

COPD

practical aspects of case finding, diagnosing and monitoring

Key points

- Diagnosis of COPD is often delayed and a high proportion of cases in primary care are unrecognised.
- COPD is often misdiagnosed in primary care, probably as a result of not using spirometry for diagnosis.
- Screening systematically or opportunistically with questionnaires can be used to case-find in general practice. Expiratory flow devices are used to determine the need for diagnostic testing.
- Spirometry is essential to diagnose COPD. COPD is present if the post-bronchodilator FEV₁/FVC ratio is below 0.7 and FEV₁ is less than 80% predicted.
- Telling smokers their 'lung age' after spirometry increases their chances of successfully quitting.
- The results of spirometry together with symptoms and exacerbation frequency guides the management of COPD.
- Complex lung function tests to distinguish between asthma and COPD are not usually required.

JULIA A.E. WALTERS BM BCh, PhD; **ALAN J CROCKETT** PSM, MPH, PhD, FANZSRs
VANESSA M. McDONALD DipHlthSci(Nurs), BNurs, PhD

Does my patient have chronic obstructive pulmonary disease (COPD), and does it matter?

Many patients with COPD remain undiagnosed, unknown even to doctors they consult regularly, until they have advanced stages of the disease. Patients may ignore limitations and symptoms of COPD or attribute them to other causes, such as increasing age, lack of fitness and weight gain. A delayed diagnosis may deny potentially effective treatment and result in lost opportunity to prevent progression. Only smoking cessation and prevention of exacerbations have been shown to reduce progression of COPD.

COPD is mainly thought of in terms of its pulmonary component: airflow limitation that is progressive and not fully reversible, due to an abnormal inflammatory response of the

lungs to cigarette smoking or other noxious particles.¹ However, there are also significant extrapulmonary consequences and comorbidities, such as deconditioning, exercise intolerance, skeletal muscle dysfunction, osteoporosis, metabolic impacts, anxiety and depression, that contribute to the overall impact and severity.^{2,3} Patients with COPD have an increased risk of conditions that have the same risk factors (advanced age, smoking, low socioeconomic status and sedentary lifestyle) – cancer (a 15-fold increased risk of lung cancer), cardiovascular disease (a fivefold increased risk), stroke (a threefold increased risk) and diabetes mellitus (double the risk).⁴

By taking a systematic approach in general practice, people at risk of lung disease can be

Dr Walters is Primary Health Care Senior Research Fellow at the 'Breathe Well' Centre of Research Excellence for Chronic Respiratory Disease, School of Medicine, University of Tasmania, Hobart, Tas.

Professor Crockett is Professor of Clinical Respiratory Physiology at the Division of Health Sciences, University of South Australia; and Emeritus Professor, School of Population Health, University of Adelaide, Adelaide, SA.

Dr McDonald is a Senior Lecturer at the Priority Research Centre for Asthma and Respiratory Diseases, University of Newcastle; Senior Lecturer at the School of Nursing and Midwifery, Faculty of Health, University of Newcastle; and Conjoint Senior Lecturer at the School of Medicine and Public Health, Faculty of Health, University of Newcastle. She is also Clinical Nurse Consultant in the Department of Respiratory and Sleep Medicine, John Hunter Hospital, Newcastle, NSW.

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identified using simple questionnaires such as the Lung Foundation Australia's one-minute Lung Health Checklist, and then screened rapidly using a COPD screening device and have diagnostic spirometry for COPD if appropriate.

This article explains the benefits of recognising COPD and discusses the issues of identifying patients with COPD early in the course of the disease and the challenges of making an accurate diagnosis.

BENEFITS OF RECOGNISING COPD

Although there is no cure for COPD, stopping smoking will reduce the progression of the condition and treatment can help reduce the symptoms (Figure 1).⁵ Recognising and understanding the cause of symptoms and participating in pulmonary rehabilitation to combat deconditioning can greatly improve quality of life, reduce anxiety and increase exercise tolerance.

