# 318. New insights into respiratory infections in children

#### P2946

National surveillance of paediatric empyema in the UK; the UK-ESPE study <u>David Spencer</u><sup>1</sup>, Matthew Thomas<sup>2</sup>, Elemraid Mohammed<sup>1</sup>, Julia Clark<sup>1</sup>, Steve Rushton<sup>2</sup>, Jimmy Paton<sup>3</sup>, <sup>1</sup>Great North Children's Hospital, Royal Victoria Infirmary, Newcastle Upon Tyne, United Kingdom; <sup>2</sup>School of Biology, Newcastle University, Newcastle uponTyne, Tyne and Wear, United Kingdom; <sup>3</sup>Clinical Sciences, Glasgow University, Glasgow, United Kingdom

UK-ESPE monitors the changing empyema epidemiology and compares management across the UK. Demographic, clinical and microbiological data on children undergoing pleural drainage were obtained from 19 paediatric respiratory centres from September 2006-March 2011. Culture negative pleural fluid underwent pneumococcal PCR, positive samples were serotyped using an assay detecting 14 serotypes/groups. Robust multivariate survival models were used to analyse length of stay (LOS). Chi-squared, Kruskal-Wallis and Fisher's test were used for other analyses. Data on 635 children were obtained (56% male, median age 4.3 years). If a bacterial cause was found (n=287), Streptococcus pneumoniae accounted for 68%, Streptococcus pyogenes 14% and Staphylococcus aureus 4%. A pneumococcal serotype was detected in 125 patients with serotype 1(46%), 3(22%), 7(12%) and 19A(9%). PCV-7 serotypes accounted for 48% in 2006/07 but had disappeared by 2010/11. Non-PCV-7 serotypes increased over the same period. 19A was associated with severe disease and the only reported death. Median tertiary LOS was 8 days (range 3-33) and median total hospital stay (THS) 11 days (range 5-43). Surgery was associated with a decrease in tertiary LOS of 41% (95% C.I.7-88%) p=0.015) and THS of 43% (95% CI 7-92%, p=0.015) compared to non-surgical treatment. This effect did not achieve significance when each treatment group was analysed separately. Empyema in the UK remains predominantly a pneumococcal disease with causative serotypes changing over time. Continuing surveillance is required to monitor changes following introduction of new pneumococcal vaccines. Primary surgical strategies were associated with reduced hospital stay in this cohort.

# P2947

# Joint effects of smoking during pregnancy and polymorphisms in the *MBL2* gene on cord blood levels of mannose-binding lectin

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Smoking in pregnancy may affect the developing immune system and is associated with respiratory disease in the offspring. Also levels of mannose-binding lectin (MBL), a soluble innate immune mediator, are related to early respiratory morbidity. Yet, a joint effect of smoking in pregnancy and single-nucleotide polymorphisms (SNPs) in the *MBL2* gene on MBL levels in cord blood (CB) is unknown.

MBL was measured in CB in N=221 participants of a birth cohort of unselected, healthy, term infants and dichotomized using cutoffs of 700 and additionally of 300 ng/ml. We studied the association of smoking in pregnancy (validated by cotinine levels in the first urine) with MBL levels in CB. Using the Illumina<sup>®</sup> HumanOmniExpress chip for genotyping, we assessed the association of *MBL2* SNPs and of SNPs on a genome-wide basis with MBL levels. We explored effect modification by smoking adjusting for multiple testing and confounders.

Smoking in pregnancy was significantly associated with lower MBL levels for both cutoffs of 700 and 300 ng/ml with an OR (95% CI) of 3.30 (1.73;6.29) and 2.99 (1.43;6.28), respectively. Several *MBL2* SNPs were significantly associated with decreased MBL levels (lowest p=1.08 x  $10^{-15}$ ). On a genome-wide basis, no region other than MBL2 reached genome-wide significance. We found significant gene-environment interaction of *MBL2* SNPs with smoking in pregnancy, such as for the downstream SNPs rs10824787 and rs3821968 (p<sub>int</sub>=0.036 and p<sub>int</sub>=0.044, respectively).

Smoking during pregnancy lowers MBL levels in CB alone and in a joint effect with *MBL2* SNPs. Our results may explain a link between genetic and environmental effects on early respiratory morbidity.

