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REVIEW

ASTHMA AND SEVERE ASTHMA MANAGEMENT IN THE CLINICAL PRACTICE

Managing asthma in primary healthcare

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ABSTRACT

Asthma brings considerable challenges for family doctors because of its variety of shapes, different levels of severity, a wide age range, and the fact that in the last decades clinicians are able to offer much better treatment options with a better level of disease control and a higher quality of life. The objectives of the current review article are to provide an up-to-date review by primary care respiratory leaders from different countries of the most significant challenges regarding asthma diagnosis and management, the importance of team work and the problems in recognizing and dealing with difficult-to-manage and severe asthma in primary care. The article provides a short review of the main challenges faced by family physicians and other primary health care professionals in supporting their patients in the management of asthma, such as asthma diagnosis, promoting access to spirometry, the importance of a multiprofessional team for the management of asthma, how to organize an asthma review, the promotion of patient autonomy and shared decision-making, improving the use of inhalers, the importance of the personalized asthma action plan, dealing with difficult-to-manage and severe asthma in primary care and choosing when, where and how to refer patients with severe asthma. The article also discusses the development of an integrated approach to asthma care in the community and the promotion of Asthma Right Care.

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KEY WORDS: Asthma; Primary health care; Patient care team; Disease management; Self care; Shared decision making.

Asthma is a frequent problem in the community with a significant prevalence and a considerable burden of disease.[1] Asthma remains an important cause of both visits to primary health care (PHC) centers and hospital admissions. There are effective tools for the diagnosis, management and control of asthma but there is also debate about the ideal setting for asthma management according to different models of organization of health care and variation between countries and regions. Ideally, most of the care for patients with asthma should occur in primary care.[2] Patients should be referred for secondary care in specific circumstances such as those re-

quiring certain diagnostic tests, the difficult-to-manage, patients with severe asthma or in the case of very serious exacerbations.[3]

Asthma brings considerable challenges for family doctors because of its variety of shapes, different levels of severity, a wide age range, from the very young to the very old and the fact that in the last decades clinicians are able to offer much better treatment options with a better level of disease control and a higher quality of life.

However, asthma is often underdiagnosed and misdiagnosed/overdiagnosed.[4] Underdiagnosis happens when a patient with asthma has not been identified as having the condition, either because the patient has not mentioned his/her symptoms to a physician or because the physician has not recognized or assumed a diagnosis to explain these symptoms. Misdiagnosis happens when the physician has attributed the patient's respiratory symptoms to another condition or when a patient is identified as having asthma when he/she does not have the condition.[4] The latter is often labelled in the literature as overdiagnosis, though this term is controversial.[5]

Well-organized primary health care teams practicing patient-centered care together with more enabled and more independent patients in the management of their condition and a good community network may obtain better results in the control of some chronic diseases, lowering morbidity, mortality and the health costs.[6]

Patients with asthma often have low expectations about the control of their illness. They may be satisfied with just symptom relief or adapt to having poor control of asthma. Patient-centered care models which include shared decision-making can help patients achieving a better control of asthma.[6]

The management of chronic diseases presents important challenges for PHC professionals, including primary health care physicians. The model of patient-centered care in use in family medicine in articulation with the chronic care model, has fostered the development of more independent patients with a higher level of control over their disease.[6]

International clinical recommendations like the GINA strategy suggest that a stronger doctor-patient relationship can improve adherence to treatment plans and lead to better results in asthma management.[7]

The objectives of the current article are to provide an up-to-date review by primary care respiratory leaders from different countries of the most significant challenges regarding asthma diagnosis and management, the importance of team work and the problems in recognizing and dealing with difficult to treat and severe asthma in PHC.

The challenges of asthma diagnosis

When should primary health care professionals consider a diagnosis of asthma?

Diagnosing asthma is like completing a jigsaw puzzle but unfortunately the pieces are scattered around the room instead of in a box. This may explain 30-50% of under- and overdiagnosis.[4] A structured approach can help.[8] The more data we elicit and record over time, the clearer the picture becomes and the better our confidence and that of our patients will be that this diagnosis — that has no gold standard test - is really the right one.

It is based on a probability assessment that increases as we confirm key clinical features that also show recurrence, variability and reversibility. Objective testing should be applied to all suspected cases whether low, medium or high probability but no test is currently available that has sufficient standalone specificity and sensitivity to give a definitive answer.[9, 10]

People tell us their symptoms using language that reflects their personal, cultural and health beliefs, their own experiences and those around them in their family or communities. If pulmonary tuberculosis is common in our community then a cough might always mean TB until proven otherwise; if your father died of lung cancer, then this will be front of mind. For many a cough in winter means a 'bronchitis' or 'chest infection' and a need for antibiotics. Words, ideas, concerns and expectations need to be understood in the local context and explored if we are to start from the right place in making a diagnosis. Fortunately, a key piece in the diagnosis puzzle is family history. For many presenting with features of asthma we can find a familial link to help build our picture and it will feel relatable to the presenting patient.

We may be confident of a diagnosis after elicit-

ing a number of features in one consultation, but it is often not possible to confirm this. An asthma diagnosis often needs time and repeated opportunities to revisit whether the pattern recurs. Does it get better on its own, like an upper respiratory infection or only with the intervention of an inhaled corticosteroid? Does the same pattern of presentation and response happen a second and third time? If their symptoms are *diurnal* and only present at night or first thing in the morning and our clinic is open between these times how will testing help us? Here, shared decision-making and collection of evidence is important, and this is one scenario where a home-based test like a peak expiratory flow (PEF) diary can support office objective testing.[11]

A golden opportunity to diagnose is when we see somebody presenting in some degree of crisis as an urgent case. Our correct first response is to fix the problem of the tight chest, frightening breathlessness and relieving their distress. It should however also be a time to try and confirm diagnosis by taking care to record objective measurements of reversibility before and after treatment, such as auscultated wheeze and PEF. This is a good time to get the answer to our essential question for an asthma diagnosis; why has it happened now, what is the trigger?

Triggers inhaled *e.g.* from dust and animal dander initiate the inflammatory cascade that cause asthma symptoms that cause people to seek help. Asking what has happened to them, where have they been and what has changed in their environment in the hours, days and weeks before will identify these. An atopy history can be seen in this situation. The person sneezing, who has a blocked or runny nose who realizes this is their peak pollen allergy month is a good indicator that this breathlessness event could be asthma.

Occupation may be more apparent in an acute event. Are they arriving in a work uniform? What were they doing at work today, what do they breathe in at work, what is the temperature and stress level there? Are they better at weekends, days off or on holiday?

Finally, the person with cough, chest tightness, breathlessness and bilateral expiratory wheeze may have asthma, but we should always methodically look for the typical features that brings the best picture into view. In PHC we can be expert and confident in this but if the picture does not appear and the puzzle is not solved then we must also recognize this and look beyond to other causes.

Promoting access to spirometry

Forced spirometry with bronchodilator reversibility is the first objective test to perform to reach a diagnosis of asthma if symptoms and clinical features suggest this possible diagnosis.[7] This test is used to demonstrate a reversible obstruction, one of the main characteristics of asthma. After a baseline forced spirometry, the patient gets 400 mcg of inhaled salbutamol and waits 15-20 minutes to repeat the maneuver. A change of more than 12% and 200 mL in the FEV_1 after bronchodilator identifies a positive test and is considered an asthma diagnosis. It is also an important test to perform for the differential diagnosis between asthma and COPD, the other important chronic respiratory disease and to identify the asthma-COPD overlap.