Stopping smoking is the most important target for people with COPD as it is the most effective intervention to reduce symptoms and prevent progression of COPD and lung function impairment.^{1,6} Smoking cessation advice and support should be offered to all smokers. Pharmacotherapy should also be considered to help patients in their smoking cessation attempts.⁷ Supporting patients' self-management for COPD, such as by being proactive and providing or enabling access to appropriate medications in case of symptom flare-up during an exacerbation, can prevent more rapid deterioration.

Preventive options recommended in the Australian COPD-X guidelines can be maximally implemented through use by the primary care team and allied health professionals of the Medicare Benefits Schedule (MBS) chronic disease management items GP Management Plan (GPMP; MBS item 721), Team Care Arrangement (TCA; item 723) and Review of GPMP or Co-ordinate Review of TCA (item 732), and also the chronic disease management nurse monitoring and support item (item 10997).⁸ Resources are also available for clinicians to provide patients with information about COPD, its symptoms and

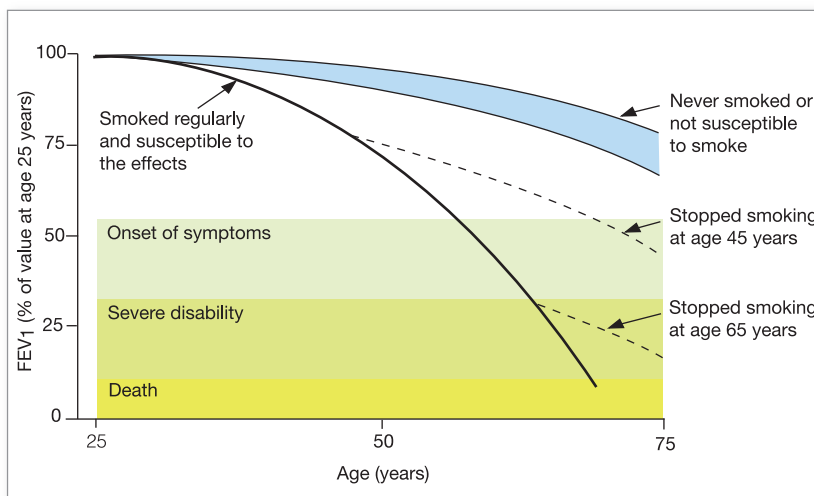


Figure 1. The Fletcher–Peto diagram. Smoking causes lung function to worsen at a faster rate. Quitting smoking at any age is beneficial.

Adapted from Fletcher C, Peto R. *Br Med J* 1977; 1: 1645-1648.⁵

management. The Lung Foundation has a range of booklets, fact sheets, DVDs and interactive tools (<http://lungfoundation.com.au>).

HOW TO IDENTIFY PATIENTS WITH COPD

The early identification of patients with COPD can be achieved using a systematic process with targeted case finding as well as by opportunistically screening those at risk.

Patients may not recognise or report their symptoms of coughing, decreasing physical activity/exertion and breathlessness, assuming they result from normal physiological changes (e.g. ageing or gaining weight).⁹ Many patients, however, have symptoms of COPD noted at general practice consultations over long periods before the diagnosis is actually made, an average of three years in one study.¹⁰ It is important to be attuned to the tendency to dismiss early COPD symptoms and to be aware that protracted or frequent episodes of acute bronchitis may be the first sign of COPD.¹¹ Breathlessness may occur later, when around 50% of lung function has been lost.

Opportunistic or systematic approach

Routine untargeted screening for COPD in primary care settings is not cost-effective.¹²



Figures 2a and b. Digital COPD screening devices. a (left). PiKo-6, with mouthpiece adaptor and one-way valved cardboard mouthpiece attached. b (right). Vitalograph COPD-6, with one-way valve mouthpiece attached.

Images courtesy of Lung Foundation Australia.

