

State of California Department of Public Health
Microbial Diseases Laboratory
850 Marina Bay Parkway, E-164
Richmond, California 94804
(510) 412-3700 – FAX (510) 412-3706

August 2016

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	* Potential bioterrorism agent. See note 8 on page 1. Please contact Heike Quinn or Yisma Gebremichael at the MDL (510) 412-3756 (heike.quinn@cdph.ca.gov , yisma.gebremichael@cdph.ca.gov) before submitting specimens to CDC.
<i>Bordetella pertussis</i>	Identification or Confirmation Molecular Detection	Pure Culture Sterile Specimen	MDL MDL	Please contact Dr. Jennifer Kyle at the MDL (510) 412-3903 (jennifer.kyle@cdph.ca.gov) for additional information. Specimen submission requires high clinical suspicion of whooping cough that has been exposed to a confirmed case or is part of a suspected outbreak. Please contact Dr. Jennifer Kyle at the MDL (510) 412-3903 (jennifer.kyle@cdph.ca.gov) before submitting these specimens.
<i>Borrelia species</i>	Confirmation or identification	Blood Smear or EDTA Blood	CDC	Please contact Robin Hogue at the MDL (510) 412-3903 (robin.hogue@cdph.ca.gov), before submitting specimens. CDC approval required before shipping samples.
<i>Brucella sp.</i>	Confirmation or identification Serology	Pure culture or specimen Serum	MDL CDC	* Potential bioterrorism agent. See note 8 on page 1. Please contact Heike Quinn or Yisma Gebremichael at the MDL (510) 412-3756 (heike.quinn@cdph.ca.gov , yisma.gebremichael@cdph.ca.gov) before submitting specimens to CDC.

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
<i>Burkholderia pseudomallei</i>	Confirmation or identification serology	Pure culture or specimen Serum	MDL CDC	* Potential bioterrorism agent. See note 8 on page 1. Please contact Heike Quinn or Yisma Gebremichael at the MDL (510) 412-3756 (heike.quinn@cdph.ca.gov , yisma.gebremichael@cdph.ca.gov) before submitting specimens to CDC.
Cholera				See <i>Vibrio cholerae</i> .

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
---------------------	----------	-----------	--------	----------

<i>Clostridium botulinum</i>	Identification or confirmation	Pure culture	MDL	*Potential bioterrorism agent. See note 8 on page 1.
	Direct Toxin testing Toxin testing and Isolation	Serum Stool Foods Other		<ul style="list-style-type: none"> • Routine diagnostic specimens must be investigated and approved for testing by County Health Department or CDPH DCDC. • 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. • Please contact Heike Quinn or Yisma Gebremichael at the MDL (510) 412-3756 (heike.quinn@cdph.ca.gov, yisma.gebremichael@cdph.ca.gov) before submitting specimens to CDC. • Specimens (if any) received without prior authorization will not be tested until such authorization is obtained. • Complete an MDL #176 form for each specimen. • 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.
<i>Coccidioides immitis</i>				Please contact Heike Quinn at the MDL (510) 412-3738 (heike.quinn@cdph.ca.gov) for additional information.

<i>Corynebacterium diphtheriae</i>	Confirmation or identification	Pure culture or throat swab	MDL	Please contact Jennifer Kyle or Robin Hogue at the MDL (510) 412-3903 (jennifer.kyle@cdph.ca.gov or robin.hogue@cdph.ca.gov), before submitting possible
------------------------------------	--------------------------------	-----------------------------	-----	--

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
	Toxigenicity testing	Pure culture	CDC	<p><i>Corynebacterium diphtheriae</i> cultures or throat swabs for identification.</p> <p>Please contact Jennifer Kyle or Robin Hogue at the MDL (510) 412-3903 (jennifer.kyle@cdph.ca.gov) robin.hogue@cdph.ca.gov, before submitting cultures for testing.</p>
	Strain Typing	Pure culture	CDC	<p>Typing of <i>C. diphtheriae</i> isolates is restricted to epidemiologic studies. Contact Jennifer Kyle or Robin Hogue at the MDL (510) 412-3903 (jennifer.kyle@cdph.ca.gov) robin.hogue@cdph.ca.gov, before submitting cultures.</p>
<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	<p>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 (greg.inami@cdph.ca.gov) for additional information.</p>
<i>Escherichia coli</i>				

