July 2021
Issue 22

Primary Care Respiratory Update




Edition Highlights

- Providing Greener, Kinder Respiratory Care
- Pulse Oximetry
- Focus on Frailty
- Top Priorities for Respiratory Service Provision post COVID

Primary Care Respiratory Society www.pcrs-uk.org

Soprobec is indicated for the maintenance treatment of asthma, when the use of pressurised metered dose inhaler is appropriate.[1] Volumatic™ spacer required in patients 15 years of age and under, and all patients requiring daily doses of 1000 mcg and over.[1]

So close to Clenil®[1-4] we had to change the colour

Soprobec (beclometasone dipropionate) and Clenil® are so strikingly similar[1-4] that we've had to update our 200 mcg inhaler from an understated brown to the rather fetching pink you see here, just to help people tell the difference.

In fact, the whole Soprobec range, from 50 mcg right up to 250 mcg, is equivalent to Clenil®[1-4] yet costs 25% less.[5]

What's not to like?

Scan to visit www.glenmarkpharma.co.uk/respiratory

Soprobec
beclometasone dipropionate

Savings that matter

Soprobec (beclometasone dipropionate) 50, 100, 200 or 250 micrograms per actuation pressurised inhalation solution. Please refer to the Summary of Product Characteristics (SmPC) before prescribing. **Indications:** Soprobec is indicated for the maintenance treatment of asthma when the use of pressurised metered dose inhaler is appropriate. **Dosage and administration:** Soprobec is for inhalation use. Adjust starting dose of inhaled beclometasone dipropionate to severity of disease, then adjust until control is achieved and then titrate to the lowest dose at which effective control of asthma is maintained. Adults (including the elderly): usual starting dose is 200 micrograms twice daily. Severe cases may be increased to 600 to 800 micrograms daily. (Soprobec 250 only: usually 1000 micrograms daily, which may be increased to 2000 micrograms daily). Dose may be reduced when the patient's asthma has stabilised. The total daily dosage should be administered as 2 to 4 divided doses. The Volumatic™ spacer device must always be used when Soprobec is administered to adults and adolescents 16 years of age and older taking total daily doses ≥ 1000 micrograms. Children: usual starting dose is 100 micrograms twice daily. Depending on the severity of asthma, the daily dose may be increased up to 400 micrograms administered in 2 to 4 divided doses. Soprobec 200 and 250 is not recommended for children. Soprobec must always be used with the Volumatic™ spacer device when administered to children and adolescents 15 years of age and under, whatever dose has been prescribed. Patients with hepatic or renal impairment: No dosage adjustment needed Soprobec is for inhalation use. To ensure proper administration of the medicinal product, the patient should be shown how to use the inhaler correctly by a physician or other health professional. Correct use of the pressurised metered dose inhaler is essential in order that treatment is successful. The patient should be advised to read the Package Leaflet carefully and follow the instructions for use as given in the Leaflet. **Please refer to the SmPC for details of testing the inhaler and instructions for use**. Patients who find it difficult to co-ordinate actuation with inspiration of breath should be told to use a Volumatic™ spacer device to ensure proper administration of the product. Young children may find it difficult to use the inhaler properly and will require help. Using the inhaler with the Volumatic™ spacer device with a face mask may help in children under 5 years. Advise the patient to thoroughly rinse the mouth or gargle with water or brush the teeth immediately after using the inhaler. The patient should be told of the importance of cleaning the inhaler at least weekly to prevent any blockage and to carefully follow the instructions on cleaning the inhaler printed on the PIL. The inhaler must not be washed or put in water. The patient should be told also to refer to the PIL accompanying the Volumatic™ spacer device for the correct instructions on its use and cleaning. **Contraindications:** Hypersensitivity to norflurane (HFA-134a), ethanol anhydrous, glycerol or beclometasone dipropionate. **Warnings and precautions**: Patients should be properly instructed on the use of the inhaler to ensure that the drug reaches the target areas within the lungs. Patients should also be informed that Soprobec should be used on a regular basis, even when they are asymptomatic. Soprobec should not be used as the first treatment for asthma for treatment of acute asthma attacks patients. For such cases patients should be advised to have their rapid-acting bronchodilator available at all times. Treatment with Soprobec should not be stopped abruptly. If patients find the treatment ineffective medical attention must be sought. Increasing use of rescue bronchodilators indicates a worsening of the underlying condition and warrants a reassessment of the asthma therapy. Sudden and progressive deterioration in control of asthma is potentially life-threatening and the patient should undergo urgent medical assessment. Systemic effects of inhaled corticosteroids may occur, particularly when prescribed at high doses for prolonged periods. Possible systemic effects include Cushing's syndrome, cushingoid features, adrenal suppression, growth retardation in children and adolescents, decrease in bone mineral density, cataract and glaucoma and more rarely, a range of psychological or behavioural effects including psychomotor hyperactivity, sleep disorders, anxiety, depression or aggression (particularly in children). It is important that the dose of inhaled corticosteroid is titrated to the lowest dose at which effective control of asthma is maintained. It is recommended that the height of children receiving prolonged treatment with inhaled corticosteroids is regularly monitored. If growth is slowed, therapy should be reviewed with the aim of reducing the dose of inhaled corticosteroids, if possible, to the lowest dose at which effective control of asthma is maintained. In addition, consideration should also be given to referring the patient to a paediatric respiratory specialist. Prolonged treatment with high doses of inhaled corticosteroids may result in adrenal suppression and acute adrenal crisis. Situations which could potentially trigger acute adrenal crisis, include trauma, surgery, infection or any rapid reduction in dosage. Presenting symptoms are typically vague and may include anorexia, abdominal pain, weight loss, tiredness, headache, nausea, vomiting, hypotension, decreased level of consciousness, hypoglycaemia, and seizures. Additional systemic corticosteroid cover should be considered during periods of stress or elective surgery. Care should be taken when transferring patients to Soprobec therapy, particularly if there is any reason to suppose that adrenal function is impaired from previous systemic steroid therapy. Patients transferring from oral to inhaled corticosteroids may remain at risk of impaired adrenal reserve for a considerable time. Patients who have required high dose emergency corticosteroid therapy in the past or have received prolonged treatment with high doses of inhaled corticosteroids may also be at risk. This possibility of residual impairment should always be borne in mind in emergency and elective situations likely to produce stress, and appropriate corticosteroid treatment must be considered. The extent of the adrenal impairment may require specialist advice before elective procedures.Patients weaned off oral steroids whose adrenocortical function is impaired should carry a steroid warning card indicating that they may need supplementary systemic steroids during periods of stress, e.g. worsening asthma attacks, chest infections, major intercurrent illness, surgery, trauma, etc. Replacement of systemic steroid treatment with inhaled therapy sometimes unmasks allergies such as allergic rhinitis or eczema previously controlled by the systemic drug. As with all inhaled corticosteroids, special care is necessary in patients with active or quiescent pulmonary tuberculosis. As with other inhalation therapy, paradoxical bronchospasm may occur with an immediate increase in wheezing, shortness of breath and cough after dosing. This should be treated immediately with a fast-acting inhaled bronchodilator. Soprobec should be discontinued immediately, the patient assessed and, if necessary, alternative therapy institute. To reduce the risk of Candida infection, patients should be recommended to rinse their mouth properly after each drug administration. Special care is necessary in patients with viral, bacterial and fungal infections of the eye, mouth or respiratory tract. If a patient presents with symptoms such as blurred vision or other visual disturbances, the patient should be considered for ophthalmologist evaluation of possible causes which may include cataract, glaucoma or rare diseases such as central serous chorioretinopathy (CSCR) which have been reported after use of systemic and topical corticosteroids. Soprobec contains 7.47 mg of alcohol (ethanol) in each actuation which is equivalent to 13% w/w. **Interactions:** Theoretical potential for interaction of ethanol (excipient) in particularly sensitive patients taking disulfiram or metronidazole. Suppressive effect on adrenal function occurs with concomitant systemic or intranasal steroids. Caution and appropriate monitoring in CYP3A inhibitors (e.g. ritonavir, cobicistat). **Pregnancy and lactation:** There is no experience of the use of this product in pregnancy and lactation in humans. **Adverse reactions:** *Very common and common:* Oral candidiasis (of the mouth and throat), hoarseness, throat irritation. *Uncommon:* hypersensitivity reaction with the following manifestations: Rash, urticaria, pruritus, erythema. *Very rare:* oedema of the eyes, face, lips and throat, anaphylactic / anaphylactoid reactions, Cushing's syndrome, cushingoid features, adrenal suppression, growth retardation (in children and adolescents), bone density decreased, cataract, glaucoma, paradoxial bronchospasm, wheezing, dyspnoea, cough. *Unknown frequency:* Psychomotor hyperactivity, sleep disorders, anxiety, depression, aggression, behavioural disorders (predominantly in children), headache, vision blurred. Please consult the summary of product characteristics for a full list of adverse reactions. **Marketing authorization number:** PL 25258/0279. **Marketing Authorization Holder:** Glenmark Pharmaceuticals Europe Limited, Laxmi House, 2B Draycott Avenue, Kenton, Middlesex, HA3 0BU, United Kingdom **Distributor:** As above. **Legal classification:** POM. Price: 50mcg £2.78, 100mcg £5.57, 200mcg £12.13, 250mcg £12.22. **Job code:** PP-UK-SOP-0116 **Date PI was drawn up:** Nov 2020

Adverse events should be reported.
Reporting forms and information can be found at https://yellowcard.mhra.gov.uk. Adverse events should also be reported to medical_information@glenmarkpharma.com or call 0800 458 0383

PIP codes: Soprobec 50 mcg/actuation - 4098620, Soprobec 100 mcg/actuation - 4098638, Soprobec 200 mcg/actuation - 4098646, Soprobec 250 mcg/actuation - 4098653.

References: 1. Soprobec Summary of Product Characteristics. **2.** Clenil® Summary of Product Characteristics. **3.** MHRA April 2019 Public Assessment Report: Soprobec 50, 100, 200, 250 mcg, UK/H/6818/001-004/DC. Available at https://mhraproductsprod.blob.core.windows.net/docs-20200302/3bc836d25349185931b189bf3ba25c395c23447b. Accessed April 2021. **4.** Data on file, Glenmark Pharmaceuticals Europe Ltd (Device equivalence). **5.** BNF. April 2021. (See NHS indicative price). Available at www.bnf.nice.org.uk/medicinal-forms/beclometasone-dipropionate.html. Accessed April 2021.

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See http://www.pcrs-uk.org/sites/pcrs-uk.org/files/files/PI_funding.pdf for PCRS statement on pharmaceutical funding.

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† Use of an AeroChamber Plus spacer device with Combisal is recommended in those who may have difficulties coordinating actuation with inspiration e.g. children <12 years.

Reference 1. Drug Tariff March 2020

Combisal (Salmeterol/ Fluticasone) Prescribing Information (please refer to the full SmPC before prescribing)

Indications: Regular treatment of asthma where use of combination product (long-acting β2 agonist and inhaled corticosteroid) is appropriate: patients not adequately controlled with inhaled corticosteroids and 'as needed' inhaled short-acting β2 agonist or patients already adequately controlled on both inhaled corticosteroid and long-acting β2 agonist **Available strengths:** 25µg/50µg; 25µg/125µg & 25µg/250µg salmeterol/fluticasone per metered dose pressurised inhalation, suspension. **Dosage and method of use:** Inhalation use. Adults and adolescents 12 years and older: two inhalations twice daily. Children 4 years and older: two inhalations 25 µg/50 µg twice daily. Titrate to lowest dose at which effective control of symptoms is maintained and if long-term control maintained at lowest dose, consider testing inhaled corticosteroid alone or combination once daily. Combisal 25 µg /50 µg not appropriate for adults and children with severe asthma. Maximum licensed dose of fluticasone propionate in children is 100 µg twice daily. No data in children under 4 years. AeroChamber Plus® spacer device can be used. This may increase drug delivery to lungs with increase in risk of systemic adverse effects. Advise patients to rinse mouth out with water and spit out, and/or brush teeth after each dose of medicine to minimize risk of oropharyngeal candidiasis and hoarseness. **Contraindications:** Hypersensitivity to active substance or excipients. **Special warnings and precautions for use:** Do not use to treat acute asthma for which fast- and short-acting bronchodilator required or initiate Combisal during an exacerbation, or if asthma is significantly worsening or acutely deteriorating. Use with caution in patients with active or quiescent pulmonary tuberculosis and fungal, viral or other infections of the airway; severe cardiovascular disorders or heart rhythm abnormalities, diabetes mellitus, thyrotoxicosis, uncorrected hypokalaemia or predisposed to low levels of serum potassium. Discontinue if paradoxical bronchospasm occurs. Prolonged use of high doses of ICS may result in adrenal suppression and acute adrenal crisis. Consider additional systemic corticosteroid cover during periods of stress or elective surgery. Monitor patients transferring from oral steroids for impaired adrenal reserve. Safety and efficacy in COPD not established. Patients of black African or Afro-Caribbean ancestry should seek medical advice if asthma uncontrolled or worsens on Combisal. If prolonged treatment in children, monitor height. Interactions: The following combinations should be avoided: Ritonavir or other potent CYP3A inhibitors; ketoconazole or other potent CYP3A4 inhibitors; non- selective and selective β blockers; xanthine derivatives, steroids and diuretics in acute severe asthma. Other β adrenergic containing drugs can have an additive effect. **Pregnancy & Lactation:** Administer only if expected benefit to mother is greater than any possible risk to fetus. Not to be used during breastfeeding. **Side effects:** For full list of side effects consult SmPC. 'Very Common' 'Common' and 'Serious' side effects included in prescribing information. Very common (≥1/10) side effects: headache, nasopharyngitis. Common (≥1/100 to <1/10) side effects: candidiasis of mouth and throat, pneumonia, bronchitis, hypokalaemia, throat irritation, hoarseness/dysphonia, sinusitis, contusions, muscle cramps, traumatic fractures, arthralgia, myalgia. Uncommon Serious (≥1/1000 to <1/100) side effects: cutaneous hypersensitivity reactions, dyspnoea, hyperglycaemia, anxiety, sleep disorders, tremor, cataract, palpitations, tachycardia, atrial fibrillation, angina pectoris. Rare serious (≥1/10,000 to <1/1000) side effects: oesophageal candidiasis, facial and oropharyngeal angioedema, bronchospasm, anaphylactic reactions including anaphylactic shock, Cushing's syndrome, Cushingoid features, adrenal suppression, growth retardation in children and adolescents, decreased bone mineral density, behavioural changes (psychomotor hyperactivity and irritability predominantly in children), glaucoma, cardiac arrhythmias, paradoxical bronchospasm. Serious side effects (unknown frequency): depression, aggression (predominantly in children). **MA number:** PL 36532/0001-0003. **Cost:** £13.50 for 25/50µg, £17.59 for 25/125µg, £27.99 for 25/250µg. **MAH:** Genetic S.p.A., Via G. Della Monica 26, 84083 Castel San Giorgio (SA), Italy. **Distributed in the UK by:** Aspire Pharma Ltd, Unit 4, Rotherbrook Court, Bedford Road, Petersfield, Hampshire, GU32 3QG. **Legal category:** POM. **Date reviewed:** March 2020. **Version number:** 1010422348 v 5.0

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A GLOBAL LEADER IN RESPIRATORY DIAGNOSTICS

Editor's Round-Up

Dr Iain Small, *Editor Primary Care Respiratory Update*

Welcome to the Summer 2021 edition of *Primary Care Respiratory Update*. In this publication, and in keeping with the weather outside, we are providing a focus on climate, Global Warming, and the environment. The balance of good and potential harm that comes with the delivery of respiratory care to our patients is a precarious one. It would be tempting to think of the solution in simple, even polarised terms- 'this inhaler good, this bad', but as you will see from the three superb pieces we are publishing here, the situation is much more complex than that. Issues such as inhaler choice, prescribing and treatment strategies, manufacture and recycling, patient travel, access and parking, and the environment that surrounds healthcare settings are all important topics.

