common loss-of-function alleles was enriched in non-syndromic familial pneumothorax. Further work is ongoing to determine the genetic basis for those patients without a genetic diagnosis to date.

Conclusion Using whole genome sequencing we have demonstrated that clinico-radiological assessment identifies most individuals with currently known pneumothorax syndromes. Further work is ongoing to determine the genetic basis for those patients without a genetic diagnosis to date.

S11 UTILITY OF COMPUTED TOMOGRAPHY (CT) TO PREDICT NEED FOR EARLY SURGERY AND RECURRENCE AFTER FIRST EPISODE OF PRIMARY SPONTANEOUS PNEUMOTHORAX (PSP)

[1]A Azam, [2]M Abdelmoteleb, [2]N Qayyum, [1]A Zahid, [1]Q Abdullah, [1]M Haris, [1]MB Ganaie. [1]*Department of Respiratory Medicine, University Hospitals of North Midlands, Stoke On Trent, UK*; [2]*Department of Radiology, University Hospitals of North Midlands, Stoke On Trent, UK*

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Introduction and objectives CT scanning is not presently advocated by British Thoracic Society (BTS) guidelines after first episode of primary spontaneous pneumothorax (PSP). There is emerging evidence that emphysema like changes and CT based Dystrophy Severity Score (DSS) can predict need for early surgical intervention and recurrence after first episode of PSP. We aimed to assess the role of CT based DSS during first episode of PSP in predicting need for early surgery and recurrence.

Methods Retrospective analysis of consecutive PSP episodes at first presentation (n=197) admitted to our institution from 01/01/2012 – 31/12/2017. Patients were categorized as low grade (score 0–3) or high grade (score 4–6) based on DSS on CT scan assessed by a thoracic radiologist who was blinded to eventual patient outcomes. DSS was calculated based on the type, number and distribution of blebs and bullae (adapted from World J Surg. 2016;40(5):1112–20).

Results 45 PSP patients had CT at first presentation. Median age was 31 years, 82% male and 73% smoker.8 patients had low grade DSS; all were managed non-surgically and none had recurrence over 12 months.37 patients had high grade DSS. 25 high grade DSS patients (67.5%) were managed by surgical intervention and 3 had contralateral recurrence over 12 months. 12 high grade DSS patients (32.5%) were managed non-surgically; 2 patients had ipsilateral recurrence over 12 months.

Conclusions CT based DSS seems to predict need for early surgery and recurrence after first episode of PSP. CT can be used to risk stratify patients after first episode of PSP and identify patients at high risk of failure of conventional treatment and early recurrence. Further prospective randomized studies are required to validate these findings.

Abstract S11 Table 1 Comparison of low grade with high grade DSS for predicting early surgical intervention and rate of recurrence after first episode of PSP

	Low grade DSS (n=8)	High grade DSS (n=37)	P value
Median age, years (IQR)	35 (23.5 – 46.7)	31 (24 – 34.5)	0.51
Male, n (%)	8 (100%)	29 (78%)	0.32
Right sided, n (%)	3 (37.5%)	17 (46%)	0.72
Current/Ex-smoker, n (%)	5 (62.5%)	28 (75.7%)	0.66
Median LOS, days (IQR)	5 (3.2 – 8.5)	8 (4 – 12)	0.52
Surgical intervention, n (%)	0	25 (68%)	0.0006
Recurrence at 1 year, n (%)	0	5 (13.5%)	0.57

S12 THE CHANGES IN INCIDENCE AND MANAGEMENT OF PLEURAL EMPYEMA IN ENGLAND OVER THE LAST DECADE

DT Arnold, FW Hamilton, TT Morris, R Payne, NA Maskell. *University of Bristol, Bristol, UK*

