Volume 4
Issue 2
AUTUMN 2017

Primary Care Respiratory **UPDATE**




www.pcrs-uk.org/pcru

HIGHLIGHTS …

Celebrating 30 years of PCRS-UK

COPD Treatment guidelines – going for GOLD?

Antibiotic prescribing for children with coughs and colds

Raising awareness of bronchiectasis

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Patients should be instructed on how to administer the product correctly. **Contraindications:** Hypersensitivity to the active substance(s) or to the excipient lactose monohydrate. **Warnings and precautions:** Asthma: Should not be used. Paradoxical bronchospasm: If this occurs, stop medicine and consider other treatment. Not for acute use: Not indicated for the treatment of acute episodes of bronchospasm. Cardiovascular effects: Use with caution in patients with a myocardial infarction during the previous 6 months, unstable angina, newly diagnosed arrhythmia within the previous 3 months, QTc above 470 msec or hospitalisation within the previous 12 months for heart failure functional classes III and IV. β_2-adrenergic agonists may produce increases in pulse rate and blood pressure, electrocardiogram (ECG) changes such as T wave flattening, ST segment depression and prolongation of the QTc-interval in some patients. If effects occur, treatment may need to be discontinued. 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Not known: Angiodema, anaphylactic reaction. **Legal category:** POM. **Marketing authorisation number:** EU/1/14/964/001. **Presentation and Basic NHS Cost:** Carton containing 1 inhaler with 60 doses: £32.50 (excluding VAT). **Marketing Authorisation Holder:** AstraZeneca AB, SE-151 85 Södertälje, Sweden. **Further information is available from:** AstraZeneca UK Ltd., 600 Capability Green, Luton, LU1 3LU, UK. DUAKLIR is a trademark under license from Almirall S.A. GENUAIR is a registered trademark of the AstraZeneca group of companies. Date of preparation: 01/2017 RSP 17 0003

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References:

1.Duaklir® Summary of Product Characteristics. Available from https://www.medicines.org.uk/emc/ **2.**Singh D *et al. BMC Pulm Med* 2014; 14: 178. **3.**D'Urzo AD *et al. Resp Res* 2014; 15:123. **4.**Bateman ED *et al. Respir Res* 2015; 16:92.**5.**Bateman ED *et al. Resp Res* 2015; 16: 92 – supplementary data

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Primary Care Respiratory **UPDATE**




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Editor's Round-Up

Dr Iain Small, *Editor Primary Care Respiratory Update*

Whilst many of you will still (hopefully) be enjoying the end of a glorious summer, this edition of *PCRU* already has an autumnal – if not a winter – feel to it.

We take a long hard look at antibiotic use in general practice. What tools are there to help guide our decision-making? What is their validity in Primary Care? Can such tools be exported from research models into clinical practice? Three of our leading thinkers in the Society try to answer these questions by analysing the available evidence. I encourage you to read their comments and draw your own conclusions.

In her policy update, Bronwen Thomson covers three hot topics for those of us trying to provide good clinical care; what is the situation regarding spirometry accreditation, how to cope with the diversity of guidelines, and the increasing number of inhalers. The fog may eventually be clearing.

If you are looking for highlights from recent *npj PCRM* publications, then your editor would draw your attention to the paper from Reilev *et al* (*npj PCRM* 27(25)) and Christyn *et al* (*npj PCRM* 27(22)); things are not always what they seem, and patients don't always behave the way we expect them to.

In our 'best of the rest' feature, take a look at the work of Movin and Triebner, highlighting two surprising findings relating to gender differences at both ends of the reproductive years.

Finally, in this edition we reflect on the 30 years of the presence and achievements of the Primary Care Respiratory Society in the UK (recalling it's youth as the GPiAG). Key Society members describe how the organisation (past and present) has changed their lives and careers. I am proud to say that without GPiAG/PCRS-UK, my own life and career would have been much the poorer.

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Chair's Perspective

Noel Baxter, *PCRS-UK Executive Chair*

Progress in respiratory care over last 30 years

This edition of *Primary Care Respiratory Update* where we celebrate 30 years of the Primary Care Respiratory Society UK (PCRS-UK) has been a fascinating read for me. I have been a member of this nurturing and progressive Society for 10 years, and reading through the reports has revealed much of which I was unaware, and the things we have achieved make me feel even more proud to be the current Chair.

Over the last year or so I have been lucky to work with GP colleagues in Bulgaria and Macedonia through our membership of the International Primary Care Respiratory Group. I mention this because I have seen the status of general practice in these countries, especially with respect to respiratory medicine, that has shocked and surprised me but also enabled me to reflect on how far we have come in the UK as a result of the work of PCRS-UK. Our colleagues in these countries have less power at the centre of medical policy, suffer considerable inequity and are usually women. They have to refer to a pulmonologist – usually a man – to have a diagnosis of asthma or COPD confirmed and they have restrictions on prescriptions of inhaled medicines. Having worked with them, I see dedicated clinicians who have long term relationships with their patients but are unable to provide the care they want to and know how to, people who want to improve services but who struggle to gain influence. Departments of general practice have no status or don't exist, and those with academic credibility have to fit into other academic units.

These three areas where I see colleagues in other countries struggling – providing clinical care in the right place, policy influence and research – demonstrate where the hard work of our Society members has made much progress over the last 30 years. In this edition you can see how PCRS-UK has influenced respiratory policy such as with QOF and more recently NHSE RightCare. We now have high calibre respiratory researchers and Chairs of departments in the best universities. The Department of Health in England's respiratory programme 2010–2013 had significant leadership from primary care, GPs and nurses that influenced the final report. PCRS-UK is the respiratory society that now respiratory specialists from varying professional backgrounds (including physicians) want to be part of because we reflect the changing face of the NHS across the whole of the UK.

The job still left to be done

There is still work to be done, however. Good standards of care for all of our population are still not being achieved. Problems with diagnosis continue, being trained to do the job you do is not universally encouraged in our practices, high value interventions such as pulmonary rehabilitation and tobacco dependency therapy are being offered and provided to only small proportions of our population with long-term respiratory disease. We are not doing as well as many countries in Europe in terms of lung cancer survival, asthma deaths and COPD outcomes, so if we are to be able to make a case that primary care can deliver as well as hospital-based specialist clinicians, we are going to need to continue to up our game.

The future

We can be positive as members about the future of our Society. Our leadership programme and mentoring and support for those who have been around for much of the 30 years has provided us with a cohort of passionate health professionals and researchers who want to make a difference as much as our founding fathers 30 years ago. We continue to develop our lay reference group and look at how we utilise the experience of patients to help inform the work of the Society.

Our NHS is undergoing many changes, general practice is forming into larger scale organisations that will work without boundaries with our specialist and hospitalist colleagues, our local authority colleagues and our voluntary sector and, importantly, through real engagement with our populations who we have responsibility to care for. There is an opportunity for improvement where professionals and patients work together equally. I see a chance for health professionals, through working in larger organisations, to play new and enhanced roles where their clinical interests lie, to use their passion for quality improvement to have an impact at greater population levels and through influence of colleagues within the same systems.

We remain a Society that has a loyal membership and also partners and sponsors who help us to reflect and challenge us to continue to improve. These are strong connections developed over many years and we look forward to another 30.

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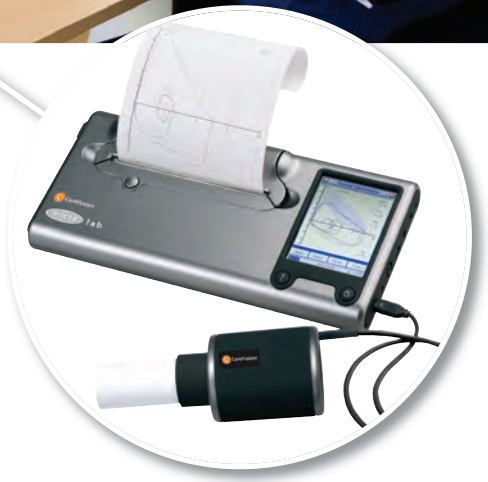

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1. Cahill K et al. Pharmacological interventions for smoking cessation: an overview and network meta-analysis. Cochrane Database of Systematic Reviews 2013, Issue 5.

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Nicorette Invisi Patch Prescribing Information: Presentation: Transdermal delivery system available in 3 sizes (22.5, 13.5 and 9cm^2) releasing 25mg, 15mg and 10mg of nicotine respectively over 16 hours. **Uses:** Nicorette Invisi Patch relieves and/or prevents craving and nicotine withdrawal symptoms associated with tobacco dependence. It is indicated to aid smokers wishing to quit or reduce prior to quitting, to assist smokers who are unwilling or unable to smoke, and as a safer alternative to smoking for smokers and those around them. Nicorette Invisi Patch is indicated in pregnant and lactating women making a quit attempt. If possible, Nicorette Invisi Patch should be used in conjunction with a behavioural support programme. **Dosage:** It is intended that the patch is worn through the waking hours (approximately 16 hours) being applied on waking and removed at bedtime. ***Smoking Cessation: Adults (over 18 years of age):*** For best results, most smokers are recommended to start on 25 mg / 16 hours patch (Step 1) and use one patch daily for 8 weeks. Gradual weaning from the patch should then be initiated. One 15 mg/16 hours patch (Step 2) should be used daily for 2 weeks followed by one 10 mg/16 hours patch (Step 3) daily for 2 weeks. Lighter smokers (i.e. those who smoke less than 10 cigarettes per day) are recommended to start at Step 2 (15 mg) for 8 weeks and decrease the dose to 10 mg for the final 4 weeks. Those who experience excessive side effects with the 25 mg patch (Step 1), which do not resolve within a few days, should change to a 15 mg patch (Step 2). This should be continued for the remainder of the 8 week course, before stepping down to the 10 mg patch (Step 3) for 4 weeks. If symptoms persist the advice of a healthcare professional should be sought. ***Adolescents (12 to 18 years):*** Dose and method of use are as for adults however, recommended treatment duration is 12 weeks. If longer treatment is required, advice from a healthcare professional should be sought. ***Smoking Reduction/Pre-Quit:*** Smokers are recommended to use the patch to prolong smoke-free intervals and with the intention to reduce smoking as much as possible. Starting dose should follow the smoking cessation instructions above i.e. 25mg (Step 1) is suitable for those who smoke 10 or more cigarettes per day and for lighter smokers are recommended to start at Step 2 (15 mg). Smokers starting on 25mg patch should transfer to 15mg patch as soon as cigarette consumption reduces to less than 10 cigarettes per day. A quit attempt should be made as soon as the smoker feels ready. When making a quit attempt smokers who have reduced to less than 10 cigarettes per day are recommended to continue at Step 2 (15 mg) for 8 weeks and decrease the dose to 10 mg (Step 3) for the final 4 weeks. ***Temporary Abstinence:*** Use a Nicorette Invisi Patch in those situations when you can't or do not want to smoke for prolonged periods (greater than 16 hours). For shorter periods then an alternative intermittent dose form would be more suitable (e.g. Nicorette inhalator or gum). Smokers of 10 or more cigarettes per day are recommended to use 25mg patch and lighter smokers are recommended to use 15mg patch. **Contraindications:** Hypersensitivity. **Precautions:** Underlying cardiovascular disease, diabetes mellitus, renal or hepatic impairment, phaeochromocytoma or uncontrolled hyperthyroidism, generalised dermatological disorders, gastrointestinal disease. Angioedema and urticaria have been reported. Erythema may occur. If severe or persistent, discontinue treatment. Stopping smoking may alter the metabolism of certain drugs. Transferred dependence is rare and less harmful and easier to break than smoking dependence. May enhance the haemodynamic effects of, and pain response, to adenosine. Keep out of reach and sight of children and dispose of with care. Should be removed prior to undergoing MRI procedures. **Pregnancy and lactation:** Smoking cessation during pregnancy should be achieved without NRT. However, for women unable to quit on their own, NRT may be recommended to assist a quit attempt after consulting a healthcare professional. **Side effects:** ***Very common:*** pruritus. ***Common:*** headache, dizziness, nausea, rash, urticaria, vomiting. ***Uncommon:*** hypersensitivity, palpitations, paraesthesia, tachycardia, flushing, hypertension, hyperhidrosis, myalgia, application site reactions, asthenia, chest discomfort and pain, malaise, fatigue, dyspnoea. ***Rare:*** Anaphylactic reaction, GI discomfort, angioedema, erythema, pain in extremity. ***Very rare:*** reversible atrial fibrillation. **NHS Cost:** 25mg packs of 7: £11.15, 25mg packs of 14: £18.28, 15mg packs of 7: £11.10, 10mg packs of 7: £10.99. **Legal category:** GSL. **PL holder:** McNeil Products L.td, Roxborough Way, Maidenhead, Berkshire, SL6 3UG. **PL numbers:** 15513/0161; 15513/0160; 15513/0159. **Date of preparation:** May 2016.

Nicorette QuickMist Prescribing Information: Presentation: Oromucosal spray. Each 0.07 ml contains 1mg nicotine, corresponding to 1mg nicotine/spray dose. **Uses:** relieves and/or prevents craving and nicotine withdrawal symptoms associated with tobacco dependence. It is indicated to aid smokers wishing to quit or reduce prior to quitting, to assist smokers who are unwilling or unable to smoke, and as a safer alternative to smoking for smokers and those around them. It is indicated in pregnant and lactating women making a quit attempt. **Dosage:** ***Adults and Children over 12 years of age:*** The patient should make every effort to stop smoking completely during treatment with Nicorette QuickMist. One or two sprays to be used when cigarettes normally would have been smoked or if cravings emerge. If after the first spray cravings are not controlled within a few minutes, a second spray should be used. If 2 sprays are required, future doses may be delivered as 2 consecutive sprays. Most smokers will require 1-2 sprays every 30 minutes to 1 hour. Up to 4 sprays per hour may be used; not exceeding 2 sprays per dosing episode and 64 sprays in any 24-hour period. Nicorette QuickMist should be used whenever the urge to smoke is felt or to prevent cravings in situations where these are likely to occur. Smokers willing or able to stop smoking immediately should initially replace all their cigarettes with the Nicorette QuickMist and as soon as they are able, reduce the number of sprays used until they have stopped completely. When making a quit attempt behavioural therapy, advice and support will normally improve the success rate. Smokers aiming to reduce cigarettes should use the Mouthspray, as needed, between smoking episodes to prolong smoke-free intervals and with the intention to reduce smoking as much as possible. **Contraindications:** Children under 12 years of age and hypersensitivity to any of the ingredients. **Precautions:** Underlying cardiovascular disease, diabetes mellitus, G.I disease, uncontrolled hyperthyroidism, phaeochromocytoma, hepatic or renal impairment. Stopping smoking may alter the metabolism of certain drugs. Transferred dependence is rare and both less harmful and easier to break than smoking dependence. May enhance the haemodynamic effects of, and pain response to, adenosine. Keep out of reach and sight of children and dispose of with care. Care should be taken not to spray the eyes whilst administering the spray. **Pregnancy & lactation:** Smoking cessation during pregnancy should be achieved without NRT. However, if the mother cannot (or is considered unlikely to) quit without pharmacological support, NRT may be used after consulting a healthcare professional. **Side effects:** ***Very common:*** headache, cough, throat irritation, nausea, hiccups. ***Common:*** toothache, hypersensitivity, burning sensation, dizziness, dysgeusia, paraesthesia, abdominal pain, diarrhoea, dry mouth, flatulence, salivary hypersecretion, stomatitis, vomiting, dyspepsia, fatigue. ***Uncommon:*** abnormal dreams, palpitations, tachycardia, flushing, hypertension, bronchospasm, dysphonia, dyspnoea, nasal congestion, sneezing, throat tightness, eructation, glossitis, oral mucosal blistering and exfoliation, paraesthesia oral, dry skin, urticaria, angioedema, hyperhidrosis, pruritus, rash, erythema, pain in jaw, asthenia, chest discomfort and pain, malaise, oropharyngeal pain, rhinorrhea, gingivitis, musculoskeletal pain, hyperhidrosis. ***Rare:*** dysphagia, hypoaesthesia oral, retching. ***Not known:*** atrial fibrillation, anaphylactic reaction, blurred vision, lacrimation increased, dry throat, GI discomfort, lip pain, muscle tightness, angioedema, erythema. **NHS Price:** 1 dispenser pack £13.03, 2 dispenser pack £20.58. **Legal category:** GSL. **PL holder:** McNeil Products Ltd, Roxborough Way, Maidenhead, Berkshire, SL6 3UG. **PL number:** 15513/0357. **Date of preparation:** June 2016.

Adverse events should be reported. Reporting forms and information can be found at www.mhra.gov.uk/yellowcard. Adverse events should also be reported to McNeil Products Limited on 01344 864 042.

Date of Preparation: June 2017 UK/NI/17-9381

PCRS-UK 30th Anniversary

Fran Robinson PCRS-UK Communications Consultant, **Anne Smith** Chief Executive and **Iain Small** Editor Primary Care Respiratory Update

2017 marks the 30th anniversary of the Primary Care Respiratory Society (PCRS-UK). In this article we celebrate our journey from a small asthma interest group of just six GPs who shared a passion for improving asthma care and the role primary care should be playing, to an influential UK-wide multidisciplinary professional society, supporting all health professionals involved in respiratory care in primary or community care.

This article chronicles how the original vision of PCRS-UK's founders of the role GPs should be playing in asthma care has expanded and flourished over the last three decades. A strong and influential group of primary care opinion leaders and a committed and passionate body of members have ensured that the Society has adapted, matured and transformed over the decades in order to continually meet the changing needs of primary care and the wider NHS and, most importantly, of the people with respiratory conditions.

Noel Baxter, GP and current Chair PCRS-UK Executive

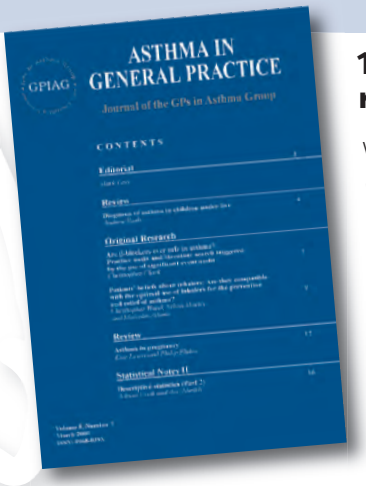
The first 20 years – putting primary care on the map in respiratory medicine

1987: The General Practitioners in Asthma Group (GPIAG) is launched

In the early 1980s, asthma as well as other respiratory conditions in the UK were managed in secondary care. There were no asthma or COPD guidelines and no tradition of primary care research into respiratory disease that could inform primary care decision-making.

During the 1980s, GPs started to question whether they could do more to manage respiratory conditions in primary care and academic papers began to talk about asthma as a chronic disease.

Against this background, GPIAG was formed in 1987 by six GPs with an interest in asthma. Their aim was to provide a forum for ideas, to become a source of expert advice and to form a research group. The first Annual Scientific Meeting, attended by over 60 GPs, was held in 1988.

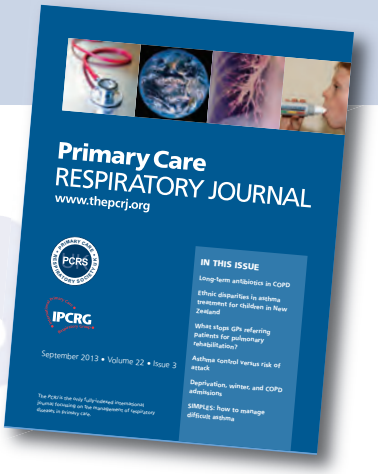


1996: Launch of a peer reviewed academic journal

What started life as a two-page newsletter in 1988 developed and became a peer reviewed academic journal called Asthma in General Practice in 1996, providing a vehicle for the publication of the increasing level of primary care audit and research being driven and initiated by the group.

1999: A broadening of the Group's interests and a change of name

By the late 1990s the Group's interests expanded to include COPD. Nurses, who were playing an increasing role in asthma care, were becoming more active in the Group. The name of the organisation was changed to reflect both these changes to General Practice Airways Group, while retaining the abbreviation GPIAG. The remit of the Journal was similarly expanded and in 2000 it was renamed the *Primary Care Respiratory Journal* (PCRJ) further reflecting the expanding horizons and respiratory interests of GPIAG.



2000: The first research chair in primary care respiratory medicine

One of the guiding principles of the GPIAG was the development of primary care solutions for primary care problems. Twenty years ago, most of the evidence for the management of asthma and other respiratory diseases in primary care was generated from trials conducted in secondary care on highly selected patient populations. This led Dermot Ryan, Chair of the GPIAG in 1996, to campaign for the first academic chair in primary care respiratory medicine. This was established in 2000 in the Department of General Practice at the University of Aberdeen and set the scene for real-life respiratory clinical studies in primary care. David Price was appointed to the post as the first Professor of Primary Care Respiratory Medicine.

2003: Registering as a charity

At the start of the new millennium the influence of GPIAG in academic, scientific and political arenas was growing. It was also a time of great change and many challenges, including increasing demands for GPIAG expertise to facilitate national developments. In order to evolve to meet the new expectations and to continue to develop its influence, GPIAG members agreed that the Group should be registered as a charity. This process was overseen by the then chair John Haughney and was finalised in 2003.

2005: Full membership extended to nurses and allied health professionals

By 2005, following the introduction of a new GMS contract, primary care nurses were playing an increasing role in managing respiratory disease. Nurses represented 50% of delegates attending the annual meeting.

Education for Health, originally set up as the National Asthma Training Centre in 1987 (also celebrating their 30th birthday this year), had spearheaded the development and training of practice nurses in respiratory care.

Whilst GPIAG had offered associate membership to nurses and allied health professionals from 2000, it was 2005 before full membership rights were given to non-GPs. A practice nurses' working party was established shortly thereafter established to look at how the GPIAG could better support the needs of its practice nurse membership.

2006: Introduction of a paid membership scheme

Formal inclusion of nurses and other health professionals as members strengthened the mandate of GPIAG to speak on behalf of primary care in its policy influencing work. The introduction and successful uptake of a paid membership scheme in 2006 was an important milestone in further strengthening the credibility and independence of GPIAG as a professional society to influence respiratory care from a primary care perspective. This is now resulting in regular evidence-based improvements in care.

The last 10 years – a fully-fledged professional society for primary care health professionals interested in respiratory care

One of the most fundamental landmarks in the last 10 years came in 2009 with a change of name from General Practice Airways Group (GPIAG) to the Primary Care Respiratory Society UK (PCRS-UK). The new name described what the organisation was by then about and paved the way for continued growth and development.

That continued growth and development in our programmes and activities is described through the following perspectives of three of our members.

Stephanie Wolfe, Independent Respiratory Nurse Specialist

Stephanie was one of the first nurses to join GPIAG and was the first nurse member of the PCRS-UK Executive, serving from 2004 to 2013. She currently serves on the Education and the Primary Care Respiratory Update committees.

"I joined Thorpewood Surgery, Norwich in 1991 as a practice nurse, but I became increasingly involved in respiratory work with David Price (now Chair of Primary Care Respiratory Medicine at the University of Aberdeen) and he used to take me to GPIAG meetings in the early 1990s. In those days, nurses could only go if their GP invited them. I was the only nurse there at that time but I used to love it. The conference ran only on a Friday evening and the following Saturday. Eventually GPIAG voted to allow nurses to become members because they realised more and more nurses were attending and benefiting from the education.

"At first when I asked if I could apply to sit on what was then called the General Committee I was told I couldn't because I was a nurse, even though by then I was a member in my own right. That for me was like a red rag to a bull.

"Eventually I was allowed to stand in 2004. That was a difficult time, as some committee members were still very conservative. However, by then I think they had really put their thinking caps on and realised that nurses were making up a fair proportion of the membership, so maybe it was time they should be represented. Now nurses are represented in all aspects of the work of PCRS-UK. It was hard work being the first nurse on the Executive. My aim was always to bring people back to the grass roots because of the generalist nature of most primary care nurses' jobs.

One of the things of which I am most proud are the PCRS-UK affiliated groups. We identified that nurses wanted local respiratory interested groups that they could get to with no more than 30 minutes' travel time from where they were based. I set up my own local group in Norwich and now there are about 50 all over the UK. My personal ambition is to have a local group in every area of the country. I've seen the groups grow from an acorn into an oak tree and PCRS-UK plays a big role in nurturing and supporting them.

"Another recent achievement of PCRS-UK has been our input into the launch of the new National Register for certification of health professionals who perform spirometry. This will have a huge impact and will raise standards by ensuring that everyone performing spirometry is accredited by 2021.

"The PCRS-UK annual conference is a highlight of the year, particularly for nurses.

"The big change that has occurred during my time as a member of PCRS-UK has been the expansion of the role of nurses in respiratory care. Now the Society welcomes everyone who delivers respiratory care in the primary care setting."

> *"PCRS-UK is a fabulous, inclusive organisation. It does what it says on the tin – it is for primary care."*

Carol Stonham, MBE, Primary Care Respiratory Nurse, Gloucestershire CCG, Queen's Nurse, PCRS-UK Vice Chair and Nurse Lead

"When I joined GPIAG I was asked to be part of the practice nurse working party which eventually became the formal nurse committee. A big thing that we were a part of was changing the name of the organisation to signal moving away from being a GP organisation to one that would encourage nurses to join.

"From being Nurse Lead and a member of the Executive to recently being appointed Vice Chair shows just how far PCRS-UK has moved towards including nurses as equal members.

> *"Encouraging other health professionals as part of the wider multidisciplinary team very much reflects how PCRS-UK has broadened its horizons to reflect how primary care works now."*

"The introduction of the Lay Reference Group now ensures that patients influence the decisions we make and helps us to focus on patient-centred care.

"Working in partnership with Cogora to launch the Primary Care Respiratory Academy is another innovation that benefits the whole primary care team, especially nurses. A lot of generalist primary care nurses who would not necessarily join PCRS-UK are going along to the Academy clinical roadshows and getting a good respiratory update. At least 60% of attendees at the last six meetings have been nurses.

"The Respiratory Commissioning Platform of the Academy which launched this year will hopefully influence commissioners and practice managers to understand the value of health professionals being members of a professional organisation like PCRS-UK.

"Our influence on respiratory care is now far reaching. In addition to being involved with the launch of the National Spirometry Register, we are helping to improve inhaler use as members of the UK Inhaler Group, Noel Baxter and I sit on the Executive Board and steering group for the COPD National Audit and there is now a PCRS-UK member involved with the development of most national guidelines for COPD and asthma.

"Through our campaigns we are working to improve practice by ensuring respiratory health professionals are trained to do the job they do, we are focusing on improving diagnosis and encouraging health professionals to tackle tobacco dependency.

"My personal project is the affiliated group programme, and we need to work continuously to encourage new groups to set up and become part of the network. One way we support our current groups through the annual meeting for affiliated group leaders.

"I hope that PCRS-UK will continue to nurture the culture of support and development that I have been offered. I have been awarded an MBE for Nursing and Healthcare and I could not have achieved that had I not been a part of PCRS-UK."

Noel Baxter, GP and current Chair PCRS-UK Executive

"For me the great achievement of PCRS-UK over the last decade has been the extent to which we have got our foot in the door of respiratory policy. It has been down to persistent lobbying from policy leads like Duncan Keeley and Kevin Gruffydd-Jones. This has ensured that the primary care voice has influenced developments such as respiratory clinical guidelines, quality standards and the Quality and Outcomes Framework. For example, when the draft of the NICE quality standards for COPD was published we lobbied heavily to ensure that they reflected what needed to happen in primary care as well as secondary care.

"Also for the first time ever NICE has looked at implementation of a guideline with the asthma diagnosis guideline. This followed lobbying from multiple stakeholders but very significantly from PCRS-UK.

"Another advance for us was the launch of the PCRS-UK Respiratory Leaders Programme 10 years ago, thanks in large part to the vision of Steve Holmes. This has played an enormous role in developing the talents and confidence of members to go away and develop projects and take on higher positions. Many clinicians have now been through the three year rolling programme gaining the skills and knowledge to improve respiratory services in their area.

"Our annual conference has been a real success story having developed from humble beginnings as an event which could be held in one room to a national two-day event. The credit for this goes to Professor Hilary Pinnock, who had the vision for a primary care conference and to recent Conference Organising Committee Chairs such as Sandy Walmsley and Andy Whittamore.

"The conference now not only supports people who do grass roots work and offers them workshops where they can refresh their hands-on skills, but also provides leading edge presentations for people who want to innovate or redesign services. The research stream goes from strength to strength each year showcasing the latest academic developments.

"Our progress to becoming an independent society and charity has enabled us over the last decade to raise our profile and have a greater impact on the wider respiratory environment. For example we have recently developed some new partnerships with key stakeholders which have helped us to extend our influence.

"The Primary Care Respiratory Academy, developed in partnership with Cogora and now in its second year, is going from strength to strength. This year we launched the Respiratory Commissioning Platform which is providing workshops for commissioners and provider managers looking at population health and ideas for transforming services. This is something that other respiratory societies are not doing.

"Another major partnership with Nature Partner Journals has strengthened our journal, *npj Primary Care Respiratory Medicine*. The journal has a good impact factor, it continues to flourish and grow, its remit is broadening as increasing numbers of people submit articles and we have a new editor with a global view around tobacco.

npj | Primary Care Respiratory Medicine

"PCRS-UK now represents a broad church of health professionals, patients and other stakeholders. It's a forward-looking organisation which adapts with the times and is the place where health professionals come to connect with colleagues and be supported in their roles.