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
<i>Shiga Toxin (STEC)</i>	Serotyping, Shiga toxin assay (Vero cell assay), PCR for <i>stx</i> Subtyping	Stool in Cary Blair Transport medium shipped with Cold pack. GN or MAC broths shipped with Cold pack. Pure culture Pure culture	MDL	Please contact Greg Inami at the MDL (510) 412-3796 (greg.inami@cdph.ca.gov) for additional information. 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 submit all STEC for laboratory surveillance purposes
Bacterial Diarrheal/ Foodborne Disease Organisms	Detection, isolation, and identification	Pure culture Food	MDL	Please contact Greg Inami at the MDL (510) 412-3796 (greg.inami@cdph.ca.gov) before submitting specimens.
<i>Francisella tularensis</i>	Confirmation or identification serology	Pure culture or specimen Serum	MDL CDC	*Potential bioterrorism agent. See note 8 on page 1. Please contact Heike Quinn or Yisma Gebremichael at the MDL (510) 412-3756 (heike.quinn@cdph.ca.gov , yisma.gebremichael@cdph.ca.gov) before submitting specimens to CDC.
Fungi	Identification (<i>Coccidioides immitis</i>)			Please see Services in Mycology below.
<i>Haemophilus influenzae</i>	Identification or Confirmation, Serotyping	Pure Culture	MDL	Please contact Dr. Jennifer Kyle at the MDL (510) 412-3903 (jennifer.kyle@cdph.ca.gov) for additional information.

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
	Molecular Detection	Sterile Specimen	MDL	Specimen submission requires high clinical suspicion of bacterial meningitis. Please contact Dr. Jennifer Kyle at the MDL (510) 412-3903 (jennifer.kyle@cdph.ca.gov) before submitting these specimens.
<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 (greg.inami@cdph.ca.gov).
<i>Legionella</i>	Confirmation or identification	Pure culture	MDL	Please contact Robin Hogue at the MDL (510) 412-3903 (robin.hogue@cdph.ca.gov), for additional information.
Leprosy				<u>Contact Hansen's Disease Regional Center in Martinez, Los Angeles, or San Diego. Information is available online at http://www.hrsa.gov/hansens/clinics.htm or (800) 642-2477.</u>
<i>Listeria monocytogenes</i>	Subtyping	Pure culture	MDL/CDC	Please submit all isolates for laboratory surveillance purposes. Contact Robin Hogue at the MDL (510) 412-3903 (robin.hogue@cdph.ca.gov), for additional information.
Miscellaneous bacteria, including: aerobic <i>Actinomycetes</i> , anaerobes, gram-positive and gram-negative rods and cocci. Excludes	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 Robin Hogue at the MDL (510) 412-3903 (robin.hogue@cdph.ca.gov), for additional information.

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
<p><i>Enterobacteriaceae</i>, <i>Vibronaceae</i>, <i>Mycobacteriaceae</i>, and all isolates associated with food and water borne outbreaks.</p>	<p>Serologic Grouping and Typing</p>	<p>Pure culture</p>	<p>MDL and/or CDC</p>	<p>Done only on isolates from sterile clinical sources. Please contact Robin Hogue at the MDL (510) 412-3903 (robin.hogue@cdph.ca.gov), for additional information.</p>
	<p>Biotyping</p>	<p>Pure culture</p>	<p>MDL and/or CDC</p>	<p>Please contact Robin Hogue at the MDL (510) 412-3903 (robin.hogue@cdph.ca.gov), before submitting cultures for typing.</p>
<p>Molecular subtyping</p>	<p>Nosocomial or community outbreaks</p>	<p>Pure culture</p>	<p>MDL</p>	<p>Available for a variety of infectious agents, Please contact Robin Hogue at the MDL (510) 412-3903 (robin.hogue@cdph.ca.gov), before sending cultures.</p>

