collected at each visit for virological analysis. Polymerase chain reaction assays for adenovirus, influenza A&B, metapneumovirus, parainfluenza 1–3, respiratory syncytial virus and rhinovirus were performed on each sample. Spirometry was recorded at each visit. Treatment failure was defined as a failure of the FEV_1 to return to ≥90% of baseline after intravenous antibiotics. Statistical analysis utilised generalized linear models and multiple linear regression as appropriate, taking into account multiple observations from participants.

Results 191/626 (30.5%) study visits were positive for ≥1 virus with rhinovirus accounting for 72.5%. The incidence of VRI and pulmonary exacerbation (PEx) was 1.6 and 2.5 cases/patient-year respectively. VRI was associated with increased risk of PEx (OR 2.2; 95% CI 1.6 – 3.1; p<0.001).

There was no significant difference in relative fall from baseline FEV_1 at virus-positive compared with virus-negative visits (8.7 vs 9.4%, p=0.4). Acute fall in FEV_1 was lower in virus-positive PEx compared with virus-negative PEx (12.7 vs 15.6%; p=0.04). Rate of PEx, but not of VRI, was associated with a statistically significant decline in FEV_1 over one year, adjusted for age, sex and baseline lung function (β coefficient –1.79; 95% CI –3.4 to –0.2; p=0.02).

Intravenous antibiotics were given for 122 PEx of which 90 had pre- and post-antibiotic FEV_1 data available. 26/90 (29%) were classified as treatment failures. There was a trend towards lower likelihood of treatment failure in virus-positive PEx (OR 0.55; 95% CI 0.1 to 2.7; p=0.46).

Conclusions Incidence of PEx, but not VRI, is associated with accelerated decline in FEV_1 in adults with CF. Virus-positive PEx are associated with a lower acute fall in FEV_1 than virus-negative PEx.

P88 IS HYDROGEN CYANIDE A MARKER OF BURKHOLDERIA CEPACIA COMPLEX INFECTION?

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Introduction Pseudomonas aeruginosa (PA) was thought to be the only organism found in the cystic fibrosis (CF) lung that produced hydrogen cyanide (HCN). A recent study used a cyanide selective electrode to demonstrate HCN production by *Burkholderia cepacia complex* (BCC) when cultured under biofilm conditions. We replicated this *in-vitro* experiment using selected ion flow tube mass spectroscopy (SIFT-MS) as a more sensitive method of detecting HCN We also investigated HCN as an *in-vivo* marker of BCC infection.

Methods Twelve adults with CF were recruited as they had chronic BCC infection and were free from PA infection for >12months. They provided mouth and nose exhalation breaths for HCN analysis and a sputum sample. The sputum sample was cultured and the isolated BCC recultured under planktonic (free floating) and biofilm (non-motile communities attached to glass beads) conditions. The HCN concentration in the headspace of the both culture types was measured after 24, 48, 72 and 96 hours of incubation. Sterile, control cultures were also analysed. Biofilm formation was assessed visually and with spectrophotometry after crystal violet staining. The mouth and nose exhaled breath from 10 patients with CF that were free from PA and BCC infection for >12 months was also analysed.

Results Biofilm formation was confirmed visually and using spectrophotometry: mean(SD) absorbance of crystal violet was 3.43(0.31) absorbance units (AU) in the biofilm cultures compared to 0.005(0.003)AU in the planktonic and control cultures (p<0.001). At each of the 4 time points, the headspace HCN concentration was <10ppbv (equivalent to background levels) for all biofilm, planktonic and control cultures. The mean(SD) breath HCN concentrations were no higher in the subjects with chronic BCC infection than in subjects without BCC infection for mouth exhaled breath (11.0(12.7) v 12.0(12.9) ppbv p=0.87) and nose exhaled breath (0.6(1.1) v 2.1(3.8) p=0.23).

Conclusions Using SIFT-MS we did not identify elevated HCN concentrations in the headspace of BCC cultured under biofilm or planktonic conditions or in the breath of patients with chronic BCC infection. Therefore, HCN does not appear to be an *in-vitro* or *in-vivo* marker of BCC infection.

