in the missed diagnosis of asthma in 13 (11%) cases and 7 (6%) cases being wrongly diagnosed with asthma.

**Conclusion** Current diagnostic algorithms for asthma either lack sensitivity (NICE and GINA), resulting in the under-diagnosis of asthma in around a third of cases, or provide reasonable sensitivity and specificity, but still result in misdiagnosis (either under- or over-diagnosis) in 1 in 6 people with suggestive symptoms. These data could be used to inform and test future asthma diagnostic algorithms.

**P121** UPPER AND LOWER AIRWAY DYSFUNCTION IN ELITE ATHLETES

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10.1136/thorax-2023-BTSabstracts.273

**Background** Some elite athletes suffer significant loss of training and competition availability because of recurrent respiratory tract infection (RTI). Airflow limitation and upper airway dysfunction may be relevant in underlying a propensity to RTIs. Bacterial microbial dysbiosis is a recognised accompaniment to airways disease, but its role in infection susceptibility, in this context, is not clear.

**Methods** Athletes from the UK Sports Institute (UKSI) completed a systematic assessment of their respiratory health, including measurement of exhaled nitric oxide (FeNO) and spirometry (FEV1 and FVC) with indirect bronchoprovocation testing (eucapnic voluntary hyperpnoea (EVH)). The presence of laryngeal dysfunction was assessed by the Pittsburgh Vocal Score Dysfunction questionnaire (VCD). A positive diagnosis of asthma was defined via spirometry, FeNO and EVH. The number of respiratory infections in the last 18 months was recorded. Bacterial microbial communities from posterior oropharyngeal swabs were quantified by sequencing of the 16S RNA gene.

**Results** We studied 127 athletes (47% female), training for international competition in a wide range of sports. There were no differences in the frequency of symptoms between sports. A total VCD score was elevated (>=4) in 20 athletes (9.4%). Approximately one third (30.7%) of the cohort were diagnosed as asthmatic and 38% had more than 2 respiratory illnesses in the previous 18 months. Asthma and VCD positive groups were quite distinct; in a backwards stepwise multiple regression, asthma was associated with bacterial biomass ($\beta =0.121$, $p=0.02$) and *Haemophilus* spp. abundance ($\beta =0.128$, $P=0.016$). Conversely, frequency of respiratory infections in the last 18 months was positively predicted by the presence of VCD ($\beta =-0.345$, $P=0.000$), sinusitis ($\beta =-0.219$, $P=0.014$) and wheeze ($\beta =-0.182$, $P=0.04$), without any clear association with bacterial microbiota.

**Discussion** Asthma symptoms are prevalent in elite athletes. Our findings indicate that focus on laryngeal dysfunction may be more relevant when considering strategies to reduce RTI in this cohort of individuals.

**P122** SUSTAINED WEIGHT LOSS AND IMPROVED ASTHMA OUTCOMES AT ONE YEAR FROM A RANDOMISED CONTROLLED TRIAL OF A WEIGHT MANAGEMENT PROGRAMME FOR DIFFICULT-TO-TREAT ASTHMA AND OBESITY

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10.1136/thorax-2023-BTSabstracts.274

Abstract P122 Figure 1 Proportion of participants achieving minimal clinically important difference in Asthma Control Questionnaire (ACQ6) and Asthma Quality of Life Questionnaire (AQLQ) with Counterweight-Plus group (CWP) and usual care (UC) over 52 weeks. Compared using $\chi^2$ or Fisher’s exact. * denotes significant result; ns = not significant.
Introduction We previously reported improved Asthma Control Questionnaire (ACQ6) and Asthma Quality of Life Questionnaire (AQLQ) scores with weight-loss after 16 weeks of the Counterweight-Plus weight management programme (CWP) compared to usual care (UC) in a single-centre, randomised, controlled trial in patients with difficult-to-treat asthma and obesity. Here we report one-year asthma outcomes from this trial.