Being a complex problem does not, however, give us the excuse to walk away or ignore our responsibilities as clinicians, prescribers, or designers and influencers of health care services. I hope that by giving careful attention to contributions from Stephen Holgate, Duncan Keeley. Darush Attar Zadeh, Daryl Freeman, Noel Baxter and of course our Chair, Carol Stonham, you will be in a stronger position to make decisions that are best for the patient in front of you, as well as for all of our futures. Make sure you also check out our PCRS Greener Respiratory Pathway available via our website (https://www.pcrs-uk.org/greener-respiratory-pathway) where you can find lots of information to support greener, kinder respiratory care throughout the patient pathway. And there's even more resources available to support you to deliver greener kinder respiratory healthcare at https://www.pcrs-uk.org/resource/greener-healthcare.

The Global Pandemic has highlighted a variety of issues that have become more focused as a consequence of the pressure under which we have all been working and living. Frailty is clearly one of them. Living with, fighting against, and making decisions in the light of frailty are now part of our common language and clinical behaviour. Teaming up with Duncan Keeley, Kevin Gruffydd-Jones turns his considerable talents to the subject with some good, grounded principals and advice.

Speaking of grounded sensible advice, check our top tips section for advice on doing things in times of physical restriction, and our pulse oximetry guide in 'getting the basics right'. Both items that will support us in continuing to provide care in challenging times.

As we move towards a different healthcare landscape, delivering good respiratory care for our patients will be part of the mix of challenges and opportunities before us. PCRS has developed a Respiratory Service Framework, against which you can measure your own provision. Daryl returns for a second contribution in this PCRU to discuss this.

Finally, it remains for me to wish you all well. I hope you can get some time away from work after the onslaught of the past 15 months, maybe squeeze in a belated celebration for an event that was cancelled during lockdown(s). On behalf of us all at PCRU, keep safe, keep looking out for each other and keep going.

PCRS

THE GREENER RESPIRATORY PATHWAY
A PCRS Initiative

The PCRS interactive respiratory pathway tool aims to help clinicians work with patients to identify a greener approach to delivering high quality, patient centred respiratory care.

https://www.pcrs-uk.org/greener-respiratory-pathway

Pragmatic guide to delivering greener respiratory healthcare

Carol Stonham *Executive Chair, Primary Care Respiratory Society, UK*

This pragmatic guide has been developed based on the work of the PCRS Greener Healthcare Working Group. In 2020, the PCRS Greener Healthcare Initiative brought together respiratory healthcare professionals working in primary and secondary care setting, public health specialist, patient advocacy organisations, patient representative, policy influences, service users and decision makers as well as representatives from the pharmaceutical industry. This pragmatic guide brings together practical and immediately implementable strategies to enable healthcare professionals to understand and deliver greener respiratory healthcare in the primary care setting. This guide is relevant to any healthcare professional working in primary care who wishes to understand and reduce the impact of the respiratory healthcare they deliver on the environment

Introduction

All healthcare incurs environmental costs, and it is incumbent on us all to be aware of and minimise these costs for future generations. The environmental burden of respiratory healthcare, perhaps more than any other sector, brings into sharp focus the interface between health and healthcare. While the environment, notably air quality and pollution levels, can both cause and worsen lung disease, respiratory healthcare delivery can add to air pollution, waste and the carbon footprint of healthcare services. Understanding these interactions and working to minimise the impact of respiratory healthcare on the environment without compromising the quality of care delivered to patients is at the heart of greener respiratory healthcare.

What do we mean by greener respiratory healthcare? Greener respiratory healthcare is that which initially works to prevent the development of respiratory disease where possible, ensures patients receive early and accurate diagnosis and appropriate treatment (pharmacological and non-pharmacological) to ensure their respiratory condition is well controlled with minimal waste and a minimal carbon footprint, using streamlined services that avoid duplication, and digital interfaces where appropriate.[1]

Why greener respiratory healthcare is important. Respiratory disease, respiratory healthcare and the environment interact in unique and reciprocal ways. Between 28,000 and 36,000 deaths in the UK are thought to be attributable to human-made air pollution.[2] Environmental pollution can cause and exacerbate respiratory disease and, conversely, delivery of healthcare for patients with respiratory disease can create and add to environmental pollution. Targeting environmental pollutants such as traffic fumes is recognised as an important strategy to improve the lives of people living with respiratory disease.[3] Minimising the environmental impact of the healthcare we deliver for patients with respiratory disease while maintaining the quality of care we deliver has the potential to achieve environmental gains from which we can all benefit. The NHS is responsible for around 6%

of England's total carbon emissions.[4] The NHS Long Term plan (2019) and the "Delivering a 'Net Zero' National Health Service" report issued in 2020 place reduction in healthcare service-related environmental pollution at the heart of decision making.[5]

Who is this guide for? This pragmatic guide has been developed to support colleagues working in primary care to consider and actively seek ways to minimise the associated environmental impact of respiratory healthcare without compromising quality of care.

Where to start

Greener respiratory healthcare spans the complete patient journey, from prevention of disease and diagnosis, through to routine chronic care and including the acute situation.[6] A good place to start is by becoming knowledgeable about the impact of respiratory healthcare on the environment and then seeking to raise awareness among and educate and engage colleagues and patients about their role in achieving greener respiratory healthcare.[1]

In 2020 the NHS was responsible for 6.1% of the total carbon emissions and 3.5% of all road traffic in England.[5] While the carbon footprint of the NHS in England has demonstrated a downward trend since 2008,[5] this trend will need to be sustained and potentially accelerated if we are to meet the ambitious targets set out in the UK Climate Change Act and the NHS Long Term plan for a Net Zero NHS.[5] In the primary care setting, the greatest sources of carbon emissions are medicines and chemicals, business services and medical and non-medical equipment, metered dose inhalers (MDIs) and building energy and patient and staff travel.[5] These are also the greatest sources of opportunity to reduce the carbon footprint of primary healthcare in general and primary respiratory healthcare in particular.

With this knowledge in hand, you can begin to evaluate the environmental impact of your own clinical practice and explore ways in which to reduce it. Some steps to get you started are shown in Box 1.

Greener prescribing

Many of the most effective medicines for the management of lung disease are delivered straight to the lungs via inhalation. MDIs have come under scrutiny in recent years for the global warming potential (GWP) of the propellants used to drive the medicine out of the device and into the patient's lungs. In emergency situations, this assisted delivery, especially in combination with a spacer device, can be life-saving. Moreover, these devices are essential for patients without the inspiratory capacity to generate sufficient power to ensure effective delivery from other types of inhaler such as dry powder inhalers (DPIs) or soft mist inhalers (SMIs). However, there is a need to reduce the GWP of inhalers in general, and it is incumbent on prescribers to be aware of the carbon footprint of the inhalers on their local formulary list and make this part of the decision-making process when deciding on a new prescription. In addition, the plastic in all inhaler types will degrade and leach into the land, waterways and sea, contributing to environmental pollution if not disposed of safely.

Prescribing decisions should always be made on an individual basis and in consultation with the patient, and should include environmental considerations to ensure patients receive their medication via a device that is effective and appropriate for them.[7,8]

Patients should always be involved in and at the heart of decision-making about their care and the medications they receive so that they are more likely to adhere to appointments, medications and self-care advice. Changing a patient from an MDI to another inhaler type should only be undertaken after careful consideration and when the alternative device can offer the same.

Box 1: Getting started with greener respiratory healthcare

Is my place of work as green as it could be?

- Use the 'Green Impact Audit for Health Toolkit' to help you understand and identify areas to target to improve the environmental impact of your practice (https://www.greenimpact.org.uk/giforhealth)

Become a green advocate within your practice and ensure the environmental impact is always at the heart of practice-level decision making. Areas you might like to advocate for within your own practice might be:

Simple steps to improve air quality in and around my place of work

- Ban smoking on site, outdoors as well as indoors
- Operate (and enforce) a 'no engine-idling' policy

Simple steps to improve recycling at my place of work

- Ensure recycling bins (paper, plastic, etc) are available and used
- Be knowledgeable about recycling schemes through local pharmacies so you can advise patients
- Educate patients about recycling inhalers (and other medicine packaging) as part of the new patient consultation and every routine review consultation

Simple steps to minimise travel to and from my place of work

- Encourage colleagues to car-share or use public transport use
- Consider the use of digital technology and remote consultation to deliver routine healthcare for respiratory patients

efficacy and safety profile, and that the patient can confidently use it. See our guidance on making safe and clinically appropriate changes to inhalers for more information on this (https://www.pcrs-uk.org/resource/pcrs-guidance-making-safe-and-clinically-appropriate-changes-inhalers).[9] Ensure patients understand their prescribed medicines, and the importance of using them as prescribed and to the last dose is important to minimise waste. Inhalers with dose counters can be useful in this respect to ensure every dose is used. Patients should also be advised against 'test sprays' except on first use.

More general approaches to greener prescribing include using electronic prescriptions wherever possible direct to pharmacies and being aware of potential interactions including the interaction between smoking and some medications used to treat respiratory disease such as theophylline and inhaled corticosteroids, which may mean that higher doses are required.[10]

Influencing Integrated Care Systems decision-makers

From April 2021, Integrated Care Systems (ICSs) will coordinate regional health and care needs in England, bringing together the NHS and local councils along with voluntary and community organisations and social enterprises. This reorganisation, bringing together insights and expertise at a local level, is an ideal opportunity for those working in primary care to engage with the wider local community and drive the greener respiratory healthcare initiative. In Scotland, regional NHS boards are responsible for the delivery of front line healthcare services and for the protection and improvement of population health (https://www.scot.nhs.uk/organisations/). In Wales, these responsibilities lie with regional Health Boards (https://gov.wales/sites/default/files/publications/2019-09/nhs-wales-planning-framework2020-to-2023.pdf) and in Northern Ireland with Local Commissioning Groups (LCGs) (http://www.hscboard.hscni.net/local-commissioning-group/.

See our top tips guide on making the case for greener respiratory healthcare and influencing upwards to start ensuring green issues are at the heart of decision making in your local area (https://www.pcrs-uk.org/sites/pcrs-uk.org/files/resources/Greener-Respiratory-Pathway/2021-04-12-Top-Tips-Making-the-case-for-greener-respiratory-healthcare.pdf).[11]

Issues with which to open the conversation might include formulary lists and information availability on the carbon footprint of inhalers and other respiratory medications or the availability of low carbon alternative inhalers.

Diagnosis: Getting patients on the right path

Ensuring patients receive a **timely and correct diagnosis** already delivers greener respiratory healthcare by reducing wasted medication that a patient does not require or does not use effectively and repeated healthcare visits for ongoing symptoms and tests.[1] Accurate diagnosis ensures that patients can embark on the appropriate management plan to gain and maintain control of their respiratory symptoms as well as making sure they receive the right medication from the start at a dose that is sufficient and via a device that is appropriate for them.

Diagnostic hubs can be a useful way to streamline diagnostic services and reduce duplication, travel and waste. Be aware of and utilise diagnostic hubs in your area. If there are none, consider advocating them with your ICS, NHS board, Health Board or LCG.

Maintenance and co-morbidities: keeping patients on the right path

Once a patient has received a correct diagnosis and been prescribed a medication regimen, the focus can then shift to achieving and maintaining disease control. This requires a holistic approach to enable patients to understand their condition and prescribed medication and adhere to their prescribed regimen, and supporting them in the correct use of any devices they are using.[1] Prescription and signposting of non-pharmacological treatments such as PR and smoking cessation also offer evidence-based benefits and must be included in the treatment pathway.

Greener healthcare principles in this area should focus on actively seeking to identify patients most at risk of symptomatic worsening for proactive review. It may be that these patients have received an incomplete or incorrect diagnosis and treatment, or that they are not taking their medicine as directed and/or with the correct inhaler technique (if applicable). We can intervene here both to improve outcomes and control for patients as well as reducing the environmental impact of their care by making sure patients understand their medicines and are taking them effectively and, perhaps most importantly, with the correct inhaler technique. All respiratory patients should have an up-to-date personalised management plan in place detailing their regular medication regimen, how to recognise when their symptoms are getting worse and what they should do in that situation. For some patients, digital action plans may be appropriate.

There is a wealth of online resources that can be used to educate and support patients in the correct use of any inhaler they have been prescribed. For example, Asthma UK have a website through which short videos demonstrating the correct technique for a range of inhalers can be accessed (https://www.asthma.org.uk/advice/inhaler-videos/).

For motivated patients whose symptoms are well controlled, routine consultations could be considered via remote platforms avoiding the need for patients to travel to their appointment.[12] Group consultations, including group virtual consultations, can

streamline routine care delivery by bringing patients together who require the same supportive service and education.

What would the ultimate 'Green' primary care practice look like?

- **The site:** 'No idling' policy in the car park
- **The building:** Safe disposal/recycling bins, environmentally friendly cleaning products, active maintenance of all services to ensure optimal efficiency (heating, lighting and any air conditioning)
- **The personnel:** Environmentally aware and engaged, seek to minimise travel-related carbon footprint (car shares, public transport) (see also 'Take action' from Greener NHS: https://www.england.nhs.uk/greenernhs/get-involved/)
- **Greener healthcare advocacy:** At least one person designated as the greener healthcare advocate, greener healthcare prioritised in all practice-level decision making
- **Environmentally aware:**
  - Diagnostic pathways utilising local diagnostic hubs
  - Prescribing
  - Patient education
  - Patient review and proactive identification of 'at risk' patients
  - Consultations that embrace digital technologies where appropriate
  - Contributes to the NHS Forest (https://nhsforest.org) and sets up and encourages patients to use local Green Health Routes

See: Sustainable and environmentally friendly general practice. GPC England Policy Document: https://www.bma.org.uk/media/2570/bma-sustainable-and-environmentally-friendly-general-practice-report-june-2020.pdf

Summary and looking to the future

Delivering the right clinical care for individual patients must remain the primary focus for clinicians. Greener respiratory healthcare has the potential to focus attention on delivering the right clinical care while reducing the environmental impact of that care. In the areas where we can affect direct change such as in the inhalers we prescribe, we can do so by having some knowledge of the subject by considering the full clinical picture including any collateral effect and including patients in sharing decision making.

Achieving greener respiratory healthcare requires system-level change, but all change begins with individuals. Starting with our own clinical practice, advocating for and educating about greener healthcare with colleagues and patients and influencing upwards is something we, as healthcare professionals, can all do. To see some examples of local level projects that have delivered real results, see the case studies from the NHS 'Greener NHS' program (https://www.england.nhs.uk/greenernhs/whats-already-happening/), particularly 'Boosting healthy and sustainable travel in Manchester' and 'For a greener NHS: GOSH reducing single use plastics'. We can all make a difference, lots of small differences will add up to sustainable change.

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Reducing indoor and outdoor air pollution in healthcare settings

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Air pollution causes up to 36,000 deaths in the UK every year and both cause and worsen lung disease. While outdoor air pollution may be a topic for governmental policy, we, as healthcare professionals, can take a range of steps to minimise our own contribution to local levels of air pollution, improve the air quality in our places of work and support patients in managing their risk from air pollution in their daily lives. In this paper we consider the importance of indoor and outdoor air quality in our places of work and the practical steps we can take to improve air quality for ourselves and our patients.