However, the possibility of COPD should be considered in patients over the age of 35 years who are current smokers or ex-smokers (who continue to be at higher risk), as recommended in the Australian COPD-X guidelines.⁸ In these patients, the presence or history of risk factors such as smoking, exacerbations (acute bronchitis episodes), occupational exposure to particles or family history of COPD should be specifically sought. There are suitable tools readily available to help in this, such as the Lung Foundation's Lung Health Checklist, which is accessible as an online tool and as pdfs in English, Arabic, Hindi, Samoan, Spanish and Vietnamese from the Lung Foundation Australia website (<http://lungfoundation.com.au/lung-information/lung-health-checklist/interactive-checklist>).

The Lung Health Checklist asks the questions listed below.

- Are you a smoker or ex-smoker?
- Do you or have you worked in a job that exposed you to dust, gas or fumes?
- Do you cough several times most days?
- Do you cough up phlegm or mucus most days?
- Do you get out of breath more easily than others your age?
- Do you experience frequent chest infections?

A positive answer to any question

indicates that the patient is at risk of having COPD and needs further investigation by full diagnostic spirometry, with or without preliminary lung function screening with a lung function screening device (Figures 2a and 2b).

Adopting a systematic approach to identify COPD may involve other members of the practice team, as recommended in the RACGP's *Guidelines for Preventive Activities in General Practice* (the 'red book').¹³ Practices are encouraged to make organisational changes and use clinical audit to identify middle-aged patients who have not had preventive activity, and to then implement a recall system or opportunistically arrange a health check. Planned health checks for middle-aged adults and patients over 75 years (MBS health assessments items 701, 703, 705 and 707) and indigenous patients (MBS health assessment item 715) are opportunities for case finding; these checks can be facilitated by the involvement of practice nurses.

COPD education for practice nurses is available online from the Lung Foundation and will equip nurses with the knowledge and skills to support a systematic approach to identifying and managing patients with COPD (<http://lungfoundation.com.au/professional-resources/training/copd-nurse-training-online>).

Lung function screening devices

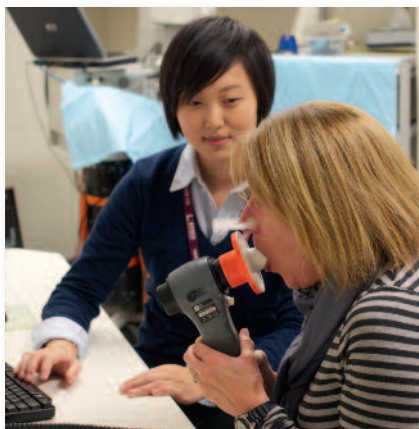
There are several expiratory flow devices available to follow up patients at risk of COPD and to rule out or confirm the need for diagnostic testing with spirometry. These devices are relatively inexpensive and easy-to-use, and require minimal training to conduct the procedure and interpret the results. They are suitable for most patients because they do not require complete emptying of the lungs as the test assesses expiratory volumes at one and six seconds (forced expiratory volume in one second, FEV₁ and in six seconds, FEV₆).

Validated devices in Australia are the PiKo-6 and Vitalograph COPD-6 (Figures 2a and b). The Lung Foundation has a short online video for training in operating both devices, and printed materials for interpreting and following up the results (<http://lungfoundation.com.au/professional-resources/1692-2/health-professional-training-and-courses/copd-screening-devices-in-the-community>). Both devices use colour-coded interpretation to make them easy to use in screening.

DIAGNOSING COPD – SPIROMETRY

The diagnosis of COPD rests on the demonstration of airflow limitation that is not fully reversible, and thus spirometry is the gold standard for diagnosis and should be performed before confirming a diagnosis to avoid potential misclassification (Figure 3).⁸ Identification of the severity of COPD by spirometry allows progression of the disease to be monitored objectively, and the result can be used along with symptoms to guide appropriate interventions for each patient.

