

# An audit of the management of Chronic Obstructive Pulmonary Disease (COPD) patients in an outpatient setting: looking beyond the respiratory illness

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## BACKGROUND

COPD is a major public health concern due to its associated morbidity and mortality, most of which is respiratory-related. However, a number of associated conditions exist, which independently contribute to morbidity and mortality, and therefore must be recognised and treated. The aim was to study the quality of management of outpatients with COPD, analyse whether associated comorbidities were being identified and treated, and if not, establish more effective ways of recognising missed opportunities.

## METHODS

This retrospective study examined 37 out-patients with COPD seen by one respiratory firm in a Maltese tertiary centre. Out-patients were randomly selected between 2013 and 2015. The inclusion criterion was a post-bronchodilator FEV1/FVC ratio of <0.7 measured during their most recent spirometry. Outcome measures included an accurate diagnosis of COPD; documentation of smoking history and smoking cessation; appropriate COPD treatment including inhaler technique and assessment of non-adherence; appropriate prescription and usage of oxygen; referral to pulmonary rehabilitation; vaccination status; and consideration of comorbidities.

## RESULTS

90% were male, mean age 68.5 years, and had all been correctly diagnosed with COPD, while 22% had a related comorbidity. The majority (81%) were ex-smokers. Virtually all were on inhaled bronchodilators, with 60% also on an inhaled corticosteroid. The uptake of Influenza and Pneumococcal vaccination was at 62% and 54% respectively. Only 24% of patients were given physical activity advice or referral to a pulmonary rehabilitation programme.

## CONCLUSION

The investigators analysed whether practices from one firm are in-keeping with the recommended international guidelines. A number of practices were adequate, while others needed improvement. In order to narrow this discrepancy, the investigators suggest creating a template for COPD patients to be used at future visits which includes the factors investigated.

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## INTRODUCTION

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Chronic Obstructive Pulmonary Disease (COPD) is a major worldwide public health concern due to its associated morbidity and mortality. In 2002, COPD was the 5<sup>th</sup> leading cause of death worldwide, and this is said to rise to the 3<sup>rd</sup> leading cause of death by 2030 according to estimates by the World Health Organisation.<sup>1</sup>

Although respiratory illness is the leading cause of morbidity and mortality in COPD<sup>2</sup>, there are a number of associated conditions which independently contribute to morbidity and mortality. Thus, these factors ought to be sought and recognised if they are to be treated, and hence have a favourable effect on decreasing morbidity and mortality in this group of patients.

Despite the several treatments available to improve quality of life, decrease symptoms and reduce hospitalisation in COPD treatments, the only three modalities proven to decrease mortality are smoking-cessation programmes for patients with early disease, home oxygen treatment for persistent hypoxaemia, and lung volume reduction surgery (LVRS) for selected emphysema patients.

The aim of this audit was to study the quality of management of outpatients with COPD; analyse whether the associated comorbidities were being identified and treated; ensure that suitable candidates for mortality-modifying treatments were being prescribed them; and if not, establish more effective ways of recognising missed opportunities.

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## MATERIALS AND METHODS

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### Participants and procedures

This retrospective study examined thirty-seven out-patients with COPD seen by one of four respiratory firms in a Maltese tertiary centre. Patients were randomly selected among those who visited the outpatient department over a 2-year period from September 2013 to September 2015. The inclusion criterion was a post-bronchodilator FEV1/FVC ratio of <0.7 measured during their most recent spirometry, as per diagnosis of COPD.<sup>3</sup>

