

Gram-Positive Cocci	Condition	Antibiotic	Duration	Alternatives if Resistant	Alternative if Allergic
<i>Staphylococcus aureus</i>	Skin and soft tissue infections	Flucloxacillin	7 days	Linezolid Quinopristin + dalfopristin Daptomycin	Clindamycin Teicoplanin Linezolid
	Endocarditis	Flucloxacillin + Gentamicin	Up to 4 wks	Vancomycin + Gentamicin (aminoglycoside)	
	Bacteraemia (if source removable)	Flucloxacillin	2 weeks	Vancomycin	
	UTI	Nitrofurantoin/ Trimethoprim/ Cipro	3 days if uncomplicated	Trimethoprim Rifampicin Tetracycline Doxycycline Fusidic acid Nitrofurantoin	
	CAP	Flucloxacillin + rifampicin	10 – 14 days		
	Empyema	Co-amoxiclav	3 weeks		
Coagulase negative Staphylococci				Vancomycin Linezolid Quinopristin/dalfopristin Daptomycin	
<i>Staphylococcus saprophyticus</i>	UTI	Nitrofurantoin/ Trimethoprim/ Cipro	3 – 5 days	Trimethoprim Nitrofurantoin Fluoroquinolone	
<i>Streptococcus pneumoniae</i>	Pneumonia	Penicillin /Amoxicillin	3 – 5 days 7 – 21 days if severe	High dose penicillin Ceftriaxone Cefotaxime	
	Meningitis	Ceftriaxone + dexamethosone	14 days	Vancomycin + Rifampicin	
	Non-meningeal site	Penicillin/	3 weeks	Ceftriaxone	

		Co-amoxiclav		Cefotaxime Moxifloxacin High dose ampicillin Carbapenem	
<i>Streptococcus bovis</i>	Bacteraemia	Penicillin	10 – 14 days		Erythromycin Clindamycin Vancomycin
	Endocarditis	Penicillin + gentamicin	Up to 4 weeks		
Viridans Streptococci	Endocarditis	Penicillin	Up to 4 weeks		Vancomycin
<i>Streptococcus pyogenes</i>	Pharyngitis	Oral Pen V (mild) IV Benzylpenicillin (severe)	10 days	Avoid amoxicillin if suspect EBV	Azithromycin/ Erythromycin
	Severe invasive infections	Penicillin + Clindamycin to prevent toxin secretion		Cephalosporin + metronidazole	
	Retropharyngeal abscess	Benpen + Clindamycin			
	Quinsy (peritonsillar abscess)	IV Benpen or Co- amoxiclav			
	Necrotising fasciitis (need surgical debridement)	Penicillin + Clindamycin + aminoglycoside? to prevent toxin secretion			
<i>Streptococcus agalactiae</i>	Neonatal	IV ampicillin + gentamicin. Follow up with penicillin G alone	10 – 14 days		
	Adult	IV Penicillin G	2 weeks		
	Adult (Endocarditis)	IV Penicillin G + Gentamicin	4 weeks		

<i>Enterococcus faecalis</i>	Endocarditis	Ampicillin + Gentamicin	4 – 6 weeks		
	Meningitis				
<i>Enterococcus faecium</i> (usually resistant to ampicillin)	Endocarditis	Vancomycin + gentamicin	4 – 6 weeks		
	Meningitis		2 weeks		
<i>Enterococcus gallinarum</i> (intrinsically resistant to glycopeptides)		Linezolid			
<i>Enterococcus casseliflavus</i> (intrinsically resistant to glycopeptides)		Linezolid			
<i>Leuconostoc</i> (intrinsically resistant to glycopeptides)	Bacteraemia Dental abscesses Meningitis	Penicillin or Ampicillin			
<i>Abiotrophia</i> (Optochin Resistent)	Endocarditis	Penicillin + Gentamicin	4 – 6 weeks		
<i>Peptostreptococcus</i>	Abscesses Otitis media Mastoiditis Chronic sinusitis Bacteraemia	Metronidazole (+/- penicillin and clindamycin)			
<i>Aerococcus viridans</i>	Endocarditis Bacteraemia	Optimal treatment unclear			
<i>Aerococcus urinae</i> (resistant to aminoglycosides and sulphonamides)	UTI	Penicillin			