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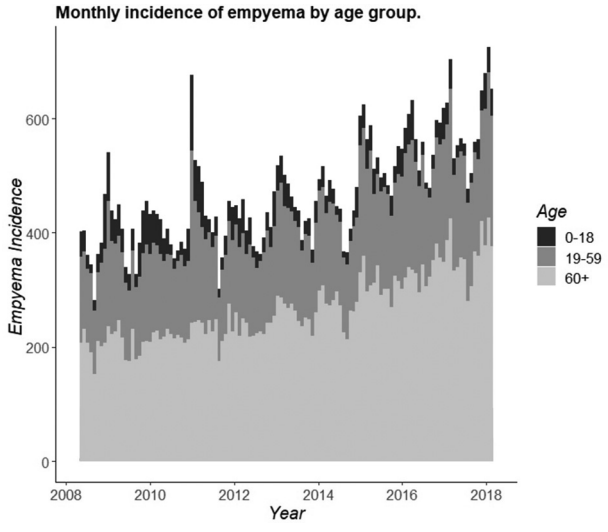
Introduction Pleural empyema represents a significant healthcare burden due to extended hospital admissions and/or requirement for surgical intervention. Epidemiological studies from Europe and North America have shown a steady increase in incidence, especially in the elderly.[1] [2] No epidemiological studies have been performed in England. This study aimed to assess changes in incidence and management of pleural empyema over the last 10 years.

Methods Hospital Episode Statistics data was used to identify every patient admitted to an English hospital with pleural empyema (code J86), as well as all previously validated codes for viral influenza and pneumonia.

Descriptive statistics were used to represent the change in empyema incidence, management and mortality. Linear regression analysis was used to compare the incidence of empyema with other respiratory infections.

Results Between April 2008 and April 2018 there were 53,161 patients admitted with empyema. There was male predominance (67% vs 33%). The incidence of empyema has significantly increased from 4916 in 2008 to 7011 in 2017, see figure. There was seasonal variation with rates in the winter



Abstract S12 Figure 1

months increasing by a quarter. The median hospital length of stay in adults was 17 days (IQR 8 to 32). The proportion requiring surgery has remained stable (15.2%), but the proportion of open surgery has fallen. Mortality rates remain approximately 12–14% throughout the study period. Incidence correlates closely with rates of viral influenza (r=0.60) and was highest in the children and young adults during the 2010/2011 influenza season.

Conclusion This is the first population level assessment of empyema incidence in this country. Rates of empyema admissions have steadily increased with a seasonal variation that may be related to influenza incidence. Results of linkage of the HES data to Public Health England influenza statistics will be presented at the conference.

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S13 THE MICROBIOLOGY OF PLEURAL INFECTION, AN APPROACH BASED ON 16S RRNA GENE NEXT GENERATION SEQUENCING

[1]NI Kanellakis, [1]E Bedawi, [1]JP Corcoran, [2]S Gerry, [1]R Hallifax, [1]R Mercer, [1]V George, [1]A Dudina, [1]JM Wrightson, [1]R Asciak, [3]R Miller, [1]M Dobson, [4]N Ilott, [5]NA Maskell, [1]I Psallidas, [1]NM Rahman. *[1]Oxford Centre for Respiratory Medicine, Churchill Hospital, Oxford University Hospitals NHS Foundation Trust, Oxford, UK; [2]Centre for Statistics in Medicine, University of Oxford, Oxford, UK; [3]Infection and Population Health Institute for Global Health, University College London, London, UK; [4]Oxford Centre for Microbiological Studies, Kennedy Institute of Rheumatology, University of Oxford, Oxford, UK; [5]Academic Respiratory Unit, University of Bristol, Bristol, UK*

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Background Pleural infection (PI) is a common and complicated disease, bearing a heavy healthcare burden worldwide. Definitive pathogen identification based on current methods occurs in only 40% of cases, mainly due to prior antibiotic administration and special bacterial nutritional culture requirements. To this end PI microbiology knowledge remains incomplete. Novel deep sequencing techniques could increase the rate of reliable pathogen identification and shed light on the complex polymicrobial patterns of PI.