Efforts to achieve quality spirometry in primary health care (PHC) have focused on providing spirometers to every healthcare center, considering the test as one of the priorities in a PHC service portfolio and making sure that proper training to perform the technique for nursing staff and proper education to interpret the test for medical staff are provided.[12] However, spirometry is not universally adopted in PHC and, in many countries, there are considerable difficulties to get the right quality and number of tests required.[13] The limited use of forced spirometry in PHC is due to several reasons:

- lack of resources;
- little public awareness about the importance of spirometry in PHC;
- hospital-based healthcare not promoting out-of-hospital spirometry;
- no collaboration with hospital-based pulmonology function laboratories;
- no specific training for either the technicians or family physicians;
- no specific guidelines about spirometry in PHC;
- very rigorous quality standards that exclude provision in PHC.

To promote access to spirometry in PHC, it is essential that health managers understand the

need for this important test in asthma diagnosis and the follow up process and they should ensure the necessary resources to implement the technique in PHC practices, not only by providing the necessary equipment, but also through adequate ongoing professional training in collaboration with hospital reference services.

The required training has also always been a limiting factor for spirometry implementation in PHC. The new ERS/ATS recommendations on spirometry reduce the minimum technical training objectives to start performing quality spirometry.[14] The development of quality guidance for spirometry in primary care is essential for success. In response, the IPCRG[15] and the Spanish Family Physicians Society[12] have published specific guidance focused on the technique performance in primary care settings.

The quality of spirometry has been traditionally assessed by using the acceptability and repeatability ATS/ERS criteria.[14] Several studies have shown that most spirometry performed in PHC (only 69.1% of spirometry tests) and a significant minority from pulmonary function laboratories (39.7%) do not meet these quality criteria. However, between 83.7 and 96.5% of those "wrong" spirometry tests were considered clinically useful according to the opinion of experienced technicians.[16] Looking for spirometry of sufficient quality for daily clinical use when combined with structured clinical data, regardless of whether or not they meet the quality criteria previously recommended by international guidelines, could be a new strategy aiming to promote its right use.[17]

The SARS-CoV-2 pandemic does not help to improve this situation. Since the beginning of the pandemic, the performance of spirometry in PHC practices has been mainly or completely suspended due to the high risk of coronavirus contagion; while in hospital, pulmonary function laboratory activity has been greatly reduced. International societies such as ERS, offer practical solutions to continue performing safe spirometry for patients and technicians in COVID-19 times.[18]

Is there a role for the peak flow meter?

The peak flow meter (PFM) is also used as an objective test following clinical suspicion of airway obstruction through comparing the result of a forced peak exhalation with that expected for age, sex and height. Repeated testing at different times of day, in different locations, in the absence or presence of symptoms and after using bronchodilators can demonstrate reversibility and variability, features of asthma but not COPD.[19]

Concerns about the safety and usefulness of the PFM have been discussed at length in the last two decades, despite its accepted, routine and regular use since the 1970s. Some guidelines recommend its use for both diagnosis and monitoring but others have decided it is too flawed in comparison to a spirometry gold standard.[9, 10]

Medical device production and quality control is subject to processes similar to medicines but the PFM pre-dates such regulation. Standardization of the measurement scale and normal reference tables exists and regulators register devices, but this does not equate with completion of a technology appraisal and approval process with evidence that inaccuracy is common.[20]

A PFM does not undergo calibration, whereas it is mandatory for spirometry. The devices are in patient homes, exposed to environments that may affect reliability. Where the spirometer microchip will digitize a verifiable result, the recording of the PFM result may see human factor error.

A 2003 review by Brusasco said the lack of PFM randomised controlled trials (RCTs) meant no evidence existed of better adherence or improved outcomes to justify Peak Expiratory Flow (PEF) measurement in patient plans.[21] A Cochrane systematic review showed plans based on PEF were not superior to symptom-based equivalents in adults.[22] Brusasco added that obsolescence was the likely future for this device. Notably, it was an era when spirometers were moving into primary care and a more objective approach to airway diagnosis was in demand.

The RCTs called for in 2003 remain sparse today. In 2020, at the time of writing, PEF recording is not however obsolete and is a measure within self-care plans provided by patient organizations.[23]

Culture, habit and patient choice may have maintained use of PFMs and there is no shortage of contemporary research using PFMs. A 2011 systematic review of PEF measurements

for diagnosis of occupational asthma (OA) concluded it was a feasible, sensitive and specific test, 'when potential sources of error are understood'.[11] The paper highlights the practical benefit of a PFM over a spirometer in that it can be used at the trigger source.

The UK's national guidance bodies provide contradicting views in the use of PFMs. England's National Institute for Clinical and Care Excellence (NICE) has signaled a move away from using PFMs for diagnosis towards spirometry and fractional exhaled nitric oxide (FENO). However, its evidence review notes that the PEF diary provided diagnosis specificity of up to 0.99 in adults and 0.80 in children.[10] This is evidence for its use as a 'rule in' test where the diagnostician has confidence in how the data was collected.

The COVID-19 pandemic has delayed respiratory diagnosis because objective airways tests are aerosol generating procedure (AGPs). Spirometry tends to be clinic-based and not as portable resulting in some interim practice of returning to the PFM as a diagnostic aid not just for asthma but also COPD until safe spirometry is available.[24]

PEF predominantly detects airflow differences in larger airways and unlike spirometry misses the impact of smaller airways resistance. However, it can demonstrate airflow obstruction and with repeated measurement it can show a fixed as well as a variable picture.

In conclusion the PFM still has its place in primary care and in people's homes. It is not the gold standard test for either asthma or COPD diagnosis. However, it can add helpful information to the picture the diagnostician creates and help with the support a health professional can give to a person living with asthma who wants to be an active participant in improving their wellbeing.

The importance of the primary health care team for the follow-up of asthma

Setting up a team in primary health care

Asthma control has improved globally in recent decades, however, in spite of the availability of effective treatments, it remains sub-optimal[25] and it is a substantial reason for direct and indirect costs.[26] Uncontrolled asthma affects a significant proportion of patients[27-29] and primary care professionals have a crucial role in the early identification and management of uncontrolled asthma.[29]

The implementation of asthma management strategies can be carried out at national, regional and local levels. This should result from the cooperation of a multidisciplinary team and the use of effective methods of knowledge translation.[28] This process, by promoting the adaptation and local capture of evidence, allows greater identification by providers who are involved in it.[7, 30]

Due to its multidimensional approach, primary care provides an integrated structure for the assessment and treatment of all levels of asthma. The knowledge of the patient's context and comorbidities, the provision of coordinated and continuing care, the management of resources and the possibility of cooperation with other levels of care are fundamental characteristics for this structure.[7, 28]

Integrated care pathways (ICP) are a way of translating national recommendations into local protocols, allowing their subsequent application. They are patient-oriented care plans that detail the essential steps in the patient journey with a certain clinical problem. They are designed for multidisciplinary teams, often extended, and focusing on both quality and coordination of the tasks of each member.[31] This interprofessional collaboration, usually limited to that between the family doctor and the respiratory specialist, should be extended to other professionals, including nurses, pharmacists, and occupational physicians.[32] This extended health care team should take into account patient expectations and goals and recognize them as partners.