"Our Executive and committees have been transformed in recent years and are now much more representative of the whole primary care team and support the outward-looking vision of PCRS-UK while remaining a welcoming and supportive society."

PCRS-UK today – a multidisciplinary Society

PCRS-UK has evolved over the years to become a Society for all health professionals involved in respiratory care in a primary or community care setting, as described below by some of our newer multidisciplinary team members.

Vikki Knowles

Respiratory Nurse Consultant,
Guildford and Waverley CCG

A former secondary care nurse, Vikki joined PCRS-UK when she took up a new role as Clinical Lead for a community respiratory team working across primary and secondary care.

"This move was extremely challenging and stretched my previous experience to the limits as I realised how poor my understanding was of the issues facing primary care. I discovered PCRS-UK has a fabulous support network, both from an information point of view and on a personal level.

"The first PCRS-UK conference I attended was a revelation as, having been to many international conferences in the past, the friendliness and relevance of this event to the work I was doing was better than anything else I had ever experienced.

"The PCRS-UK Clinical Leadership programme and the affiliated groups offer opportunities to maximise your potential and share good practice. PCRS-UK also offers a voice of reality which is sometimes missing in the national conversations around delivering quality respiratory care."

Sanjay Tanna

Practice-Based Pharmacist

"When I started working as a pharmacist working in general practice I needed a supportive organisation to help with the day to day questions that arise when seeing patients. Looking online I came across the PCRS-UK website – the information was up to date, relevant and fairly concise with lots of useful practical information to help with my clinical work. The website was aimed at primary care and did not seem to make distinctions between doctors, nurses or any other healthcare professionals.

"As 'a new breed of pharmacist' – a pharmacist working in primary care – I decided to attend the annual conference one year. I met up with lots of different professionals interested in improving care for respiratory patients – the same as me! There was lots of practical advice about helping patients, up to date research/projects ongoing and a chance to network. Access to other professionals has enabled me to improve the care I provide for my patients."

Vince Mak

Consultant Physician in Respiratory Integrated Care, Imperial College Healthcare NHS Trust

"As a secondary care physician, I was becoming increasingly frustrated that I was seeing patients who had advanced disease but who were being managed in a disjointed manner. This prevented me from addressing their needs in a patient-centred, holistic manner. In my own professional circle I feel we focus more on the diseases we treat rather than the patients who are afflicted by them.

"I was appointed to the London Respiratory Team where I met some members of PCRS-UK. They showed me that there is a body of professionals promoting a way of working that I strongly believe in. Within PCRS-UK I am able to engage with a range of other health professionals who play an equally valuable role in the care of our patients and give them an equal voice and standing. This reflects the multidisciplinary teams that we are building and provides a forum where we can share our experiences and knowledge."

Clare Cook

Community Respiratory Physiotherapist, Bristol Community Health

"PCRS-UK helps me to stay current, inspired and enthused about respiratory care. I always feel very grounded and supported by PCRS-UK. This is reassuring in a changing climate.

"The annual conference is one of PCRS-UK's absolute strengths. It gives me a really accessible and meaningful level of education. Many members of my clinical team have attended and have learned something that resulted in them changing their practice.

"Both *npj Primary Care Respiratory Medicine* and *Primary Care Respiratory Update* help me to stay up to date clinically and the resources on the website are very useful for updates because they condense things into something that is do-able. I often use these tools in my teaching.

"The Respiratory Leaders Programme has opened up opportunities for me and given me a lot of self-confidence.

"I feel I can trust PCRS-UK's assessment of national respiratory issues and their assessment helps me to set my priorities for my own practice."

OUR CORPORATE SUPPORTERS

Many thanks must go to a host of corporate supporters who have supported PCRS-UK throughout the last 30 years and without whom much of our progress would not have been possible.

GPIAG was set up launched with the help of financial support from Allen & Hanburys. Then followed support from AstraZeneca, Boehringer Ingelheim and Teva (initially as 3M, then becoming Ivax and most recently Teva), after we invited multi-company funding in 2000. We have also received help from a wide number of companies making a shorter foray into the respiratory area, including MSD, Schering Plough, Nycomed and Viatris.

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Presentation:** Pressurised inhalation suspension, in a pressurised metered dose inhaler (pMDI), containing fluticasone propionate and formoterol fumarate dihydrate at strengths of 50 µg/5 µg, 125 µg/5 µg or 250 µg/10 µg per actuation. **Indications:** Regular treatment of asthma where the use of a combination product (inhaled corticosteroid and long-acting β_2-agonist) is appropriate: For patients not adequately controlled with inhaled corticosteroids and 'as required' inhaled short-acting β_2-agonist (SABA), or for patients already adequately controlled on both an inhaled corticosteroid and a long-acting β_2-agonist (LABA). ***flutiform*** 50 µg/5 µg and 125 µg/5 µg per actuation are indicated for use in adults and adolescents 12 years and above. ***flutiform*** 250 µg/10 µg per actuation is only indicated for use in adults. **Dosage and administration:** For inhalation use. The patient should be shown how to use the inhaler correctly by a physician or other healthcare professional. Patients should be given the strength of ***flutiform*** containing the appropriate fluticasone propionate dose for their disease severity (note that ***flutiform*** 50 µg/5 µg per actuation is not appropriate in patients with severe asthma). The appropriate strength should be taken as two inhalations, twice-daily (normally in the morning and evening) and used every day, even when asymptomatic. ***flutiform*** should not be used in children under 12 years. Prescribers should be aware that in asthmatics, fluticasone propionate is as effective as some other inhaled steroids when administered at approximately half the total daily microgram dose. Total daily dose can be increased if asthma remains poorly controlled by administering a higher strength inhaler. Appropriate doses of the β_2-agonist and inhaled corticosteroid (ICS) in separate inhalers, or the ICS alone, should be prescribed if a patient requires doses outside the recommended dose regimens. 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Patients should be advised to contact their prescriber when the ***flutiform*** dose counter is getting near zero. **Contra-indications:** Hypersensitivity to any of the active substances or excipients. **Precautions and warnings:** ***flutiform*** should not be used for the first treatment of asthma, to treat acute asthma symptoms or for prophylaxis of exercise-induced asthma. It should not be initiated during an exacerbation, during significantly worsening or acutely deteriorating asthma, and should not be stopped abruptly. Patients should use their ***flutiform*** maintenance treatment as prescribed, even when asymptomatic. If a patient experiences serious asthma-related adverse events or exacerbations, they should continue treatment but also seek medical advice. Patients should be reviewed as soon as possible if there is any indication of deteriorating asthma control. In the case of sudden and progressive deterioration, which is potentially life-threatening, an urgent medical assessment should be carried out. Use with caution in patients with: pulmonary tuberculosis; quiescent tuberculosis; fungal, viral or other infections of the airway; thyrotoxicosis; pheochromocytoma; diabetes mellitus (consider additional blood sugar controls); uncorrected hypokalaemia; predisposition to low levels of serum potassium; impaired adrenal function (monitor HPA axis function regularly); hypertrophic obstructive cardiomyopathy; idiopathic subvalvular aortic stenosis; severe hypertension; aneurysm or other severe cardiovascular disorders. There is risk of potentially serious hypokalaemia with high doses of β_2-agonists or concomitant treatment with β_2-agonists and drugs that can induce or potentiate a hypokalaemic effect. Particular caution is recommended in unstable or acute severe asthma and other conditions when the likelihood for hypokalemia adverse effects is increased. Monitoring of serum potassium levels is recommended during these circumstances. Formoterol may induce prolongation of the QTc interval. Caution must be observed when treating patients with existing prolongation of QTc interval. ***flutiform*** should be discontinued immediately if there is evidence of paradoxical bronchospasm. Systemic effects with an ICS may occur, particularly at high doses for prolonged periods or when combined with potent CYP3A4 inhibitors, but are less likely than with oral corticosteroids. Use of a spacer device may also cause an increased systemic exposure. Increased exposure can be expected in patients with severe hepatic impairment. 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Caution is advised with use of non-potassium sparing diuretics (e.g. loop or thiazide), xanthine derivatives, glucocorticosteroids, L-Dopa, L-thyroxine, oxytocin, alcohol or other adrenergic drugs. There is an increased risk of arrhythmias in patients receiving concomitant anaesthesia with halogenated hydrocarbons. Hypokalaemia may increase the risk of arrhythmias in patients being treated with digitalis glycosides. Concomitant use of β-adrenergic drugs can have a potentially additive effect. Caution should be taken when using formoterol fumarate with drugs known to prolong the QTc interval, such as tricyclic antidepressants or MAOIs (and for two weeks following their discontinuation), as well as antipsychotics (including phenothiazines), quinidine, disopyramide, procainamide and antihistamines. Concomitant use of an MAOI or a similar agent, such as furazolidone or procarbazine, may precipitate hypertensive reactions. ß-blockers and formoterol fumarate may inhibit the effect of each other. ß-blockers may produce severe bronchospasm in asthma patients, and they should not normally be treated with ß-blockers including those that are used as eye drops to treat glaucoma. Under certain circumstances, e.g. as prophylaxis after myocardial infarction, cardioselective β blockers could be considered with caution. **Pregnancy and lactation:** ***flutiform*** is not recommended during pregnancy. It should only be considered if benefits to the mother outweigh risks to the foetus. It is not known whether fluticasone propionate or formoterol are excreted in breast milk; a risk to the breast feeding infant cannot be excluded. A decision should be made on whether to discontinue breastfeeding or discontinue/abstain from ***flutiform***. **Side-effects:** Potentially serious side-effects: hyperglycaemia; depression; aggression; behavioural changes (predominantly in children); paradoxical bronchospasm; agitation; vertigo; palpitations; ventricular extrasystoles; angina pectoris; tachycardia; hypertension; dyspnoea; peripheral oedema; Cushings Syndrome; adrenal suppression; growth retardation; cataract and glaucoma; hypersensitivity reactions and QTc interval prolongation. Please consult the SPC for details of non-serious side-effects and those reported for the individual molecules. **Legal category:** POM. **Package quantities and price:** One inhaler containing 120 actuations. 50 µg/5 µg - £14.40. 125 µg/5 µg - £28.00. 250 µg/10 µg - £45.56. **Marketing Authorisation numbers:** PL 16950/0167. PL 16950/0168. PL16950/0169. **Marketing Authorisation holder:** Napp Pharmaceuticals Limited, Cambridge Science Park, Milton Road, Cambridge CB4 0GW UK. Tel: 01223 424444. Member of the Napp Pharmaceutical Group. For medical information enquiries, please contact medicalinformationuk@napp.co.uk. **Date of preparation:** July 2015 **Date effective:** August 2015. ®FLUTIFORM is a registered trademark of Jagotec AG, and is used under licence. ®The 'lung' device (logo) is a registered trademark of Mundipharma AG. ®AEROCHAMBER and AEROCHAMBER PLUS are registered trademarks of Trudell Medical International. © 2012 Napp Pharmaceuticals Limited. UK/FLUT-15085

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Reference: 1. Usmani OS *et al.* J Allergy Clin Immunol Pract 2017. http://dx.doi.org/10.1016/j.jaip.2017.02.006

Date of preparation: August 2017 UK/FLUT-17060

Aspiring and Inspiring Respiratory Researchers

28th September 2017
Telford International Centre
12.30 – 17.30

Generating research questions - Using primary care databases - Translating ideas into protocols - Implementation science

Calling all clinical and non-clinical researchers, whether you're completely inexperienced or a seasoned researcher...

Are you involved in respiratory research, or interested in doing some research in future? If so, this pre-conference workshop for you! This excellent programme offers you the chance to learn how to turn your ideas into structured research projects suitable for publication in scientific journals, whatever the scale of your funding and resources. The workshop also focuses on the use of primary care databases and implementation science.

The workshop provides a unique opportunity to meet and network with some of the leaders in primary care respiratory research including Professor Patrick White, Professor Hilary Pinnock, Professor Kamran Siddiqi, and Dr Rachel Jordan.

The workshop is designed for:

- ✓ People starting out on a career in research (PhD students, academic clinical fellows, early career researchers) as well a those wondering if research would be a good career move them.
- ✓ Clinicians involved in research, or who would like to be involved in research
- ✓ Existing or experienced researchers wanting to develop links with others engaged in respiratory research in the UK or find out about a new research method
- ✓ Anyone with innovative work they would like to publish or develop.

You do not need be an expert researcher (yet!) - but enthusiasm is essential!

The workshop is FREE of charge. Visit

https://pcrs-uk.org/early-researchers-meeting

for more information and to download the conference programme and register

PRIMARY CARE RESPIRATORY SOCIETY UK
PCRS UK

Inspiring best practice in respiratory care

Treatment guidelines for COPD - Going for GOLD?

Treatment guidelines for COPD – Going for GOLD?' is a consensus based article, that sets out a simple treatment pathway based on the predominant characteristics of COPD for an individual – whether symptoms or exacerbations– distilled from current guidelines. The article has been developed by a group of clinicians working with and in primary care, facilitated by integrated care consultant, Vince Mak, GPs, Duncan Keeley and Kevin Gruffydd Jones and practice nurse, Carol Stonham

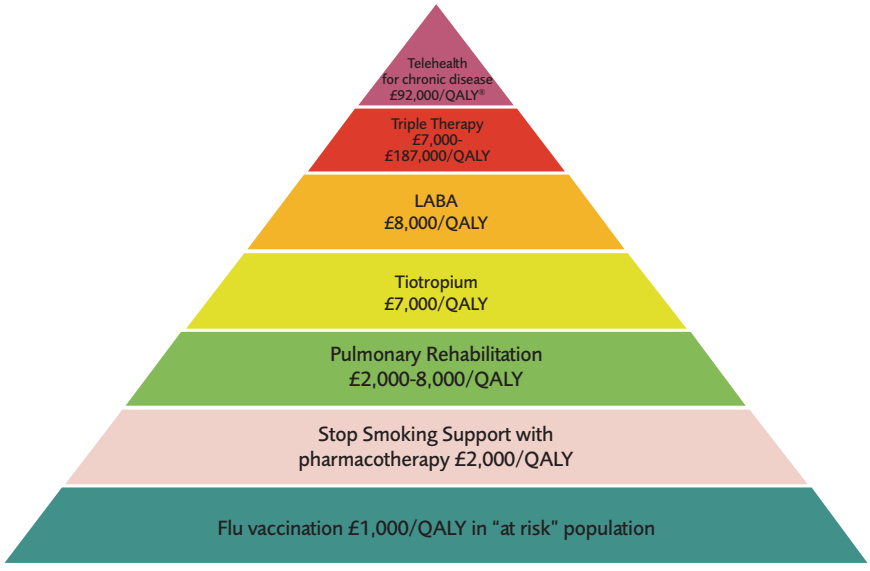
Vince Mak Consultant Physician in Respiratory Integrated Care, Imperial College, London

The way we manage certain conditions are usually directed by clinical guidelines. In the UK, we tend to adopt guidance either from respected specialist societies or from the National Institute of Health and Care Excellence (NICE). The guidelines are always based on the best evidence available at the time of writing, and ideally updated regularly as new research emerges.

Current guidance for COPD

The current NICE COPD Guidelines – CG101, were published in 2010,[1] so includes research up to 2009. The next iteration of NICE COPD is not due to be published until late 2018. Several new drug classes have been introduced since then and we understand more about the relative value of various interventions in the management of COPD (Figure 1).[2] The decision by NICE not to update the guideline more recently has resulted in more up-to-date guidelines being sought from other sources, and in some instances, local guidelines being devised. The GOLD (Global Initiative for Chronic Obstructive Lung Disease) Global strategy for diagnosis, management and prevention of COPD has therefore gained greater prominence.[3] Indeed, in a recent survey of PCRS-UK members, 65% of respondents used GOLD or a local variation of GOLD as their management pathway, with only 33% using NICE (PCRS-UK – data on file June 2017). However, being a member of the PCRS-UK proclaims an interest and degree of prior expertise in COPD and is therefore probably not representative of the majority of primary care clinicians who manage patients with COPD.

Figure 1 London Respiratory Team COPD Value Pyramid



The length and complexity of both NICE and GOLD guidance is daunting, making an informed choice between the two very difficult for the busy clinician. There is a need for a simplified approach to the management of COPD aimed at a non-expert primary care audience. For the experienced practitioner who is already competent at COPD management, the choice should be based on which takes into account the most up to date studies.

What is COPD?

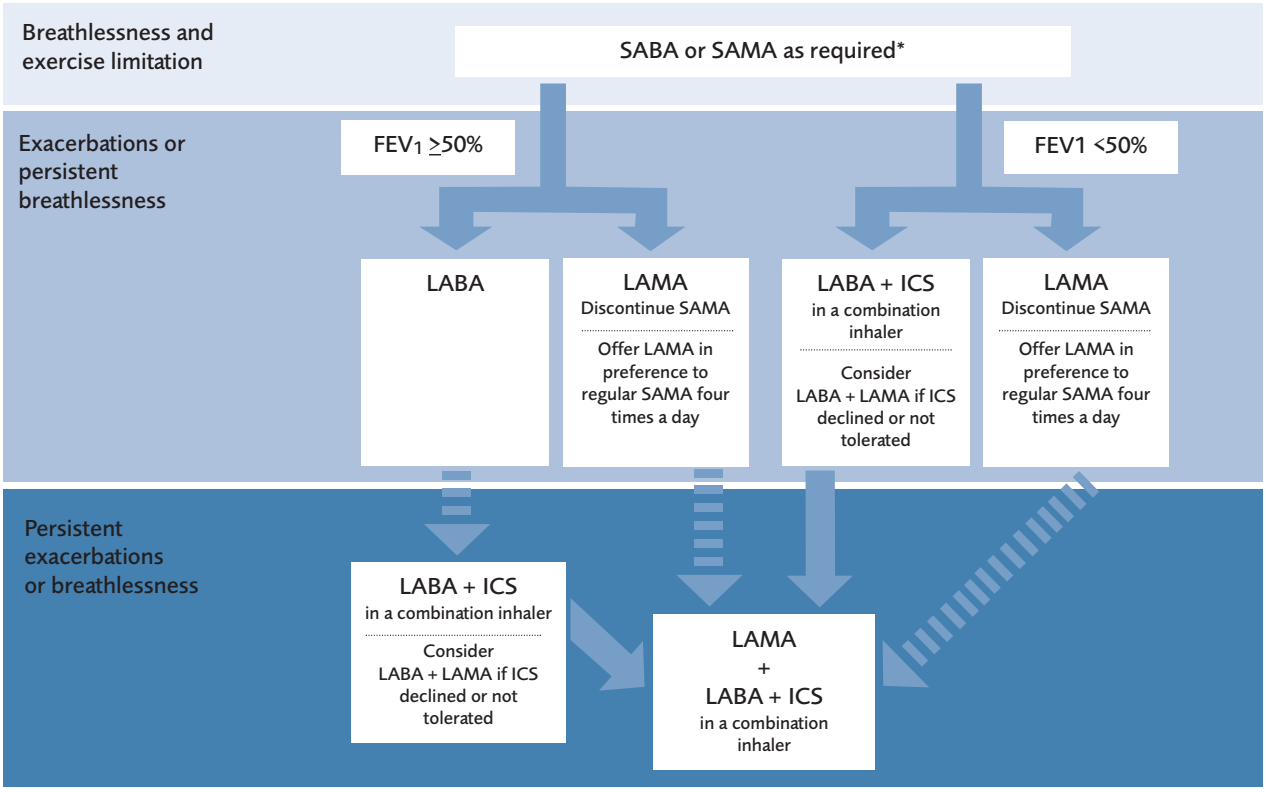
One major caveat needs to be highlighted first; COPD is not actually a disease. COPD is an umbrella term that encompasses a range of disorders; chronic bronchitis, emphysema and chronic asthma[4] and describes poorly reversible chronic obstruction of the airways. When the term "COPD" was first coined, there were limited treatment options, so combining all causes of chronic airflow obstruction into a single condition made diagnosis and treatment simpler. However, with the advent of more treatment modalities for each subgroup of COPD, the utility of a blanket term of "COPD" becomes questionable (for instance, how can chronic asthma with fixed airflow obstruction be treated in the same way as the same level of airflow obstruction caused by emphysema?). In addition, interpretation of studies of "COPD" patients becomes more difficult if we realise that it is not a homogenous disease.

Although all guidelines highlight the importance of differentiating COPD from asthma, there is a grey area where patients may have both chronic poorly reversible obstruction and asthma. More up to date guidelines now recognise that there are differences between patients and GOLD does this by distinguishing different subsets on the basis of symptoms and frequency of exacerbations. However, this leads to 4 different potential treatment pathways (excluding asthma-COPD overlap). Some guidelines attempt to differentiate many potential subsets of COPD which then add to complexity.[5]

The NICE algorithm

NICE primarily uses lung function (measured by FEV_1) as the first step to assess severity and then guide treatment. However, with either increasing symptoms or exacerbations, all treatment pathways lead to triple therapy (LAMA+LABA+ICS) regardless of FEV_1 (Figure 2). Thus patients with continuing breathlessness (a

Figure 2 NICE COPD guideline 101 (2010) treatment algorithm



Abbreviations
SABA - Short-acting beta agonist; SAMA - Short-acting muscarinic antagonist; LABA - Long-acting beta agonist; LAMA - Long-acting muscarinic antagonist; ICS - inhaled corticosteroid; * SABA (as required) may continue at all stages

Offer therapy (strong evidence) Consider therapy (less strong evidence)

common symptom in COPD) may end up on triple therapy. However, evidence supports the use of inhaled corticosteroids in COPD mainly in the prevention of exacerbations.[6,7] Currently, inhaled steroids are used inappropriately across the severity stages of COPD[8,9] causing waste and potential harm from side effects.

GOLD - assessment and algorithm

The GOLD strategy is based on consensus using up to date evidence rather than the grading of evidence, based on rigorous GRADE methodology that is used by NICE. NICE also looks at cost effectiveness whereas GOLD is based on a review of clinical evidence and a consensus of expert clinical opinion.

GOLD previously used lung function (measured by FEV_1) as a guide to severity and treatment, but in its 2017 update, GOLD relegated the use of FEV_1 on the basis that there is poor correlation between lung function and severity.[10] Instead, GOLD now mainly uses a combination of symptoms (determined by either the modified MRC (mMRC) score or CAT score) and exacerbation frequency to assess a patient. This classifies the patient into one of 4 quadrants; ABC or D (Figure 3). Drug treatment options are then proposed for each quadrant giving 4 treatment pathways. As there are several alternatives for some quadrants, this adds to complexity (Figure 4).

Figure 3 The refined ABCD assessment tool

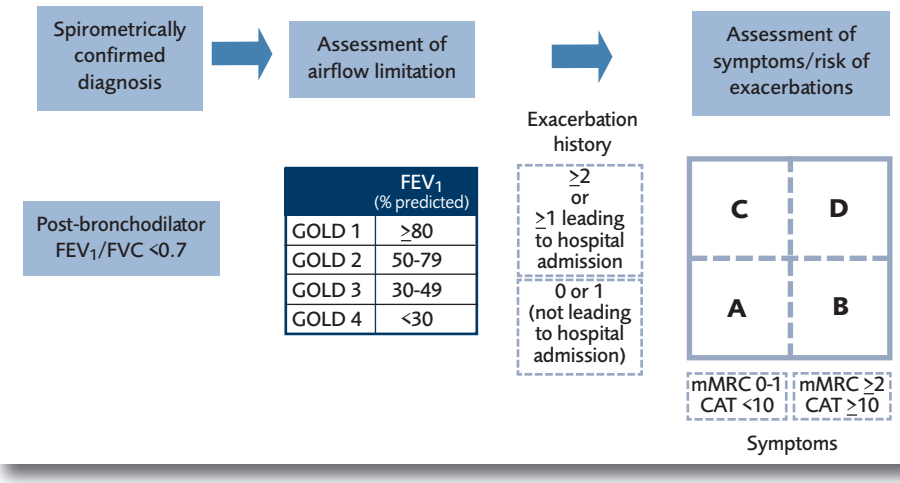


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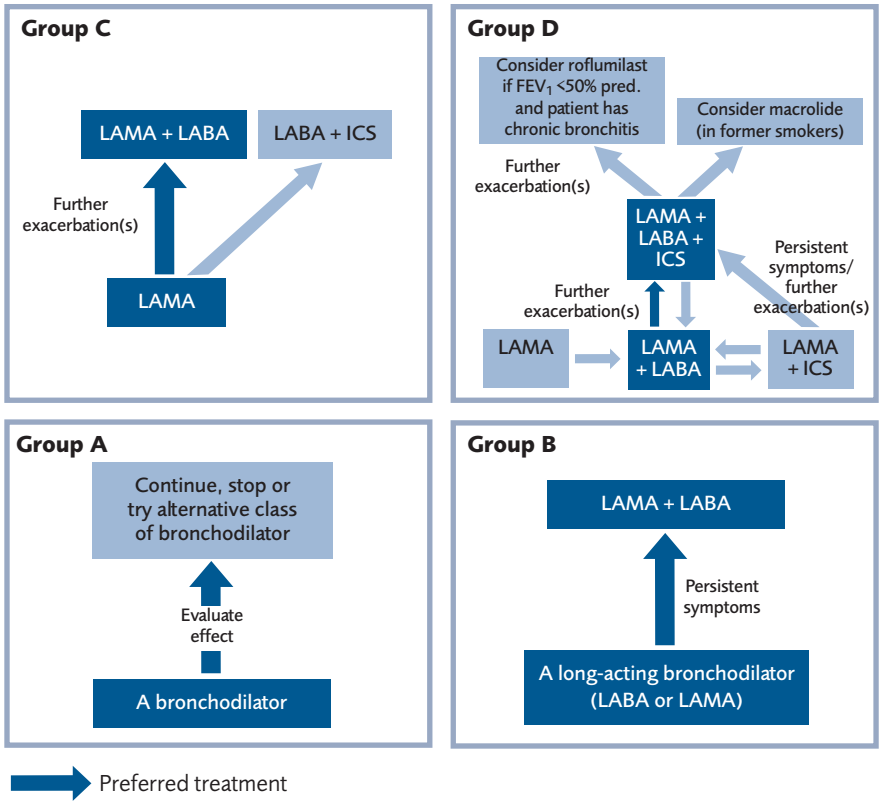
Figure 4 Pharmacologic treatment algorithms by GOLD Grade (dark blue boxes and arrows indicate preferred treatment pathways)



In patients with a major discrepancy between the perceived level of symptoms and severity of airflow limitation, further evaluation is warranted.

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In search of a simpler solution – clinical phenotypes

The development of different options for pharmacological and non-pharmacological treatments for patients with COPD has led to the understanding that clinical response differs according to the characteristics of the disease. The concept of phenotype (defined as the observable characteristics of a subject as determined by the interaction of its genotype with the environment) applied to COPD has resulted in the definition of different groups of COPD patients

with prognostic and therapeutic significance. There is a move towards better characterisation of patients using their phenotype[11] rather than just by their underlying disease.

In this way, we take a more personalised approach to treatment, not necessarily according to just the severity of the disease, but also modified by the clinical phenotype. From a clinical viewpoint, a COPD phenotype should separate patients into distinct groups that can differentiate their prognosis and response to treatment.

There are many potential COPD phenotypes, and there is no consensus currently. Potential classifications can be based on disease attributes such as symptoms,[12] prognosis[13] or combining different features.[14] Several excellent recent reviews have covered the extensive literature around phenotyping[15,16] and there have been guidelines developed based on clinical phenotypes.[5] However, for a classification of subgroups of COPD to be clinically useful, it should be simple for the primary care clinician to apply, and be potentially responsive to different therapeutic interventions (so called "treatable traits").

Three basic phenotypes based on the predominant symptom profile have been proposed as a possible simple classification:[17,18]

- Predominantly breathlessness
- Predominant frequent exacerbations
- COPD with features of asthma

This phenotypic classification may be useful as the predominant characteristic helps determine the main therapeutic options.

Predominant breathlessness phenotype

The key feature of this phenotype is that the main symptom is breathlessness on exertion but patients may not have frequent exacerbations (≥2 exacerbations/year requiring treatment with oral steroids and/or antibiotics).

The patient usually has a significant smoking history and full lung function shows reduced gas transfer capacity (DL_{CO}) and hyperinflation (increased RV/TLC ratio) suggestive of underlying emphysema. Many studies have demonstrated that breathlessness,[19] reduced exercise[20] and hyperinflation[21] predict mortality independent of FEV_1 defined severity.[22] The cause of breathlessness and reduced exercise tolerance may be due to hyperinflation causing increased work of breathing rather than just airflow obstruction. Therefore, reduction in hyperinflation and gas trapping may be a more relevant therapeutic target than just improvement in FEV_1. Non-drug treatments such as pulmonary rehabilitation[18,23,24] and education on breathing techniques[25] are aimed at reducing hyperinflation.

Hyperinflation can be reduced by bronchodilation with only minor improvements to airflow.[26,27] Hyperinflation is also improved by Long-Acting Muscarinic Antagonists (LAMA)[28] and a Long-Acting B_2-Agonist (LABA).[29] This strategy may have additional benefits in terms of improvement in FEV_1 and improvement in quality of life, particularly when used together.[30-33] Therefore, long acting bronchodilators should be the cornerstone of pharmacological treatment of patients with COPD with breathlessness.