#### P2948

# Inhaled racemic adrenalin versus saline in acute bronchiolitis, a multicenter randomized double-blind clinical trial

randomized double-blind clinical trial <u>Håvard Ove Skjerven</u><sup>1,9</sup>, Jon Olav Gjengstø Hunderi<sup>2</sup>, Sabine Kristin Brügmann-Pieper<sup>3</sup>, Ane Charlotte Brun<sup>4</sup>, Kai-Håkon Carlsen<sup>1,9</sup>, Hanne Engen<sup>5</sup>, Leif Eskedal<sup>6</sup>, Marius Haavaldsen<sup>2</sup>, Bente Kvenshagen<sup>2</sup>, Jon Lunde<sup>2</sup>, Petter Mowinckel<sup>1</sup>, Leif Bjarte Rolfsjord<sup>7</sup>, Christian Siva<sup>4</sup>, Truls Vikin<sup>8</sup>, Karin C. Lødrup Carlsen<sup>1,9</sup>. <sup>1</sup>Dept of Paediatric Medicine, Oslo University Hospital, Oslo, Norway; <sup>3</sup>Dept of Paediatric Medicine, Østfold Hospital HF, Fredrikstad, Østfold, Norway; <sup>4</sup>Dept of Paediatric Medicine, Vestred Viken HF, Drammen, Buskerud, Norway; <sup>5</sup>Dept of Paediatric Medicine, Telemark Hospital HF, Skien, Telemark, Norway; <sup>6</sup>Dept of Paediatric Medicine, Sørlandet Hospital HF, Kristiansand, Vest-Agder, Norway; <sup>7</sup>Dept of Paediatric Medicine, Innlandet Hospital HF, Elverum, Hedmark, Norway; <sup>8</sup>Dept of Paediatric Medicine, Innlandet Hospital, Lillehammer, Oppland, Norway; <sup>9</sup>Insitute of Clinical Medicine, University of Oslo, Oslo, Norway

**Background:** The efficacy of inhaled racemic adrenaline (iRA) versus general supportive therapy in acute bronchiolitis in infants is questioned. Aims: To assess efficacy of iRA versus inhaled saline and regular vs. on demand therapy in hospitalized infants with acute bronchiolitis.

Subjects and methods: A multicenter (n=8) randomized double-blind controlled trial (pharmaceutical company independent) of iRA vs saline further randomised into regular vs on demand inhalations (up to every second hour) included 404 children < 12 months of age (mean 4.2 months), 59.3% boys, with moderate to severe acute bronchiolitis in Norway in 2009-11. A validated clinical score (0-10, 0 best) was used pre-and post inhalation daily. Inclusion required a score  $\geq$  4. Supportive therapy (oxygen, nasogastric feeding (NGf) or ventilatory support) were recorded. The primary outcome was length of stay (LOS) (hours until deemed ready for discharge). Analyses were by intention to treat except for LOS.

**Results:** Infants treated with iRA vs saline had no significant difference in LOS (mean, 95% conf. interval) (59.6, 52.2–67.0 vs 63.6, 56.2–71.0) (n=322) (p=0.4) or need for NGf (21.8 vs 24.4%), ventilatory support (7.4 vs 7.5%), supportive treatment (27.2 vs 25.9%) or relative improvement in clinical score from pre-inhalation (0.25 vs 0.22) (all p>0.1, n=40). On demand vs regular study medication inhalations resulted in shorter mean LOS (54.93, 47.9–62.0 vs, 68.1, 60.4–75.7 hrs, p= 0.01) and fewer inhalations (11.9 vs 17.0) (p<0.001).

**Conclusion:** Inhaled RA for acute bronchiolitis is not more effective than inhaled saline, whereas inhalations on-demand appears more effective than regular intervals.

#### P2949

### Is primary ciliary dyskinesia a "biofilm" disease?

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**Introduction:** Bacterial biofilms are structured communities of adherent bacteria enveloped in self-produced matrix which are refractory to antibiotics and the host immune response. They play a key role in the chronicity of respiratory infection in cystic fibrosis. *Haemophilus influenzae* is the most common pathogen isolated in primary ciliary dyskinesia (PCD). We hypothesise that impaired mucociliary clearance in PCD will predispose these patients to biofilm infections.

