# Test Definition: KKRP

Kingella kingae, Molecular Detection, PCR, Varies

## Overview

### Useful For
Aiding in the diagnosis of *Kingella kingae* infection using tissue or synovial fluid specimens

### Method Name
Real-Time Polymerase Chain Reaction (PCR)

### NY State Available
Yes

## Specimen

### Specimen Type
Varies

### Necessary Information
**Specimen source is required.**

### Specimen Required
The high sensitivity of amplification by polymerase chain reaction requires the specimen to be processed in an environment in which contamination of the specimen by *Kingella kingae* DNA is unlikely.

**Submit only 1 of the following specimens:**

**Specimen Type:** Synovial fluid
**Preferred:** Lavender top (EDTA)
**Acceptable:** Pink top (EDTA), royal blue top (EDTA), sterile vial containing EDTA-derived aliquot, red clot tube (no anticoagulant), or sterile container
**Specimen Volume:** 0.5 mL
**Collection Instructions:** Send specimen in original tube (preferred).
**Specimen Stability Information:** Refrigerated (preferred) <7 days /Frozen <7 days

**Specimen Type:** Fresh tissue or biopsy
**Sources:** Bone, joint, synovium, heart valve, aorta, or endocardium
**Container/Tube:** Sterile container
**Specimen Volume:** Entire collection or 5 mm(3)- approximately the size of a pencil eraser
**Collection Instructions:**
1. Collect fresh tissue specimen.
2. Submit tissue only, do not add fluid to tissue

3. Refrigerate or freeze specimen.
**Specimen Stability Information:** Refrigerated (preferred) <7 days/ Frozen <7 days

**Preferred Paraffin-embedded tissue block:**
**Specimen Type:** Formalin-fixed, paraffin-embedded tissue block (FFPE)
**Sources:** Bone, joint, synovium, heart valve, aorta, or endocardium
**Supplies:** Tissue Block Container (T553)
**Container/Tube:** Tissue block
**Collection Instructions:** Submit a formalin-fixed, paraffin-embedded tissue block to be cut and returned.
**Specimen Stability Information:** Ambient (preferred)/Refrigerated

**Acceptable Paraffin-embedded tissue block:**
**Specimen Type:** Formalin-fixed, paraffin-embedded tissue block (FFPE)
**Sources:** Bone, joint, synovium, heart valve, aorta, or endocardium
**Container/Tube:** Sterile container for each individual cut section (scroll).
**Collection Instructions:** Perform microtomy and prepare five separate 10-micron sections. **Each section (scroll) must be placed in a separate sterile container for submission.**
**Specimen Stability Information:** Ambient (preferred)/Refrigerated

## Forms

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

## Specimen Minimum Volume

Fluid/fresh tissue or biopsy: See Specimen Required
Paraffin-embedded tissue block: Two 10-micron sections

## Reject Due To

| | |
|---|---|
| Tissue in formalin, formaldehyde, or acetone Decalcified bone Bone marrow Slides | Reject |

## Specimen Stability Information

| Specimen Type | Temperature | Time | Special Container |
|---|---|---|---|
| Varies | Varies | | |

## Clinical & Interpretive

## Clinical Information

*Kingella kingae* is a fastidious short gram-negative bacillus that may colonize the oropharynx of young children. Colonization may occasionally lead to invasive disease via hematogenous dissemination, primarily in children younger than 4 years of age. This most commonly results in bone and joint infection; *K kingae* is the most frequent cause of osteomyelitis and septic arthritis in children aged 6 to 36 months. *K kingae* may also cause endocarditis, involving both native and prosthetic valves, in patients of any age and is considered part of the HACEK (*Haemophilus* species, *Aggregatibacter* species, *Cardiobacterium hominis, Eikenella corrodens*, and *Kingella* species) group of organisms, known for causing culture-negative endocarditis. *K kingae* produces a repeat-in-toxin (RTX) toxin.