A globally ageing population and the epidemiological transition from acute to chronic disease such as asthma, provides new challenges. The *Right Care* approach of reducing avoidable hospital stays requires a change in how we manage patients.[33]

To treat an asthma patient, we face similar challenges as with other patients. Most of the published studies are qualitative and they refer to health care professional (HCP), patient and health system barriers. The features are common to other chronic diseases. To develop optimal care, accessibility and trust must be guaranteed.

The option recommended is to develop a multidisciplinary team formed by a family physician/general practitioner (FP/GP) and a nurse with additional support from pharmacists, physiotherapists, respiratory technicians and psychologists.

The challenges and barriers faced by HCPs are connected to the health care system where they work and its existing economic restrictions, with patient financial constraints adding to this. No less important is the barrier faced by the HCP team in building their awareness of each other's roles and competences, shared information, confidentiality and responsibility, team building and inter professional training, long-term funding and joint monitoring.[34]

Developing new partnerships between patients and different HCPs and new treatment approaches can be a challenge. Some patients perceive that treatment is quicker and more efficient in the emergency department (ED), so it is important to improve communication and health literacy in order to improve their own confidence in self-care and adherence to medication. This change in approach can lead to pressure on consultation time, requires clarity of role, availability of nurses and continuity of care.[35] HCPs have a role in treatment besides prescribing. Working with patients and bearing in mind their asthma medications beliefs, dealing with mood disorders and anxiety, acceptance of asthma as a chronic disease that needs continuous control and solving problems related to the understanding of medication instructions is hard and requires communication and educational skills.

Many patients live with comorbid conditions beyond asthma that must be remembered and also need to be managed. Self-management interventions are helpful and action plans can be useful to empower patients and improve self-confidence.

Agreeing on roles and tasks

Teamwork is essential in providing health care. The work division among health care professionals (HCPs) means that several professionals participate in a full episode of health care. The definition of roles and tasks is essential because a team that understands and agrees about what each member does is more functional. It is known that interventions aimed at improving teamwork and organization optimize the provision of care to persons with asthma. This team is multidisciplinary by nature involving patients, their families, family physicians/general practitioners, nurses, pharmacists, occupational doctors and other professionals.

Patients

The perceptions of HCPs about what is good asthma control is defined by national and international guidelines.[7] There is, however, an evident disparity between patient perception of control with those observed by experts. Many patients overestimate their level of control compared with clinical recommendations.[36, 37] Achieving good asthma control through disease management is not a linear process. As patient need and lifestyle change, so might symptoms and, therefore, a regular review is necessary, even in the absence of complaints.[7]

A particular challenge of long-term follow-up of patients with asthma is the possibility of developing ideas and expectations about the level of control they can achieve.

This situation can lead to greater improvisation in self-management of asthma and a certain reluctance in deciding to consult the primary care physician (PCP), due to low expectations regarding the support they will receive.[37]

A powerful patient empowerment tool is the personalized asthma action plan which is a real consensus between the PCP and the patient.[38]

Family physicians/general practitioners

Family physicians/general practitioners (FP/GP) are key team-members coordinating the care provided to patients with asthma. They have the required training to manage the patient's comorbidities as many of these are chronic diseases which require regularly evaluation, and this is mostly done in primary health care.[26, 37] The ability to articulate with other levels of care and with other professionals makes the FP/GP a true pivot in the integration of care.

Although the administration of biological therapies is reserved for hospital care, patients with severe asthma are still treated and co-managed by FP/GPs.[37, 39] This ability to monitor adverse

events in primary care is important in reducing the burden on specialized services and in involving FP/GPs in the care of patients with severe asthma.

Nurses

In some countries, nurses are major players in asthma in primary care.[40] This inconsistency of nurse involvement in the follow-up of patients with asthma in primary health care in different settings, may be due to inadequate training or organizational support.[37, 41] When properly trained and led by well-defined clinical protocols, nurse performance translates into considerable improvements in the treatment of asthma.[42]

Pharmacists

There is strong evidence that partnerships with competent pharmacists, working alone or as part of teams, can be extremely important in identifying and referring patients with poorly controlled asthma who would otherwise not attend other health professionals.[26, 37]

The intervention of pharmacists allows benefits in asthma control, inhalation technique, verification of the existence of a written action plan, asthma-related quality of life and medication adherence.[43]

Occupational doctors

An articulation with occupational physicians favors better management of patients with asthma, especially those with occupational or work-aggravated asthma. Only a small proportion of patients with asthma communicate with HCP about asthma associated with work.[44] Yet approximately 20% of persons with asthma have work-exacerbated asthma and they suffer asthma morbidity, health care use and work absenteeism and presenteeism.[45, 46] Occupational physicians are, therefore, in a strategic position to identify factors associated with this difficult control.

Other professionals

Other professionals who have a role in the multidimensional team such as physiotherapists, speech therapists, nutritionists and clinical psychologists are often involved in the care of patients with asthma,[47, 48] becoming fundamental players in the management of asthma comorbidities.

How to organize an asthma review

The high prevalence of asthma of about 10% and resulting high-volume workload for primary health care doing planned annual reviews requires a systematic approach to ensure that all people living with asthma are equally and equitably given the opportunity to engage in a regular review appropriate to their individual need and in a timely manner.

Our continued struggle to tackle and improve on poor asthma outcomes is not due to the absence of effective pharmacotherapy to treat the underlying inflammation but as a result of people with asthma not taking enough of the right treatment.[37] The reasons are complex and so, skilled conversations are required.[49] Creating the space for this to happen and structuring the encounters with evidence-based exploration and shared action requires planning and forethought.[50]

Proactive engagement in the form of a systematic but individualized review is therefore required and there is good evidence that doing this works.[51] On the basis of such evidence, guidelines recommend them and, in some countries, primary care is financially incentivized to provide these, recognizing that they incur additional resource needs. The benefit to the healthcare system is the realization of reduced costs further downstream by impacting on more expensive hospital attendances and admissions and also broadly keeping people in school and at work.[52]

One country where this has been well-established is the UK. A primary care contracted and formalized process of annual recall for asthma review was initiated in 2004 and still occurs today in 2020 in most of the UK. This is part of a nationally directed quality improvement called the Quality and Outcomes Framework (QOF) and is optional for primary care organizations to carry out but is widely taken up with good levels of achievement.[53]

However, whilst indicator standards have been reached successfully year-on-year by most organizations, evidence has suggested that this has not translated into improved outcomes for

asthma.[54] The QOF scheme has seen some improvements however in other long-term conditions such as diabetes mellitus and severe mental health.[55]

Since its inception the QOF indicators have changed to keep up with current evidence and to try and increase the opportunity of impacting on outcomes. Each indicator is selected based on a guideline standard (BTS/SIGN or NICE) that itself arises from an expert and patient panel that systematically reviews current evidence.[9, 10]

So, why don't good evidence standards translate into better outcomes? The challenge is converting an evidence-based activity or intervention into universal good practice. The solution is not yet found and here we highlight how learning from the UK experience might aid another primary care organization or system wanting to institute a process of regular asthma review.