Aims: To investigate the biofilm-forming capacity of clinical *H. influenzae* isolates from PCD patients.

**Methods:** The biofilm-forming ability of 4 *H. influenzae* clinical isolates from different PCD patients were compared using a crystal violet (CV) assay, colony forming unit counts (CFUs), fluorescence *in situ* hybridisation (FISH) and scanning electron microscopy (SEM).

**Results:** CV staining demonstrated bacterial biomass adherent to plastic for all isolates (OD<sub>600</sub> 0.04 for isolate 1 to 0.12 for isolate 4, p<0.05). SEM permitted visualisation of a characteristic matrix surrounding the bacteria. Biofilm thickness varied for each isolate, qualified by FISH (13µm for isolate 1; 82µm for isolate 4). CFUs quantified the number of viable bacteria within each day 4 biofilm, ranging from 9x10<sup>6</sup> CFU/cm<sup>2</sup> in isolate 1 to 2x10<sup>8</sup> CFU/cm<sup>2</sup> in isolate 4.

Conclusion: We have characterised biofilm-forming capacity in all 4 H. influenzae isolates from PCD patients. 2 isolates from chronically colonised patients (over 4 years) consistently formed thicker, cell dense and structurally more complex biofilms than the other, more recently isolated, strains. These data suggest that H. influenzae is capable of biofilm formation and that PCD patients, like cystic fibrosis, might harbour bacteria in biofilms.

# P2950

#### Evidence of increased pathogenicity of HRVC compared with HRVA and B: Comparisons between children with an acute lower respiratory illness and controls

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Introduction: Recent studies suggest that human rhinovirus group C (HRVC) is more pathogenic in young children than HRVA and B. However, the relative frequency of isolation of these HRV groups between children presenting to an emergency department (ED) with an acute lower respiratory illness (ALRI) and healthy community controls has not been determined.

Aim: To compare isolation rates for HRVA, B and C between children with an ALRI presenting to ED and health community controls.

Methods: Children aged 0-5 years presenting with an ALRI to the ED of a tertiary paediatric hospital along with healthy children from a local childcare centre were prospectively recruited. A nasal sample was collected at recruitment from which RNA was extracted and reverse transcribed. From cDNA, a 2-step PCR of the HRV 5' NCR was used for HRV detection and molecular typing.

Results: There were no differences in isolation rates for HRVA between ALRI cases and controls. Isolation rates for HRVB were low and slightly higher in controls than cases. For HRVC, not only were isolation rates higher than for HRVA or B, but rates were substantially higher for cases versus controls (48.5 vs 8.7%, p<0.001).

#### Table 1. Cases versus controls

-	Cases	Controls	p-value
n	167	69	
HRVA (%)	33 (19.8)	12 (17.9)	0.14
HRVB (%)	3 (1.8)	5 (7.2)	0.049
HRVC (%)	81 (48.5)	6 (8.7)	< 0.001

Conclusions: HRVC is the most common HRV group causing ALRI in this group of young children, but is relatively uncommon in healthy children. In contrast, HRVA and B were not more common in children with ALRI than controls. These data provide support for HRVC being more pathogenic than HRVA and B.

#### P2951

# RSV hospitalization in Down syndrome in the Canadian Registry of Synagis (CARESS) following prophylaxis (2006-2011)

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Background: The Canadian Registry of Synagis (CARESS) tracks palivizumab use and RSV hospitalizations iincluding 299 full term Down syndrome (DS) infants without congenital heart disease.

Objective: To determine respiratory illness (RIH) and RSV hospitalization (RSVH) rates in healthy DS)infants who received palivizumab compared to: 1) infants with underlying medical disorders (MD) and 2) infants who meet standard indications for RSV prophylaxis (SD).

