Conclusions Severe RSV infection in high-risk infants represents a significant cause of morbidity and mortality and is associated with a high economic burden. Palivizumab was found to be cost-effective compared to no prophylaxis in the UK in all of the subgroups considered, demonstrating a good use of NHS resources.

P171 IMPACT OF HEPTAVALENT PNEUMOCOCCAL CONJUGATE VACCINE ON THE INCIDENCE OF CHILDHOOD PNEUMONIA SEEN IN HOSPITAL IN THE NORTH EAST OF ENGLAND

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Background Community-acquired pneumonia (CAP) is a common childhood infection. In September 2006, heptavalent pneumococcal conjugate vaccine (PCV7) was added into the UK national immunisation programme. Data from this study were compared with those from a similar study undertaken in the same hospitals in 2000–2001 to describe the disease epidemiological trend.

Aim To evaluate the impact of PCV7 on the incidence of all causes childhood CAP.

Methods A prospective population-based study including 11 hospitals in the North East of England from August 2008 to July 2009. Eligible cases were all children aged 0–16 years who presented with clinical and radiological features of pneumonia. Demographic and clinical details were recorded.

Results Five hundred and seventy-six cases were initially identified, 34 of them had normal chest x-ray and were removed after validation, leaving a total of 542 cases eligible for enrolment (57.7% males; 73.8% under-five). The rate of empyema complication was 5.3%. Lobar consolidation was reported in 29.9%, and pleural effusion was present in 9.6% of the chest x-rays. PCV7 uptake was 88.9% among the eligible group, which is similar to that recorded nationally in the NHS Immunisation Statistics for England 2008–2009. In comparison with the data from 2001 study, there were 28% fewer cases of CAP in 2009 study. The incidence of CAP decreased from 14.4 cases per 10 000 children in 2001 to 11.8 cases per 10 000 children in 2009 (95% CI 0.74 to 0.92).

Conclusion This study suggests that following the introduction of PCV7, the incidence of childhood pneumonia seen in hospital has decreased since 2001.

P172 CHANGES IN PNEUMOCOCCAL SEROTYPE DISTRIBUTION OF PAEDIATRIC EMPYEMA IN THE AGE OF PNEUMOCOCCAL CONJUGATE VACCINES

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Introduction Pneumococcal infection is the leading cause of paediatric empyema in the UK. The seven valent pneumococcal vaccine (PCV-7) was introduced to the UK routine immunisation schedule in September 2006 and replaced in April 2010 with a 13 valent vaccine (PCV-13). Concerns have been raised in several countries about serotype replacement disease in paediatric empyema following the introduction of PCV-7. We have monitored changes in pneumococcal serotype distribution to determine whether there is evidence of serotype replacement in culture negative paediatric empyema in England following introduction of PCV-7 and PCV-13.

Abstract P172 Table 1

Serotype	2006/2007 (n=74)	2009/2010 (n=107)	Incidence rate ratio (95% CI)
1	46	50	1.09 (0.71 to 1.66)
3	11	35	3.18 (1.58 to 6.93)*
4	1	0	0.33 (0 to 15.41)
5	0	2	4.99 (0.21 to 6625)
7A/F	0	10	20.96 (1.83 to 22872)*
14	6	0	0.08 (0 to 1.00)*
19A	5	7	1.40 (0.38 to 5.58)
23F	1	0	0.33 (0 to 15.41)
6A/C	0	1	2.99 (0.07 to 4600)
6B	3	0	0.14 (0 to 2.52)
9V	1	0	0.33 (0 to 15.41)
Non-assay serotype	0	2	4.99 (0.21 to 6625)

Serotype	2006/2007 (n=74)	2009/2010 (n=107)	p Value
PCV—7			
PCV-7 serotypes	12 (16%)	0	<0.001
Non PCV-7 serotypes	62 (84%)	107 (100%)	
PCV—13			
PCV-13 serotypes	107 (98%)	2 (1.8%)	0.68
Non PCV-13 serotypes	108 (96%)	4 (3.6%)	

*Denotes statistical significance.

