Bacillus - other than B cereus grp. Brevibacillus spp. Lysinibacillus spp. Paenibacillus ssp. (LTR79357)

Edit Approved By: Dragan, Tatiana (07/25/2023) **Revision: 4.00**

Organism

- ***Bacillus spp.* (other than *B. cereus* group)**
- ***Brevibacillus spp.***
- ***Lysinibacillus spp.***
- ***Paenibacillus spp.***

Clinical

These organisms are widely distributed in nature, especially in soil environments. Their spores may contaminate dried foods (spices, tea, flour, powders). They represent environmental contaminants in most specimens (including blood cultures). There are over 70 species of Bacillus species that may cause a variety of infections, (septicemia, endocarditis, brain abscess, peritonitis, wound and ocular infections) especially in immunocompromised patients. Foodborne diarrhea illness may also be caused by some of these organisms.

Clinical infections associated with *Bacillus spp.*	
Organism	**Clinical**
B. circulans	Isolated from cases of bacteremia in cancer patients, meningitis, CSF shunt infections, endophthalmitis, endocarditis, wound infections, and peritonitis in a patient undergoing dialysis.
B. licheniformis	Reported agent of food-borne diarrheal illness, leading to at least one fatality. Other reported infections involve: prosthetic valve endocarditis, pacemaker wire infection, endophthalmitis, ventriculitis following the removal of a meningioma, brain abscesses, septicemia following arteriography, bacteremia associated with indwelling central venous catheters, and peritonitis in patients undergoing continuous ambulatory peritoneal dialysis. Sepsis in immunocompetent patients has also been reported.
B. megaterium	Reported as a cause of keratitis. Also occasionally recovered from blood, wounds, and urine. Skin lesions can resemble cutaneous anthrax, and phenotypically, the organism can mimic *B. anthracis*.
B. pumilus	Implicated in cases of cutaneous, pustule, and rectal fistula infections, bacteremias in immunosuppressed patients, a central venous catheter infection in an immunocompetent child, and sepsis in neonates, and at least one fatality has been reported. Toxigenic strains have been isolated from cases of food-borne illness and implicated in a rice-associated food poisoning outbreak.

Clinical (continued)

Clinical infections associated with *Brevibacillus / Lysinibacillus / Paenibacillus spp.*	
Organism	**Clinical**
Brevibacillus spp	Have been recovered from BAL, breast abscess and blood.
Lysinibacilllus sphaericus	An insecticidal toxin commercialized for mosquito control programs. Has been implicated in a fatal lung pseudotumor, bacteremia and meningitis.
P. alvei	Isolated from cases of meningitis, a prosthetic hip infection in a patient with sickle cell anemia, wound infections, and in association with *Clostridium perfringens*, a case of gas gangrene.
P. macerans	Isolated from a wound infection following removal of a malignant melanoma, from a brain abscess following penetrating periorbital injury, and from a catheter-associated infection in a leukemic patient.
P. polymyxa	Isolated from patients with bacteremia.
P. glucanolyticus	Involved in cardiac device-related endocarditis.

Usual susceptibility pattern

These organisms are usually susceptible to vancomycin, gentamicin, ciprofloxacin, imipenem, erythromycin and TMP-SMX. Susceptibility to penicillin, cephalosporins, chloramphenicol, clindamycin and tetracycline is variable. Rare resistance to vancomycin has been reported.

Susceptibility method

Etest method using Mueller-Hinton agar with 5% sheep blood incubated in 5% CO_2 at 35°C for 20-24 hours.

Use 1.0 McFarland suspension in broth

Bacillus (other than *B. cereus group) / Brevibacillus spp. / Lysinibacillus spp. / Paenibacillus spp.*, Continued

Susceptibility reporting

	CSF/ Brain	Blood	Sterile Body Site	Eyes (See Note)	Other	Comments
Ciprofloxacin		✓*	✓*	✓	✓*	*Do not report in patients < 18 y
Clindamycin		*	✓	✓	✓	***See Special Considerations**
Gentamicin				*		***See Special Considerations**
Imipenem	*	✓	✓	2		2nd line if cipro I/R * Test and consult microbiologist prior to reporting
Meropenem	*	✓	✓	2		2nd line if cipro I/R * Test and consult microbiologist prior to reporting
Penicillin	✓	✓	✓	✓	✓	
Tetracycline					✓	Do not report in patients < 8 y
Vancomycin	✓	✓	✓	✓	2	**See Special Considerations** 2nd line if pen I/R

Note

Deep eye specimens:	Perform susceptibility testing according to report chart if:

• vitreous fluid	• canaliculitis	• corneal ulcer / scrapings
• chamber aspirate	• endophthalmitis	• contact lens related infections
• intraocular fluid	• donor sclera	• ophthalmology clinic/ward
• keratitis	• chorioretinitis	• history of failure of therapy
• injury/surgery	• cornea	• preseptal/orbital cellulitis

Special considerations

Clindamycin:	Clindamycin may be reported on blood culture isolates on physician request. It is NOT recommended for treatment of endocarditis.
Gentamicin:	Consult microbiologist regarding the need for gentamicin susceptibility testing. If requested by microbiologist send to reference lab for gentamicin MIC testing.
Vancomycin:	These organisms should be susceptible to vancomycin. Consult MOC if I/R. Confirmation with broth microdilution and molecular testing for *van* genes may be needed.

Interpretation Use **CLSI** interpretive document for **Bacillus species (Not B. anthracis) and Related Genera.**