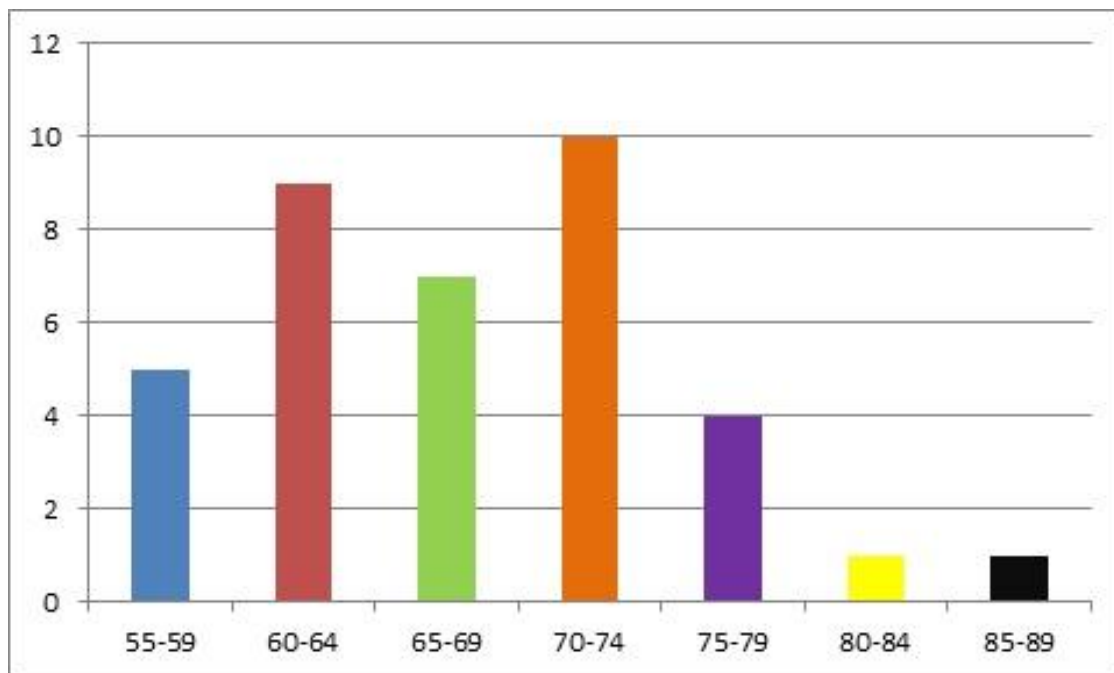
### Outcome measures

Various outcomes were considered, namely whether the diagnosis of COPD had been accurately made; whether a smoking history had been documented and thus smoking cessation implemented; whether treatment and inhaler technique were appropriate; and whether non-adherence was an issue.

The study also analysed whether hypoxia was being checked for, and if so, whether supplemental oxygen had been prescribed and was being used appropriately. Where indicated, referral to Pulmonary Rehabilitation was audited.

The investigators were also interested in whether comorbidities had been considered, namely Heart Failure, Polycythaemia and Sleep Disordered Breathing. Since influenza and pneumococcal vaccination are pivotal in COPD care, the audit considered vaccination data on the subjects. Lastly, records of participants were analysed for End of life care documentation.

**Figure 1** Distribution of patients according to age groups



### Demographics and medical data

Data was retrieved manually from individual patients' clinical notes and electronically from iSOFT Clinical Manager (ICM). Spirometry testing was carried out by qualified spirometry nurses. Data was collected by two doctors not directly involved in the patients' care.

The data collected pertained to patient demographics, individual patient factors (e.g. weight, height, blood pressure (BP), respiratory symptoms, smoking status, and body mass index (BMI)), duration of care, spirometry results, smoking status, functional status, factors limiting self-care, treatment of COPD (e.g. medical treatment, treatment for smoking cessation and oxygen prescription), and influenza and pneumococcal vaccination status.

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## RESULTS

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### Demographics

The large majority (90%) of patients studied were male, with ages ranging from 56-88 years,

and a mean age of 68.5. The elderly (patients over 65 years of age) made up almost two-thirds (64%) of the total patient population (Figure 1)

