Introduction:
Although viruses are considered the commonest cause of admitted cases of lower respiratory tract infections (LRTIs) [1] data for patients with severe LRTI are missing. This study aimed to define the epidemiology of severe LRTI using the BIOFIRE® FIlMARRAY® Pneumonia plus (PNplus) Panel.

Methods:
This was a sub-study of the PROGRESS trial where procalcitonin (PCT)-guidance for early stop of antibiotics was used to prevent infection-associated adverse events in patients with sepsis (ClinicalTrials.gov NCT03333304). PNplus Panel was performed retrospectively in frozen lower respiratory samples of 90 septic patients (Sepsis-3) with LRTI. Primary endpoint was the comparison of the detection rate of pathogens between conventional microbiology (blood, sputum, pleural fluid cultures and urine antigen detection) and PNplus Panel. Secondary endpoints were the association with inflammatory host response and detection of antibiotic resistance.

Results:
56 patients with community-acquired (CAP) and 34 with healthcare-associated pneumonia (HCAP) were studied; median pneumonia severity index was 113 (88-135). PNplus detected at least one pathogen in 65 patients (72.2%) compared to 10% detected by conventional microbiology (p<0.0001); bacteria were the commonest pathogens (Figure). Median PCT was 0.49 ng/ml among patients with ≥10^5 copies/ml of a bacterial pathogen compared to 0.18 ng/ml in detection at lower loads (p=0.004). SOFA score, serum CRP and white blood cells did not differ in patients with undetected, bacterial, viral or mixed cause of infection. Median PCT was 0.52 ng/ml among patients with bacterial pathogens compared to 0.19 ng/ml with viral (p: 0.045). At least one resistance gene was detected in 14.4% of samples, being more common in HCAP versus CAP (32.2% vs 5.1%; p: 0.001).

Conclusion:
PNplus detects severe pneumonia pathogens at significantly greater rate than conventional microbiology and higher circulating PCT levels reflect their true virulence.

References:
Pathogens detected by BIOFIRE® FILMARRAY® Pneumonia Panel in patients with sepsis due to lower respiratory tract infections