

State of California Department of Public Health  
Microbial Diseases Laboratory  
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(510) 412-3700 – FAX (510) 412-3706

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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 cases and 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 microbes 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*

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
<i>Bacillus anthracis</i> (anthrax)	Confirmation or identification  Serology	Pure culture or specimen  Serum	MDL  CDC	* <b>Potential bioterrorism agent.</b> See note 8 on page 1.  Please contact Dr. Fengfeng Xu or Margot Graves at the MDL (510) 412-3903 ( <a href="mailto:fengfeng.xu@cdph.ca.gov">fengfeng.xu@cdph.ca.gov</a> , <a href="mailto:margot.graves@cdph.ca.gov">margot.graves@cdph.ca.gov</a> ) before submitting specimens to CDC.
<i>Borrelia species</i>	Confirmation or identification	Blood Smear or EDTA Blood	CDC	Please contact Margot Graves at the MDL (510) 412-3903 ( <a href="mailto:margot.graves@cdph.ca.gov">margot.graves@cdph.ca.gov</a> ), before submitting specimens. CDC approval required before shipping samples.
<i>Brucella sp.</i>	Confirmation or identification  Serology	Pure culture or specimen  Serum	MDL  CDC	* <b>Potential bioterrorism agent.</b> See note 8 on page 1.  Please contact Dr. Fengfeng Xu or Margot Graves at the MDL (510) 412-3903 ( <a href="mailto:fengfeng.xu@cdph.ca.gov">fengfeng.xu@cdph.ca.gov</a> , <a href="mailto:margot.graves@cdph.ca.gov">margot.graves@cdph.ca.gov</a> ) before submitting specimens to CDC.
<i>Burkholderia pseudomallei</i>	Confirmation or identification  serology	Pure culture or specimen  Serum	MDL  CDC	* <b>Potential bioterrorism agent.</b> See note 8 on page 1.  Please contact Dr. Fengfeng Xu or Margot Graves at the MDL (510) 412-3903 ( <a href="mailto:fengfeng.xu@cdph.ca.gov">fengfeng.xu@cdph.ca.gov</a> , <a href="mailto:margot.graves@cdph.ca.gov">margot.graves@cdph.ca.gov</a> ) before submitting specimens to CDC.

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Cholera				See <i>Vibrio cholerae</i> .
<i>Clostridium botulinum</i>	Identification or confirmation	Pure culture	MDL	<b>*Potential bioterrorism agent.</b> See note 8 on page 1.
	Direct Toxin testing  Toxin testing and Isolation	Serum  Stool  Foods  Other		<ul style="list-style-type: none"> <li>• Routine diagnostic specimens must be investigated and approved for testing by County Health Department or CDPH DCDC.</li> <li>• Local Public Health Laboratory needs to review the MDL acceptance criteria (see MDL182.103107) before shipping. Specimens without the proper volume or conditions will not be tested.</li> <li>• Please contact Dr. Fengfeng Xu or Margot Graves at the MDL (510) 412-3903 (<a href="mailto:fengfeng.xu@cdph.ca.gov">fengfeng.xu@cdph.ca.gov</a>, <a href="mailto:margot.graves@cdph.ca.gov">margot.graves@cdph.ca.gov</a>) before submitting specimens. Call (510) 412-3903 during working hours, evening, weekends, and holidays.</li> <li>• Specimens (if any) received without prior authorization will not be tested until such authorization is obtained.</li> <li>• Complete an MDL #176 form for each specimen.</li> <li>• Perishable foods must be kept refrigerated or frozen until delivered to laboratory. (Do not freeze foods unless already frozen.) Refrigerate sera and stools. Hand deliver or send by most rapid means of transport.</li> </ul>