### Spirometry severity grade

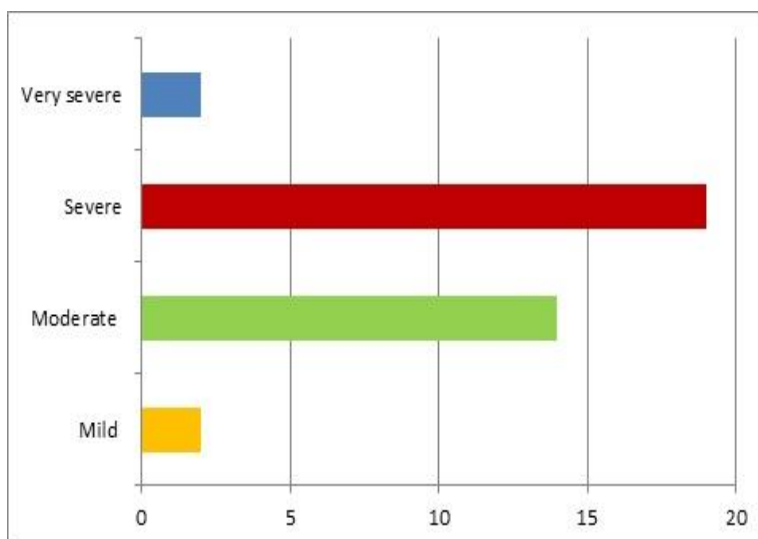
All patients included in the study had been correctly diagnosed as COPD, with a post-bronchodilator FEV1/FVC ratio of <0.7 as per diagnostic criterion for COPD.<sup>3</sup> Most patients were in the moderate (FEV1 50-79%) or severe (FEV1 30-49% predicted) group, with a minority in the mild (FEV1 ≥80%) and very severe groups (FEV1 <30%)<sup>3</sup> (Figure 2).

### Smoking status

Although all patients were questioned about their smoking status at some point during their duration of care, documentation of smoking status within the previous 12 months was present in 79% of cases.

The majority of the population (81%) were ex-smokers, of which more than three quarters (76%) were former smokers and 5% recent

**Figure 2** Distribution of patients according to severity of COPD based on FEV1 GOLD criteria



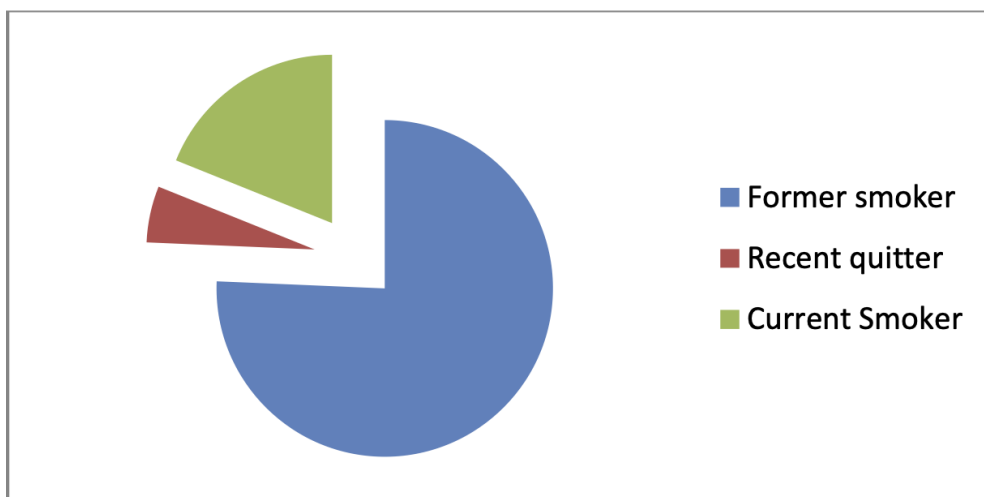
quitters (quit less than 6 months previously). 19% of patients were still smoking at the time of review (**Figure 3**). Of these ( $n=7$ ), smoking cessation information was given to all patients at their most recent visit and during at least 1 other outpatient appointment during the prior 12 months, such that 86% received brief advice, 57% were referred to a smoking cessation programme, and 29% were prescribed pharmacotherapy (nicotine replacement or Varenicline). Data on 1 patient was not available.

Similar advice was also given to recent quitters in order to assist in preventing relapse.

