

## Overview

### Useful For

Diagnosing anaerobic bacterial infections

Directing antimicrobial therapy for anaerobic infections

### Reflex Tests

Test Id	Reporting Name	Available Separately	Always Performed
ANAID	Anaerobe Ident	No, (Bill Only)	No
RMALA	Id MALDI-TOF Mass Spec Anaerobe	No, (Bill Only)	No
ISAN	Anaerobe Ident by Sequencing	No, (Bill Only)	No
PCRID	Identification by PCR	No, (Bill Only)	No
TISSR	Tissue Processing	No, (Bill Only)	No
BLA	Beta Lactamase	No, (Bill Only)	No
BATTA	Anaerobe Suscep Battery	No, (Bill Only)	No
SANA	Anaerobe Suscep per agent	No, (Bill Only)	No
MECAB	mecA PCR Test, Bill Only	No, (Bill Only)	No

### Testing Algorithm

When this test is ordered, the reflex tests may be performed at an additional charge. All bacterial organisms submitted will automatically have susceptibility testing performed and billed as appropriate. Antimicrobial agents appropriate to the organism and specimen source will be tested according to Mayo Clinic's practice and the laboratory's standard operating procedures.

See [Anaerobic Bacteria Antimicrobials](#) for a listing of the antimicrobials routinely tested in our laboratory as well as antimicrobials that may be tested upon request. Call 800-533-1710 and ask to speak to the Bacteriology Anaerobe Laboratory if the organism or antimicrobial of interest is not listed in this table.

For information see [Infective Endocarditis: Diagnostic Testing for Identification of Microbiological Etiology](#).

### Special Instructions

- [Anaerobic Bacteria Antimicrobials](#)
- [Infective Endocarditis: Diagnostic Testing for Identification of Microbiological Etiology](#)

### Method Name

Conventional Culture Technique with Minimal Inhibitory Concentration (MIC) by Agar Dilution (if appropriate)

**NY State Available**

Yes

**Specimen****Specimen Type**

Varies

**Shipping Instructions**

Specimen should arrive within 72 hours of collection.

**Necessary Information**

Specimen source is required.

**Specimen Required****Supplies:** Anaerobic Transport Tube (T588)**Acceptable Sources:** Deep tissues, sterile body fluids, abscesses, percutaneous transtracheal aspirates, suprapubic aspirations, or wounds**Collection Instructions:** Specimen should be obtained by using a needle and syringe from a source not normally colonized by anaerobes.**Forms**If not ordering electronically, complete, print, and send a [Microbiology Test Request](#) (T244) with the specimen.**Reject Due To**

Swab	Reject
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**Specimen Stability Information**

Specimen Type	Temperature	Time	Special Container
Varies	Ambient	72 hours	

**Clinical & Interpretive****Clinical Information**

Anaerobic bacteria are the greatest component of the human body's normal bacterial flora. Anaerobes colonize the skin, oral cavity, and genitourinary and lower gastrointestinal tracts, and generally do not cause infection. Their presence is important for vitamin and other nutrient absorption and in preventing infection with pathogenic bacteria.

When usual skin and mucosal barriers are compromised, in an anaerobic environment, these bacteria can behave as

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pathogens. Typical anaerobic infections include periodontitis, abdominal or pelvic abscesses, endometritis, pelvic inflammatory disease, aspiration pneumonia, empyema and lung abscesses, sinusitis, brain abscesses, gas gangrene, and other soft tissue infections.

Anaerobes grow aggressively in the body under anaerobic conditions and may possess a variety of virulence factors including capsules and extracellular enzymes. They also can develop resistance to antimicrobials by producing beta-lactamase and other modifying enzymes, and by alterations in membrane permeability and structure of penicillin-binding proteins. Susceptibility testing results are useful to clinicians because anaerobic bacteria are a significant cause of human infection, and they are often resistant to commonly used antimicrobials. *Bacteroides* and *Parabacteroides* species produce beta-lactamases. Ertapenem, metronidazole, and clindamycin are generally effective agents although resistance to clindamycin, and occasionally ertapenem, is increasing.

The minimal inhibitory concentration (MIC) obtained during antimicrobial susceptibility testing is helpful in indicating the concentration of antimicrobial agent required at the site of infection necessary to inhibit the infecting organism. For each organism-antimicrobial agent combination, the Clinical and Laboratory Standards Institute and/or the European Committee on Antimicrobial Susceptibility Testing provides interpretive criteria for determining whether the MIC should be interpreted as susceptible, susceptible dose dependent, intermediate, nonsusceptible, resistant, or epidemiological cutoff value.

**Reference Values**

No growth

Identification of probable pathogens

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; therefore, the following comment will be included on the report: There are no established interpretive guidelines for agents reported without interpretations.

For information regarding CLSI and EUCAST susceptibility interpretations, see [Susceptibility Interpretative Category Definitions](#).

