line access to the most up-to-date testing information from Quest Diagnostics.

In this efficient digital format, you can quickly access test ordering, specimen collection, and handling information on any device and ensure you have everything you need to serve your patients.

**Easy access** from your desktop, laptop, tablet or phone

**Enhanced search features**

**Up-to-date information** on nearly 2,000 tests of our more frequently ordered tests

**Specific test details** includes CPT codes, preferred specimens, patient preparation, transport instructions, reject criteria and methodology.

**Easy On-line Search**

Using the search bar at the top of the page, you can search by keyword or test name. The first results will take you to our alphabetical test list, where you can click on your test and jump to the appropriate section for the detail you are seeking.

**Full Screen Mode**

Click to enlarge the page for easy viewing and enhanced visibility.

**Intuitive Navigation**

Use the streamlined navigation to quickly find in-depth test information.

Tabs along the top of each page have been updated with descriptive labels that make it easy to navigate.

**Feedback Button**

You can give thoughts and comments on how we can improve our directory.

**Print & Download**

Use the print button to print out individual pages or the download button to save to your desktop for off-line reference.

**For More Info**

For additional test information including clinical significance, test interpretation or clinical algorithms, visit [QuestDiagnostics.com/TestCenter](https://www.QUEST.com/TestCenter) or call 1.866.MY.QUEST (1.866.697.8378).
Intellitest Manager®

Easily manage the test changes that are most important to you

Intellitest Manager® is a flexible on-line tool that provides best-in-class features for accessing new test information, test updates and changes based on specific account utilization. Clients can simply visit IntelliTestManager.com and log in with their client number and 5-digit zip code.

Get the test update data you need in the format you want with IntelliTest Manager

Features

Filter by the utilization of multiple accounts
Browse and perform keyword search across all updated tests
Manage recipients of email notifications about lab updates
Export information in the product-specific format specified by your EMR or LIS vendor
Filter and browse tests by specific client utilization
Customize the view by selecting and hiding data fields
Sort information based on the following: new tests, CPT code, specimen requirements, transport temperature, specimen stability, reference range or methodology
View test change documents on-line, 24/7
See test update history with effective date range
See detailed information for updated test(s), including specimen requirements and effective dates
Export and download list of all updated tests to Excel and PDF
Update notification available by email
Interface mapping information provided, including LOINC
See pricing messages for price matching due to test code changes
Browse and print new test offerings

For questions or support:

Email IntelliTestManager@QuestDiagnostics.com, call 1.800.697.9302, Option 1, then 6, or ask your DLO Account Executive
Virtual Test Guide

DLO’s premium laboratory testing reference tool

An innovative on-line, no-cost solution to providing testing information with specimen guideline and visual collection guides for Oklahoma’s healthcare providers.

DLO’s Virtual Test Guide (VTG) on DLOlab.com features test information, specimen collection specifics and a visual collection guide for individually selected frequently-used tests and tests with a history of collection and/or submission difficulties. The Virtual Test Guide homepage can be accessed several different ways.

Easily accessed through your phone, tablet or computer at DLOlab.com/virtual-test-guide.

1. DLOlab.com/virtual-test-guide
2. Drop-down menu under “Providers”
3. VTG links on DLOlab.com homepage
4. VTG button right navigation menu
5. Links throughout Providers section
Virtual Test Guide

Gain complete test information in one location

Finding the information you need has never been easier.

VTG Search Engine is dedicated to search key words, disease state, tests names, tests numbers and specimen collection devices within the guide.

Tests are listed alphabetically on the VTG homepage, according to test name.

Filters allow tests to be sorted according to specific specialties and/or alphabetic ranges.

Specimens must be segregated according to temperature while being stored for transport. Lock Box Usage instructions clarify what is needed to protect the integrity of each specimen until pickup by a DLO RSR.

Quest’s Test Center contains information on all of the over 3,500 tests available through DLO.

Can’t find a test? Have a comment you want to share? Virtual Test Guide Comment Form sends all submissions to DLO’s VTG Team for review and response.

Providing accurate results every time.