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Bacillus species	Food poisoning	Non required			
	Device related (remove source)	Vancomycin/ Aminoglycosides/ Carbapenems/ Fluoroquinolones/ Clindamycin			
	Invasive infections	Vancomycin/Clindamycin +/- aminoglycoside			
	Other infections	Vancomycin/ Aminoglycosides/ Carbapenems/ Fluoroquinolones/ Clindamycin			
<i>Bacillus anthrax</i>	Cutaneous	Ciprofloxacin/Doxycycline	60 days		
	Inhalation	Ciprofloxacin/Doxycycline + 2 extra antimicrobials Rifampicin/Vancomycin/ Penicillin/Ampicillin/ Chloramphenicol/Clindamycin/ Clarithromycin/Imipenem	Continue Cipro/Doxy until day 60		
<i>Corynebacterium diphtheriae</i>	Respiratory tract	IV penicillin (anti toxin???)	4 weeks	Erythromycin Azithromycin Clarithromycin	
	Cutaneous				
	Cardiac				
	Neurological				
	Invasive				
	Prophylaxis	Benzylpenicillin	7 days	Erythromycin	
Non-diphtheria Corynebacterium	Community	Vancomycin/Teicoplanin/Daptomycin			
	Nosocomial	Vancomycin/Teicoplanin/Daptomycin			

<i>Listeria monocytogenes</i> NEVER USE CEPHALOSPORINS!!	Meningitis	Ampicillin + Gentamicin	21 days	Co-trimoxazole or meropenem	
	Bacteraemia	Ampicillin +/- gentamicin		Co-trimoxazole or meropenem (Vancomycin assoc with relapse)	
	Prophylaxis	Co-trimoxazole			
<i>Erysipelothrix rhusiopathiae</i> (intrinsically resistant to vancomycin, teicoplanin, sulphonamides, co- trimoxazole and aminoglycosides)	Erysipeloid (localized skin lesion)	Penicillin		Ciprofloxacin Cephalosporins	
	Diffuse cutaneous eruption	Penicillin		Ciprofloxacin Cephalosporins	
	Bacteraemia/endocarditis		4 weeks – 6 weeks		
<i>Rhodococcus equi</i>	Necrotizing pneumonitis/ abscesses/bacteraemia	Need 2/3 of: Vancomycin/Erythromycin/Rifampicin/ Imipenem/fluoroquinolone/ Aminoglycoside			
<i>Arcanobacterium haemolyticum</i> (resistant to co- trimoxazole)	Acute pharyngitis/skin sepsis/infective endocarditis	Penicillin	10 days pharyngitis 4 weeks endocarditis	Erythromycin	
<i>Clostridium botulnum</i>	Food borne	Anti-toxin			
	Wound	Benzylpenicillin + metronidazole + wound debridement			
	Intestinal	Anti-toxin			
	Infant	Anti-toxin			
<i>Clostridium tetani</i>		Tetanus immunoglobulin, wound debridement Benzylpenicillin + Metronidazole			

<i>Clostridium difficile</i>	CDI	Oral Metronidazole/Vancomycin	10 days		
<i>Mobiluncus</i>		Metronidazole			
<i>Actinomyces</i>	Single organism	Debridement (+ removal of IUDs) Penicillin/ampicillin	Up to 6 months		Doxycycline
	Mixed with others	Debridement (+ removal of IUDs) Co-amoxiclav/ ceftriaxone/metronidazole			
<i>Nocardia</i>	Cutaneous (due to trauma)	Co-trimoxazole	>3 months in normal host 6 months in immunosuppressed	Minocycline Imipenem Amikacin	
	Pulmonary - inhalation				
<i>Actinomadura and Strptomycetes</i>	Madura foot	Streptomycin + Co-trimoxazole/Dapsone/Rifampicin/ sulphonamides	Up to 9 months		

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<i>Neisseria meningitidis</i>	Meningitis	Ceftriaxone (give single dose Ciprofloxacin/2 days Rifamicin to remove carriage)	7 days		Pregnant/breast feeding = single dose Azithromycin
<i>Neisseria gonorrhoea</i>		Ceftriaxone (single dose injections)			7 days azithromycin
<i>Morexella catarrhalis</i> β-lactam resistant	Otitis media LRTI Sinusitis	Co-amoxiclav (Tetracycline/macrolides)	10 days for sinusitis		