Predominant frequent exacerbations phenotype

The frequent exacerbation phenotype can be defined as a patient with fixed airflow obstruction who has two or more exacerbations per year (with the exacerbations at least four weeks apart) or one hospitalised exacerbation.[10]

The risk of an exacerbation is poorly correlated with the severity of disease as classified by FEV_1, but highly correlated with having had previous exacerbations.[34] The importance of exacerbations is threefold: exacerbations adversely affect the patient's quality of life, they risk deterioration to the extent the patient may need more frequent hospital treatment, but also, they damage the lungs such that they may never return to pre-exacerbation levels (seen as a rapid decline in FEV_1). With advanced disease, the frequency of exacerbations increases,[35] so targeting treatment to reduce exacerbation frequency and severity will have beneficial long term effects on the rate of decline in lung function, morbidity and mortality.

Treatment modalities focused on exacerbation reduction such as flu vaccination, stopping smoking and pulmonary rehabilitation are the cornerstones in the management of this phenotype.[23,36] In terms of medications, both LAMAs[37,38] and LABAs[39,40] have been shown to reduce the risk of exacerbations by about 25%. The addition of inhaled corticosteroids (ICS) therapy has also been shown to be beneficial,[6,41] and most current COPD guidelines only recommend the use of ICS in combination with a LABA. However, the benefits of adding an ICS to LAMA or LABA may only be marginal.[7]

COPD with asthma phenotype

This phenotype is the most controversial and is creating significant discussion. Some patients may have features of both asthma and COPD, so called Asthma-COPD overlap (ACO).[42,43] Current estimates suggest that depending on age, between 10-52% (pooled estimate 27%) of patients classified as having COPD may actually have a mixed COPD with asthma phenotype.[42,44] This can come about from asthmatics who have smoked heavily, or who have had lifelong chronic asthma with airways remodelling. Alternatively, a heavy smoker with COPD may develop adult onset asthma.

The importance of determining which patients have a COPD with asthma phenotype is that they may benefit from early inhaled corticosteroid (ICS) treatment.[45,46] Consensus currently is that patients who have COPD with asthma should be treated early with a combination of LABA + ICS. Monotherapy with ICS alone is not recommended.[47] Not surprisingly perhaps, patients who have significant bronchodilator reversibility seem to do better with ICS.[48,49] With more widespread use of FeNO measurement, a marker of eosinophilic inflammation in lung tissue, together with the evolving work on the presence of mild eosinophilia, it may become easier to identify those who have an asthmatic element which should respond to ICS.

Keeping it simple

Defining specific phenotypes is a more patient centred approach as we are considering the presenting problem rather than some measure of lung function. In addition, phenotypes with treatable characteristics can guide more appropriate management. However, many patients exhibit more than one characteristic so the most predominant element should be identified to prioritise treatment.

To classify the patient into the most appropriate phenotype, accurate diagnosis is key. The first step is determining if the patient has chronic airflow obstruction ($FEV_1/FVC<0.70$), and then if there are any features of asthma. It they do have features of asthma then management can be modified from current asthma guidance[50]:

For patients with COPD with Asthma:

1. Intermittent symptoms – SABA
2. If persistent symptoms (i.e using SABA >3 times a week) or exacerbations – SABA plus LABA/ICS combination
3. If continuing exacerbations – SABA plus LABA/ICS plus LAMA or consider referring to specialist

If asthma is deemed unlikely, simple assessment of whether the patient is troubled mainly by breathlessness or exacerbations (or both), will determine their treatment pathway. If they have more than 2 moderate exacerbations a year (or one moderate exacerbation and one severe exacerbation requiring hospitalisation), they fall into the predominant frequent exacerbation phenotype and treatment should prioritise reduction of exacerbations.

For patients with COPD with frequent exacerbations and breathlessness:

1. Intermittent exacerbations – SABA plus LAMA or LABA
2. If persistent exacerbations – SABA plus LAMA/LABA combination
3. If continuing exacerbations – SABA plus LABA/ICS combination + LAMA or consider referring to specialist

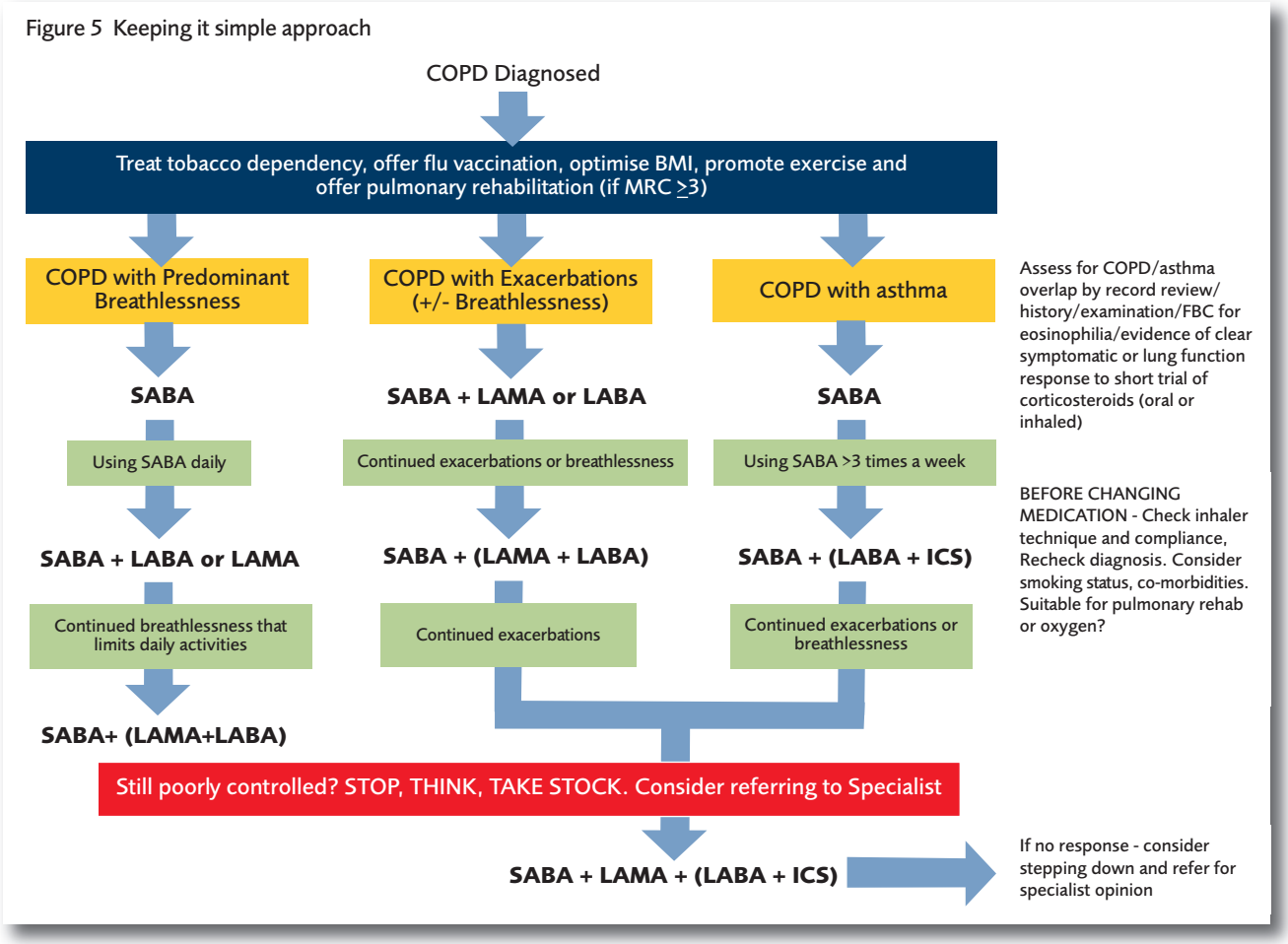
If the patient does not have frequent exacerbations, they may have the predominant breathlessness phenotype and treatment should be focused on maximising bronchodilation and reduction in hyperinflation.

For patients with COPD and breathlessness (but no asthma):

1. Intermittent breathlessness – SABA
2. If persistent breathlessness – SABA plus LAMA or LABA
3. If still getting persistent breathlessness – SABA plus LABA/LAMA combination

This is summarized in Figure 5. These treatment options still follow what is recommended by both NICE and GOLD, but bases decisions on the predominant problem of the patient and simplifies the choices that can be made.

Figure 5 Keeping it simple approach



Conclusions

For the non-specialist primary care practitioner, currently available treatment guidelines for COPD may not reflect current practice or appear dauntingly complicated. These guidelines may not take into account adequately that COPD is not a homogenous disease but contains a collection of different clinical phenotypes. There is a need for a simple strategy that is patient centred and easy to apply. We have proposed a simple treatment pathway based on the predominant symptoms of the patient distilled from current guidelines that will hopefully make management of the patient sitting in front of us more straightforward.

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Concomitant administration of other beta-adrenergic drugs may have potentially additive effects. Concomitant treatment with quinidine, disopyramide, procainamide, phenothiazines, antihistamines, monoamine oxidase inhibitors (MAOIs) and tricyclic antidepressants can prolong the QTc interval and increase the risk of ventricular arrhythmias. L-dopa, L-thyroxine, oxytocin and alcohol can impair cardiac tolerance towards $beta_2$-sympathomimetics. Hypertensive reactions may occur following co-administration with MAOIs including agents with similar properties (e.g. furazolidone, procarbazine). Concomitant treatment with xanthine derivatives, steroids or diuretics may potentiate a possible hypokalaemic effect of $beta_2$-agonists. Hypokalaemia may increase the likelihood of arrhythmias in patients receiving digitalis glycosides. 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New tool may help cut unnecessary antibiotic prescribing for children with coughs and respiratory tract infections

Fran Robinson, PCRS-UK Communications Consultant, **Steve Holmes**, PCRS-UK Education Lead, and **Katherine Hickman**, PCRS-UK Conference Organising Committee Co-Chair

This article introduces the TARGET study algorithm paper, which reports development of a new clinical prediction algorithm designed to improve targeted antibiotic prescribing in children with respiratory tract infections.

Three PCRS-UK experts give differing opinions on the value of this new tool. This study is important because respiratory tract infections are the single most important cause of consultations in primary care[1] and this tool could provide a new layer of evidence to help healthcare professionals and parents deal with the uncertainties they face when managing these common but potentially life-threatening infections.

You can learn more about this topic at the PCRS-UK annual conference '*Beyond the respiratory consultation: inspiring lifelong change*', when Professor Andrew Bush, Professor of Paediatrics and Paediatric Respirology, Imperial College and Royal Brompton Hospital, will discuss respiratory infections in children and when to refer. The conference is being held on 29th-30th September at the Telford International Centre. For further information visit: https://pcrs-uk.org/annual-conference

The Target study

"Respiratory tract infections (RTI) with cough are the most common reason children are prescribed antibiotics by doctors in primary care, but up to a third of prescriptions may be unnecessary", say the authors of this study.

Despite national and international calls for more targeted use,[2] primary care prescription of antibiotics for coughs and colds increased by 40% in the UK between 1999 and 2011,[3] in part reflecting the uncertainties facing patients, parents and healthcare professionals when managing these common but potentially life-threatening infections.

A new study published in the *Lancet Respiratory Medicine*[4], of over 8,000 children has identified seven key predictors which could help GPs and nurses in primary care identify low risk children who are less likely to need antibiotics.

The authors estimate that, if antibiotic prescribing in this low risk group was halved, and even if it increased to 90% in high risk patients, a new algorithm they have developed, with the mnemonic STARWAVe, could reduce antibiotic prescribing to children with RTI and coughs by 10% overall, similar to other interventions used to combat antibiotic resistance.

STARWAVe, uses seven predictors of future hospitalisation that can be easily identified by doctors and nurses during a patient visit.

The seven characteristics are:

- Short illness (less than 3 days)
- Temperature (37.8°C on examination or parent reported severe fever in the previous 24 hours),
- Age under 2 years
- Respiratory distress
- Wheeze
- Asthma
- Vomiting (moderate/severe in the previous 24 hours).

To create the tool, Professor Alastair Hay from the University of Bristol and colleagues analysed data collected between July 2011 and May 2013 from almost 8,400 children aged between 3 months and 16 years with acute (less than 28 days) cough and respiratory tract infection symptoms (eg fever) who were seen at 247 GP practices across England. They used modelling to determine which of

the 50 demographic characteristics, parent-reported symptoms and physical examination signs measured might be most useful and accurate in distinguishing good from poor prognosis illnesses, defined as those resulting in hospitalisation for respiratory infection in the month following a visit to primary care.

Modelling showed that seven characteristics outlined by the STARWAVe algorithm were independently linked with hospitalisation.

Using these findings, the authors then developed a seven-item scoring system for a child's risk of future hospitalisation. For example:

- A child presenting with one or none of these characteristics would be at very low risk of hospitalisation (0.3% risk; 67% of children in the study)
- A child with 2–3 of these characteristics would be at normal risk, similar to the general population (1.5% risk; 30% of children in the study)
- A child showing 4 or more would be a high risk candidate for future hospitalisation (11.8% risk; 3% of children in the study).

The authors recommend that:

- A 'no antibiotic' prescribing strategy would be appropriate for low risk children
- A 'no antibiotic or delayed antibiotic' treatment strategy would be best for normal risk children as recommended by NICE
- Children deemed at high risk of hospitalisation should be closely monitored for signs of deterioration and followed up within 24 hours.

The accuracy of the rule was measured by a figure called the 'area under the receiver operating characteristic curve', or AUROC. An AUROC of 0.5 would mean the rule is about as good a predictor as flipping a coin. An AUROC of 1.0 is perfect. The new STARWAVe rule gave an AUROC of 0.81, which indicates it should predict the risk of hospitalisation with high accuracy.

The authors note that the results are likely to be applicable to primary care systems similar to those in the UK, but as only 78 children were hospitalised during the study, further research is needed to externally validate the tool in a randomised trial.

They argue that it could be a useful tool to improve the targeting of antibiotics to reduce the growing threat of antibiotic resistance because it is challenging for GPs and primary care nurses to easily identify serious respiratory infections.

Lead author Professor Hay, says: "Excessive antibiotic use has contributed to the development of resistance to these drugs. The aim of our study was to develop a simple, usable prediction tool based on symptoms and signs to help GPs and nurses identify children presenting in primary care at the lowest and highest risk of future complications and hospitalisation, so that antibiotics can be targeted accordingly.

"This is the first study of its kind, based on a large representative sample of children who visit the doctor with respiratory illness. We hope that our proposed clinical tool might eventually enable doctors to quickly and easily identify their lowest and highest risk patients, although more research will be needed to determine just how effective it is in clinical practice. The rule should supplement not replace clinical judgement, and doctors and nurses should still advise parents about the symptoms and signs they should look out for, and when to seek medical help."

In a linked comment in the *Lancet Respiratory Medicine*,[5] Professor David Price, Chair of Primary Care Respiratory Medicine at the University of Aberdeen and colleagues discuss the need to test the tool in whole study populations and not just those recruiting and consenting to enter a study.

They write: "Notwithstanding the inclusion of patients prescribed an antibiotic and the absence of an independent validation cohort, STARWAVe promises to achieve better targeting of antibiotics in primary care. There are few efficacious interventions for respiratory tract infection available to primary care clinicians beyond offering reassurance and self-management advice, so the modest benefit offered by antibiotics can persuade general practitioners to prescribe them.

They add: "STARWAVe offers primary care clinicians an evidence-based practical tool to help guide antibiotic prescription decisions and, through shared decision-making, has the potential to reduce antibiotic prescription based on prognostic uncertainty or on non-medical grounds.[6] Combining this tool with point-of-care C-reactive protein (CRP) testing, or to triage for CRP testing[7] might help to target antibiotic use further."

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What the experts say:

Dr Noel Baxter
PCRS-UK Chair, GP South London, Co-Lead NHS London Respiratory Network, Primary Care Lead National COPD Audit

"My reflections on this paper come from the position of an experienced GP who still dreads those difficult decisions I need to make in tandem with anxious parents and guardians about young children day in day out during the winter respiratory infection season when certainty can't be provided. I was also the research lead for the Target study at Surrey Docks health centre during the recruitment and the notes review period so can also reflect how the experience resulted in a change in my own practice from simply taking part.

"It is important to say that the study does not yet provide us with a validated tool for this coming winter, but future work will hopefully move us towards that point. I'm sure I am not alone in finding Wells, Centor, CRB65 and other scoring systems useful as an objective check against what my gut instinct tells me – something that was noted as a statistically significant predictor for admission. It would therefore be useful to have a validated tool too for this scenario.

"The key characteristics identified from their statistical modelling do seem plausible to me and they fit with the features that I tend to look for as a GP. What I will do differently now is ensure that I have considered these and begin to get used to noting and, indeed, coding them where possible. Developing a template with these codes and making recording these items of health status an easy thing to do might be an opportunity within a practice or cluster or federation.

"An element from the paper that I think we can communicate to parents and that may help assess risk or provide assurance is that, in this study, out of 8,394 children presenting unwell to their GP surgery with similar symptoms to their child, only 78 were subsequently admitted.

"The practice-changing experience for me from being the lead in a study centre was that I had to grade the carer's score out of 10 for how ill they thought their child was. The paper does in fact show it to be a marker statistically significant for risk of admission and it did help change the feel of the consultation. It allowed me to use a tool to ensure that I was taking their concerns seriously and including them in my assessment. Hearing the concern of the child's carer is of course a basic lesson for a medical student studying paediatric care, but the process of recording it as part of the assessment was a new process for me and one that I think is helpful."

Dr Katherine Hickman
GP, Leeds, PCRS-UK Regional Lead, York and Humber, CCG Respiratory Lead for Leeds and Bradford

"Clinicians and patients are aware of the growing problem of antibiotic resistance but we still have a long way to go. By discussing the Centor Score with every patient who presents with a sore throat, I have rarely had to enter into a disagreement over antibiotics. This is reflected in not only in my day-to-day practice, but also when working at out-of-hours service. So often patients just want reassurance, backed up by good evidence and appropriate safety netting. My experience has been overwhelmingly positive. Problems occur when patients feel they are not being listened to or their concerns are ignored.

"The STARWAVe algorithm, therefore, is a welcome adjunct to daily practice. It allows a logical conversation to occur, backed up by emerging evidence and can be reassuring for both parties. There will always be certain patients who are adamant they want antibiotics and if they don't get them from their GP, they will get them from elsewhere. These patients should be the exception not the rule.

"For this tool to be truly effective, ideally it should be adopted by the practice as a collective as well as by out-of-hour providers. Patients shouldn't be deciding which clinician to see based on whether or not they are more likely to get antibiotics. We all have a responsibility to send out a clear message to our patients that so often antibiotics simply aren't the answer."

Dr Steve Holmes
PCRS-UK Education Lead, GP trainer, Associate Postgraduate Dean Health Education England (South West), Clinical Respiratory Lead Somerset CCG, Trustee of Education for Health

"This paper is interesting and well worth a read. It highlights that a frightening 37% of presentations for cough/URTI result in antibiotic prescriptions. It does indeed identify the factors that appeared commoner in children more likely to be admitted with respiratory problems (wheeze, asthma, age under 2 years, fever, etc.) in the 78 admissions out of 8,394 children studied.

"However, fundamentally the paper is trying to recommend when to use or not to use antibiotics based on whether the patient is admitted to hospital, and the identifiable factors around that. The problem is that, of the 78 admissions, only 21 had a potential bacterial respiratory infection (26.9%) on the hospital discharge letter (and we know how reliable these can be).

"Many of the factors (asthma, wheeze in younger people) suggest more viral origin and, indeed, need for asthma-like treatment rather than antibiotics. It is also worth noting that the severity of illness in those being admitted was relatively low with only 28% having a raised respiratory rate and 26% a raised temperature when assessed.

"The paper did not look at the impact that the antibiotic had in preventing the admission in the first place (or potentially preventing) although with the method used this would not have been feasible.

"There are many validated tools in clinical practice and although this study is exploring an interesting area of current practice, we are probably better using our Centor Score for sore throat, BTS/SIGN guideline on the management of asthma,[1] NICE guidance on fever in children[2] and sepsis[3] at the current time. More research is needed, as ever, as we discover the best way to treat our patients."

1. BTS/SIGN guideline on the management of asthma. 2016. https://www.brit-thoracic.org.uk/standards-of-care/guidelines/btssign-british-guideline-on-the-management-of-asthma
2. Fever in under 5s: assessment and initial management. NICE, May 2013. https://www.nice.org.uk/guidance/cg160
3. Sepsis: recognition, diagnosis and early management. NICE, July 2016. https://www.nice.org.uk/guidance/ng51

The Centor criteria

Centor criteria to aid diagnosis of group A beta-haemolytic streptococcus (GABHS) as a cause of presentation with a sore throat:

- tonsillar exudate
- tender anterior cervical lymph nodes
- absence of cough
- history of fever

- Presence of three or four of these clinical signs suggests that the chance of the patient having GABHS is between 40% and 60% so the patient may benefit from antibiotic treatment
- Absence of three or four of the signs suggests that there is an 80% chance that the patient doesn't have the infection and antibiotics are unlikely to be necessary
- In patients with tonsillitis who are unwell and have three out of four of these criteria, the risk of quinsy is 1:60 compared with 1:400 in those who are not unwell
- Centor criteria are not ideal and will lead to some patients with bacterial pharyngitis not being treated and result in unnecessary antibiotic treatment

MeReC Bulletin 2006;**17**(3):12-14

Streptococcal score card

The streptococcal score card gives an indication of the likelihood of a sore throat being due to infection with group A beta-haemolytic streptococci GABHS. The criteria are:

- Age 5–15 years
- Season (late autumn, winter, early spring)
- Fever (≥38.3°C [≥101°F])
- Cervical lymphadenopathy
- Pharyngeal erythema, oedema or exudate
- No symptoms of a viral upper respiratory infection (conjunctivitis, rhinorrhoea or cough).

If five of the criteria are met, a positive culture for GABHS is predicted in 59% of children; if six of the criteria are met, a positive culture is predicted in 75% of children.

NICE guidance

A no-antibiotic prescribing strategy or a delayed antibiotic prescribing strategy should be agreed for patients with the following conditions:

- acute otitis media
- acute sore throat/acute pharyngitis/acute tonsillitis
- common cold
- acute rhinosinusitis
- acute cough/acute bronchitis

Depending on clinical assessment of severity, patients in the following subgroups can also be considered for an immediate antibiotic prescribing strategy (in addition to a no-antibiotic or a delayed antibiotic prescribing strategy):

- bilateral acute otitis media in children younger than 2 years
- acute otitis media in children with otorrhoea
- acute sore throat/acute pharyngitis/acute tonsillitis when three or more Centor criteria are present

For all antibiotic prescribing strategies, patients should be given:

- advice about the usual natural history of the illness, including the average total length of the illness (before and after seeing the doctor):
- acute otitis media: 4 days
- acute sore throat/acute pharyngitis/acute tonsillitis: 1 week
- common cold: 1.5 weeks
- acute rhinosinusitis: 2.5 weeks
- acute cough/acute bronchitis: 3 weeks

When the no-antibiotic prescribing strategy is adopted, patients should be offered:

- reassurance that antibiotics are not needed immediately because they are likely to make little difference to symptoms and may have side effects, for example, diarrhoea, vomiting and rash
- a clinical review if the condition worsens or becomes prolonged

When the delayed antibiotic prescribing strategy is adopted, patients should be offered:

- reassurance that antibiotics are not needed immediately because they are likely to make little difference to symptoms and may have side effects, for example, diarrhoea, vomiting and rash
- advice about using the delayed prescription if symptoms are not starting to settle in accordance with the expected course of the illness or if a significant worsening of symptoms occurs
- advice about re-consulting if there is a significant worsening of symptoms despite using the delayed prescription. A delayed prescription with instructions can either be given to the patient or left at an agreed location to be collected at a later date

Respiratory tract infections (self-limiting): prescribing antibiotics. NICE July 2008. https://www.nice.org.uk/guidance/cg69

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Systemic effects: Use with caution in patients with severe cardiovascular disorders, convulsive disorders, thyrotoxicosis and phaeochromocytoma. Hyperglycaemia and hypokalaemia may occur with high doses of β_2-adrenergic agonists. In patients with severe COPD, hypokalaemia may be potentiated by hypoxia and concomitant treatment. Due to its anticholinergic activity, use with caution in patients with symptomatic prostatic hyperplasia, urinary retention or narrow-angle glaucoma. Dry mouth has been observed and may in the long term be associated with dental caries. Excipients: Patients with rare hereditary problems of galactose intolerance, the Lapp lactase deficiency or glucose-galactose malabsorption should not take Duaklir Genuair. **Drug interactions:** COPD medicinal products: Co-administration with other anticholinergic and/or β_2-adrenergic agonist containing medicinal products is not recommended. 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References:

1.Duaklir® Summary of Product Characteristics. Available from https://www.medicines.org.uk/emc/ **2.**Singh D *et al. BMC Pulm Med* 2014; 14: 178. **3.**D'Urzo AD *et al. Resp Res* 2014; 15:123. **4.**Bateman ED *et al. Respir Res* 2015; 16:92.**5.**Bateman ED *et al. Resp Res* 2015; 16: 92 – supplementary data

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Policy Round-Up

Bronwen Thompson, *PCRS-UK Policy Advisor*

A summary of the latest developments in the UK health services, including any major new reports, guidelines and other documents relevant to primary care respiratory medicine

Spirometry – what's the story?

In our Spring edition we highlighted that the new scheme for assessing and certifying competence in performing and/or interpreting spirometry would be going live from April 1st. Things have been moving on a pace since then, and PCRS-UK has been closely involved with all developments.

In June the first meeting of the National Scrutiny Board (NSB) was held, chaired by Professor Mike Morgan, National Director for Respiratory Disease with NHS England. Both members and non-members have been seeking clarification about how the scheme will operate in practice, and we are keeping the NSB informed about the priorities for communication in order that primary care professionals fully understand how the scheme will work. We see our role as ensuring that the interests of the primary care community are taken into account as the scheme is implemented in the coming 4 years, and Noel Baxter and Carol Stonham (PCRS-UK Chair and Vice-Chair) are representing on the NSB. The NSB has representation from all the major respiratory stakeholder groups and its role is to oversee the whole scheme so that there is an active National Register in place from April 2021.

We believe that there will be significant clarification in the coming months about the options for training and how assessment will work and we shall keep you informed as the scheme develops.

- **Spirometry 'mythbuster' from CQC!**

  The Care Quality Commission (CQC) has issued a piece on spirometry in its 'Nigel's surgery' series for primary care. Professor Nigel Sparrow, senior national GP adviser, has referenced both the guidance on standards for spirometry (2013) and the document on assessment and certification of competence (2016) on the CQC website. He supports the move to raise the standard of diagnosis through improving the quality of diagnostic spirometry, and points out that it is best practice for those performing or interpreting diagnostic spirometry in general practice to be on the National Register from 2021. He will be encouraging inspectors in primary care to ask practices about how they are preparing for the introduction of the new scheme. See http://bit.ly/2v0IiEe for more information

- **Guidance on how to commission a spirometry service is still in preparation at NHS England and we will keep you informed about publication.**

What can primary care do to improve outcomes in COPD?

The latest report from the National COPD audit was issued by the RCP in February. This report, 'Who cares when it matters most?' is a supplementary report detailing the outcomes of the cohort of patients included in the 2014 clinical audit of COPD exacerbations in England, at 30 and 90 days after the index admission. This report doesn't pull any punches. It describes a situation characterised by 'high front-end efficiency' for the initial admission, but with less emphasis on 'whole-case management and the important application of evidence-based care during the hospital episode' which clearly has 'long-term ramifications for patient experience and long-term outcomes'. The executive summary highlights that there is a 'pressing need for commissioners and the primary, secondary and social care sectors to develop integrated care systems that better manage the needs of this complex and fragile patient group.'

Importantly, it highlights what can be done by primary care and commissioners to improve outcomes and address some of the shortfalls in care identified in the report.

These include:

- identification and targeted support within primary care of patients who are at particular risk of hospital admission
- the importance of review in primary care within 7 days of discharge
- the use of high value interventions such as pulmonary rehabilitation and addressing tobacco dependence

Best practice tariff for COPD

Hospital trusts now have an added incentive to improve their management of COPD because April 1st saw the introduction of a best practice tariff for COPD. This means that they have more clearly defined in the tariff what secondary care needs to do to deliver optimal care for people with COPD. A timely intervention, given what the National COPD audit is revealing about COPD care.

Specifically, there should be more specialist input in the management of exacerbations. Currently, only 57% of people admitted to secondary care receive specialist input into their care within 24 hours of admission.

And there is specific encouragement to use discharge bundles more. Currently, only 68% of providers report using discharge bundles, yet they have been shown to encourage a more systematic and evidence-based approach to patient care.

Confused by increasing number and types of inhalers?