**Interpretation**

Isolation of anaerobes in significant numbers from specimens collected under sterile conditions including blood, other normally sterile body fluids, or closed collections of purulent fluid indicates infection with those organisms.

A susceptible category result and a low minimum inhibitory concentration value indicate in vitro susceptibility of the organism to the antimicrobial tested.

For interpretation of various antimicrobial susceptibility interpretive categories (ie, susceptible, intermediate, resistant,

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or epidemiological cutoff value), see Reference Values.

**Cautions**

Specimens may be collected by needle and syringe aspiration or surgical drainage to avoid contamination with normal-flora anaerobes; such contamination would make interpretation of culture results impossible.

Specimens must be transported in anaerobic transport vials.

When antimicrobial susceptibilities are performed, in vitro susceptibility does not guarantee clinical response. Therefore, the decision to treat with a particular agent should not be based solely on the antimicrobial susceptibility testing result.

**Clinical Reference**

1. Rosenblatt JE, Brook I. Clinical relevance of susceptibility testing of anaerobic bacteria. *Clin Infect Dis.* 1993;16(Suppl 4):S446-S448
2. Summanen P, Baron EJ, Citron DM, et al. *Wadsworth Anaerobic Bacteriology Manual.* 6th ed. Star Publishing Co; 2002
3. Schuetz AN, Carpenter DE. Susceptibility test methods: anaerobic bacteria. In: Carroll KC, Pfaller MA, eds. *Manual of Clinical Microbiology.* 12th ed. ASM Press; 2019:1377-1397
4. Hall GS. Anaerobic Bacteriology. In: Leber AL, ed. *Clinical Microbiology Procedures Handbook.* Vol 1. 4th ed. ASM Press; 2016:section 4
5. Jenkins SG, Schuetz AN. Current concepts in laboratory testing to guide antimicrobial therapy. *Mayo Clin Proc.* 2012;87(3):290-308

**Performance****Method Description**

Appropriate specimens are inoculated onto blood agar, phenylethyl alcohol agar, and lysed blood agar containing gentamicin and vancomycin and into thioglycollate broth tubes. After 48 hours of incubation at 35 degrees C in an anaerobic atmosphere, colonies are identified using 1 or a combination of the following techniques: Gram stain, use of various differential media, aerotolerance testing, conventional biochemical tests, matrix-assisted laser desorption/ionization time-of-flight mass spectrometry, real-time polymerase chain reaction, or 16S ribosomal RNA gene sequencing.(Procop GW, Church DL, Hall GS, et al. *The anaerobic bacteria.* In: Koneman's Color Atlas and Textbook of Diagnostic Microbiology. 7th ed. Wolters; 2017:983-1073)

An agar dilution method is used for routine susceptibility testing. The antimicrobial is added to agar in various concentrations depending upon levels attainable in serum. A standardized suspension of the organism is applied to the agar plates, which are incubated anaerobically for 42 to 48 hours at 35 to 37 degrees C. The end point is that in which a marked reduction occurs in the appearance of growth on the test plate as compared to that of growth on the control plate. Examples of marked change include a change from confluent growth to a haze, less than 10 tiny colonies, or 1 to 3 normal-sized colonies.(Clinical and Laboratory Standards Institute [CLSI]. *Methods for Antimicrobial Susceptibility Testing of Anaerobic Bacteria.* 9th ed. CLSI standard M11. CLSI; 2018)

**PDF Report**

No

### Day(s) Performed

Monday through Sunday

### Report Available

14 to 20 days

### Specimen Retention Time

7 days

### Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Main Campus

## Fees & Codes

### Fees

- Authorized users can sign in to [Test Prices](#) for detailed fee information.
- Clients without access to Test Prices can contact [Customer Service](#) 24 hours a day, seven days a week.
- Prospective clients should contact their account representative. For assistance, contact [Customer Service](#).

### Test Classification

This test has been cleared, approved, or is exempt by the US Food and Drug Administration and is used per manufacturer's instructions. Performance characteristics were verified by Mayo Clinic in a manner consistent with CLIA requirements.

### CPT Code Information

87075-Bacterial Culture, Anaerobic

87076-Anaerobe Ident (if appropriate)

87076-Id MALDI-TOF Mass Spec Anaerobe (if appropriate)

87153-Anaerobe Ident by Sequencing (if appropriate)

87150-Identification by PCR (if appropriate)

87176-Tissue Processing (if appropriate)

87185-Beta Lactamase (if appropriate)

87186-Antimicrobial Susceptibility, Anaerobic Bacteria, MIC (if appropriate)

87181-Anaerobe Susceptibility per agent (if appropriate)

87150-mecA PCR (if appropriate)

### LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
ANAES	Bacterial Culture, Anaerobic + Susc	635-3

## Test Definition: ANAES

Bacterial Culture, Anaerobic with Antimicrobial  
Susceptibilities, Varies

Result ID	Test Result Name	Result LOINC® Value
ANAES	Bacterial Culture, Anaerobic + Susc	635-3