

August 2020

## REFERENCE SERVICES IN MICROBIOLOGY - MICROBIAL DISEASES LABORATORY

1. Reference services of the Microbial Diseases Laboratory (MDL) supplement the diagnostic and reference service of the local public health laboratories.
2. Local health departments should be prepared to supply necessary containers, forms, and information to laboratories and physicians in their jurisdiction.
3. When indicated in the table below, call MDL before collecting and sending specimens.
4. Please fill out laboratory forms completely including all clinical and laboratory data requested. Failure to do so may delay testing. For information needed on Pure Cultures for Identification, contact the specific MDL laboratory unit.
5. Send by mail, or where indicated, by more rapid means of transport. Observe proper packaging and labeling requirements mandated by Federal Regulations.
6. Applicable shipping and packaging regulations should be followed. If refrigeration (or freezing) is required, be sure refrigerant is adequate for time in transit. Indicate on outside of package if it is to be refrigerated or frozen upon arrival at MDL.
7. All specimens, (with the exception of those for serological testing\*) to be sent to the Centers for Disease Control & Prevention (CDC) must be submitted through MDL unless otherwise indicated. Necessary information must accompany the specimen.

**\*Serums submitted for patient antibody testing by the CDC should be submitted through the local public health laboratory for forwarding to the CDC unless otherwise indicated. Please notify MDL by faxing a copy of both sides of your completed CDC DASH form to the MDL at 510-412-3706.**

### 8. **Potential Bioterrorism Agent Protocol:**

1. **Notify the nearest FBI Field Office immediately when suspected bioterrorism events and/or environmental exposure situations arise.**  
(California locations: Los Angeles, Sacramento, San Diego, and San Francisco).
2. **Contact your local Public Health Laboratory or the Microbial Diseases Laboratory for assistance in obtaining LRN-B Reference testing.**

**Potential bioterrorism agents include:** *Bacillus anthracis*, *Francisella tularensis*, *Brucella* species (*B. abortus*, *B. melitensis*, *B. suis*), *Yersinia pestis*, *Burkholderia pseudomallei*/ *Burkholderia mallei*, botulinum neurotoxin-producing species of *Clostridium*, botulinum neurotoxin

**-SERVICES IN BACTERIAL DISEASES SECTION  
REFERENCE BACTERIOLOGY UNIT-**

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
<i>Borrelia species</i>	Confirmation or identification	Blood Smear or EDTA Blood	CDC	Please contact Dr. Hillary Berman-Watson at (510) 412-3903 ( <a href="mailto:hillary.berman-watson@cdph.ca.gov">hillary.berman-watson@cdph.ca.gov</a> ) or Dr. Peng Zhang ( <a href="mailto:peng.zhang@cdph.ca.gov">peng.zhang@cdph.ca.gov</a> ) before submitting specimens. CDC approval required before shipping samples.
Carbapenemase Resistant <i>Enterobacteriaceae</i> (CRE), <i>Pseudomonas aeruginosa</i> (CRPA), and <i>Acinetobacter baumannii</i> (CRAB)	Carbapenemase detection (phenotypic testing)	Pure culture	MDL or CDC	Testing for carbapenemase production by the Modified Carbapenem Inactivation Method (mCIM) test at MDL is limited to <i>Escherichia coli</i> , <i>Klebsiella oxytoca</i> , <i>Klebsiella pneumoniae</i> , <i>Enterobacter species</i> , and <i>Pseudomonas aeruginosa</i> that are either (1) resistant to at least one carbapenem (i.e., imipenem, ertapenem, doripenem, or meropenem), or (2) documented to possess a carbapenemase by another phenotypic test.