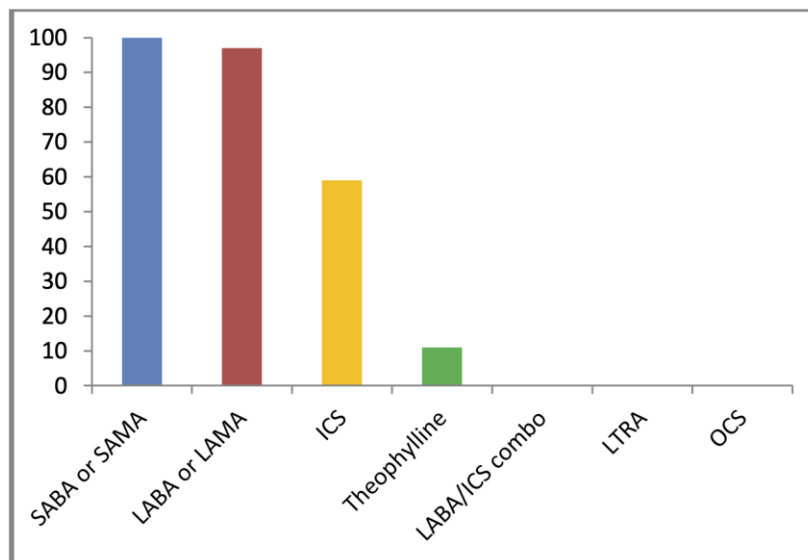
#### **COPD treatment**

Virtually all study subjects were on inhaled short (SABA or SAMA) and long-acting bronchodilator (LABA or LAMA), with 60% also on an inhaled corticosteroid (ICS). A small proportion were on oral Theophylline, while none were on Leukotriene Receptor Antagonists, oral steroids (OCS) or LABA/ICS combinations (**Figure 4**). Inhaler technique was

**Figure 3** Distribution of patients according to smoking status



**Figure 4** Percentage of patients on various COPD treatments



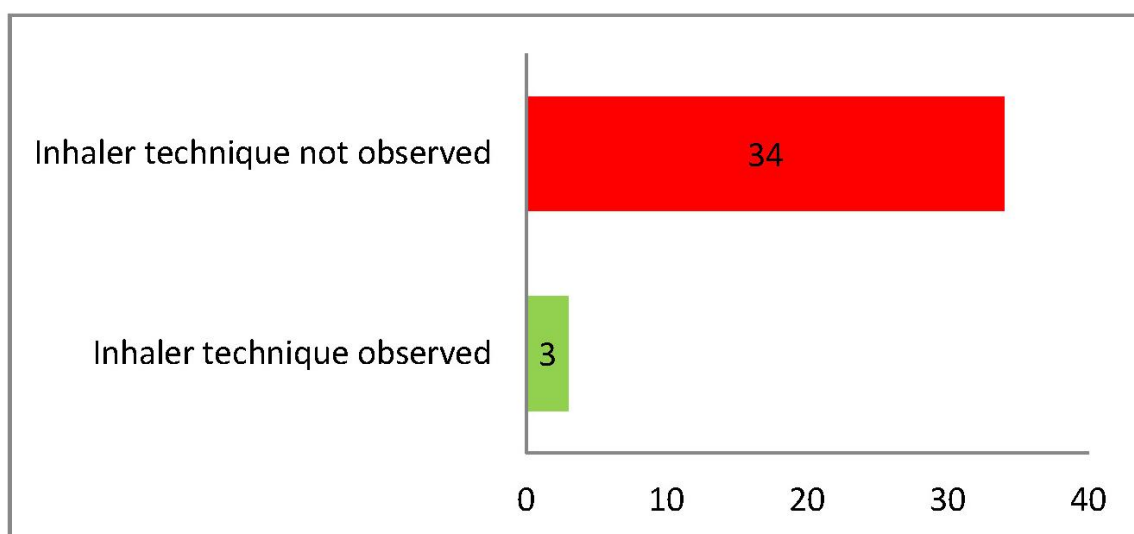
documented to have been assessed in the previous 12 months in only 8% of the study population (**Figure 5**).