Aim To investigate and further characterise the microbial nature of PI using next generation sequencing (NGS).

Methods Pleural fluid samples from the 'Pleural Infection Longitudinal Outcome Study' (PILOT, ISRCTN50236700, n=243) underwent bacterial DNA extraction followed by 16S rRNA NGS using Illumina MiSeq. Data were analysed with DADA2 and Phyloseq R packages.

Results Bacterial DNA from pleural fluid samples was successfully extracted and sequenced. NGS detected 391 diverse pathogens up to the genus level and analysis showed that PI is a polymicrobial disease. 131 (54%) samples had one pathogen with relative abundance over 50% and 89 (36%) samples had at least 3 pathogens with relative abundance over 10%. *Streptococcus Pneumoniae* was detected in 40 (16%) and *Staphylococcus Aureus* in 20 (8%) samples.

Discussion It is feasible to extract and sequence bacterial DNA from pleural fluid samples from patients with PI. 16S rRNA NGS is a robust method for investigating the total bacteriology of pleural fluid samples.

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S14 THE ROLE OF SOLUBLE UROKINASE PLASMINOGEN ACTIVATING RECEPTOR (SUPAR) IN PARAPNEUMONIC EFFUSIONS

[1]DT Arnold, [1]FW Hamilton, [1]KT Elvers, [1,2]N Zahan-Evans, [1]NA Maskell. *[1]University of Bristol, Bristol, UK; [2]North Bristol NHS Trust, Bristol, UK*

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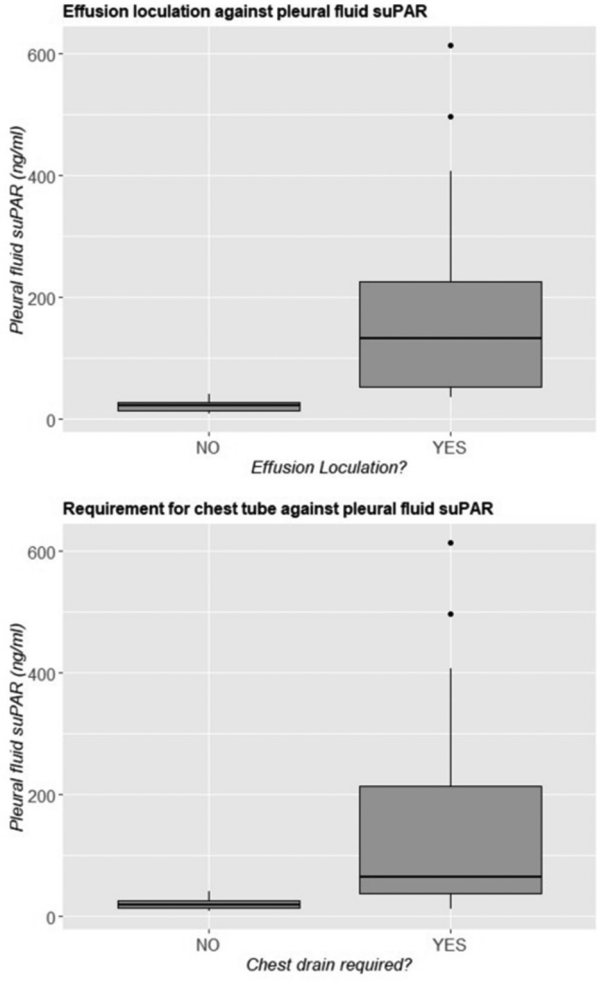
Introduction For decades the management of parapneumonic effusions has relied on pleural fluid pH measurement. However, the eventual requirement for fibrinolytics or surgery is more often dictated by the development of loculations. soluble urokinase Plasminogen Activating Receptor (suPAR) is a novel biomarker released by pleural mesothelial cells in response to infection as part of the fibrinolysis cascade. This study



Abstract S14 Figure 1