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
	Carbapenemase gene detection (real time PCR based methods)	Pure culture		<p>Appropriate isolates for carbapenemase gene detection testing at MDL are members of the Enterobacteriaceae and <i>Pseudomonas aeruginosa</i> having a non-susceptible MIC to a carbapenem using current Clinical Laboratory Standards Institute (CLSI) standards <b>and</b> a positive or indeterminate mCIM or Modified Hodge Test (MHT) if phenotypic testing has been performed.</p> <p>Isolates must be submitted with the isolate identification, associated antibiogram containing MICs to the beta- lactams, and the results of the MHT or mCIM, if performed.</p> <p>Testing for carbapenemase production or genes in other organisms, including <i>Acinetobacter baumannii</i> and other Enterobacteriaceae, may be performed by the regional ARLN lab or at CDC. This testing is performed on a case by case basis and requires approval prior to submission. Please contact Dr. Hillary Berman-Watson (510) 412-3903 (<a href="mailto:hillary.berman-watson@cdph.ca.gov">hillary.berman-watson@cdph.ca.gov</a>) or Dr. Peng Zhang (<a href="mailto:peng.zhang@cdph.ca.gov">peng.zhang@cdph.ca.gov</a>) for additional information.</p>
	Additional testing including Expanded AST testing through ARLN/CDC	Pure culture	ARLN regional lab or CDC	<p>Pan-non-susceptible isolates should be routinely submitted. Additional testing may be done by the regional ARLN lab or at CDC. This testing is done on a case by case basis and requires approval prior to submission. Please contact Dr. Hillary Berman-Watson (510) 412-3903 (<a href="mailto:hillary.berman-watson@cdph.ca.gov">hillary.berman-watson@cdph.ca.gov</a>) or Dr. Peng Zhang (<a href="mailto:peng.zhang@cdph.ca.gov">peng.zhang@cdph.ca.gov</a>) for additional information.</p>

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
<i>Legionella</i>	Confirmation or identification	Pure culture	MDL	Please contact Dr. Hillary Berman-Watson at the MDL (510) 412-3903 ( <a href="mailto:hillary.berman-watson@cdph.ca.gov">hillary.berman-watson@cdph.ca.gov</a> ), or Dr. Peng Zhang ( <a href="mailto:peng.zhang@cdph.ca.gov">peng.zhang@cdph.ca.gov</a> ) for additional information.
<i>Listeria monocytogenes</i>	Subtyping	Pure culture	MDL or CDC	Please submit all isolates for laboratory surveillance purposes only. Contact Dr. Hillary Berman-Watson at (510) 412- 3903 ( <a href="mailto:hillary.berman-watson@cdph.ca.gov">hillary.berman-watson@cdph.ca.gov</a> ), or Dr. Varvara Kozyreva (PulseNet) ( <a href="mailto:varvara.kozyreva@cdph.ca.gov">varvara.kozyreva@cdph.ca.gov</a> ) for additional information.
Miscellaneous bacteria, including: aerobic <i>Actinomyces</i> , anaerobes, gram-positive and gram-negative rods and cocci  <b>Excludes</b> <i>Enterobacteriaceae</i> (Enterics), <i>Vibrionaceae</i> ( <i>Vibrio</i> spp.), <i>Mycobacteriaceae</i> ( <i>Mycobacteria</i> ), potential Select Agents, and Vaccine Preventable Pathogens	Confirmation or identification	Pure culture	MDL	Assistance with identification of miscellaneous bacteria when the clinical and laboratory data indicate involvement of the isolate in a disease process. Please contact Dr. Hillary Berman-Watson (510) 412-3903 ( <a href="mailto:hillary.berman-watson@cdph.ca.gov">hillary.berman-watson@cdph.ca.gov</a> ) or Dr. Peng Zhang ( <a href="mailto:peng.zhang@cdph.ca.gov">peng.zhang@cdph.ca.gov</a> ) for additional information.  <ul style="list-style-type: none"> <li>• For Enterics and <i>Vibrio</i> spp., see “Services in Foodborne &amp; Waterborne Diseases Section”</li> <li>• For Mycobacteria, see “Services in Mycobacteriology”</li> <li>• For Select Agents, see “Services in High Risk Pathogens”</li> <li>• For Vaccine Preventable Pathogens, see “Services in Vaccine Preventable Pathogens &amp; Molecular Bacteriology Unit”</li> </ul>
	Serologic Grouping and Typing  Biotyping	Pure culture	CDC	Performed only on isolates from sterile clinical sources. Please contact Dr. Hillary Berman-Watson at (510) 412-3903 ( <a href="mailto:hillary.berman-watson@cdph.ca.gov">hillary.berman-watson@cdph.ca.gov</a> ), or Dr. Peng Zhang ( <a href="mailto:peng.zhang@cdph.ca.gov">peng.zhang@cdph.ca.gov</a> ) before submitting cultures.

