The 2024 BTS/NICE/SIGN asthma guidelines have potential to improve UK asthma outcomes, but we must act now.

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Key Messages

What is already known on this topic

Asthma is a common lung disease and outcomes in the UK are among the worst in Europe. Over-use of short-acting beta agonist (SABA) and under-use of anti-inflammatory, inhaled corticosteroid (ICS) containing inhalers are associated with risk of exacerbations and death. The new collaborative BTS, NICE, SIGN Asthma Guideline endorses an anti-inflammatory reliever-based approach to asthma management and has potential to significantly improve asthma outcomes in the UK.

What this study adds

We discuss the role of guidelines to support delivery of evidence-based practice and highlight the knowledge-action gap that can prevent implementation of guidelines in practice. Based on the published literature and expert consensus, we describe some of the challenges/barriers that will be faced at both a system and individual level when implementing the BTS, NICE, SIGN Asthma Guideline, and tailor theoretically underpinned strategies to address these.

How this study might affect research, practice or policy

The proposed framework to support asthma guideline implementation across the healthcare system can support national, regional, and local efforts to improve asthma outcomes.

Introduction

Over 5 million people in the United Kingdom (UK) are living with asthma [1]]. Despite efforts to improve care, the UK has the highest rates for asthma deaths and disability-adjusted life years in Western Europe [2], costing the NHS more than £3 billion annually [3]. A concerted effort is required by healthcare providers, commissioners, and society if we are to transform asthma outcomes.

In November 2024, BTS, NICE and SIGN published their first collaborative guideline for the diagnosis, monitoring, and management of chronic asthma [4]. While biologics proved transformational for many with severe asthma [5], this new guideline could prove a defining moment for many more people living with asthma in the UK. Here we highlight key opportunities for changing asthma care, identify barriers to guideline implementation, and offer potential, theoretically underpinned solutions, based on implementation science principles, and with precedent for improving asthma care.

Why the 2024 BTS, NICE, SIGN Guideline could represent a watershed moment for UK asthma care

The 2024 guideline recommends anti-inflammatory reliever (AIR)-based regimens for all newly diagnosed asthma patients aged ≥12 years and existing asthma patients that are uncontrolled on low- or moderate-dose ICS containing regimes [3]. This move away from SABA-relievers recognises the potential for AIR-based management to significantly improve outcomes for those with asthma [6, 7].

SABA over-use and ICS under-use are recognised factors associated with asthma deaths [8]. Global studies have shown a consistent association between use of ≥3 SABA canisters per year and risk of asthma exacerbations [9-12]. Despite policy and quality improvement initiatives leading to declining rates of SABA over-use in recent years, it remains common, representing a continued threat to patients' safety [13].

AIR inhalers contain a combination of ICS and the fast- and long-acting beta agonist, formoterol. Multiple trials have demonstrated that AIR-based approaches, either only as-needed in so-called mild asthma (as-needed AIR) [6], or alongside regular maintenance doses (maintenance and reliever therapy; MART) [7], reduce the risk of asthma exacerbations compared with fixed-dose preventer plus SABA-reliever regimens, often at lower overall ICS doses [14]. With AIR-use, ICS dose is individually titrated according to symptoms through additional reliever inhalations, reducing the risk posed by ICS non-adherence in SABA containing regimens, where SABA-only treatment poses a danger of exacerbation and death [15]. AIR-based regimens therefore represent a safe and effective treatment, acknowledging human factors (e.g., ICS non-adherence) and disease-related factors (e.g., uncontrolled inflammation).

Bridging the gap between guidelines and practice

The 2024 guideline provides an opportunity to change the treatment paradigm and reduce risk for people with asthma. However, a gap exists between guidelines and practice, often limiting impact on health outcomes [16]. While as-needed AIR only recently received a UK licence (2023), MART has featured in UK guidelines for many years, but with limited uptake [13]. Guidelines alone are therefore not enough; guideline implementation is needed for benefit realisation. Recognising this, NICE create 'tools and resources' to support adoption; however, uptake and effectiveness of these are unclear. It is therefore essential that we consider the optimal approach to guideline implementation, and that we do so from a behavioural perspective, recognising that implementation ultimately depends on individual clinician and patient behaviours.