#### Oxygen prescription

Practically all patients (97%) had pulse oximetry documented at an out-patient visit within the previous 12 months. 5 patients (13.5%) had a saturation of 90% or less, and these were already on long-term (LTOT) or

short burst oxygen therapy (SBOT). Arterial blood gases were not available for any of the patients within the last 12 months. Only in 1 patient was LTOT being used unnecessarily, as the resting saturation on room air was documented at 96%. On review of all patients' haemoglobin, none were noted to be polycythaemic (haematocrit >55%). There was no mention in the notes of *cor pulmonale* as an indication for LTOT.

**Figure 5** Assessment of inhaler technique in previous 12 months



## Vaccinations

The uptake of Influenza and Pneumococcal vaccination was relatively good, at 62% and 54% respectively (Figure 6). Of those that were not vaccinated, the influenza and pneumococcal vaccines appear not to have been offered by the physician in 27% and 38% of patients respectively. The remainder refused it or had a medical reason for not receiving it, whilst in 5% of cases respectively, the information was not available.

## Physical activity advice/pulmonary rehabilitation

Only 24% of patients were given advice regarding starting, increasing, or maintaining physical activity. This included brief advice or referral to a physical rehabilitation (PR) programme. The investigators did not make a distinction between physical activity advice and actual referral for PR.

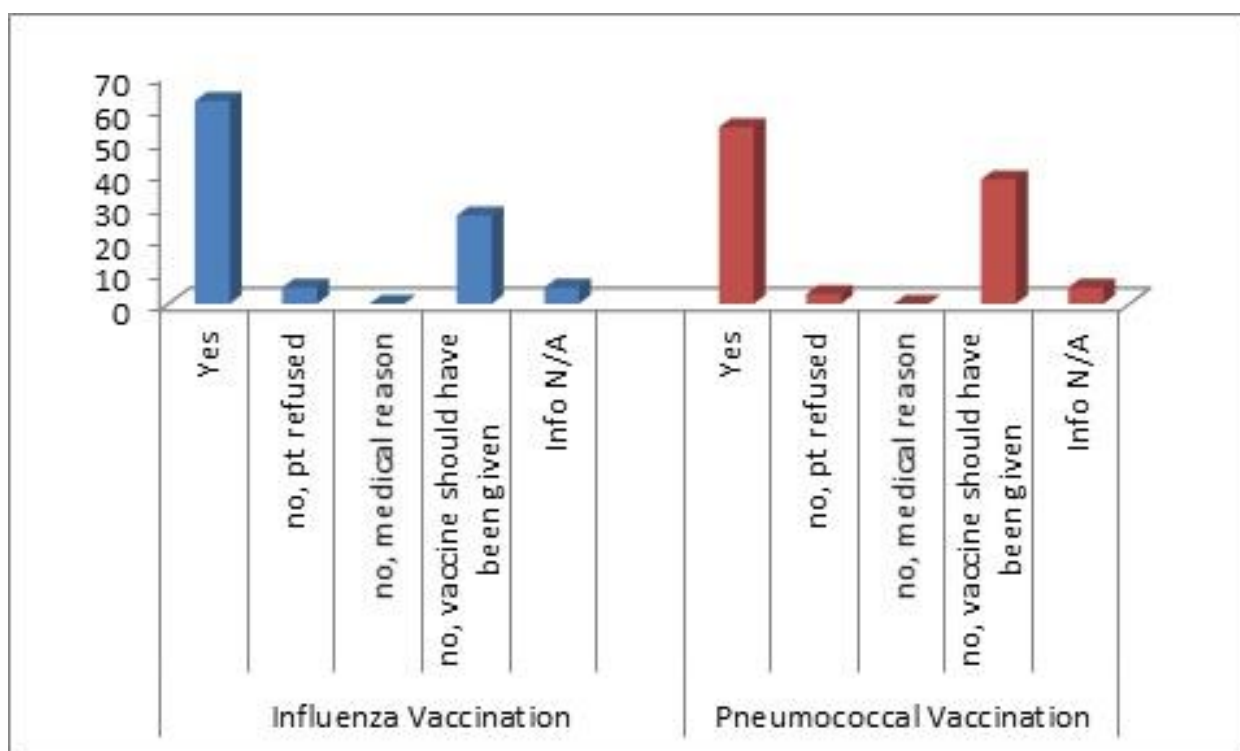
## Comorbidities

BP was documented on all patients within the previous 12 months, and was shown to be well controlled, with a mean of 129/73. Of the population studied, three COPD-related comorbidities were actively looked for: cor pulmonale, a raised haematocrit and sleep disordered breathing (SDB). 22% had some form of SDB, with none having cor pulmonale or a raised haematocrit.