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
Molecular subtyping	Nosocomial or community outbreaks	Pure culture	MDL	Available for a variety of infectious agents, Please contact Dr. Hillary Berman-Watson at (510) 412-3903 ( <a href="mailto:hillary.berman-watson@cdph.ca.gov">hillary.berman-watson@cdph.ca.gov</a> ) or Dr. Peng Zhang ( <a href="mailto:peng.zhang@cdph.ca.gov">peng.zhang@cdph.ca.gov</a> ) before submitting cultures.
<i>Neisseria gonorrhoeae</i>	Confirmation, identification, or AST	Pure culture	MDL/ CDC (AST)	Please contact Dr. Hillary Berman-Watson at (510) 412-3903 ( <a href="mailto:hillary.berman-watson@cdph.ca.gov">hillary.berman-watson@cdph.ca.gov</a> ), or Dr. Peng Zhang ( <a href="mailto:peng.zhang@cdph.ca.gov">peng.zhang@cdph.ca.gov</a> ) for additional information.
<i>Staphylococcus aureus</i>	Confirmation or identification	Pure culture	MDL	Please contact Dr. Hillary Berman-Watson (510) 412-3903 ( <a href="mailto:hillary.berman-watson@cdph.ca.gov">hillary.berman-watson@cdph.ca.gov</a> ), or Dr. Peng Zhang ( <a href="mailto:peng.zhang@cdph.ca.gov">peng.zhang@cdph.ca.gov</a> ) before submitting cultures.
	Confirmation of AST	Pure culture	CDC	
Group A <i>Streptococci</i> , beta-hemolytic	M & T Typing	Pure culture	CDC	Service restricted to special cases where type may be significant (epidemiologic studies, etc.). CDC determines testing availability. Please contact Dr. Hillary Berman-Watson (510) 412-3903 ( <a href="mailto:hillary.berman-watson@cdph.ca.gov">hillary.berman-watson@cdph.ca.gov</a> ), or Dr. Peng Zhang ( <a href="mailto:peng.zhang@cdph.ca.gov">peng.zhang@cdph.ca.gov</a> ) before submitting cultures.