Then RightBreathe has a solution for you. RightBreathe is a tool designed specifically to help with the selection, prescribing and ongoing use of inhalers. Its overall aim is to optimise medicines use in this increasingly complicated area. It covers all inhalers and spacers on the UK market. It is an online tool which enables a healthcare professional to see what the treatment options are at any step in the treatment pathway, and to be able to compare and contrast them. If you like, it is a BNF arranged in pathway format, covering pathways described in international, national and local (London) guidelines, with visuals of the inhalers and succinct product information. This was initiated by the London procurement partnership, was led by a collaboration of clinicians and pharmacists, with inputs from many stakeholders in the respiratory community, and is being made available to the whole country. As it will be kept constantly updated with new inhalers as they become available, it promises to be a useful source of information to support prescribing decisions in the long term. https://www.rightbreathe.com/

In brief – Update on asthma and COPD work at NICE

- Long awaited asthma guidelines are now expected in October 2017. The publication of the asthma management guideline has been delayed to enable simultaneous publication of the asthma diagnosis and monitoring guideline.
- NICE took the unprecedented step of doing field testing of the diagnosis and monitoring guideline recommendations after questions were raised about the practicalities of implementation by the respiratory community. This completed in December, and a second consultation has been undertaken prior to publication to incorporate learning from the field testing.
- The draft asthma management guideline was out to consultation in January, and PCRS-UK submitted a comprehensive response. The significant difference from the BTS/SIGN British asthma guideline was the positioning of leukotriene receptor antagonists (LTRAs) as the preferred first-line add-on treatment after inhaled corticosteroids (ICS) have failed to achieve control once a comprehensive adherence and other risk factor assessment has been completed. This is largely due to the low cost of LTRAs, since efficacy is similar for long acting bronchodilators (LABAs) and LTRAs. NICE considers cost effectiveness, whereas BTS/SIGN is purely based on clinical effectiveness.
- The work on updating the COPD guideline continues, with a consultation on a draft guideline expected in summer 2018 and final publication in November that year.

Watch this space…

RightCare respiratory focus pack

We are hopeful that by the time of publication, there will be a revised and updated Focus pack on respiratory disease from RightCare. This focus pack will compare a CCG with a group of similar CCGs on their spend and outcomes, and highlight where a CCG should focus their efforts in improving care. A pack of 90-100 charts will give any CCG a really good picture of how they compare so that they can explore any unexplained variation, and draw up a programme of improvement.

Optimal value programme from RightCare

We have taken part in a round table workshop with other respiratory stakeholders to identify the interventions across health economies, which have a solid evidence base and would make a real difference to the outcomes of care. Currently, when CCGs recognise a need to improve the care of people with COPD, and make COPD a priority, there is no agreed list of interventions at system level, which they can consult and select from. The RightCare Optimal Value initiative aims to fill this gap. The outputs will be a set of interventions that a CCG can lead, from which CCGs can select the ones most appropriate for them. PCRS-UK had several people at the meeting who work both in primary/community care as well as taking a population view of their CCG, and this mix of perspectives meant they were able to make a really useful contribution to discussions. We shall keep you updated with any outputs.

An Airways audit?

PCRS-UK has been contributing to discussions about incorporating asthma into the National audit programme – so that there would be an Airways audit programme from 2018, combining both COPD and asthma in a single audit. We think this will really help to put respiratory disease on the map, but there are still problems with data collection in primary care following the data confidentiality issues that emerged in the care.data scheme which was shelved in 2016. We will continue to be involved in the hope that the data confidentiality issues around data collection in primary care can be overcome in time.

The Lay Patient and Carer Reference Group

Lay Reference Group Member Profile

Name: John Hubbold
John is aged 72 and lives in Kempston, near Bedford

What condition do you suffer from?
Relapsing polychondritis. This is an auto immune disease which has destroyed the cartilage in my airways and as a result has restricted my breathing. It did not affect any other cartilage.

When were you diagnosed?
I was 39 and cycling to work and my airways got cut off several times. It took nearly 11 months for the condition to be diagnosed. My GP first sent me to an ENT consultant who didn't know what was wrong with me. Eventually because of long waiting lists I paid to see a local respiratory consultant with connections to Papworth Hospital.

What has made the most difference to you in terms of your care?
When I was 50, Papworth Hospital inserted nine stents in my airways to keep them open and my peak flow went from 170 to 340. It made life a lot easier even though I still get out of breath. If I hadn't had that operation I don't think I would be around today because my health was deteriorating.

When I retired in 2008 I joined the a Breath Easy group and discovered the local pulmonary rehabilitation course and that has really given me control and changed the way I do things. I can now stand and talk in front of people without getting too out of breath which is something I could never have done when I was working.

Why did you join the Lay Reference Group?
Relapsing polychondritis is a rare disease and because of my experience in getting a diagnosis I would like GPs know more about breathing problems – they seem to be very low down on the NHS list of priorities. It's important they hear the patient perspective.

What messages would you like health professionals to hear?
I would like GP to tell patients not to be worried about getting out of breath – that's what frightens a lot of people. What I have learned from pulmonary rehabilitation is that the more you do for yourself the more your breathing will improve.

Journal Round-Up

npj Primary Care Respiratory Medicine Key Summaries

A selection of short summaries of original research articles published in *npj Primary Care Respiratory Medicine*. The articles featured have been selected by the Primary Care Respiratory Update editorial board as being the most relevant and useful to primary care respiratory clinical practice in the UK. You can download freely any articles of interest from the website http://www.nature.com/npjpcrm/

npj Primary Care Respiratory Medicine is the only fully indexed scientific journal devoted to the management of respiratory diseases in primary care. It is an international, online, open access journal and is part of the Nature Partner Journal series.

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**** EDITOR'S CHOICE ****

Stability of the frequent COPD exacerbator in the general population: a Danish nationwide register-based study
Mette Reilev, Jesper Lykkegaard, Anders Halling, Jørgen Vestbo, Jens Søndergaard & Anton Pottegård
npj Primary Care Respiratory Medicine 27, Article number: 25 (2017)
doi:10.1038/s41533-017-0029-7

Patients with chronic obstructive pulmonary disease (COPD) who suffer from frequent exacerbations do not necessarily persist with such severity over time. Exacerbations in COPD are defined by worsening respiratory symptoms that result in changes to treatment, hospitalization and, at worst, death. However, clarity is needed on whether frequent exacerbations are a stable feature of some patients' disease. Mette Reilev at the University of Southern Denmark and co-workers followed, over 10 years, 19,752 COPD patients living in Denmark who suffered at least one exacerbation in 2003. By 2004, 60% of patients were classed as infrequent or non-exacerbators, rising to 68% by 2012. Very few patients remained 'frequent exacerbators', suggesting the rate of exacerbations changes considerably over time. This could hold implications for COPD treatment and challenge assumptions made about disease progression.

Device errors in asthma and COPD: systematic literature review and meta-analysis
Henry Chrystyn, Job van der Palen, Raj Sharma, Neil Barnes, Bruno Delafont, Anadi Mahajan & Mike Thomas
npj Primary Care Respiratory Medicine 27, Article number: 22 (2017)
doi:10.1038/s41533-017-0016-z

Researchers should adopt a standardised approach to investigate the incorrect use of inhalers and its associated clinical implications. Henry Chrystyn at Plymouth University, together with scientists across the UK and the Netherlands, conducted a review of research related to inhaled medication errors made by patients with asthma or chronic obstructive pulmonary disease. It is widely acknowledged that many patients with lung conditions don't use their inhaler devices correctly, which affects drug effectiveness and disease control. While Chrystyn's team found high critical error rates reported across all devices, their meta-analysis and systematic review highlighted significant gaps in knowledge regarding different inhalers and associated error rates, and how these affect clinical outcomes. The researchers call for in-depth studies into device use, alongside standardised checklists and definitions for such studies to use to ensure consistency.

Management of respiratory tract infections in young children: a qualitative study of primary care providers' perspectives
Ruby Biezen, Bianca Brijnath, Danilla Grando & Danielle Mazza
npj Primary Care Respiratory Medicine 27, Article number: 15 (2017)
doi:10.1038/s41533-017-0018-x

The emotions and psychology of both parents and clinicians influence how respiratory tract infections (RTIs) are managed in young children. Researchers in Australia, led by Ruby Biezen from Monash University, interviewed 30 primary care clinicians about their views on how to care for children with RTIs, such as the common cold. The interviews focused on symptomatic management, over-the-counter medications and antibiotic use. Despite the availability of best-practice guidelines, clinicians did not always follow the recommendations owing to factors such as time constraints, parental anxiety, perceived parental pressure, and fear of losing patients. These are some of the reasons why clinicians sometimes advise or prescribe unnecessary medications. The

authors suggest that a team approach involving multiple healthcare professionals who deliver consistent advice could improve guideline adherence.

The impact of poor asthma control among asthma patients treated with inhaled corticosteroids plus long-acting β2-agonists in the United Kingdom: a cross-sectional analysis
Ian D Pavord, Nicola Mathieson, Anna Scowcroft, Riccardo Pedersini, Gina Isherwood & David Price
npj Primary Care Respiratory Medicine 27,
Article number: 17 (2017)
doi:10.1038/s41533-017-0014-1

Many people who take inhaled steroids combined with long-acting β2-agonist drugs still have poorly controlled asthma. A team led by Ian Pavord from the University of Oxford, UK, identified 701 people from the 2010–2011 UK National Health and Wellness Surveys who were taking this drug combination for their asthma. The researchers found that nearly two-thirds of these individuals had poorly controlled asthma associated with more visits to the emergency room, worse quality of life (both mentally and physically), impaired productivity and other health problems. The calculated direct and indirect costs per person with poorly controlled asthma were about double that for someone whose asthma was under control. The authors conclude that better treatment and management is needed to reduce costs and address the unmet medical need for people with persistent uncontrolled asthma.

Feasibility and applicability of the paper and electronic COPD assessment test (CAT) and the clinical COPD questionnaire (CCQ) in primary care: a clinimetric study
JWH Kocks, CMG Blom, MJ Kasteleyn, W Oosterom, BJ Kollen, T Van der Molen & NH Chavannes
npj Primary Care Respiratory Medicine 27,
Article number: 20 (2017)
doi:10.1038/s41533-017-0023-0

Two questionnaires commonly used to manage chronic obstructive pulmonary diseases (COPD) are equally suitable for routine primary care. Researchers in the Netherlands, led by Janwillem Kocks from the University Medical Center Groningen, administered both the COPD assessment test (CAT) and the clinical COPD questionnaire (CCQ) to 95 patients with the lung disease. These two tests are the most comprehensive assessments recommended by the global initiative for obstructive lung disease for guiding treatment decisions. The researchers found that both tests took approximately 95–100 s on average. Both tests were also equally easy to complete and provided similar types of information. Most patients said they had no preference for either one, and they filled out both electronic and paper versions of the questionnaires in much the same way. The authors conclude that both tests seem fine for routine use.

Enablers and determinants of the provision of written action plans to patients with asthma: a stratified survey of Canadian physicians
Fabienne Djandji, Alexandrine J Lamontagne, Lucie Blais, Simon L Bacon, Pierre Ernst, Roland Grad, Kim L Lavoie, Martha L McKinney, Eve Desplats & Francine M Ducharme
npj Primary Care Respiratory Medicine 27,
Article number: 21 (2017)
doi:10.1038/s41533-017-0012-3

Changes to practice organisation and doctors' perceptions should encourage the provision of written action plans for all asthma patients. International guidelines state that effective long-term treatment of asthma requires educated self-management, regular reviews and provision of a written action plan (WAP). However, many patients have poor asthma control and as few as 30% have a WAP. Fabienne Djandji at the Saint-Justine University Central Hospital in Montreal, Canada and co-workers conducted a survey of 421 doctors to determine their attitudes and provision of WAPs. Only 5.2% of respondents provided WAPs to patients; those treating children or aiming for long-term asthma control were more likely to do so. The doctors said that incentives to provide WAPs would include requests from patients themselves, being paid to complete WAPs and having extra support from specialists or other healthcare professionals such as pharmacists.

Reliably estimating prevalences of atopic children: an epidemiological study in an extensive and representative primary care database
David HJ Pols, Mark MJ Nielen, Joke C Korevaar, Patrick JE Bindels & Arthur M Bohnen
npj Primary Care Respiratory Medicine 27,
Article number: 23 (2017)
doi:10.1038/s41533-017-0025-y

The prevalence of atopic disorders in children can be more reliably calculated by incorporating clinical information with diagnosis data. Researchers in the Netherlands, led by David Pols from the Erasmus University Medical Center Rotterdam, examined the electronic health records of more than 660,000 children aged 0–18, from a Dutch primary care database to determine the number of cases of atopic eczema, asthma, and allergic rhinitis. They looked for diagnosed children who also had at least two relevant clinical consultations and at least two relevant prescriptions. This strategy helps correct for the problem of overestimation because it does not assume that a child, once diagnosed, will have an atopic disorder for life. However, other methods are still needed to identify cases that are missed or misclassified in the health database.

Development and outcomes of a primary care-based sleep assessment service in Canterbury, New Zealand
Michael J Epton, Paul T Kelly, Brett I Shand, Sallyanne V Powell, Judith N Jones, Graham RB McGeoch & Michael C Hlavac
npj Primary Care Respiratory Medicine 27,
Article number: 26 (2017)
doi:10.1038/s41533-017-0030-1

A community-based service for common sleep disorders can provide rapid and easily accessed sleep assessment and treatment. A team led by Michael Hlavac and Michael Epton from Christchurch Hospital describe the creation of a sleep assessment service within the Canterbury district of New Zealand, in which initial assessments are conducted throughout the community by general practice teams under guidance and advice from sleep specialists at the region's largest hospital. Before the service, there were around 300 sleep assessments per year in all of Canterbury, a region with a population of around 510,000. Now that number has more than tripled, with shorter waiting times for treatment,

especially for people with severe sleep apnoea. The authors conclude that most patients can be assessed for a suspected sleep disorder without needing to visit a hospital's sleep unit.

High probability of comorbidities in bronchial asthma in Germany

S Heck, S Al-Shobash, D Rapp, DD Le, A Omlor, A Bekhit, M Flaig, B Al-Kadah, W Herian, R Bals, S Wagenpfeil & QT Dinh
npj Primary Care Respiratory Medicine 27,
Article number: 28 (2017)
doi:10.1038/s41533-017-0026-x

Patients in Germany with bronchial asthma are highly likely to suffer from co-existing diseases and their treatments should reflect this. Quoc Thai Dinh at Saarland University Hospital in Homburg, Germany and co-workers conducted a large-scale study of patients presenting with bronchial asthma in the Saarland region between 2009 and 2012. Patients with asthma made up 5.4% of the region's total population, with a higher prevalence occurring in females. They found that bronchial asthma was strongly associated with allergic comorbidities such as rhinitis. Indeed, asthmatic patients had a seven times higher chance of suffering from allergic rhinitis than the rest of the population, and were at higher risk of respiratory diseases like pneumonia and obstructive sleep apnoea syndrome. Further associations included cardiovascular, metabolic and mental disorders. Dinh's team call for asthma treatments to take such comorbidities into account.

Practice makes perfect: self-reported adherence a positive marker of inhaler technique maintenance

Elizabeth Azzi, Pamela Srour, Carol Armour, Cynthia Rand & Sinthia Bosnic-Anticevich
npj Primary Care Respiratory Medicine 27,
Article number: 29 (2017)
doi:10.1038/s41533-017-0031-0

Patients who consciously make an effort to perfect asthma inhaler technique will maintain their skills long-term. Elizabeth Azzi at the University of Sydney, Australia and co-workers further add evidence that there is a strong behavioral component to patients retaining correct inhaler technique over time. Poor inhaler technique can limit asthma control, affecting quality of life and increasing the chances of severe exacerbations. Azzi's team followed 238 patients to determine the key predictors of inhaler technique maintenance from factors including age, asthma knowledge and perceived future risks. Correct inhaler technique at initial assessment was the strongest predictor of long-term success, but this was strengthened further when patients reported good adherence to their own medication regimen. This suggests that maintaining correct inhaler technique is more than just a physical skill. Careful guidance towards this 'practice makes perfect' approach may improve patients' long-term technique maintenance.

Hospital readmissions for COPD: a retrospective longitudinal study

Timothy H Harries, Hannah Thornton, Siobhan Crichton, Peter Schofield, Alexander Gilkes & Patrick T White
npj Primary Care Respiratory Medicine 27,
Article number: 31 (2017)
doi:10.1038/s41533-017-0028-8

A managed reduction of hospital readmissions for London-based chronic lung disease patients may not be needed. Preventing hospital readmissions for patients with chronic obstructive pulmonary disease (COPD) is a key priority to improve patient care and limit costs. However, few data are available to determine and ultimately reduce the risk of readmission. Timothy Harries at King's College, London and co-workers conducted a longitudinal study incorporating all COPD admissions into UK hospitals for 20,932 patients registered at London general practitioners between 2006 and 2010. They found that 32% of patients were readmitted within a year, 17.8% within 90 days and 10% within 30 days. Neither age nor geographical deprivation were useful predictors of readmission. These represent lower than estimated levels of readmission, suggesting there may be fewer opportunities to reduce the risk of readmission further.

Peak flow meter with a questionnaire and mini-spirometer to help detect asthma and COPD in real-life clinical practice: a cross-sectional study

Yogesh T Thorat, Sundeep S Salvi & Rahul R Kodgule
npj Primary Care Respiratory Medicine 27,
Article number: 32 (2017)
doi:10.1038/s41533-017-0036-8

A simple questionnaire and peak flow meter measurements can help doctors differentiate between asthma and chronic lung disease. In clinical settings where access to specialist equipment and knowledge is limited, it can be challenging for doctors to tell the difference between asthma and chronic obstructive pulmonary disease (COPD). To determine a viable alternative method for differentiating between these diseases, Rahul Kodgule and colleagues at the Chest Research Foundation in Pune, India, trialled a simplified version of two existing symptom questionnaires, combined with peak flow meter measurements. They assessed 189 patients using this method, and found it aided diagnosis with high sensitivity and specificity. Breathlessness, cough and wheeze were the minimal symptoms required for COPD diagnosis, while the length of asymptomatic periods was most helpful in distinguishing asthma from COPD.

Beta-agonist overuse and delay in obtaining medical review in high risk asthma: a secondary analysis of data from a randomised controlled trial

Janine Pilcher, Mitesh Patel, Alison Pritchard, Darmiga Thayabaran, Stefan Ebmeier, Dominick Shaw, Peter Black, Irene Braithwaite, Mark Weatherall & Richard Beasley
npj Primary Care Respiratory Medicine 27,
Article number: 33 (2017)
doi:10.1038/s41533-017-0032-z

In asthma, overuse of beta-agonist reliever medication and delay in seeking medical review in an exacerbation are linked to asthma deaths. Janine Pilcher at the Medical Research Institute of New Zealand, and co-workers, conducted a review of data from a study of 303 adult patients with severe asthma, followed over 24 weeks. The patients were allocated to either a budesonide/formoterol, or a salbutamol inhaler to take for symptom relief, in addition to their maintenance treatment. Inhalers were fitted with electronic monitors, to accurately document every use. In both groups, on 90% of days when an exacerbation requiring excess use of an inhaler occurred, patients did not follow-up

with medical professionals within 48h as advised. Further, in both groups, 'extreme' reliever inhaler use was recorded at least once in around one in four patients

Identifying individuals with physician-diagnosed chronic obstructive pulmonary disease in primary care electronic medical records: a retrospective chart abstraction study
Theresa M Lee, Karen Tu, Laura L Wing & Andrea S Gershon
npj Primary Care Respiratory Medicine 27,
Article number: 34 (2017)
doi:10.1038/s41533-017-0035-9

Researchers develop an algorithm that can accurately search through electronic health records to find patients with chronic lung disease. Mining population-wide data for information on patients diagnosed and treated with chronic obstructive pulmonary disease (COPD) in primary care could help inform future healthcare and spending practices. Theresa Lee at the University of Toronto, Canada and colleagues used an algorithm to search electronic medical records and identify patients with COPD from doctors' notes, prescriptions and symptom histories. They carefully adjusted the algorithm to improve sensitivity and predictive value by adding details such as specific medications, physician codes related to COPD, and different combinations of terminology in doctors' notes. The team accurately identified 364 patients with COPD in a randomly selected cohort of 5,889 people. Their results suggest opportunities for broader informative studies of COPD in wider populations.

Physical activity and risk of comorbidities in patients with chronic obstructive pulmonary disease: a cohort study
Tsung Yu, Gerben ter Riet, Milo A Puhan & Anja Frei
npj Primary Care Respiratory Medicine 27,
Article number: 36 (2017)
doi:10.1038/s41533-017-0034-x

Patients with chronic lung disease who stay physically active could reduce their chances of depression and anxiety. Milo Puhan at the University of Zurich, Switzerland and co-workers assessed the association between physical activity and the risk of developing various co-existing diseases in 409 patients with chronic obstructive pulmonary disease (COPD). Co-morbidities such as cardiovascular diseases, diabetes and depression are prevalent in patients with COPD, but the reasons why are not clear. Puhan's team assessed patients' activity levels using an existing questionnaire, and administered another questionnaire to assess mental health. They followed the cohort for 5 years. Results indicated weak associations between physical activity levels and most physical illnesses, but there were significant links between higher levels of physical activity and a reduced risk of depression and anxiety. The results could inform novel COPD treatment programmes.

Characterisation of antibiotic prescriptions for acute respiratory tract infections in Danish general practice: a retrospective registry based cohort study
Rune Aabenhus, Malene Plejdrup Hansen, Laura Trolle Saust & Lars Bjerrum
npj Primary Care Respiratory Medicine 27,
Article number: 37 (2017)
doi:10.1038/s41533-017-0037-7

Better adherence to guidelines for prescribing antibiotics for different respiratory tract infections is warranted in Danish general practice. The over-use of antibiotics, particularly so-called 'second-line' agents such as amoxicillin, increases resistance and may lead to a potentially catastrophic scenario where antibiotics are no longer effective. Exactly how widespread the over-use of antibiotics is for different infections, however, is not clear. Rune Aabenhus at the University of Copenhagen and co-workers analyzed primary care data regarding antibiotic prescriptions for acute respiratory tract infections including pneumonia and ear infections in Denmark. They found that penicillin V – the current recommended first-line drug in Scandinavian countries – accounted for 58 per cent of prescriptions, a figure which should be improved. Amoxicillin and macrolides were over-prescribed, particularly in elderly patients. The team also call for further analysis of prescriptions given by out-of-hours clinics.

The contribution of an asthma diagnostic consultation service in obtaining an accurate asthma diagnosis for primary care patients: results of a real-life study
RME Gillis, W van Litsenburg, RH van Balkom, JW Muris & FW Smeenk
npj Primary Care Respiratory Medicine 27,
Article number: 35 (2017)
doi:10.1038/s41533-017-0027-9

A consultation service can help general practitioners more accurately diagnose asthma and select the appropriate treatments for their patients. Researchers in the Netherlands, led by Frank Smeenk from Catharina Hospital in Eindhoven, describe an asthma diagnostic consultation service they created to support GPs in their diagnostic process for patients suspected of having asthma. Over a four-year period, the service received a total of 659 referrals and only confirmed the diagnosis of asthma in 275 cases. Another 20 patients had asthma overlapping with chronic obstructive pulmonary syndrome. The service also picked up other diseases, such as rhinitis, that general practitioners had missed. Overall, because of the consultation service and its revised diagnoses, more than half of all patients adjusted their medications. Most patients required only a single consultation and could then be referred back to their physicians.

Why do physicians lack engagement with smoking cessation treatment in their COPD patients? A multinational qualitative study
Eva Anne Marije van Eerd, Mette Bech Risør, Mark Spigt, Maciek Godycki-Cwirko, Elena Andreeva, Nick Francis, Anja Wollny, Hasse Melbye, Onno van Schayck & Daniel Kotz
npj Primary Care Respiratory Medicine 27,
Article number: 41 (2017)
doi:10.1038/s41533-017-0038-6

Doctors should be given careful, ethically-informed guidance during medical training to help them to support patients to quit smoking. The most important part of treatment for patients with chronic obstructive pulmonary disease (COPD) is help to stop smoking. However, there is evidence to suggest that doctors don't always motivate COPD patients to quit. Eva Anne Marije van Eerd at Maastrict University, The Netherlands, together with an international team of scientists, conducted focus group interviews with doctors in seven different countries to assess barriers to smoking cessation. They found that doctors' frustration

with and negative attitudes towards patients who continued to smoke contributed to poor cessation management and treatment inequalities in some cases. Many doctors also cited a lack of experience with smoking cessation techniques alongside time and money issues as barriers to effective treatment.

Determinants of initial inhaled corticosteroid use in patients with GOLD A/B COPD: a retrospective study of UK general practice

James D. Chalmers, Abigail Tebboth, Alicia Gayle, Andrew Ternouth & Nick Ramscar
npj Primary Care Respiratory Medicine 27,
Article number: 43 (2017)
doi:10.1038/s41533-017-0040-z

Inhaled steroids are often prescribed to early-stage chronic lung disease patients in the UK despite guidelines to the contrary. Patients newly diagnosed with early-stage chronic obstructive pulmonary disease (COPD) should not be prescribed inhaled corticosteroids (ICS), because they carry an increased risk of side effects such as pneumonia and osteoporosis. ICS should be reserved for patients with severe COPD and frequent exacerbations. James Chalmers at the Scottish Centre for Respiratory Research, Dundee, and co-workers examined prescribed medication data from the UK spanning 10 years, to determine key predictors of ICS prescription during early-stage COPD. Of 29,815 patients identified, an average of 63% were prescribed ICS upon diagnosis, regardless of disease severity. Younger patients were more likely to receive ICS, possibly due to co-morbidity with chronic asthma, and particular UK regions and medical practices prescribed ICS more readily than others.

Exploring the perspectives of clinical professionals and support staff on implementing supported self-management for asthma in UK general practice: an IMP2ART qualitative study

Susan Morrow, Luke Daines, Sharon Wiener-Ogilvie, Liz Steed, Lorna McKee, Ann-Louise Caress, Stephanie JC Taylor & Hilary Pinnock
npj Primary Care Respiratory Medicine 27,
Article number: 45 (2017)
doi:10.1038/s41533-017-0041-y

Understanding the routines of primary care practices can suggest strategies to implement supported self-management in general practice. Supported self-management of asthma including provision of individual action plans improves patient health and reduces the burden on healthcare services, but is not well implemented in routine practice. As part of a large-scale programme to implement self-management into UK general practice, Hilary Pinnock at the University of Edinburgh and co-workers conducted interviews and focus groups with 33 participants from 14 general practices to explore the organisational routines that hinder or enable professionals to provide support for asthma self-management. Poor attendance at asthma clinics, demarcation of roles, lack of time and limited access to tailored resources were identified as specific barriers. Improvements suggested included improved teamwork between doctors and other medical healthcare professionals, comprehensive training, and improvements to IT systems.

Self-management behaviour and support among primary care COPD patients: cross-sectional analysis of data from the Birmingham Chronic Obstructive Pulmonary Disease Cohort

Ainee Khan, Andrew P Dickens, Peymane Adab & Rachel E Jordan
npj Primary Care Respiratory Medicine 27,
Article number: 46 (2017)
doi:10.1038/s41533-017-0046-6

Health professionals should ensure all patients with chronic lung disease receive individualised self-management plans and lifestyle advice. UK national guidelines state that patients with chronic obstructive pulmonary disease (COPD) should receive personalised self-management plans and comprehensive support to help them manage their disease. Ainee Khan and colleagues at the University of Birmingham analysed patient questionnaire data gathered during the Birmingham COPD Cohort study to explore self-management behaviour, receipt of self-management plans and advice, and patient knowledge of COPD. Of 1,078 participants, only 400 had self-management plans, and less than half reported receiving lifestyle advice or support. Those with plans were more likely to adhere to medication, had greater knowledge about COPD and were more likely to attend support groups and training courses. The authors recommend carefully-planned, wider implementation of COPD self-management plans and associated support.

Stage 1 development of a patient-reported experience measure (PREM) for chronic obstructive pulmonary disease (COPD)

Susan Walker, Sharon Andrew, Matthew Hodson & C Michael Roberts
npj Primary Care Respiratory Medicine 27,
Article number: 47 (2017)
doi:10.1038/s41533-017-0047-5

An exploration of patient perceptions of living with chronic lung disease will help develop a new patient-reported experience scale. Healthcare services are aiming to provide effective patient-centred care for those with chronic obstructive pulmonary disease (COPD). Such care strategies require structured, validated patient feedback scales to facilitate accurate communication between patients, carers and healthcare professionals. Susan Walker at Anglia Ruskin University in Chelmsford, UK and co-workers analysed qualitative data from interviews with 64 COPD patients in London and Essex regarding their emotions and perceptions of living with COPD, with the aim of creating a patient-reported experience measure, or PREM. Initial results identified five themes – including 'journey to diagnosis' and 'everyday life' – and 21 affective responses, ranging from negative to positive. The team will take these results forward for further validation.

Best of the rest

These reviews were prepared by Dr Basil Penney and published by Doctors.net.uk Journal Watch. They have been selected and edited for inclusion into *Primary Care Respiratory Update* by editor Dr Iain Small.

The Doctors.net.uk Journal Watch service covers other specialities as well as respiratory medicine. Doctors.net.uk is the largest network of GMC-registered doctors in the UK. To find out more about membership visit http://www.doctors.net.uk

Abbreviations used in these reviews are:

Diseases/disorders

AECOPD	Acute exacerbation of chronic obstructive pulmonary disease
ACOS	Asthma:COPD overlap syndrome
AMI	Acute myocardial infarction
COPD	Chronic obstructive pulmonary disease
RA	Rheumatoid arthritis
TB	Tuberculosis

Measures and investigations

6MWD	Six-minute walking distance
BMI	Body mass index
BDR	Bronchodilator response
CO_2	Carbon dioxide
CXR	Chest X-ray
FEV_1	Forced expiratory volume in 1 second
FVC	Forced vital capacity
mmHg	Millimetres of mercury

Organisations/People

GOLD	Global Initiative for Chronic Obstructive Lung Disease
GINA	Global Initiative for Asthma
HCW	Healthcare workers

Treatments

ADT	Androgen deprivation therapy
BCG	Bacillus Calmette-Guérin vaccine
ICS	Inhaled corticosteroids
LABA	Long-acting beta-agonist
LAMA	Long-acting muscarinic agent
SABA	Short acting beta-agonist

Statistical terms

n	Number(s)
HR	Hazard ratio
p-value	Probability value
RCT	Randomised controlled trial
RR	Relative risk
SD	Standard deviation
95% CI	95% Confidence interval

**** EDITOR'S CHOICE ****

Impact of childhood asthma on growth trajectories in early adolescence: Findings from the Childhood Asthma Prevention Study (CAPS)

Movin M, Garden FL, Protudjer JLP, *et al*.