Introduction

Air pollution is recognised as one of the top environmental global threats to human health causing 4.2 million deaths globally every year.[1] In the UK, air pollution is estimated to account for between 28,000 and 36,000 deaths every year.[2]

Air pollution arises from industry and manufacturing, power generation, the way we heat and light our homes, the way we run our transport systems and even farming.[2,3] Pollution can also come from natural sources such as pollen, sandstorms and volcanic eruptions. Pollution consists of noxious gases, such as ammonia and nitrogen dioxide, and particulate matter which together can damage the lungs and trigger respiratory symptoms when inhaled.[2] In 2010, the three leading risk factors for global disease burden were high blood pressure (7.0% [95% uncertainty interval 6.2–7.7] of global disability-adjusted life years [DALYs]), tobacco smoking including second-hand smoke (6.3% [5.5–7.0]) and household air pollution from solid fuels (4.3% [3.4–5.3]).[4]

Air pollution affects everyone, healthy or well, affecting the growth and development of children and causing chronic lung disease with long-term exposure. Poor air quality is an increasing cause of concern for the prevention and management of lung disease, and measures led by international agreements and UK-based initiatives are working to improve the air that we breathe. Environmental pollutants such as traffic fumes and industrial waste are targeted by national policies designed to improve air quality for all, which will particularly benefit people with lung conditions. Workplace exposure to substances harmful to the lungs is also now increasingly recognised. Indeed, removal of the patient from exposure can actually cause a condition such as asthma to disappear, if caused by a workplace trigger. Healthcare settings are places of work for healthcare professionals. In addition to ensuring air quality is optimal for patients visiting for care, it is equally important to ensure healthcare settings are safe for the people who work there.

In this paper we consider the importance of indoor and outdoor air quality in our places of work and the practical steps we can take to improve air quality for ourselves and our patients.

Steps to improve indoor air quality in healthcare settings

Good building management is fundamental to maintaining indoor air quality in healthcare settings. At the most basic level, buildings should be well ventilated and have efficient, well maintained heating systems. Questions to ask about your place of work might include: Is there a facility-level policy on ventilation of rooms? Can windows be opened for ventilation? If windows face a road, is there a time of day when road traffic is low? This is particularly important to avoid allowing polluted outdoor air to enter the building. One way to minimise the amount of vehicle-related pollution near to healthcare facilities is to operate (and enforce) a 'no-idling' rule in the car park, especially for parking spaces close to the building.

Buildings in a state of disrepair may be associated with increased levels of small particulate matter and mould spores, both of which are known to be damaging to the lungs of healthy individuals and triggers for symptom worsening among people with lung disease. It is particularly important that air conditioning systems are regularly maintained and used appropriately to avoid clogging of filters or the build-up of areas where bacteria might proliferate. The choice of materials for the buildings themselves, as well as the furnishings used, can influence air quality as many give off harmful organic compounds.[2] Surfaces and furnishings should be easy to clean and designed to minimise the accumulation of dust particles.

The cleaning materials used can have a detrimental impact on indoor air quality as well as their wider environmental impact, and cleaning materials that are environmentally safe and contain minimal fumes and volatile organic compounds should be used where possible.

Indoor air purifiers may be helpful in clinical areas where asthma reviews are conducted. There is evidence that the use of air purifiers can reduce the medication burden in children with asthma by reducing small particulate mass levels.[5] These should be cleaned and maintained regularly. However, air fresheners should be avoided in healthcare settings, even in the toilets.

Steps to improve outdoor air quality around healthcare settings

In 2018, the British Lung Foundation report highlighted that 2,220 GP practices were in areas that exceed the WHO's safe air pollution limits.[6] Data from DEFRA demonstrated a considerable reduction in levels of air pollution during the period of national lockdown in 2020 due to the COVID-19 pandemic (https://geographical.co.uk/nature/climate/item/3680-coronavirus-measures-taken-now-could-ensure-a-greener-life-after-lockdown). A reduction in travel is likely to have played a major part in this reduction, emphasising the need to reduce healthcare-related travel in order to improve air quality for patients with respiratory disease and the wider community. You might like to consider engaging with and supporting local action groups focused on improving local public transport links and local air quality – for example, by replacing public transport fleets with low emissions vehicles.

While outdoor air quality is an area of national policy, there are many things we can do to minimise our own contribution to air pollution. Travel to and from work for both staff and patients is a major contributor to air pollution, and using and encouraging others to use public transport or consider car sharing where possible is one way to reduce work-related travel (Figure 1).

Remote consultations for routine reviews for engaged, informed patients with stable conditions may be helpful to reduce patient travel and also to minimise the need for vulnerable patients to go outside during periods of poor air quality. Much has been learnt about the benefits and limitations of remote consultations during the recent COVID-19 pandemic, and while they are unlikely to replace face-to-face consultations, especially for patients with worsening symptoms, they can be useful for some routine consults.[7]

The ban on smoking in public places has had a significant impact on the experience of people with lung disease. While smoking is banned inside all healthcare buildings, the ban on smoking outside is less well enforced and environmental tobacco smoke continues to be an issue around many secondary healthcare settings.

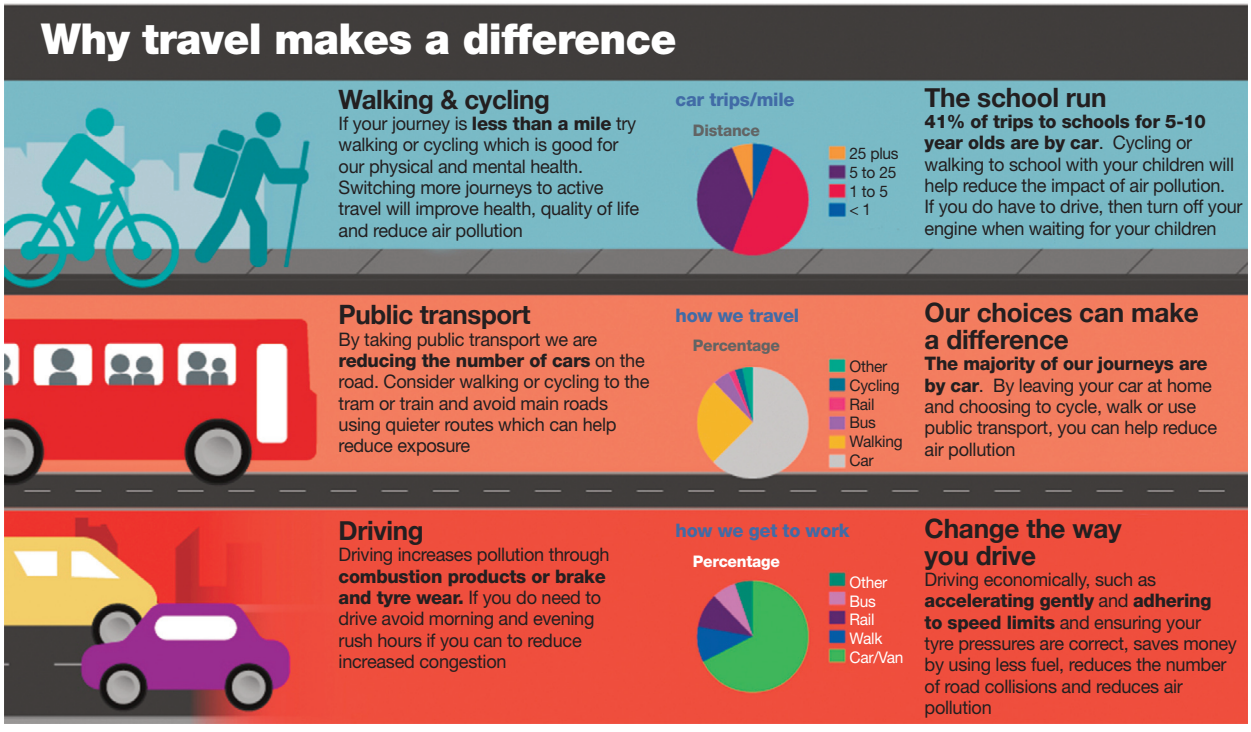
Supporting patients in understanding the dangers of air pollution and minimising their exposure

In February 2019, NICE issued their Quality Standard on outdoor air quality and health for England and Wales (QS181).[8] The statement recommends that clinicians provide patients with chronic respiratory conditions with advice on what to do when outdoor air quality is poor. This advice should be offered at routine appointments and enable patients and their families or carers to protect themselves and prevent their respiratory condition worsening.

The advice that patients should be offered includes:

- Avoiding or reducing strenuous activity outside, especially in highly polluted locations such as busy streets, and particularly if experiencing symptoms such as sore eyes, a cough or sore throat
- Using an asthma reliever inhaler more often, as needed
- Closing external doors and windows facing a busy street at times when traffic is heavy or congested to minimise the amount of polluted air coming into the home
- Being aware of expected outdoor air quality in the days ahead so that time outside the home can be planned or minimised as appropriate. See Box 1 for examples of sources on information on national and local air pollution levels.

Figure 1. Why the way we travel makes a difference *(Permission granted under the Open Government License v3.0)*.[2]



Box 1: Sources of information on national and local air pollution levels

- Government monitoring services:
  - UK-wide: Department for Environment, Food and Rural Affairs Daily Air Quality Index (https://uk-air.defra.gov.uk/)
  - Scotland: http://www.scottishairquality.scot/
  - Wales: https://airquality.gov.wales/
  - Northern Ireland: https://www.airqualityni.co.uk/
- Text messaging services:
  - London: https://www.airtext.info/
  - Sussex: https://airalert.info/Splash.aspx
  - Scotland: http://www.scottishairquality.scot/know-and-respond/

Summary and looking to the future

Seeking out ways to reduce air pollution should be an integral part of all our lives, both personal and professional. Achieving real change will require cooperation between healthcare and social policy makers to ensure reducing air pollution is at the heart of decisions made with regard to urban planning. In the meantime, there are a multitude of small changes we can all make at a personal level and within the governance of the healthcare facilities in which we work to improve air quality for ourselves and our patients.

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Shared decision making for greener healthcare: guidance on making safe and clinically appropriate changes to inhalers

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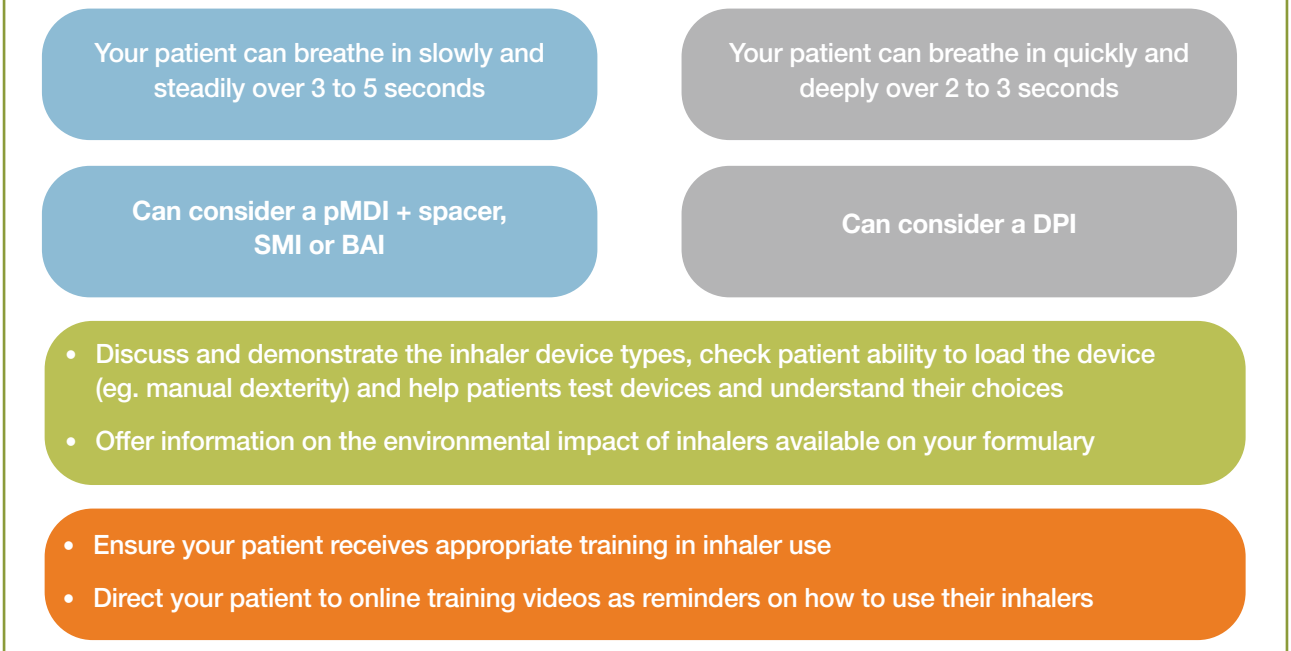
Inhalers for the delivery of respiratory medications have transformed the care of patients with respiratory disease, delivering medications exactly where they are needed and, in emergency situations, undoubtedly saving countless lives. However, their contribution to environmental pollution in terms of propellant gases and also as single use plastic devices has made them an important focus for efforts to reduce the environmental impact of the NHS. In this article we discuss how to incorporate environmental considerations when selecting inhaler devices for patients newly diagnosed with respiratory disease. We also consider how to safely change to inhalers with a lower environmental burden when clinically appropriate and how to support patients in making the decision to change.

Pressurised metered dose inhalers (pMDIs) have, since the 1990s, used hydrofluoroalkane (HFA) propellant gases to enable the delivery of respiratory medicines to the lungs. However, the use of HFA propellants contributes to global warming, and the two most commonly used HFA propellants – HFA 134a and HFA227a – are 1,300 times and 3,300 times, respectively, more potent than CO_2 as global warming agents. The NHS Sustainability Development Unit (SDU) estimates that 4% of NHS greenhouse gas emissions are accounted for by inhaler usage, and 3% of overall greenhouse gas emissions in the UK are accounted for by NHS activity. The Government's Environmental Audit Committee (EAC), in their 2017 scrutiny of F-gases, recommended a 2022 NHS target for 50% of all inhalers to be of 'low global warming impact', as well as an increase in the recycling of used inhalers with residual F-gas propellants to 50% of all those prescribed.[1] The NHS SDU inhaler taskforce has recommended more moderate targets to reduce the carbon footprint of NHS inhalers by 50% by 2030.

Against this background there is a clear argument for moving away from inhalers that utilise HFA propellants with high global warming potential (GWP) to alternatives that use low GWP propellants or no propellant gases at all. Propellant-free inhalers such as dry powder inhalers (DPIs) and soft mist inhalers (SMIs) do not contain HFC propellants, so from this perspective have no global warming potential in comparison to traditional pMDIs. These inhalers still incur environmental costs in relation to their production and disposal.[2] Current inhalers are designed as single use devices and we lack an effective national recycling scheme.

Strategies to exclude pMDIs or 'blanket switching' of patients from one inhaler type to another in a practice or an area are not patient-centred. There is clear evidence that this is not good practice.[3–5] How then should we support patients in

Figure 1. Simple algorithm for the selection of inhalers for respiratory medications



selecting inhalers that will effectively deliver the medication they require while minimising environmental impact?

New inhaler prescriptions for maintenance respiratory medications

When starting inhaled treatments, consideration should be given to the clinical appropriateness of devices without propellant gases.[6] The decision should always be made in partnership with patients (Figure 1). It is they who will be using the device on a daily basis and, for some patients, environmental considerations may be an important part of the decision process.[3,7] We need to ensure that patients can make fully informed choices. Get to know the GWP of inhalers on your local formulary, for example, by using the information compiled by Dr Alex Wilkinson (https://greeninhaler.org/inhaler-comparison/) and that provided by RightBreathe (https://www.rightbreathe.com/). It is possible to reduce propellant use even when a pMDI is considered to be an appropriate choice. For example, for a patient who requires beclomethasone 200 µg twice daily, select an inhaler that delivers 200 µg as a single dose rather than an inhaler that delivers 100 µg per dose. However, be aware that the 200 µg dose is not licensed in children. In this way propellant use is halved. Careful consideration of alternative choices should be made before selecting an inhaler that uses HFA227a as the propellant gas.