We can start by suggesting a good asthma review, using the SIMPLES model covered elsewhere in this article, and view the current UK indicator set from this perspective (Supplementary Digital Material 1: Supplementary Table I).[56]

The COVID-19 pandemic has accelerated new ways of working with patients without them attending clinic and so the asthma review structure can now be re-evaluated as evidence emerges about its application and effectiveness.[57]

The UK experience of incentivized and planned annual reviews has never resulted in complete coverage of the population and in recent years has tended to see about 75% of people with asthma being recorded as having one.[58] It is possible that a key step to improvement will be providing the sort of review that the patient wishes to have whether telephone, video or face to face. We know also from a patient survey that some only want a review if they have symptoms and then, quickly.[59]

In conclusion, we have good evidence about what should be in an asthma review and it is possible to describe a 'good practice' asthma review. It is a resource intensive process and health professionals will be limited in doing the right thing without this. Ensuring the right review is available to deliver and reaches all people with asthma is the challenge that we need to keep working on.

Patient-centered care

The promotion of patient autonomy

It is essential to involve a person with a chronic disease in their own care. People who understand better the nature of their illness, its development and its potential complications, who are aware of the risks of inappropriate use of medicines or poor adherence to treatment, who are more capable to deal with their own disease, have fewer complications and less use of hospital care, have a better quality of life.[60] More enabled patients will lead to a reduction of the workload of health professionals, generating additional time that can be used to deliver care to less autonomous, less differentiated, or elderly persons.[61]

Patients with chronic conditions make everyday decisions about the management of their illnesses. This introduces the need for a new chronic disease model: the patient-professional partnership, involving cooperative care and the improvement of self-management skills. The promotion of self-management complements traditional patient education models because it supports improved patient skills to achieve the best possible quality of life with their chronic condition. While traditional patient education has mostly offered information and technical skills, self-management education teaches problem-solving skills.[62]

Self-management is a regular proposal of most national and international asthma programs.[7, 9, 63] Self-management of asthma is a cost-effective investment that prevents exacerbations and improves quality of life.[64]

Supported self-management is the help given to people with chronic conditions that enables them to manage their health on a day-to-day basis. Self-management support can help and inspire people to learn more about their conditions and to take an active role in their health care. Supported self-management for asthma can reduce unscheduled care and improve asthma control, can be delivered effectively for diverse demographic and cultural groups, is applicable in a broad range of clinical settings, and does not significantly increase total healthcare costs.[65]

There is an inter-relationship between professional review and patient self-management. Improved outcomes are the result of training in

asthma self-management coupled with regular review.[66] Periodic asthma reviews are interactions situated in the border between patient self-care and management by health care professionals, offering opportunities to reinforce and cultivate self-management skills and to build continuity of care and improve the relationship with patients.[66]

Shared decision-making

Shared decision-making (SDM) emerges as a natural result of the promotion of patient autonomy. It is an interactive process in which patients, their families and carers, in collaboration with their health care providers, choose the next actions in their care path following an informed analysis of possible options, their values and preferences.[61]

Shared decision-making should include some essential elements: the physician's aptitude in state of the art asthma care, integrating Evidence Based Medicine (EBM), a patient-centered approach, good communication skills and a structured planning of long term care involving other members of the health care team, the patient and the family or carer. In SDM there is a two-way exchange of information between patient and physician including medical and personal information, the discussion of possible options, risks and benefits, and a consensus between the patient and the doctor about what to do.[67]

Evidence Based Medicine and SDM are both important components of health care decisions. It is generally accepted that health care decisions require the integration of the best available evidence and patient's individual preferences.[67] Patients' preferences and choices are influenced by previous experiences, ideas, expectations, feelings, effect on function and the information provided by the health care professional. The process of finding common ground and reaching a shared decision requires the physician to combine EBM and SDM. Patient-centered care requires an approach to patients with dignity and respect and involving them in all decisions about their health. In patient-centered care, clinicians need to acknowledge the social and cultural factors that affect the health-care encounter, understand the important role of those factors in health-care decision-making, and expand the paradigm of EBM to incorporate sociocultural influences more explicitly.[68]

The evidence about SDM in asthma is limited as some studies showed benefit while others did not. Individual studies have demonstrated some benefits of SDM in asthma control, including quality of life; patient and parent satisfaction; adherence to prescribed medication; reduction in asthma-related visits/exacerbations; and improved asthma control. Shared decision-making may also help people to take their asthma inhalers more regularly owing to better understanding of why they need to do that.[69]

As SDM requires a well-informed patient, physicians should encourage an improvement in patient knowledge and skills for dealing with asthma. Consultation tools such as images, leaflets, demonstrations or videos by health care professionals should be used in order to promote patient knowledge and autonomy and the ability for self-management. It is useful to facilitate access to information and to provide access to brochures, leaflets, websites and contacts of patient organizations. If possible, tools for home monitoring such as self-assessment control tests (ACT, CARAT or other) should be provided. Some patients might benefit from using peak flow meter home measurements.

Appointments are good opportunities to teach the use of inhalers which should be reviewed frequently. Skills learning about coping with the disease and the involvement of spouses, relatives and carers needs to be part of the care plan. An asthma action plan that is shared and agreed with the patient is an important component of the routine asthma consultation (see later section).[66]

How to improve the use of inhalers

Inhaler therapy is the cornerstone of asthma treatment. Inhaler devices allow drugs to be delivered directly into the lungs, minimizing systemic side effects and optimizing efficacy. Currently, many types of inhalers are available in the market with different features and characteristics that may be considered by patients in order to use them correctly. Thus, it is important to suit the inhaler type to the patient profile to achieve optimal inhaler performance.[70] Nevertheless, most patients use their inhaler incorrectly, making some error

during the maneuver. Inhaler misuse reaches up to 90% in some studies, and errors occur in all different steps of inhaler performance.[71] Moreover, only 11% of patients receive regular inhaler review and 25% have never received proper education. This may be due to patients' own determinants, but may also be due to heath care professionals themselves, who fail to recognize this problem. New and more evolved devices are now available, but this problem remains, and no improvements have been seen in inhaler performance in the past few decades.[72]

The quality of inhaler performance is, therefore, related to asthma outcomes, not only to clinical control and quality of life, but also to exacerbation risk.[73] Additionally, some types or errors may be more critical than others, compromising clinical efficacy even further. In fact, critical errors may be present in up to 50% of patients.[74] Many factors may be related to the patient's ability to use inhalers, such as age, educational and socioeconomic level, living alone, having comorbidities, using multiple devices or history of proper inhaler education delivered by a health care professional.[73, 75, 76] Inhaler performance may be taught to patients by means of several methods and tools, such as using videos,[77] flyers or booklets,[78] labels and reminders on the cover of the devices,[79] or using interactive and multimedia-based tools.[80] However, interventions through a tailored teach-to-goal placebo device training seem to be the most relevant and efficient on clinical control and exacerbation risk reduction.[70, 81] This should be done involving all health care professionals dealing with asthma patients on a regular basis.