Respirology 2017;22:460–465 doi: 10.1111/resp.12928

Growth patterns vary widely between individuals during adolescence. In addition, growth patterns may be disturbed in children with asthma during the pubertal years. Heterogeneity in growth patterns has not been addressed in previous studies of associations between childhood asthma and growth.

This longitudinal study from Australia examined a birth cohort of children at high risk of asthma to identify sex-specific classes of growth trajectories during early adolescence, to evaluate the association between childhood asthma and different classes of growth trajectories in adolescence. 316 asthmatic children (51.6% male) had their growth trajectories between 11 and 14 years of age classified using a latent basis growth mixture model.

Asthma was not associated with growth trajectory classes in boys. In contrast, girls with asthma were more likely to belong to a class of growth trajectories with late growth compared to girls without asthma. This association was still significant when adjusting for potential confounding factors or excluding participants using ICS.

This study has identified sex-specific heterogeneous classes of growth and showed that girls with asthma are more likely to have slow growth during puberty compared with girls without asthma. Importantly, there was no difference in height at end point between the classes of growth trajectories in girls.

**** EDITOR'S CHOICE ****

Menopause is associated with accelerated lung function decline

Triebner K, BMatulonga B, Johannessen A, *et al*

Am J Respir Crit Care Med 2017;195(8): 1058–1065, doi: 10.1164/rccm.201605-0968OC

Menopause is associated with reduced 17β-estradiol as production in the ovaries ceases. Low levels of 17β-estradiol are associated with increased systemic inflammation and inflammation in the lungs. The inflammation markers C-reactive protein and IL-6 are inversely associated with FVC and FEV_1. These findings point toward a possible association between menopause and increased lung function decline.

Triebner *et al* investigated the association of menopausal status with decline in lung function over a 20-year period using repeated spirometry, hormone measurements, and questionnaire data from a large European population-based cohort (1,438 women aged 25–48 years). Associations with lung function decline were investigated using linear mixed effects models.

Adjusted mean FVC decline was increased by -10.2 ml/year (95% CI, -13.1 to -27.2) in transitional women and -12.5 ml/year (95% CI,-16.2 to -8.9) in post-menopausal women, compared with non-menopausal women. FEV_1 decline increased by -3.8 ml/year (95% CI, -6.3 to-2.9) in transitional women and -5.2 ml/year (95% CI, -8.3 to -2.0) in post-menopausal women.

These results confirm that menopause is associated with an accelerated decline in lung function beyond the expected age-related decline. This is most pronounced for FVC, with results consistent across subgroups and independent of smoking history. Clinicians should be aware that respiratory health often deteriorates during reproductive aging.

Prognosis of asymptomatic and symptomatic, undiagnosed COPD in the general population in Denmark: a prospective cohort study

Çolak,Y , Afzal S, Nordestgaard BG, *et al*

Lancet Respir Med 2017;5:426–34

http://dx.doi.org/10.1016/S2213-2600(17)30119-4

Individuals with undiagnosed COPD have fewer symptoms and less impairment of lung function than those with diagnosed COPD, but are still a considerable burden to the healthcare system and have an increased risk of early death. The effect of symptoms on the long-term prognosis of individuals with undiagnosed COPD in the general population is unknown.

Çolak *et al* carried out this population-based prospective cohort study in Copenhagen to investigate the prognosis of individuals with asymptomatic and symptomatic, undiagnosed COPD.

Data were analysed from 95,288 individuals aged 20–100 years from the Copenhagen General Population Study. 32,518 (34%) of these individuals were regarded as being at high risk for COPD (defined as individuals aged ≥40 years with >10 pack years smoking and without previous asthma). In this group, 3699 (11%) had COPD, (FEV_1/FVC <70% and <LLN, and FEV FEV_1 <80% predicted), of whom 2,903 (78%) were undiagnosed (neither a previous COPD hospital contact nor medical treatment for COPD). Among the individuals with undiagnosed COPD, 2,052 (71%) reported respiratory symptoms. Median follow-up was 6.1 years.

Compared with individuals who did not have COPD but who had similar tobacco exposure, individuals with undiagnosed, symptomatic COPD had an increased risk of exacerbations, pneumonia and death whereas individuals with undiagnosed, asymptomatic COPD had an increased risk of exacerbations and pneumonia. These findings suggest that better initiatives for early diagnosis and treatment of COPD are needed.

Changes in physical activity and sedentary behaviour following pulmonary rehabilitation in patients with COPD

Mesquita R, Meijer K, Pitta F,*et al*

Respir Med 2017;126:122-129

http://dx.doi.org/10.1016/j.rmed.2017.03.029

Pulmonary rehabilitation (PR) reduces dyspnoea, increases exercise capacity and improves health status in patients with COPD. However, the general impact of PR on physical activity levels has been shown to be very modest. Identifying groups with different patterns of change in physical activity and sedentary behaviour after PR may help clinicians to determine which groups benefit most from this intervention.

This retrospective observational study from the Netherlands aimed to characterise groups of patients with COPD according to their patterns of change in physical activity and sedentary behaviour after a comprehensive PR programme.

90 patients with COPD (60% male; mean age 67±8; median FEV_1 47 (32-62)% predicted) completed a comprehensive 40 session PR programme. An accelerometer was used to assess the time in sedentary behaviour, light activities and moderate-to-vigorous physical activity. Exercise capacity, quality of life and symptoms of anxiety and depression were assessed.

Based on changes in sedentary behaviour, and physical activity following PR, patients were classified into six groups. The two most prevalent patterns were good responders (increase in physical activity and reduction in sedentary behaviour, 34%) and poor responders (decrease in physical activity and increase in sedentary behaviour, 30%). Good responders had greater improvements in six-minute walk distance (6MWD) and symptoms of depression than poor responders ($p<0.05$ for all). Strong correlation was found between changes in sedentary behaviour and changes in light activities. Changes in 6MWD correlated fairly with changes in sedentary behaviour and physical activity.

Focusing on light physical activities might be a potential strategy to make patients less sedentary, but for this to be achieved improvements in functional capacity seem to be necessary.

Chronic obstructive pulmonary disease and comorbidities: a large cross-sectional study in primary care

Chetty U, McLean G, Morrison D, *et al*
Br J Gen Pract 2017;67:e321–e328
https://doi.org/10.3399/bjgp17X690605

Comorbid conditions are commonly associated with COPD and increase the risk of hospitalisation, higher levels of polypharmacy and higher mortality. Estimates of the prevalence of individual comorbidities associated with COPD vary substantially, and studies investigating COPD and comorbidities often only consider a small number of conditions.

Chetty *et al* aimed to evaluate the prevalence of 38 physical and mental health comorbidities in people with COPD, and compare findings with those for people without COPD in a large dataset on 1,272, 685 adults in Scotland from 314 primary care practices. The prevalence of comorbidities was compared between people who did and did not have COPD, standardised by age, sex and socioeconomic deprivation.

51,928 (4.1%) people with COPD were identified. Those with COPD were more likely to be female, older and live in areas of high social deprivation. Only 14.0% of people with COPD did not have any additional conditions compared with 48.9% of people without COPD. Those with COPD were significantly more likely to have ≥1 additional conditions. The largest difference was for ≥5 comorbidities, found in 22.3% of people with COPD compared with just 4.9% of those without COPD. 29 of the 31 physical conditions and six of the seven mental health conditions were statistically significantly more prevalent in people who had COPD.

The majority of patients with COPD have complex physical and mental health comorbidity. COPD guidelines should reflect the associated comorbidities in order to provide clinicians with clear management strategies.

Computed tomographic findings in subjects who died from respiratory disease in the National Lung Screening Trial

Pompe E de Jong PA, Lynch DA, *et al*
Eur Respir J 2017; 49: 1601814
https://doi.org/10.1183/13993003.01814-2016.

Lung cancer screening CT scans could be utilised for the detection of other respiratory diseases. Almost 10% (175/1,865) of all deaths in the CT arm of the NLST were from respiratory illnesses other than lung cancer, and identification of these respiratory illnesses on lung cancer CT can therefore provide important information regarding the diagnosis of the disease, which might have an impact on survival.

Pompe *et al* conducted this retrospective case–control study in NLST participants who died from a respiratory illness other than lung cancer to evaluate the prevalence of emphysema, airway wall thickening and fibrotic lung disease in comparison with surviving controls matched for age, sex, pack-years and smoking status.

A chest radiologist and radiology resident blinded to the outcome independently scored baseline CT scans visually and qualitatively. The prevalence of CT abnormalities was compared between cases and controls by using chi-squared tests.

167 participants died from a respiratory cause other than lung cancer. Severe emphysema was more prevalent in participants who died compared to participants still alive (28.7% versus 4.8%; p<0.001), whereas the prevalence of mild and moderate emphysema did not differ significantly between cases and controls. Airway wall thickening and fibrotic lung disease were 26.9% versus 13.2% and 18.6% versus 0.5% in cases and controls, respectively. Radiological findings were significantly more prevalent in those who died compared with controls (all p<0.001).

CT scans may increase the yield of lung cancer screening by possibly reducing the number of respiratory deaths other than lung cancer.

Socio-economic inequalities in stage at diagnosis, and in time intervals on the lung cancer pathway from first symptom to treatment: systematic review and meta-analysis

Forrest LF, Sowden S, Rubin G, *et al*.
Thorax 2017;72:430–436.
https://doi.org/10.1136/thoraxjnl-2016-209013

Patients with cancer who are diagnosed at an early stage have a greater chance of survival. In the UK, fewer than 10% of those diagnosed with lung cancer survive for 5 years. A socio-economic gradient for lung cancer survival exists in the UK, which is not fully accounted for by the socio-economic gradient in incidence. Socio-economic inequalities in receipt of lung cancer treatment have been shown in a recent meta-analysis and there is some evidence that inequalities in treatment contribute to socio-economic inequalities in lung cancer survival.

Forrest *et al* aimed to assess the published evidence for socio-economic inequalities in stage at diagnosis of lung cancer, and in the length of time spent on the lung cancer pathway.

Databases were searched for cohort studies of adults with a primary diagnosis of lung cancer, where the outcome was stage at diagnosis or the length of time spent on the care pathway, or a proxy measure, analysed according to a measure of socio-economic status.

39 papers met the inclusion criteria for the review with 20 papers using data from the UK. Seven studies with non-overlapping populations were selected for the final meta-analysis. Overall, there was no evidence of socio-economic inequalities in late stage at diagnosis in the most, compared with the least, deprived groups. There was no evidence of inequalities in the patient or treatment intervals, and no consistent pattern was observed in diagnostic or referral intervals.

Objective assessment of adherence to inhalers by patients with chronic obstructive pulmonary disease

Sulaiman I Cushen B, Greene G, *et al*
Am J Respir Crit Care Med 2017;195(10):1333–1343
https://doi.org/10.1164/rccm.201604-0733OC

It is recognised that inhaler technique is poor among patients with COPD. Poor adherence is associated with critically important but yet unidentified factors other than simply not taking the medication. Hence, it is important to both quantify inhaler adherence and also to understand the determinants of adherence among this population. This prospective observational study aimed to describe the patterns and the determinants of adherence to a commonly used preventer inhaler, salmeterol/fluticasone Diskus/Accuhaler inhaler (GSK,Uxbridge, UK) by patients with COPD.

244 patients with COPD following discharge from hospital were recruited. Mean age 71 (SD, 9.7) years with a mean FEV1 of 52% pre-

dicted. 59% had evidence of mild/moderate cognitive impairment. On discharge patients were issued with a Diskus inhaler attached to an acoustic recording device (INCA) designed to quantify when and how a Diskus inhaler has been used.

Adherence over the study was 22.6% of what would be expected if all the doses had been taken correctly and on time. Only 6% of the study population had an actual adherence greater than 80%. 34% had low inhaler use and high error rates; 25% had high inhaler use and high error rates.

The major determinants of poor adherence were cognitive impairment, which affected the patient's ability to remember to take the medication, and severe hyperinflation, which affected the ability of the individual to generate sufficient inhalation flow for optimal drug delivery.

When selecting inhaler devices for COPD patients, health care professional need to be aware of cognitive impairment and poor inspiratory flow.

Blood eosinophils and response to maintenance chronic obstructive pulmonary disease treatment. Data from the FLAME trial

Roche N, Chapman KR, Vogelmeier CF, *et al*
Am J Respir Crit Care Med 2017;195(9):1189–1197
https://doi.org/10.1164/rccm.201701-0193OC

A LABA/LAMA combination is recommended as initial therapy in GOLD COPD guidelines for patients who are at increased risk for exacerbation (GOLD D). LABA/ICS are only recommended in GOLD D patients who develop exacerbations after initial LABA/LAMA therapy or with asthma–COPD overlap. These recommendations are largely based on the FLAME (Effect of Indacaterol/Glycopyronium vs Fluticasone/Salmeterol on COPD Exacerbations) study, which demonstrated the superiority of LABA/LAMA versus LABA/ICS in exacerbation prevention in patients with one or more exacerbations in the previous year.

Sputum eosinophils may predict responsiveness to ICS but the evidence is conflicting, and assessing sputum samples in clinical practice presents challenges. Blood eosinophil levels have been studied in post hoc analyses, which suggested that blood eosinophils could predict the efficacy of LABA/ICS in preventing exacerbations.

Roche *et al* examined the relationship between baseline blood eosinophils and the rate of exacerbations with indacaterol/glycopyronium compared with fluticasone/salmeterol through analysis of data from FLAME.

Indacaterol/glycopyronium was superior to fluticasone/salmeterol for exacerbation prevention in patients, independent of blood eosinophil count above or below 2%. At a cut-off of ≥5%, the two treatments appeared similar (RR, 0.94). This suggests that any ICS benefit was observed primarily in those with the highest blood eosinophil levels. However, at no cut-off was fluticasone/Salmeterol statistically superior to indacaterol/glycopyronium for exacerbation rate. The incidence of pneumonia was higher in patients receiving salmeterol/fluticasone in both the <2% and ≥2% subgroups.

Blood eosinophils should not be used in patients with COPD to determine who should receive LABA/ICS instead of LABA/LAMA.

Concurrent use of long-acting bronchodilators in COPD and the risk of adverse cardiovascular events

Suissa S, Dell'Aniello S, Ernst P
Eur Respir J 2017; 49: 1602245
https://doi.org/10.1183/13993003.02245-2016.

Observational studies and randomised trials have reported some cardiovascular risks with long-acting bronchodilators including long-acting β2-agonists (LABAs) and anticholinergics (LAMAs), although they only considered their effects in monotherapy. With the expected increasing use of these agents in combination in COPD, the question of the potential cardiovascular risk arising from the concurrent use of two long-acting bronchodilators becomes pertinent and has yet to be studied.

Suissa *et al* assessed the comparative safety of adding a second long-acting bronchodilator on the incidence of acute myocardial infarction (AMI), stroke, heart failure and arrhythmia in patients with COPD, relative to monotherapy in a cohort of COPD patients, from the UK Clinical Practice Research Datalink. Using high-dimensional propensity scores, each patient (n=31,174) adding a second bronchodilator was matched with a patient who remained on monotherapy (n=31,174) and they were followed up for 1 year.

Adding a long-acting bronchodilator, compared to remaining on monotherapy, was not associated with an increased risk of AMI (hazard ratio (HR) 1.12, 95% CI 0.92 to 1.36), stroke (HR 0.87, 95% CI 0.69 to 1.10) or arrhythmia (HR 1.05, 95% CI 0.81 to 1.36), but the risk was elevated for heart failure (HR 1.16, 95% CI 1.03 to 1.30).

Overall, in this real-world setting study of the treatment of COPD, the addition of a second long-acting bronchodilator as recommended by COPD treatment guidelines when the disease worsens, appears safe with respect to cardiovascular and cerebrovascular risks, except perhaps for a small increase in the risk of heart failure, which warrants continued monitoring.

Doxycycline for outpatient-treated acute exacerbations of COPD: a randomised double-blind placebo-controlled trial

van Velzen P, Ter Riet G, Bresser P, *et al*
Lancet Respir Med 2017;5:492–9
https://doi.org/10.1016/S2213-2600(17)30165-0

Treatment of COPD exacerbations consists of systemic corticosteroids alone or in combination with antibiotics. Systemic corticosteroids improve lung function and COPD symptoms and decrease the rate of relapses of exacerbations. By contrast, use of antibiotics is still controversial. Findings from a systematic review showed that antibiotics for AECOPD reduced treatment non-response and mortality in patients admitted to hospital, but not in outpatients receiving treatment for mild-to-moderate exacerbations. However, the long-term effects of antibiotics are unknown.

This randomised double-blind placebo-controlled trial from the Netherlands aimed to investigate if doxycycline added to the oral corticosteroid prolongs time to next exacerbation in patients with AECOPD in the outpatient setting.

Eligible patients were aged ≥45 with at least 10 pack-years smoking history, GOLD stage 1–3 and had at least one AECOPD during the past 3 years. 305 (34%) patients from a cohort of 887 patients were randomised to doxycycline (152) or placebo (153). Exclusion criteria for

randomisation were fever, admission to hospital and current use of antibiotics or use within the previous 3 weeks. Patients in both groups received a 10-day course of 30 mg oral prednisolone daily.

The addition of doxycycline and did not increase the time to next exacerbation did not have significant effects on day 21 treatment non-response, mortality, number of exacerbations, or decline of lung volume.

Female smokers are at greater risk of airflow obstruction than male smokers UK Biobank

Amaral AF, Stachan DP, Burney PGJ, *et al*
Am J Respir Crit Care Med 2017;195(9):226–1235
https://doi.org/10.1164/rccm.201608-1545OC

COPD prevalence and mortality have been lower in women than in men. In the UK, patterns of smoking in women have moved closer to those of men in terms of age of smoking initiation, duration, and intensity. It has also been suggested that, among smokers, women are more likely than men to develop COPD, but evidence for higher risk of disease in women remains weak.

Amaral *et al* used data from 149,075 women and 100,252 men who had provided spirometry measurements and information on smoking in the UK Biobank (a large population-based study of adults aged 40–69 years recruited from 22 centres across the UK). The association of airflow obstruction with smoking characteristics was assessed by sex using regression analysis.

The association of airflow obstruction with smoking status was stronger in women than in men. For equal number of cigarettes per day and years of smoking, women showed greater risk of airflow obstruction than men, with women becoming at risk of airflow obstruction at lower doses of smoking than men (10 vs 19 pack-years). For equal time since quitting, the reduction in risk among women seemed less marked than among men.

This study has limitations as smoking data were self-reported and spirometry data were not based on three blows in each case (as stipulated in the guidelines). However it does suggest that, for the same dose of smoking, women have a higher risk of airflow obstruction than men.

Fruit and vegetable consumption and risk of COPD: a prospective cohort study of men

Kaluza J, Larsson SC, Orsini N, *et al.*
Thorax 2017;72:500–509.
https://doi.org/10.1136/thoraxjnl-2015-207851

Oxidative stress induced by cigarette smoking is now recognised as a major predisposing factor in the pathogenesis of COPD. Antioxidant capacity in patients with COPD is substantially reduced as a result of cigarette smoking, with oxidative stress persisting long after the cessation of cigarette smoking. Thus, it can be hypothesised that high consumption of fruits and vegetables, a rich source of antioxidants, may protect the lung against oxidative damage and prevent COPD.

Using longitudinal data from 44,335 men in the Cohort of Swedish Men, Kaluza *et al* investigated the association between total fruit and vegetable consumption and incident COPD, according to smoking habits. Fruit and vegetable consumption was assessed with a self-administered questionnaire and, after a mean follow-up of 13.2 years, 1,918 incident COPD cases were identified.

After adjustment for several potential confounders (education level, smoking, physical activity, BMI, alcohol intake) they reported a negative and significant association between fruit and vegetable intake and the risk of COPD in smokers but not in never-smokers. Current and ex-smokers who were consuming ≥5.3 versus <2 servings per day of fruits and vegetables had 40% and 34% lower COPD risk, respectively.

While there may well be confounding factors operating, these findings suggest that a healthy diet may have a potential role in the prevention of COPD in smokers.

Improved outcomes in ex-smokers with COPD: a UK primary care observational cohort study

Josephs L, Culliford D, Johnson M and Thomas M
Eur Respir J 2017;49:1602114
https://doi.org/10.1183/13993003.02114-2016.

Evidence that stopping smoking benefits FEV1 trajectories comes from the Lung Health Study, with benefit persisting after 11 years in sustained 'quitters' and 14-year mortality benefit. However, these data relate to undiagnosed smokers in a screening programme with mild to moderate airflow obstruction, who are therefore not representative of diagnosed COPD patients in the community. In COPD the impact of stopping smoking on key health outcomes is less clear.

Josephs *et al* used data from the Hampshire Health Record Analytical Database to quantify current smoking status in a large primary care cohort with diagnosed COPD (n=16,479) and explore the relationship with all-cause mortality, unplanned respiratory-cause hospital admission and emergency department (ED) attendance. Three outcomes were measured over 3 years: all-cause mortality, respiratory-cause unplanned hospital admission and respiratory-cause ED attendance.

Smoking status was defined in 91.3% of the cohort and 38.5% continued to smoke, with the highest prevalence of active smokers among younger patients. After adjusting for confounding factors (including age, disease severity and inhaled medication), ex-smokers had a significantly reduced risk of all three adverse outcomes (death, unplanned respiratory-cause hospital admissions and ED attendances), with an estimated reduction in these outcomes of 14.6%, 11.8% and 14.6%, respectively, if all smokers quit.

Ex-smokers have significantly better outcomes, emphasising the importance of effective smoking cessation support, regardless of age or lung function.

Socioeconomic deprivation and the outcome of pulmonary rehabilitation in England and Wales

Steiner MC, Lowe D, Beckford K, *et al.*
Thorax 2017;72:530–537
https://doi.org/10.1136/thoraxjnl-2016-209376

The 2015 England and Wales national audit of pulmonary rehabilitation (PR) confirmed that the benefits of PR observed in clinical trials are delivered at a comparable magnitude in real-life clinical practice in patients who attend and complete therapy. However, the audit also suggested that, for many patients who do not enrol or complete their course of

PR, there is heterogeneity in the response to therapy. It is unknown whether socioeconomic deprivation is associated with rates of completion of PR or the magnitude of clinical benefits delivered by PR.

Steiner *et al* determined whether completion of treatment and outcomes recorded during the audit were associated with deprivation indices derived from participants' (n=7,413) postcodes and whether any such associations held true when adjusted for other disease and demographic variables recorded at baseline assessment for PR.

There was a statistically significant association between rates of completion of PR and quintile of deprivation (70% in the least and 50% in the most deprived quintiles). Patients from more deprived quintiles who completed PR were less likely to achieve a gain in health status above accepted thresholds for clinically important change, but this association disappeared after adjustment for other baseline variables. Deprivation was not associated with clinical outcomes in patients who completed therapy.

Targeted interventions aimed at enhancing referral, uptake and completion of PR among patients with COPD living in deprived areas have the potential to improve health outcomes in this population.

A longitudinal modelling study estimates acute symptoms of community-acquired pneumonia recover to baseline by 10 days

Wootton DG,Dickinson L, Pertinex H, *et al*.
Eur Respir J 2017; 49: 1602170
https://doi.org/10.1183/13993003.02170-2016

Community-acquired pneumonia (CAP) is an increasingly common cause of admission to hospital and is potentially fatal. However, 80% of hospitalised patients survive the acute illness and are discharged. Understanding the factors associated with symptom recovery time would not only enable us to prognosticate for patients but also to address modifiable risk factors for delayed symptom recovery.

Wootton *et al* modelled symptom scores from a prospective, longitudinal, observational study of symptom recovery from CAP to address three fundamental questions relating to the symptoms of pneumonia. Do patients completely recover from pneumonia symptoms? How long does this recovery take? Which factors influence symptomatic recovery?

169 adults (52% male) with CAP were recruited within 24 hours of their first dose of in-hospital antibiotic. Patients with cystic fibrosis (CF) or non-CF bronchiectasis who were immunocompromised, required renal replacement therapy, had thoracic malignancy or advanced cancer of any type were excluded. Multivariable analysis demonstrated that the time taken to recover to baseline was determined by the initial severity of symptoms.

The time taken for an individual patient to recover to their baseline was dependent on the severity of their acute symptoms, which in turn was influenced by the patient's age and comorbidity. The model estimated that, on average, patients had recovered 97% of their CAP symptoms by 10 days.

Bronchiectasis rheumatoid overlap syndrome is an independent risk factor for mortality in patients with bronchiectasis: A multicentre cohort study

De Soyza A, McDonnell MJ, Goeminne PC, *et al*
Chest Journal 2017;151(6):1247–1254
http://dx.doi.org/10.1016/j.chest.2016.12.024

Symptomatic bronchiectasis is more prevalent in patients with rheumatoid arthritis (RA) compared with the general population. Studies have suggested that patients with RA and bronchiectasis without interstitial lung disease (bronchiectasis-rheumatoid arthritis overlap syndrome) may have a worse clinical course than those patients with bronchiectasis due to other aetiologies.

This international cohort study of 1,716 adult bronchiectasis patients aimed to assess the mortality, frequency of exacerbations, hospital admissions, quality of life, and Bronchiectasis Severity Index (BSI) scores in bronchiectasis-rheumatoid arthritis overlap syndrome compared to bronchiectasis without RA. Because bronchiectasis and COPD overlap syndrome (BCOS) has been linked to excess mortality, this second group was used as an additional reference group.

147 patients with bronchiectasis-rheumatoid arthritis overlap syndrome were identified. Mortality was statistically higher in patients with bronchiectasis-rheumatoid arthritis overlap syndrome (18%) and BCOS (28.5%) compared with those with all other aetiologies (8.6%). The increase in mortality was not associated with exacerbations or bronchiectasis-related hospitalisations. The BSI scores were statistically but not clinically significantly higher in bronchiectasis-rheumatoid arthritis overlap syndrome compared to bronchiectasis without RA.

The current data support the premise that patients with bronchiectasis-rheumatoid arthritis overlap syndrome are at higher risk of premature death. The investigators suggest that excessive cardiovascular risk may be an underpinning mechanism for excess mortality in bronchiectasis-rheumatoid arthritis overlap syndrome, with additive cardiovascular risk driven by each comorbidity. Further investigation is required in this group of patients.

Childhood lung function predicts adult chronic obstructive pulmonary disease and asthma–chronic obstructive pulmonary disease overlap syndrome

Bui DS, Burgess JA, Lowe AJ, *et al*
Am J Respir Crit Care Med 2017;196:39–46
https://doi.org/10.1164/rccm.201606-1272OC

Determining the causes for asthma–COPD overlap syndrome (ACOS) as opposed to asthma alone or COPD alone could help guide more targeted prevention and treatment. Fixed airflow obstruction is a common feature of COPD and ACOS, and it is therefore plausible that early life lung function may play a role in the aetiology of both conditions.

Bui *et al* analysed a cohort of 45-year-olds (n=1,389) from the Tasmanian Longitudinal Health Study, where 7-year-old Tasmanian children (n=8,583) were studied with surveys and prebronchodilator (BD) spirometry in 1968 to investigate associations between childhood lung function and current asthma, spirometrically defined COPD and ACOS, and to estimate the prevalence of these conditions in early middle age.

COPD was defined as a post-bronchodilator $FEV_1/FVC <$ lower limit of normal. Asthma–COPD overlap syndrome (ACOS) was defined as the coexistence of both COPD and current asthma. Associations between childhood lung function and asthma/COPD/ACOS were examined using multinomial regression.

Once adjusted for the sampling weights, the prevalence of current asthma alone was 13.5%, COPD alone 4.1% and ACOS 2.9%. Therefore, among the COPD population, ACOS accounted for 41%. The lowest quartile of FEV_1 at 7 years was associated with ACOS, but not COPD or asthma alone. The lowest quartile of FEV_1/FVC ratio at 7 years was associated with ACOS and COPD, but not asthma alone.

Lower childhood lung function is a risk factor for adult COPD and ACOS, providing further evidence on the early life origins of these diseases.

Effect of a single exacerbation on decline in lung function in COPD

Halpin DMG, Decramer M, Bartolome RC *et al*
Respiratory Medicine 2017;128:85-91
http://dx.doi.org/10.1016/j.rmed.2017.04.013

Exacerbations of COPD have long-term consequences on patient outcomes. They are associated with poor health status and lead to significant mortality. The progression of COPD is heterogeneous; frequent exacerbations have been associated with a more rapid decline in lung function in some publications but not in another. The association between exacerbation frequency and the increase in the rate of lung function decline remain unclear.

In this study, funded jointly by Boehringer Ingelheim and Pfizer, Halpin *et al* evaluated the effect of a single exacerbation on rate of lung function change using data from the 4-year Understanding Potential Long-term Impacts on Function with Tiotropium (UPLIFT®) trial. They compared rate of decline in lung function (FEV_1 and FVC) before and after a single exacerbation in patients who experienced only one exacerbation during UPLIFT® and compared it with the rate of decline in those patients who did not have any exacerbations.