DPIs and SMIs should be considered where such devices are acceptable to the patient and have the same efficacy and safety profile for an individual patient.[3] Patients for whom a DPI could be considered include all those with adequate inspiratory capacity. SMIs require minimal inspiratory effort and so could be potentially considered for those patients with poor inspiratory capacity. Patients for whom a pMDI would be more appropriate include those requiring a spacer device, such as children, or those with low inspiratory capacity. A pMDI with a spacer or an SMI may be more appropriate for some elderly patients who may have difficulty with the quick/fast inspiratory effort needed for DPIs. For pMDI alone there may be an inability to coordinate (press and breath manoeuvre) for many, so alternative choices should be explored.

Different DPIs have different inspiratory flow requirements.[6] Inspiratory flow check devices are available and can be used to decide whether a patient has sufficient inspiratory flow to use a DPI. Alternatively, a placebo device that has an indicator such as a whistle can be helpful in making this judgement. If neither of these options are available, remote or face-to-face assessment may be useful. To effectively use a DPI, patients must be able to inhale quickly and deeply so, by asking patients to empty their lungs and inhale quickly and deeply over 2–3 seconds, a judgement can be made. For a pMDI or SMI, after emptying the lungs the patient should ideally be able to inhale slowly and steadily over 3–5 seconds. These assessments should ideally be conducted by a skilled clinician with expertise in teaching/coaching inhaler technique.[8]

Changing inhalers when clinically appropriate

Changing inhalers for the delivery of respiratory medications requires careful review of the patient's current condition. Blanket switching of inhalers without patient engagement in the decision process has the potential to worsen disease control and should be avoided.[9] The decision should always be made within the context of delivering optimal care for the individual patient with the goal of ensuring the right device for the right patient. Ultimately, the decision should be that of the patient's when clinical choices are equal, and they should be supported to make a decision that is appropriate to them and receive support and training on the appropriate use of any new inhaler device.

For patients whose condition is stable, the regular review consultation is an opportunity to consider inhaler choice. Whether the discussion has been initiated by the patient or not, changing inhalers should only be considered where the change is clinically appropriate, safe and acceptable to patients.[7] Online video resources such as those provided by Asthma Research UK can be used to help patients master the new skills required (https://www.asthma.org.uk/advice/inhaler-videos/).

Changing an inhaler may also be considered for patients whose disease control is poor. However, this should only be considered when a full review of the patient's inhaler technique has been undertaken. Adherence to maintenance treatment and monitoring uptake and appropriate use of spacer should be assessed. Poor inhaler technique and adherence to the prescribed maintenance medication regimen can result in over-reliance on reliever medication in asthma. People with asthma should be using no more than 4 canisters of SABA in a year and ideally no more than 2 canisters. Any more than this is an indicator of poor disease control and an increased risk for potentially life-threatening exacerbations. If improvements have still not been achieved through interventions such as inhaler technique training and you are confident the patient is taking their medication as directed, then an alternative inhaler device can be discussed, first exploring a person's ability to use a device and then factoring in GWP of any new inhaler included as part of the decision-making process. It is important to be clear for patients with poor disease control, the focus should be on improving the clinical situation for the patient.

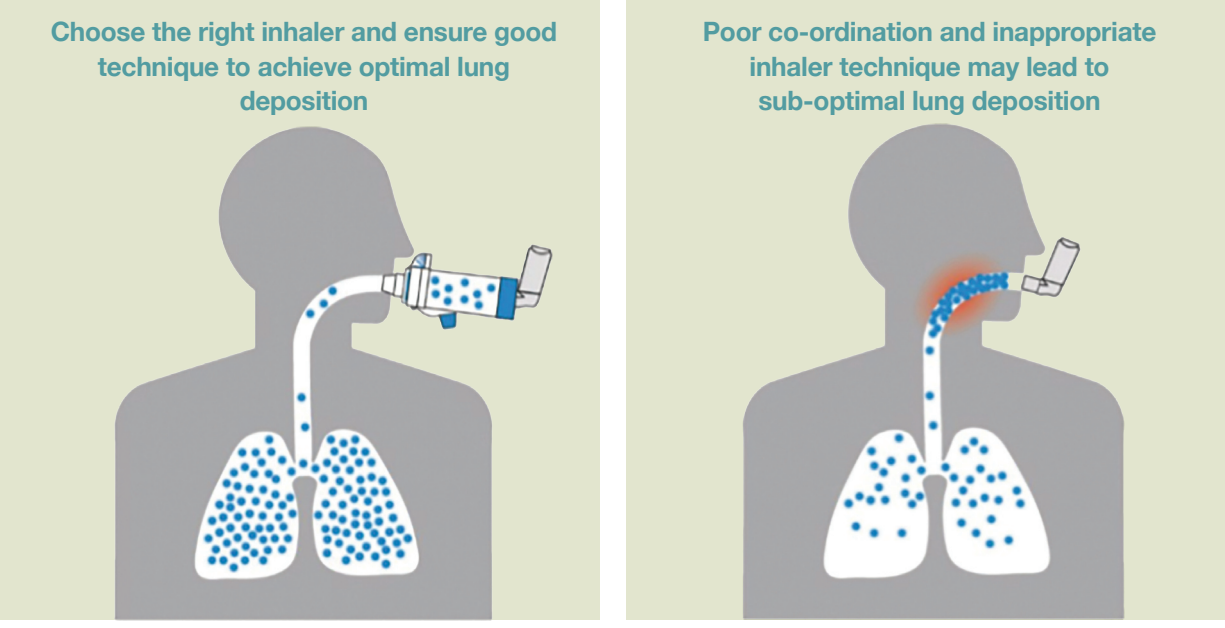
Changing inhalers should not be considered for patients with dexterity, cognitive or other physical issues that may increase the risk for poor adherence or poor inhaler technique with an alternative device. Once again, the focus should be on optimising the clinical situation for the patient.

Optimising inhaler use

When an inhaler is prescribed, the patient should be fully supported in learning to use the device correctly and effectively. The prescribing clinician should have the skills both to train patients in correct inhaler technique and in reviewing technique and spotting errors. Appropriate inhaler technique ensures delivery of medication to the lungs; poor co-ordination or inappropriate technique may lead to sub-optimal lung deposition (Figure 2).

Considering wider aspects of the care of patients with respi-

Figure 2. The importance of appropriate inhaler technique [Image copyright Trudell Medical International].



ratory disease helps improve outcomes and avoid waste. Early and accurate diagnosis by competent clinicians is vital for the best use of medications and reduces the need for travel to unnecessary appointments.

Correct use of regular preventer treatment in asthma and of long-acting bronchodilators in COPD improves outcomes and greatly reduces the need for short-acting bronchodilators.

Ensuring patients have the skills to use their inhaler effectively and appropriately should be a fundamental component of all new prescriptions and an integral part of all regular review consultations.

A holistic approach to care that encourages patients to engage with high value non-pharmacological treatments and more general self-care helps to promote general well-being and symptom control.

Utilising the wider multi-disciplinary team is essential to support patients and optimise the use of respiratory medicine. For example, many community pharmacy teams have the skills required for inhaler technique coaching as part of the New Medicines Service. Community pharmacists are ideally placed to educate patients to ensure their inhalers are empty before they are disposed of and encourage patients to return their empty inhalers for safe disposal.

pMDIs in emergency situations

pMDIs continue to play an important – potentially life-saving – role in respiratory emergencies and this role must be recognised and protected.[6,10] When patients have deteriorating control of their respiratory condition, they may lack the inspiratory effort required to deliver sufficient quantities of the medicine in a DPI for adequate drug deposition. In this situation, pMDI with spacer helps maximise the delivery of the medicine to the lungs (see our position statement on emergency care packs https://www.pcrs-uk.org/resource/emergency-mdi-and-spacer-packs-asthma-and-copd). When and how to use inhaled medications in attacks should be recorded in a self-management plan that has been co-created with the patient.

While use in emergency situations accounts for only a very small proportion of current usage of SABA pMDIs, 83% of the 9.24 million SABA pMDIs prescribed each year are not being used as intended in people with asthma – i.e. for emergency use only.[11]

For the future

Respiratory medicines delivered via inhaler devices and spacers where appropriate will continue to be a fundamental part of the care for patients with a range of respiratory diseases. Minimising the environmental impact of inhalers is an important part of ensuring a sustainable future for us all. For patients who are using a pMDI and express a concern or guilt about the impact they may be having on the environment, it is important clinicians put their minds at ease, highlight that about 4% of NHS greenhouse gas emissions are accounted for by inhaler usage and the device that has been chosen is the right one for them. Current low levels of return of inhalers to pharmacies for safe disposal continues to result in a considerable amount of plastic and metal going into landfill and in the environmentally harmful release of HFA propellants. Effective national-level recycling (rather than safe disposal) schemes are needed. Patients and clinicians should encourage and advocate for inhaler recycling. Increased utilisation of reusable inhalers, such as Respimat, or inhaler components presents a further opportunity for decreasing the environmental impact of inhaled medications. For the longer term, low GWP propellants for pMDIs are in development and these will hopefully reduce the environmental impact of treatment while meeting the needs of patients who need or prefer to use these devices.

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Top Tips: Making the case for greener respiratory healthcare and influencing upwards

Daryl Freeman *PCRS Executive Committee Member* and
Noel Baxter *PCRS Member*

Introduction

As of April 2021, regional health and care needs in England will be coordinated through Integrated Care Systems (ICSs) (https://www.england.nhs.uk/integratedcare/what-is-integrated-care/). ICSs will bring together expertise and insights from the NHS and local councils as well as voluntary and community organisations and social enterprises. The aim of this integrated approach is to meet the health and care needs across an area by coordinating services aimed at improving health and reducing inequalities.

In Scotland, regional NHS Boards are responsible for the delivery of front line healthcare services and for the protection and improvement of population health (https://www.scot.nhs.uk/organisations/). In Wales, these responsibilities lie with regional Health Boards (https://gov.wales/ sites/default/files/publications/2019-09/nhs-wales-planning-framework-2020-to-2023.pdf) and in Northern Ireland with Local Commissioning Groups (http://www.hscboard.hscni.net/local-commissioning-group/).

Decisions takenby these organisations will directly affect the environmental impact of local health and care services and will be an important medium by which the environmental burden of respiratory healthcare can be reduced. In this article we bring together our top tips to help you get started with influencing local policy to raise awareness of and drive greener respiratory healthcare initiatives and to ensure that the environment is at the heart of all health and social care decision making in your local area.

Tip 1: Know your local influencers

A good place to start is with the lead for respiratory healthcare in your area and by making yourself known to them. Get to know their priorities and whether greener respiratory healthcare is high on their agenda. If greener respiratory healthcare is not something on which they currently focus, this is a great place to start to make the case for the environment to be at the heart of local decision making.

Know the members of the organisation responsible for setting healthcare priorities in your area. In England this will be an ICS, in Scotland the regional NHS Board, in Wales the regional Health Board and in Northern Ireland the Local Commissioning Group.

Tip 2: Decide on your own priorities

Decide on your priorities for greener respiratory healthcare in your local area. Speak to colleagues, especially those with prior experience of local-level influencing, to help with ideas for initiatives and what might be achievable in your area. You don't need to start with a grand plan; small step changes can be just as effective and can start a movement towards placing greener decision making at the heart of all CCG-level decisions. An example of an initiative you might choose would be to ensure that low carbon alternative inhalers are available on your local formulary list.

Useful resource:

- The PCRS White Paper on Greener Respiratory Healthcare is a great place to start and has lots of ideas for small and more ambitious initiatives to improve the environmental impact of respiratory healthcare.

Tip 3: Align with the NHS long-term plan

Design your priorities to align with the long-term plan for respiratory healthcare. For example, you might decide that improving respiratory diagnosis is a key priority. Ensuring patients have the right diagnosis and receive the right treatment is already greener respiratory healthcare as it reduces wasted medications. You might decide to campaign for a local diagnosis and management hub staffed by appropriately trained clinicians. Such a hub could reduce travel of patients to different clinics for different tests and consultations, avoid duplication of services and improve outcomes for patients.

Useful resource:

- The PCRS Respiratory Service Framework provides a wealth of information about what a high quality respiratory service should look like including ensuring early, accurate and complete diagnosis of respiratory conditions.

Tip 4: Gather your evidence

Gather evidence on how your proposal/s will improve the environmental impact of respiratory healthcare in your area. For example, if your goal is to move local inhaler use towards low carbon alternatives, speak with your local medicines optimisation team and ask whether they have local data about what devices are currently being used.

Useful resource:

- The PCRS White Paper on Greener Respiratory Healthcare includes information on the carbon footprint of the NHS in England and target areas for reducing environmental impact.
- The Centre for Sustainable Healthcare provides guidance on how commissioning groups can reduce the NHS carbon footprint.

Tip 5: Inform and educate

Support the organisation responsible for setting healthcare priorities in your area by giving them the clear information they need to support greener decision making. Make your case clearly and concisely – what it will cost, will there be immediate cost savings, will there be long-term cost savings, what the wider benefits to the local community will be.

Tip 6: Know the local system

Know the planning cycle of the organisation responsible for setting local healthcare priorities including when they are agreeing priorities, setting commissioning intentions and tendering.

Tip 7: Speak out

Attend the public meetings of the organisation responsible for setting local healthcare priorities and make sure you know when and how to table questions. There may be an open question session, but often questions must be submitted ahead of the meeting.

Tip 8: Start small but be ambitious

Start small but have a plan. Once your first objective is achieved, build on the progress and relationships you've made to move forward with your next priority. Be ambitious and keep pushing for more.

Date of Preparation: May 2021

PCRS Peer Support Programme

Bringing healthcare professionals together

PEER SUPPORT NETWORKS
PART OF THE PCRS LIFE LONG LEARNING PROGRAMME

Whether you are a practice nurse or locality lead, being responsible for improving respiratory care for patients can be both daunting and frustrating, especially when you're juggling workloads and trying to keep up-to-date with the latest developments.

A local network is the ideal way to bring colleagues together in your area providing a forum to keep up to date, share best practice with local colleagues and benefit from peer support.

There are around 50 local peer support networks that are affiliated to PCRS – Find your nearest network at https://bit.ly/3zz8wvZ.

If you participate in a local network that is not affiliated to us – contact us now at info@pcrs-uk.org for information on how your group can affiliate so that you can access the benefits below.

If you don't have a local network close to you, why not consider setting one up? Coordinating a peer support network is incredibly rewarding and can be a lot of fun! Running a group can also help to grow leadership skills – great if you are seeking to develop your professional portfolio. We know that running a network can seem daunting but with our support, and recent advances in technology it is easier than you think – if you affiliate your group to PCRS we can support you all the way and we can provide:-

- Free membership for group/network leader
- Access our speaker and video bank for presentations for your group/network
- Lead your group with confidence with our supportive free training programme for group/ network leaders
- Access our resources to support you to manage your network
- Promote your group/ network's events on the PCRS website and in mailings to local PCRS members
- Access other affiliated group/ network leaders to share information, tips and advice with our dedicated WhatsApp group and through our exclusive group/network leader events

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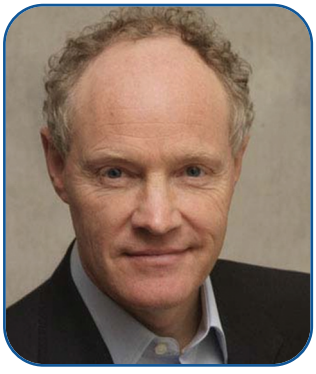
PCRS is grateful to HSF and Simpson Millar for the provision of grants to support the activities of the Peer Support Network programme. The programme has been solely organised by PCRS.