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<i>Coccidioides immitis</i>				Please contact Heike Quinn at the MDL (510) 412-3738 ( <a href="mailto:heike.quinn@cdph.ca.gov">heike.quinn@cdph.ca.gov</a> ) for additional information.
<i>Corynebacterium diphtheriae</i>	Confirmation or identification	Pure culture	MDL	Please contact Margot Graves at the MDL (510) 412-3903 ( <a href="mailto:margot.graves@cdph.ca.gov">margot.graves@cdph.ca.gov</a> ) before submitting possible <i>Corynebacterium diphtheriae</i> cultures for identification.
	Toxigenicity testing	Pure culture	CDC	Please contact Margot Graves at the MDL (510) 412-3903 ( <a href="mailto:margot.graves@cdph.ca.gov">margot.graves@cdph.ca.gov</a> ) before submitting cultures for testing.
	Strain Typing	Pure culture	CDC	Typing of <i>C. diphtheriae</i> isolates is restricted to epidemiologic studies. Contact Margot Graves at the MDL (510) 412-3903 ( <a href="mailto:margot.graves@cdph.ca.gov">margot.graves@cdph.ca.gov</a> ) before submitting cultures.
<i>Enterobacteriaceae</i>	Carbapenemase gene detection ( <i>kpc</i> , <i>ndm</i> )	Pure culture on Non-inhibitory media slant or deep. Transport at room temperature.	MDL	Appropriate isolates for testing are members of the <i>Enterobacteriaceae</i> having a non-susceptible MIC to a carbapenem using current Clinical Laboratory Standards Institute (CLSI) standards, and a positive or indeterminate Modified Hodge Test (MHT). Isolates must be submitted with the associated antibiogram containing MICs to the beta-lactams and the results of the MHT, if performed. Please contact Greg Inami at the MDL (510) 412-3796 ( <a href="mailto:greg.inami@cdph.ca.gov">greg.inami@cdph.ca.gov</a> ) for additional information.

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
<p><i>Escherichia coli</i></p> <p><i>Shiga Toxin (STEC)</i></p>	<p>Serotyping, Shiga toxin assay (Vero cell assay),</p> <p>PCR for <i>stx</i></p> <p>Subtyping</p>	<p>Stool in Cary Blair Transport medium shipped with Cold pack.</p> <p>GN or MAC broths shipped with Cold pack.</p> <p>Pure culture</p> <p>Pure culture</p>	<p>MDL</p>	<p>Please contact Greg Inami at the MDL (510) 412-3796 (<a href="mailto:greg.inami@cdph.ca.gov">greg.inami@cdph.ca.gov</a>) for additional information.</p> <p><u>Note:</u> 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>.</p> <p>Please submit all STEC for laboratory surveillance purposes</p>
<p>Bacterial Diarrheal/ Foodborne Disease Organisms</p>	<p>Detection, isolation, and identification</p>	<p>Pure culture</p> <p>Food</p>	<p>MDL</p>	<p>Please contact Greg Inami at the MDL (510) 412-3796 (<a href="mailto:greg.inami@cdph.ca.gov">greg.inami@cdph.ca.gov</a>) before submitting specimens.</p>
<p><i>Francisella tularensis</i></p>	<p>Confirmation or identification</p> <p>serology</p>	<p>Pure culture or specimen</p> <p>Serum</p>	<p>MDL</p> <p>CDC</p>	<p><b>*Potential bioterrorism agent.</b> See note 8 on page 1.</p> <p>Please contact Dr. Fengfeng Xu or Margot Graves at the MDL (510) 412-3903 (<a href="mailto:fengfeng.xu@cdph.ca.gov">fengfeng.xu@cdph.ca.gov</a>, <a href="mailto:margot.graves@cdph.ca.gov">margot.graves@cdph.ca.gov</a>) before submitting specimens to CDC.</p>

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Fungi	Identification ( <i>Coccidioides immitis</i> )	Pure culture	MDL CDC	Please contact Heike Quinn at the MDL (510) 412-3738 ( <a href="mailto:heike.quinn@cdph.ca.gov">heike.quinn@cdph.ca.gov</a> ) for additional information.
<i>Klebsiella</i> and <i>Serratia</i>	Molecular subtyping	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 at the MDL (510) 412-3796 ( <a href="mailto:greg.inami@cdph.ca.gov">greg.inami@cdph.ca.gov</a> ).
<i>Legionella</i>	Confirmation or identification	Pure culture	MDL	Please contact Margot Graves at the MDL (510) 412-3903 ( <a href="mailto:margot.graves@cdph.ca.gov">margot.graves@cdph.ca.gov</a> ) for additional information.
Leprosy				<u>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.</u>
<i>Listeria monocytogenes</i>	Subtyping	Pure culture	MDL/CDC	Please submit all isolates for laboratory surveillance purposes. Contact Margot Graves at the MDL (510) 412-3903 ( <a href="mailto:margot.graves@cdph.ca.gov">margot.graves@cdph.ca.gov</a> ) for additional information.