Following a single (moderate-to-severe) exacerbation, mean annual decline in post-bronchodilator lung function increased compared with the rate of decline before the exacerbation (FEV_1 76.5 vs. 39.1 mL/year, p=0.003; FVC 106.5 vs. 34.7 mL/year, p=0.011). In non-exacerbators there were no differences in rates of decline. In the exacerbator subgroup, declines in post-bronchodilator FEV_1 or FVC were similar to non-exacerbators prior to exacerbation; after the single exacerbation they were significantly higher than for non-exacerbators.

This analysis shows the impact of a single exacerbation on the course of COPD. It supports the concept that exacerbations drive disease progression and has important and clinically relevant implications for defining treatment objectives.

Quantitative CT measures of bronchiectasis in smokers

Diaz AA, Young TP, Maselli DJ, *et al*
Chest 2017; 151(6):1255-1262.
http://dx.doi.org/10.1016/j.chest.2016.11.024

Several studies suggest that bronchiectasis in subjects with COPD is frequent and associated with longer hospital stays and higher risk of death. The diagnosis is made on the basis of visual identification of an airway whose diameter is greater than that of the adjacent artery (the BA ratio) and a lack of airway tapering on CT scans or lung tissue. Extensive literature focuses on the clinical associations and prognostic value of visual detection of bronchiectasis on CT scans, but only a small number of CT studies in children have reported quantitative CT (QCT) measures of the disease.

Diaz *et al* collected QCT measures of BA ratios, peak wall attenuation, wall thickness (WT), wall area, and wall area percent (WA%) at matched fourth through sixth airway generations in 21 ever smokers with bronchiectasis (cases) and 21 never smoking control patients (control airways), to identify those measurements able to discriminate bronchiectasis.

The BA ratios, WT and WA% were greater in bronchiectatic than control airways and were able to discriminate bronchiectatic and non-bronchiectatic airways. Those with an increased BA ratio had lower expiratory airflows and worse airflow obstruction. It appears that the elevated BA ratio in subjects with mild bronchiectasis is due to reductions in the calibre of the adjacent pulmonary artery rather than dilation of the airway.

Using the BA ratio in smoking bronchiectasis requires careful interpretation because it might be sensitive to changes in pulmonary arteries. Further investigation is needed to disentangle the interactions among smoking, COPD, bronchiectasis, emphysema, and pulmonary vasculature.

TB in healthcare workers in the UK: a cohort analysis 2009–2013

Davidson JA, Lalor MK, Anderson LF, *et al*.
Thorax 2017; 72:654–659
http://dx.doi.org/10.1136/thoraxjnl-2015-208026

In the UK, all new employees working in a healthcare setting should be given pre-employment screening using a Mantoux test and/or an interferon gamma release assay test. In those who screen negative and are previously unvaccinated, the guidelines recommend that BCG should be given. To inform the continued relevance of existing occupational health guidance, an understanding of the current burden of TB in health care workers (HCWs) in the UK and assessment of the extent to which this is acquired due to occupational exposure in the UK is required. Davidson *et al* undertook a retrospective cohort analysis of national UK TB surveillance and genotyping data between 2009 and 2013 to address this.

2320 cases of TB in HCWs were notified in the study period: 85% were born abroad. The demographic characteristics of HCWs with TB reflect the characteristics of the HCW population, with a disproportionate number being women, foreign born and aged 25-44 years. The TB rate in HCWs was 23.4/100,000 compared with 16.2/100,000 in non-HCWs. However, after stratifying by country of birth, there was no increased TB incidence in HCWs for the majority of countries of birth, including in the UK-born. Only 10 confirmed nosocomial transmission events involving HCWs were identified and two involved transmission to patients.

These data suggests that TB in HCWs in the UK is not generally acquired through UK occupational exposure and guidelines should focus less on BCG vaccination in HCWs and more on identifying and treating latent TB, especially in those from high TB burden countries.

SECOND OPINION

Your respiratory questions answered...

ENQUIRY FROM A PCRS-UK NURSE MEMBER

Question:

I had a 7-year-old boy attend today, poorly SATS <92. I asked the GP if I should use our basic nebuliser tubing through oxygen, to which he said no. The child got worse, so I asked another GP and we made a decision to give the child oxygen and he perked up immediately – the SATS – and he was sent to hospital. A bit of debate has followed in the practice and I have been made to feel I was making a fuss, which perhaps I was! Do you have any guidelines for primary care please re emergency asthma care with children and adults?

Another GP said you have to have another type of nebuliser to use oxygen. I worked elsewhere and we just attached the nebuliser mask and tubing to the oxygen cylinder and nebulised salbutamol or whatever that way. Is that OK?

I would be grateful for any information you can provide on this issue.

Answer:

The BTS/SIGN guidelines section 2.6.2 recommend the following advice for the acute management of asthma:

- Children with life-threatening asthma or SpO_2 <94% should receive high-flow oxygen via a tight fitting face mask or nasal cannula at sufficient flow rates to achieve normal saturations of 94–98%
- Inhaled beta-2-agonists are the first-line treatment for acute asthma in children
- Give oral steroids early in the treatment of acute asthma attacks in children

When nebulising, oxygen bubble tubing should not be used; this can lead to different flow rates of oxygen being delivered. The same mask and chamber can be used. If an oxygen cylinder is used, a high flow regulator should be fitted to the cylinder in order to deliver the medication effectively. Oxygen should be delivered at 6 L/min to drive the nebuliser.

The NICE quality statement 8 states: "People aged 5 years or older presenting to a healthcare professional with a severe or life-threatening acute exacerbation of asthma receive oral or intravenous steroids within one hour of presentation".

Children with life-threatening exacerbations of asthma should be referred to hospital for acute management as soon as possible and also followed up in primary care as soon as possible after discharge to review treatment, management and self-management action plans.

Along with many other clinical updates on asthma and COPD, the PCRS-UK Conference this year features a session by world renowned Professor of Paediatrics and Paediatric Respirology, Professor Andrew Bush, on 'How Sick is the Child? Croup, Bronchiolitis and Paediatric Respiratory Infections – When to Refer'. You may wish to attend the conference to help support your own professional development and confidence in dealing with acute asthma and respiratory conditions.

In addition, PCRS-UK has produced a guide on the key standards knowledge and skills required for all healthcare professionals to deliver high quality respiratory care in primary and community care called 'Fit to Care' (see https://pcrs-uk.org/fit-care). The document can help healthcare professionals to seek appropriate support from employers for further development to ensure they have the confidence and skills required to deliver acute care, such as the above example.

Have you got a question for Second Opinion?
If you have a question for Second Opinion please submit your question to info@pcrs-uk.org quoting "Second Opinion" in the subject line

PCRS-UK News Round-Up

CAROL STONHAM APPOINTED TO FIRST NURSE VICE CHAIR ROLE

PCRS-UK Nurse Lead Carol Stonham, MBE, has been appointed Vice Chair of the Society, taking over from Duncan Keeley who is also our Policy Lead. The appointment marks a change in the future leadership of the executive. To reflect the broad professional membership of the Society, the Chair and Vice Chair roles will in future be held by a nurse and a doctor or vice versa. Carol, who is Respiratory Nurse Practitioner for Gloucestershire CCG and a Queen's Nurse, said: "Appointing a nurse to be Vice Chair is a massive step forward for PCRS-UK. It is recognition that the role of the nurse in primary care is as important as any other member of the team. It reflects the way that primary care works – it isn't about the qualification or job title of the person, it's about what they bring to the team and all team members have an equally important role to play. The executive also felt this change reflects the NHS structure which has a lead doctor and executive nurse."

WELCOME TO JANE YOUNG: TRUSTEE PCRS-UK

PCRS-UK is delighted to announce the appointment of Jane Young as a Trustee to the organisation. Jane is a Senior Lecturer in community nursing at Anglia Ruskin University, Cambridge and an advanced nurse practitioner at Cornford House Surgery in Cambridge. She is currently undertaking a PhD at the University of Birmingham, looking at self-management of COPD in primary care. She has a strong respiratory research interest and a drive to continue to develop her own skills in a diverse and changing healthcare world, embracing and discovering innovative new research ideas in order to empower and educate others. We welcome Jane to the organisation.

PRIMARY CARE RESPIRATORY ACADEMY NOMINATED FOR PRESTIGIOUS AWARD

The Primary Care Respiratory Academy (PCRA) medical education programme, a collaboration between the healthcare marketing agency Cogora (whose brands include Pulse and Nursing in Practice) and PCRS-UK, reached the final of the Communiqué Awards, one of the most prestigious industry awards which celebrates excellence in healthcare communications. It was nominated in the 'Excellence in Professional Education Programmes' category. The Academy was launched last year after PCRS-UK entered a strategic educational partnership with Cogora to improve respiratory education, as well as raise the Society's profile among the wider primary care sector. PCRA combines respiratory educational events, developed in conjunction with PCRS-UK experts, with an online education platform and is offered to primary care healthcare professionals through Cogora's community and brands. In 2016, the PCRA programme delivered 20 full-day educational roadshow events, educating more than 1,200 primary care healthcare professional delegates across the UK The initiative was a great success with 95% of participants highly rating the events. The complementary online hub with CPD resources, news and respiratory information further extended the reach of the programme. The 2016 programme was funded by Pfizer (on behalf of the Novartis-Pfizer Alliance).

ASPIRING AND INSPIRING RESPIRATORY RESEARCHERS WORKSHOP 2017 TELFORD INTERNATIONAL CENTRE, 28TH SEPTEMBER 2017

Don't miss out on this year's workshop taking place on 28th September 2017. If you're involved with respiratory research or interested in doing some research in the future, this practical and inspiring workshop is just for you. You do not need to be an expert researcher (yet!) – but enthusiasm is essential! Key topics include generating research questions – using primary care databases – translating ideas into protocols and implementation science PLUS you'll get the chance to meet and network with leaders in primary care-based respiratory research including Professor Patrick White, Professor Hilary Pinnock, Professor Kamran Siddiqi and Dr Rachel Jordan. The workshop is FREE and takes place the day prior to the PCRS-UK national conference. For more information visit https://pcrs-uk.org/early-researchers-meeting

OBITUARY: DR JUDY BAXTER

It is with great regret that we inform you of the death of Dr Judy Baxter, a GP and long-standing active member of PCRS-UK. Her husband reported that the PCRS-UK was a very special organisation for Judy in two respects, the core driver being to improve the lives of others, which developed Judy's interest in COPD. But Judy also gained hugely herself from the PCRS-UK clinical respiratory leadership programme, which got her moving in a much wider sphere as a GP, and also ultimately in key senior roles in Bedfordshire CCG leading the procurement of mental health services. He went on to say that Judy loved the PCRS-UK and always booked early for the annual conference, and really looked forward to going. We were very sorry to learn of her passing and our deepest sympathies go to Simon her husband and family.

FIT TO CARE?

PCRS-UK has recently published *Fit to Care*, which provides a succinct summary of the key knowledge skills and training required by healthcare professionals caring for people with respiratory disease in a primary or community care setting, at three clearly defined levels of practice (standard,

advanced and expert). The aim of the publication is to:

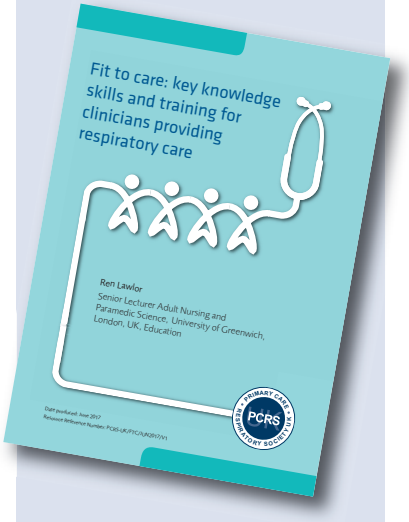
1. Support all healthcare professionals to review and reflect on their own knowledge skills and training with respect to the requirements of respiratory care delivery they are required to undertake as part of their professional role and assess areas where further development and training are required

2. Act as evidence to help healthcare professionals to seek support from their employers for further training and development

3. Provide guidance for employers and commissioners on the skills, knowledge and training required by healthcare professionals, irrespective of profession, working with patients with a respiratory condition in a primary or community care setting.

4. Support the consistent delivery of high quality respiratory care and reduce variation in care as a result of inadequate training/ skills

You can access the document at https://pcrs-uk.org/fit-care



Delivering Excellence Locally

Featuring initiatives led by PCRS-UK members around the UK, supported by PCRS-UK programmes and tools

Investing in you and your future: the Respiratory Leaders Programme

Clare Cook and **Stephen Gaduzo**
Joint Chairs, PCRS-UK Respiratory Leaders Education Organising Committee

Understanding teams, how they work and how to get the best from them is the theme of the PCRS-UK November Respiratory Clinical Leadership workshop.

When a team gels and everyone pulls together a lot can be achieved but, human nature being what it is, most of us will find that at some point we will be working in a team that is having problems.

This workshop will give delegates the skills and confidence to identify what makes their team tick, how to get the best from it but also how to deal with challenges when they arise.

Sessions will explore how to manage conflict and, at a time when health and care services are being integrated, how that might impact on teams. Delegates will hear how they can adapt their style to meet different needs and drivers while maintaining their authenticity. They will understand how they can make themselves heard and will learn strategies for reaching out to the tricky member of the team.

Attendees will learn to look at the culture of team and work out what they can control and what is outside of their control, and then how to set priorities for their team around those controls.

Succession planning will also be addressed – how to enable others in the team to see themselves as leaders, how to delegate and how to support others in their development programme.

Last but not least, the workshop will help delegates to understand how to look after themselves and their teams and how to set realistic goals.

Clare Cook, a community respiratory physiotherapist in Bristol and joint lead of the Respiratory Leaders Programme, says the workshops give attendees the chance to work on real-life current challenges and activities in small groups.

"The programme gives you the opportunity to work with your peers on a current project so you will learn about the tools you might need, what the challenges are and how you can develop the skills you have got. It is geared to a practical level so you don't have to be academic to get the benefit.

"It's a chance to try things out in a closed environment and nobody will judge you because there's no pass or fail."

She adds that delegates will come away from the workshop with an understanding of how they can be the best they can be. "Respiratory Leaders workshops are about respecting people as individuals and giving them space and security to carve their own style and supporting people to recognise how they can develop as a practitioner and as a leader.

"It is not about putting people on a programme and saying you've got to fulfil X, Y, and Z. It is about exposing people to theories and strategies that enable them to reflect on their own abilities. It is a place to actively problem solve the challenges you face in a supportive environment.

"We know that investing in leadership improves patient care. The Respiratory Leaders workshop is focused on investing in you and your future."

Clare adds that, on a personal level, the Respiratory Leaders Programme has challenged her to think about what else she can contribute to the respiratory community. She first started coming to the Respiratory Leaders Programme in 2014 and has been co-chair with Stephen Gaduzo for a year.

"At first it was very nerve wracking, but I feel very supported in the role. The experience and the mentorship is helping me to be a better practitioner in my day-to-day work. Also, the Programme has given me a much better understanding of the political and commissioning system and I am much more confident about presenting information to commissioners."

The November workshop is part of a rolling three-year programme. Each workshop is a standalone event with a focus on hot clinical topics and policy or guidance changes and teaches essential professional skills such as understanding your team or your own leadership style, as well as one or more relevant management techniques such as making a business case, mapping your stakeholders, pitching your case for change or evaluating data.

Planning the workshops over a three-year cycle offers progression. Attending regularly ensures growth and a culture change but, equally, delegates can attend just one workshop at a time.

Stephen Gaduzo, says the programme gives people an opportunity to have a go and do scary things like role play or stand in front of a group to speak in front of non-judgemental colleagues.

"I went to one of the first workshops 10 years ago and since then have hardly missed a year. I remember being encouraged by Steve Holmes to attend, then being asked to help him present, to facilitate and then co-chair. The committee always spots someone in the delegate group with potential that sometimes they don't even realise they have, but with support they very quickly shine.

"If it wasn't for the programme I would not have had the confidence to take on a lot of what came after – from presenting at meetings, to submitting posters to conferences, to becoming part of the North West respiratory team and eventually PCRS-UK Chair.

"I would say to anyone who is or maybe (even reluctantly) a respiratory lead of any description or magnitude, come along. It's free due to a big investment in you by PCRS-UK, it's fun, safe, and who knows where it might lead!"

Reflections of a first timer

Sam Maddox, a practice nurse from Clacton, who is the respiratory lead for her surgery, went to the June Respiratory Leaders workshop on project planning.

"I found the workshop inspirational and motivating. It felt like a really friendly environment where I felt I could talk openly about my ideas. It was great to be around like-minded people.

"I feel quite isolated in my surgery and don't have any contacts or networks so I wanted to meet other people and to find out what my potential is.

"I am interested in setting up a local respiratory group and I picked up a lot of tips and the tools I need to do this and got some great advice."

> *"It's the best course I've been to in a long time. It's given me a lot of support and I came away feeling that I can make a difference to respiratory care in my area"*

'Understanding Teams: How they Work and How to get the Best from Them' will be held on 10th-11th November, Cranage Hall, Crewe.

For further information and to register visit
https://pcrs-uk.org/clinical-leadership-programme

Asthma skills updates are improving the safety and care of youngsters with asthma


Fran Robinson interviews **Dr Rajat Srivastava** Abbey Medical Practice Bedford

Concern that increasing numbers of children and young people are attending emergency departments with respiratory symptoms has prompted a drive to upskill GPs and practice nurses in the East Midlands.

A local survey found that one-third of referrals from primary to secondary care were for respiratory problems. In addition, four out of five GPs and practice nurses said they lacked confidence in treating asthma in children and young people and an understanding of referral pathways for paediatric advice.

Now the majority of GPs and practice nurses who have attended a series of workshops run by the East Midlands Maternity and Children's Network say they feel confident about diagnosing and managing wheeze and asthma in children and young people.

Dr Rajat Srivastava, the Network's GP Clinical Lead who organised the workshops, says the National Review of Asthma Deaths (NRAD)[1] highlighted that the majority of deaths of children and young people with asthma occurred outside hospital.

It also revealed that poor recognition of an 'adverse outcome' such as death was an important avoidable factor in 70% of children and 83% of young people receiving care in general practice.

"Against this background, general practice is overstretched and younger GPs and most practice nurses may not have had paediatric-specific postgraduate training. That is bound to affect their confidence and skill in managing asthma," he says.

Dr Srivastava persuaded the network of the need to update primary care practitioners' expertise in managing wheeze and asthma in children and their knowledge of the primary/secondary care interface.

Paediatric emergency department consultants in Nottingham, Derby and Leicester were approached and were enthusiastic about devising a teaching plan geared towards primary care.

An East Midlands bespoke asthma management plan for children was also developed for the programme. NRAD highlighted that many patients who died as a result of asthma did not have asthma plans, but Dr Srivastava says it can be time consuming for busy nurses and GPs to provide them for patients.

So, in partnership with experienced paediatricians and respiratory nurses, the Network produced a simplified asthma management plan condensed on to one A4 sheet. This is quick to complete and will empower the patients to manage their asthma better. They are now working with Arden and GEM Clinical Support Units to incorporate the plan into clinical record systems, making it easy to use in the consultation.

Demand for the workshops was high, but numbers were kept to 25 for each event with 6–8 delegates allocated to individual workshops, giving them opportunities to ask questions. The workshops covered diagnosing and managing asthma, inhaler technique, asthma plans and asthma attack.

All attendees were given a pack with a condensed version of the BTS/SIGN guidelines[2] and the Network's asthma plan so that the learning could be cascaded to colleagues in their practices.

Videos of the presentations[3] are now available to watch free of charge on the Network's website and the asthma plan[4] can be downloaded.

Dr Srivastava says this initiative was cheap to put on and could be easily reproduced in other areas. The consultants provided their services for free and were only refunded their travel expenses. The cost of hiring a few rooms at a local venue was funded by NHS England through the network. Dr Srivastava suggests that other areas could argue a case for funding from their CCGs on the grounds that the education would save costs from reduced referrals to A&E. The workshops could be run during protected learning time.

He says it is hard to obtain specific figures to prove that the initiative has reduced A&E referrals for respiratory problems because of the complexity of the data. However, after completing the most recent programme in June, all the delegates said they felt 'at least fairly confident' about treating children and young people with respiratory symptoms. Before the event only four in 10 delegates said they felt 'at least fairly confident' to do so.

Before the event only two-thirds of delegates said they felt confident about teaching inhaler techniques to patients. Afterwards nearly all of them said they did. All attendees will be followed up

in a year's time in order to monitor the ongoing impact of the training.

Dr Srivastava says the excellent feedback showing that nearly all the attendees now feel confident about treating children and young people's asthma should result in improved care and safety of children and young people in the East Midlands.

"We had two deaths of children from asthma in the East Midlands since 2014. Each death is one too many," he says.

References
1. Why asthma still kills. The National Review of Asthma Deaths. May 2014. https://www.rcplondon.ac.uk/projects/outputs/why-asthma-still-kills
2. BTS/SIGN Guideline on the management of asthma. https://www.brit-thoracic.org.uk/standards-of-care/guidelines/btssign-british-guideline-on-the-management-of-asthma/
3. Link to videos of the workshops. https://vimeo.com/emsenatecn/videos
4. The East Midlands Maternity and Children's Network asthma plan. http://www.em-respiratory.co.uk/children-and-young-people-s-asthma-and-wheeze/asthma-plans

PCRS-UK Affiliated Groups

How to future proof your affiliated group


Fran Robinson PCRS-UK Communications Consultant and
Melissa Canavan, Group Lead for the Leeds Respiratory Network

When respiratory nurse specialist Melissa Canavan launched the Leeds Respiratory Network with her colleague Sarah Anderson in October 2013 they initially ran it by splitting the work between themselves.

They were concerned about data showing that Leeds was one of the worst places in the country for respiratory outcomes and were inspired to set up the network after attending a PCRS-UK Clinical Leaders workshop.

Melissa, then a practice nurse, felt isolated in her practice and wanted to connect with colleagues and to organise educational events to help reduce the local variation in general practice respiratory care.

Melissa and Sarah built up a large database of interested healthcare professionals and began sending out regular emails and posting on social media to inform everyone about the latest respiratory news and developments. The network now runs two or three educational evening events a year and holds an annual one-day conference with national speakers.

Both Melissa and Sarah achieved all this on top of being full-time mothers, running their homes, working in busy day jobs and studying at university.

Eventually they realised they needed help and decided the best way forward would be to set up an education committee to help them to plan and organise events.

Involving colleagues in running affiliated groups not only provides vital support for the Lead, but is an excellent way of future proofing the group by ensuring there is always someone to take up the mantle if the Lead retires or moves away to another job.

Melissa says it was easy to set up the committee. "I sent out an email asking people to get in touch if they wanted to come on board with us. A few people replied. We arranged to meet and I explained that I wanted to set up an education committee. They all looked rather nervous but I was honest with them and said – let's just try and see if it works."

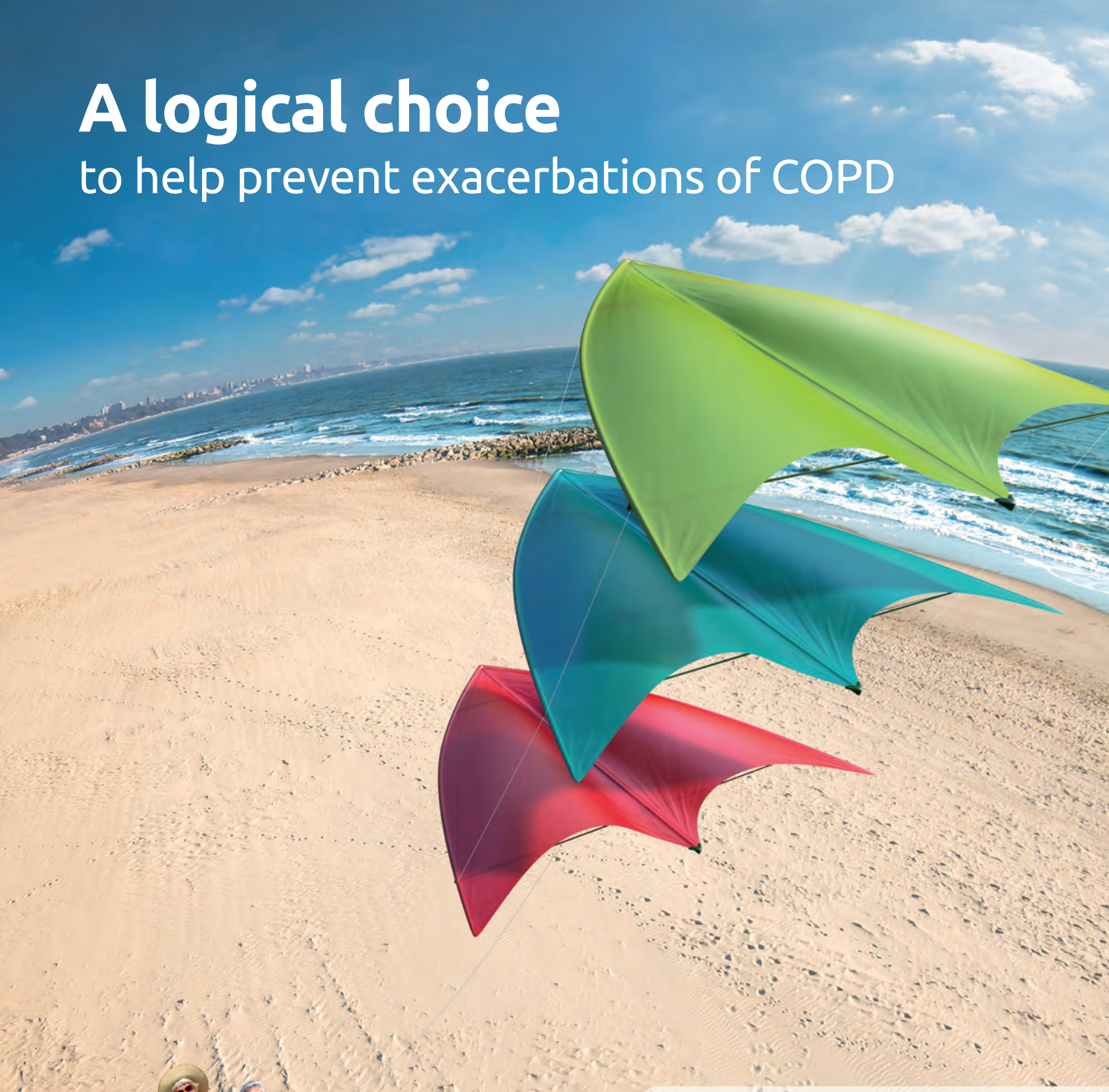
The group, now with eight members, has bonded and meets three times a year over a meal to plan events.

The committee members have all grown personally and professionally from being involved with the committee and five have attended the PCRS-UK Clinical Leaders programme. "We support each other and I have seen my colleagues thrive and find their voice. All the committee members have grown in confidence and have made changes in their own practices. Some have negotiated pay rises which is making them feel more valued while others have gained to confidence to move on to new jobs," says Melissa.

She says they now have some terrific debates in their meetings. "It's a lot of work thinking up who you can invite to speak and what subjects should be discussed. If you have a committee, people not only bounce ideas off each other but they also share the load.

"I would say to anyone who is either setting up or running an established group on their own – make sure you get some support from other members of the group – that way your group will thrive."