Methods We randomised (1:1 CWP:UC) adults with difficult-to-treat asthma and body mass index (BMI) ≥ 30 kg/m². CWP with dietitian support: 12-week total diet replacement phase (850kcal/day low-energy formula); stepwise food reintroduction and weight loss maintenance up to week 52. Study visits occurred at baseline, 16-weeks and 52-weeks. Outcomes measured include ACQ6, AQLQ and healthcare usage. Minimal clinically important difference (MCID) in ACQ6 is −0.5 and in AQLQ 0.5.

Results Of 36 recruited, 29 attended at 52-weeks for intention-to-treat analysis: 13 CWP, 16 UC. CWP resulted in greater weight change (median −14 kg [IQR −15, −9]) compared to UC (2 kg [−7, 8]; p=0.015) at 52-weeks. 53% in CWP achieved MCID in ACQ6 at 16-weeks (vs 19% UC [p=0.041]) and these 53% sustained improvement at 52-weeks (vs 25% UC [p=0.101]). Over 52-weeks a greater proportion of participants achieved MCID with CWP vs UC in AQLQ (71% vs 6% respectively; p<0.001), including AQLQ symptom domain (71% vs 31%; p=0.024), activity domain (53% vs 19%; p=0.041) and environmental domain (65% vs 19%; p=0.008), figure 1. Median annualised prednisolone courses reduced with CWP from 4 (IQR 2, 5) at baseline to 0 (0, 2) at 52-weeks (Friedman[2]=14.8, p<0.001, Kendall’s W=0.44).

Conclusion Weight-loss, with a structured low-energy formula diet replacement programme, results in sustained weight-loss and improvements in asthma quality of life and frequency of exacerbations compared to usual care over one year. The Counterweight-Plus weight management programme is a non-pharmacological option for the challenging phenotype of difficult-to-treat asthma and obesity. Further study is needed to assess effects on spirometry and inflammation.

REFERENCE

Please refer to page A290 for declarations of interest related to this abstract.

P123 ASTHMA CONTROL IN SEVERE ASTHMA AND OCCUPATIONAL EXPOSURES TO INHALABLE ASTHMA GENS

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Methods We searched the Birmingham Regional NHS Severe Asthma Service electronic clinical database (n=1453 records; 1/3/2004 to 1/3/2021) and undertook a cross-sectional study using baseline data collected at diagnosis. We included all employed patients aged 16–64 with available data on current occupation (n=504; figure 1), and collected socio-demographic data, general health data (atopy, major co-morbidities, BMI) and asthma-related factors (spirometry, asthma control questionnaire (ACQ7) score, asthma related quality of life (AQLQ) score, maintenance oral corticosteroids, peripheral eosinophil count, hospital admissions). The Occupational Asthma Specific Job-Exposure Matrix (OAsJEM) was employed to determine likelihood of exposure to respiratory sensitizers, irritants, cleaning agents and detergents; associations between workplace exposures and ACQ7 score were investigated using binary and multinomial regression analyses.

Results The most frequently reported occupations were care assistants (7%), nurses (6%), office workers (5%), and teachers (5%); 197/504 (39%) patients were likely exposed to any inhalable asthmagen, including 30% to respiratory sensitizers, 38% airway irritants and 29% to a low-molecular weight sensitizing- or irritant cleaning product or disinfectant. ACQ7 score was available for 372/504 (74%) patients, of whom 14% had adequate control (ACQ7 score=0–1.5). After adjustment for major confounders there were no significant associations between inhaled asthmagens and ACQ7 score (either as binary or multinomial outcomes).

Conclusion In a SA population, JEM-determined workplace exposures to inhalable asthmagens are not associated with asthma control; however 29–39% of patients may have current exposure to airborne sensitizers or irritants at work. Routine collection of individual lifetime occupational data including current job role and level of exposure, in the national asthma registry, would give further insights into this relationship.

Abstract P123 Figure 1