

## Please read this bit first

The HPCSA and the Med Tech Society have confirmed that this clinical case study, plus your routine review of your EQA reports from Thistle QA, should be documented as a “Journal Club” activity. This means that you must record those attending for CEU purposes. Thistle will **not** issue a certificate to cover these activities, nor send out “correct” answers to the CEU questions at the end of this case study.

The Thistle QA CEU No is: **MT00025**.

Each attendee should claim **THREE** CEU points for completing this Quality Control Journal Club exercise, and retain a copy of the relevant Thistle QA Participation Certificate as proof of registration on a Thistle QA EQA.

## Cycle 22 Organism 5:

### *Klebsiella pneumoniae*

Three species of *Klebsiella* are associated with infections in humans: *Klebsiella pneumoniae*, *Klebsiella oxytoca*, and *Klebsiella granulomatis*. The species *Klebsiella ozaenae* and *Klebsiella rhinoscleromatis* are considered as non-fermenting sub-species of *K. pneumoniae* that are associated with particular diseases. With certain exceptions, strains within the genus ferment lactose, and most produce highly mucoid colonies because of the production of a polysaccharide capsule. All species are non-motile.

*K. pneumoniae* is a primary pathogen capable of causing urinary tract infections and pneumonia in otherwise healthy people, however most infections caused by *K. pneumoniae* are acquired in the hospital. Nosocomial infections, pneumonia and UTIs caused by *K. pneumoniae* may include wound infections, infection of invasive devices, biliary tract infections, peritonitis, and meningitis. *K. pneumoniae* is second in incidence only to *Escherichia coli* as the causative agent of bacteraemia resulting from urinary tract infections. Pneumonia caused by *K. pneumoniae* has classically been described as having particular features, warranting the eponym “Friedländer’s disease”.

The principal virulence factor that has been described for *K. pneumoniae* is its polysaccharide capsule, which come in over 70 antigenic varieties and is responsible for its mucoid growth on laboratory media. The mechanism by which the capsule promotes virulence is thought to be due inhibition of phagocytosis. *K. pneumoniae* can produce a variety of fimbrial types, including type-1 pili that are involved in adherence to host cells.

All strains are resistant to ampicillin as a result of a chromosomal gene encoding to penicillin-specific beta-lactamase. Nosocomial isolates are frequently resistant to numerous other antibiotics as a result of the acquisition of multi-drug resistant plasmids. *K. pneumoniae* are the most common organisms to carry plasmids encoding for extended-beta-lactamases (ESBLs). For multi-resistant strains, especially those expressing ESBLs, treatment options are often reduced to the carbapenems (imipenem, meropenem, and ertapenem).

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**Questions:**

1. How will you isolate and identify a *K. pneumoniae*?
2. What types of infections are caused by *K. pneumoniae*?
3. What are the recommended antimicrobial agents used to treat *K. pneumoniae* infections, especially the strains that produce ESBLs?

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