VTG search results will list all tests which contain any part of the submitted search criteria. The tests are listed according to the percentage of matching criteria.
Virtual Test Guide

The only place to go for all your test information

All information you need to make the best decision for your patients.

DLO/Quest test name
Collection device(s) photo
Test code(s)
Billing CPT code(s)
Additional testing or reflex criteria
Methodology
Limitations
Reference ranges
Clinical significance
Link to FAQs, algorithms, test reference material or related articles
Alternative test names
Complete listing of the specimen(s) with collection device(s)

Easy to understand instructions and clinical explanations

Collection device with DLO supply order number
Additional test codes, when available
Preferred specimen
Collection instructions with illustrations, when available
Specimen transport and storage
Transport container
Transport temperature
Specimen stability
Rejection criteria
Specialties associated with test

Click any “Virtual Test Guide” link to return to the VTG homepage.

“HOME” link at the top of any page within DLOlab.com will lead to the site’s homepage.

Information on related tests or disease states not listed in the VTG can be found at the Quest Diagnostics’ Test Center.
Proper Blood Collection

Quality testing starts with proper specimen preparation.

Properly collecting and preparing patient blood specimens can minimize errors or inaccurate results and reduce test delays or cancellations. Common examples of inaccurate results and error messages include, but are not limited to:

- Falsely elevated potassiums
- Falsely decreased glucoses
- Falsely elevated lactate dehydrogenase levels
- “Specimen received unspun” comment on reports
- “Quantity not sufficient” (e.g., QNS) comments on reports
- “Red Blood Cells present in specimen” comment on report

Order of Draw

In order for a blood specimen to be appropriate for testing, it must be drawn in a specific order. The following “Order of Draw” procedure must be followed to ensure a suitable blood specimen is obtained and to avoid cross contamination of specimens with additives from a previous tube or container.

- Allow the SST and red top serum tubes to clot for a minimum of 30 minutes, but no longer than 45 minutes, before centrifugation.
- Tubes should be allowed to clot in a vertical position (e.g., in a test tube rack) at room temperature unless otherwise noted.
- If your centrifuge is a swing bucket centrifuge, spin the SST and serum tubes for 15 minutes at 2,200 RPM.

For serum or plasma specimens, draw a sufficient volume of whole blood to obtain the required serum or plasma volume after centrifugation (approximately 2½ times more whole blood).

For serum, gently invert the tube 8 times after filling; allow the blood to clot for at least 30 minutes in a vertical position and separate by centrifugation.

- 10 minutes for horizontal spin centrifuges
- 15 minutes for fixed head centrifuges

For plasma and whole blood, completely fill the tube to eliminate dilution from the anticoagulant or preservative; immediately mix the blood by gently and thoroughly inverting the tube 10 times. Separate plasma by centrifugation. Transfer plasma to a plastic tube and label the tube as “plasma.”
Proper Blood Collection

Proper Phlebotomy Techniques

<table>
<thead>
<tr>
<th>Stopper</th>
<th>Additive</th>
<th>Inversions</th>
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</thead>
<tbody>
<tr>
<td>Blood Cultures</td>
<td>8-10</td>
<td></td>
</tr>
<tr>
<td>Light Blue</td>
<td>Citrate</td>
<td>3-4</td>
</tr>
<tr>
<td>Red/Gray or Gold</td>
<td>Gel, serum</td>
<td>5</td>
</tr>
<tr>
<td>Red</td>
<td>No gel, Serum</td>
<td>5</td>
</tr>
<tr>
<td>Green or Tan</td>
<td>Heparin</td>
<td>8-10</td>
</tr>
<tr>
<td>Lavender or Tan</td>
<td>EDTA</td>
<td>8-10</td>
</tr>
<tr>
<td>Royal Blue</td>
<td>EDTA</td>
<td>8-10</td>
</tr>
<tr>
<td>Gray</td>
<td>Sodium Fluoride</td>
<td>8-10</td>
</tr>
</tbody>
</table>