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Miscellaneous bacteria, including: aerobic <i>Actinomyces</i> , anaerobes, gram-positive and gram negative rods and cocci. Excludes <i>Enterobacteriaceae</i> , <i>Vibrionaceae</i> , <i>Mycobacteriaceae</i> , and all isolates associated with food and water borne outbreaks.	Confirmation or identification	Pure culture	MDL	Assistance in identification of miscellaneous bacteria when the clinical and laboratory data indicate involvement of the isolate in a disease process. Please contact Margot Graves at the MDL (510) 412-3903 ( <a href="mailto:margot.graves@cdph.ca.gov">margot.graves@cdph.ca.gov</a> ) for additional information.
	Serologic Grouping and Typing	Pure culture	MDL and/or CDC	Done only on isolates from sterile clinical sources. Please contact Dr. Fengfeng Xu or Margot Graves at the MDL (510) 412-3903 ( <a href="mailto:fengfeng.xu@cdph.ca.gov">fengfeng.xu@cdph.ca.gov</a> , <a href="mailto:margot.graves@cdph.ca.gov">margot.graves@cdph.ca.gov</a> ) for additional information.
	Biotyping	Pure culture	MDL and/or CDC	Please contact Dr. Fengfeng Xu or Margot Graves at the MDL (510) 412-3903 ( <a href="mailto:fengfeng.xu@cdph.ca.gov">fengfeng.xu@cdph.ca.gov</a> , <a href="mailto:margot.graves@cdph.ca.gov">margot.graves@cdph.ca.gov</a> ) before submitting cultures for typing.
Molecular subtyping	Nosocomial or community outbreaks	Pure culture	MDL	Available for a variety of infectious agents, Please contact Margot Graves at the MDL (510) 412-3903 ( <a href="mailto:margot.graves@cdph.ca.gov">margot.graves@cdph.ca.gov</a> ) before sending cultures.

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<i>Mycobacteria</i>	Identification	Pure culture	MDL	Assistance in identification of mycobacteria. For mycobacteria isolated from sputum samples, screening for clinical relevance by local public laboratory is expected. See Am J Respir Crit Care Med Vol 175. pp 367–416, 2007. Please contact Yvonne Jang at the MDL (510) 412-3924 ( <a href="mailto:yvonne.jang@cdph.ca.gov">yvonne.jang@cdph.ca.gov</a> ) for additional information.
	Direct Detection of <i>M. tuberculosis</i> complex and mutations associated with INH, rifampin, quinolone or injectable drug resistance	Acid-fast smear positive sputum sediments (1+ or greater), at least 0.5 ml of sediments.	MDL	Molecular testing may be requested on a limited basis depending on available resources. Please contact the drug susceptibility testing laboratory at the MDL (510) 412-3929, or Dr. Edward Desmond, Section Chief (510) 412-3781 ( <a href="mailto:ed.desmond@cdph.ca.gov">ed.desmond@cdph.ca.gov</a> ) for prior approval.
	Drug susceptibility tests	Pure culture	MDL  CDC	Testing for susceptibility to primary drugs, INH, Rifampin, Ethambutol and PZA, is restricted to cultures of <i>M. tuberculosis complex</i> 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, and if the isolate is resistant to rifampin or any two primary drugs. Secondary drugs include amikacin, capreomycin, moxifloxacin, and ethionamide.

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<i>Neisseria meningitidis</i>	Confirmation or identification  Serogrouping  Molecular Subtyping  Antimicrobial susceptibility testing	Pure culture or specimen (Blood and CSF)  Pure culture  Pure culture or specimen  Pure culture	MDL  MDL  CDC  CDC	Specimen submission requires high clinical suspicion of bacterial meningitis.  Done only on isolates from sterile clinical sources  Please contact Dr. Fengfeng Xu at the MDL (510) 412-3903 ( <a href="mailto:fengfeng.xu@cdph.ca.gov">fengfeng.xu@cdph.ca.gov</a> ) before submitting specimens.  Please contact Dr. Fengfeng Xu at the MDL (510) 412-3903 ( <a href="mailto:fengfeng.xu@cdph.ca.gov">fengfeng.xu@cdph.ca.gov</a> ) before submitting cultures for testing.
Plague				See <i>Yersinia pestis</i>
<i>Salmonella</i>	Identification    Serotyping    Molecular epityping	Pure culture on non-sugar containing media.	MDL	Human isolates <b>MUST</b> be sent to local or state laboratory. Please contact Heike Quinn at the MDL (510) 412-3738 ( <a href="mailto:heike.quinn@cdph.ca.gov">heike.quinn@cdph.ca.gov</a> ) for additional information.    Epidemiological tracing of <i>S. typhi</i> isolates now done by PFGE. Please contact Greg Inami at the MDL (510) 412-3796 ( <a href="mailto:greg.inami@cdph.ca.gov">greg.inami@cdph.ca.gov</a> ) for additional information.
<i>Shigella</i> *	Serotyping* Molecular epityping	Pure culture	MDL	*Services restricted to special epidemiological investigations and problem cultures. Please contact Greg Inami at the MDL (510) 412-3796 ( <a href="mailto:greg.inami@cdph.ca.gov">greg.inami@cdph.ca.gov</a> ) for additional information.