However, spirometry is underused in general practice in Australia, leading to under-recognition and also misdiagnosis of COPD. Studies have shown COPD misdiagnosis in 31% to 44% of cases in Australian general practices.^{14,15} In a



Figures 3a and b. a (left). Spirometry is the gold standard for diagnosis of COPD. b (right). A digital spirometer.



survey of 45- to 70-year-old Australian adults, of those with confirmed moderate or severe COPD, 49% reported no diagnosis of a respiratory condition, and among those with COPD or asthma who had seen a GP (for any reason) in the previous 12 months, only one-third had undergone a respiratory function test.¹⁶

Diagnostic criteria

Airflow limitation is considered not fully reversible when, after administration of bronchodilator medication (such as two puffs of salbutamol or terbutaline), the ratio of FEV₁ to forced vital capacity (FVC) is less than 70% (FEV₁/FVC ratio) and the FEV₁ is less than 80% of the predicted value.⁸ Recent studies have criticised this definition, suggesting that the use of a fixed FEV₁/FVC ratio of less than 70% will lead to overdiagnosis of COPD in older populations and underdiagnosis in younger people, and may lead to gender imbalances as women have a higher FEV₁/FVC ratio than men.^{17,18}

The most recent (2005) international statement on lung function interpretation has proposed alternative criteria, defining airflow obstruction based on the FEV₁/FVC lower limit of normal (LLN).¹⁹ However, both the Australian and international guidelines (the COPD-X guidelines

and the GOLD guidelines, respectively) continue to recommend the fixed cut-off values for COPD diagnosis.^{1,8}

Spirometry testing

Several factors can be barriers to spirometry, and need to be addressed in general practice. Although spirometer ownership may appear high in general practices, the selection of suitable spirometers is important, the rate of use is often low and the test results obtained are frequently of low quality (due in part to lack of expertise).^{11,20} An information paper describing spirometer selection in general practice is available from the National Asthma Council Australia (<http://www.nationalasthma.org.au/health-professionals/spirometry-resources/spirometer-users-buyers-guide>).

It is well recognised that GPs may not feel confident performing spirometry and interpreting results, and referral to a spirometry service or pulmonary function laboratory is an appropriate alternative.²¹ Factors such as equipment costs and the low reimbursement level for a spirometry test with bronchodilator reversibility (MBS item 11506) may also contribute to a practice policy to refer patients elsewhere for testing and interpretation of results.

Training in spirometry

If spirometry is performed in the practice, effective training and ongoing quality control of tests are essential. Training programs for GPs and practice nurses endorsed by the Australian and New Zealand Society of Respiratory Science are available through the National Asthma Council Australia and other providers (listed on the National Asthma Council Australia website, <http://www.nationalasthma.org.au/health-professionals/spirometry-resources/spirometry-training>).

Ongoing assessment of spirometry quality in primary care has been limited in the past. A recent development is an online training program (Spirometry 360) that also addresses the need for quality feedback (available on the website <http://www.spirometry360.org>). This program provides monthly analysis by clinical experts of spirometry performed in the practice setting after training.

The Lung Foundation's online Spirometry Calculator (part of the Primary Care Respiratory Toolkit) can help with interpretation of spirometry results (<http://www.lungfoundation.com.au/professional-resources/general-practice/primary-care-respiratory-toolkit>).

Value of spirometry for smoking cessation

The most important preventive measure in COPD is smoking cessation, and spirometry can be used as a tool to motivate smokers to quit. In a UK study in general practice, telling smokers their lung age (the age of the average healthy individual who would perform similar to them on spirometry) significantly improved the likelihood of successful quitting, and an almost twofold increase in long-term quit rates was achieved.²² The Lung Foundation has developed an online, interactive Lung Age Estimator as part of its Primary Care Respiratory Toolkit. This motivational tool provides a personalised graphic presentation of an individual's estimated lung age based