Tubes with other additives

Last tube drawn
Yellow Citrate ACD 8-10

**Stopper Additive Inversions**

**Blood Cultures 8-10**

**Light Blue Citrate 3-4**

**Red/Gray or Gold Gel, serum 5**

**Red No gel, Serum 5**

**Green or Tan Heparin 8-10**

**Lavender or Tan EDTA 8-10**

**Royal Blue EDTA 8-10**

**Gray Sodium Fluoride 8-10**

**Yellow Citrate ACD 8-10**

**Tube must be filled completely.** Note: When using a winged blood collection set and a coagulation (citrate) tube is the first specimen, begin by drawing another partially filled citrate tube. This discard tube is used to fill the winged set tubing’s “dead space” and helps ensure a proper blood-to-additive ratio.

**Do not use gel tubes for toxicology or drug testing.**

**Proper Blood Collection**

**Proper Phlebotomy Techniques**

**Specimen Handling and Transport**

Please properly fill and separate all specimens. For more information, please visit [DLOlab.com/virtual-test-guide](http://DLOlab.com/virtual-test-guide) or call 800.891.2917, option 2. Information is subject to change without notice.


Sufficient volume achieved if blood drawn falls above minimum fill indicator. For blood transfer, do not fill above illustrated dashed maximum line.

Note: The quantity of blood drawn into evacuated tubes varies with altitude, ambient temperature, barometric pressure, tube age, venous pressure and filling technique.

Proper Blood Collection

Coagulation Testing

Preparing Platelet - Poor Plasma for Coagulation Testing

Immediately after collection, mix specimen by gentle inversion. Complete processing within 60 minutes of collection.

Centrifuge at 1500 x g for 15 minutes.

Using plastic Pasteur Pipettes, transfer supernatant plasma to a plastic tube.

Cap and centrifuge supernatant plasma at 1500 x g for 15 minutes.

Remove supernatant plasma from second spin, being careful to not disturb the sediment at the bottom of the tube.

Transfer plasma to plastic storage tubes.
Specimen integrity is imperative to achieve quality test results.

Your care, skill, and knowledge when preparing the patient and specimen are essential to the provision of the highest quality standards for testing and services. The following guidelines highlight the various factors that can compromise patient’s specimens and assays.

Hemolysis

Hemolysis occurs when the erythrocytes are ruptured and release their contents into the serum or plasma. The hemolyzed serum or plasma will look light pink to bright red. Hemolysis, even in small amounts, may alter test results markedly, particularly potassium and LDH. Grossly or moderately hemolyzed specimens may be rejected.

Causes of hemolysis include:
- Small needle used to collect specimen
- Difficult phlebotomy
- Placing red top tubes in the refrigerator without allowing 30 minutes at room temperature for complete clotting
- Vigorous shaking of specimens
- Storing specimens in excessive heat or in a refrigerator that is too cold

Quantity Not Sufficient (QNS)

Each assay requires a minimum amount of specimen required to perform the test accurately. If we do not receive enough of a specimen to meet the minimum volume requirements, we will not perform the test. For serum or plasma specimens, please draw more than the amount requested in our specimen requirements (for example, 2½ times more than the requested volume). If you suspect a specimen will be QNS, list tests in order of priority.

Lipemia

Excessive lipids in the blood produce a cloudy or milky specimen. Moderately to grossly lipemic specimens may invalidate many test results. Lipemic specimens may be the result of a recent meal prior to the blood collection. Follow the general rules of fasting before a blood specimen is obtained (e.g., the patient should have nothing to eat or drink, except water, for 8-12 hours prior to the draw).

Hyperbilirubinemia

Icteric serum or plasma will appear dark to bright yellow. Icterus may affect some results. To ensure quality we may request another specimen be collected for analysis.

Specimens collected with outdated supplies

Please check routinely to ensure that your supplies are not outdated. All specimens received in expired collection or transport tubes will be rejected by DLO.
Specimen Handling & Transport

Quality testing starts with proper specimen preparation.

