

identify environmental and genetic factors associated with risk of vitamin D deficiency (25[OH]D concentration < 50 nmol/L).

**Results** Mean serum 25(OH)D concentration was 45.4 nmol/L (SD 25.3); 171/278 (61.5%) participants were deficient. The following factors independently associated with increased risk of vitamin D deficiency: BMI >30 kg/m<sup>2</sup> (OR 1.87, *p* = 0.04) and blood draw during winter and spring seasons (OR 3.00, *p* < 0.01; OR 2.50, *p* < 0.01, respectively). The following factors independently associated with reduced risk of deficiency: consumption of a vitamin D supplement, 100–400 IU/day (OR 0.42, *p* < 0.01); and a sunny holiday abroad no more than 2 months prior to blood draw (OR 0.27, *p* = 0.02). None of the 37 SNP investigated independently associated with vitamin D deficiency.

**Conclusions** Vitamin D deficiency was highly prevalent among COPD patients in this study. Obesity and winter and spring sampling were risk factors for deficiency. Recent travel to a sunny country and consumption of vitamin D supplements were protective. Genetic variants in the vitamin D pathway that have previously been shown to associate with risk of vitamin D deficiency in healthy adult populations were not associated with deficiency in this patient group.

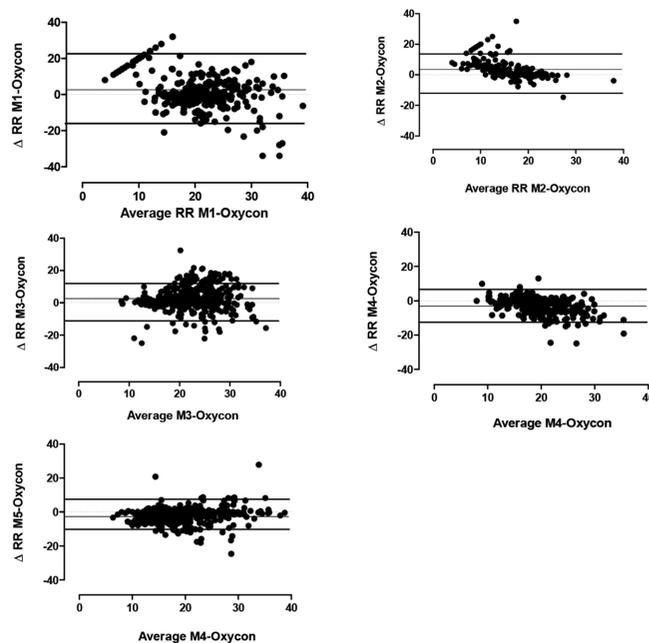
#### M146 VALIDATION OF FIVE NON-INVASIVE RESPIRATORY RATE MONITORS IN PATIENTS WITH COPD IN A LABORATORY SETTING

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**Introduction** There is a need of innovative models of care for patients with severe COPD and frequent AECOPD, and Telehealth (TH) is part of these programs. But current systems are limited by the parameters feasibly monitored in a domestic setting and lack of a reliable method of predicting exacerbations. Evidence from hospital based studies show that breathlessness increases during exacerbations. If respiratory rate (RR) could be reliably monitored remotely it may provide a significant advance in predicting and identifying COPD exacerbations and monitoring recovery. The aim of this study is to validate five non-invasive RR monitors (M1 to M5) in patients with COPD in a laboratory setting against a gold standard measurement of RR.

**Methods and results** Five RR monitors identified in the literature were selected for validation against RR measured with a gold standard method (Oxycon mobile, Carefusion) in 23 patients with COPD (13 males, age 70 ± 8.3 years, FEV<sub>1</sub> 58.3 ± 17.1%pred) during a 52 min protocol of a total of 19 activities of daily living (i.e sitting, standing, walking at different speeds, climbing stairs, lifting objects and sweeping the floor). Patients wore simultaneously the five monitors and the Oxycon mobile and RR was recorded breath by breath and averaged by minute. One minute of each activity was selected for analysis using Bland and Altman plots. Bias and limit of agreement (LoA) was established for each monitor (Figure 1). Bias and LoA for the five monitors were the following (M1 2.15 (-17.9 to 22.2), M2 3.1 (-8.7 to 14.9), M3 2.2 (-12.12 to 16.6), M4 -2.5 (-11.7



**Abstract M146 Figure 1** Bland and Altman plots for RR between all five monitors and Oxycon Mobile

to 6.8) and M5 -1.9 (-10.8 to 6.9)). Patients were compliant with the use of the five monitors.

**Conclusions** Monitoring RR is feasible and non-intrusive in patients with COPD. We have identified two monitors (M4 and M5) with the lowest bias and the narrower LoA. These monitors will be further investigated in a home setting.

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#### M147 FEASIBILITY OF DELIVERING AN OCCUPATIONAL HEALTH INTERVENTION AIMED AT IMPROVING WORK PRODUCTIVITY, AMONG WORKING COPD PATIENTS

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**Introduction** There is evidence that workplace productivity may be impaired among working patients with COPD. Occupational health (OH) interventions have been effective in improving work productivity in other chronic conditions. However, little is known about the feasibility and acceptability of such interventions among those with COPD.