A number of approaches can be used to support guideline implementation: "implementation science", the adoption of new evidence [17]; "improvement science", enhancing the adoption of evidence in practice; and "knowledge mobilisation", sharing usable knowledge across communities to support change. Although these approaches are subtly different, there are "blurred boundaries" and "overlap", with choice of approach tending to be based on familiarity. There are many published processes, theories, models and frameworks for guideline implementation [18], but these are mainly used by researchers and are rarely applied in practice. Given the ubiquitous nature of asthma and the fact that most patients are seen in time-pressured primary care clinics, a pragmatic approach, taking both general and context specific barriers into consideration is imperative.

Motivating and Enabling Guideline Implementation: understanding behaviour

To achieve implementation, we must recognise the challenges/barriers faced at both a system and individual level, and tailor theoretically underpinned strategies to address these [19]. We propose using two theoretical frameworks: the Theoretical Domains Framework (TDF v1) [19], and the Perceptions and Practicalities Approach (PaPA) [20] (Table 1). The TDF was developed to understand factors influencing healthcare professional (HCP) behaviour, synthesising published behaviour change models into one simple framework, and allowing categorisation of barriers and tailoring of strategies to overcome them [20]. The PaPA was originally developed to explain variation in treatment adherence among patients but has more recently been applied to HCPs behaviour.

The PaPA conceptualises individuals' behaviour as a product of motivation and ability, and recognises that there are many reasons (both intentional and unintentional) why people may not follow guidelines. Unintentional factors may include a lack of guideline awareness/knowledge, financial restrictions, or personal and environmental resource constraints. Intentional non-adherence

represents a conscious or subconscious decision and can be understood in terms of the perceptions (e.g., beliefs, emotions, and background biases) that determine whether the person thinks adherence is a good idea for them. This can be considered in terms of the Necessity Concerns Framework (NCF) [20].

The NCF states that motivation is influenced by two key sets of beliefs: necessity beliefs and concerns. Necessity beliefs can be understood as the answer to two internal questions: '*How much do I really need to follow this guidance to achieve something that is important to me*?' and *'Can I get away without doing it*?'. One might believe that a course of action could be effective, but their behaviour is determined more by how important they perceive the benefit to be (their necessity belief). Humans, being 'creatures of habit', will tend toward what they already know/do [21]. Necessity beliefs are the fundamental building blocks of adherence, and once convinced of necessity, we then balance that against concerns (personal beliefs about the downsides). The PaPA and NCF provide a 3-step approach to supporting behaviour changes required for guideline implementation: 1. Provide a convincing rationale for necessity; 2. Elicit and address concerns; and 3) Make adherence as easy and convenient as possible.

How can asthma guideline implementation be achieved in the UK?

AIR-based management will represent a significant change for many clinicians and patients. SABA-based symptom relief has been customary practice for >40 years and many patients have a strong attachement to their SABA [22]. Even those newly diagnosed may have expectations based on social influences, e.g. exposure to others using SABA, through personal experience or the media [23]. Recognition of such barriers must be reflected in deployed solutions.

Chronic asthma management predominantly occurs in primary care, mainly performed by nurses and pharmacists. During exacerbations, patients often encounter other HCPs across the healthcare system (e.g., urgent and emergency care services). A whole-team and system-wide approach is therefore essential, ensuring everyone who interacts with asthma patients is appropriately trained and equipped, to enable HCPs to deliver and patients to positively receive guideline recommended care. System wide programmes, such as the Respiratory Transformation Partnership in England [24], may provide opportunities to achieve this by using a coordinated, theoretically underpinned approach.

The TDF [19] and PaPA [20] can be used to categorise barriers to implementation and tailor strategies and approaches to overcome them [19]. We will focus on broad concepts that can be operationalised and applied across the healthcare system to achieve the desired/required behaviour change. A summary of barriers, based on the published literature and the authors collective experiences,

mapped to the TDF and PaPA, linked to theoretically underpinned solutions [19] and, where examples exist, pragmatic interpretation of behaviour change techniques that address identified barriers, is presented in Table 1. A proposed initial framework for guideline implementation is displayed in Figure 1 and described below. When considering local and regional solutions to support guideline implementation, it is also important to recognise the role of national organisations (e.g., Asthma + Lung UK, Primary Care Respiratory Society, British Thoracic Sociey, Association for Respiratory Nurse Sepcialsits, etc.) to overcome barriers to delivery of guideline recommended care.

A tailored startegy to support guideline adoption

Based on identified barriers and facilitators, the following will be important early considerations for healthcare systems wishing to support guideline implementation.