Design/Methods: A prospective, observational, registry of infants who received 1 dose of palivizumab during the 2006-2011 RSV seasons. Data collected monthly. Results: 10,061 infants were enrolled (DS: 299, 3.0%; infants with MD: 1247, 12.4%; and SD: 8515, 84.6%). Participants were significantly different (p<0.005) in most demographic variables and risk factors such as siblings, smoke exposure,  $\geq$  5 household members and daycare attendance. Compliance rates relative inter-dose intervals (p=0.323) across the groups was similar, though the DS group received a significantly higher proportion of their expected injections (p=0.018). A significantly greater proportion of DS had RIHs compared to MD (p=0.025), but not SD infants. DS infants did not have a significantly different RSVH rate (1.18%) from either MD (2.55%; p=0.627) or SD (1.52%; p=0.547)

Conclusions: Rates of hospitalization for respiratory illnesses and RSV-related hospitalization did not differ among the groups following prophylaxis. Palivizumab may be efficacious in reducing RSVH in DS compared to reported historical untreated controls in a similar Danish cohort of DS patients (untreated; 7.6%; versus treated; 1.6% - 77% reduction).

# P2952

# Role of probiotics in attenuation of acute respiratory tract infections in preschool and primary school children Sergei Gerasimov<sup>1</sup>, Orysya Cycura<sup>2</sup>. <sup>1</sup>Pediatrics, Lviv National Medical

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# Background: Probiotics have been shown to reduce incidence, duration and symptom scores of acute respiratory tract infections (ARTI).

Objective: To study a potential of probiotics in prevention of ARTI in children. Materials and Methods: 96 otherwise healthy children aged 3-12 years closely contacted to a household with ARTI were randomized to receive 1 g of a powder containing 5 billion CFU of *L. acidophilus* DDS-1, *B. lactis* and 50 mg fructooligosaccharide (DDS Junior, UAS Laboratories) (group I, n=48) or rice maltodextrine powder (group II, n=48) once daily for 30 days. During one-month follow-up, we recorded incidence, duration, and clinical course of ARTI using Canadian acute respiratory illness and flu scale (CARIFS).

Results: At baseline groups I and II were comparable on age, number of social contacts, history of attending daycare/school, and history of previous ARTI. 85%(n=41) of children in the group I and 90% (n=43) in the group II developed ARTI (p=0.368). In sick children at group I 50% clinical recovery from baseline value of CARIFS occurred on day 6.2(1.9), while in the group II on day 7.2(2.1) (p=0.025). For the group I return to normal health was observed on day 8.5(3.3) vs 10.7(3.9) in the group II (p=0.007). In the group I nasal decongestants, throat preparations, and antipyretics were used for a shorter course than in the group II (2.3(1.2) vs 3.2(1.7) p=0.007; 1.9(1.1) vs 2.5(1.6) p=0.046; 2.7(1.2) vs 3.5(1.5) p=0.009, respectively).

Conclusions: At tendency toward prophylactic potential in limitation of household spread, probiotics have a clear attenuating effect on the clinical course of ARTI in young children and shorten use of flu/cold drugs

#### P2953

#### Active cytomegalovirus infection in non-immunosuppressed children with chronic respiratory disease

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Cytomegalovirus (CMV) is reactivated in lower respiratory tract in the context of local or systemic inflammatory processes, increasing its morbimortality.

Objective: To set the incidence of active CMV infection in children with chronic respiratory diseases and no acute exacerbation.

Material and methods: Mixed retrospective-prospective study (May 2009-September 2011) of non-immunosuppressed children who underwent a diagnostic bronchoscopy. The serological test for the CMV was performed using CLIA (DiaSorin, Italy).Detection and quantification of DNA in respiratory samples and plasma by PCR QRT-PCR in the m2000RT system (AbbottDiagnostics, USA).

Results: 36 patients (45%male), mean age 5.5 years. Underlying diseases were cystic fibrosis(10), middle lobe syndrome(6), laryngotracheomalacia(4), poorly controlled asthma(3), obliterans bronchiolitis(2), interstitial lung disease(2), tracheostomy complications(2), bronchiectasis(2), persistent atelectasis(2), bronchial sequelae after bronchial tuberculosis (1), pulmonary hypoplasia(1) and pulmonary hemosiderosis(1). 11 patients were IgG positive.CMV DNA detected in 6 respiratory samples (16.6%;54.5% of the IgG positive population),4 in bronchoalveolar lavage and 2 in brochoaspirated.Viral DNA detected in plasma in two of them. The mean viral load at respiratory samples was 180 copies/mL (range 27-815 copies/mL) and in plasma 18 and 123 copies/mL.All the positive CMV children were under inhaled corticosteroid treatment.