**- SERVICES IN BACTERIAL DISEASES SECTION  
VACCINE PREVENTABLE PATHOGENS & MOLECULAR BACTERIOLOGY UNIT -**

<b>ORGANISM OR DISEASE</b>	<b>SERVICES</b>	<b>SPECIMENS</b>	<b>SOURCE</b>	<b>COMMENTS</b>
<i>Bordetella pertussis</i>	Identification or Confirmation	Pure culture	MDL	Please contact Dr. Peng Zhang ( <a href="mailto:peng.zhang@cdph.ca.gov">peng.zhang@cdph.ca.gov</a> ) or Dr. Jennifer Kyle ( <a href="mailto:jennifer.kyle@cdph.ca.gov">jennifer.kyle@cdph.ca.gov</a> ) at MDL (510) 412-3700 for additional information.
<i>Corynebacterium diphtheriae</i>	Identification or Confirmation, Toxigenicity testing	Pure culture	MDL/CDC	Please contact Dr. Peng Zhang or Dr. Jennifer Kyle at (510) 412-3700 ( <a href="mailto:peng.zhang@cdph.ca.gov">peng.zhang@cdph.ca.gov</a> ; <a href="mailto:jennifer.kyle@cdph.ca.gov">jennifer.kyle@cdph.ca.gov</a> ) for additional information.
<i>Haemophilus influenzae</i>	Identification or Confirmation, Serotyping	Pure culture from sterile site	MDL	Please contact Dr. Jennifer Kyle at the MDL (510) 412-3903 ( <a href="mailto:jennifer.kyle@cdph.ca.gov">jennifer.kyle@cdph.ca.gov</a> ) or Dr. Peng Zhang ( <a href="mailto:peng.zhang@cdph.ca.gov">peng.zhang@cdph.ca.gov</a> ) for additional information.
	Molecular Detection	Sterile-site specimen (Culture Negative)	MDL	Specimen submission requires high clinical suspicion of bacterial meningitis. Please contact Dr. Peng Zhang ( <a href="mailto:peng.zhang@cdph.ca.gov">peng.zhang@cdph.ca.gov</a> ) or Dr. Jennifer Kyle ( <a href="mailto:jennifer.kyle@cdph.ca.gov">jennifer.kyle@cdph.ca.gov</a> ) at MDL (510) 412-3700 for additional information and approval.
<i>Neisseria meningitidis</i>	Identification or Confirmation	Pure culture from sterile site or eye	MDL	Please contact Dr. Peng Zhang or Dr. Jennifer Kyle at MDL (510) 412-3700 ( <a href="mailto:peng.zhang@cdph.ca.gov">peng.zhang@cdph.ca.gov</a> ; or <a href="mailto:jennifer.kyle@cdph.ca.gov">jennifer.kyle@cdph.ca.gov</a> ). Human isolates <b>MUST</b> be sent to local or state lab.
	Serogrouping	Pure culture or PCR-positive specimen from sterile site	MDL	Please contact Please contact Dr. Peng Zhang ( <a href="mailto:peng.zhang@cdph.ca.gov">peng.zhang@cdph.ca.gov</a> ) or Dr. Jennifer Kyle ( <a href="mailto:jennifer.kyle@cdph.ca.gov">jennifer.kyle@cdph.ca.gov</a> ) at MDL (510) 412-3700 for additional information.
	Molecular Detection	Sterile-site specimen (Culture negative)	MDL	Specimen submission requires high clinical suspicion of bacterial meningitis. Please contact Dr. Peng Zhang ( <a href="mailto:peng.zhang@cdph.ca.gov">peng.zhang@cdph.ca.gov</a> ) or Dr. Jennifer Kyle ( <a href="mailto:jennifer.kyle@cdph.ca.gov">jennifer.kyle@cdph.ca.gov</a> ) at MDL (510) 412-3700 for additional information and approval.

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
<i>Streptococcus pneumoniae</i>	Serotyping	Pure culture from sterile site	CDC	Services restricted to special cases where serotyping may be significant (outbreak, potential vaccine failure, epidemiologic studies, etc.). Please contact Dr. Peng Zhang ( <a href="mailto:peng.zhang@cdph.ca.gov">peng.zhang@cdph.ca.gov</a> ) or Dr. Jennifer Kyle ( <a href="mailto:jennifer.kyle@cdph.ca.gov">jennifer.kyle@cdph.ca.gov</a> ) at (510) 412-3700 for additional information or approval.
	Molecular Detection	Sterile-site specimen (Culture Negative)	MDL	Specimen submission requires high clinical suspicion of bacterial meningitis. Please contact Dr. Peng Zhang ( <a href="mailto:peng.zhang@cdph.ca.gov">peng.zhang@cdph.ca.gov</a> ) or Dr. Kyle ( <a href="mailto:jennifer.kyle@cdph.ca.gov">jennifer.kyle@cdph.ca.gov</a> ) at (510) 412-3700 for additional information or approval.

**- SERVICES IN IMMUNODIAGNOSTICS & MOLECULAR CHARACTERIZATION SECTION -**

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
<i>Salmonella</i>	Serotyping	Pure culture identified as <i>Salmonella</i> species	MDL	Submitted cultures are required to be previously determined as pure isolates of <i>Salmonella</i> species. Please contact Linda Sae-Jang (510) 412-3913 ( <a href="mailto:linda.sae-jang@cdph.ca.gov">linda.sae-jang@cdph.ca.gov</a> ) or Dr. Fengfeng Xu ( <a href="mailto:fengfeng.xu@cdph.ca.gov">fengfeng.xu@cdph.ca.gov</a> ) for additional information.
Whole Genome Sequencing (WGS) / Next Generation Sequencing (NGS) (Bacteria)	Sequencing and Bioinformatics	Pure Culture, Sequence Data	MDL	Isolates or sequence data files can be submitted after consultation. Please contact Dr. Rituparna Mukhopadhyay ( <a href="mailto:rituparna.mukhopadhyay@cdph.ca.gov">rituparna.mukhopadhyay@cdph.ca.gov</a> ), OR Matthew Sylvester ( <a href="mailto:matthew.sylvester@cdph.ca.gov">matthew.sylvester@cdph.ca.gov</a> )