Frailty and respiratory disease in primary care

Duncan Keeley, *GP Oxon* and **Kevin Gruffydd-Jones,** *GP Wiltshire,* on behalf of the PCRS Policy Group



Frailty is a health state in which a person's body systems gradually lose their in-built reserves. An individual can be considered to be frail if they exhibit three of more of the five frailty markers: slow walking speed; impaired grip strength; declining physical activity levels; exhaustion; unintended weight loss. Frailty is thought to affect around 10% of those over 65 years of age and up to half of those aged >85 years. Primary care practitioners should seek to identify and provide proactive support to older people living with frailty in the community. An extended consultation should be considered that should ideally include the patient's usual carer to enable a comprehensive review and confirmation of current diagnoses, review of all medications giving consideration to the goals of treatment, likely benefits and likely side effects. Appropriateness of self-administered medication should be considered if dexterity or cognitive issues are present. Patients should have a clear, concise management plan that is available to and understood by all those providing care. Exercise, including pulmonary rehabilitation, should be encouraged where appropriate.

Background

Frailty is a health state in which a person's body systems gradually lose their in-built reserves.[1] An individual can be considered to be frail if they exhibit three of more of the five frailty markers:[2]

- Slow walking speed
- Impaired grip strength
- Declining physical activity levels
- Exhaustion
- Unintended weight loss.

Around 10% of those over 65 years of age – a chronological cut-off often used to define the transition from middle aged to elderly – are thought to be living with frailty, a figure that rises to up to half of those aged >85 years.[3] The frail elderly patient is more likely to be poorly nourished, have reduced mobility, be receiving multiple medications, be depressed, have impaired cognition and be functionally dependent on others to meet their daily physical needs.

Frailty impairs an individual's ability to cope with apparently minor health-related events. As a result, minor illness in frail elderly patients may progress into serious threats to their overall health and wellbeing. These vulnerabilities extend to the medications they take. Frail elderly patients are more susceptible to the side effects of medicines. People with respiratory conditions who are frail are at increased risk of exacerbations of their condition and frailty contributes to the increased risk associated with COVID-19 infection among those with chronic obstructive pulmonary disease.[4]

Caring for the frail elderly patient

While a proportion of frail elderly patients will receive care on a specialist Frailty Unit or a Geriatric Medicine Ward, many will be cared for in the community setting, either in nursing homes or perhaps even in their own home. The ongoing respiratory health care of these patients therefore comes under the purview of their primary care team and specifically their primary care physician (PCP).

Evaluating frailty in the elderly patient

Not all elderly patients are frail. However, for

those that are a holistic approach is necessary to understand the full range of their medical needs and ensure all treatments and interventions remain harmonised so patients remain symptomatically controlled with the best quality of life that can be achieved for them.

Repeated falls and incontinence are red flags for the possibility of frailty in elderly patients as are delirium or dementia and prolonged immobility. Under the NHS Long Term Plan patients with frailty presenting in the emergency room must be identified within 30 minutes of arrival so that the frailty team can be alerted. However, in the community setting, frailty may remain unrecognised until a medical event or even crisis occurs and intervention from the PCP is required.

Consider frailty among elderly patients with respiratory disease, especially those with multiple chronic physical and mental health problems and those with poor compliance with respiratory medication. When frailty is suspected it should be evaluated as it will impact on all subsequent clinical decision making and the involvement of or referral to other medical specialties. This may require an extended consultation and should ideally include the patients usual carer. The NICE Guideline NG65 (Multimorbidity: clinical assessment and management)[5] recommends the following for the assessment of frailty in the community setting:

- An informal assessment of gait speed (for example, time taken to answer the door, time taken to walk from the waiting room)

- Self-reported health status (this is, 'how would you rate your health status on a scale from 0 to 100?', with scores of 6 or less indicating frailty
- A formal assessment of gait speed, with more than 5 seconds to walk 4 metres indicating frailty
- The PRISMA-7 questionnaire, with scores of 3 and above indicating frailty.

Frailty in the elderly is often accompanied by loneliness, social isolation, depression and poverty. Social security benefits for which the patient is eligible may not have been claimed. Enlist the support of family members, social services and local charities such as Age Concern in seeking to address these problems.

Consider social prescribing and referral to a local link worker.

Home visits, which have become much less frequent during the COVID-19 pandemic, are particularly valuable in assessing the problems of the frail elderly.

Respiratory care for the frail elderly patient

When caring for the frail elderly patient with respiratory issues it is essential that we do everything necessary to optimise the care of all their medical needs, not just their respiratory issues. We also need to bear in mind the possibility of patient harm through overdiagnosis and overtreatment. Patients with multiple comorbid conditions are more at risk of non-adherence to prescribed treatments and more at risk of drug interactions if they do take all their prescribed medicines. So how do we approach a holistic evaluation of the frail elderly patient presenting with respiratory issues?

1. Review the full clinical picture.
    a. Start by conducting a comprehensive review that considers the patient as a whole, beyond the specific condition that has prompted their presentation. Take into account both physical and psychosocial aspects – especially the presence or absence of family or community support. Review the list of medications and whether or not they are being used.
    b. Determine, following a review, which condition(s) or complaint(s) are the primary concern for management. Be sure to take into consideration the patient's priorities or, if they are unable to communicate those, the wishes they may have expressed to their family members.
2. Confirm the respiratory diagnosis/diagnoses
    a. Older patients with an asthma diagnosis may actually have, or have developed, chronic obstructive pulmonary disease (COPD). Confirming the diagnosis is, of course, critical in ensuring the patient receives the appropriate

medication and, conversely, does not receive medications that are unlikely to improve their condition.

b. Confirming a diagnosis of asthma with or without COPD may be more challenging in the frail elderly patient who is unable to undergo spirometry or even undertake a peak flow effectively. If there are no sufficiently recent test results to support a differential diagnosis then the clinical picture and clinical judgement should be used. For example, asthma is not associated with recurrent or persistent purulent sputum – if this is present, the patient may have bronchiectasis. If the patient has needed repeated course of antibiotic for respiratory infections then a suspicion for COPD may be raised.

c. Looking beyond the respiratory system for causes of respiratory symptoms may also be informative. Dyspnoea may be cardiac in origin. Dysfunctional breathing (breathing pattern disorder) – usually related to anxiety – can be an important contributor to respiratory symptoms, can lead to overestimation of the severity of asthma and consequent overtreatment.

3. **Review medication and stop what you can – eliminate medications that are unnecessary. The potential for harm from medication is higher in patients with multimorbidity, especially in frail elderly patients who may be particularly susceptible to side effects.**

   a. A core part of the NICE Guidelines NG65 (Multimorbidity: clinical assessment and management)[5] is to rationalise treatment in frail patients and consider medication concordance. Reducing treatment burden may include:

      i. Stopping treatment of limited benefit

      ii. Reducing the dose of considering alternatives for treatments with a higher risk of adverse events

      iii. Considering non-pharmacological treatments as possible alternatives to some medications

   b. It is important to consider the indication and expected benefit from each medication prescribed. For example, does a frail, elderly and largely immobile patient who is not breathless need regular bronchodilation which in the case of an anticholinergic may also be causing side effects such as dry mouth and constipation? An even more difficult question is whether to continue with treatments that are aimed at providing a prognostic benefit for patients with frailty and limited life expectancy. An example of this might be statin therapy. On this topic the wishes of the patient either directly expressed or expressed through their family members should be sought and considered.

   c. A particular challenge for frail elderly patients with COPD is to identify those who have been started on an inhaler containing high-dose inhaled corticosteroids (ICS) and who may be safely weaned off this component of their treatment. Patients with a history of asthma with documented significant reversibility of airways obstruction and intermittent or continuing eosinophilia on blood counts are those most likely to derive benefit from ICS. However, many patients with COPD on high-dose ICS do not even meet the earlier guideline criteria for starting these agents, and guidelines are evolving towards using them less and relying more on long-acting bronchodilators alone or in combination. High-dose ICS have the disadvantage of increasing pneumonia risk and may have other adverse effects.

      i. Begin by reviewing the individual's criteria for ICS therapy as part of their COPD treatment regimen against the latest clinical guidelines.[6]

      ii. For patients not meeting the criteria for ICS therapy undertake a monitored step down of ICS therapy.[7]

   d. For inhaled medications consider the suitability of the inhaler device in terms of dexterity issues if the patient is self-administering. Inspiratory capacity should also be considered when selecting a device or evaluating whether a current device is appropriate.

e. Cognitive issues may also impact on the ability of the patient to adhere to their prescribed regimen as well as to successfully use their inhaler device. Ensure a written management plan is available and that anyone caring for the individual is aware of the plan and how to correctly deliver any inhaled medications.

Medication rationalisation is a complex and challenging area, but NICE has produced a useful discussion document summarising the evidence on this topic to accompany its guideline on multimorbidity.[8] Another useful and practical resource is the Canadian website https://www.deprescribing.org, developed by Dr Barbara Farrell and Dr Cara Tannenbaum. This site provides tools to help patients and providers participate in deprescribing, information about ongoing and completed deprescribing initiatives and research projects in Canada, and links to people around the world who are interested in deprescribing.

4. Consider pulmonary rehabilitation (PR) for the frail elderly patient. A study conducted in 2016 found that among patients aged 70 years and over referred for PR, 1 in 4 met criteria for frailty.[9] The study found that compliance was a challenge for frail patients compared with non-frail patients, largely due to COPD exacerbations and hospital admission, those who did engage fully with their prescribed PR fared better in terms of overall health status and exercise tolerance than the overall study cohort. So frailty in itself is not a reason to rule out PR. Always encourage simple home exercise programs appropriate for the level of disability – age and frailty should be no bar to trying to maintain and improve strength and fitness.

PCRS position

- Primary care practitioners should seek to identify and provide proactive support to older people living with frailty in the community
- Conduct a comprehensive review that includes confirmation of the diagnosis/diagnoses of the patient to identify comorbid conditions as well as establish patient's priorities for their care. Ideally include the patient's usually carer in this process. Assess and seek to optimise nutrition and social support.
- Review all the respiratory medications the patient is currently taking giving consideration to the goals of treatment, likely benefits and likely side effects. In particular:
  - Consider whether regular bronchodilation is necessary and appropriate for the frail patient without breathlessness who is largely immobile
  - Re-evaluate the clinical indication for high-dose ICS and consider a dose reduction or cessation if appropriate
  - Consider any dexterity or cognitive issues for patients self-administering their medication and inspiratory capacity
  - Ensure a clear, concise management plan is in place and that anyone caring for the individual is aware of the plan and is able to administer any inhaled medications correctly
- Consideration should be given to the potential for pulmonary rehabilitation given that this intervention has been shown to improve lung function and reduce frailty. Always encourage exercise.

Conclusion

The primary care clinician is critical in providing continuity of care based on a knowledge and understanding of the whole person for the frail elderly patient receiving care in the community and to coordinate care from multiple services. As part of this, re-evaluating and rationalising care directed towards respiratory conditions and symptoms has the potential to reduce the overall burden of care and ensure patients receive the package of care that is most appropriate and beneficial for them.

Patients with COPD and co-existing frailty should be identified as high risk with regard to COVID-19 infection and a proactive review of their condition carried out.

Acknowledgements

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Date of Preparation: May 2021

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Pulmonary Fibrosis Trust

ABOUT THE PULMONARY FIBROSIS TRUST

The Pulmonary Fibrosis Trust exists to provide personal support to all those affected by Pulmonary Fibrosis (PF) or Idiopathic Pulmonary Fibrosis (IPF).

Our aim is to help patients with PF or IPF live their lives to the full and ensure they can live as independently, and as comfortably, as possible. We can provide patients with the help they need quickly and with minimal fuss.

The support we provide

The PFTrust offers the following services to sufferers of Pulmonary Fibrosis:

- An emotional support service (no medical advice can be given) for patients and their carers/families
- Installation of stairlifts (in the event they are not available via the local health authority/Occupational Therapy.)
- Provision of mobility scooters
- Arrangement of portable oxygen concentrators for holidays
- Payment of transport fees to hospitals and specialist centres
- Caravan holidays
- Other ad-hoc services

In addition, the PFTrust works hard to raise awareness of Pulmonary Fibrosis, in particular the challenges people face on a daily basis, and also provides grants towards research projects.

PLEASE DO PASS ON OUR INFORMATION TO YOUR PULMONARY FIBROSIS PATIENTS WE CAN SUPPORT THEM

We couldn't do it without you!

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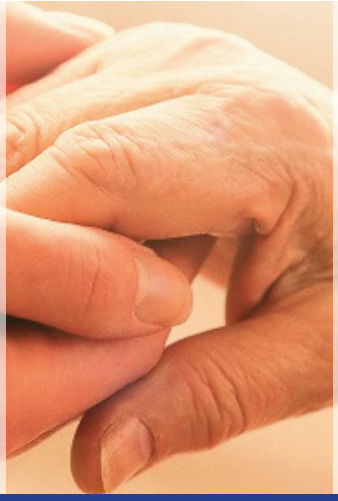

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Conference programme

Date/Time		Session	Speaker/chair
Friday 24th	0900-1000	**What's Getting in the Way of Respiratory Health** *Online Stream 1*	Carol Stonham (Facilitator) Llinos Jones (Panellist) Maisun Elftise (Panellist) Ian Sinha (Panellist) Rosamund Adoo-Kissi-Debrah (Panellist)
	1005-1050	**Acute presentation of respiratory symptoms in adults** *Online Stream 1*	Jon Bennett (Speaker) Ren Lawlor (Speaker) Claire Ellis (Chair)
	1005-1050	**Evolve from electronics -moving to blended consultation styles** *Online Stream 2*	Thushyanthi Kailayanathan (Facilitator) Matthew Inada-Kim (Panellist) Rupa Joshi (Panellist) Rachel Binks (Panellist)
	1005-1050	**Honey and syrup - managing cough in primary care** *Online Stream 3*	Adam Hill (Speaker) Kevin Gruffydd-Jones (Chair)
	1120-1205	**Bronchiectasis - the latest guidance and advice on diagnosis and management** *Online Stream 1*	James Chalmers (Speaker) Barbara Preston (Speaker) Fiona Mosgrove (Chair)
	1120-1205	**Setting up and evaluating a local diagnostics hub for a breathlesssness service** *Online Stream 2*	Rachael Evans (Speaker) Rachel Pring (Chair)
	1120-1205	**COVID- The epilogue – Recovering from the pandemic: managing the long term effects of COVID-19** *Online Stream 3*	Steve Holmes (Speaker) Sarah Elkin (Chair)
	1210-1255	**Sponsored Satellite Symposium** *Online Stream 1*	To Be Confirmed (Speaker)
	1400-1445	**Sponsored Satellite Symposium** *Online Stream 1*	To Be Confirmed (Speaker)
	1450-1535	**Stop, check Go - asthma diagnosis in children** *Online Stream 1*	Viv Marsh (Speaker) Iain Small (Chair)
	1450-1535	**Turning over the page of guidelines - surgical options, risk stratification and referral** *Online Stream 2*	Nick Hopkinson (Speaker) Sanjeev Rana (Chair)
	1450-1535	**What's the latest on rescue packs? Do they rescue our patients?** *Online Stream 3*	John Hurst (Speaker) Nicola Wood (Chair)
	1605-1650	**How to spot interstitial lung disease - and what to do when you suspect ILD** *Online Stream 1*	Stephen Gaduzo (Speaker) Darush Attar-Zadeh (Chair)
	1605-1650	**Movement and activity as a prescription for health** *Online Stream 2*	Sam Pilsworth (Speaker) Deborah Leese (Chair)
	1605-1650	**The sleeping HGV driver - everything you didn't know about sleep apnoea and how to manage it** *Online Stream 3*	Tahmina Siddiqui (Speaker) Rob Daw (Chair)
	1655-1740	**Sponsored Satellite Symposium** *Online Stream 1*	To Be Confirmed (Speaker)
	1740-1820	**Tiny Habits** *Online Stream 1*	Katherine Hickman (Speaker)
Saturday 25th	0850-0935	**What's happened to lung cancer since COVID? How to spot that one patient per year with lung cancer** *Online Stream 1*	David Baldwin (Speaker) Robert Stuart Shields (Chair)
	0850-0935	**Conducting virtual respiratory reviews in primary care and community - top tips for multi-professionals** *Online Stream 2*	Dominika Froehlich-Jeziorek (Speaker) Katherine Hickman (Chair)
	0850-0935	**What is disordered breathing and how do you deal with it?** *Online Stream 3*	Gillian Austin (Speaker) Clare Cook (Chair)
	0940-1025	**Sponsored Satellite Symposium** *Online Stream 1*	To Be Confirmed (Speaker)
	1115-1200	**What progress have we made in greener healthcare - what do we still need to do?** *Online Stream 1*	Alex Wilkinson (Panellist) Aarti Bansal (Panellist) Carol Stonham (Panellist)
	1115-1200	**What's new in research? Including 2021 winning abstract presentation** *Online Stream 2*	Jane Watson (Speaker)
	1115-1200	**End stage management of COPD/ILD - Best practice tips and guidance** *Online Stream 1*	Jill Nichols (Speaker) Maisun Elftise (Chair)
	1205-1305	**Grand Rounds - Transitional care - paediatrics to teenagers and adults** *Online Stream 1*	Rebecca Thursfield (Speaker) Daryl Freeman (Chair)

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Getting the Basics Right

Pulse oximetry: not an infallible test – use clinical judgement!