Methods In September 2006, the Health Protection Agency established enhanced surveillance of paediatric culture negative empyema for England in collaboration with members of the British Paediatric Respiratory Society. Samples were forwarded from admitting hospitals, those that were pneumococcal PCR positive underwent non-culture serotyping using a multiplex antigen detection assay capable of detecting 14 serotypes/groups (1, 3, 4, 5, 6A/C, 6B, 7F/A, 8, 9V, 14, 18, 19A, 19F and 23F). Fisher's exact test was used for analysis of count data and incidence rate ratios calculated for individual serotypes.

Results 420 pleural fluid samples from 413 patients were tested. Four serotypes/groups contributed more than 85% of the total serotypes detected (Serotype 1–42.4%, 3–24.3%, 7A/F–10.2% and 19A–8.8%). Changes in individual serotypes and overall counts are shown in Abstract P172 table 1. PCV-7 serotypes initially contributed 16% of those detected but in 2009/2010 none were detected ($p<0.001$). There was an increase in the detection of non-PCV-13 serotypes in 2010/2011 although this rise was non-significant (Pre: 1.8%, Post 3.6%, $p=0.68$).

Conclusions No PCV-7 serotypes were detected in the final year before it was replaced by PCV-13, suggesting that PCV-7 was effective in preventing empyema due to these serotypes. There were significant increases in non-vaccine serotypes/groups, notably 3 and 7A/F, consistent with serotype replacement disease and mirroring changes in invasive pneumococcal disease as a whole. The increase in disease caused by non-PCV-13 serotypes in 2010/2011 highlights the need for ongoing active surveillance. Future changes in serotype distribution are likely, and these may alter the clinical profile of empyema.

P173 COMPARISON OF PRIMARY PLEURAL DRAINAGE STRATEGIES IN PAEDIATRIC EMPYEMA

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Introduction Drainage of infected pleural fluid is a key component in the management of paediatric empyema. There is significant controversy regarding management policy resulting in substantial variation in treatment between tertiary centres in the UK. We have compared different primary pleural drainage strategies using a multicentre cohort design.

Methods Demographic and clinical data on cases of paediatric empyema undergoing pleural drainage were obtained from 19 centres from September 2006 until March 2011. Primary management strategy was defined as that used in the first 48 h of pleural drainage. Robust multivariate survival models were used to analyse length of stay (LOS) and incorporated a frailty term to account for institutional differences. All models were adjusted for age, sex, length of pre-hospital illness, comorbidity and intensive care admission. Fisher's exact test was used to compare readmission and pneumothorax rates.

Results Four pleural drainage strategies were recorded in 637 cases (56% male, median age 4.3 years)—Thoracocentesis without fibrinolysis (TC alone, n=35), Thoracocentesis with fibrinolysis (TC-Fib, n=286), Video assisted thoracoscopic surgery (VATS, n=18) and open Thoracotomy (Tho, n=295). Median tertiary LOS was 8 days (range 3–33) and median total hospital stay (THS) 11 days (range 5–43). Results of LOS analysis are shown in Abstract P173 table 1. In comparison to TC-Fib there were no significant differences in either LOS measure for VATS or Tho. TC alone was associated with a 44% increase in LOS at the tertiary centre and a 36% increase in THS, although the THS effect was of borderline statistical significance. There were significant differences in the rates of pneumothoraces between treatment groups (TC alone 11.4%, TC-Fib 4.2%, VATS 0% and Tho 1.69%, p=0.023) but no differences in readmission rates.