A logical choice
to help prevent exacerbations of COPD



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Inspired logic

Chiesi

Prescribing information can be found overleaf

CHTRI20170962F Aug 2017

Prescribing Information

Trimbow 87/5/9 Pressurised Metered Dose Inhaler (pMDI) Prescribing Information
Please refer to the full Summary of Product Characteristics (SPC) before prescribing. **Presentation:** Each Trimbow 87/5/9 pMDI delivered dose contains 87micrograms (mcg) of beclometasone dipropionate (BDP), 5mcg of formoterol fumarate dihydrate (formoterol) and 9mcg of glycopyrronium. This is equivalent to a metered dose of 100mcg BDP, 6mcg formoterol and 10mcg glycopyrronium. **Indications:** Maintenance treatment in adult patients with moderate to severe chronic obstructive pulmonary disease (COPD) not adequately treated by a combination of an inhaled corticosteroid (ICS) and a long-acting beta2-agonist (for effects on symptoms control and prevention of exacerbations see section 5.1 of SPC). **Dosage and administration:** For inhalation in adult patients (≥18 years). 2 inhalations twice daily (bd). Can be used with the AeroChamber Plus® spacer device. BDP in Trimbow is characterised by an extrafine particle size distribution which results in a more potent effect than formulations of BDP with a non-extrafine particle size distribution (100mcg of BDP extrafine in Trimbow are equivalent to 250mcg of BDP in a non-extrafine formulation). **Contraindications:** Hypersensitivity to the active substances or to any of the excipients. **Warnings and precautions:** Not for acute use in treatment of acute episodes of bronchospasm or to treat COPD exacerbation. Discontinue immediately if hypersensitivity or paradoxical bronchospasm. *Deterioration of disease:* Trimbow should not be stopped abruptly. *Cardiovascular effects:* Use with caution in patients with cardiac arrhythmias, aortic stenosis, hypertrophic obstructive cardiomyopathy, severe heart disease, occlusive vascular diseases, arterial hypertension and aneurysm. Caution should also be used when treating patients with known or suspected prolongation of the QTc interval (QTc > 450 milliseconds for males, or > 470 milliseconds for females) either congenital or induced by medicinal products. Trimbow should not be administered for at least 12 hours before the start of anaesthesia as there is a risk of cardiac arrhythmias. Caution in patients with thyrotoxicosis, diabetes mellitus, phaeochromocytoma and untreated hypokalaemia. Increase in pneumonia and pneumonia hospitalisation in COPD patients receiving ICS observed. Clinical features of pneumonia may overlap with symptoms of COPD exacerbations. Systemic effects of ICS may occur, particularly at high doses for long periods, but are less likely than with oral steroids. These include Cushing s syndrome, Cushingoid features, adrenal suppression, growth retardation, decrease in bone mineral density, cataract, glaucoma and more rarely, a range of psychological or behavioural effects including psychomotor hyperactivity, sleep disorders, anxiety, depression and aggression. Use with caution in patients with pulmonary tuberculosis or fungal/viral airway infections. Potentially serious hypokalaemia may result from beta2-agonist therapy. Formoterol may cause a rise in blood glucose levels. Glycopyrronium should be used with caution in patients with narrow-angle glaucoma, prostatic hyperplasia or urinary retention. Use in patients with severe hepatic or renal impairment should only be considered if benefit outweighs the risk. **Interactions:** Since glycopyrronium is eliminated via renal route, potential drug interactions could occur with medicinal products affecting renal excretion mechanisms e.g. with cimetidine (an inhibitor of OCT2 and MATE1 transporters in the kidney) co- administration, glycopyrronium showed a slight decrease in renal excretion (20%) and a limited increase in total systemic exposure (16%). Possibility of systemic effects with concomitant use of strong CYP3A inhibitors (e.g. ritonavir, cobicistat) cannot be excluded and therefore caution and appropriate monitoring is advised. *Related to formoterol:* Non-cardioselective beta-blockers (including eye drops) should be avoided. Concomitant administration of other beta-adrenergic drugs may have potentially additive effects. Concomitant treatment with quinidine, disopyramide, procainamide, antihistamines, monoamine oxidase inhibitors (MAOIs), tricyclic antidepressants and phenothiazines can prolong the QTc interval and increase the risk of ventricular arrhythmias. L-dopa, L-thyroxine, oxytocin and alcohol can impair cardiac tolerance towards beta2-sympathomimetics. Hypertensive reactions may occur following co-administration with MAOIs including drugs with similar properties (e.g. furazolidone, procarbazine). Risk of arrhythmias in patients receiving concomitant anaesthesia with halogenated hydrocarbons. Concomitant treatment with xanthine derivatives, steroids or diuretics may potentiate a possible hypokalaemic effect of beta2-agonists. Hypokalaemia may increase the likelihood of arrhythmias in patients receiving digitalis glycosides. *Related to glycopyrronium:* Co-administration with other anticholinergic-containing medicinal products is not recommended. *Excipients:* Presence of ethanol may cause potential interaction in sensitive patients taking metronidazole or disulfram. **Fertility, pregnancy and lactation:** Should only be used during pregnancy if the expected benefits outweigh the potential risks. Children born to mothers receiving substantial doses should be observed for adrenal suppression. Glucocorticoids and metabolites are excreted in human milk. It is unknown whether formoterol or glycopyrronium (including their metabolites) pass into human breast-milk but they have been detected in the milk of lactating animals. Anticholinergic agents like glycopyrronium could suppress lactation. A risk/benefit decision should be taken to discontinue therapy in the mother or discontinue breastfeeding. A decision must be made whether to discontinue breastfeeding or to discontinue/abstain from therapy. **Effects on driving and operating machinery:** None or negligible. **Side effects:** *Common:* pneumonia (in COPD patients), pharyngitis, oral candidiasis, urinary tract infection, nasopharyngitis, headache, dysphonia. *Uncommon:* influenza, oral fungal infection, oropharyngeal candidiasis, oesophageal candidiasis, sinusitis, rhinitis, gastroenteritis, vulvovaginal candidiasis, granulocytopenia, dermatitis allergic, hypokalaemia, hyperglycaemia, restlessness, tremor, dizziness, dysgeusia, hypoaesthesia, otosalpingitis, atrial fibrillation, electrocardiogram QT prolonged, tachycardia, tachyarrhythmia, palpitations, hyperaemia, flushing, cough, productive cough, throat irritation, epistaxis, diarrhoea, dry mouth, dysphagia, nausea, dyspepsia, burning sensation of the lips, dental caries, rash, urticaria, pruritus, hyperhidrosis, muscle spasms, myalgia, pain in extremity, musculoskeletal chest pain, dysuria, urinary retention, fatigue, asthenia, C-reactive protein increased, platelet count increased, free fatty acids increased, blood insulin increased, blood ketone body increased, blood cortisol decreased. *Rare:* Lower respiratory tract infection (fungal), hypersensitivity reactions, including erythema, lips, face, eyes and pharyngeal oedema, decreased appetite, insomnia, hypersomnia, angina pectoris (stable and unstable), ventricular extrasystoles, nodal rhythm, sinus bradycardia, blood extravasation, hypertension, paradoxical bronchospasm, oropharyngeal pain, angioedema, nephritis, blood pressure increased, blood pressure decreased. *Very rare:* thrombocytopenia, adrenal suppression, glaucoma, cataract, dyspnoea, growth retardation, peripheral oedema, bone density decreased. *Unknown frequency:* psychomotor hyperactivity, sleep disorders, anxiety, depression, aggression, behavioural changes (Refer to SPC for full list of side effects). **Legal category:** POM **Packs and price:** £44.50 1x120 actuations. **Marketing authorisation No:** EU/1/17/1208/002 **UK Distributor:** Chiesi Limited, 333 Styal Road, Manchester, M22 5LG. **Date of preparation:** Jun 2017. 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Adverse events should be reported. Reporting forms and information can be found at www.mhra.gov.uk/yellowcard. Adverse events should also be reported to Chiesi Limited on 0800 0092329 (GB), 1800 817459 (IE).

The benefits of setting up or joining a local group:

- They offer a lifeline for nurses and other healthcare professionals who may feel isolated in general practice or the community
- They are an opportunity for respiratory interested health professionals to update their knowledge, learn something new and share good practice
- They are an opportunity to network with colleagues
- They are a place to meet like-minded colleagues and make friends

The benefits of affiliating your group to PCRS-UK

Affiliating your group to PCRS-UK confers free PCRS-UK membership for the group leader and the opportunity to attend group leader workshops. PCRS-UK can help you to set up a group.

We can:

- Introduce you to members who are already running successful groups so that they can help mentor you through the initial stages
- Provide you with a resource pack to help you get started (see https://www.pcrs-uk.org/resource-pack-help-you-get-started)
- Promote your events/meetings by sending emails to members in your area and adding your meetings to our events listing on our website
- List your group on our website and promote it to our members
- Point you in the direction of tools and resources that you can use as a basis for discussion and local update
- Send you a regular newsletter especially for group leaders offering tips and advice for managing your group and sharing information

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What is Quality Assured Diagnostic Spirometry?

Spirometry is a key pulmonary function test used to evaluate respiratory health. Results from spirometry tests give objective measures of lung function to support the assessment, diagnosis and management of asthma, COPD, cystic fibrosis and other respiratory and systemic diseases.

The collaboration of a number of professional bodies, including the Association for Respiratory Technology & Physiology, Education for Health, the Association of Respiratory Nurse Specialists, Asthma UK, the British Lung Foundation, the British Thoracic Society and the Primary Care Respiratory Society UK, led to the creation of the 'Quality Assured Spirometry' competency assessment framework, designed to establish minimum competency standards for practitioners performing spirometry.

This framework is a direct response to the recommendations of the All Parliamentary Group (APPG) Report on Premature Mortality from Respiratory Disease (2014). The recommendations include the need for quality training and a common training curriculum, the assessment of healthcare professionals against defined standards and the creation of a national register of those certified to perform spirometry testing. The framework will be phased in from 1st April 2017 and fully implemented by 31st March 2021.

The Importance of Spirometry Quality Assurance

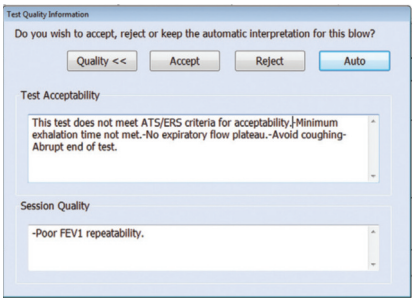
The quality of spirometry measurements can be compromised by a wide range of factors, including incorrect testing procedures, inaccurate equipment or the misinterpretation of results. Technically flawed tests often lead to inaccurate interpretations of respiratory health, falsely labelling normal subjects as 'impaired' or impaired subjects as 'normal.' Such flawed test results are not only useless but also convey erroneous information which could be harmful to patients. It is, therefore, very important that those who conduct the tests or interpret the results are aware of potential technical pitfalls and current spirometry testing recommendations.

Confidence in Spirometry Measurements

Confidence in spirometry measurements and in the accuracy of data interpretation is predicated on confidence in your hardware and quality assurance feedback from your software. Such feedback includes accuracy checks, as per the latest international and national spirometry guidelines, clear visual display of traces, the correct comparative normal reference values, data trending and traceability of all test data and events.

Users may not perform spirometry often enough to maintain the skills and knowledge to obtain grade A results every time. This is why it is essential to choose the best hardware for accurate, precise readings and software that helps with pattern recognition and pinpoints poor or erroneous tests that may lead to incorrect diagnoses

Vitalograph Hardware & Software Aligns With Framework Objectives



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Session | Test QA | Information | Interpretation

Acceptability Criteria	Test 1	Test 2	Test 3
Start of Test	✓	✓	✓
End of Test	✓	✓	✓
Cough free	✓	✓	✓
User Defined Artefact free	✓	✓	✓

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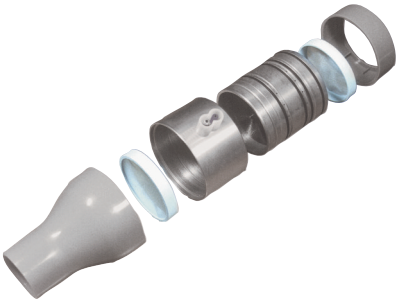

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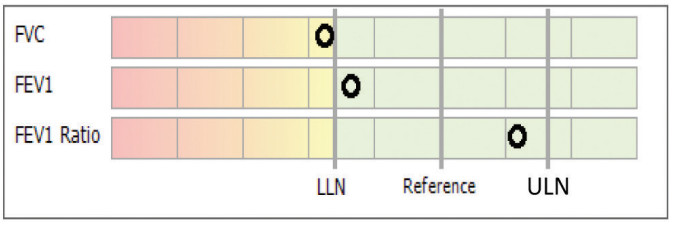
Global Lung Initiative (GLI)



Traditionally, individual sites have selected their own preferred reference equations with which to compare patients' results, however, the use of different equations has been shown to lead to differing interpretations depending on where spirometry testing was undertaken. International collaboration between more than 40 countries has resulted in standardised spirometry reference equations that can be used globally for people of both sexes aged 3 - 95 years. This normative reference data is based on approximately 74,000 healthy non-smoking subjects and represents the first multi-ethnic reference equations for spirometry. These new normal reference values from the Global Lung Initiative are built into Vitalograph Spirotrac Software to ensure that, regardless of where a patient is tested, the interpretation is based upon comparisons with the same population groups' normal range.

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For further information contact sales@vitalograph.co.uk

Further reading

Jenkins C, Spirometry Performance in Primary Care: The Problem, and Possible Solutions, Prim Care Respir J 18 (3), 128-129. 9 2009
Stanojevic S, et al The Global Lung Function Initiative: dispelling some myths of lung function test interpretation, Breathe 2013 9: 462-474

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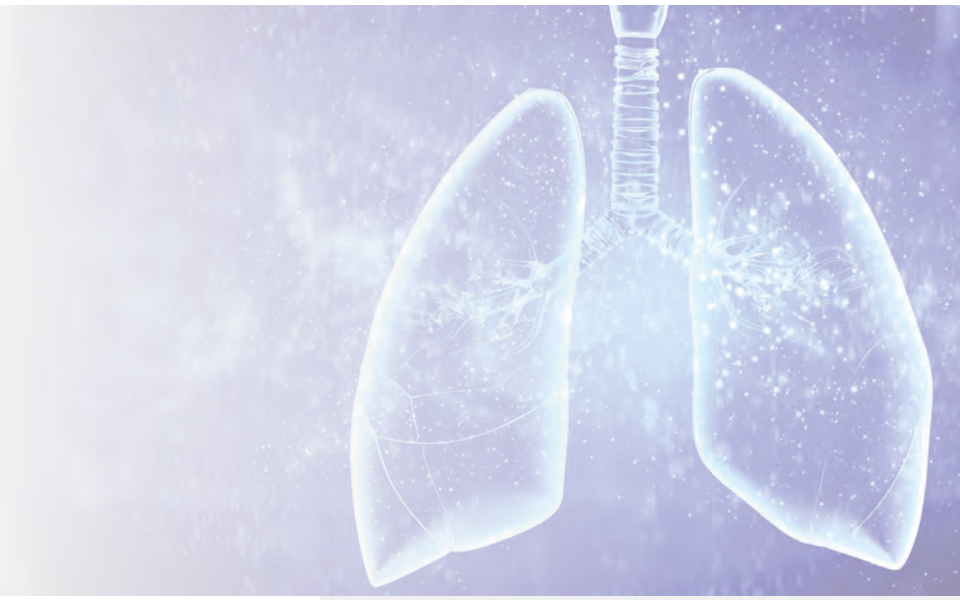

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REVIEW ARTICLE OPEN

Raising awareness of bronchiectasis in primary care: overview of diagnosis and management strategies in adults

James D. Chalmers[1] and Sanjay Sethi[2]

Bronchiectasis is a chronic lung disease characterised by recurrent infection, inflammation, persistent cough and sputum production. The disease is increasing in prevalence, requiring a greater awareness of the disease across primary and secondary care. Mild and moderate cases of bronchiectasis in adults can often be managed by primary care clinicians. Initial assessments and long-term treatment plans that include both pharmacological and non-pharmacological treatments, however, should be undertaken in collaboration with a secondary care team that includes physiotherapists and specialists in respiratory medicine. Bronchiectasis is often identified in patients with other lung diseases, such as chronic obstructive pulmonary disease, asthma, and in a lesser but not insignificant number of patients with other inflammatory diseases, such as rheumatoid arthritis and inflammatory bowel disease. Overall goals of therapy are to prevent exacerbations, improve symptoms, improve quality of life and preserve lung function. Prompt treatment of exacerbations with antibiotic therapy is important to limit the impact of exacerbations on quality of life and lung function decline. Patient education and cooperation with health-care providers to implement treatment plans are key to successful disease management. It is important for the primary care provider to work with secondary care providers to develop an individualised treatment plan to optimise care with the goal to delay disease progression. Here, we review the diagnosis and treatment of bronchiectasis with a focus on practical considerations that will be useful to primary care.

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INTRODUCTION

Non-cystic fibrosis bronchiectasis (referred to as bronchiectasis throughout) is a chronic lung disease characterised by recurrent infection, inflammation, persistent cough and production of sputum.[1, 2] Bronchiectasis results from permanent dilation of the airways.[3] The primary insult is often unknown, but pathological changes in response to Cole's vicious cycle hypothesis[4, 5] are thought to be responsible for disease progression (Fig. 1).

Causes may include post-infective injury (previous bacterial or viral infections), congenital defects of the mucociliary clearance such as primary ciliary dyskinesia (PCD) or immune deficiency.[1, 2, 5, 6] A listing of possible causes is shown in Table 1, although often the underlying cause is undetermined.[1, 2, 7–14] Where the cause is not identified, patients are classified as having 'idiopathic' bronchiectasis. Because prior infections are common causes of bronchiectasis,[2, 15] recent guidelines suggest asking patients about previous respiratory infections, including previous tuberculosis, to establish possible linkage with the onset of bronchiectasis symptoms.[2] In Lady Windermere syndrome,[16, 17] a syndrome named for a character with a chronic voluntarily suppressed cough in the Oscar Wilde play *Lady Windermere's Fan*,[18] bronchiectasis is thought to be caused by chronic *Mycobacterium avium* complex or other pulmonary non-tuberculous mycobacteria (NTM) infection.[19] It is more prevalent in tall, lean, middle-aged women than it is in the general population.[19]

Bronchiectasis can also result from rare congenital defects such as PCD, in which the epithelial cell motor cilia are dysfunctional, resulting in mucus accumulation.[20, 21] Airway obstruction from the mucus and subsequent inflammation and bacterial infection contribute to development of bronchiectasis.[20, 21] Other rare genetic causes associated with bronchiectasis have recently been reviewed in detail,[22] and include Williams-Campbell syndrome (a cartilage deficiency), Mounier-Kuhn syndrome (tracheobronchomegaly), common variable immune deficiency (hypogammaglobulinaemia), inherited connective tissue disorders, α1-antitrypsin deficiency and yellow nail syndrome.

Bronchiectasis prevalence estimates vary by region and increase with age but suggest that bronchiectasis is a relatively common disease. Prevalence estimates in the United States, United Kingdom and New Zealand are variable owing to differences in diagnostic techniques and methods[2, 13, 23–26]; recent estimates range from 370 per 100,000 persons to 566 per 100,000 persons.[13, 24] These estimates also may appear to be increasing owing to improved diagnosis and recognition, including wider use of high-resolution chest computed tomography (HRCT) scans.[13, 27] To put the prevalence in context, these estimates suggest there may be 1 patient with bronchiectasis for every 20 patients with chronic obstructive pulmonary disease (COPD) in Western countries.

Bronchiectasis is commonly found in patients with a diagnosis of COPD[11] and asthma.[28, 29] Coexistence of bronchiectasis with HIV, rheumatoid arthritis, inflammatory bowel disease and pulmonary fibrosis also has been shown.[13, 28] A high awareness of this overlap is needed for primary care physicians to identify patients with bronchiectasis, as symptoms can be easily dismissed as part of the underlying disorder.

The aim of this manuscript is to provide a focused review of bronchiectasis and its management in adult patients for the general practitioner or primary care physician. Guidelines for

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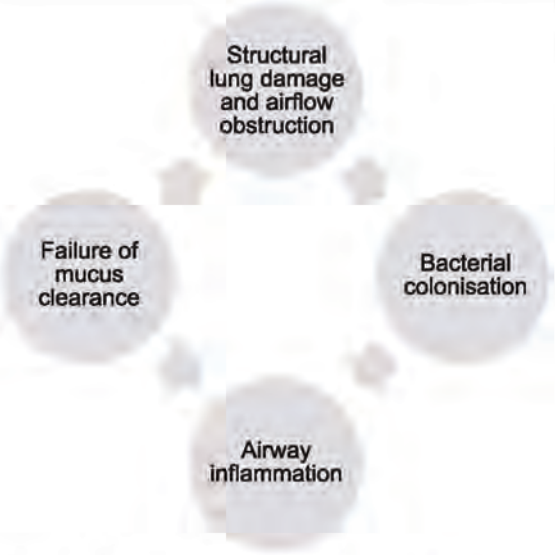

Fig. 1 Vicious cycle hypothesis of bronchiectasis[4, 5]

Table 1. Possible causes and associated comorbid conditions of non-cystic fibrosis bronchiectasis

Causes	Frequency (%)
Primary cause	
Undetermined (idiopathic bronchiectasis)	30–53
Previous infection–bacterial or viral	33–42
Aspiration/inhalation injury	2–4
Congenital defect of large airway (e.g., Mounier-Kuhn syndrome)	<1
Immune deficiency (hypogammaglobulinaemia)	1–8
Primary ciliary dyskinesia	1–17
Connective tissue disease/rheumatoid arthritis/ Sjögren's syndrome/systemic sclerosis	3–6
Cause or comorbid condition	
COPD[a]	4–69
Asthma[a]	17.5–43.0
Allergic bronchopulmonary aspergillosis (associated with asthma)	1–7
Inflammatory bowel disease	1–2
Non-tuberculosis mycobacterial infection	0.7–34.0

Data from Aliberti *et al.*,[8] Agusti *et al.*,[7] Chalmers and Hill,[1] Fowler *et al.*,[9] Gupta *et al.*,[10] Ni *et al.*,[11] Park and Olivier,[12] Pasteur *et al.*,[2] Quint *et al.*[13]
COPD chronic obstructive pulmonary disease
[a]Whether COPD and asthma are the underlying cause of bronchiectasis, or are associated conditions, is often not clear. Non-tuberculous Mycobacteria and allergic bronchopulmonary aspergillosis are thought to be both causes and consequences of bronchiectasis

treatment of bronchiectasis are available from the British Thoracic Society,[2, 30] the Thoracic Society of Australia and New Zealand[25, 31] and SEPAR (Spain),[32] but not in the United States. This review considers these guidelines, along with newly published information.

CLINICAL PRESENTATION—WHEN TO SUSPECT BRONCHIECTASIS

A 66-year-old lady presents with a chest infection associated with cough productive of green sputum and increasing shortness of breath. She had never smoked and has no relevant past medical history. Chest x-ray shows no abnormality. She is treated with antibiotic therapy by her primary care physician and improves. She attends again a few months later with worsening productive cough. Her primary care physician notes that she has had several courses of antibiotics for chest infections over the previous 3 winters and has reported a chronic productive cough on a daily basis for the past 3 years.

In new patients or those that do not have an established diagnosis, one of the most common core symptoms is a persistent cough (>90% of patients), often producing large quantities of mucoid (white or clear) or purulent (dark yellow, green or brown) sputum[2] (Table 2). Adults may have a history of symptoms over many years. Recurrent respiratory tract infections also raise the possibility of bronchiectasis, and patients may take a long time to recover from chest infections or require multiple courses of antibiotics before symptoms fully resolve. Dyspnoea is present in a high proportion of cases, with frequent haemoptysis in severe disease. These symptoms can be variable across patients, with some having symptoms daily and others only having symptoms during exacerbations.[5] The longstanding textbook teaching of bronchiectasis patients with widespread crackles, digital clubbing and cachexia is now rarely seen.

Diagnosis may be difficult when a patient has already received a diagnosis of another chronic respiratory disease such as COPD or asthma. Furthermore, considerable diagnostic confusion exists between bronchiectasis, asthma and COPD. Patients with primary bronchiectasis are often first labelled as asthma and COPD. Further adding to this complexity is the occurrence of secondary bronchiectasis in patients with asthma and COPD, and the coexistence of these common disorders in the same patient. A thorough clinical evaluation is essential and often the best diagnostic tool to determine the primary condition/s and manage accordingly. Bronchiectasis should be suspected in patients when there is a poor response to standard therapy, when unusual pathogens are isolated from sputum or when patients do not have a typical clinical history of COPD (e.g., absence of smoking history or young age of onset). In addition, patients with asthma may develop bronchiectasis associated with an immunological reaction to *Aspergillus*, known as allergic bronchopulmonary aspergillosis (ABPA).[2] Such patients present with a history of asthma that is poorly controlled, often with the production of large volumes of sputum or plugs. Therefore, bronchiectasis and ABPA should be considered as a potential contributor to severe asthma or poor asthma control.

HOW TO DIAGNOSE BRONCHIECTASIS

Primary care

The majority of respiratory tract infections seen in the primary care setting are self-limiting and do not require further investigation. In addition, the majority of patients with a chronic cough will not have bronchiectasis. In one study of 266 patients with chronic cough lasting longer than 8 weeks referred to a secondary care cough clinic and who completed follow-up, most patients had positive outcomes and did not receive a bronchiectasis diagnosis.[33] The largest group of patients (29%) had asthma that was demonstrated by bronchodilator reversibility. Gastro-oesophageal reflux disease (GORD) related cough was noted in 22% and most of these patients were sensitive to proton pump inhibitor

Table 2. Symptoms/signs of bronchiectasis

Clinical signs of bronchiectasis
Core symptoms
Persistent cough
Sputum production
Breathlessness on exertion
Recurrent pneumonia/lung infections/bronchitis
Asthma or COPD unresponsive to usual treatment
Additional signs and symptoms
Coarse crackles on auscultation (often absent)
Chronic rhinosinusitis
Chest discomfort
Fatigue and weight loss
Signs associated with underlying disorders (e.g., rheumatoid arthritis, yellow nail syndrome, connective tissue disease)

Pasteur *et al.*[2] and Chalmers *et al.*[5]
COPD chronic obstructive pulmonary disease

treatment. Angiotensin converting enzyme inhibitor (ACEi)-induced cough was present in 14% and resolved on withdrawal of the ACEi. Only one patient had a diagnosis of bronchiectasis. Indicators of possible bronchiectasis are sputum production, which is often absent with GORD, cough variant asthma or cough hypersensitivity, and episodes of respiratory tract infections, which are also uncommon with these disorders. Fevers or night sweats with a chronic cough are unusual in bronchiectasis and suggest pulmonary tuberculosis or pulmonary non-tuberculous Mycobacterial disease in the appropriate clinical context.

Bronchiectasis should be considered as a possible diagnosis where respiratory tract infections are severe, persistent, unusual or recurrent (represented by the helpful acronym SPUR). Patients with suspected clinical signs and symptoms of bronchiectasis should be evaluated by a thorough clinical examination to rule out other possible causes and a sputum sample should be sent for microbiological analysis.[2, 25]

Haemophilus influenzae, Pseudomonas aeruginosa, Streptococcus pneumoniae and *Moraxella catarrhalis* are among the most common pathogens isolated from patients with bronchiectasis.[2, 34, 35] Standard bacterial cultures will not identify some important bronchiectasis-associated pathogens such as NTM, but these can be excluded by requesting specific cultures for Mycobacteria. Negative sputum cultures do not exclude a diagnosis of bronchiectasis. Sending samples when patients are clinically 'well' is important, as culture positive samples with chest infections are common in many conditions, but a culture positive sputum sample when the patient is well increases the likelihood that the patient has bronchiectasis.

Chronic colonisation with *P. aeruginosa* occurs in many patients and is associated with more severe disease.[2, 36] In a recent systematic review,[37] which included a meta-analysis of 21 studies, mortality for bronchiectasis patients with *P. aeruginosa* colonisation was higher (pooled odds ratio of 2.95, $P < 0.0001$) than in patients without colonisation. In patients with *P. aeruginosa*, mortality was 7.7% at 1 year and 30 to 50% at 5 years.[37] In contrast, mortality for bronchiectasis patients without *P. aeruginosa* was 0% at 1 year and 9 to 15% at 5 years. Hospital admission rates were significantly increased in those with *P. aeruginosa*, as were exacerbation rates (those with *P. aeruginosa* infection had an average of 1 additional exacerbation per patient per year than those without). *P. aeruginosa* was also associated with a worsened quality of life.[37] Isolation of *P. aeruginosa* in a new patient or for the first time in a patient with recurrent respiratory tract infections should be promptly referred to secondary care for antibiotic treatment.[2]

Knowing which pathogen is present, if any, will help determine the most effective antibiotic treatment. However, isolation of a pathogen does not require treatment if the patient is well, as many patients are chronically infected with organisms that will not be eradicated by repeated short courses of oral antibiotics.[6, 38]

A regular chest x-ray may be insensitive to the changes caused by bronchiectasis, as in the clinical example above.[39] Although an HRCT scan of the chest is the radiological investigation of choice in the diagnosis of bronchiectasis,[2, 30] it may also be identified using a standard CT scan. Bronchial dilation (luminal diameter greater than accompanying pulmonary artery/lack of tapering) is the defining feature (Fig. 2).[2, 25, 30] Bronchial wall thickening also may be present.[2] If HRCT is not indicative of bronchiectasis, then the diagnosis can be excluded.

In some cases, radiological evidence for bronchiectasis will be found in patients without overt symptoms. Radiological evidence of asymptomatic bronchiectasis should be investigated to determine if a causal event might explain the finding. This has been reported to occur in patients with underlying rheumatoid arthritis or humoral immune deficiency.[2] However, it should be emphasised that bronchiectasis is a clinical diagnosis, supported by imaging, rather than a condition identified by imaging alone.

Lung function should be evaluated using spirometry,[2, 25, 30] assessing forced expiratory volume in the first second (FEV_1), forced vital capacity and peak expiratory flow.[2] Although up to 80% of adult patients with bronchiectasis in secondary care will exhibit airflow obstruction, some show no reduction in airflow and spirometry may be completely normal.[2] Presence of reduced FEV_1 is highly predictive of mortality, hospital admission, exacerbation frequency and worse quality of life;[40] however, it is important to emphasise that airflow reduction is a marker of severity, but it is not useful for diagnosis. For example, in one study of 608 patients with confirmed bronchiectasis, 49.5% had airflow obstruction, 18.8% had restrictive spirometry, yet 31.7% had normal spirometry.[40]

A 71-year-old lady presents with 2 years of worsening cough, sputum production and 5 chest infections in the past year requiring antibiotics. She is an ex-smoker, has a previous history of asthma and is treated with an inhaled corticosteroid. She also has a history of rheumatoid arthritis, but has had well controlled joint disease for several years. Sputum culture is positive for

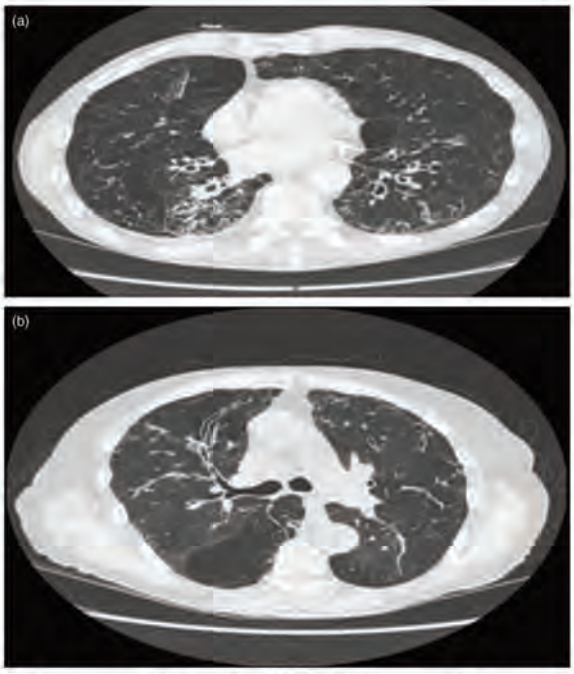

Fig. 2 Example high-resolution chest computed tomography images of bronchiectasis. **a** Cylindrical bronchiectasis; **b** longitudinal or varicose bronchiectasis

H. influenzae. The primary care physician suspects bronchiectasis and refers the patients for a high resolution CT scan. This shows bilateral lower lobe bronchiectasis.