**- SERVICES IN FOODBORNE & WATERBORNE DISEASES SECTION -**

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
Cholera				See <i>Vibrio cholerae</i> .
<i>Enterobacteriaceae</i>	Confirmation or identification	Pure culture	MDL	<p>Assistance in identification of <i>Enterobacteriaceae</i> when the clinical laboratory and epidemiological data indicates involvement of the isolate in a disease or outbreak investigation. Prior arrangements must be made with MDL before submitting cultures. For <i>Salmonella</i> testing see Immunodiagnostic Services.</p> <p>Please contact Greg Inami (510) 412-3796 (<a href="mailto:greg.inami@cdph.ca.gov">greg.inami@cdph.ca.gov</a>) or Dr. Stephanie Abromaitis (<a href="mailto:stephanie.abromaitis@cdph.ca.gov">stephanie.abromaitis@cdph.ca.gov</a>) for additional information.</p>
Whole Genome Sequencing (WGS) for PulseNet	<p>Whole Genome Sequencing (WGS)</p> <p>Data upload to the PulseNet national database and NCBI</p>	Pure culture	MDL	<p>WGS is routinely performed on isolates of <i>Salmonella</i>, <i>E. coli</i> O157, and <i>Listeria</i>. Typing of non-O157 STEC, <i>Shigella</i>, <i>Campylobacter</i> and <i>Vibrio</i> is available when the clinical laboratory and epidemiological data indicates involvement of the isolate in a disease or outbreak investigation.</p> <p>Please contact Dr. Varvara Kozyreva (<a href="mailto:varvara.kozyreva@cdph.ca.gov">varvara.kozyreva@cdph.ca.gov</a>) or Dr. Stephanie Abromaitis (<a href="mailto:stephanie.abromaitis@cdph.ca.gov">stephanie.abromaitis@cdph.ca.gov</a>) for additional information.</p>

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
Shiga toxin-producing <i>Escherichia coli</i> (STEC) including O157 and non-O157 strains	Serotyping  Shiga toxin testing (PCR)	Stool in Cary Blair transport medium shipped with cold packs.  GN or MAC broths shipped with cold packs.  Pure culture	MDL	In accordance with Title 17, submit all STEC isolates or Shiga-toxin-positive fecal broths to the local or State public health laboratory for laboratory surveillance purposes. Note: GN or MAC broth is preferred over a stool specimen for the detection of STEC. If possible, please submit a STX-positive broth with 1-5 isolates identified as <i>E.coli</i> .  Please contact Greg Inami (510) 412-3796 ( <a href="mailto:greg.inami@cdph.ca.gov">greg.inami@cdph.ca.gov</a> ) or Dr. Stephanie Abromaitis ( <a href="mailto:stephanie.abromaitis@cdph.ca.gov">stephanie.abromaitis@cdph.ca.gov</a> ) for additional information.
<i>Shigella</i>	Serotyping  Shiga toxin testing (PCR)	Pure culture	MDL	In accordance with Title 17, all <i>Shigella</i> isolates must be submitted to the local or State public health laboratory for laboratory surveillance purposes.  Please contact Greg Inami (510) 412-3796 ( <a href="mailto:greg.inami@cdph.ca.gov">greg.inami@cdph.ca.gov</a> ) or Dr. Stephanie Abromaitis ( <a href="mailto:stephanie.abromaitis@cdph.ca.gov">stephanie.abromaitis@cdph.ca.gov</a> ) for additional information.