Inhaler performance should also be regarded with special attention in vulnerable populations, such as chronically ill patients, the elderly and those with frailty syndrome. These patients often have a low perception of their symptoms and frequently have concomitant comorbidities that hamper an easy and proper clinical management.[7] Elderly patients, for instance, have particular issues to be considered because they show a significant trend to poor inhaler performance.[82] Some factors may play an important role, such as cognitive decline that hampers the ability to understand inhaler maneuvers, the presence of concomitant comorbidities, hand osteoarthritis, depression or frailty, educational level, socioeconomic status and the duration of the disease.[83] Teaching inhaler technique in older people may also be done using several tools, but a tailored teach-to-goal placebo device training seems to be the best method, reducing exacerbations with up to a 29% risk reduction and being cost-effective.[81, 84]

The importance of the asthma action plan

What is a personalized asthma action plan?

The personalized asthma action plan (PAAP) is a document that advises patients what to do if their asthma worsens, typically including their usual asthma medications, and guidance on how to recognize when their asthma is getting worse; when/how to increase reliever and controller puffs or start oral corticosteroids (*e.g*. prednisone) and when to access medical care if symptoms fail to respond. It is recommended as an important element of good asthma care which every person with asthma should receive and know how to use.[85, 86] However, studies repeatedly show that clinicians do not prioritize them and only a proportion of people with asthma have them and use them.[87]

The plan is normally written, and may include pictures. The definition now includes "personalized." We welcome this to guarantee equity. Asthma affects patients with different levels of activation, literacy and health literacy. A generic action plan will be of low value;[88] it must be tailored to the literacy and knowledge of the individual. Pictorial plans are feasible in paper and apps; apps have advantages in terms of animation and sound. However, it is important that those without access to smartphones or tablets, or have a preference for hard copy, are offered paper-based alternatives. A PAAP has the potential to reduce mortality and morbidity if it is up-to-date, understood and accessible when needed.[64] Some examples of PAAPs can be found online.[23, 89]

What are the benefits?

Despite their ubiquitous recommendation in asthma guidelines, the most recent Cochrane review concluded that there was no strong evidence of benefit or harm for PAAPs with or with-

out patient education.[90] This is unsurprising, because PAAPs are not an isolated intervention, but part of a complex self-management intervention that address both motivational factors and clinician and patient capability to manage asthma, including inhaler use. It also needs the health system to create opportunities to do the right things right.[65, 91]

How should they be developed and used

Organization and delivery of PAAPs will be context specific; there is no single best way.[40] However, using the AACTT framework,[92] there are some feasible options which can be seen in Table I.

Digital personalized asthma action plans

During the COVID-19 pandemic there has been accelerated enthusiasm for digital health solutions. Regarding PAAPs this includes the PAAP itself and the process of agreeing it. Patient organizations see huge benefits to digital PAAPs. They are portable and enable easy and accurate sharing of information with healthcare providers and informal carers.[87] They also offer the opportunity to provide education, links to other resources, and integration with the individual's electronic health record. Ultimately, PAAPs could be a live document accessed by the patient and updated from the electronic health record.[87]

A recent feasibility study has shown that a PAAP can be discussed remotely between a health care professional and a patient using a videolink using a whiteboard function.[94]

Summary

The PAAP should guide the individual during a crisis and is part of supported self-management. There are 8760 hours in a year, and the latest evidence shows that just two hours of that time spent with trained primary care professionals in the year of diagnosis would improve quality of life and reduce healthcare utilization. Part of that time should always be spent on agreeing a personalized asthma action plan.[93]

Developing an integrated approach to asthma care in the community

Integrated asthma care in primary and community settings should be viewed in the context of the European Union definition of primary care:

"The provision of universally accessible, integrated, person-centered, comprehensive health and community services provided by a team of professionals accountable for addressing a large majority of personal health needs. These services are delivered in a sustained partnership with patients and informal caregivers, in the context of family and community, and play a central role in the overall coordination and continuity of people's care. The professionals active in primary care teams include, among others, dentists, dieticians, general practitioners/family physicians, midwives, nurses, occupational therapists, optometrists, pharmacists, physiotherapists, psychologists and social workers."[95] For people with asthma, this also needs to include exacerbation management.

Primary care offers the entry point to the most appropriate and cost-effective forms of care for an individual. This might include referral, but can also mean navigation to other community services, or integration of respiratory specialist advice into the practice through remote consultation.[96]

Commentators on health systems[95, 97, 98] ex-

TABLE I.—*Different options for the use of PAAPs.*

Parameter	Description
Action	Complete together with patient and clinician an action plan: paper, static digital or app
Actor	FP/GP or practice nurse
Context	1. Near diagnosis 2. Post discharge from emergency department (GINA) 3. During a routine review face to face or remote
Target	All people with diagnosed asthma; people discharged from ED are a priority.
Time	Variable but Hodkinson recommends that people with asthma receive up to two hours of support per year including regular reinforcement of action plan[93]

plain how investment to strengthen primary care is critical to respond to the challenges that health systems now face, which are well illustrated by asthma:

• demographic and epidemiological transition towards chronic diseases and multi-morbidity and away from episodic acute care: acute management of asthma exacerbations and hospital admissions should be avoidable with good ambulatory care;

• patients as active partners who want "the care they need and no less, the care they want and no more,"[99, 100] and expect that their history and care decisions are shared across organizational boundaries so that this can be fulfilled;

• increasing social inequalities and the need for integration with other sectors such as social care, employment, education and the environment to address the determinants of poor quality of life including quality of housing, proximity to poor outdoor air, tobacco dependence rates, occupational hazards in manual labor such as dust and fumes, and lack of disposable income to afford the right inhaled medicine and devices;

• increasing complexity in health care, which, for people with asthma, might include care that integrates horizontally and vertically — for example between physical and mental health, hospital and community, private and public, adolescent to adult services, and different providers such as the pharmacist and FP/GP;

• new needs for continuity of care now that not all primary care offers a continuous relationship with a single practitioner;

• key elements of an integrated approach to asthma span diagnosis, communication about diagnosis, shared management decisions and personalized asthma action plans.[101]

The rate-limiting step to their delivery is the shared electronic medical record.[97] A shared medical record enables all care-givers to have the same information about clinical and patient decisions. It avoids duplication of effort and the tedium patients experience when repeating their history. It should provide information about the diagnosis, date of diagnosis, reasons for the diagnosis and relevant test results, which enable continuity of care even if the patient encounters a different care provider.[102]

Good care records also enable risk stratification. People with mild to moderate asthma may need a relatively simple integration between the FP/GP and other team members within the practice, and/or between the FP/GP and community pharmacist. However, in many contexts it is not yet reality for prescribers and dispensers to share records and intelligence about a patient's misuse of their inhaler, overreliance on symptom relief including over the counter salbutamol, or to communicate concern about underuse of anti-inflammatory medicines.

For people with less controlled asthma, integration may be needed between urgent care and the FP/GP, based on shared access to the PAAP and a simple way to ensure that guideline recommended review by the FP/GP within 48 hours of attendance at an urgent care facility is routinised.[85]

People with severe asthma need to be stratified as they may need more complex care and support to navigate to a variety of services. Some novel primary care services *e.g*. Iora Health offer every older person in their care a team of "provider", nurse and health coach.[103] They also have access to a behavioral health specialist. This illustrates another feature of integrated care centered around the patient: the opportunity to redefine team roles based not on professional boundaries but on patient goals and needs.