## Functional status

Patients' functional status was categorised according to the Eastern Cooperative Oncology Group (ECOG) performance status<sup>4</sup>. Almost half (47%) were able to carry out physical work of a light intensity (ECOG 1), while just under a third (30%) were fully active (ECOG 0). A small proportion (8%) were "ambulatory and capable of all self-care but unable to carry out any work activities; up and

**Figure 6** Percentage of study patients receiving Influenza and Pneumococcal vaccines respectively



about more than 50% of waking hours” (ECOG 2) while 14% were “capable of only limited self-care; confined to bed or chair more than 50% of waking hours” (ECOG 3). None of the study patients were completely disabled (ECOG 4) (Figure 7).

### BMI

All patients had a documented BMI from their spirometry records. Almost half of patients (43%) were noted to be overweight with a BMI of 25-29.9kg/m<sup>2</sup>. There were equal numbers of patients in the normal BMI range (18.5-24.9kg/m<sup>2</sup>) and the obese range (30-39.9kg/m<sup>2</sup>) (27% respectively). One patient was grossly underweight with a BMI of 13.3kg/m<sup>2</sup>.

### Duration of care

Three quarters of the patients (74%) had been followed up for more than twelve months prior to auditing.

### Factors limiting self-care

Some factors which were considered to potentially hinder patient self-care were recorded, notably psychiatric illness or cognitive impairment (8%), non-adherence to smoking cessation or to COPD-related

treatment (47%) and other medical conditions (8%). Financial factors were not readily available in this group of patients.

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## DISCUSSION AND LIMITATIONS

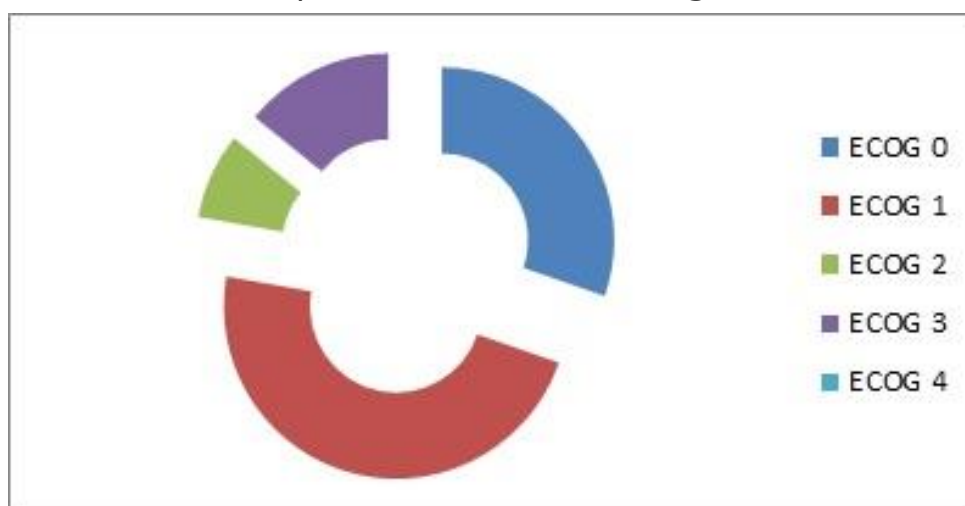
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The number of participants in this study was small, and the view point was only that of one out of four firms. However, the aim was to analyse a cohort of COPD patients for what may be being missed in their follow-up, so as to create a proforma to be used on all future COPD patients, which may then be disseminated amongst all four respiratory firms. Data can subsequently be collected from all four firms so as to audit adherence with guidelines.