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Gram-negative Fermenters					
<i>Escherichia coli</i>	UTI	Trimethoprim/Ampicillin	3 – 7 days		
	Enteric infections	Antibiotics may be harmful in O157			
	Bacteraemia	Cephalosporin/Piperacillin-tazobactam/ Carbapenem/Aminoglycoside	7 – 10 days		
	Neonatal sepsis				
	Non-enteric infections				
<i>Klebsiella</i> Often β -lactam resistant	Infections in COPD/diabetes/alcoholism	Carbapenems/fluoroquinolones	7 – 10 days		
<i>Proteus</i> (resistant to Colistin) Some carry AmpC	UTI Bacteraemia Wound infection Respiratory infection	Amikacin Moxifloxacin/Levofloxacin Carbapenems	7 days		
<i>Enterobacter species</i> Inducible β -lactamase and AmpC	Nosocomial opportunistic infections	Meropenem (+ other Carbapenems)			
<i>Enterobacter sakazakii</i>	Neonatal meningitis	Ampicillin and Gentamicin	14 days		
<i>Citrobacter diversus</i>	Severe meningitis and brain abscess				
<i>Citrobacter freundii</i> Inducible AmpC	Nosocomial respiratory tract and UTI infections	Aminoglycosides Carbapenems Quinolones			
<i>Serratia marcescens</i>	Respiratory and UTI + bacteraemia/skin/wound	Amikacin Piperacillin-Tazobactam Carbapenems			
<i>Salmonella typhi</i>	Enteric fever	Ceftriaxone		Ciprofloxacin Azithromycin Ampicillin Co-trimoxazole	

<i>Salmonella (non-typhoid)</i>	Gastroenteritis	Usually no antibiotics required In elderly/immunocompromised etc Ciprofloxacin/Trimethoprim/Chloramphenicol			
	Invasive disease	Cefotaxime/ceftriaxone			
<i>Shigella (dysenteriae, flexneri, sonnei, boydii)</i>	Gastroenteritis	Not normally indicated except in immunosuppressed or at extremes of age			
	Toxic megacolon/haemolytic uraemic syndrome	Ciprofloxacin/ co-trimoxazole/tetracyclines/cephalosporins			
<i>Hafnia alvei</i> (formerly Enterobacter)	Opportunistic/nosocomial infections	Meropenem (+ other Carbapenems)			
<i>Pantoea agglomerans</i>	Opportunistic infections (UTI/bacteraemia/chest infections)				
<i>Edwardsiella tarda</i>	Gastroenteritis	Usually resolves without antibiotics			
	Bacteraemia, liver abscess, soft tissue infection, meningitis				
<i>Morganella morganii</i> (often multi-resistant)	HCAI	Carbapenems			
<i>Providencia (alcalifaciens, stuartii, rettgeri)</i>	Nosocomial infections	Carbapenems			

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Gram-negative non-fermenters					
<i>Delftia acidovorans</i> (resistant to Colistin and Gentamicin)	Endocarditis in drug users		6 weeks		
<i>Brevundimonas (diminuta, vesicularis)</i>	Doubtful clinical significance				
<i>Eikenella corrodans</i>	Endocarditis (part of HACEK group)		4 – 6 weeks		
<i>Flavimonas oryziphanitans</i>	CVL bacteraemia in immunocompromised				
<i>Chryseobacterium meningosepticum</i>	Epidemics of meningitis	Vancomycin +/- Rifampicin Or Ciprofloxacin/Levofloxacin			
<i>Chryseobacterium</i> (other species)	Colonisation rather than infection	No treatment required			
<i>Sphingobacterium (spiritivorum, multivorum)</i>	Nosocomial infections				
<i>Shewanella putrefaciens</i>	Cellulitis complicating leg ulcers/burns				
<i>Roseomonas gilardii</i>	Community associated bacteraemia				
<i>Chryseomonas luteola</i>	PD catheters, indwelling lines leading to peritonitis/endocarditis/bacteraemia/meningitis				
<i>Ochrobactrum anthropic</i>	Catheter associated bacteraemia				
<i>Oligella urethralis</i>	Long term indwelling urinary catheters				
<i>Aliccaligenes</i>	Nosocomial outbreaks	Carbapenems/Co-trimoxazole			