<p><i>Mycobacteria</i></p>	<p>Identification</p>	<p>Pure culture</p>	<p>MDL</p>	<p>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 (yvonne.jang@cdph.ca.gov) for additional information.</p>
----------------------------	-----------------------	---------------------	------------	---

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
	<p>Direct Detection of <i>M. tuberculosis</i> complex and mutations associated with INH, rifampin, quinolone or injectable drug resistance</p> <p>Drug susceptibility tests</p>	<p>Acid-fast smear positive sputum sediments (1+ or greater), at least 0.5 ml of sediments.</p> <p>Pure culture</p>	<p>MDL</p> <p>MDL</p> <p>CDC</p>	<p>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 (ed.desmond@cdph.ca.gov) for prior approval.</p> <p>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.</p>
<i>Neisseria meningitidis</i>	<p>Confirmation or identification</p> <p>Serogrouping</p> <p>Molecular Subtyping</p>	<p>Pure culture or specimen (Blood and CSF)</p> <p>Pure culture or specimen</p> <p>Pure culture or specimen</p>	<p>MDL</p> <p>MDL</p> <p>CDC</p>	<p>Specimen submission requires high clinical suspicion of bacterial meningitis.</p> <p>Done only on isolates from sterile clinical sources</p> <p>Please contact Dr. Jennifer Kyle at the MDL (510) 412-3903 (jennifer.kyle@cdph.ca.gov) before submitting specimens.</p>

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
---------------------	----------	-----------	--------	----------

Plague				See <i>Yersinia pestis</i>
<i>Salmonella</i>	<p>Identification</p> <p>Serotyping</p> <p>Molecular epityping</p>	Pure culture on non-sugar containing media.	MDL	<p>Human isolates MUST be sent to local or state laboratory. Please contact Dr. Fengfeng Xu at the MDL (510) 412-1470 (Fengfeng.Xu@cdph.ca.gov) for additional information.</p> <p>Epidemiological tracing of <i>S. typhi</i> isolates now done by PFGE. Please contact Greg Inami at the MDL (510) 412-3796 (greg.inami@cdph.ca.gov) for additional information.</p>
<i>Shigella</i> *	<p>Serotyping*</p> <p>Molecular epityping</p>	Pure culture	MDL	*Services restricted to special epidemiological investigations and problem cultures. Please contact Greg Inami at the MDL (510) 412-3796 (greg.inami@cdph.ca.gov) for additional information.

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 Robin Hogue at the MDL (510) 412-3903 (robin.hogue@cdph.ca.gov), 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.

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
	Serotyping	Pure culture	CDC/MDL	Services restricted to special cases where serotyping may be significant (epidemiologic studies, etc.). Please contact Dr. Jennifer Kyle at the MDL (510) 412-3903 (jennifer.kyle@cdph.ca.gov) before submitting specimens. Services restricted to special cases where drug susceptibility testing may be significant (epidemiologic studies, etc.). Please contact Dr. Jennifer Kyle at the MDL (510) 412-3903 (jennifer.kyle@cdph.ca.gov) before submitting specimens.
	Antimicrobial Susceptibility Testing	Pure culture	CDC	
<i>Staphylococcus aureus</i>	Confirmation or identification	Pure culture	MDL	Please contact Robin Hogue at the MDL (510) 412-3903 (robin.hogue@cdph.ca.gov), for additional information.
	Confirmation of antimicrobial susceptibility testing	Pure culture	CDC	Please contact Robin Hogue at the MDL (510) 412-3903 (robin.hogue@cdph.ca.gov), before submitting specimens.
Tuberculosis				See <i>Mycobacteria</i> .
Typhoid				See <i>Salmonella</i> serotyping. Please contact Dr. Fengfeng Xu at the MDL (510) 412-1470 (Fengfeng.Xu@cdph.ca.gov) for additional information.
<i>Vibrio cholerae</i>	<i>Identification/Biotyping</i>	Pure culture	MDL	Biotyping for El Tor or Classical biotypes
	<i>Serotyping</i>			O1, Inaba, O139, O141 and Ogawa serogrouping.
	<i>Toxin testing by PCR</i>			
	<i>Molecular subtyping</i>			Service restricted to special epidemiological investigations Please contact Greg Inami at the MDL (510) 412-3796