Summary

Integrated care for people with asthma will be context-specific. It should be driven by the individual patient's needs that are elicited, recorded and then, via primary care, delivered by a range of providers in the community. Where electronic records and remote consulting options exist, this can deliver care in or close to the patient's home.

Promoting asthma right care

Asthma Right Care is a social movement created by the International Primary Care Respiratory Group (IPCRG) about asthma awareness and asthma care. It was initiated in 2017 in four pilot countries, Portugal, Spain, the United Kingdom and Canada, applying the evidence about social movements for health[104] large scale change,[105] and followership[106, 107] to generate a groundswell of support for two things:

• a global change in the priority given to asthma; and

• a change in the standards of care being offered.

Its name is inspired by the Right Care approach, illustrated in a series in the *Lancet* in 2017.[108] This describes the extent of overuse and underuse worldwide, highlights drivers of inappropriate care, and suggests a Right Care framework providing an enormous opportunity to improve population health and wellbeing.

At its core, Asthma Right Care is about creating opportunities to have conversations with many asthma stakeholders including health professionals, patients, informal carers and associations that raises their awareness about the need for improvement, and starts to get them to think differently and, hopefully, commit to doing things differently.

These conversations may be between health professionals, or between them and their patients, and include what is appropriate care for the person with asthma, what are the obstacles to achieve it, and what are the successful attitudes and behaviors that can help people with asthma to improve their quality of life.

There has been substantial investment in asthma education, and yet variation in asthma outcomes and examples of underuse and overuse persist. The Asthma Right Care movement believes that if clinical colleagues and the public feel discomfort with the status quo, they are more likely to want to receive education about what does Right Care look like and ultimately, with improved knowledge and skills, and commit to a bigger movement, more likely to change their behavior. It might seem simple, but it is hard to do the right things, at the right time with the right people.

Asthma outcomes are not what we wish they were. To walk this way, in Asthma Right Care we try to disrupt thinking and create discomfort with the way things are done now — in primary care, in emergency departments, in pharmacies. We started with the idea of "overreliance" on symptom relief or on episodic acute management of a chronic condition which might mean overreliance on short-acting beta-agonists (SABA), or on oral steroids, or on hospital visits or nebulization. And underuse of chronic disease management, including regular use of inhaled corticosteroids.

We developed tools such as the Asthma SABA slide rule and question and challenge cards to get the conversation started. These have been prototyped and tested and improved in over ten countries. Importantly, they also introduce fun and creativity, which maintains interest and commitment.[109]

The pilots had to adapt each idea to the local reality. This has been a challenge, to call people to action and explain that we all face the same problems and that we have many ways (related to the local resources) to reach our goals.

Large scale change requires us to reach more geographies, more parts of the health system and to go deeper to achieve a paradigm shift.[106] Asthma Right Care has gained momentum in the pilot countries and has now spread to the Netherlands, Argentina, Greece, Australia, Slovenia and South Africa and more countries are seeking involvement. We are now prioritizing work with community pharmacists and urgent care teams. We are developing education about Right Care, now there is more appetite for this.

Motivation, team work, the feeling of reward for a good work are the basis to make ARC happen and grow. In the end we all need each other and health care providers, patients and caregivers are all called to action to reduce underdiagnosis and misdiagnosis, improve management and enable better disease control.

In parallel with this individual-level work, we need to work at policy level to ensure the motivational factors like reimbursement and the opportunity factors, like developing good pathways of care, are also debated and improved.[91] This is the next phase.

Difficult-to-manage and severe asthma in primary health care

The patient with difficult-to-manage asthma

A small but significant number of patients have persistent asthma symptoms despite being prescribed high levels of treatment. They have been labelled in many different ways but, currently, these patients are referred to as having "difficult to treat" or "difficult-to-manage" asthma. The GINA initiative defines difficult to treat asthma

as asthma that is uncontrolled despite GINA Step 4 or 5 treatment, or that requires such treatment to maintain good symptom control and reduce the risk of exacerbations.[7]

The International Primary Care Respiratory Group (IPCRG) produced guidance in 2012 with the aim of providing a systematic, practical approach to support primary care and other community healthcare professionals to improve the care of people with difficult-to-manage asthma.[110] The term "difficult-to-manage asthma" was adopted and defined as asthma that either the patient or the clinician finds difficult-to-manage. A patient with difficult-to-manage asthma is one that presents with frequent or daily symptoms and regular exacerbations despite apparently best treatment. The document was followed by a Position Paper[111] and publications in peer-reviewed journals.[56, 112] The consensus resulted in a practical guide that considers the steps in the management and investigation of patients with uncontrolled asthma. The aim is to identify when and why asthma control is lost or has never been achieved and then, by effective monitoring, to try to gain or regain control and then maintain control of asthma with effective, well-tolerated treatment. It also helps to identify those patients that require a referral to secondary care and those who will benefit from referral to a 'difficult asthma' clinic.

The working group adopted and adapted the acronym SIMPLES to provide a useful tool for the main factors to check when doing an asthma review.[56]

The IPCRG's position paper identified ten steps that can support the reduction of the human and health service costs of difficult-to-manage asthma.[111] They can help both healthcare professionals and patients with asthma to do the right things in the right way to improve asthma control. Difficult-to-manage asthma should be targeted as a priority for improving value and equity of healthcare. Primary and community health services need to be strengthened and supported and interaction with hospital services for asthma should be improved. Countries need to introduce national asthma plans and a difficult-to-manage asthma approach should be included. Health systems need to provide access to tests for diagnosing asthma and respiratory allergies supported by training in diagnostic testing and interpretation of results for FP/GPs and nurses. Health services need to work further in empowering people with difficult-to-manage asthma to self-manage their condition. Incentives or a reimbursement system should be implemented to motivate annual structured reviews in primary care for people with asthma. Governments and academia should support research that helps to answer questions about effective prevention strategies, the impact of other diseases on asthma, how to promote adherence to optimal treatment by both professionals and patients and advanced patient-centered care that helps people "co-manage" or self-care. Systematic and shared data collection on difficult-to manage asthma should be supported. Difficult-to-manage asthma should be included in tobacco control policies. There is a need to develop policies that reduce the impact of environmental factors on asthma at home, work and more widely.

The SIMPLES approach

Difficult-to-manage asthma is a challenge for both the patient and the primary care physician. The 2012 structured review suggested by the IPCRG is the key measure to improve the detection and care of patients with difficult-to-manage asthma. The SIMPLES approach has been well-received by physicians and the desktop helper has been translated in many languages.[56, 110]

The SIMPLES acronym stands for: smoking, inhalation, monitoring, pharmacotherapy, lifestyle, education, and support.

Smoking

Smoking increases symptoms and disability, accelerates decline in FEV1, alters airway inflammation and reduces the response to corticosteroids.[113] Therefore, it is important to ask about current smoking and exposure to second-hand smoke and encourage and support patients to quit. The IPCRG has produced a position paper and desktop helpers to assist physicians in this task.[110, 111]

Inhalation

Poor control is commonly due to poor inhaler technique, and not all asthma inhalers are the same.[114]

Moreover, health care professionals that prescribe inhalers fail in showing, explaining and teaching the patient how to use them, therefore, there is an urgent need for improvement.[115] Physicians should take into consideration that patients may get confused with different devices[116] and that control of asthma worsens the greater the number of errors there are and try to teach accordingly.

