Introduction and Objectives Pleural infection is a serious clinical condition with an average hospital length of stay of 13 days. Current standard of care defaults to hospital admission for drainage of the infected fluid and intravenous antibiotics. The standard empirical antibiotic choice varies nationally but the ability of these antibiotics to reach the pleura is poorly understood. Previous pharmacokinetics and pharmacodynamics (PK/PD) literature on the penetrance of antibiotics into pleural fluid is extrapolated from non-infected effusions (e.g. malignant effusions) or animal models.

The Pleural Antibiotic Concentrations informing Treatment (PACT) study is a single centre PK/PD study that aims to assess the concentration of antibiotics within the infected pleural space to improve the evidence base around antimicrobial choice, route and duration of therapy.

Methods Patients with parapneumonic effusions/empyema planned for pleural drainage were prospectively recruited. Serial pleural fluid samples were collected timed with routine antibiotic administration and paired with synchronous serum sampling. Pleural fluid and serum antibiotic concentrations were measured using a validated high performance liquid chromatography (HPLC) method at the National Antimicrobial Reference Laboratory (Bristol, UK).

Results This study is ongoing, further results on a wider range of antimicrobials will be available for the conference.

At the time of writing, 18 patients had been recruited (15 CPPE, 3 empyema) with over 150 paired serum/pleural samples collected. Ten different antibiotics have been assayed although the majority of timepoints relate to Amoxicillin/Co-amoxiclav (n=36), Metronidazole (n=28) and Piperacillin-Tazobactam (n=22) at this time, see figure 1.

For these antibiotics the peak concentration and area under the curve within the pleural space was equivalent to serum concentrations of antibiotic remined well above the minimum inhibitory concentrations of bacteria known to cause pleural infection even when given orally. The pleural levels for penicillins persisted beyond the dosing schedule (8 hours) and were not affected by pleural pH or fibrinolytics.

Conclusions For 3 commonly used antibiotics (Amoxicillin, Metronidazole, Piperacillin-Tazobactam) the pleural fluid concentration of antibiotic remained well above the usual MICs of causative bacteria. Penetration and persistence of antibiotics make twice-daily or oral administration a possibility in pleural infection.