- *Build an Implementation Team*

The 2024 BTS, NICE, SIGN guideline aims to guide both clinicians and patients across the spectrum of asthma care. At national, regional and local levels, it will be essential to idenitify, motivate, and empower individuals that can lead, facilitate, and deliver change. Working collaboratively across organisational boundaries to create regional and local implementation teams (e.g., at an integrated care board (ICB) level in England) would provide a practical means of achieving this and enable strategic leadership to ensure delivery of solutions in a way that addresses both general and context specfic barriers [25]. Much of asthma guideline implementation relies on practitioner clinical behaviour and on this basis, in this paper, we have focused primarily on “bottom up” strategies to achieve implementation. However, provision of resources lies within the gift of ICBs. Implementation teams should include a “boundary spanner”, an individual with the skills to work between groups who hold a range of priorities and perspectives (patients, clinicians, researchers, funders) to ensure the flow of information, resource, build relationships, and provide tailored input and contextual information to inspire change [26]. For example, patients may value data on health benefits, commissioners may need additional cost consequence data or evidence, allowing decision making across a spectrum of outcomes.

- *Education, Motivation and Empowerment*

Gaps in knowledge and skills relating to asthma diagnosis and AIR-based management will need to be overcome through education and training. Programmes to equip clinicians and patients with knowedge and skills should deploy evidence-based techniques to overcome implementation barriers, including promoting necessity beliefs and addressing concerns. Clinicians should be equipped with skills to support patients to adopt guideline recommended care, utilising existing tools and resources

where available (e.g. Asthma+Lung UK Healthcare Hub and resources, PCRS Fit to Care, among others) and, where gaps exist, new tools and resources should be developed. All healthcare staff (clinical and non-clinical) interacting with asthma patients should be included.

If arduous, education programmes could exacerbate barriers relating to low staffing levels, or emotional barriers, such as burnout and exhaustion. Education and training must therefore be tailored to address the perceptions (e.g., necessity beliefs and concerns) and practicalities influencing motivation, and ability to implement guidelines [20] and be considered part of the solution, but not 'the solution' by itself. A nationally coordinated educational strategy, co-created with patients, and delivered locally, could enable training to reach everyone involved in delivering/receiving asthma care, addressing diverse needs and perspectives.

- *Quality asthma reviews*

To accelerate guideline implementation, targeted approaches to identify and review uncontrolled, high-risk asthma patients (e.g. those over-using SABA) should be considered. Where this has been undrtaken as part of a complex inrtervention in primary care, reductions in SABA over-use, increased uptake of MART, and fewer asthma exacerbations were observed [27]. Recognising that not all patients engage with primary care reviews [28], collaboration across unscheduled care services (out-of-hours GP services, NHS 111/999, and emergency departments), community and on-line pharmacies, and schools would avoid missed opportunities.

Reviews must recognise emotional aspects of SABA over-use and clinicians must be equipped with skills and resources to support patients through transition to AIR. Inhaler switching must be well managed, with shared decision-making, and clinicians should ensure inhaler technique is observed and corrected as necessary. Clinician-initiated follow-up should be universal to ensure treatment adherence and suitability. Embedding prompts, triggers and templates within systems can remind clinicians about guideline recommendations and encourage concordance.

- *Local Guidelines*

National guidelines can reduce unwarranted variation in care across the UK. Previously, having two national asthma guidelines was considered a barrier to implementing a standard approach. It is important to consider that there are >40 locally developed and published asthma guidelines across the UK. Such guidelines allow evidence to be applied within the local context but, unless updated, may act as a barrier to national guideline implementation [29]. Updating and aligning local guidelines with national guidance should be a priority. Financial pressures within the NHS contribute to decisions

being perceived to be driven by cost savings, rather than evidence-based. Uncoordinated or blanket switches may undermine clinical care and patient trust, and must be avoided.

- *Quality Standards and Frameworks: the power of data.*

Quality frameworks enable performance evaluation against quality standards. By describing what 'good care' looks like, they enable both self-reflection and external validation. NICE Asthma Quality Standards include 5 statements describing high-quality care across diagnosis, monitoring, and management; but attainment is not actively monitored, mandated or incentivised.

The Quality and Outcomes Framework (QOF) uses financial incentives to motivate attainment of quality indicators in UK primary care. However, a systematic review found that QOF had limited long-term impact on health outcomes, despite initial improvements [30, 31]. QOF threshold ceilings and disparity between indicators and other quality standards have been cited as barriers to impact [30]. Additionally, QOF has been criticised for focussing on procedural measures rather than clincial outcomes. Financial incentives, such as those previously offered through the Investment and Impact Fund (IIF), helped to drive a switch to lower carbon footprint inhalers in the UK, but had less impact on tackling more complex behaviours, such as SABA over-use [13].