Conclusion: Active CMV infection is common in non-immunosuppressed children with chronic respiratory disease. Prospective studies should elucidate the effects of CMV replication in their lower respiratory tract and clinical evolution.

# P2954

### The microbiology of lung disease in ataxia telangiectasia (A-T)

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Background: A-T is a progressive, neurodegenerative disease causing immunodeficiency, an increased risk of malignancy & respiratory system complications, like chronic sinopulmonary disease, bronchiectesis, interstitial lung disease & aspiration. The high early age mortality is due to cancer & respiratory disease. Little is known about what causes lung infections in A-T (Ped Pul 2010;45:847-59). Aim: To describe the microbiology of Respiratory tract in patients attending the UK National A-T clinic in order to guide blind antimicrobial therapy, & to inform future studies to improve the evidence base for A-T treatment.

Methods: We prospectively obtained cough swabs or sputum cultures as age-

appropriate & throat swabs for virology. We collected data on new treatment prescribed, current maintenance antibiotic or immune replacement therapy. Results: 56 children (68 consuls) were seen in the clinic (May 09 to January 12).We could not obtain a sample in some children (Bacteria, n=14; Viruses, n=33).

#### Table 1. Microbiology

Viruses (n=35 consults)	Rhinovirus	10
	Metapneumovirus	1
	No Resp. viruses	24
Bacteria (n=54 consults)	Resp. commensals	47
	H. influenzae	3
	H. influenzae + S. pneumoniae	1
	P. aeruginosa	2
	B. cepacia	1

Table 2. Treatment

	Treatment
7/56 children (12.5%) 15/68 (22%) consults (n=5 Intravenous, n=8 oral, n=2 nebulised & ora	Immunoglobulin infusion l) Acute antibiotic
41/56 children (73%) (n=33 Azithromycin, n=8 Other)	Maintenance antibiotic

Conclusions: Our findings are similar to smaller series (n=15) (Acta Pædia 2007;96:1021-24) but with no opportunistic infections; bacterial infection is common and current management is based on extrapolation from other lung conditions. A-T specific evidence based guidelines are urgently needed.

#### P2955

Host and viral factors predicting severity of rhinovirus-associated wheeze <u>Giulia Cangiano</u><sup>1</sup>, Elena Proietti<sup>1</sup>, Marie Noelle Krönig<sup>1</sup>, Elisabeth Kieninger<sup>1</sup> Meri Gorgievski<sup>3</sup>, Maria Teresa Barbani<sup>3</sup>, Laurent Kaiser<sup>2</sup>, Caroline Tapparel<sup>2</sup>, Marco Polo Alves<sup>1</sup>, Nicolas Regamey<sup>1</sup>. <sup>1</sup>Division of Respiratory Medicine, Department of Paediatrics, Inselspital and University of Bern, Switzerland; <sup>2</sup>Central Laboratory of Virology, University Hospitals, Geneva, Switzerland; <sup>3</sup>Institute for Infectious Diseases, University of Bern, Switzerland

Background: Rhinovirus (RV) is a common cause of wheeze in childhood. Personal history of atopy, presence of siblings and day care attendance are known risk factors for severe RV-associated wheezing but objective markers predicting disease severity are lacking. We aimed at identifying such markers in a cohort of preschool children hospitalized for RV-associated wheezing.

Methods: Direct immunofluorescence for RV and other viruses was performed on nasopharyngeal aspirates (NPA) within the first 24 hours of hospitalisation of children aged 0-6 years. RV load, interferons ( $\gamma$  and  $\lambda$ s) and cytokines (IL-4, 6, 8, 13, IP-10) were quantified by RT-PCR and ELISA and related to clinical parameters

Results: Within a 4-years period (2007- 2011), we included 126 children (median (range) age: 1.66 (0.40-5.81) years). Presence of RV was confirmed by RT-PCR in all NPA samples. RV load was inversely related to age (r=-0.22, p=0.02) and correlated with the pro-inflammatory cytokines IL-8 (r=0.23, p=0.01) and IL-6 (r=0.35, p=0.001). There was no relationship between RV load or any IFNs cytokine level and clinical outcome parameters (clinical severity scores, length of hospitalisation and duration of oxygen therapy). Post-hoc analysis revealed a trend towards higher IL-6 levels of children with prolonged oxygen need (>1 vs. ≤1 days): (135 (5-789) vs.16 (5-244) pg/ml, p=0.07).