<i>(xylooxidans, faecalis, piechaudii)</i>					
<i>Agrobacterium (radiobacter, tumifaciens)</i>					
<i>Sphingomonas paucimobilis</i>	Nosocomial outbreaks associated with contaminated water				
<i>Pseudomonas aeruginosa</i>	<p>Community – usually mild and superficial = folliculitis (assoc. with Jacuzzis) otitis externa</p> <p>Nosocomial = bacteraemia, UTI, wound infections, SSI, pneumonia</p> <p>CF</p> <p>Endocarditis (IDUs, prosthetic valves), eye infections, bone and joint, post-operative neurological, ear</p>	<p>Necrotizing otitis externa</p> <p>CAP ceftazidime + gentamicin/tobramycin Fluoroquinolones = only oral option Think about duel therapy Ceftazidime/Ticarcillin/Piperacillin-tazobactam/Meropenem/Gentamicin/Tobramycin/Amikacin/Colistin/Aztreonam</p> <p>Sinusitis = levofloxacin</p>	<p>4 – 6 weeks</p> <p>7 – 10 days</p> <p>10 days</p>		
<i>Acinetobacter</i>	<p>VAP/pneumonia Tracheobronchitis Bronchiolitis in children UTI Post-surgical intracranial Soft tissue – burns, line associated cellulitis Eye infections</p>	<p>Localized cellulitis with a foreign body/line = removal of the body – no need for antibiotics</p> <p>OXA-23 usually sensitive to Colistin/Tigecycline Treat with Rifampicin + Colistin +/- Imipenem</p>			

	Endocarditis Bone Nosocomial bacteraemia				
<i>Stenotrophomonas maltophilia</i> (aminoglycoside resistant)	Respiratory tract/bacteraemia/UTI/skin and soft tissue Contact lens related eye	Co-trimoxazole (ticarcillin-clavulanate, doxycycline, minocycline, moxifloxacin) Moxifloxacin + Co-trimoxazole = synergistic			
<i>Burkholderia cepacia</i> (resistant to Polymixins)	CF patients: Chronic carriage Progressive deterioration Necrotizing pneumonia & bacteraemia	Co-trimoxazole, chloramphenicol, minocycline, carbapenems			
<i>Burkholderia pseudomallei</i>	Melioidosis	Ceftazidime Follow up with prolonged oral therapy Co-trimoxazole + doxycycline + chloramphenicol for first 4 weeks	10 – 14 days 20 weeks + 4 weeks	Meropenim/Imipenem Co-amoxiclav Can give oral therapy instead of initial IV step if allergic but it is less effective	
<i>Burkholderia mallei</i>	Glanders	Ceftazidime Follow up with prolonged oral therapy Co-trimoxazole + doxycycline + chloramphenicol for first 4 weeks	10 – 14 days 20 weeks + 4 weeks	Meropenim/Imipenem Co-amoxiclav Can give oral therapy instead of initial IV step if allergic but it is less effective	

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Fastidious Gram-negative rods					
<i>Haemophilus influenzae</i> (HACEK group)	Invasive infections – meningitis, septic arthritis, bacteraemia, pneumonia, cellulitis	Cefotaxime = endocarditis Ceftriaxone Prophylaxis household contacts = Rifampicin Amoxicillin in pneumonia	10 days meningitis 7 – 21 days if severe	Co-amoxiclav Clarithromycin	Co-trimoxazole Chloramphenicol
	Non-invasive infections – otitis media, sinusitis, COPD exacerbations	Oral Ampicillin/cefuroxime Amoxicillin COPD Amoxicillin	10 days sinusitis 7-10 days COPD exacerbation	Co-amoxiclav Clarithromycin	Co-trimoxazole Chloramphenicol
	Empyema		3 weeks		
<i>Haemophilus parainfluenzae</i> (HACEK group)	Similar to <i>H. influenzae</i>	Cefotaxime = endocarditis	4 – 6 weeks		
<i>Haemophilus parahaemolyticus</i> (HACEK group) <i>Haemophilus haemolyticus</i>	Rare causes of human disease	Cefotaxime = endocarditis	4 – 6 weeks		
<i>Aggregatibacter aphrophilus</i> (HACEK group)	Sinusitis, Otitis media, pneumonia, empyema, bacteraemia, endocarditis, septic arthritis, meningitis, osteomyelitis	Cefotaxime = endocarditis	4 – 6 weeks		
<i>Aggregatibacter actinomycetemcomitans</i> (HACEK group)	Endocarditis, joint infections, severe periodontal disease	(Ceftriaxone) Cefotaxime = endocarditis Periodontitis = tetracycline +	Native valve = 4 weeks Prosthetic valve = 6 weeks		