Quality standards/frameworks therefore have a potential role to play in supporting behaviour change. Through goal setting, with linked rewards (and/or consequence for non-attainment), they can create an environment in which expectations are clear and measurable. This, linked with monitoring of prescribing data, may allow health services and clinicians to benchmark current practice and build a case to motivate change. Using data to provide positive feedack could engender optimism and belief that change is attainable. However, failure to identify and address barriers to guideline implementation, preventing attainment of quality standards, could have a negative impact by reducing self-belief and contributing to stress and burn-out.

It is therefore crucial that healthcare providers are equipped with the knowledge, skills, environment and resources ~~tools~~ to enable them to achieve set quality standards. Frameworks should focus on rewarding change that impacts outcomes (e.g. reducing SABA over-use, increasing AIR use) and recognise improvement, without ceiling effects. Whilst electronic prescribing in the UK enables accurate coding and recording of prescriptions (dose, duration, format), dispensing data is not always linked with the individual patient record. Improved data linkage and better standardised coding of athma control and outcomes is needed to ensure interventions are assessed rather than changes in coding practice.

Conclusion

The 2024 BTS, NICE, SIGN asthma guidelines provide an opportunity to transform care and improve outcomes for those with asthma in the UK. The AIR-based treatment paradigm is not new, but will be unfamiliar to many clinicians and patients alike. We must not underestimate the challenges that will be faced to achieve widespread guideline implementation. We have suggested key, theoretically-underpinned considerations that have an evidence-based rationale to support guideline implementation and are designed to support change leaders to ensure that this is the watershed moment that turns the tide on UK asthma outcomes.

Figure Legends

Figure 1. *Proposed initial framework to support BTS, NICE, SIGN guideline implementation in the UK (Created in BioRender. Sykes, D. (2025)).*

CLINICIAN BARRIERS (NCF)	Barriers	Behaviour Change Techniques likeliest to be effective [19]	Pragmatic interpretation of BCTs	Examples from published literature
Necessity for action	- Clinician not convinced of the imperative to change practice in line with guidance. - Lack of awareness about how guideline recommendations relate to intrinsic motivations (e.g. improved patient outcomes, reduced healthcare resource-use, environmental benefits) [32]. - Clinician perceives the status quo to be meeting the needs of their patients (‘*If it isn’t broken don’t fix it’).* - Clinician thinks that ‘my patient is happy with SABA and is well controlled’, so no need to change.	- Persuasive communication - Personalised message - Social processes of encouragement, pressure, and support	- Communicate the guidelines in way that addresses implicit questions: ‘Why do I need to do this to achieve something that is important to me’ and ‘Can I get away without doing it?’ - Communication of relationship between guideline elements (e.g. AIR-based regimens) and internal drivers (e.g. satisfaction obtained through patient benefit, reduced workload, or protecting the environment), using personalised messages.	- Raising patient awareness of guidelines and potential for improved asthma management to stimulate discussion with HCPs [33]. - Tailoring messaging to resonate with the target audience, for example, communicating clinical and environmental co-benefits of improving asthma control and addressing SABA over-use [27].
Concerns about action	- Perceived negative consequences of changing practice to align with guidelines (e.g. concern about a patient coming to harm due to a change in prescribing, or, concern about patient complaints).	- Persuasive communication - Personalised message - Social processes of encouragement, pressure, and support	- Ensuring patients are involved in shared decision making regarding their asthma therapy. - Development of communities of practice, enabling peer support and	- Applying tools such as the Reliver Reliance Test to identify and address patient SABA-over reliance [33]. - Providing support to patients that can be accessed outside the

	- Concern about Patient over-reliance / psychological dependence on SABA-reliever inhalers and perceived difficulty of dealing with it [34]. - Concern about increased workload associated with changing from SABA-containing regimens to AIR-based regimens. - Patient fear about discontinuation of SABA-reliever inhalers [34].		shared learning to support change. - Utilising early adopters of AIR-based regimens in asthma to share their experiences and evidence relating to rewards/consequences.	consultation to explain treatment changes and address patient doubts and concerns [33, 35] - Respiratory champions networks (e.g. Asthma and Lung UK [36]) and coordinated communities of practice (e.g. NHS England and Respiratory Transformation Partnership [24])
CLINICIAN BARRIERS (TDF)	**Barrier**		**Potential Solution**	
Knowledge	Lack of knowledge about: - Guideline content [37]. - Theory and evidence underpinning guideline recommendations [37]. - How to deliver guideline recommended care (procedural knowledge) [38]. - Dangers of using SABA alone and SABA overuse.	- Information provision - Persuasive communication	- National, regional, and local education and knowledge exchange activities and creation of resources that are accessible to all clinicians and healthcare staff involved in caring for people with asthma.	- Nurse educator delivered training sessions across primary care practices to increase knowledge and confidence in asthma care, including patient management, treatment adjustments, diagnosis confirmation, and appropriate referral to secondary care [39].