Abstract P173 Table 1

Primary pleural drainage strategy	Hazard	Estimated change in LOS (%)	95% CI	p Value
Length of stay at tertiary centre				
Chest drain and fibrinolysis	Reference			
Chest drain alone	0.56	+44%	0.36 to 0.87	0.011
VATS	0.81	+19%	0.46 to 1.45	0.49
Thoracotomy	1.28	−28%	0.88 to 1.85	0.20
Total hospital stay				
Chest drain and fibrinolysis	Reference			
Chest drain alone	0.64	+36%	0.41 to 1.01	0.053
VATS	0.82	+18%	0.45 to 1.47	0.48
Thoracotomy	1.40	−40%	0.95 to 2.08	0.093

Conclusions Thoracocentesis alone is associated with substantially increased length of hospital stay and increased risk of pneumothorax. There were no significant differences in length of stay or readmission rates between drainage with fibrinolysis, VATS and thoracotomy. Both thoracotomy and VATS were associated with lower risk of pneumothorax but given the overall small number of pneumothoraces this finding should be interpreted with caution.

P174 EMERGENCE OF PNEUMOCOCCAL SEROTYPE 19A AS A CAUSE OF SEVERE COMPLICATED PNEUMONIA WITH EMPYEMA IN CHILDREN IN ENGLAND

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Introduction The severity of pneumococcal empyema varies according to serotype. Invasive disease due to serotype 19A has become a major concern, particularly in the USA and Asia with an increasing incidence of virulent often antibiotic resistant variants. This has not been a significant problem in the UK until now. We describe changes in the incidence of this problem in England and the characteristics of serotype 19A disease.

Methods Data on paediatric empyema patients requiring pleural drainage between September 2006 and March 2011 were collected from 19 collaborating UK-ESPE centres. Pneumococcal serotypes were identified by non-culture multiplex polysaccharide antigen detection assay on culture negative pleural fluid. Kruskal–Wallis and Fisher's exact test were used for continuous and categorical variables. Multivariate models were used for length of stay data.

Results The incidence of empyema due to *S pneumoniae* serotype 19A more than quadrupled from 0.48 in 2006/2007 to 2.41 cases per million children in 2010/2011 (p=0.03). Of cases where full clinical details were available (n=12), 25% had a positive blood culture but all had culture negative pleural fluid. No evidence of antibiotic resistance was reported. Cases of 19A were significantly younger compared to other pneumococcal cases (median 2.0 years vs 4.3 (p=0.004)), had more reported complications (33% vs 11% (p=0.047)), were more likely to have been admitted to intensive care (50% vs 12% (p=0.008)) and to have required assisted ventilation (50% vs 9% (p=0.003)). Duration of hospital admission at the centre managing the empyema was increased by >50% in patients with 19A disease compared to all other serotypes (adjusting for age/sex—HR: 0.47, 95 % CI 0.24 to 0.91, p=0.024). One 19A case died, no further deaths were reported.

Conclusions Empyema due to *S pneumoniae* serotype 19A infection is a particularly serious disease. The incidence of this problem has increased dramatically. Prevenar 7©, the first version of the conjugate pneumococcal vaccine introduced into the UK vaccination programme did not offer protection against this serotype, the second generation vaccine Prevenar 13© introduced in 2010 contains antigen for 19A, but continued surveillance will be required to determine whether this is effective in our population.

P175 MANTOUX OR GAMMA INTERFERON (IGRA)—WHICH TEST IS BEST IN CHILDREN?

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Introduction NICE guidelines recommend a Mantoux threshold of 15 mm induration to trigger investigation for tuberculosis (TB), with IGRA tests used as second line in selected groups. Little data are available about the role of the two tests in the diagnosis of active TB. Emerging evidence suggests IGRA tests may be more sensitive in identifying TB infection in children.

Aim To explore the relationship between Mantoux and IGRA in children attending a paediatric TB clinic in Manchester.

Hypothesis A Mantoux threshold of ≥15 mm induration underestimates TB infection in children.

Method All children aged 0–17 years referred to the TB service at Central Manchester Foundation Trust between Jan 2009 and May 2011 were included. Initial screening included symptom review and Mantoux testing. Based on induration at 48–72 h, Mantoux tests were defined as negative <6 mm or positive ≥6 mm for those with no prior BCG, and negative <10 mm, borderline 10 to ≥15 mm or