Conclusions: In our cohort, RV load and related antiviral and pro-inflammatory responses were not associated with disease severity. This may be due to the wide age-range of subjects studied. Whether IL-6 levels in NPA may help to predict clinical outcome in subgroups of children with RV-associated wheezing illnesses needs to be evaluated in further studies.

#### P2956

# Modulation effect of beta-glucan isolated from Pleurotus ostreatus in children with recurrent respiratory tract infections

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Introduction: Recurrent respiratory tract infections (RRTI) present very frequent problem in pulmonologist praxis. Several natural preparations have been used for their prevention, but only few of them have scientific evidence for a real clinical efficacy

Objectives: The aim of the study was to evaluate the preventive effect of Imunoglukan P4H<sup>®</sup>, syrup containing imunoglukan – beta-glucan from *Pleurotus* ostreatus, on the frequency of RRTI in children.

Methods: In double-blind, placebo-controlled study, 175 children (5.65±2.39 years) with  $\geq$ 5 respiratory infections in previous 12 months were studied. Children

were treated for 6 months with Imunoglukan P4H® or with artificial syrup with vitamin C (placebo group). During three visits questionnaires were fulfilled and immune parameters in blood were evaluated.

Results: In active group, 36% of the children did not suffer from any respiratory infection during the treatment compared to 21% in placebo group (p < 0.05). Imunoglukan P4H<sup>®</sup> significantly decreased the frequency of flu and flu-like diseases and also lower respiratory tract infections. 65% of physicians evaluated the effect of Imunoglukan P4H<sup>®</sup> as excellent (significant decreased morbidity) commend to 20% for all the (z = 0.0%). compared to 39% for placebo (p<0.05). We observed a significant modulation effect of Imunoglukan P4H<sup>®</sup> on humoral and cellular immunity.

**Conclusions:** Our study provided relevant evidence for preventing effect of Imunoglukan P4H<sup>®</sup> on the incidence of respiratory infections and revealed its complex immunomodulating activity. This is the first double-blind, placebo-controlled study in children with RRTI aimed on the preventive effect of beta-glucans on respiratory morbidity.

#### P2957

#### Community-acquired pneumonia in pediatric patients with heritable connective tissue disorders: Novel phenotypic variants

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Background: The prevalence of heritable connective tissue disorders (HCTD) changed manifestations of community-acquired pneumonia (CAP) in pediatric patients, leading to diagnostic and therapeutic errors

Objective: To study clinical features of CAP in children with HCTD.

Material and methods: 105 patients aged 3-18 years, with clinically, serologically and radiographically diagnosed CAP, were followed up for two years. 60(57.4%) patients had moderate persistent asthma (A). All pediatric patients had HCTD manifestations

Results: CAP caused by Mycoplasma pneumonia (Mp) was in 89.1% of patients, by Cytomegalovirus (Cmv) - in 26.7%, by Chlamydophilla pneumonia (Cp) - in 21.9%. CAP was caused by association of Mp, Cp and Cmv in 38.1% of children. CAP in asthmatic patients occurred with longer duration of respiratory symptoms and bronchial obstruction (11.5±2 days). Pulmonary hypertension (PH) was in 51,7% of patients with CAP and A, with pulmonary fibrosis (PF) in 48.3% of this group of patients. 26.7% of children with PH and PF had CT evidence of emphysematous bullae (EB). Patients with CAP and A received antibiotic treatment (macrolides) (ABT) besides controller therapy for achievement of A control.

Conclusions: 1. Close relationship between CAP, caused by intracellular pathogens, and HCTD is revealed. 2. CAP provoked A exacerbation in 57.4% of patients. 3. CAP in asthmatic patients had more long-term and severe clinical course. 4. PH was diagnosed in 51.7% of patients with CAP, A and HCTD, 48.3% of them had PF. 5. 26.7% of patients with PH and PF had EB. 6. It is advisable to consider CAP associated with HCTD and A as clinical phenotypes of CAP.