Skills	- Lack of skills [37] relating to delivery of guideline recommended asthma diagnosis and management among healthcare staff involved in asthma care delivery [40-42]. - Lack of skills to support patients to change their behaviour to those concordant with guideline recommendations [32].	- Information provision - Goal/target specified behaviours - Self-monitoring - Rehearsal of skills - Demonstration of behaviours by others.	- Implementation of a competence framework for clinicians delivering asthma care across the healthcare system, including goal-setting and monitoring. - Accessible education and training for all healthcare staff, to include practical application of skills, embedded within organisational systems and structures. - Specific training for healthcare professionals to support communication with patients to support behaviour change.	- Intervention to improve self-management with patient-centred resources including asthma review templates focusing on individual treatment goals, education, and shared decision-making. Patient education materials to support improved asthma understanding and self-management [43].
Social/professional role and Identity (Self-standards)	- Lack of clarity within the healthcare system and teams about who is responsible for implementing guideline recommended care. - Lack of organisational commitment to support guideline implementation. - Established norms and expectations relating to SABA-use in asthma [44].	- Rewards & Incentives - Goal-setting - Social processes of encouragement and support. - Persuasive communication - Personalised messages	- Clear organisational leadership and commitment to supporting guideline implementation. - Development and deployment of an implementation framework with clear delineation of roles and responsibilities, aligned to quality standards and incentives. - Challenging established behaviours and equipping clinicians with the	- Matrix support facilitating collaboration to support a secondary to primary shift in care. Specific clinical aims include increasing recognition and diagnosis of health problems and improving the appropriateness of referrals to specialist care [45].

			knowledge and skills to establish new norms.	
Beliefs about capabilities (Self-efficacy)	- Lack of perceived ability to transition patients from SABA containing regimens to AIR-based asthma management. - Clinicians (often practice nurses and pharmacists) that deliver chronic asthma care not feeling empowered/supported to lead change in care to align with guideline recommendations. - Lack of confidence undertaking guideline recommended care.	- Social processes of encouragement, pressure and support - Feedback	- Leadership and peer support to empower clinicians and promote self-efficacy. - Utilising data to evidence practice change and promote self-confidence and self-efficacy. - Equipping clinicians and other healthcare staff with the knowledge and skills require to build confidence and optimism that guideline recommended care can be implemented effectively.	- Support through monthly group calls to help clinicians adopt shared decision-making in asthma care [46]. - Data monitoring and feedback to positively reenforce behaviour change and increase self-efficacy (e.g. using publicly available prescribing data to feedback changes in practice level SABA and ICS prescribing over time to clinicians [27]).
Beliefs about consequence (Anticipated outcomes /attitude) Concerns about change	- Lack of awareness of the positive impact of implementing guideline recommendations. - Lack of alignment of national quality and incentive frameworks making rewards associated with guideline implementation unclear.	- Information about outcomes - Persuasive communication - Self-monitoring - Feedback	- Alignment of national and regional quality frameworks and associated incentives to promote behaviours associated with guideline implementation. - Utilising data to evidence practice change and positive impact of guideline implementation.	- Information based interventions identified but no evidence that this included content to support change in outcome expectancies [45].
Motivation and Goals (Intention)	- Lack of measurable goals relating to guideline implementation.	- Persuasive communication - Personalised message - Increasing skills - Goal setting	- Establishing clear, attainable and measurable goals related to guideline implementation.	- No existing intervention identified in the literature that directly addresses motivation or competing