Monitoring

It is important to assess asthma control in a systematic way using a simple, validated tool, such as the Asthma Control Test, the Asthma Control Questionnaire (ACQ), The Royal College of Physicians (RCP) 3 questions, or the Control of Allergic Rhinitis and Asthma Test (CARAT).[117] The latest has four questions on rhinitis plus six on asthma and has been developed and validated for use in primary and secondary care.[118] Monitoring shall also include objective measures as well, such as the peak flow.

Pharmacotherapy

Most people with asthma will need daily treatment with ICS but adherence to ICS is less than 30%,[119] and 52% of those having a prescription do not use it.[120] It is important to check if the patient is being treated at the right step for the severity of their asthma and also assess adherence. Non-adherence to inhaled corticosteroids (ICS) is a common cause of poor asthma control[121] and can be intentional (*e.g.* fear of steroids) or unintentional (*e.g.* financial reasons).

Lifestyle

It is important to ask and advise patients on diet, exercise, alcohol and weight maintenance. In addition, specific questions about their exposure to factors that may worsen their asthma should be addressed: smoke, living conditions (*e.g.* exposure to dust mites, wood stoves, use of air fresheners), environmental conditions, hobbies, occupational exposure (free of symptoms in the weekends), pets, animals outside the home, etc. It is also important to ask about comorbidities such as eczema, gastroesophageal reflux disease, rhinitis, social and psychological factors. As well as ask about other medications that can worsen asthma *e.g.* aspirin, NSAIDs, some antibiotics (tetracycline) etc.

Education

Check that the patient understands their asthma: what it is, why treatment helps, what their medications are for. Educate on how to self-monitor (symptoms, peak flow), accompanied by a written action plan), what to do in an emergency etc.

Support

Check what support the patient has from their family and involve them whenever possible to support their understanding of asthma and adherence to treatment.

When, where and how to refer patients with severe asthma

When asthma symptoms do not improve with interventions that follow from the SIMPLES approach, or exacerbations keep occurring, confirmation of the diagnosis is needed as well as a referral to specialist care. Following the SIMPLES approach, many aspects (see previous section) that can cause symptoms and exacerbation risk can be identified and solutions are available. Assess overuse of SABA, underuse of ICS, allergic rhinitis, depression, anxiety, other comorbidities and the possibilities of a severe asthma phenotype and factors contributing to symptoms, quality of life and exacerbations.[7] If the primary health care team cannot follow the SIMPLES or similar structured assessments, a referral is also indicated if the patient with asthma continues to experience symptoms or exacerbations. For exacerbations, a common guidance for referral is when there are two or more exacerbations requiring oral corticosteroids despite optimum ICS treatment.[7] Another important reason to refer is when the asthma is likely to be linked to occupational exposure.

Different health care systems provide distinct referral pathways. Some systems have shared care between primary and secondary care,[122] or a hospital or office-based pulmonologist. There are examples of severe asthma specialist networks like SANI in Italy,[123] or the German Asthma Net.[124]

Generally, there is a preference to refer asthma

patients that are uncontrolled or continue to experience exacerbations despite optimizing treatment to a pulmonologist with a special interest and specific training in severe asthma management.

When referring patients to specialist care, local guidance should be followed, but effective care can be delivered when information about diagnostic step outcomes, the SIMPLES details, previous treatment and occupational involvement is included in the referral process. The known triggers and actions to reduce these (including smoking) should be mentioned. As few medical records are linked, information on prescriptions of medication which can be useful for assessment of adherence to maintenance therapy should be added when available. Next, any concomitant rhinitis, eczema or anaphylaxis should be mentioned and how this is being treated. Information of blood eosinophil level is useful for the potential indication of biological treatment in specialist care. A template on what to include in the referral letter was developed by the International Primary Care Respiratory Group as part of the Difficult-to-manage Asthma initiative described in previous sections of this article.[125]

In summary, patients with asthma would benefit from referral if they continue to experience symptoms or exacerbations with optimized treatment, referral to a specialist with specific interest in severe asthma is recommended and the referral should include complete and relevant information on medical history, aggravating factors and treatment.

Managing a patient with asthma and other comorbidities

Comorbidity usually defines a coexistent disease or condition. As regards asthma, there are many comorbidities that may complicate diagnosis, severity assessment, and management. Misattribution of symptoms is also frequent. Comorbidities may deteriorate asthma symptoms and be the cause of loss of control. Therefore, clinicians should suspect, recognize and treat them promptly especially when asthma is uncontrolled and there is treatment failure. Many comorbidities have to be considered. Rhinitis and rhinosinusitis management and in general allergic sensitivity are of particular importance as they strongly affect asthma control. Psychological dysfunction, paradoxical vocal cord dysfunction, obesity, gastroesophageal reflux, obstructive sleep apnea, smoking, hyperventilation, hormonal disturbances, etc. could also worsen asthma symptoms and control. Some of them are presented here.

Asthma and chronic obstructive pulmonary disease (COPD)

Asthma and chronic obstructive pulmonary disease (COPD) are two prevalent respiratory conditions that may share common features and overlap in the same patient but treatment is different, so diagnosis should be confirmed.[126] In recent years, there has been renewed interest in patients with clinical characteristics of both diseases, the asthma/COPD overlap (ACO). Though ACO definition is controversial and supporting evidence is poor, patients with overlapping characteristics are frequently found in clinical practice, and it has been observed that they have worse clinical outcomes and greater use of health resources than those who only suffer from asthma.[127, 128] The main problem for ACO diagnosis appears in older patients, smokers or ex-smokers with a COPD confirmed post bronchodilator obstruction, in whom we do not have a confirmed previous diagnosis of asthma, but who present some features that increases the suspicion of asthma: history (family, childhood asthma, atopy, nasal polyposis, etc.), clinical characteristics (wheezing, cough, chest tightness, etc.), partial reversibility of the obstruction, or typical asthma inflammatory markers. In these cases, the proposed diagnosis criteria are based in blood eosinophiles >300 cells/μL or a very positive bronchodilator test (>15% and >400 mL). It is important to identify these patients and apply the available evidence for their correct treatment.[63, 126] Despite poor evidence on how to treat patients with ACO, it is recommended that, due to their asthma condition, they should receive inhaled corticosteroids as they have proven activity in eosinophilic inflammation.

