

What is the Total Testing Process?

The Total Testing Process is a guide for clinical testing cycles involving all steps in each testing phase. Activities include requesting tests in the pre-analytic phase; performing tests in the analytic phase; and reporting results in the post-analytic phase.

The Total Testing Process helps diagnostic laboratories avoid common errors, follow regulations set by the Clinical Laboratory Improvement Amendments (or CLIA), and monitor quality. This microlearning video describes each phase and step of the Total Testing Process. Upon completion, viewers will understand how the Total Testing Process steps relate to each other and the laboratory.

The first phase of the Total Testing Process is the pre-analytic phase, where, according to studies, most diagnostic errors can occur. The pre-analytic phase begins in the patient care setting and ends in the laboratory setting. This phase includes steps that happen before a patient specimen is tested.

The first step of the pre-analytic phase is the patient encounter. In this step, a patient is evaluated, and a decision to test is made.

Working with physicians to better understand laboratory testing supports diagnostic excellence. Guiding clinical decisions and educating providers can reduce diagnostic errors. A clinical laboratory can provide consultation during test selection. Testing often involves various laboratory specialties and other diagnostic services. Collaboration among care teams can enhance the accuracy of diagnosis. After deciding to test a patient, physicians can select the correct test. Misdiagnoses can occur when an incorrect test is requested.

Once a physician decides to test a patient, test requesting occurs. It is important to request the right test, for the right patient, at the right time. This process leads to the right diagnostic actions to improve patient outcomes.

One challenge during test requesting is confusing test names. Also, test selection might be difficult when a patient's clinical symptoms overlap across conditions. Testing algorithms can help determine when to use specific tests.

When selecting a test, the ordering physician can consider the pretest probability of a diagnosis. Pretest probability is the likelihood that a patient has an infection or condition before testing occurs.

The third step in the pre-analytical phase is the test request. Clinical laboratories need written or electronic patient test requests before testing can begin.

The fourth step in the pre-analytical phase is specimen collection. The test request should be

reviewed to ensure the specimen type and amount collected are correct. Healthcare professionals involved in the specimen collection should also take care to avoid an unacceptable patient specimen.

Finally, the healthcare professionals involved in the specimen collection label and store each specimen collection container. They are responsible for ensuring that patient information on the authorized test request is correct and that the correct patient and specimen are matched to the test request. Clear and correct labels should be applied as soon as a specimen is collected. Labels should also be checked to verify that the patient's name and a unique patient identifier, such as the patient's date of birth, are listed. Specific specimen storage and preservation procedures outlined by the laboratory should be followed.

The fifth step in the pre-analytic phase is specimen transport, where the patient specimen is transferred to the laboratory. Healthcare professionals should follow laboratory or facility policies and procedures for specimen collection, packaging, and transport. The laboratory determines the proper specimen temperature to maintain and provides packing and shipping procedures as needed.

The last step in the pre-analytic phase marks the transition from the patient care setting to the laboratory setting, where the laboratory receives patient specimens. Each specimen is evaluated for laboratory-specific acceptance or rejection criteria. Laboratory specimen rejection criteria may include poor condition upon arrival such as clotted blood or an improper collection tube, insufficient volume, incorrect specimen type, incorrect labeling, incorrect temperature, and transfer delays.

The specimen is often assigned an accession number for a laboratory information management system. Laboratory professionals record the date and time a specimen is received. The next phase of the total testing process is the analytic phase, which includes testing patient samples in a laboratory setting.

Written procedure manuals for sample preparation and testing should be available to laboratory professionals. Sample preparation and testing procedures will be laboratory specific. Sample preparation is the first step in the analytical phase. A sample is a portion of the patient specimen, which has been prepped for testing. The laboratory can define criteria for appropriate testing conditions, which may include proper storage of reagents and specimens, accurate and reliable test system operation, and test result reporting.

Sample testing is performed to gather data and is the last step in the analytic phase. Monitoring and documenting testing conditions can help assess the quality of the testing system.

The post-analytical phase is the final phase of the Total Testing Process. Studies suggest this phase may have the second highest possibility for errors. Activities include analyzing testing data, reporting test results, and interpreting test results. The post-analytic phase begins in the

laboratory setting and ends in the patient care setting. The ordering physician not retrieving test results and misinterpreting test results are common challenges during this phase.

The data analysis step is when the data is processed to determine a test result. For example, a false-positive diagnosis may lead to patient overtreatment, while a delayed or missed diagnosis may lead to patient undertreatment.

The reporting step is where the laboratory provides the results of the testing. Test results are commonly entered into an electronic reporting system such as a laboratory information system. Test results can be shared with the ordering physician and appropriate care teams.

Following the laboratory report results, the physician provides the patient with a diagnosis and treatment. The physician also determines if additional testing or any other follow-up procedures are required. Care teams could consider the test result in context with the patient's symptoms and any additional test results. Appropriate testing and treatment improve patient outcomes.

The Total Testing Process is a guide for clinical testing cycles to remain accurate and efficient. It includes the pre-analytic, analytic, and post-analytic phases. To ensure quality patient care, diagnostic laboratories should establish procedures that follow CLIA regulations and monitor quality to correct possible errors in the testing system.