cough sound signal. CSI was calculated for the actual cough sound duration and also for a constant duration (time constant) to assess the potential for automation. The repeatability of CSI and the effect of microphone position were assessed. For each subject, PCFRs and CSI data were normalised to values obtained during maximum voluntary cough (MVC).

Results The correlation between the optimal CSI and peak cough flow rate was best for the free-field microphone; median (IQR) correlation coefficient 0.88 (0.79–0.92) (Table 1). The median correlation for all cough sound intensity remained strong for males (r=0.90–0.91), females (r=0.79–0.84), patients with chronic cough (r=0.79–0.82) and healthy subjects (r=0.82–0.89). The intraclass correlation coefficient for repeatability was good, r=0.90, p<0.01. The CSI degraded when the microphone was positioned further away from the mouth, downwards, but not in any other position. The use of a constant cough sound duration to determine CSI did not impact on the association with PCFR (Table 1).

Conclusion Cough sound intensity correlates strongly with PCFR in voluntary cough and is a repeatable measure. The microphone position needs to be standardised as in this study. Further work is needed to automate the analysis of CSI; our preliminary findings suggest this is possible. The CSI has the potential to be developed into a non-invasive, ambulatory outcome measure of cough severity.

Abstract P158 Table 1 Correlation between cough sound intensity (CSI) and peak cough flow rate

	Correlation between cough sound intensity and peak cough flow rate
Cough sound intensity from laryngeal microphone	0.84 (0.75–0.90)
Cough sound intensity from free-field microphone	0.88 (0.79–0.92)
Time-constant CSI from laryngeal microphone	0.82 (0.77–0.90)
Time-constant CSI from free-field microphone	0.87 (0.79–0.91)

Data presented as median (IQR) Spearman correlation coefficients. All p-values <0.01.

P159 VALIDATION OF THE VITALOJAK™ 24 HOUR AMBULATORY COUGH MONITOR

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Introduction Development of novel treatments for cough and its management are hampered by the lack of well validated objective cough frequency methodologies. Previous validations have been performed over limited time periods or in laboratory conditions not always representative of typical usage. We describe the rigorous validation of a semi-automated 24 hour ambulatory cough monitoring system (Vitalojak; Vitalograph; Buckinghamshire, England) operating in a manner which completely replicates routine practise.

Methods In total 10 (4 female) patients (mean age 60.4 years [SD ±14.1] including 6 chronic cough, 2 asthma, 1 COPD and 1 healthy control underwent full 24 Hour ambulatory monitoring (VitaloJAK™). These recordings were manually counted by trained cough counters who also recorded the time at which each cough occurred. These 24 hour recordings were then compressed using custom designed compression software and the sensitivity to cough and the reduced file times were determined. Importantly in each case we confirmed that cough sounds identified in the compressed files were the same sounds identified by the trained manual cough counters in the full 24 hour recording. We tested the software algorithm using three distinct compression levels (1, 2 and 3).

Results All results are presented as median (IQR).

Sensitivities to cough (%) for compression levels 1, 2 and 3 are 100(100, 100), 100(99.53, 100) and 99.92(99.33, 100) and for reduced file times (minutes) 65.89 (62.40, 83.07), 43.21 (35.94, 57.23) and 26.30 (25.07,46.81) respectively (Table 1).

Conclusions The vitaloJAK™ is a reliable, robust and efficient tool for the objective measurement of cough frequency. Importantly it reduces 24 hour recordings by up to 98% whilst preserving close to 100% of recorded cough sounds. This development facilitates efficient and speedy manual cough counting and the level of compression achieved represents significant progress towards fully automated cough monitoring.

P160 INCREASED COUGH INTENSITY IN PATIENTS WITH CHRONIC COUGH

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Introduction and objectives Cough frequency is increased in chronic cough (CC) compared to healthy subjects. It is not known if patients with CC cough more intensely. We investigated cough intensity in maximum voluntary cough (MVC) in patients with chronic cough and in healthy controls.

Abstract P159 Table 1 Compressed output file times and sensitivities for each subject at compression levels 1, 2 and 3. Uncompressed file length=1440 minutes

	Output times and sensitivity					
	Level 1		Level 2		Level3	
Subject	Minutes	sensitivity	Minutes	sensitivity	Minutes	sensitivity
1	62.01	100.00	37.40	100.00	26.23	99.37
2	63.56	100.00	31.08	99.44	24.98	98.33
3	128.24	100.00	93.45	100.00	63.82	100.00
4	144.00	100.00	120.72	100.00	71.90	99.83
5	35.13	100.00	25.08	100.00	20.83	100.00
6	63.69	100.00	42.91	99.32	22.65	99.32
7	73.15	100.00	43.50	100.00	25.32	100.00
8	86.38	100.00	56.53	100.00	41.23	100.00
9	68.08	100.00	57.47	99.81	48.67	100.00
10	52.71	96.95	35.45	96.95	26.37	96.59
Mean	77.69	99.70	54.36	99.55	37.20	99.34
Median	65.89	100.00	43.21	100.00	26.30	99.92