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
<i>Vibrio cholerae</i>	Identification/biotyping  Serotyping  Toxin testing (PCR)	Pure culture	MDL	Biotyping for El Tor or Classical biotypes O1, Inaba, O139, O141 and Ogawa serogrouping. Service restricted to special epidemiological investigations.  Please contact Greg Inami (510) 412-3796 ( <a href="mailto:greg.inami@cdph.ca.gov">greg.inami@cdph.ca.gov</a> ) or Dr. Stephanie Abromaitis ( <a href="mailto:stephanie.abromaitis@cdph.ca.gov">stephanie.abromaitis@cdph.ca.gov</a> ) for additional information.
<i>Vibrio</i> , other species	Identification	Pure culture	MDL	Cultures may be tested if warranted by epidemiologic investigation (arrangements must be made with MDL before submitting cultures).  Please contact Greg Inami (510) 412-3796 ( <a href="mailto:greg.inami@cdph.ca.gov">greg.inami@cdph.ca.gov</a> ) or Dr. Stephanie Abromaitis ( <a href="mailto:stephanie.abromaitis@cdph.ca.gov">stephanie.abromaitis@cdph.ca.gov</a> ) for additional information.
<i>Yersinia enterocolitica</i>	Identification  Serotyping  Biotyping	Pure culture	MDL	Cultures may be tested if warranted by epidemiologic investigation (arrangements must be made with MDL before submitting cultures).  Please contact Greg Inami (510) 412-3796 ( <a href="mailto:greg.inami@cdph.ca.gov">greg.inami@cdph.ca.gov</a> ) or Dr. Stephanie Abromaitis ( <a href="mailto:stephanie.abromaitis@cdph.ca.gov">stephanie.abromaitis@cdph.ca.gov</a> ) for additional information.
<i>Yersinia pseudotuberculosis</i>	Identification	Pure culture	MDL	Cultures may be tested if warranted by epidemiologic investigation (arrangements must be made with MDL before submitting cultures).  Please contact Greg Inami (510) 412-3796 ( <a href="mailto:greg.inami@cdph.ca.gov">greg.inami@cdph.ca.gov</a> ) or Dr. Stephanie Abromaitis ( <a href="mailto:stephanie.abromaitis@cdph.ca.gov">stephanie.abromaitis@cdph.ca.gov</a> ) for additional information.

**- SERVICES IN HIGH RISK PATHOGENS SECTION -**

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
(Botulism – Adult)  Botulinum neurotoxin and <i>Clostridium botulinum</i> and Botulinum neurotoxin producing species of <i>Clostridium</i>	Isolation and identification  Confirmation by direct toxin testing	Pure culture* Specimen*  *Consult required prior to shipping	MDL  CDC (for additional characteri zation)	<p><b>Potential bioterrorism agent (see note 8, page 1)</b> Call during Business Hours</p> <p>1) Dr. Jayakumar Poovassery – LRN-B Coordinator (<a href="mailto:jayakumar.poovassery@cdph.ca.gov">jayakumar.poovassery@cdph.ca.gov</a>) at 510-307-8557, 510-621-8743 (cell), <b>OR</b></p> <p>2) Mahtab Shahkarami (<a href="mailto:mahtab.shahkarami@cdph.ca.gov">mahtab.shahkarami@cdph.ca.gov</a>) at 510-307-9822, <b>OR</b></p> <p>3) Dr. Laura Smoot (<a href="mailto:laura.smoot@cdph.ca.gov">laura.smoot@cdph.ca.gov</a>) at 510-412-3738</p> <p><b>Call during Non-Business Hours</b>                      CDPH Duty Officer at 916-328-3605</p>
(Botulism – Infant, age ≤16 months)  Botulinum neurotoxin and <i>Clostridium botulinum</i> and Botulinum neurotoxin producing species of <i>Clostridium</i>	Isolation and identification  Confirmation by direct toxin testing	Solid or liquid (enema) fecal specimens*  *Consult is required	MDL	<p><b>Potential bioterrorism agent (see note 8, page 1)</b>                      Contact on-call physician 510-231-7600 (24/7/365)</p>