Whilst pulse oximetry is a simple non-invasive monitoring system and has been described as the greatest advance in monitoring since the invention of the electrocardiogram,[1] it is not to be used in isolation. Rather, it should be used to support a comprehensive patient assessment and physical examination and aid the decision making process.

Pulse oximetry can rapidly detect changes in oxygen (O_2) saturation, enabling clinicians to identify problems before the patient is compromised.

The measurement of O_2 saturation is endorsed in numerous guidelines to aid the assessment process and, therefore, pulse oximeters should be widely available in primary care. Indeed, increasingly, people with chronic lung disease are purchasing their own pulse oximeters.[2]

Purchasing a pulse oximeter

Pulse oximeters are available, highly portable and increasingly less costly to purchase. In purchasing equipment, it is worth considering what factors are important. Within primary care – especially when carried in diagnostic bags – the equipment needs to be:

- Reliable
- Reproducible
- Safe
- Accurate
- Robust
- Portable
- Cost effective
- Simple to use

How does pulse oximetry work?

The pulse oximeter calculates the amount of light of two separate wavelengths absorbed from a source in the probe when put onto a finger or toe. This reflects the red colour of arterial blood, thus producing an estimate of O_2 saturation/desaturation in the body. This is referred to as % SpO_2.

The pulse oximeter is designed to pick up arterial pulsed flow rather than venous flow in its estimations, and needs an arterial pulse to do this. An SpO_2 greater than 95% is considered normal. Indeed, O_2 saturations in the normal healthy individual are often more than 98%. In an acute situation when O_2 saturations are decreased below 92%, O_2 is given to maintain the level at 94–98%, and one should consider hospital admission. If a healthy individual during an acute episode has saturations of 93–94%, this may – depending on the total clinical picture – warrant hospital admission or earlier clinical review.[3]

A reduction of normal O_2 saturations on exertion (1 minute sit to stand test or 40 step test) of 3% is also considered highly significant in those with acute respiratory. infections including COVID-19.[4]

Use and training

Like any equipment, it is important that clinicians using a pulse oximeter are able to use the equipment correctly, know when to use the equipment and know its limitations and how to interpret test results. It is also important to check that you know when the results are reliable.

Most available pulse oximeters are accurate between O_2 saturations of 70% and 100% with a range of ±2%. Pulse oximeters are calibrated during manufacture and most have an internal check system to ensure that calibration remains valid, hence they do not need recalibration.

Limitations

There are many factors that can affect the readings displayed. It is essential clinicians are aware of the potential limitations to ensure effective management of the patient. Most errors are the result of factors that affect light transmission, perfusion or pulse detection.

There are several situations where the pulse oximeter readings may not be accurate:

1. **Low perfusion state** which reduces peripheral pulsatile blood flow (e.g. cold digits). This usually results in the machine not providing a reading at all and can arise due to:
   a. Hypotension
   b. Hypovolaemic shock
   c. Cold weather/house
   d. Cardiac failure
2. **Carbon monoxide poisoning**. Carboxyhaemoglobin (haemoglobin combined with carbon monoxide) is bright red in colour therefore the pulse oximeter will overestimate the saturation in this situation and may be falsely reassuring.
3. **Shivering**. The background movement causes problems for pulse oximeters which may be unable to differentiate an adequate signal from arterial pulsation.
4. **Nail varnish or dirt** may cause falsely low readings. If a patient has nail varnish on, this should be removed (or use of alternative digits – e.g. toes) where the varnish is absent.
5. The evidence for change of O_2 saturation in a patient who is **jaundiced**[5] or **anaemic**[6] remains debatable. There is evidence to suggest that dark skin colour may reduce the accuracy of pulse oximetry at low O_2 saturation levels.[7–9]
6. Pulse oximetry in patients with **arrhythmias** needs to be interpreted with some caution. Pulse oximetry relies on a steady pulse signal, therefore conditions such as slow atrial fibrillation will affect the result.[10,11]
7. If patients are being assessed in an area with a **high level of artificial light** this can falsely reduce the readings (e.g. operating theatre fluorescent lighting).[12]
8. This article is written for UK-based practice; however, it should be remembered that **at altitude** O_2 saturations can drop causing altitude sickness (the use of pulse oximetry at high altitude is not within the scope of this article).

Pulse oximetry in the young and the elderly

Pulse oximetry is equally useful in the management of children as it is in adults, and the same ranges are applicable. Many of the "adult" pulse oximeters can be used in children over the age of 2 years. Below the age of 2 years, more specialised oximeters are generally preferred. There are two particular challenges with measuring O_2 saturation in young children. First, they may be difficult to examine and not want to stay still while the oximeter reading is taken. Second, small digits (fingers) are more likely to have poor perfusion (see above) and a reading may not be obtainable.

In older people and those with COPD, the normal O_2 saturation levels may be lower than in younger people.

Uses of pulse oximetry in respiratory disease

This section will look at the use of pulse oximetry in three areas; it is appropriate to refer to recognised national or international guidance for more comprehensive details on the individual conditions.

1. Acute respiratory infection (including community acquired pneumonia and influenza)
2. Asthma
3. Chronic obstructive pulmonary disease (COPD)

Whatever the clinical circumstances, it is essential to record whether the patient was breathing room air or receiving O_2 at the time the O_2 saturation was measured.

Acute respiratory infections (including influenza and community acquired pneumonia [CAP])

The British Thoracic Society guidance on emergency O_2 suggests that pulse oximetry is the "fifth vital sign" along with temperature, pulse, blood pressure and respiratory rate and should be considered for all those presenting with acute breathlessness in primary care.[13,14]

One of the key considerations for hospital admission is an O_2 saturation below 92% in a previously healthy individual, especially if other clinical features that indicate severity are evident. There has been a trend in the UK to use a hospital-based review system to evaluate severity in primary care (NEWS2; Box 1).[15] However, recent data indicate that patients can be seriously ill in primary care even with relatively preserved NEWS2 scores.[15]

There are also some acute respiratory infections during which saturation levels are normal at rest but after relatively small exertion can decline (so-called "silent hypoxia"). Clinicians should be aware that a 3% drop in saturation from resting when exerting (1 minute sit to stand or 40 steps on the flat test) should be considered as a potential indicator of more severe disease and would

suggest likely hospital admission. If emergency O_2 is given, it should aim to achieve 94–98% saturation until further assessment is available within a more specialist setting where arterial blood gases can be measured.[3]

Box 1: Clinical features indicating severity of condition and requirement for consideration of admission to hospital[15]

Pulse oximetry (less than 92% or an exertional drop of 3%)

New onset confusion

Respiratory rate >25/minute

Systolic blood pressure <90 mmHg

Pulse rate (>130/min)

Note: At times clinical history alone may override these findings – for example, myocardial infarction or stroke

Asthma

In addition to the usual assessments considered appropriate in asthma (history, examination, pulse, respiratory rate, peak expiratory flow rate compared with patient's best), it is important to measure O_2 saturation in an acute asthma attack or if an acute episode is suspected. If the O_2 saturation before treatment with bronchodilators is below 92%, the patient should be considered for acute admission to hospital.[16] If emergency O_2 is given, aim to keep SpO_2 levels between 94% and 98% until further assessment is available within a secondary care setting.

COPD

In a routine review, a patient with moderate to severe COPD should be considered for screening pulse oximetry. A figure of 92% or less, especially if repeated on more than one occasion, should trigger referral for more comprehensive O_2 assessment.[17]

It is recognised that some people with hypercapnic respiratory failure will deteriorate if given high-dose O_2. In the acute situation, pulse oximetry should be used to ensure that oxygen saturations are maintained between 88% and 92% if at risk. These patients usually have a history of significant respiratory problems and some will have an alert warning card.[3]

Acute COVID-19 illness

Pulse oximetry has been used in the home setting to detect hypoxia associated with acute COVID-19 illness as part of a virtual ward remote monitoring model.[2,4] UK guidelines recommend that pulse oximetry should form part of the assessment and monitoring of acutely unwell or high-risk patients with suspected COVID-19.[18,19] Reduced O_2 saturation alongside a worsening clinical picture should prompt further clinical assessment and consideration of transfer to hospital.[4]

Conclusions

Pulse oximetry is a useful non-invasive investigation that is easily performed and is reproducible in primary care. Research findings in other settings may be applicable in primary care. The evidence for benefit is clear, and it is difficult to justify failure to use pulse oximetry with the current evidence-based guidelines in influenza, community acquired pneumonia, asthma and COPD.

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Date of Preparation: May 2021

SERVICE DEVELOPMENT

The PCRS Respiratory Service Framework Interactive Tool

Daryl Freeman, *PCRS Service Development Lead*

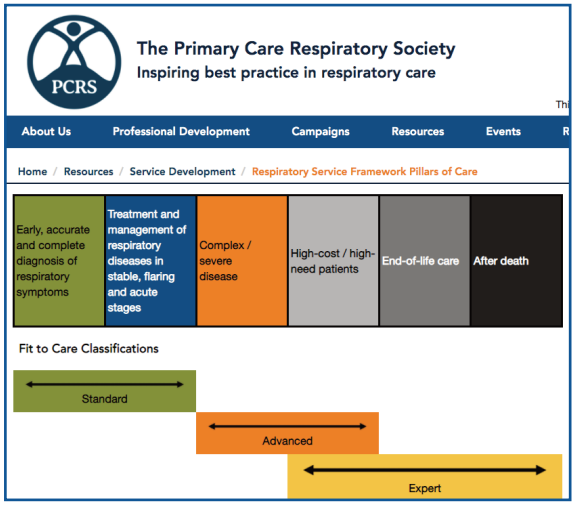
Patients with respiratory disease deserve equal access to early and accurate diagnosis, high standards of care, delivered by practitioners with suitable training and experience. Barriers to such a standardised level of service design, however, may include knowhow, resources and expertise. That's why the Primary Care Respiratory Society (PCRS) has put together a pragmatic, easy to use Quality Improvement Tool to help commissioners, providers and healthcare professionals overcome these challenges, to reduce variation in care and help to practically demonstrate what excellence is. COVID-19 has added many layers of complexity to providing good respiratory care and has resulted in many patients receiving virtual reviews – often by telephone. The Respiratory Service Framework (RSF) (https://www.pcrs-uk.org/resource/respiratory-service-framework) aims to provide a user-friendly interactive Quality Improvement Tool which can be used by a variety of professionals involved in delivering and designing care for patients with respiratory disease.

The tool covers eight different areas of respiratory disease

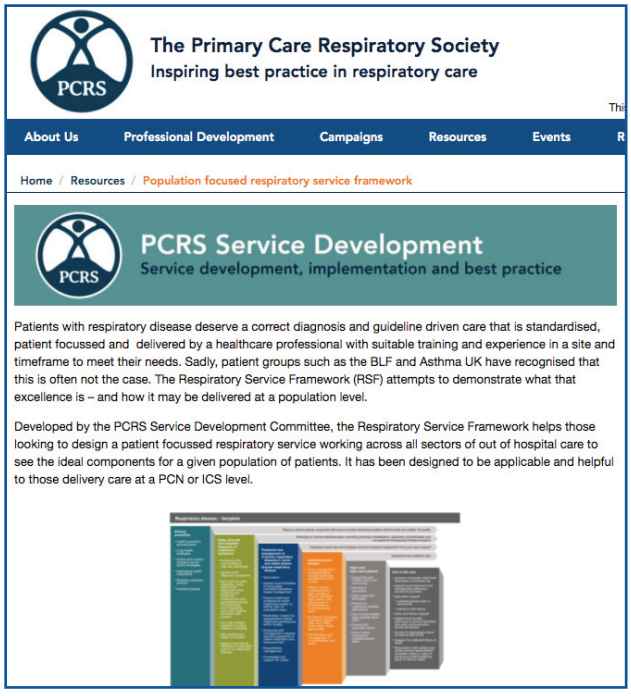
- General Respiratory
- Asthma in Adults
- Asthma in Children and Young Adults
- Treating Tobacco Dependency
- Interstitial Lung Disease
- COPD
- Lung Cancer
- Respiratory Infections

Each disease area is divided into "pillars" (https://www.pcrs-uk.org/respiratory-service-framework-pillars-care) covering care from primary prevention through to primary care, complex patients and end-of-life care, with resources applicable to each pillar and each disease.

The tool is interactive and searchable, allowing healthcare professionals to search easily for priorities. The resources are categorised by article, video, blog, etc and have a small clock face next to them, allowing healthcare professionals to choose a resource fitting with the time they have available – from a half day looking at service re-design to a coffee break listening to a blog.



There is a huge variety of resources ranging from clinical, research papers, descriptions of respiratory services to short videos or blogs. In total, there are over 250 resources, allowing everyone



involved in designing or delivering respiratory care to find a document which is not only of benefit but interesting and inspiring.

To gain the most benefit from the six disease areas, the interactive resource allows professionals to search on:

- Disease area
- Pillar (ie, primary prevention, complex and severe disease)
- Skill level (based on the Fit to Care document)
- Key – a document, infographic, blog, etc.

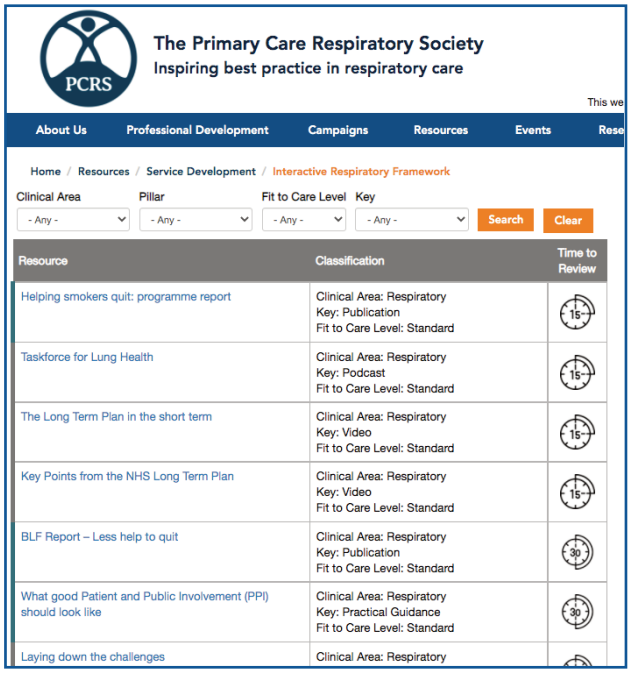
This allows a wide range of professionals involved in the care of patients with respiratory disease to identify resources which will aid in service re-design and delivery.