		mechanical debridement			
<i>Haemophilus ducreyi</i>	Chancroid	Tetracyclines/Erythromycin/Co-amoxiclav			
<i>Haemophilus influenzae</i> <i>biogroup aegyptius</i>	Brazilian purpuric fever (conjunctivitis leading to fulminant septicaemia) Epidemic purulent conjunctivitis	Ampicillin + Chloramphenicol			
<i>Cardiobacterium hominis</i> (HACEK group)		Co-amoxiclav and Gentamicin	4 – 6 weeks		
<i>Eikenella corrodans</i> (HACEK group) usually resistant to aminoglycosides	Sub-acute endocarditis Mixed infections as part of human bite wounds – often including <i>Streptococcus</i> spp.	Cefotaxime = endocarditis Also Clindamycin, Erythromycin, Metronidazole	4 – 6 weeks		
<i>Kingella kingae</i> (HACEK group)	Endocarditis (6mths – 4yrs) Bacteraemia Septic arthritis	Cefotaxime = endocarditis	4 – 6 weeks	Aminoglycosides Quinolones	Erythromycin Co-trimoxazole
<i>Gardnerella vaginalis</i> Resistant to Colistin, Cephalexin, Tetracyclines, Nalidixic acid	Bacterial vaginosis UTI Bacteraemia	Metronidazole		Vancomycin	Penicillin Clindamycin
<i>Bordetella (pertussis, parapertussis)</i>	Whooping cough = ≥ 21 days cough with paroxysms, associated whoops or post-pertussis vomiting + culture confirmation	Azithromycin Or Erythromycin/Clarithromycin (Cochrane review data) Or Co-trimoxazole	3 – 5 days 7 days 7 days		
<i>Brucella (abortus, suis, melitensis)</i>	Brucellosis	Need to penetrate macrophages Doxycycline +	At least 6 weeks		

		Gentamicin/Streptomycin/Rifampicin			
		Neurobrucellosis = Doxycycline+Rifampicin+Co- trimoxazole			
<i>Yersinia pestis</i>	Bubonic, pneumonic and septicaemic plague	Streptomycin/Gentamicin/Doxycycline Prophylaxis	3 days before removal from isolation		
<i>Yersinia enterocolitica</i> Resistance to penicillin	Febrile illness with bloody diarrhoea Secondary – Reiters syndrome, meningitis, erythema nodosum, poly arthritis	Gastroenteritis – no antibiotics required Severe infection = Doxycycline + Gentamicin If patient on desferrioxamine = MUST STOP			Cefotaxime Co-trimoxazole Fluoroquinolones
<i>Yersinia pseudotuberculosis</i>	Yersiniosis – asymptomatic – fatal typhoid like illness Mesenteric adenitis +/- erythema nodosum may mimic appendicitis, males aged 5 - 15	Mesenteric adenitis = usually self- limiting Ciprofloxacin		Tetracyclines Aminoglycosides Sulphonamides Penicillin	
<i>Pasteurella</i> (<i>multocida, haemolytica,</i> <i>canis, stomatis,</i> <i>pneumotropica</i>)	<i>P. multocida</i> = skin and soft tissue after animal bites, localized abscess with cellulitis and lymphadenitis, URTI, LRTI <i>P. pneumotropica</i> = animal bite wounds, septicaemia, URTI	Penicillin		Flucloxacillin	Erythromycin Clindamycin Fluoroquinolones (if sensitive)
<i>Francisella tularensis</i>	Tularaemia –	Streptomycin/Gentamicin			