# P2958

### Effect of short-chain fatty acids and pH on aerobic and anaerobic growth of Pseudomonas aeruginosa

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Background: Pseudomonas aeruginosa (PA) is one of the most common pathogens in patients with cystic fibrosis (CF) lung disease. PA and other anaerobic bacteria produce short-chain fatty acids (SCFAs) as byproducts of anaerobic fermentation. SCFAs are more volatile at low pH values, and reports have shown that CF patient sputum in acidic. Recently, we detected SCFAs in the low millimolar range in the sputum of CF patients.

Aim: To determine if SCFAs affect bacterial growth at different pH levels.

Methods: The laboratory strain PAO1 and a clinical isolate PA508 were used for experiments with and without the addition of SCFAs (acetate, propionate, butyrate) at a range of concentrations between 3.125-100 mM and pH values from 5.5-7.0 in tryptic soy broth. Optical density at 600 nm was measured every 30 minutes for a 6 hour period, as well as viable colony counts after the period of incubation. Anaerobic/microaerobic conditions were generated by sealing microplates with optically-clear PCR film.

Results: Acetate showed a significant inhibition in growth above 50 mM (>77%, p<0.0001) that was dependent on pH. Conversely there was a significant increase in growth below 12.5 mM acetate (>20%, p<0.05). Propionate had the highest inhibition, followed by butyrate and acetate. Anaerobic conditions resulted in lower growth overall and showed similar trends in growth inhibition. Results were consistent for both PA strains tested.

Conclusion: SCFAs increase the growth of laboratory and clinical strains of PA at concentrations found in CF patient sputum, but inhibit growth at high concentrations. SCFAs produced by anaerobic bacteria may provide an indication of increased virulence of PA.

### P2959

Longitudinal microbiology of children with primary ciliary dyskinesia <u>Woolf Walker</u><sup>1,2</sup>, Claire Jackson<sup>1,2</sup>, Amanda Harris<sup>2</sup>, Samantha Packham<sup>2</sup>, Jane Lucas<sup>1,2</sup>, <sup>1</sup> Primary Ciliary Dyskinesia Research Group, Clinical and Experimental Sciences, Faculty of Medicine, University of Southampton United Kingdom; <sup>2</sup> Primary Ciliary Dyskinesia Diagnostic Service, University Hospital Southampton NHS Foundation Trust, Southampton, United Kingdom

Introduction: Longitudinal changes in the respiratory microbiology of cystic fibrosis is well characterised; *Staphylococcus aureus & Haemophilus influenzae* are initially isolated before chronic *Pseudomonas aeruginosa* colonisation. However there is a paucity of similar microbiological data for primary ciliary dyskinesia (PCD).

Aims: Longitudinal assessment of respiratory microbiology in paediatric PCD patients in a UK specialist centre.

**Methods:** Results of sputum and cough swab microbiology from PCD patients (aged 2.1-19.3 years old, n=17) between January 2003–January 2012, were reviewed. Results were divided into 5-year cohorts corresponding to patient age at time of sample acquisition(table 1).

**Results:** 168/341 (49.1%) cultures were positive. *H. influenzae* was most prevalent (61/168, 36.3%) followed by *S. aureus* (32/168, 19%), *Streptococcus pneumoniae* (27/168, 16%) and *P. aeruginosa* (16/168, 9.5%). The predominance of H. influen-

Table 1. Percentage prevalence of bacteria in PCD children in a tertiary follow up clinic in the UK (overall and in age bands)

Bacteria	Overall (n=168)	Age band in years (samples)			
		0–5 yrs (n=28)	5–10 yrs (n=67)	10–15 yrs (n=47)	15-20 yrs (n=26)
H. influenzae	36	32	18	55	54
S. aureus	19	15	22	21	11
S. pneumoniae	16	11	24	13	8
P. aeruginosa	10	7	19	0	4
M. catarrhalis	3	7	5	0	0
Fungi and yeast	7	14	6	0	15
Other	9	14	6	11	8

zae continued throughout childhood apart from in 5-10 year olds where there were equivalent numbers of *H. influenzae*, *P aeruginosa*, *S. aureus* & *S. pneumoniae* (Table 1).

**Conclusion:** *H. influenzae* is the predominant pathogen in our PCD patients throughout childhood, particularly >10 years old. The progression to chronic *P. aeruginosa* colonization seen in CF is not evident in our PCD population.