Additionally, there is an HR section to the RSF tool. This consists of several sections:

- A workforce calculation tool (https://www.pcrs-uk.org/workforce-calculation): this allows managers and commissioners to identify how many healthcare professionals they will require to deliver a high-quality respiratory service. The tool can be adapted to fit with a patient population from 10,000 to 50,000 patients. The tool will inform managers about the number of (Full Time Equivalents) staff from Standard, Expert, Advanced professionals in addition to healthcare assistants. The workforce tool is not only aligned to the PCRS Fit to Care document, but also linked to the RSF pillars; as care becomes more complex, a higher level of training is required. This also allows those professionals delivering respiratory care to identify gaps in provision and enable them to be a voice in improving service design and delivery.
- A skills audit (https://www.pcrs-uk.org/supporting-service-redesign-and-delivery); this is a resource which can be downloaded directly from the website and disseminated to a given workforce. The skills audit is easy to administer (a short questionnaire which takes around 5 minutes to complete) and allows service delivery teams to identify potential skills and training needs in their workforce and also to identify pockets of expertise which may be used in future service re-design around networks or hubs. The skills audit is linked to and based on the PCRS Fit to Care document (https://www.pcrs-uk.org/resource/fit-care-0) and interrogates the participants on:
  - What roles they undertake in their practice
  - What training and qualifications they possess
  - Their own self-rated levels of expertise
  - Their level of autonomy and decision-making responsibilities within their practice

Once the skills audit is completed, it can be uploaded into a spreadsheet which visually demonstrates training needs and skills gaps; this allows managers and service re-design personnel additional resources including job description templates which are easily edited within Word and provide job descriptions for Standard, Advanced & Expert (based on the Fit to Care document) healthcare professionals.

The entire tool is designed to help healthcare professionals



deliver excellent care to patients with respiratory disease and to help managers, commissioners and Integrated Care Systems to focus on respiratory care and provide care to patients with respiratory disease, which will be future proofed for the challenges which lie ahead following the "re-start" of services after the COVID pandemic.

Date of Preparation: May 2021

Top priorities for respiratory-focused primary healthcare service provision in the COVID era

The necessary restrictions imposed by the COVID-19 pandemic have created a backlog of patients in primary care who have perhaps delayed coming forward with respiratory health concerns, whose respiratory condition has worsened during lockdown and those whose assessment or treatment has been delayed. As we emerge from this seismic shift in primary healthcare provision, there is an urgent need to work through this backlog of patients. In this article we bring together our top priorities to help service managers support healthcare practitioners (HCPs) providing respiratory healthcare to prioritise their time and efforts to ensure that patients are evaluated, diagnosed and, where necessary, started on treatment to manage their respiratory disease.

Encourage HCPs to focus on identifying patients with asthma or COPD most at risk for exacerbation

This will help to initially focus care provision on the sickest or most in need patients and prioritise them for a face-to-face appointment. Practice-level IT systems and IT leads can be used to identify patients who meet any of the criteria listed in Table 1 for priority review. If you have access to local risk stratification software, consider running it across an Integrated Care System and pooling resources when you have identified your at-risk patients.

Support HCPs to restart spirometry and to focus on accurate diagnosis of respiratory symptoms

The hold on spirometry in the primary care setting has created a backlog of patients awaiting confirmatory evaluation of a provisional diagnosis. As spirometry services can now be restarted in primary care, they should be prioritised to ensure provisional diagnoses are confirmed or ruled out and that patients are receiving the appropriate therapy. HCPs should continue to take a pragmatic approach to the assessment and diagnosis of patients presenting with respiratory symptoms while the COVID-19 virus remains in widespread circulation.

Table 1: Red flags among patients with asthma or COPD

Red flags among patients with asthma	Red flags among patients with COPD
1. Using ≥4 reliever inhalers in the past year	1. Requiring ≥2 courses of oral steroids and/or antibiotics in last year
2. Using <60% prescribed maintenance therapy in the last year	2. Been to the emergency department or out-of-hours care at all in the last year
3. Requiring ≥2 courses of oral steroids in the last year	3. Seen by the ambulance service at all in the last year
4. Eosinophil count >400	4. Admitted to acute hospital care at all in the last year
5. Been to the emergency department or out-of-hours care at all in the last year	5. Current smokers
6. Seen by the ambulance service at all in the last year	6. Medical Research Council (MRC) score ≥4
7. Admitted to acute hospital care at all in the last year	
8. Current smokers	

Additional resources:

- Guidance for the Resumption and Continuation of Urgent and Elective Outpatient Respiratory Services. Available at: https://www.brit-thoracic.org.uk/covid-19/covid-19-resumption-and-continuation-of-respiratory-services/#restarting-spirometry/
- PCRS guidance on Risk Minimization in Spirometry Re-start which includes the Spirometry in Primary Care: Guidance on Reinstating spirometry in England. Available at: https://www.pcrs-uk.org/sites/pcrs-uk.org/files/ReinstatingSpirometry270421.pdf
- Improving the Quality of Diagnostic Spirometry in Adults. Available at: https://respiratoryacademy.co.uk/resources/improving-quality-diagnostic-spirometry-adults-2/
- The Diagnostic Work-Up of Patients Presenting with Respiratory Symptoms during the COVID-19 Pandemic. Available at: https://www.pcrs-uk.org/resource/diagnostic-work-patient-presenting-respiratory-symptoms-during-covid-19-pandemic

Encourage and equip HCPs to be vigilant for other potential respiratory diagnoses such as lung cancer

Another casualty of COVID-19 has been the presentation and identification of patients with potential lung cancer. There is increasing evidence from secondary care that patients with lung cancer are presenting as emergencies and, moreover, presenting with more advanced disease. Be aware of the common presenting symptoms of lung cancer – cough, shortness of breath and chest pains – and ensure that there are processes in place to review patients with such symptoms that do not resolve after 3 weeks and who do not have a diagnosis of COVID-19. Make sure you know the process for referral for suspected cancer and are able to confidently implement this where appropriate to do so.

Additional resources:

The UK Lung Cancer Coalition provide a series of documents with a range of best practice recommendations on service development and delivery including:

- Early Diagnosis Matters – https://www.uklcc.org.uk/wp-content/uploads/2020/01/UKLCC-ED-Matters-FINAL.pdf
- COVID-19 Matters – https://www.uklcc.org.uk/wp-content/uploads/2020/10/UKLCC-COVID-19-Matters-Report-Oct-2020.pdf
- Access Matters – https://www.uklcc.org.uk/wp-content/uploads/2020/01/UKLCC-Access-Matters-FINAL-1.pdf

Encourage and support the use of group consultations to reach more patients

Another way in which we can tackle the backlog of patients is by adopting Respiratory Group Consultations for patients with the same or similar diagnoses. These consultations can be useful to deliver education and support to groups of patients and to encourage peer support between patients facing the same challenges. While ideally delivered face to face, group consultations can be delivered virtually when national restrictions apply. Sessions typically last 60–90 minutes, with up to 10 patients joining the virtual session at the same time and supported by a trained group consultations facilitator, who remains with the patients for the duration of the session. A clinician (i.e. doctor, nurse, pharmacist) can deliver advice to the group for part of the session as well as 1:1 consultations when required.

Additional resources:

Useful resources for understanding and implementing group consultations can be found at:

- https://www.networks.nhs.uk/nhs-networks/releasing-capacity-in-general-practice/documents/2-4-group-consultations-evidence-summary-elc.

Listen to Dr Rupa Joshi describe how she has set up group virtual consultations in her practice. Available at: https://vimeo.com/462115242/db3b675b5d.

Continue to ensure patients are offered smoking cessation support

People who smoke tobacco have worse outcomes when they acquire respiratory infection and that includes COVID-19.[1] Continue to ensure staff are trained in offering Very Brief Advice and are encouraged to do so at every opportunity. Ensure all staff are aware of local smoking cessation services.

Additional resources:

- Free online training on VBA is available through the National Centre for Smoking Cessation and Training (https://elearning.ncsct.co.uk/vba-stage_1) and through the MedThority website (https://www.medthority.com/very-brief-advice-for-tobacco-dependency-learning-zone/).
- PCRS provides a comprehensive range of tools to support those working in primary care to learn skills to help provide smoking cessation support including case studies demonstrating how smoking cessation support can be incorporated into a regular consultation – see https://www.pcrs-uk.org/resource/tobacco-dependency-pragmatic-guide.

See also the PCRS guide to the Role of E-cigarettes in smoking cessation. Available at: https://www.pcrs-uk.org/sites/pcrs-uk.org/files/pcru/articles/2019-Autumn-Issue-18-RoleofECigs.pdf.

Promote the provision and uptake of pulmonary rehabilitation services

National lockdowns and shielding for patients most at risk for severe COVID-19 disease has likely exacerbated the deconditioning of patients with respiratory disease, a situation exacerbated by the lack of face-to-face pulmonary rehabilitation (PR) and the challenges of delivering such a service remotely. PR is a proven cost-effective intervention for patients with COPD with improvements in both exercise tolerance and quality of life for those who complete such programmes, with benefits lasting up to one year following completion. As such, the provision and uptake of PR should now be prioritised. There is emerging evidence that PR benefits the post COVID-19 patient.[2] Encourage HCPs to consider opportunities to refer suitable patients to local PR services or local exercise programmes commissioned via the Local Authority or on offer by other local groups. Where face-to-face services remain unavailable, ensure HCPs are aware of resources that can be recommended to patients to enable them to self-manage at home using home exercises and educational materials.[3,4]

Additional resources:

See the Primary Care Respiratory Society resources to support the uptake of PR services:

- https://www.pcrs-uk.org/resource/tips-encouraging-activity-gateway-good-respiratory-health
- https://www.pcrs-uk.org/resource/top-tips-communicating-benefits-pulmonary-rehabilitation-patients
- https://www.pcrs-uk.org/resource/business-case-cardiopulmonary-rehabilitation-service

Support HCPs in optimising regular respiratory review consultations

Making the most of every clinical consultation is vital at this time when direct patient contacts are reduced owing to COVID-19. Support HCPs to optimise routine clinical reviews by encouraging a systematic, structured approach that captures the red flags that may indicate poor disease control and risk for exacerbation. Encourage HCPs to review patient records prior to routine reviews to identify any red flags for exacerbation (see Priority One).

Utilise the expertise of your community pharmacy colleagues

The last 18 months has brought up significant changes in the way we work and interact with our patients, allowing many innovations which previously were considered aspirational. Integrating community pharmacy into the respiratory pathways around improving self-management and prevention and optimising some of the newer services such as the Discharge Medicines Service (DMS) for people discharged from hospital, the New Medicines Service and the Structured Medication Review is an opportunity clinicians and their patients simply cannot afford to miss (Pharmaceutical Services Negotiating Committee 2021).[4] Community pharmacies are the most accessible and inclusive part of the healthcare service, both for the supply of medicines and medical advice. During the COVID-19 pandemic, community pharmacies successfully helped to deliver vaccinations and supported the distribution of lateral flow tests, demonstrating their potential lies far beyond dispensing medication. Community pharmacy teams are already involved in the delivery of respiratory-focused services, ranging from inhaler technique reviews and supporting asthma reviews[5,6] to a holistic COPD support service.[7,8] Although the number of commissioned services is low, the outcomes are encouraging.[9]

Get 'Winter Ready' by encouraging vaccination at every opportunity

Now is a great opportunity to plan for Winter 2021 so that the new-found confidence in immunisation can translate into increasing the number of eligible patients receiving the flu vaccine. In the years leading up to the COVID-19 pandemic, vaccination against flu among many at-risk groups struggled to achieve 50%. While the rates of influenza cases in the 2020/2021 season were lower than usual, likely as a result of the national lockdowns, we can, of course, expect our usual winter respiratory viruses to return. Now is a good time to start to prepare for the Winter 2021 flu season, reminding all at-risk patients (and HCPs) of the importance of flu vaccination and preparing for any potential programme of COVID-19 booster vaccinations.

Additional resources:

- See the suite of PCRS *Get Winter Wrapped* resources. Available at: https://www.pcrs-uk.org/resource/winter-wrapped.
- See the PCRS article prepared by Ren Lawlor on flu vaccination including strategies to increase vaccine updated. Available at: https://www.pcrs-uk.org/resource/influenza.

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PCRS-UK News Round-Up

PCRS AND BTS COLLABORATION

PCRS and the British Thoracic Society have formed a new collaboration to drive forward transformative change towards more effective integrated care. A new joint working group has been established, co-chaired by Dr Daryl Freeman and Dr Sarah Sibley, which will pool expertise and resources, share intelligence and identify gaps and areas of need.

Further details on the working group can be found at https://www.pcrs-uk.org/news/pcrs-announces-new-collaboration-british-thoracic-society

ASTHMA RIGHT CARE

ASTHMA RIGHT CARE

Visit the PCRS Asthma Right Care web pages for access to heaps of resources, tools and advice on how you can engage with your patients to reduce over-reliance on SABA and improve asthma care and support. Packed with video webinars, interactive slide rule to demonstrate SABA use, case studies, blogs and much more these pages offer great tips and advice you can implement locally.

Our upcoming webinars focusing on diagnosis and management of asthma will provide some fantastic analogies you can use with your patients to help them understand and engage in their asthma management.

Find out more about the Asthma Right Care programme and download the resources free at https://www.pcrs-uk.org/resource/arc

GREENER KINDER RESPIRATORY HEALTHCARE

THE GREENER RESPIRATORY PATHWAY
A PCRS Initiative

The PCRS interactive patient pathway provides resources, tools and tips for you to explore how you can provide the kindest respiratory healthcare for your patients and the planet.

Vist the pathway now to access these tools https://www.pcrs-uk.org/greener-respiratory-pathway

NEW MEMBER OF PCRS PATIENT REFERENCE GROUP

PCRS welcomes **Benedict Greenwood** to the Patient Reference Group. An asthmatic all his life Ben has not let his asthma get in the way of his health and fitness and he is a keen marathon runner. Ben is about to embark on a PhD in mental health at University College London and he also works as a freelance medical writer. Ben hopes that through his participation in the group he will be able to help healthcare professionals to understand the impact of high quality, person-focused respiratory care

ALL CHANGE AT PCRS COMMITTEES

Earlier this year PCRS held elections for available posts on its standing committees. We were delighted to welcome new committee member Fiona Mosgrove to the education committee, Irene Valero-Sanchez to the service development committee, Vince Mak, Clare Cook and Nicola Wood to the policy forum, Maisun Elftise, Oonagh Potts and Siobhan Hollier to the respiratory leaders programme board and Nicola Wood and Dominika Froehlich-Jeziorek to the PCRS Executive.

PCRS also welcomed Jane Watson as the new PCRS Research Lead (https://www.pcrs-uk.org/committee-member/25656/JaneWatson). We're also grateful to Executive Chair, Carol Stonham, for stepping in as policy lead following the resignation of Dr Noel Baxter who has now taken up the role of joint chief executive of the IPCRG with Siân Williams. PCRS wishes to convey its thanks to Dr Helen Ashdown who stepped down as research lead last year and also offer its congratulations to Noel and grateful thanks for all his hard work over the years in PCRS respiratory leaders, the PCRS Executive and more recently, as PCRS policy lead

For more information on the PCRS committees do visit the website (About Us) where you can find committee member information, biographies and terms of reference. We are so grateful to all PCRS committee members for their continued support, enthusiasm and hard work in helping us to deliver our charitable objectives.