P89 THE EFFECT OF SAMPLE HANDLING ON VIABLE BACTERIAL COMMUNITY PROFILES FROM CYSTIC FIBROSIS SPUTUM SAMPLES

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Introduction Obtaining accurate information on the composition of Cystic fibrosis (CF) lung infections is essential for the selection of appropriate therapy and maintenance of respiratory function. Whilst significant advances have been made using molecular techniques to provide such characterisation, there is a pressing need to identify the most appropriate sampling handling protocols. Here, we investigated the relationship between the time period prior to sample freezing and the bacterial community profiles.

Methods Eleven sputum samples were collected from adult CF patients experiencing acute pulmonary exacerbations. Expectorated sputum was aliquoted into 12 equal portions, with one portion being frozen immediately and others transferred to –80°C at time points over a 72 hour period. Samples were treated with propidium monoazide prior to DNA extraction to limit analysis to viable bacterial cells. The bacterial composition of samples was determined by 16S rRNA gene Terminal Restriction Fragment Length Polymorphism (T-RFLP) profiling. Changes in bacterial community composition over the time course were then analysed using ecological statistical tools.

Results A marked change in the bacterial community composition and abundance was observed within the first hour. Using Bray Curtis similarity index, a 51% similarity change in the bacterial community was observed in the first hour when compared to the sample frozen immediately. Thereafter, the bacterial community remained relatively stable for the following 72 hours (Figure 1A). Species cumulative richness showed an increase of approximately 63 new bacterial species over 72 hours, of which 25/63 (40%) emerged within the first hour. The mean sample richness also showed a significant increase in bacterial species within the first hour (Figure 1B).

Conclusion The data presented indicates a significant change in sample bacterial composition within the first hour of sample collection. These findings have clear implications for the handling of samples for viable community profiling.

P90 OSTEOPOROSIS IN NON-CYSTIC FIBROSIS BRONCHIECTASIS (NCFBR) ADULTS

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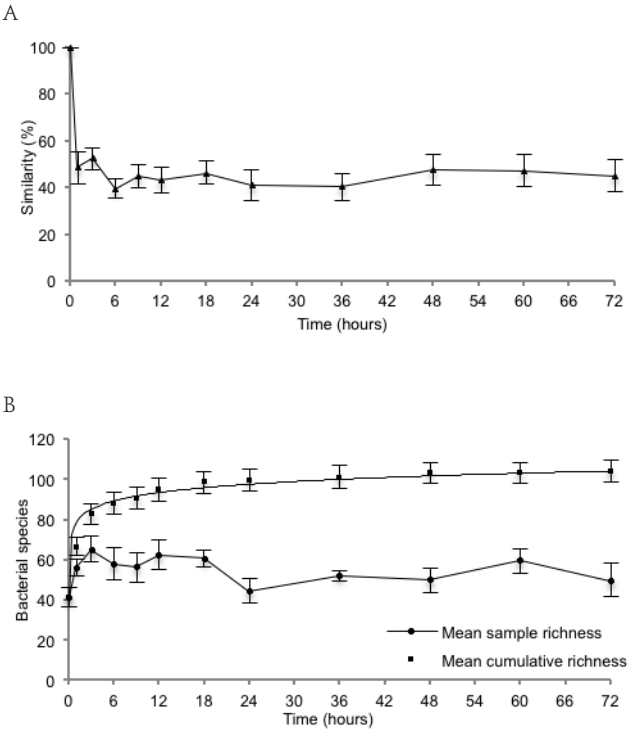
Introduction Whilst osteoporosis is associated with COPD, little is known on its prevalence in non-cystic fibrosis bronchiectasis



Abstract P89 Figure 1 (A) Change in bacterial community composition and abundance over 72 hours, the sample at each time point was compared to the sample frozen immediately. (B) Mean cumulative richness (emerging new bacterial species) and mean sample richness (total number of bacterial species in each sample). Error bars represent the standard error of the mean.

(NCFBr). We assessed the impact of factors associated with NCFBr disease severity on bone mineral density (BMD) and DEXA referral patterns in NCFBr.

Methods BMD reports from DEXA scanners were collected for all NCFBr patients from our specialist clinic database and T-scores for lumbar spine (LS), total left hip (TLH) and neck of femur (NOF) were recorded. Osteoporosis was defined as T-scores ≤–2.5, osteopenia between –1 and –2.5 and normal BMD ≥–1. FEV_1 values, exacerbation frequency and *Pseudomonas aeruginosa* chronic infection (defined as >1 positive sputum result in past 12 months) were recorded.