Urine Collection

Urine collections require providing specific instructions to the patient. Clean catch patient instructions and 24-hour collection instructions are detailed in DLO’s Virtual Test Guide and/or Directory of Services. For 24-hour test collections, total urine volume must be included on both the laboratory order and the urine aliquot submitted for analysis.

Tissue Collection

Ensure that tissue specimens are covered completely in 10% formalin. For further details about collection and preparation of tissue specimens, refer to the Virtual Test Guide, Directory of Services or on-line Test Center.

Collection (other)

Comprehensive collection procedures for trace elements, cultures, and toxicology specimens can be found in the Virtual Test Guide, Directory of Services or Test Center.

Labeling

Each specimen container must be labeled with appropriate patient identification in order to be tested. Specimens with missing patient identification will not be tested. If a significant discrepancy is noted with the patient information provided on the specimen and the laboratory order, your facility will be contacted for clarification. Specimens for HIV testing and other sensitive tests that are inconsistently labeled will not be tested.

Storage

All specimens must be stored at the appropriate temperature prior to transport to the laboratory for testing. Refer to the Virtual Test Guide, Directory of Services or on-line Test Center for information on specimen storage temperatures.

- Storage temperatures are defined as:
  - Ambient/Room Temperature (15 - 30 degrees C)
  - Refrigerated (2 - 10 degrees C)
  - Frozen (-20 degrees C or colder)

Minimum Volume Requirements

Test volumes listed in the Virtual Test Guide, Directory of Services or on-line Test Center allow for multiple test determinations. The minimum volume allows for a single test including instrument dead volume. Adequate specimen volume for each test requested should be submitted to DLO to avoid delays in processing and to expedite turnaround time. Prioritizing tests for low volume (short) specimens: Specimens with questionably small sample volumes can have the tests prioritized on the test order form. Minimum testing requirements are available by calling DLO customer services.

Collection Supplies

Specimens collected and/or transported in expired collection or transport devices will be rejected by DLO. Please routinely check to ensure your supplies are not outdated.

Additional Details & Instructions

- Specimen collection and handling should always take place using Universal Precautions.
- Specimens should never be frozen in glass tubes.
- Needles or syringes should never be submitted to the laboratory.
Specimen Handling & Transport

Microbiology Collection Devices

- **BBL CultureSwab Plus w/ Amies Gel**
- **BBL CultureSwab Plus w/ Amies Gel (w/Wire Shaft)**
- **Liquid Amies Double Plastic Swabs**
- **Culture Swab Liquid Stuart**
- **APTIMA Vaginal Swab Transport Media (STM)**
- **APTIMA Combg 2**
- **APTIMA Urine**
- **BD Affirm VPIII**
- **BD Vacutainer Urine C&S Preservative Plastic Tube**
- **Urinalysis Tube**
- **Sterile Urine Cup**
- **Pinworm Paddle**
- **Total Fix**
- **Para-Pak CLEAN VIAL**
- **Para-Pak C&S**
- **InSure Card**
- **BD Vacutainer Serum Red Top Tube**
- **BacTec Plus**
- **Bact/ALERT PF (Pediatric)**
Cytology Specifications

Comprehensive testing from one vial, one specimen

Image-guided Pap with age-based screening protocols—DLO SMART Codes

SMART test codes are comprised of Imaged Pap testing with HPV and additional STI tests, appropriate for the patient’s age, based on professional guidelines.*

Send in the specimen using either ThinPrep or SurePath, and provide the patient’s date of birth

<table>
<thead>
<tr>
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<td>91339</td>
<td>18828</td>
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<tr>
<td>Pap &amp; HPV mRNA E6/E7, reflex HPV 16,18/45</td>
<td>91414</td>
<td>18829</td>
</tr>
</tbody>
</table>

CT/NG: C. trachomatis/N gonorrhoeae RNA
1. For patients with risk factors for sexually transmitted infections.

Ask your DLO representative, or visit QuestDiagnostics.com/SMARTCodes, for a full explanation of the use of SMART Codes, as well as to see the most current professional cervical cancer and STI screening guidelines.