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Unravelling the risk factors associated with under- and over-diagnosis of COPD

Angela Wixey *Respiratory Nurse Specialist*

Introduction

Chronic obstructive pulmonary disease (COPD) is a major cause of mortality and morbidity.[1] The Global Initiative for Chronic Obstructive Lung Disease (GOLD)[2] defines COPD as "a common, preventable and treatable disease that is characterised by persistent respiratory symptoms and airflow limitation that is due to abnormalities usually caused by significant exposure to noxious particles or gases".

The Clinical Commissioning Group (CCG) commissioned a county-wide spirometry service with the aim to support GP practices to identify, diagnose and initiate the management of new patients (without pre-existing respiratory disease) with COPD. The service was operated by a Respiratory Nurse Specialist (RNS) credited by the Association of Respiratory Technology and Physiology (ARTP) in spirometry who examined 375 patients in five practices across the county over 9 months.

A pivotal point very early in the project was the high numbers of patients being referred into the service with an existing respiratory diagnosis (asthma or COPD). Although this was originally outside the project remit, it highlighted historic 'missed, under- or over-diagnoses' of COPD (and asthma), which reflected the national picture described by Diab *et al* in 2018,[3] and thereafter underpinned the additional direction the project took to accept all referrals into the service (with or without existing respiratory disease).

The service embraced the opportunity to set about identifying the multifactorial reasons for under- and over-diagnosis of COPD with the determination to find ways to improve the accuracy of COPD diagnosis in the locality. The process would include, where available, vigilant examination of each individual patient's historic medical notes and previous spirometry then, during the face-to-face consultation, establish a comprehensive respiratory history alongside current signs and symptoms together with accurate quality-assured diagnostic spirometry (in all cases reversibility testing was performed) to either confirm, amend the existing diagnosis or establish a new diagnosis of COPD or asthma or other respiratory disease.

Data collection

Those with an existing diagnosis (COPD, asthma)

Scrutinisation of historic spirometry, medical notes and history were cross-referenced with new spirometry, current signs and symptoms, and medical, respiratory and occupational history and exposure to noxious substances. Thereafter, an accurate diagnosis was created or factors identified that may have influenced missed or over-diagnosis of COPD. Allowance was given for any disease progression in those with a pre-existing respiratory diagnosis.

Those with no existing diagnosis (new diagnosis of asthma or COPD)

Although this cohort comprised new patients with no pre-existing diagnosis, a number had performed spirometry previously. Scrutinisation of historic spirometry, medical notes and history were then cross-referenced with new spirometry, current signs and symptoms, and medical, respiratory and occupational history and exposure to noxious substances. Thereafter, an accurate diagnosis was formulated and factors identified that may have influenced a missed diagnosis of COPD.

A summary of the data collected is shown in Table 1.

Table 1: Summary of data

Total patient appointments booked = 429	429	**Referral source:** **Nurse 57.3%** **GP 42.6%**
DNA exacerbating or contraindications	20 + 34 Total 54	
Total seen by service and full history and spirometry performed (n=375)	Cohort 1: 272 patients without an existing diagnosis (COPD, asthma, ACOS, other) Cohort 2: 103 patients with existing diagnosis (COPD, asthma, ACOS, other)	Outcome of all spirometry: Normal: 70 (18.7%) Obstructive: 283 (75.5%) Restrictive: 16 (4.3%) Combined: 6 (1.6%)
Patients without existing diagnosis (n=151 new COPD diagnosis, 4 ACOS)	Patients with 'existing' diagnosis: COPD x33, asthma x69, ACOS x1 Final outcome after review by service: COPD x 29, asthma x60, ACOS x10 Diagnosis removed x2, restrictive diagnosis x2 ACOS diagnosis increased from 1 to 10 (likely due to disease progression)	At the end of the project a total of 180 patients with confirmed COPD and 14 ACOS ACOS is an advancement of obstructive lung disease in most cases developing life-limiting outcomes.

ACOS, asthma–COPD overlap syndrome.

Treatment outcomes

Examination of the treatment options is a valuable indication that COPD diagnosed in new patients is still late in the disease trajectory – that is, symptoms and exacerbations have already manifested. It is essential to intercept these patients earlier in the disease in order to instigate treatment and reduce exposure to any noxious substances and make a formal COPD diagnosis.

Understandably, in those with existing respiratory disease, the progression of symptoms and exacerbations is more apparent.

Treatment outcomes for patients without and with an existing respiratory diagnosis of COPD are shown in Table 2 (see https://www.pcrs-uk.org/resource/copd-diagnosis-project).

Historic and current diagnosis

Of interest, following the examination of historic notes and spirometry, a number of those with an existing diagnosis (COPD, asthma and asthma–COPD overlap syndrome (ACOS)) were in fact found to be misinterpreted and incorrect. Therefore, a 'changed or removed' diagnosis of COPD or asthma was made based on the original spirometry. This was further substantiated by the current history-taking and new spirometry, taking into account disease progression. In addition, among those without an existing respiratory diagnosis but who had historic spirometry, there were a number of patients with a missed diagnosis of COPD.

Across both cohorts the severity of COPD was distributed similarly. Remarkably, a number of new COPD patients were already in the 'severe' (15/151) and 'very severe' (5/151) categories,[2] further demonstrating the presence of a late/delayed COPD diagnosis with evidence of irreversible lung decline.

Unsurprisingly, a number of patients with an existing COPD or asthma diagnosis were newly diagnosed with ACOS during the project, which is an acceptable reflection of disease progression. However, there were a number of patients with a diagnosis of 'without existing disease' in whom ACOS was newly diagnosed during the project. This advanced state of disease reflected the impact of a delayed or incorrect diagnosis on patient outcomes (Table 3 see https://www.pcrs-uk.org/resource/copd-diagnosis-project).

Critical analysis of existing/historic spirometry (NB: not current) and medical notes

The examination of historic spirometry in both those with or without existing respiratory disease revealed the following:

- Relatively low numbers (63%) of those with an existing diagnosis (asthma or COPD) had historic spirometry to examine and only 36% (asthma 44% and COPD 56%) of these were 'accurate/reproducible and had an absence of anomalies' and suitable for interpretation. This reflects the National Asthma and COPD Audit Programme (NACAP) 2018 findings where only 59.5% of COPD patients had spirometry recorded.
- Of interest, 15% of those without an existing diagnosis had historic spirometry available (where a respiratory diagnosis must have been suspected previously). Following the removal of those that were 'inaccurate/not reproducible and had

anomalies', 58% were suitable for interpretation.

- In both cohorts those actually suitable for interpretation were checked for accuracy of the original interpretation (these were cross-referenced with the most appropriate guideline available at that time – that is, NICE 2004 or GOLD 2009).[4,5]
- Furthermore, in those with existing disease, 69% were accurate whilst, in those with no existing disease, 66% were accurate interpretations, providing further support that under- and over-diagnosis of COPD is dependent not only on the accuracy of spirometry performed but also the accuracy of interpretation.
- Remarkably, 40 patients with an existing obstructive diagnosis (asthma/COPD/ACOS) had no evidence of historic spirometry, which is aligned with the NACAP (2018) findings. This highlights the absence of accurate diagnostic processes in place. Possible explanations in this locality may be that COPD6 monitor or forced expiratory volume in 1 second (FEV_1) assessment alone were used in some cases, or spirometry was performed and not retrievable or visible at the time of the project.
- In a number of cases, FEV_1 was used by mistake instead of FEV_1/FVC ratio to define obstruction, which would influence over- and under-diagnosis of COPD.
- Demonstration of a comprehensive clinical history was not always evident – that is, signs and symptoms, and medical, respiratory and occupational history and exposure to noxious substances.
- Encouragingly, there was documentary evidence in many cases of ruling out other disease/diagnosis.
- All historic spirometry was performed and documented by nurses. However, nurses making a respiratory diagnosis were represented in small numbers. This is a development opportunity for those nurses performing spirometry to enhance their knowledge and skills to be able to interpret the results, providing a more succinct holistic service for the patient.

Full details are shown in Table 4 (see https://www.pcrs-uk.org/resource/copd-diagnosis-project)

Risk factors

Having identified under-diagnosed/over-diagnosed/missed diagnosis of COPD, the next stage was to collate all of the risk factors identified and stratify into under- and over-diagnosis and thereafter to look at solutions that could be instigated in the future (see details in Table 5 (see https://www.pcrs-uk.org/resource/copd-diagnosis-project).

Summary of project

Following examination of each individual patient's previous medical notes and historic spirometry (where available) and during face-to-face consultation, the author documented a comprehensive respiratory history, current signs and symptoms in collaboration with accurate spirometry and reversibility testing, with interpretation of the results. This supported either confirmation, amendment to the existing diagnosis or establishment of a new diagnosis. This facilitated appropriate management of the respiratory disease or further investigation of a non-respiratory cause.

The author identified that under- and over-diagnosis of COPD had the following key predisposing causative/risk factors.

(1) Insufficiently accurate spirometry testing

- Absence of any spirometry
- Absence of trained accredited clinicians performing and interpreting spirometry
- Spirometry performed but not accurate, reproducible or anomalies present
- Spirometry performed but not interpreted correctly

(2) Not adhering to guidelines when performing and interpreting spirometry and making a diagnosis

- The presence of all the three key fundamental elements (history of symptoms, noxious gas exposure and airflow obstruction) to diagnose COPD effectively were absent in a number of cases (as recommended by GOLD),2 revealing that either history taking or spirometry had been historically used in isolation to make a diagnosis.
- Using a fixed ratio of FEV_1/FVC rather than lower limit of normal (LLN) increases the prevalence of under- and over-diagnosis of COPD
- Absence of documentary evidence demonstrating the use of which standardised national spirometric criteria to interpret spirometry – that is, obstructive spirometry is defined as FEV_1/FVC ratio either <0.7 or 5% below the LLN (GOLD, 2020),[2] affecting the rates of under- and over-diagnosis
- Guidelines can be confusing and, in particular, there was some disparity between NICE (2004)[4] and GOLD (2009)[5] before 2010 for the staging of COPD severity (see Appendix 1 online at www.pcrs-uk.org)
- When history was recorded in some of the cases, evidence of 'comprehensive history taking' was not always in place. In particular, the recording of specific signs and symptoms were absent (eg, productive cough, wheeze, dyspnoea and exacerbations) or being asymptomatic was not recorded.
- In some cases, the diagnosis was inhibited by ad hoc/inaccurate COPD screening programmes leading to over- and under-diagnosis of COPD.
- Importantly, nurses performing spirometry in general practice very often have limited access/funding/time to attend formal accredited or practical education.
- Many nurses undertaking the ARTP spirometry training during the time of the project had not attended or undertaken previous asthma or COPD training, and this made it difficult

for them to understand and put into context spirometry in relation to the disease and its management. In addition, they did not always have the insight to rule in or out other disease (eg, asthma, bronchiectasis, heart failure).

Reflection and recommendations

We know from clinical evidence and guidelines that accurate quality-assured spirometry and comprehensive history taking is vital to underpin the correct and timely diagnosis of COPD. It is important to mention at this stage that there is a wealth of good practice and expertise throughout the county. The outcomes found reflected the national picture in that, due to multifactorial reasons, we have neglected at times to diagnose COPD effectively.

Historically, there were common barriers to performing and interpreting spirometry including inappropriate equipment (COPD6, FEV_1 alone), unskilled operators and interpreters (nurses and GPs), a deficit in access to robust training and using history taking or spirometry in isolation. Failure to avoid tunnel vision in diagnosing respiratory symptoms and considering other causes beyond COPD appears common.

However, in more recent years there has been more availability and recognition of the importance of spirometry training for nurses. At the present time, NHS England has driven the recommendation that formal spirometry accreditation is to be accomplished by those clinicians performing and interpreting spirometry by 2021. Diagnosis of breathlessness and respiratory symptoms is moving towards a hub-based model using trained practitioners who are skilled in respiratory diagnostics.

Nevertheless, there are still further barriers in general practice that prevent the accurate performance and interpretation of spirometry and diagnosis of COPD. In particular, the enormity and diversity of the individual practice nurse's role reduces the number of nurses in a surgery who can be freed up from other responsibilities, trained and undertake this role. This is further impacted by the fluidity of practice nursing at the current time. Commonly, as experienced and accredited practice nurses retire or leave the service, there is often a skills gap in the surgery. There is very little succession planning to replace the high volume of extremely skilled practice nurses who are reaching retirement age. It is especially difficult to 'grow your own' in smaller surgeries.

If there is no succession planning, this leads to recruitment becoming a frantic search for experienced/trained practice nurses, of which the numbers are essentially diminishing. More recently, though, practice nursing has developed a career pathway and is becoming increasingly more attractive to newly qualified nurses. In addition, obtaining funding within a practice for training courses and also the willingness and commitment from the individual practice nurse in terms of time and undertaking academic study has an impact on the number of skilled operators available.

Recommendations

The recommendations originally targeted the performance of spirometry and, more fully, the diagnosis of COPD in the locality. COVID-19 has impacted the recommendations; it has made us reconsider how we offer respiratory diagnostic services, but the diagnosis of COPD and other respiratory conditions still needs to be delivered in a timely accurate way by clinicians who are trained to do this and are competent and feel confident to do so.

- There are inconstancies across the locality in the level of exposure/awareness/access to all training that practice nurses have. Therefore, mentors and practice nurse facilitators should be used to reach out to practices and individual nurses to 'sign post' formal academic training, in particular highlighting opportunities of funded places with providers such as the CCG, pharmaceutical sponsorship, etc.
- It is important to raise awareness to practice teams and future candidates that a systematic approach to education is required whereby training and understanding of COPD and asthma are prerequisite to underpinning and improving the understanding and a successful outcome.
- Mentorship by ARTP-accredited respiratory nurses/mentors should be provided in the clinical workplace to support those undertaking the accredited ARTP qualification, provided through a commissioned service. As diagnostic hubs are developed, mentorship will also be a function of the hub.
- Mentorship is also provided following accreditation through practical support in the workplace to improve confidence, knowledge and skills to perform spirometry. This includes mainly registered nurses, but there is also a growing number of non-registered nurses who are undertaking spirometry accreditation. This may be by rotation through a PCN-based diagnostic hub.
- If a practice continues to offer spirometry, then mentorship would also encompass support in the creation of an individual practice 'spirometry policy and standards' which are underpinned by national guidelines for performance and interpretation of spirometry. This includes the importance of choosing and specifying which guideline is followed for identifying obstruction (FEV_1/FVC ratio) and the staging of the severity of COPD (FEV_1).
- Mentorship also supports 'post accreditation' of those developing interpretation of spirometry skills and comprehensive history taking in order to have a robust COPD diagnostic process and rule out other disease.
- Engaging practice nurses to work collaboratively with practice nurse support groups and integrated respiratory teams

to further enhance/consolidate their knowledge, skills and confidence.

- Implementing a localised standardised competency framework for respiratory skills adapted from the PCRS respiratory framework.
- Succession planning, prompting/supporting practices to identify staff who are approaching retirement and helping to create a strategy to build/retain a skilled workforce. Introduce new ways of thinking rather than trying to overburden and upskill one new member of staff and consider having a part time nurse with a special interest/ expertise in respiratory. Encourage every practice to have a named respiratory lead GP and nurse.
- Set out targeted COPD screening to appropriate demographic age and risk groups.
- Educational intervention for GPs who may be less likely to attend formal and informal training due to the diversity of their role and expectation that their expertise is established.

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Further reading

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For full paper including access to all tables visit https://www.pcrs-uk.org/resource/copd-diagnosis-project

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