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
<p><b>Select Agents - Not Botulism</b></p> <p><i>Bacillus anthracis</i> (anthrax)</p> <p><i>Brucella</i> species</p> <p><i>Burkholderia mallei</i> or <i>Burkholderia pseudomallei</i></p> <p><i>Francisella tularensis</i> (tularemia)</p> <p><i>Yersinia pestis</i> (plague)</p>	<p>Confirmation or identification</p>	<p>Pure culture* Specimen* Environmental sample*</p> <p>*Consult required prior to shipping</p>	<p>MDL</p> <p>CDC (for additional characterization)</p>	<p><b>Potential bioterrorism agent (see note 8, page 1)</b></p> <p>Call algorithm during Business Hours</p> <p>1) Dr. Jayakumar Poovassery – LRN-B Coordinator (<a href="mailto:jayakumar.poovassery@cdph.ca.gov">jayakumar.poovassery@cdph.ca.gov</a>) at 510-307-8557, 510-621-8743 (cell), <b>OR</b></p> <p>2) Mahtab Shahkarami (<a href="mailto:mahtab.shahkarami@cdph.ca.gov">mahtab.shahkarami@cdph.ca.gov</a>) at 510-307-9822, <b>OR</b></p> <p>3) Dr. Laura Smoot (<a href="mailto:laura.smoot@cdph.ca.gov">laura.smoot@cdph.ca.gov</a>) at 510-412-3738</p> <p><b>Call during Non-Business Hours</b> CDPH Duty Officer at 916-328-3605</p>

**- SERVICES IN MYCOBACTERIOLOGY –**

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
<i>Mycobacteria</i>	Confirmation or Identification	Pure culture	MDL	<p>Primary identification using MALDI-TOF MS and/or DNA sequencing. For mycobacteria isolated from sputum specimens, screening for clinical relevance by the local public health laboratory is expected. See Am J Respir Crit Care Med Vol 175. pp 367–416, 2007.</p> <p>Please contact Sphoorthy Rao at (510) 412-3924 (<a href="mailto:sphoorthy.rao@cdph.ca.gov">sphoorthy.rao@cdph.ca.gov</a>) for additional information.</p>

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
<i>Mycobacteria</i> ( <i>Mycobacterium tuberculosis</i> Complex, MTBC)	Pyrosequencing (PSQ) for molecular direct detection of MTBC, and molecular-based DST	Acid-fast smear positive processed pulmonary sediments or sterile pulmonary and extrapulmonary specimens (1+ AFB or greater), at least 0.5 ml of sediments	MDL	Molecular testing may be requested on a limited basis depending on available resources. The molecular technique used is pyrosequencing (PSQ). PSQ targets are used for detection of MTBC (including differentiation of <i>M. bovis</i> ), and detection of mutations associated with INH, rifampin, quinolone or injectable drug resistance. Please contact the drug susceptibility testing laboratory at the MDL (510) 412-3929, or Dr. Linlin Li by email ( <a href="mailto:linlin.li@cdph.ca.gov">linlin.li@cdph.ca.gov</a> ) for prior approval.
	Culture-based DST	Pure culture	MDL	Testing for susceptibility to primary drugs Isoniazid, Rifampin, Ethambutol and Pyrazinamide, is restricted to cultures of MTBC from public health laboratories unable to provide this service, and to problem cultures from other laboratories. Submitter's results must accompany the specimen. Testing for susceptibility to secondary drugs, including Streptomycin, will be performed if requested, or if the isolate is resistant to rifampin or any two primary drugs. Secondary drugs include amikacin, capreomycin, moxifloxacin, and ethionamide.
				CDC
Tuberculosis				See <i>Mycobacteria</i> .

