

Reporting Title: Susceptibility, Aerobic, MIC
Performing Location: Rochester

Ordering Guidance:
Mayo Clinic Laboratories will not perform susceptibility testing on select agents (eg, *Bacillus anthracis*, *Brucella* species, *Burkholderia mallei*, *Burkholderia pseudomallei*, *Francisella tularensis*, and *Yersinia pestis*). Consult with your state health department or the Centers for Disease Control and Prevention regarding antimicrobial susceptibility testing of such isolates. For more information see www.selectagents.gov/sat/list.htm.

Shipping Instructions:
1. See [Infectious Specimen Shipping Guidelines](#)
2. Place specimen in a large infectious container and label as an etiologic agent/infectious substance.

Necessary Information:
Organism identification and specimen source are required.

Specimen Requirements:
Supplies: Infectious Container, Large (T146)
Container/Tube: Agar slant or other appropriate media
Specimen Volume: Organism in pure culture
Collection Instructions:
1. Perform isolation of infecting bacteria.
2. Organism must be in pure culture, actively growing. **Do not submit mixed cultures.**

Forms:
If not ordering electronically, complete, print, and send a [Microbiology Test Request](#) (T244) with the specimen.

Specimen Type	Temperature	Time	Special Container
Varies	Ambient (preferred)		
	Frozen		
	Refrigerated		

Ask at Order Entry (AOE) Questions:

Test ID	Question ID	Description	Type	Reportable
ZMMLS	Q00M0070	Specimen Source (Required) and Organism Identification (Required unless concurrent identification test is ordered)	Plain Text	Yes

Result Codes:

Result ID	Reporting Name	Type	Unit	LOINC®
ZMMLS	Susceptibility, Aerobic, MIC	Alphanumeric		21070-8

LOINC® and CPT codes are provided by the performing laboratory.

Supplemental Report:

No

CPT Code Information:

- 87077-Ident by MALDI-TOF mass spec (if appropriate)
- 87185-Beta lactamase (if appropriate)
- 87186-Antimicrobial Susceptibility, Aerobic Bacteria, MIC-per organism for routine battery (if appropriate)
- 87181-Susceptibility per drug and per organism for drugs not in routine battery (if appropriate)
- 87150-H pylori + Clarithro Resistance PCR (if appropriate)
- 87150-mecA PCR (if appropriate)

Reflex Tests:

Test Id	Reporting Name	CPT Units	CPT Code	Always Performed	Available Separately
RMALD	Ident by MALDI-TOF mass spec	1	87077	No	No, (Bill Only)
BLA	Beta Lactamase	1	87185	No	No, (Bill Only)
SUS	Susceptibility	1	87181	No	No, (Bill Only)
HPCR1	H pylori + Clarithro Resistance PCR	1	87150	No	No, (Bill Only)
MARP1	mecA PCR (Bill Only)	1	87150	No	No, (Bill Only)

Result Codes for Reflex Tests:

Test ID	Result ID	Reporting Name	Type	Unit	LOINC®
MARP1	MARP1	mecA PCR (Bill Only)	Alphanumeric		Bill only; no result

Reference Values:

Susceptibility results are reported as minimal inhibitory concentration (MIC) in mcg/mL Breakpoints (also known as "clinical breakpoints") are used to categorize an organism as susceptible, susceptible-dose dependent, intermediate, resistant, or nonsusceptible according to breakpoint setting organizations, either the Clinical and Laboratory Standards Institute (CLSI) or the European Committee on Antimicrobial Susceptibility Testing (EUCAST), as applicable.

In some instances, an interpretive category cannot be provided based on available data and the following comment will be included: "There are no established interpretive guidelines for agents reported without interpretations."

Clinical and Laboratory Standards Institute (CLSI) Interpretive Category Definitions:

Susceptible:

A category defined by a breakpoint that implies that isolates with an MIC at or below or a zone diameter at or above the susceptible breakpoint are inhibited by the usually achievable concentrations of antimicrobial agent when the dosage recommended to treat the site of infection is used, resulting in likely clinical efficacy.