**Aim** To assess feasibility and acceptability of an OH intervention in working COPD patients.

**Methods** Nested within a primary care COPD cohort (*n* = 1870), the study included all those who were in work (*n* = 309). Eligible patients were invited for an interview and assessment with an OH practitioner. The aim was to explore and identify workplace factors that may contribute to their work performance or exacerbate their condition, and to suggest approaches to minimise any respiratory symptoms and improve work capability. Recommendations are sent to the patient, and with their permission, to their GP and employer. The acceptability of the intervention to employers will be explored as a separate part of the study.

**Results** Of those eligible, 43 (13.9%) agreed to take part and 107 (34.6%) declined. The most common reasons for declining

included a perception of being fine at work (49.5%); followed by believing that work adjustments had already been made (7.5%); and worry about involving the employer (4.7%).

Patients agreeing to take part were more likely to be male (71.4% vs. 56.2%), ever-smokers (100% vs. 89.5%), slightly older (mean age 61.9 vs. 60.9) and have more severe airflow obstruction (19.5% vs. 12.5%) than those declining.

One or more OH recommendations were identified for 14/16 (87.5%) patients seen so far. These included: avoid substances/materials at work (56.3%); modify physical aspects of job (43.8%); modify job tasks/work methods (37.5%); modify work environment (18.8%), change work organisation (31.3%); use respiratory protective equipment (6.3%).

**Conclusions** This is the first study to assess the feasibility of delivering an OH intervention to patients with COPD working in diverse occupations. Although uptake rates were low, modifiable factors in the work environment that could improve their symptoms and condition were identified for the majority who were assessed. The acceptability of recommendations and feasibility of involving the employer will be further explored.

### M148 INVESTIGATING THE FEASIBILITY OF AN ONLINE HEALTH RESOURCE WITH NURSE COACHING TO SUPPORT SELF-MANAGEMENT IN COPD

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**Introduction** Pulmonary rehabilitation includes self-management support for COPD but is not suitable for or accessible to all. Web based approaches have potential to provide self-management support but effectiveness is not consistently demonstrated and issues of reach and adoption are relatively unstudied.

We performed a mixed methods before-and-after study of an intervention comprising web-based health promotion for LTC self-management, The Prevention Plan™ (TPP), with integrated nurse coach support. This report describes the qualitative evaluation. The aim was to understand the benefits gained and the characteristics of patients most likely to benefit.

**Abstract M148 Table 1** Table of themes

#### Benefits from the programme

Sub-themes	Description
Increased motivation for self-management behaviours	Physical activity, healthy eating and quitting smoking. Raised awareness of healthy options and of current behaviours and habits, and introducing new behaviours, e.g. replacing some foods in the diet.
Use of self-management skills	Use of goal setting and pacing techniques to aid in behaviour change.
Increased access to information resources	Links to other external sources of information, providing further information on a wide range of subjects related to healthy lifestyles and COPD.
Enhanced understanding of lifestyle risk factors	How factors such as weight can impact on health.

#### Facilitators to gaining benefits

Sub-themes	Description
Use of action plans in TPP	Patients were able to register and self-monitor their progress towards goals and gain support and supervision from the nurse coach. The greatest benefit from action plans was gained where patients were motivated and committed towards a specific goal, such as losing weight or quitting smoking, but did not have a self-management strategy to implement the change.
Nurse coach contact	Ongoing contact through email, phone or visits provided progress checking and support for action programmes and behaviour change. The email function within TPP was used frequently by patients to support them in their use of TPP. The nurse coach was a driving force for patients' motivation and involvement in the action programmes, improving their self-management skills and quitting tobacco. For some, this was more important than the TPP website.
Health Risk Assessment	Completing the HRA was beneficial for patients who had not attended PR or who had little awareness of their lifestyle risk factors.
Hand-held Personal Health Plan	Some patients found it more convenient and user-friendly to use the book rather than the website.
Patient's own determination	Self-motivation to make a change.

#### Barriers to gaining benefits

Sub-themes	Description
Lack of personal contact	Despite the nurse coach support some self-motivation was required on the part of the patient to use the website, including the action plans. Some patients, particularly those who had attended Pulmonary Rehabilitation in the past, preferred the more interactive approach in PR with the opportunity to observe others doing things, rather than having to rely to a great extent on their own self-motivation and the impersonal nature of a web programme.
Lack of tailoring of information	Content was insufficiently tailored in terms of: overlap between information provided in TPP and that provided in other rehabilitation programmes which patients had attended; difficulty finding way to information that was personally relevant; poor fit between patients who regard themselves as having a high level of self-management skill and the level of support provided by TPP.
Lack of user-friendliness	Navigation was difficult for some patients, especially through a large amount of information, making them opt for other alternatives or stop using the programme out of frustration.
Technical problems on the website	Problems such as links being unavailable slowed patients' progress and caused frustration.
Physical discomfort	Physical discomfort sitting at a computer and poor eyesight.