NATIONWIDE SURVEILLANCE OF PAEDIATRIC EMPYEMA 2014 - 2016 – preliminary results

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AIMS
To document the burden of empyema in children aged <15 years in New Zealand including infectious aetiology, demographic and underlying conditions
To describe surgical and medical management, complications and short term outcomes

METHODS
Cases of empyema in children aged 0-14 years admitted to hospital were notified to the New Zealand Paediatric Surveillance Unit (NZPSU) 1st May 2014 through to 1st June 2016.
Clinician questionnaires were used to collect demographics, underlying conditions, management, laboratory results, complications and short term outcomes.

RESULTS
117 notifications were received with 99 fulfilling the case definition and complete data available for 87 cases (88%)
Annual incidence of empyema related hospitalisations was 5.2/100,000 in children <15 years

Demographics:
- Even gender distribution (55% male)
- Median age at hospitalization 3.8 years (range 2 months to 14.9 years)
- 61% aged < 5 yrs
- 46% of cases lived in the greater Auckland area (50% CMDHB, 32.5% WDHB, 17.5% ADHB) (map of NZ with numbers)
- Immunisation status for Hib was 98% for the 80 in whom data was available. 52/87 (60%) children had received ≥3 doses of PCV. Influenza vaccination uptake was low (<1%)
- 22% of children were identified as having another medical condition ranging from mild asthma or eczema to immune-compromising conditions (such as Type 1 DM, neuroblastoma or polyarticular JIA on etanercept)

Management:
- 72/87 (83%) required surgical intervention including pleural aspirate alone, pleural drain, pleural drain+fibrolytic, Video Assisted Thorascopic Surgery (VATS) or open thoracotomy
- 15/87 (17%) were managed conservatively with IV antibiotics alone
- At diagnosis 76/87 (87%) of cases were treated with empiric antibiotics in line with clinical guidelines¹,²

Microbiology:
- Causative organism was detected from a sterile site in 72% of cases
- Of the 63 organisms detected (via culture, PCR, anti-gen detection), S. pneumoniae was the most common organism followed by S. aureus and S. pyogenes

Study period incorporated different eras of pneumococcal vaccination (PCV10 and PCV13) and serotype data for NZ pneumococcal infection is awaited

Increasing incidence of MSSA infection has been reported in NZ although MRSA rates in New Zealand have been reported as relatively stable since 2001

Empyema cases reflect a significant morbidity burden with a majority requiring surgical intervention, 1/3 requiring ICU and prolonged hospitalization (19 days).

DISCUSSION
- Paediatric empyema rates in NZ appear higher than the UK (2.7/100,000 and Australia (<1/100,000) at 5.2/100,000 over the 25 month period of this study
- Maori and Pacific groups were both over-represented (32% and 23% of cases respectively).
- Nearly 5% of empyema cases had a causative bacterial pathogen identified
- S. pneumoniae was the most common organism implicated (38%) followed closely by S. aureus (35%) of which 18% were MRSA
- Paediatric empyema in children is thought to be a complication of childhood pneumonia involving the accumulation of infected fluid in the pleural space
- Mortality in children is low but significant morbidity and cost are associated with potential for surgical intervention, prolonged hospital stay and intensive care
- Incidence of empyema appears to be increasing worldwide and is occurring despite reductions in pneumonia and invasive pneumococcal disease associated with conjugate pneumococcal vaccine (PCV)¹
- Streptococcus pneumoniae is the most common causative organism in developed countries worldwide although Staphylococcus aureus plays an important role in New Zealand.²,³

Streptococcus pneumoniae is the most common organism implicated in empyema and complicated pneumonias; global trends in incidence, prevalence, and serotype epidemiology.

Empyema is a rare yet serious complication of childhood pneumonia involving the accumulation of infected fluid in the pleural space, compromising conditions (such as Type 1 DM, neuroblastoma or polyarticular JIA on etanercept).
Mortality in children is low but significant morbidity and cost are associated with potential for surgical intervention, prolonged hospital stay and intensive care.

Empyema cases reflect a significant morbidity burden with a majority requiring surgical intervention, 1/3 requiring ICU and prolonged hospitalization (19 days).

ACKNOWLEDGEMENTS:
Dr Peter W Reed, Statistician, Children’s Research Centre, Starship Children’s Health, ADHB
New Zealand Paediatric Surveillance Unit staff and collaborators. The New Zealand Paediatric Surveillance Unit is funded by the Ministry of Health.

REFERENCES
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