SLO Public Health Laboratory Bulletin

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Test of Cure: traditional and molecular methods

Although often not recommended by some authorities for verification of success of treatment, health care providers often resort to repeated testing to determine treatment success, or to remove restriction on occupational activities. However, the increasing use of molecular amplification tests for detection of infection often means that these tests will be used as test of cure as well. There are caveats to this practice.

Traditional Test of Cure: culture. For certain infections, such as tuberculosis and gastrointestinal salmonellosis, culture is standard for successful eradication of the infecting organism. Culture is highly specific and is the prime indicator that the infecting agent is no longer viable. The measurement of viability almost certainly guarantees the culture will remain the gold standard for tests of cure for some time to come. However, after administration of antibiotic therapy the time that needs to elapse before a test of cure specimen can be taken varies greatly depending on the test method. For infections with shigatoxin-producing E coli ---often E coli O157:H7-- where antibiotic therapy is not advised, carriage of the organism may persist for some time, requiring repeated cultures to verify that an individual patient is no longer shedding.

Molecular Tests of cure: When culture was the common method for diagnosis of Chlamydia infections, it was common and correct to collect a specimen 72 hrs after completion of therapy to ascertain treatment success. If culture is used this time frame is still correct. However molecular amplification methods are now routinely used and the nucleic acids of live or dead Chlamydia may be detected 2 – 3 weeks after successful treatment. Medical insurance reimbursement typically requires that a test of cure–or diagnosis of a newly acquired infection-- be attempted no sooner than 30 days after the last specimen was taken unless medical justification is provided.

Norovirus, called Norwalk or small, round structured viruses in the past, are another agent that has seen the extension of appropriate time for test of cure. When elaborate electron microscopic methods were used, 4-5 days was considered appropriate to assess viral shedding, then a full 7 days for more advanced methods and now 2 to 3 weeks may be required before a sensitive molecular amplification method such as RT-PCR can be expected to yield negative results. Molecular methods, such as PCR, detect nucleic acids – DNA or RNA— and the bacterium or virus does not need to be alive or even intact. The natural elimination processes of the immune system needs time before all remnants of an invader have been degraded. Molecular tests are powerful enough to detect 1-10 DNA molecules or fragments, so the duration of time after therapy must necessarily be increased. Otherwise a clinician may mistake a positive result for test of cure as a treatment failure.

Influenza Update

Until the declared start of the influenza season, PCR testing of rapid flu test-POSITIVE specimens will be performed without a fee for surveillance purposes. Providers should use the Influenza requisition and complete the clinical questionnaire**.** A recent rapid flu test-positive specimen was tested San Luis Obispo Public Health laboratory using the CDC-developed real time, reverse-transcription PCR test and determined to be Influenza A (H3N2) not the pandemic 2009 H1N1 strain.

What else does a public health laboratory do besides flu testing?

Since May 1, 2010 the SLO Public Health laboratory has tested 800 specimens for pertussis by PCR with 21% positive for Bordetella pertussis DNA.