The above example illustrates the difficulties of identifying and managing bronchiectasis in the context of multiple comorbidities. The presentation could relate to poorly controlled asthma, undiagnosed COPD, immunosuppression resulting from tumour necrosis factor antagonist therapy, Mycobacterial infection or bronchiectasis. The diagnosis of bronchiectasis is easily missed in such patients.

Consequently, recognition of comorbid/associated conditions associated with bronchiectasis is very important (Table 1).[2, 13, 41, 42] Prevalence of bronchiectasis in patients with COPD has been found to range from a low of 4% (ref. 7) to as high as 69%, with mean prevalence of 54% in a recent systematic literature review.[11] In many studies in patients with COPD, the presence of bronchiectasis was associated with increased presence of *P. aeruginosa* and other pathogenic microorganisms in sputum, reduced lung function, greater sputum production, more frequent exacerbations and increased mortality versus those with COPD alone.[11, 43] Patients with some non-pulmonary diseases (e.g., rheumatoid arthritis, sarcoidosis, ulcerative colitis/inflammatory bowel disease) can have recurrent lung infections and may have concurrent bronchiectasis.[44, 45] As shown in Table 1, the prevalence estimates for concurrent bronchiectasis in those with non-pulmonary diseases can range from 1 to 2% for inflammatory bowel disease to as high as 6% for rheumatoid arthritis.

Referral to secondary/specialist care

Most patients with a diagnosis of bronchiectasis will be referred to secondary/specialist care for an assessment even if care is subsequently maintained by the primary care team. Specialist care may be necessary to investigate and confirm underlying causes, as specific treatment plans, including antibiotics, canvary depending on the underlying cause. Specialists will perform and/or interpret tests that may not be available in primary care, such as HRCT in some places, immunoglobulin classes (IgG, IgA, IgM, Total IgE), IgE specific to *Aspergillus fumigatus* and *Aspergillus precipitins*.[30] More specialised testing in certain populations, such as α_1-antitrypsin testing,[5] functional antibody responses to vaccination or a myeloma screening also might be performed. Testing concentrations of nasal nitric oxide[20] to exclude ciliary dyskinesia may be required, but is generally available only at specialist centres.[46] Adult diagnosis of cystic fibrosis may be made in patients presenting with apparent 'non-CF' bronchiectasis. The diagnosis should be suspected in patients <50 years of age with *P. aeruginosa* or *S. aureus* infection, male infertility or other extrapulmonary features. Sweat test and/or genotyping for common cystic fibrosis transmembrane conductance regulator mutations should be performed in these patients.[47–50]

Determining severity of disease. Bronchiectasis has a highly variable impact on patients. Patients with mild disease, as defined by a lower number and intensity of symptoms, may not produce sputum except during exacerbations, and will be in otherwise good health. Sputum in patients with mild disease is often mucoid (white or clear), sputum cultures are negative, and lung function is well preserved. Patients with moderate disease often have persistent symptoms in spite of standard care and may require antibiotic therapy between exacerbations. In contrast, patients with severe disease typically will have large volumes of purulent sputum even when 'well', have reduced lung function and frequent exacerbations and have sputum cultures positive for a range of bacteria including *P. aeruginosa*.

Exacerbations have a severe impact on quality of life.[51] In addition, the presence of bronchiectasis is associated with an increase in mortality compared with the general population.[13] Care decisions should be based on identifying patients at high risk of frequent exacerbations, hospital admission and death. Hospitalisation is recommended in patients with breathlessness, circulatory failure/cyanosis, hypoxia, temperature ≥38°C (100.4°F), requirement for intravenous therapy or massive haemoptysis.[2]

The bronchiectasis severity index has recently been developed and extensively validated and may enhance the ability of physicians to predict outcomes and better manage patient care.[40] The index uses clinical data (age, body mass index, FEV_1%, hospitalisation for severe exacerbations, exacerbation number per year, Medical Research Council dyspnoea score, *P. aeruginosa* colonisation, colonisation with other organisms and radiological severity [≥3 lobes involved]) to derive a numerical score (see the online tool: http://www.bronchiectasisseverity.com). Bronchiectasis severity index scores can be used to predict the likelihood of one or more of the major consequences of the disease: mortality, frequency of exacerbations, hospital admissions and deterioration of health-related quality of life. The FEV1, age, colonisation, extension on CT and dyspnoea (FACED) score also has been developed specifically to predict mortality in patients with bronchiectasis and is based on five clinical variables (FEV_1%, age, *Pseudomonas* colonisation, radiological severity [≥2 lobes involved] and Medical Research Council dyspnoea score).[52] Both scoring systems predict long-term mortality, but FACED does not reliably reflect severity of disease in terms of exacerbations and quality of life.[53–55] Those at highest risk require specialist care and intensive follow-up and/or aggressive therapy. Neither of these scoring systems has been developed for use in primary care, and both require steps such as evaluating lobar involvement on CT that are not commonly performed during primary care assessment. Formal scoring can be useful for clinical management, but at a minimum we would recommend that primary care physicians are aware that frequent exacerbations, hospital admissions, lower FEV_1%, significant breathlessness and

the presence of *P. aeruginosa* and other pathogens are markers of worse prognosis.

OVERALL GOALS OF TREATMENT

The main goals of treatment are to reduce exacerbations, preserve lung function and improve the patient's quality of life. A disease management schematic is shown in Fig. 3. Patients with bronchiectasis should be instructed in how to improve airway clearance using physiotherapy techniques at home or at a physiotherapy clinic. Treatments, both pharmacological and non-pharmacological, should focus on reducing inflammation and preventing exacerbations. Because bronchiectasis involves a permanent change in lung structure, the condition is chronic and the patient's quality of life may be severely impacted. Care is best managed by a stepwise multidisciplinary team approach, including respiratory/chest physiotherapy.[5]

Primary care management

Some management principles are common to all patients with bronchiectasis and include the requirement for good education about the disease, annual vaccination against influenza and vaccination against *S. pneumoniae*. Patients that are breathless will benefit from pulmonary rehabilitation as is the case with other respiratory disorders, and patients should be encouraged to exercise. Smoking cessation should be strongly advocated for the minority of patients that continue to smoke (up to 18% of patients with bronchiectasis are reported to be current smokers).[40]

Specific management strategies for bronchiectasis depend on the underlying severity and cause of disease. Patients with mild or moderate bronchiectasis are often managed and monitored in the primary care setting. Patients with mild bronchiectasis usually will not require prophylactic antibiotic therapy, but those with sputum production should perform daily physiotherapy between and during exacerbations.[5] Patients with moderate bronchiectasis patients will typically have persistent symptoms in spite of standard care and may require prophylactic long-term antibiotic therapy as well as adjunctive treatments and strategies to promote mucus clearance (see sections below on Secondary care management and Chest physiotherapy/respiratory therapy).[5]

In the primary care setting, management should focus on monitoring the disease and implementing techniques and procedures to minimise disease progression and maximise equality of life. Regular clinic visits will allow the primary care provider to coordinate care with specialists and refer the patient

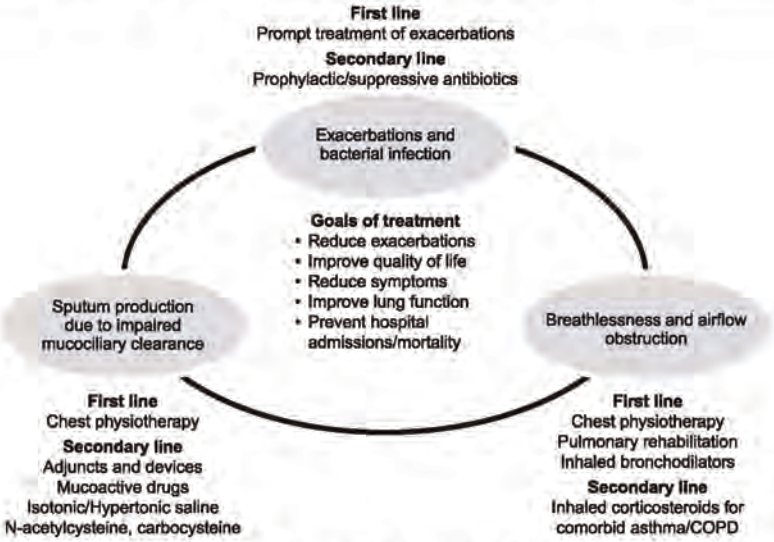

Fig. 3 Bronchiectasis disease management. COPD, chronic obstructive pulmonary disease

Table 3. Key questions to ask at each visit

Key points and questions for each visit
Are disease symptoms controlled?[a]
Is the patient performing pulmonary physiotherapy?
What is the frequency of exacerbations?
How are we going to treat the next exacerbation (requires recent sputum sample and knowledge of antibiotic allergies/sensitivities)?
Treatment should be based on previous sputum culture
Important to send an additional sputum sample for analysis at the start of an exacerbation
Treat for 14 days
When was last time that sputum was analysed (twice per year is recommended)?[2]
Positive culture for *Pseudomonas aeruginosa*, particularly for a new finding, should prompt review and often referral to secondary care
Are there any signs of deterioration?

[a]Key symptoms are cough, sputum production and breathlessness

to the appropriate specialist, as needed. Key considerations for the primary care provider to assess at each visit are outlined in Table 3. Regular tracking of exacerbations and symptoms allows the patient to learn more about managing his or her disease and helps to keep the care plan up-to-date. Regular monitoring of sputum[56] (ideally twice per year) will identify the emergence of new pathogens or the development of antibiotic resistance. The previous sputum results can be used to guide future antibiotic use for exacerbations.

Spirometry is a key pulmonary function test used to assess lung function and should be performed at least annually, and preferably at each clinic visit in patients with severe bronchiectasis.[2, 5, 10, 25, 31] Significant worsening over time in pulmonary function indicates worsening disease and should drive an intensification in treatment.

The discussion between the primary care provider and patient during these routine visits provides an opportunity for ongoing patient education, a key component of disease management. Educating the patient regarding the disease will ensure that he or she understands the clinical approach and management plan, including the importance of sputum analysis.[2] It is crucial that patients are able to recognise an exacerbation and how best to access the medical care team when necessary. Knowledge of airway physiotherapy/airway clearance techniques will help reduce the impact of exacerbations and improve quality of life. In a study to determine compliance with a bronchiectasis treatment program in 75 patients, only 53% were found to be compliant with medical treatment and only 41% were compliant with airway clearance techniques.[57] Improving compliance with all aspects of recommended therapy is, therefore, a key goal of enhanced patient education. Indeed, the benefits of patient education have been demonstrated by expert patient self-management programs that promote action planning, role modelling, problem solving, reinterpretation of symptoms and decision making.[58]

Exacerbation monitoring/management. An exacerbation can be defined as a significant worsening of symptoms over several days, which may include an increase in the frequency of cough, shortness of breath, increase of sputum volume, viscosity and/or purulence.[2] In the outpatient setting, assessments of exacerbations should include the history, a clinical examination, a sputum sample for culture prior to beginning antibiotic treatment and a review of previous sputum microbial analyses.[2]

Medications should be chosen based on current and previous bacteriological results.[2, 5, 31] For exacerbations that are not severe, oral antibiotics are appropriate. Standardised courses of antibiotics (14 days) are recommended for all patients with exacerbations owing to the higher airway bacterial loads observed in bronchiectasis. Antibiotic prescribing is variable in the United States and among European countries.[59–61] Recent guidelines suggest that coordinated efforts to develop antibiotic stewardship programs can help to minimise the development of antibiotic resistance.[59, 60]

Patients requiring intravenous antibiotics include those with severe infections requiring hospital admission, patients with organisms resistant to oral antibiotic agents (most frequently *P. aeruginosa* resistant to ciprofloxacin or other multi-drug resistant Gram-negative organisms) or patients who have failed to improve with 14 days of targeted oral antibiotics. Patients with respiratory failure, confusion, haemodynamic instability or large volume haemoptysis will require admission to hospital. Small volume haemoptysis is relatively common in bronchiectasis and may simply require antibiotic therapy. Patients experiencing haemoptysis for the first time should be evaluated by a specialist and patients with large volume haemoptysis (e.g.,>100 ml), or haemoptysis with hypoxaemia or haemodynamic instability should be referred to hospital.

Although most often administered to hospitalised patients, intravenous antibiotics have been shown to be effective and safe when administered at home, after proper instruction.[62]

P. aeruginosa *eradication.* *P. aeruginosa* is a special case because of its strong impact on prognosis. When *P. aeruginosa* is isolated for the first time in patients with bronchiectasis most international guidelines recommend attempting to eradicate the organism when isolated for the first time in sputum. Our recommendation for primary care is to send sputum samples for stable patients at least once per year, and preferably more often. In the event of a first positive sample for *P. aeruginosa,* patients should send a further sample for culture, and treat with oral ciprofloxacin 750 mg twice daily for 14 days. A repeat sputum sample should be sent after antibiotics to determine if the treatment has been successful and the patient should be referred to a specialist who will determine whether to add intravenous or inhaled antibiotics to the regime.[2]

Inhaled bronchodilators and corticosteroids. Although there is limited evidence, it is reasonable to treat patients with significant breathlessness with inhaled bronchodilators, such as combined long-acting β-agonists and anti-muscarinics. This is particularly the case when airflow obstruction is present.

Recent recommendations suggest no role for inhaled corticosteroids in bronchiectasis unless the patient has coexisting asthma or COPD.[2, 5, 31] In a recent reviews, these agents have not been shown to have significant beneficial effects on lung function or exacerbation frequency in bronchiectasis patients without asthma or COPD.[5, 51]

Secondary care management

Once a patient is diagnosed, he or she should be referred to secondary care for assessment and to help determine the underlying cause of the disease as described in the Introduction. Secondary care physicians in most countries will provide the initial disease education and provide access to chest physiotherapy.

Patients with immune deficiency can often be treated by immunoglobulin replacement therapy under the care of an immunologist.[2] Specialists should also be involved in the treatment of patients with ABPA, who will nearly always have asthma, elevated total and *Aspergillus*-specific IgE and IgG-mediated immunological responsiveness. Treatment of ABPA involves prolonged treatment with oral corticosteroids. Antifungal agents may also be used as steroid-sparing agents.[2, 5, 63] Secondary care teams are necessary when managing patients with severe bronchiectasis requiring long-term oxygen therapy and/or persistent symptoms requiring oral and/or inhaled antibiotics.[5, 30] Specialist care is also required if chronic *P. aeruginosa*, opportunist mycobacteria (NTM), methicillin-resistant *S. aureus* colonisation or ABPA occur,[2, 5, 30] and for patients with deteriorating lung function, as treatment for these conditions will often require specialised combinations of antibiotics/antifungals and/or robust monitoring.[2, 63] Some aetiologies, such as rheumatoid arthritis and PCD, are associated with a more severe course and these patients will usually be managed in secondary care.

Recent controlled trials have provided evidence that macrolide antibiotics (azithromycin, erythromycin) can reduce exacerbation frequency and improve quality of life.[5, 51, 63, 64] It is important to note, however, that long-term treatment can lead to the development of antibiotic resistance.[64] As use of long-term macrolides is increasingly common, it is important for primary care physicians to be aware of the potential complications and consequences of macrolide treatment. Up to 20% of patients will develop gastrointestinal side effects with macrolides,[65, 66] and this

is more common if higher doses are used. If this becomes troublesome, a dose reduction or change to an alternative oral antibiotic may be needed. Macrolides can cause hearing loss[67] and this may initially present with tinnitus. This is usually reversible but macrolides should be discontinued immediately if tinnitus is reported. Macrolides can prolong the QT interval[68] and so should not be co-prescribed with other drugs that prolong the QT interval.

Inhaled formulations of antibiotics deliver higher concentrations of a drug to sites of infection within the airway than with delivery by oral or intravenous routes. A meta-analysis of nine trials indicated that inhaled formulations reduced sputum bacterial load, increased the eradication of *P. aeruginosa*, reduced exacerbations and decreased health-care utilisation.[69] It must be emphasised, however, that as yet, no inhaled antibiotics have been approved by regulatory agencies for treatment of bronchiectasis. Several inhaled antibiotics are licensed for cystic fibrosis bronchiectasis, but use of data from antibiotic trials in patients with cystic fibrosis are not always directly translatable to non-cystic fibrosis bronchiectasis. The most common adverse effect of inhaled antibiotics is bronchospasm. As a result, it is recommended that inhaled antibiotics are always initiated in secondary care, and a test dose is administered in a controlled environment (e.g., hospital ward or outpatient clinic setting) to ensure the patient does not experience an adverse reaction.

Chest physiotherapy/respiratory therapy. Physiotherapy techniques are recommended as non-pharmacological methods for mucus clearance, and should be tailored to the individual patient through input from a specialist in physiotherapy where possible. The most frequently used technique in Europe is the active cycle of breathing technique (ACBT).[70] In a systematic review and meta-analysis, ACBT was shown to be more effective in reducing sputum volume than other methods.[71] ACBT includes breathing control (tidal breathing at a normal rate), thoracic expansion exercises (deep breathing exercises), forced expiration of 1 or 2 huffs, followed by more breathing control. The huffs assist in clearing secretions in the larger upper airways. These methods can be viewed online by searching www.youtube.com for 'ACBT breathing technique.' Several excellent physiotherapist-narrated videos are available demonstrating this technique.

Several oscillatory positive expiratory pressure devices are also available to assist with airway clearance, including the Flutter, Shaker and Acapella, which are handheld devices that use exhaled breath to create oscillating positive expiratory pressure to help clear mucus.[72, 73] The Lung Flute is a small self-powered handheld audio device that produces a low frequency acoustic wave with moderately vigorous exhalation, rather than oscillatory back pressure, to increase mucus clearance.[74] The majority of patients can manage their chest clearance without requiring devices, but these may be helpful as adjuncts under the supervision of specialist chest physiotherapists. It is recommended that patients with severe symptoms, frequent exacerbations or those experiencing difficulty with expectoration are reviewed regularly by a specialist physiotherapist.

Surgical options. Removal of portions of damaged lung may be considered in patients with severe bronchiectasis who have failed medical therapy.[2] In patients with localised disease, recent reviews suggest that the removal of the permanently damaged areas of the lung can result in significant symptom resolution and an improved quality of life.[75, 76] In a meta-analysis of 38 studies covering 5541 patients who had surgical resection for management of bronchiectasis, operative morbidity and mortality rates were 16.7% and 1.5%, respectively.[76]

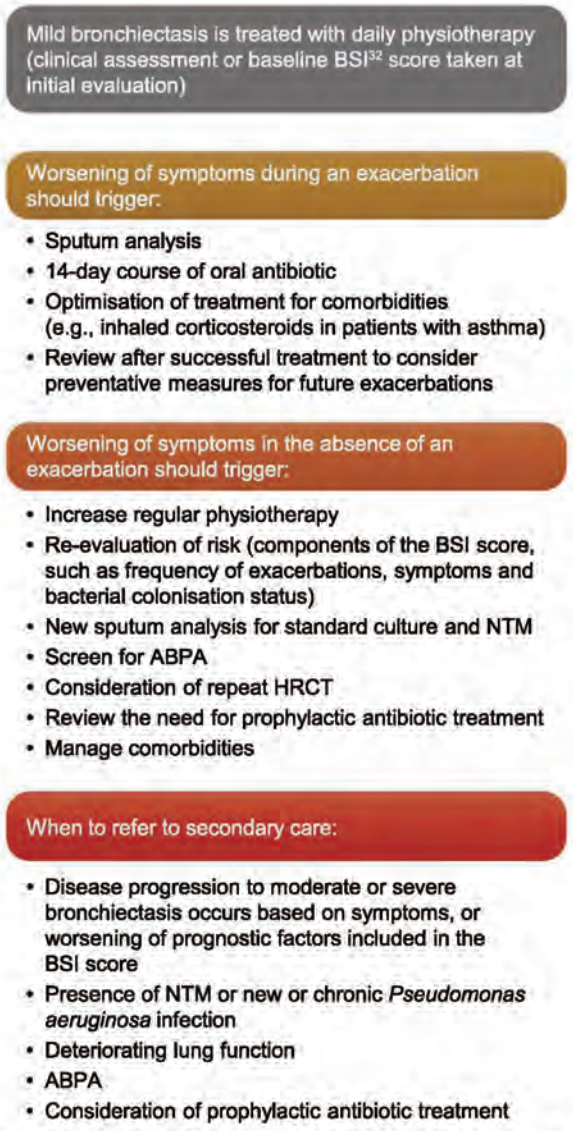

Fig. 4 Considerations for the management of bronchiectasis in a patient with worsening symptoms in primary care. ABPA, allergic bronchopulmonary aspergillosis; BSI, bronchiectasis severity index; HRCT, high-resolution chest computed tomography; NTM, non-tuberculous Mycobacteria

Treatment algorithm for the deteriorating patient

A major challenge in the care of patients with bronchiectasis in the primary care setting is managing those whose condition is deteriorating. This situation may require input from an expanded team of specialists to intensify and refine the treatment plan. Figure 4 illustrates an algorithm for advancing the treatment plan for typical patient scenarios of deterioration in their condition, which reflects the authors' clinical experiences. Deterioration is defined as an increase in the number of exacerbations (>2 per year), hospital admissions, rapidly declining FEV_1 and new isolation of *P. aeruginosa* in sputum associated with worsening of symptoms. It is essential for primary care physicians to be

confident in identifying patients such as those that require referral or re-referral to secondary care and intensified therapy.

CONCLUSIONS

Bronchiectasis is a complex chronic disease, often resulting in disability and impaired quality of life. Patient education and compliance with care providers' recommendations are key to successful disease management. Progress in determining best practices and treatments will be aided by patient recruitment into recently developed patient registries in the United States and Europe.[5, 51] These registries will encompass the experiences of many more and varied patients than can be included in individual clinical trials. They encourage international collaborations and can help drive research with the overall goal of improving clinical care.[51]

Although mild and moderate bronchiectasis usually can be managed in the primary care setting, collaboration with specialists to develop an individualised patient management plan would provide advanced planning should the patient's condition worsen. Those with more advanced disease who require long-term antibiotic therapy should be referred to secondary care.

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AUTHOR CONTRIBUTIONS

J.D.C. and S.S. both contributed to the initial concept of the article and actively reviewed and revised each draft of the manuscript for important intellectual content. J.D.C. provided the clinical vignettes and de-identified example HRCT images for use in Fig. 2. J.D.C. and S.S. gave final approval of the manuscript and agreed to be accountable for all aspects of the work.

COMPETING INTERESTS

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Prescribing Information: AirFluSal® Forspiro®

(Please refer to the full Summary of Product Characteristics (SPC) before prescribing) **AirFluSal® Forspiro® 50/500 (50 mcg salmeterol xinafoate and 500 mcg fluticasone propionate) Indications:** For use by adult patients aged 18 years and older only. Asthma: Regular treatment of severe asthma where use of a combination of LABA and ICS is appropriate, i.e. patients not adequately controlled on a lower strength corticosteroid combination product or patients already controlled on high dose ICS and LABA. COPD: Symptomatic treatment of patients with COPD with a FEV_1 <60% predicted normal (pre-bronchodilator) and a history of repeated exacerbations who have significant symptoms despite regular bronchodilator therapy. **Dosage and administration:** Inhalation only. Asthma: one inhalation b.d. of AirFluSal Forspiro 50/500. Regularly review patients and reduce dose to lowest that maintains effective symptom control. Once control of asthma is attained treatment should be reviewed and consideration given as to whether titrate downwards the dose of inhaled corticosteroid as appropriate to maintain disease control. AirFluSal is not available in any strengths lower than salmeterol 50 mcg/fluticasone propionate 500 mcg per metered dose. Therefore, when titrating down to a lower strength, a change to an alternative fixed dose combination of salmeterol and fluticasone propionate containing a lower dose of the ICS is required. COPD: one inhalation b.d. of AirFluSal Forspiro 50/500. *Paediatric population:* not recommended for either children or adolescents. **Contraindications:** Hypersensitivity to the active ingredients or to any of the excipients. **Precautions:** Pulmonary tuberculosis, fungal, viral or other infections of the airway, severe cardiovascular disorders, heart rhythm abnormalities, diabetes mellitus, hypokalaemia and thyrotoxicosis. An increase in the incidence of pneumonia, including pneumonia requiring hospitalisation, has been observed in patients with COPD receiving inhaled corticosteroids. Physicians should remain vigilant for the possible development of pneumonia in patients with COPD. Risk factors for pneumonia in patients with COPD include current smoking, older age, low body mass index (BMI) and severe COPD. Paradoxical bronchospasm post-dose. *Severe unstable asthma:* Warn patients to seek medical advice if short-acting inhaled bronchodilator use increases. Consider increased inhaled/ additional corticosteroid therapy. *Acute symptoms:* Not for acute symptoms. Use short-acting inhaled bronchodilator. *Systemic effects:* Systemic effects of inhaled corticosteroids may occur, particularly at high doses for prolonged periods, but much less likely than with oral corticosteroids. May include Cushing's syndrome, cushingoid features, adrenal suppression, adrenal crisis, growth retardation in children and adolescents, decrease in bone mineral density, cataract, glaucoma and, more rarely, a range of psychological or behavioural effects including psychomotor hyperactivity, sleep disorders, anxiety, depression or aggression. Tremor, palpitations and headache, have been reported with β_2-agonist treatment. In asthma, therapy should be down titrated under physician supervision to lowest effective dose and treatment should not be abruptly stopped due to risk of exacerbation. Serious asthma-related adverse events and exacerbations may occur during treatment with AirFluSal. Patients should not be initiated on AirFluSal during an exacerbation or if they have significantly worsening or acutely deteriorating asthma. Data from a large clinical trial suggested patients of black African or Afro-Caribbean ancestry were at increased risk of serious respiratory-related events or deaths when using salmeterol. All patients should continue treatment but seek medical advice if symptoms remain uncontrolled or worsen when initiated on AirFluSal or using AirFluSal. In COPD cessation of therapy may also be associated with decompensation and should be supervised by a physician. *Transfer from oral steroids*: Special care needed. Consider appropriate steroid therapy in stressful situations. **Drug interactions:** Avoid beta-blockers. Avoid concomitant administration of ketoconazole or other potent (e.g. itraconazole, telithromycin, ritonavir) and moderate (erythromycin) CYP3A4 inhibitors unless benefits outweigh potential risk. β_2 adrenergic blockers may weaken or antagonise the effect of salmeterol. Potentially serious hypokalaemia may result from β_2-agonist therapy, particular caution is advised in acute severe asthma. This effect may be potentiated by concomitant treatment with xanthine derivatives, steroids and diuretics. **Pregnancy and lactation:** Experience limited. Balance risks against benefits. **Side effects:** *Very Common:* headache, nasopharyngitis. *Common:* candidiasis of the mouth and throat, hoarseness/ dysphonia, throat irritation, pneumonia (in COPD patients), bronchitis, hypokalaemia, sinusitis, contusions, traumatic fractures, arthralgia, myalgia, muscle cramps. *Uncommon:* respiratory symptoms (dyspnoea), anxiety, tremor, palpitations, tachycardia, angina pectoris, atrial fibrillation, cutaneous hypersensitivity reactions, hyperglycaemia, sleep disorders, cataract. *Rare:* angioedema, respiratory symptoms (bronchospasm), anaphylactic reactions including anaphylactic shock, Cushings syndrome, cushingoid features, adrenal suppression, growth retardation in children and adolescents, decreased bone mineral density, oesophageal candidiasis, behavioural changes including psychomotor hyperactivity and irritability, glaucoma, cardiac arrhythmias and paradoxical bronchospasm. *Not known:* depression or aggression. *Paradoxical bronchospasm:* substitute alternative therapy. Prescribers should consult the SPC in relation to other adverse reactions **Legal category:** POM. **Presentation and Basic NHS cost:** AirFluSal Forspiro 50/500 60 inhalations. £32.74. **Product Licence (PL) no:** PL 04416/1431. **PL holder:** Sandoz Ltd, Frimley Business Park, Frimley, Camberley, Surrey. GU16 7SR. **Last date of revision:** February 2017. UK/ MKT/AFS/17-0007.

Adverse events should be reported. Reporting forms and information can be found at www.mhra.gov.uk/yellowcard

Adverse events should also be reported to Sandoz Ltd, 01276 698020 or uk.drugsafety@sandoz.com

References: 1. AirFluSal® Forspiro® SmPC. **2.** MIMS UK June 2017.

†AirFluSal® Forspiro® 50/500µg vs Seretide® Accuhaler® 50/500µg.

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