Results 336 NCFBr patients were identified attending the specialist clinic. 101 patients had DEXA scans performed (30%); 96 reports were retrievable. The male:female ratio was significantly different between scanned patients (29%:71%) and the entire NCFBr patient cohort (41%:59%): $p<0.01$ (two-tailed chi-squared test). Osteoporosis was detected in the same percentage of scanned males as females (32%, any site). The prevalence of osteoporosis identified was similar across different scan sites (see table). Mean FEV_1 (% predicted) for DEXA-scanned patients was 58.2 (±28.4), 24% were colonised with *P. aeruginosa* and mean number of exacerbations was 4.7/year (±3.0; n=44). No significant correlation was found between T-scores (any site) and FEV_1% pred values, *P. aeruginosa* colonisation or number of exacerbations.

Conclusion More than 40% of NCFBr patients have osteopenia and more than 25% have osteoporosis; this is higher than seen in COPD (e.g. NHANES, Schnell *et al*, 2012). Male patients had lower DEXA scanning rates suggesting referral bias favouring females. Low BMD is not predictable based on NCFBr "disease severity parameters". Greater emphasis on investigating NCFBr patients for osteoporosis, particularly males, may improve the incidence rate of fragility fractures in this patient population. Future studies on steroid use and osteoporosis incidence rates in this population would also be beneficial.

Abstract P90 Table 1 NCFBr patients with osteoporosis, osteopenia or normal bone mineral density measurements at different DEXA scan sites

	BMD classification		
Scanning site	Normal (%)	Osteopenia (%)	Osteoporosis (%)
Lumbar spine	28 (29)	44 (46)	24 (25)
Total Left Hip	32 (34)	38 (40)	25 (26)
Neck of Femur	22 (24)	43 (47)	27 (29)

P91 ANTI-IGE THERAPY: AN OBSERVATION IN CYSTIC FIBROSIS

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Introduction Cystic Fibrosis (CF) is characterised by the development of progressive cystic bronchiectasis. A proportion of patients have asthmatic elements which respond to conventional asthma therapy. Omalizumab (Xolair®, Novartis, UK) is a recombinant humanised monoclonal IgG which binds to IgE. We hypothesise that an IgE mediated component of airway inflammation in CF may respond to omalizumab.

Methods Seven patients mean age 31 (SD±12) years, serum IgE (30–1500), symptomatic despite maximal conventional therapy were administered omalizumab using standard dosing regimen in an open label fashion. The Asthma Control Test (ACT), Asthma Quality of Life Questionnaire (AQLQ) and FEV_1 were recorded at baseline and sixteen weeks post-treatment. Days of intravenous (IV) antibiotic in the year before and during therapy were compared.

Results There was a significant improvement in the mean ACT score from 11 (±3.7) to 17 (±5.9), p=0.031. AQLQ scores pre-omalizumab 49 (±15) vs. post-omalizumab 69 (±22), p=0.156; and %FEV_1 pre-omalizumab 42% (±13%) vs. post-omalizumab 45% (±14%), p=0.078 were not significantly improved. Similarly, the number of days of IV antibiotic usage declined with omalizumab treatment from 43 days (±24 days) to 25 days (±16 days) p=0.297, respectively.

Discussion This small study shows an improvement in symptom control in selected CF patients with omalizumab and other indices showed non-significant improvements, particularly IV antibiotic usage. Previous studies have demonstrated a correlation between exacerbation frequency in CF patients and the rate of decline in lung function. These findings warrant larger trials of omalizumab in 'asthmatic' CF.

P92 A RETROSPECTIVE STUDY TO EVALUATE THE USE OF NEBULISED MEROPENEM AT A LARGE UK ADULT CF CENTRE

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Background Meropenem is commonly used intravenously in CF patients infected with Pseudomonas aeruginosa, but there is limited evidence of its tolerability and effectiveness when used as a nebulised treatment.

Aim To evaluate the use of nebulised meropenem in our large UK adult CF centre.

Methods Medical records of patients who had trialled nebulised meropenem between 2008–2012 were reviewed for: demographics, lung function, BMI, sputum microbiology, indications and tolerability and number of exacerbations requiring IV antibiotics.