Stepwise Management of Stable COPD

| | MILD | MODERATE | SEVERE |
|--|---|--|--|
| Typical Symptoms | <ul style="list-style-type: none"> few symptoms breathless on moderate exertion recurrent chest infections little or no effect on daily activities | <ul style="list-style-type: none"> increasing dyspnoea breathless walking on level ground increasing limitation of daily activities cough and sputum production infections requiring steroids | <ul style="list-style-type: none"> dyspnoea on minimal exertion daily activities severely curtailed experiencing regular sputum production chronic cough |
| Lung Function | FEV ₁ ≈ 60-80% predicted | FEV ₁ ≈ 40 -59% predicted | FEV ₁ < 40% predicted |
| Non-Pharmacological Interventions Management of stable COPD should centre around supporting smoking patients to quit. Encouraging physical activity and maintenance of a normal weight range are also important. Pulmonary rehabilitation is recommended in symptomatic patients. | RISK REDUCTION Check smoking status, support smoking cessation, recommend annual influenza and pneumococcal vaccine according to immunisation handbook | | |
| | OPTIMISE FUNCTION Encourage physical activity, review nutrition, provide education, develop GP management plan and initiate regular review | | |
| | CONSIDER CO-MORBIDITIES especially osteoporosis, coronary disease and lung cancer | | |
| | REFER TO PULMONARY REHABILITATION and consider psychosocial needs, agree written action plan | | |
| Pharmacological Interventions The aim of pharmacological treatment may be to treat symptoms, (ie breathlessness) or to prevent deterioration (either by decreasing exacerbations or by reducing decline in quality of life) or both. A stepwise approach is recommended, irrespective of disease severity, until adequate control has been achieved. | CHECK DEVICE USAGE TECHNIQUE AND ADHERENCE AT EACH VISIT - Up to 90% of patients don't use devices correctly | | |
| | SHORT-ACTING RELIEVER MEDICATION: salbutamol or terbutaline or ipratropium bromide | | |
| | SYMPTOM RELIEF: Long acting anticholinergic (tiotropium) and/or long acting beta ₂ agonists (salmeterol, eformoterol or indacaterol*). This may also help to prevent exacerbations. Once tiotropium is commenced, ipratropium bromide should be discontinued. | | |
| | EXACERBATION PREVENTION: (When FEV ₁ < 50% predicted OR patient has had 2 or more exacerbations in the previous 12 months) inhaled glucocorticoids combined with long-acting beta ₂ agonist (fluticasone/salmeterol or budesonide/eformoterol). LABA monotherapy (eformoterol, salmeterol or indacaterol) should be ceased once combination therapy (ICS/LABA) is initiated. | | |
| | | | Consider roflumilast [†] or low dose theophylline |

Based on COPD-X Plan: Australian and New Zealand Guidelines for the Management of COPD 2006; Australian Therapeutic Guidelines

* Indacaterol should not be used in asthma or mixed airways disease. A differential diagnosis should be made to exclude asthma or mixed airways disease before initiating indacaterol.

† Roflumilast is not yet available for use in Australia.

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Figure 4. Stepwise management of stable COPD – the Lung Foundation (until 2013, The Australian Lung Foundation).

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on spirometry results and the person's age, height and gender, and demonstrates how much stopping smoking can prevent lung function decline.

In addition, use of the 'Fletcher-Peto' diagram to demonstrate that smoking increases the loss of lung function and quitting returns the decline to the normal ageing-related rate may assist smokers to decide which path they will follow (see Figure 1).⁵ A patient fact sheet containing this graph, *Smoking and Lung Health – Patients*, is available from the Lung Foundation (<http://lungfoundation.com.au/wp-content/uploads/2012/06/Smoking-and-lung-health-Patients.pdf>).

MONITORING DISEASE PROGRESSION

Monitoring disease progression and patient outcomes is an important aspect of COPD management. COPD is a progressive condition associated with frequent acute exacerbations, and patients are required to make significant behavioural changes to manage their disease well.² Monitoring disease severity by spirometry together with symptoms and exacerbation frequency will inform management. An example of a COPD management summary is shown in Figure 4 (available online from the Lung Foundation, <http://lungfoundation.com.au/>

[wp-content/uploads/2012/01/alf-stepwise-management-of-copd.pdf](http://lungfoundation.com.au/wp-content/uploads/2012/01/alf-stepwise-management-of-copd.pdf)).

Once COPD is diagnosed, patients require ongoing and regular monitoring because treatment recommendations change as the disease progresses. An example of an annual cycle of care in general practice for a patient with COPD is shown in Figure 5 (available online from the Lung Foundation, http://lungfoundation.com.au/wpcontent/uploads/2012/06/mbs_flow_charts_for_copd.pdf).