The use of treatable traits and biomarkers such as peripheral blood eosinophils, exhaled nitric oxide, and serum immunoglobulin E can help select appropriate therapies for these patients.[129]

Asthma and rhinitis

Epidemiological studies have shown that rhinitis and asthma frequently coexist[130] and they are considered as different manifestations of a single airway entity.[131] Over 80% of asthma patients have rhinitis. On the other hand, 20% of the population suffers from rhinitis and, among them, the prevalence of asthma varies between 15 and 40%, more frequently in severe and persistent rhinitis than in mild and seasonal. Likewise, other upper airways conditions such as polyposis and chronic sinusitis are frequently associated with asthma, and the intensity of rhinitis is directly related to the severity of asthma.[132]

Also, cough is the primary symptom of rhinitis or rhinosinusitis and likely to be confused with asthma. ARIA guidelines support the view that asthma and rhinitis are different features of the same respiratory disease ("one airway, one disease") and recommend that patients with persistent rhinitis should be evaluated for the presence of asthma as well as patients with persistent asthma for the presence of rhinitis. An adequate therapeutic strategy must combine the management of the upper and lower airways in terms of efficacy and safety.[133] The Control of Allergic Rhinitis and Asthma Test (CARAT) is the first questionnaire to assess control of both diseases concurrently and is adapted for use in different languages and cultures.[118]

Asthma and obesity

Obesity is a prevalent health problem; a major risk factor for asthma onset, as well as for the appearance of symptoms.[134] Obese people show a greater risk of having asthma and obese people who have asthma have more symptoms, and their exacerbations are more frequent and severe.[126] Asthma is more difficult to control in obese patients, and this can be related to different types of airway inflammation, existing comorbidities in the same patient (sleep apnea-hypopnea syndrome, gastroesophageal reflux disease), mechanical factors and others not yet well defined. Furthermore, lack of physical fitness and decreased lung volume due to abdominal fat can contribute to shortness of breath, exercise-induced dyspnea, and chest tightness as a result of obesity may be misattributed to asthma, resulting in an incorrect diagnosis in obese patients.[126] The interrelationship between obesity and the inflammatory response is beginning to be understood. The metabolic activity of excess adipose tissue combines with the underlying immune dysfunction in asthma, enhancing the response of the airway to the changes induced by different agents (antigens, drugs, pollution, etc.) that cause damage to the lung parenchyma.

In obese patients the response to inhaled corticosteroids can be reduced possibly due to an increased production of inflammatory mediators in obesity (cytokines). Weight reduction should be included in treatment plans for obese patients since some studies suggest that a 5 to 10% weight loss may produce a significant improvement in asthma control. The most relevant results have been obtained after bariatric surgery.

Gastroesophageal reflux disease (GERD)

Atypical GERD symptoms include throat tightness, cough, chest tightness, and hoarseness. Thus, the symptoms of GERD may be misinterpreted as asthma or rhinitis both when making a diagnosis and when monitoring patients for control of their respiratory disease. A significant association between GERD and asthma, especially the difficult-to-manage asthma has been mentioned.[135] Asthma therapies, particularly theophylline and beta-agonists, may decrease lower esophageal sphincter tone, suggesting asthma therapy may increase GERD.

Does treating GERD improve asthma? Double-blind trials demonstrate that proton pump inhibitor treatment of asymptomatic GERD does not improve asthma, but in those with asthma and symptomatic GERD, a benefit in quality of life and number of exacerbations has been depicted, despite the poor effects on asthma symptoms, rescue medication use, and pulmonary function. A Cochrane review about GERD therapy in adults and children with asthma found a lack of benefit in achieving asthma control, although there is a suggestion of reduced rescue medication use and clinical benefit in an undefined group of asthma patients.[136]

Managing the severe asthma patient between hospital visits

Severe asthma defines a type of asthma that is difficult to treat and get controlled. It affects

around 5-10% of asthma patients, resulting in a big impact in quality of life and highest costs. These patients are at high risk of a life-threatening asthma crisis which usually leads patients to emergency departments (ED).[137]

The Global Initiative for Asthma Management (GINA) has recently developed specific guidelines for the management of severe asthma where they clearly recommend that patients with severe asthma should be referred to a specialist respiratory team for correct diagnosis and expert management.[85] New monoclonal antibodies and biological therapies for severe asthma are currently available and, in most cases, they can be exclusively prescribed by hospital specialists enhancing early referral.

On-going management of severe asthma patients involves integration between the patient, the primary care doctor, the hospital specialist and other health professionals to optimize clinical outcomes and patient satisfaction.[138]

An effective approach to asthma severe patients in PHC begins by assessing asthma severity in any visit, by identifying triggers and risk factors for uncontrolled asthma, by measuring medication adherence and inhaler technique and by optimizing lifestyle counselling, including tobacco cessation interventions and stepping up and down therapy according to current guidelines.[35] PHC professionals need to educate severe asthma patients to live and cope with the disease and to recognize potential danger signs and symptoms that could require them to seek medical help. A personalized asthma action plan will help their self-management.[85]

Guidelines recommend to regularly communicate with patients about:

• outcomes of review follow-up visits: in between hospital visits, PHC providers should help patients to understand their type of asthma and how all its complexity impacts on treatment. In these cases, it is of prime importance to move from established step-up strategies to individual self-management plans. A multidimensional assessment can be helpful (covering domains related to pulmonary assessments, comorbidities, risk factors, and behavioral assessments);

• patient concerns: communication with patients is a basic requirement for successful management of severe asthma patients. PHC professionals are their first line and continuously accessible. Considering their perceptions, preferences, beliefs, and attitudes is the best way to improve self-management skills;

• action plan for worsening asthma and possible flare ups: despite a correct diagnosis and management, severe asthma patients sometimes need to visit an emergency department (ED). The personalized asthma action plan should offer clear instructions and indications as well as contact details in case of urgent or expedited review. Initial steps to be made by patients at home before contacting an ED should also be clearly described. The ED should provide evidence-based, discharge home instructions, specifying which medications to continue, which new medications to begin, and guiding the patient to contact their PHC provider for a detailed follow-up (preferably in the first 48 hours). In reality, this contact will normally be short, but enable a longer consultation to be booked. This is a complex, dynamic, and multistep task to perform in a busy ED setting;[138]

• changes to medication and potential side effects: patients should receive relevant information to understand their treatment options.[137] PHC professionals must review response to asthma medications every 3-6 months including asthma control, allergy, other comorbidities and patient satisfaction. They have to assess the effectiveness of these high-level treatments on a daily basis to properly inform hospital specialists about it. Treatment should be optimized at each visit and overreliance on oral corticosteroids must also be considered.[85] Another important role for PHC is to identify early possible side effects associated with specific severe asthma treatments (biologics, oral corticosteroids, etc.). Preventative drugs for osteoporosis such as bisphosphonates should also be considered in severe asthma patients taking maintenance oral corticosteroids for long periods. Stepping down additional treatments could also be a coordinated shared task for PHC and hospital professionals, however, inhaled corticosteroids should be maintained at least at medium doses and patients should be reminded about the importance of continued ICS therapy.[85]

Primary health care professionals should seek

updated knowledge and health systems ensure implementation of current asthma guidelines, including patient-centered programs.

Conclusions

This article provides a short review of the main challenges faced by family physicians and other primary health care professionals in supporting their patients in the management of asthma. In spite of the generous offer of text size from the Journal's editors which allowed for a fairly comprehensive approach, it was not possible to cover many other aspects such as the challenges and opportunities of research in asthma and other respiratory diseases in PHC, the promotion of postgraduate and continuing education and the need for quality improvement in respiratory care in PHC around the world.

The promotion of most of these activities has been a major concern of the IPCRG throughout a program of activities supported by a strong network of national organizations and an active cooperation with respiratory and family medicine societies and associations, patient organizations and the WHO.[139]

We hope this article will provide readers with a view of what is being done at PHC level to promote excellence in asthma care and will foster a better collaboration between family physicians and respiratory specialists for the benefit of all persons with asthma.

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