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
---------------------	----------	-----------	--------	----------

				(greg.inami@cdph.ca.gov) for additional information.
<i>Yersinia pestis</i>	Confirmation or identification	Pure Culture	MDL	<p>*Potential bioterrorism agent. See note 8 on page 1.</p> <p>Please contact Heike Quinn or Yisma Gebremichael at the MDL (510) 412-3756 (heike.quinn@cdph.ca.gov, yisma.gebremichael@cdph.ca.gov) before submitting specimens to CDC.</p>
	Serology	Serum	CDC	Please contact Heike Quinn at the MDL (510) 412-3756 (heike.quinn@cdph.ca.gov), before submitting specimens to CDC.

- SERVICES IN PARASITOLOGY -				
Blood parasites	Identification	Blood films	MDL	<p>Services include examination of thick and thin blood films for blood parasites (malarial parasites, hemoflagellates, filarial worms, etc.).</p> <p>Please contact Heike Quinn at the MDL (510) 412-3756 (heike.quinn@cdph.ca.gov) before submitting any tissue samples.</p>
	Confirmation			
<i>Entamoeba histolytica</i>	PCR	Liver aspirates, Stools in PVA,	MDL	Samples in 10% Formalin will be rejected. Please contact Heike Quinn at the MDL (510) 412-3756 (heike.quinn@cdph.ca.gov),

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
<i>Giardia intestinalis</i> <i>(lamblia)</i> <i>Cryptosporidium spp</i> <i>Cyclospora cayetanensis</i>		Cary-Blair, or frozen		for additional information.

- SERVICES IN MYCOLOGY -				
Fungi	Referral	Pure culture on solid media	CDPH	Please contact Yvonne Jang at the MDL (510) 412-3924 (yvonne.jang@cdph.ca.gov) or Linlin Li at the MDL (510) 412-3926 (Linlin.li@cdph.ca.gov), for additional information.
<i>Coccidioides immitis</i>	PCR	Pure culture in screw capped tube	CDPH	Please contact Yvonne Jang at the MDL (510) 412-3924 (yvonne.jang@cdph.ca.gov) or Linlin Li at the MDL (510) 412-3926 (Linlin.li@cdph.ca.gov), for additional information.
<i>Coccidioides posadasii</i>	PCR	Pure culture in screw capped tube	CDPH	Please contact Yvonne Jang at the MDL (510) 412-3924 (yvonne.jang@cdph.ca.gov) or Linlin Li at the MDL (510) 412-3926 (Linlin.li@cdph.ca.gov), for additional information.

ORGANISM OR DISEASE	SERVICES	SPECIMENS	SOURCE	COMMENTS
---------------------	----------	-----------	--------	----------

Yeast	MALDI-TOF MS	Pure culture in screw capped tube	CDPH	Please contact Yvonne Jang at the MDL (510) 412-3924 (yvonne.jang@cdph.ca.gov) or Linlin Li at the MDL (510) 412-3926 (Linlin.li@cdph.ca.gov), for additional information.
Yeast and Mold	Ribosomal DNA Sequencing	Pure culture in screw capped tube	CDPH	Please contact Yvonne Jang at the MDL (510) 412-3924 (yvonne.jang@cdph.ca.gov) or Linlin Li at the MDL (510) 412-3926 (Linlin.li@cdph.ca.gov), for additional information.
<i>Histoplasma sp.</i>	Gen-Probe	Pure culture in screw capped tube	CDC	Please contact Yvonne Jang at the MDL (510) 412-3924 (yvonne.jang@cdph.ca.gov) or Linlin Li at the MDL (510) 412-3926 (Linlin.li@cdph.ca.gov), for additional information.