**- SERVICES IN MYCOLOGY -**

<b>ORGANISM OR DISEASE</b>	<b>SERVICES</b>	<b>SPECIMENS</b>	<b>SOURCE</b>	<b>COMMENTS</b>
<i>Coccidioides immitis</i>	PCR MALDI-TOF MS Ribosomal DNA sequencing	Pure culture in screw capped tube	CDPH	Please contact Dr. Linlin Li at the MDL (510) 412-3926 ( <a href="mailto:linlin.li@cdph.ca.gov">linlin.li@cdph.ca.gov</a> ), for additional information.
<i>Coccidioides posadasii</i>	PCR MALDI-TOF MS Ribosomal DNA Sequencing	Pure culture in screw capped tube	CDPH	Please contact Dr. Linlin Li at the MDL (510) 412-3926 ( <a href="mailto:linlin.li@cdph.ca.gov">linlin.li@cdph.ca.gov</a> ), for additional information.
Fungi	MALDI-TOF MS Ribosomal DNA sequencing	Pure culture on solid media	CDPH	Please contact Dr. Linlin Li at the MDL (510) 412-3926 ( <a href="mailto:linlin.li@cdph.ca.gov">linlin.li@cdph.ca.gov</a> ), for additional information.
Leprosy				Contact Hansen's Disease Regional Center in Martinez, Los Angeles, or San Diego. Information is available online at <a href="http://www.hrsa.gov/hansens/clinics.htm">http://www.hrsa.gov/hansens/clinics.htm</a> or (800) 642- 2477.
Yeast	MALDI-TOF MS Ribosomal DNA Sequencing	Pure culture in screw capped tube	CDPH	Please contact Dr. Linlin Li at the MDL (510) 412-3926 ( <a href="mailto:linlin.li@cdph.ca.gov">linlin.li@cdph.ca.gov</a> ), for additional information.
Yeast and Mold	MALDI-TOF Ribosomal DNA Sequencing	Pure culture in screw capped tube	CDPH	Please contact Dr. Linlin Li at the MDL (510) 412-3926 ( <a href="mailto:linlin.li@cdph.ca.gov">linlin.li@cdph.ca.gov</a> ), for additional information.
<i>Histoplasma sp.</i>	MALDI-TOF Ribosomal DNA Sequencing	Pure culture in screw capped tube	CDC	Please contact Dr. Linlin Li at the MDL (510) 412-3926 ( <a href="mailto:linlin.li@cdph.ca.gov">linlin.li@cdph.ca.gov</a> ), for additional information.



**- SERVICES IN PARASITOLOGY -**

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
Malaria	PCR	Whole blood  Whole blood, blood films, and other specified by CDC	MDL  CDC	Please contact Dr. Nirmala Dhungana at (510) 412-3924 ( <a href="mailto:nirmala.dhungana@cdph.ca.gov">nirmala.dhungana@cdph.ca.gov</a> ), or Dr. Zenda Berrada at (510) 307-8547, ( <a href="mailto:zenda.berrada@cdph.ca.gov">zenda.berrada@cdph.ca.gov</a> ) before submission to MDL or CDC.
Blood parasites	Identification, Confirmation	Whole blood, blood films, and other specified by CDC	CDC	Services include examination of thick and thin blood films for blood parasites (malarial parasites, hemoflagellates, filarial worms, etc.).  Please contact Dr. Nirmala Dhungana at (510) 412-3924 ( <a href="mailto:nirmala.dhungana@cdph.ca.gov">nirmala.dhungana@cdph.ca.gov</a> ), or Dr. Zenda Berrada at (510) 307-8547 ( <a href="mailto:zenda.berrada@cdph.ca.gov">zenda.berrada@cdph.ca.gov</a> ) before submitting specimens to CDC.
<i>Entamoeba histolytica</i> <i>Giardia intestinalis</i> ( <i>lamblia</i> ) <i>Cryptosporidium spp.</i> <i>Cyclospora cayetanensis</i>	PCR	Liver aspirates, Stools in PVA, Cary-Blair, or frozen		Please contact Dr. Nirmala Dhungana at (510) 412-3924 ( <a href="mailto:nirmala.dhungana@cdph.ca.gov">nirmala.dhungana@cdph.ca.gov</a> ), or Dr. Zenda Berrada at (510) 307-8547 ( <a href="mailto:zenda.berrada@cdph.ca.gov">zenda.berrada@cdph.ca.gov</a> ) before submission to MDL.