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Group A, <i>Streptococci</i> , Beta-hemolytic	M & T Typing	Pure culture	CDC	<p>Service restricted to special cases where type may be significant (epidemiologic studies, etc.). CDC determines testing availability.</p> <p>Please contact Margot Graves at the MDL (510) 412-3903 (<a href="mailto:margot.graves@cdph.ca.gov">margot.graves@cdph.ca.gov</a>) before submitting specimens.</p>
<i>Streptococcus pneumoniae</i>	Confirmation or identification	Specimen (Blood and CSF) or pure culture	MDL	Specimen submission requires high clinical suspicion of bacterial meningitis.
	Serotyping	Pure culture	CDC/MDL	<p>Services restricted to special cases where serotyping may be significant (epidemiologic studies, etc.).</p> <p>Please contact Dr. Fengfeng Xu at the MDL (510) 412-3903 (<a href="mailto:fengfeng.xu@cdph.ca.gov">fengfeng.xu@cdph.ca.gov</a>) before submitting specimens</p> <p>Services restricted to special cases where drug susceptibility testing may be significant (epidemiologic studies, etc.).</p>
	Antimicrobial Susceptibility Testing	Pure culture	CDC	Please contact Dr. Fengfeng Xu at the MDL (510) 412-3903 ( <a href="mailto:fengfeng.xu@cdph.ca.gov">fengfeng.xu@cdph.ca.gov</a> ) before submitting specimens.
<i>Staphylococcus aureus</i>	Confirmation or identification	Pure culture	MDL	Please contact Margot Graves at the MDL (510) 412-3903 ( <a href="mailto:margot.graves@cdph.ca.gov">margot.graves@cdph.ca.gov</a> ) for additional information.
	Enterotoxin	Food samples Pure culture, vomitus	CDC/MDL	<p>Foods and pure cultures must be connected to a patient case or outbreak. Pure cultures cannot be tested in the absence of complete information. Samples must be sent for testing refrigerated and by most rapid means of transport. Please contact Greg Inami at the MDL (510) 412-3796 (<a href="mailto:greg.inami@cdph.ca.gov">greg.inami@cdph.ca.gov</a>) before submitting specimens.</p>
	Confirmation of antimicrobial susceptibility testing	Pure culture	CDC	Please contact Margot Graves at the MDL (510) 412-3903 ( <a href="mailto:margot.graves@cdph.ca.gov">margot.graves@cdph.ca.gov</a> ) before submitting specimens.



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- SERVICES IN PARASITOLOGY -				
Blood parasites	Identification  Confirmation	Blood films	MDL	Services include examination of thick and thin blood films for blood parasites (malarial parasites, hemoflagellates, filarial worms, etc.).  Please contact Heike Quinn at the MDL (510) 412-3738 ( <a href="mailto:heike.quinn@cdph.ca.gov">heike.quinn@cdph.ca.gov</a> ) before submitting any tissue samples.
<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	MDL	Samples in 10% Formalin will be rejected. Please contact Heike Quinn at the MDL (510) 412-3738 ( <a href="mailto:heike.quinn@cdph.ca.gov">heike.quinn@cdph.ca.gov</a> ), for additional information.
Ova & parasite exam	FEA concentration Trichrome Stain	Stools in 10% Formalin and Zn- PVA	MDL	Please contact Heike Quinn at the MDL (510) 412-3738 ( <a href="mailto:heike.quinn@cdph.ca.gov">heike.quinn@cdph.ca.gov</a> ), before submitting samples.