Diagnosis of *K kingae* infection may be challenging due to the fastidious nature of the organism in culture. Evaluation of cardiac, bone, joint tissue, or fluid by polymerase chain reaction is a useful tool for the diagnosis of some cases of *K kingae* infection.

## Reference Values

Not applicable

## Interpretation

A positive result indicates the presence of *Kingella kingae* DNA.

A negative result indicates the absence of detectable *K kingae* DNA but does not negate the presence of the organism and may occur due to inhibition of PCR, sequence variability underlying primers or probes, or the presence of *K kingae* DNA in quantities less than the limit of detection of the assay.

## Cautions

Test results should be used as an aid in diagnosis. The single assay should not be used as the only criteria to form a clinical conclusion, but results should be correlated with patient symptoms and clinical presentation. A negative result does not negate the presence of the organism or active disease.

This assay does not detect species of *Kingella* other than *kingae* or *negevensis* (see Supportive Data).

This assay cross-reacts with *Kingella negevensis*.(1)

## Supportive Data

This assay was validated by testing 30-spiked positive samples and 10-negative samples for each accepted sample type; fresh tissue, formalin-fixed paraffin-embedded tissue (FFPE), synovial fluid, and EDTA blood. No PCR inhibition was encountered. The assay was 100% sensitive and specific. The assay showed no cross-reactivity when tested with a panel of 67 bacterial isolates, including *Kingella* species other than *kingae*. The limit of detection (LOD) in fresh tissue and FFPE was 73.7 CFU/mcL. The LOD of synovial fluid was 1.3 CFU/mcL.

## Clinical Reference

1. El Houmami N, Bzdreng J, Durand GA, et al: Molecular tests that target the RTX locus do not distinguish between Kingella kingae and the recently described Kingella negevensis species. J Clin Microbiol. 2017 Oct;55(10):3113-3122
2. Murphy TF: Moraxella catarrhalis, Kingella, and other gram-negative cocci. In: Bennett JE. Dolin R, Blaser MJ, eds. Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases. 9th ed. Elsevier; 2020:chap 213
3. Yagupsky P: Kingella kingae: carriage, transmission, and disease. Clin Microbiol Rev. 2015 Jan;28(1):54-79

4. Madigan T, Cunningham SA, Ramanan P, et al: Real-time PCR assay for detection of Kingella kingae in children. J Pediatr Infect Dis. 2018;13(3):216-233. doi: 10.1055/s-0038-1641603

## Performance

### Method Description

Nucleic acid is extracted from the specimen using the automated MagNA Pure instrument. Target specific primers are used to amplify the *rxtB* gene region of *Kingella kingae*; amplification is monitored by detecting fluorescence produced by target specific fluorescence resonance energy transfer hybridization probes. This real-time polymerase chain reaction (PCR) takes place on a LightCycler instrument. Detection of the *K kingae* target is performed through melting curve analysis using the LightCycler software.(Cockerill FR, Uhl JR: Applications and challenges of real-time PCR for the clinical microbiology laboratory. In: Reischl U, Wittwer C, Cockerill F, eds. Rapid Cycle Real-Time PCR Methods and Applications. Springer-Verlag, 2002:3-27; Zbinden R: Aggregatibacter, Capnocytophaga, Eikenella, Kingella, Pasteurella, and other fastidious or rarely encountered gram-negative rods. In: Carroll K, Pfaller M, eds. Manual of Clinical Microbiology. 12th ed. ASM Press; 2019:656-669)

### PDF Report

No

### Day(s) Performed

Monday through Friday

### Report Available

2 to 7 days

### Specimen Retention Time

1 week

### 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 was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. It has not been cleared or approved by the US Food and Drug Administration.

## CPT Code Information

87798

## LOINC® Information

| Test ID | Test Order Name | Order LOINC® Value |
|---|---|---|
| KKRP | Kingella kingae PCR | 65809-6 |

| Result ID | Test Result Name | Result LOINC® Value |
|---|---|---|
| KKSRC | Specimen Source | 31208-2 |
| 48324 | Kingella kingae PCR | 65809-6 |