	ulceroglandula (direct contact) or typhoidal/pulmonary (indirect contact – ticks etc or contaminated food/water)	Add Chloramphenicol for meningitis Prophylaxis = doxycycline/ciprofloxacin			
<i>Legionella pneumophila</i>	Legionnaires disease Pontiac fever	IV Erythromycin OR Oral Clarithromycin +/- Rifampicin If infection severe double dose of Erythromycin and add Rifampicin	7 - 21 days	Ciprofloxacin	
<i>Capnocytophaga (canimorsus, cynodegmi)</i>	Associated with dogs - bites or animal contact	Co-amoxiclav Asplenic patients should be given penicillin or Co-amoxiclav as prophylaxis			
<i>Capnocytophaga (ochracea, gingivalis, sputigena, haemolytica, granulosa)</i> β-lactamases reported Resistance to aminoglycosides	Human mouth – juvenile periodontitis Occasional severe infections as opportunistic pathogens	Co-amoxiclav		Clindamycin/Erythromycin Tetracyclines/Quinolones	
<i>Vibrio cholera</i>	Cholera	Rehydration + Azithromycin/Clarithromycin to reduce duration of disease			
<i>Vibrio parahaemolyticus</i>	Explosive diarrhoea Infected aquatic wounds	Rehydration Severe infection = Ceftazidime + Doxycycline			
<i>Vibrio vulnificus</i>	Fulminant septicaemia Wound infection Acute diarrhoea	Ceftazidime + Doxycycline			
<i>Vibrio alginolyticus</i>	Wound infection	Self-limiting			

<p><i>Aeromonas (hydrophilia, sobria, caviae)</i></p> <p>Some resistance to Carbapenems</p>	<p>Soft tissue infections + sepsis in the immunocompromised (<i>A. hydrophilia</i>)</p> <p>Wound infections in healthy ppl undergoing leech therapy</p> <p>Diarrhoea, sometimes followed by chronic colitis</p>	<p>Fluoroquinolones Co-trimoxazole Gentamicin/Amikacin</p> <p>Prophylactic Ciprofloxacin in leech use</p>			
<p><i>Plesiomonas shigelloides</i></p>	<p>Mild self-limiting diarrhoea – enteroinvasive disease</p> <p>Occasional extra intestinal infection</p>	<p>Quinolones/Imipenem/Cephalosporins</p>			
<p><i>Campylobacter (jejuni, coli, lari, upsaliensis, concisus, rectus)</i></p>	<p>Gastroenteritis – sometime HUS/toxic mega-colon</p> <p>Meningitis, deep abscess, reactive arthritis, cholecystitis</p> <p>25% of Guillian Barre syndrome report prior Campylobacter</p>	<p>Rehydration and symptom relief</p> <p>Severe = erythromycin/ciprofloxacin</p>		<p>Coli = resistant so give trimethoprim/co-trimoxazole</p>	
<p><i>Helicobacter pylori</i></p>	<p>Gastric ulcers</p>	<p>NICE guidance = Triple therapy = proton pump inhibitor + 2 antibiotics i.e. omeprazole + amoxicillin + clarithromycin</p>	<p>1 week</p>	<p>If have received clarithromycin in the previous year give metronidazole</p>	

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Bacteroides					
<i>Bacteroides fragilis</i> β-lactamase producer	Intra-abdominal infection Bacteraemia Endocarditis Skin and soft tissue infection Anaerobic meningitis Brain abscesses Diarrhoea in children	Abscesses - drainage and debridement Metronidazole		Pipercillin-tazobactam Co-amoxiclav	Clindamycin Chloramphenicol Cefoxitin
<i>Prevotella (melaninogenica, bivia, oralis, bucalis)</i> and <i>Porphyromonas (gingivalis, endodontalis, asaccharolytica)</i>	Abscesses Soft tissue infection Periodontal and endodontal disease Female genital tract infection Human bite infections Osteomyelitis of the facial bones	Surgical drainage and debridement of necrotic tissue Metronidazole		Pipercillin-tazobactam Co-amoxiclav	Clindamycin Chloramphenicol Cefoxitin
<i>Fusobacterium (nucleatum, necrophorum)</i>	F. necrophorum = severe systemic infection, such as Lumierre's disease Tropical ulcers, intra-abdominal infection, oral infections	Surgical drainage and debridement of necrotic tissue Lemierre's disease = penicillin + metronidazole	6 weeks		Clindamycin Chloramphenicol