Susceptible-Dose Dependent:

A category defined by a breakpoint that implies that susceptibility of an isolate depends on the dosing regimen that is used in the patient. To achieve levels that are likely to be clinically effective against isolates for which the susceptibility testing results (either MICs or zone diameters) are in the susceptible-dose dependent (SDD) category, it is necessary to use a dosing regimen (ie, higher doses, more frequent doses, or both) that results in higher drug exposure than that achieved with the dose that was used to establish the susceptible breakpoint. Consideration should be given to the maximum literature-supported dosage regimens, because higher exposure gives the highest probability of adequate coverage of a SDD isolate. The drug label should be consulted for recommended doses and adjustment for organ function.

Intermediate:

A category defined by a breakpoint that includes isolates with MICs or zone diameters within the intermediate range that approach usually attainable blood and tissue levels and/or for which response rates may be lower than for susceptible isolates.

Note: The intermediate category implies clinical efficacy in body sites where the drugs are physiologically concentrated or when a higher than normal dosage of a drug can be used. This category also includes a buffer zone, which should prevent small, uncontrolled, technical factors from causing major discrepancies in interpretations, especially for drugs with narrow pharmacotoxicity margins.

Resistant:

A category defined by a breakpoint that implies that isolates with an MIC at or above or a zone diameter at or below the resistant breakpoint are not inhibited by the usually achievable concentrations of the agent with normal dosage schedules and/or that demonstrate MICs or zone diameters that fall in the range in which specific microbial resistance mechanisms are likely, and clinical efficacy of the agent against the isolate has not been reliably shown in treatment studies.

Nonsusceptible:

A category used for isolates for which only a susceptible breakpoint is designated because of the absence or rare occurrence of resistant strains. Isolates for which the antimicrobial agent MICs are above or the zone diameters are below the value indicated for the susceptible breakpoint should be reported as nonsusceptible.

Note: An isolate that is interpreted as nonsusceptible does not necessarily mean that the isolate has a resistance mechanism. It is possible that isolates with MICs above the susceptible breakpoint that lack resistance mechanisms may be encountered within the wild-type distribution after the time the susceptible-only breakpoint was set.

Epidemiological Cutoff Value:

The MIC that separates microbial populations into those with and without phenotypically detectable resistance (non-wild-type or wild-type, respectively). The epidemiological cutoff value (ECV) defines the highest MIC for the wild type population of isolates. ECVs are based on in vitro data only, using MIC distributions. ECVs are not clinical breakpoints, and the clinical relevance of ECVs for a particular patient has not yet been identified or approved by CLSI or any regulatory agency.

When an ECV is reported, an interpretive category is not assigned, and the following comment will be included: "This MIC is consistent with the Epidemiological Cutoff Value (ECV) observed in isolates (WITH / WITHOUT) acquired resistance; however, correlation with treatment outcome is unknown."

-Wild-type (WT) – an interpretive category defined by an ECV that describes the microbial population with no

phenotypically detectable mechanisms of resistance or reduced susceptibility for an antimicrobial agent being evaluated.

-Non-wild-type (NWT) – an interpretive category defined by an ECV that describes the microbial population with phenotypically detectable mechanisms of resistance or reduced susceptibility for the antimicrobial agent being evaluated.

Note: MIC values for which ECV's are defined are not to be interpreted or reported as susceptible, intermediate or resistant but rather as WT or NWT. The ECV's should not be used as clinical breakpoints. (Clinical and Laboratory Standards Institute [CLSI]. Performance Standards for Antimicrobial Susceptibility Testing. 31st ed. CLSI supplement M100. CLSI; 2021:4-6, 268-269)

European Committee on Antimicrobial Susceptibility Testing (EUCAST) Interpretive Category Definitions:

S - Susceptible, standard dosing regimen: A microorganism is categorized as "Susceptible, standard dosing regimen", when there is a high likelihood of therapeutic success using a standard dosing regimen of the agent

I - Susceptible, increased exposure*: A microorganism is categorized as "Susceptible, Increased exposure*" when there is a high likelihood of therapeutic success because exposure to the agent is increased by adjusting the dosing regimen or by its concentration at the site of infection.

R - Resistant: A microorganism is categorized as "Resistant" when there is a high likelihood of therapeutic failure even when there is increased exposure*.

*Exposure is a function of how the mode of administration, dose, dosing interval, infusion time, as well as distribution and excretion of the antimicrobial agent will influence the infecting organism at the site of infection.

(The European Committee on Antimicrobial Susceptibility Testing. Breakpoint tables for interpretation of MICs and zone diameters. v11.0, 2021. Available at www.eucast.org.)