Frequent exacerbations of COPD are associated with an accelerated decline in lung function, accelerated decrease in health status and decreased survival.

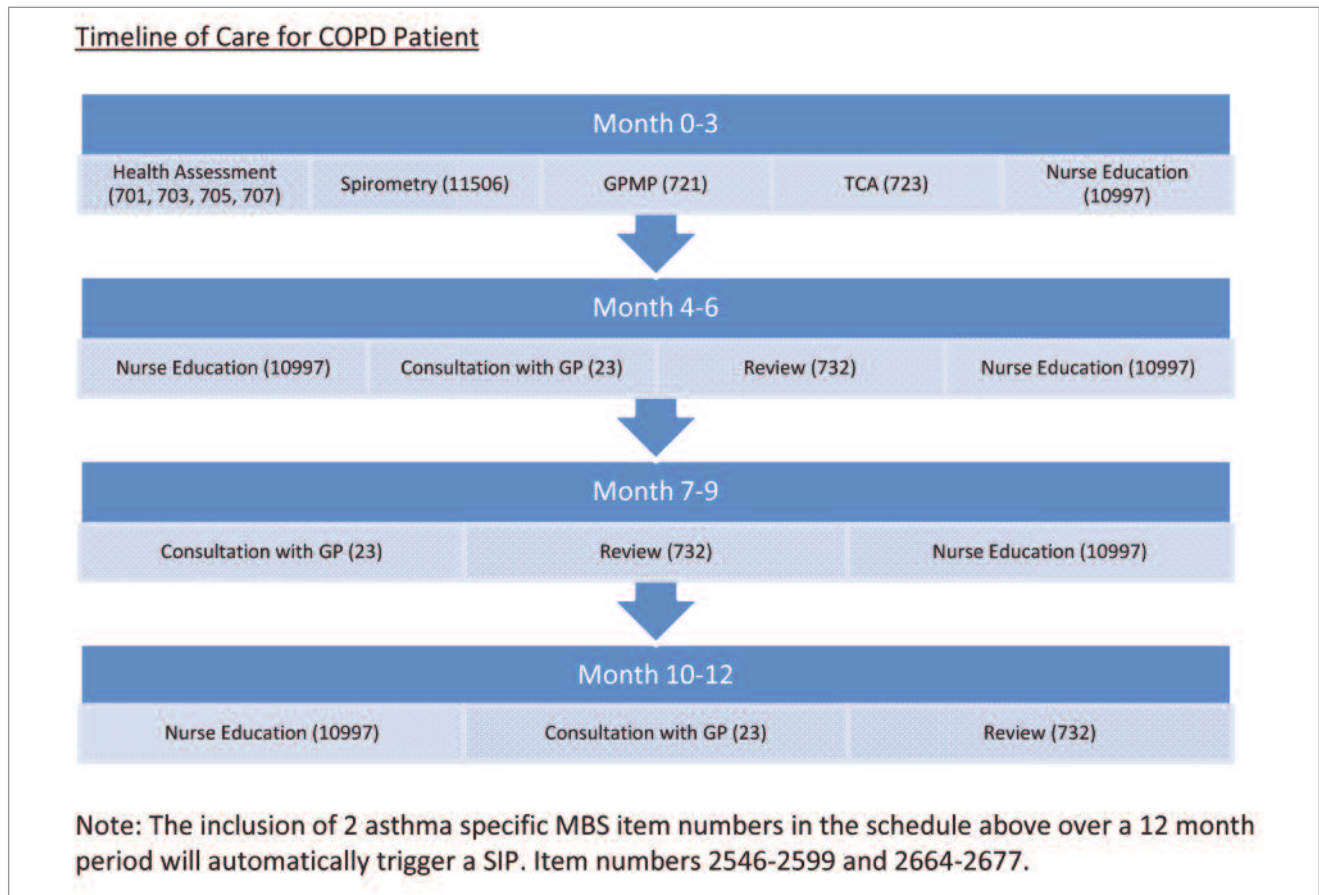


Figure 5. The Lung Foundation's COPD cycle of care showing MBS item numbers.