Additional Testing Options

Reflex and co-testing options for Pap and HPV (based on ACOG guidelines)

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Out-of-the-vial tests

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Note: The HPV test listed in these test codes is for Aptima HPV mRNA High Risk testing. For a full menu of testing from DLO, go to DLOlab.com/Virtual-Test-Guide.
Specimen Handling & Transport

Proper Specimen Identification

The College of American Pathologists (CAP), DLO’s laboratory accrediting agency, requires that all specimens submitted for testing must have two patient identifiers located on the specimen container upon submission.

Specimen labels

All specimens should be labeled at the time of collection with at least two patient identifiers that must also appear on the requisition.

Examples of patient identifiers are as follows:

The patient’s name (full last name, then full first name or initial) or a unique ID code is always required.

The second patient identifier may be one of the following:

- Date of birth (month/date/year)
- Other unique patient identifier that is also on the test requisition, e.g., hospital or office ID code or file number
- DLO requisition number or specimen barcode label
- Other barcode labels can be used if the barcode matches the unique identifiers on the printed requisition (the barcode does not need to be human readable)

NOTE: Location-based identifiers are **NOT** acceptable, e.g., hospital room number or street address

Each specimen container must have a securely affixed label with the following information:

- the patient’s name written exactly as it appears on the test requisition (e.g. Doe, Jane)
- a second patient identifier as noted above
- your account number
- date of collection

Additional Instructions

If the label is hand-written, use a ballpoint pen—do not use a felt tip pen.

If glass slides are submitted, use a pencil for labeling the frosted end — two identifiers are preferred although patient’s name alone is acceptable

If labeling a sample that is intended to be frozen, secure the label with transparent tape.

When submitting a specimen in a container other than the tube used to draw the sample (e.g., transfer vials), **indicate specimen type on the label** (e.g., serum, plasma, urine, etc.).

When submitting specimens for **microbiological testing** (e.g., cultures, bacterial antigen, microscopic examination) the **nature and anatomic source of the sample and the specific organism(s) to be detected, if any, should be specified.**

Care360 will automatically print specimen labels with submitted orders.

**Improper labeling of patient specimens may result in test cancellations.**
Specimen Transport Preparation

Information Regarding Requisition Folding

DLO is dedicated to delivering accurate results on-time, every time. Our goal is to be accountable for your patient’s specimen from the time we pick it up until the time it is tested and resulted.

Specimen tracking is the tool that allows us to capture individual patient demographics for each specimen you entrust in our care. By folding the requisition in a manner that allows us to scan the barcode, we are able to capture each patient’s information. This allows us to track the status of your patient’s specimen at any given time until the results are in your hands.
Specimens must be segregated according to temperature while being stored for transport. **Lock Box Usage instructions clarify** what is needed to protect the integrity of each specimen until pickup by a DLO RSR.

Ambient, refrigerated, and frozen specimens MUST be segregated. If you need additional lock box capacity to allow for complete segregation, please contact DLO at 1.800.891.2917, option 3.

**Ambient**

Place ambient specimens **farthest away from any cold packs.**

If there are specimen tubes requiring different temperature states within a single patient sample collection, place each specimen tube in a separate specimen bag with a copy of the ordering requisition. This will facilitate those tubes being placed in the correct areas of the lock box.

**DO NOT put ambient specimens on top of refrigerated specimens.**

**Refrigerated**

When placing a refrigerated specimen inside the lock box, use a cold pack and place refrigerated specimen directly on the cold pack either by:

1) rubber banding specimen to the cold pack, or

2) placing specimen in a separate bag with the cold pack

**DO NOT put refrigerated specimens in the frozen tote bag.**

**Frozen**

Frozen specimens should be placed inside a frozen tote container to allow them to remain frozen while in the lock box. **Make sure the specimen is completely frozen before placing it inside the frozen container.**

Remember to take the frozen tote out of the lock box in the morning to refreeze the gel-packs before reusing. Freeze only the gel packs, not the entire tote.

Call **1.800.891.2917, option 3**, for specimen pick-up, to cancel specimen pick-up or to notify DLO of your need for additional lock box capacity to properly store specimens.