All patients audited had been correctly diagnosed as having COPD, with an FEV1/FVC ratio on spirometry of <0.7. Investigators did not delve into the merits of whether patients were on the correct treatment depending on COPD Class according to COPD GOLD Guidelines 2014 (which have since been updated), as the CAT score was not recorded in the audit. However, results show that all patients were correctly on a short or long acting bronchodilator, and none were on

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**Figure 7** Functional status of patients classified according to ECOG





inhaled corticosteroids alone. It was disappointing to note that in only 8% of cases was inhaler technique documented to have been checked in the previous year.

Results show that in 21% of cases, a smoking history was not documented in the last 12 months. However, the investigators did not go into the merits of whether this group of patients were smokers or ex-smokers. A postulation is that the physician may have flipped through the case notes and noted that the patient had quit smoking, and therefore not questioned the patient. However, this is a misgiving, as nicotine addiction can notoriously cause relapse in a former quitter. Another explanation may be of not documenting what is asked.

One fifth of the study population was still smoking. Almost all received brief advice on quitting, just over half were referred to a smoking cessation programme, but less than one third were prescribed pharmacotherapy. These results are rather disappointing, as the evidence clearly shows that interventions that combine pharmacotherapy and behavioural support increase smoking cessation success compared to brief advice on quitting.<sup>5</sup>

Hypoxia was actively searched for by pulse oximetry. The audit design did not consider ABGs, and therefore hypoxia was defined as a resting oximetry saturation of <88%. Furthermore, review of oxygen prescription was not considered, whereas the guidelines indicate that oxygen prescription should be reviewed at 60-90 days to assess continued indication and effectiveness.<sup>6</sup>

Both influenza and pneumococcal vaccination uptake was relatively good in the population audited, in line with recommendations from the GOLD guidelines<sup>3</sup>. The GOLD guidelines

distinguish between the 23-valent polysaccharide (PPSV23) and the 13-valent conjugate (PCV13) pneumococcal vaccines, stating that both PCV13 and PPSV23 should be given to all patients over the age of 65 years, whereas PPSV23 is also recommended for younger COPD patients with significant comorbid conditions including chronic heart or lung disease. The investigators in this audit did not differentiate between the 23-valent polysaccharide (PPSV23) and the 13-valent conjugate pneumococcal vaccination (PCV13). In the light of these guidelines, it is disappointing that vaccination was not offered to the study patients in a quarter to a third of cases.

Pulmonary rehabilitation has been shown to be the most effective therapeutic strategy to improve shortness of breath, health status and exercise tolerance.<sup>7</sup>

However, education about the benefits of exercise has not been shown to be effective, with an evidence Class C.<sup>8</sup> Thus, grouping 'advice on exercise' and 'referral to pulmonary rehab' in the same category was somewhat inaccurate in this audit. Even so, the uptake was poor, occurring in only a quarter of patients.

The study population was not shown to be hypertensive. However, COPD patients are known to have associated comorbidities. Of the population studied, three COPD-related comorbidities were actively looked for: *cor pulmonale*, a raised haematocrit and sleep disordered breathing (SDB). Other comorbidities known to affect COPD patients (depression, osteoporosis, IHD) were not investigated.

Despite COPD being known to be associated with mortality, whether independently or



through comorbidities, end of life discussion was not documented in the notes of any study subject within the last 12 months.

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### CONCLUSION

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The audit attempted to investigate whether practices of one firm in a respiratory department of a tertiary hospital are in-keeping with what is recommended by international guidelines, namely GOLD (Global Initiative for Chronic Obstructive Lung Disease). Whereas a number of practices were up to scratch, a number of others needed refining. In order to narrow this discrepancy, the investigators suggest creating a template

for COPD patients to include all the factors that were investigated in the audit, so as to make it easier for the physician to ensure all aspects have been addressed during the encounter, and in as efficient a time as possible. Thus, this audit served as a pilot study to create a template for a much larger study that will serve to analyse whether guidelines are being adhered to, and will be disseminated within the whole respiratory department.

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### ACKNOWLEDGEMENTS

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We wish to extend our gratitude to medical student Jade Zammit for helping with data collection.

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