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Review and monitoring of patients during and after exacerbations is important as not only are these events an immediate concern but also, after recovery, they can have a negative effect on disease trajectory. Follow up after an exacerbation is an appropriate time to refer a patient for pulmonary rehabilitation to help him or her return to previous activity and health status.⁸ Recent evidence also indicates that exacerbations cluster together in time and that after one exacerbation the risk of a second is heightened.²³

ASTHMA-COPD OVERLAP

Overlap of asthma and COPD is common, occurring in up to half of older people with obstructive airway disease, and often causes diagnostic and management

difficulties.^{2,24,25} Asthma and COPD are usually considered distinct conditions, with their own diagnostic and management approaches; in practice, however, older patients often demonstrate features of both conditions (Table).²

Airflow obstruction in COPD is not highly variable and is largely irreversible, unlike in asthma, which is a disease of variable airflow obstruction. Symptoms may be common to both conditions and there is considerable overlap as many people with asthma smoke and long-standing asthma may have a degree of irreversibility.²⁵

Overlap syndrome is recognised by the coexisting features on spirometry of increased variability of airflow in a patient with incompletely reversible airway

obstruction. There is no strong justification for more complex lung function tests to distinguish between asthma and COPD. Pharmacological treatment in both conditions may include inhaled corticosteroids and long-acting beta agonists.⁸ Nonpharmacological therapies and risk factor reduction such as self-management, pulmonary rehabilitation (in the presence of airflow obstruction and symptoms), smoking cessation and exacerbation avoidance are beneficial and recommended in both conditions.^{2,26,27}

To overcome the complexities of management in patients with asthma-COPD overlap, it has been recommended that clinicians undertake a systematic and multidimensional assessment to determine the clinical problems and then

TABLE. COMPARING FEATURES OF COPD AND ASTHMA

| COPD | Asthma |
|---|--|
| Onset in mid-life | Onset early in life (often childhood) |
| Symptoms progress slowly | Symptoms vary from day to day |
| Dyspnoea during exercise | Symptoms provoked by a range of triggers |
| May not have atopy | Allergy, rhinitis and/or eczema may be present |
| Uncommon family history (genetic deficiency of alpha 1-antitrypsin) | Common family history |

apply individualised management recommendations.^{2,25}

CHALLENGES AND PITFALLS IN DIAGNOSING COPD

In the absence of spirometry, breathlessness due to obesity, which is now prevalent in the primary care population, may be wrongly attributed to COPD.¹⁴ Additionally, COPD symptoms in women are often mistakenly attributed to asthma, as historically COPD was a disease of older men.²⁸ More recently, there is a higher incidence of COPD in younger women, due to increased smoking among women. The Australian mortality rate in women reflects this, with the death rate for women from COPD rising and approaching the rate for men.²⁹

CONCLUSION

COPD is a common condition that is underdiagnosed and undertreated. A delay in diagnosis may deny patients

potentially effective treatment and result in lost opportunities to prevent progression. Current Australian guidelines (the COPD-X guidelines) recommend that COPD should be considered in people over the age of 35 years who are current smokers or ex-smokers.

Patients with COPD can be identified using a systematic process with targeted case finding as well as by opportunistically screening those at risk. Lung function screening devices may be used to follow up patients at risk of COPD and to rule out or confirm the need for diagnostic testing with spirometry.

Spirometry is underutilised in primary care, and its improved use is essential for diagnosing COPD and monitoring disease progression, which informs patient management. Information about training programs in spirometry is provided.

Complex lung function tests to distinguish between asthma and COPD are not usually required. MT

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References are included in the pdf version of this article available at www.medicinetoday.com.au.

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JULIA A.E. WALTERS BM BCh, PhD; **ALAN J CROCKETT** PSM, MPH, PhD, FANZSRS
VANESSA M. MCDONALD DipHlthScien(Nurs), BNurs, PhD

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