	- Asthma not being prioritised within many local/regional health systems.	- Contracts and rewards/incentives	- Establish guideline implementation and improving asthma outcomes as a national, regional and local priority. - Consider national and/or local incentives that are focussed on positive outcomes related to guideline implementation	priorities as barriers to optimal asthma care. - Locally enhanced services, in which additional funding is agreed at a local level to deliver specific elements of asthma care, have potential to lead to prioritisation of asthma care. - Alignment of national standards (e.g. NHS England Medicines Optimisation Priorities) with guideline recommendations may motivate change.
Memory, attention, and decision processes	- Reverting to established clinical behaviours when under pressure [47]. - Knowledge/skill gaps impacting decision making.	- Panning, implementation - Prompts, triggers and cues - Self-monitoring - Feedback - Time management	- Ensuring asthma reviews are sufficient in length to enable delivery of guideline recommended care. - Utilising prompts and triggers to support guideline implementation (e.g. electronic prescribing system alerts, screensavers etc.). - Equipping clinicians with adequate knowledge and skills to make guideline concordant clinical decisions.	- Available, brief, gold standards for prescribing in asthma [27].

			- Support self-reflection and mentoring to establish new behavioural norms.	
Environmental context and resources (Environmental constraints)	- Poor access to tests required for asthma diagnosis within primary care [41]. - Lack of access to resources to support implementation of guideline recommended care (e.g. asthma action plans, patient facing education materials, etc.) [48]. - Access to SABA-relievers through unscheduled healthcare services, friends/relatives, online/abroad.	- Environmental changes	- Improved access to diagnostic tests through commissioning guidance, locally enhanced services and development of diagnostic pathways. - Increased awareness of and access to national resources (e.g. Asthma + Lung UK Action Plans, NICE implementation resources, etc.) and creation of local resources. - Coordination and information sharing across the healthcare system to avoid inconsistent care between services.	- Matrix - promotes shared care, communication between primary care and specialised care to support patient-centred care in the community [45]. - Pulmonary function test machines donated to clinics with in-person and computer-based training for staff [49].
Social influences (Norms)	- Established norms and expectations relating to SABA-reliever inhaler provision and use. - Media depictions of asthma patients with SABA inhalers [23]. - Lack of professional and social support networks/leadership to support change	- Social process of encouragement, pressure and support - Monitoring - Modelling/demonstration of behaviours by others - Persuasive communication	- Establishing an implementation team to reset social expectations and support change in practice. - Recognise patient expectations and establish a therapeutic relationship to facilitate change. - Utilise alternatives to SABA-reliever inhalers in asthma	- Patient-centred resources including asthma review templates focusing on individual treatment goals, education, and shared decision-making [43]. - Guided counselling, with pharmacists instructed to monitor patients' inhaler technique and highlight any incorrect steps on a label and attach to the

			related communications and media. - Consider patient peer-support from those that successfully manage their asthma with AIR-based regimens. - Establish peer support networks with clear regional/organisational leadership.	patient's controller medication[50].
Emotion	- Clinician stress, burn-out and tiredness related to work-load and professional/social [51].	- Coping skills - Stress management - Social processes of encouragement, pressure and support	- Creating a supportive environment for a knowledgeable, skilled and empowered workforce. - Utilising quality frameworks to provide positive feedback and target support where needed. - Recognition of patient needs and provision of support from clinicians across the healthcare system.	- Monthly group calls to help clinics adopt shared decision-making in asthma care [46].
Action planning	- Lack of clear goals and objectives relating to guideline implementation. - Lack of feedback relating to clinical behaviours/prescribing and clinical outcomes. - Lack of access to FeNO as a tool to feedback impact of	- Goal/target specified behaviour - Planning, implementation - Social processes of encouragement, pressure and support - Monitoring - Rewards - Feedback	- Goal oriented behaviours centred on a clear and coherent quality framework. - Leadership and peer-support (e.g. respiratory champions networks). - Utilising national, regional and local data to provide	- Specific clinical aims include increasing recognition and diagnosis of health problems and improving the appropriateness of referrals to specialist care [45].

	anti-inflammatory inhaler (ICS) use in asthma [41]. - Lack of personalised self-management strategies for patients.		feedback and support goal setting/benchmarking. - Establishing local implementation teams to identify and address local barriers and leverage facilitators of clinical behaviour change. - Local systems to support access to objective tests in asthma, including FeNO to support provision of feedback to patients. - Ensuring that tailored self-management strategies, centred around AIR, are discussed at asthma reviews - Digital applications to support self-management and action plan.	- Toolkit (orders, measurement guidelines, treatment steps, discharge plans) to standardise emergency asthma care and enhance guideline adherence [52].

Table 1. *Identifying barriers and solutions to delivering guideline-recommended care using the principal concepts of the TDF and PaPA.*

Author Contributions

MC, DS, HC and JD planned the manuscript. All authors contributed to conduct of the work and to manuscript drafting and final review.

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