



Research Policy and Practice Brief: Where next for digital tools in asthma care?

Recommendations from the Centre

Given the potential of digital health to support asthma care, we need to increase the pace and scale of research and innovation, including evaluating implementation of evidence-based digital tools into standard clinical practice.

Policy makers and funders

- Call for digital tool developers to involve people with asthma at every stage of the design and creation process with input from healthcare professionals wherever possible.
- Recommend that digital innovations are tested, trialled and optimised within the NHS, at pace to ensure that technology integrates with other aspects of care provision and does not become outdated prior to adoption.
- Strive to develop new ways for developers and innovators to rapidly move through the translation landscape and develop evidence to take their digital tools from pilots to trials and evaluation of implementation.
- Key grant funders should support research which focusses on the integration of digital technologies into routine asthma care without widening digital and health inequalities.
- NHS commissioners should develop incentives to encourage the adoption of evidence-based digital tools by people, carers and clinicians.

Practitioners and commissioners

- Through professional development training and clinical guidelines, ensure healthcare professionals are aware of digital tools that have been evaluated and shown to improve asthma outcomes.
- When recommending digital tools to patients, be aware of potential additional financial costs or access issues.
- Encourage uptake in those who may be digitally marginalised.
- Recommend funded evidence-based digital tools to patients that can complement standard care and support self-management.
- Provide rapid and responsive technology support for those who need help with setting up, using and maintaining digital tools.
- For patients who are expert in their own care, offer alternative methods of regular asthma reviews using telephone or video, with continuity of care conducted by a respiratory skilled practitioner.

People with asthma

- Ask your GP, respiratory nurse or pharmacist about the different digital options available for asthma, that could help you better manage your asthma.
- If you have a preference, ask your practice if a telephone, video or face to face consultation could be appropriate to review your asthma.

Researchers

- Make sure that people with asthma are involved at all stages of research studies, including driving ideas for research.
- Collaborate with digital technology innovators to combine existing and new research and evaluation methods.
- To promote digitally supported self-management, researchers should collaborate with health technology companies and work with health care regulators to support implementation into practice.
- Use the best methods to examine the adoption and implementation of digital tools into routine asthma care, for example ethnography, video observation, population level routine data.
- Design studies to evaluate innovations used in remote consultations.

Asthma affects 5.4 million people in the UK: one in every 12 adults and one in every 11 children¹. Symptoms of asthma can come and go, and triggers vary by individual. People with asthma need to be constantly aware of their triggers and symptoms in order to take preventive measures and respond promptly with a view to reducing the risk of (potentially severe) asthma attacks.

The use of digital innovations in health and wellness is rapidly expanding and are influencing the way health services are delivered. The UK's leading charity for people with respiratory disease, Asthma + Lung UK, has highlighted the enormous potential for digital innovation to improve outcomes for people with asthma (and other respiratory conditions), improve quality of care, and reduce the environmental impact of asthma and its treatments². The Global Initiative for Asthma (GINA) has recognised that the use of digital technology to support people with asthma is rapidly increasing³ and recent evidence from a Cochrane Review suggests that digital interventions may result in more people with asthma taking their medication as recommended, leading to better asthma control and improvements in quality of life⁴.

An impact report concluded that digital tools in healthcare can be used to manage, store and transmit data, support clinical decision making, and enable remote models of care⁵. Many digital tools are available to support novel ways of delivering asthma care. These include, for example, the numerous 'apps' for self-monitoring asthma and supporting adherence. Personalised interventions include electronic inhaler monitors, wearable devices such as smart watches, mobile phone apps, smart peak flow meters and inhalers. Collaborative tools like screen sharing technologies enable patients to work together with their healthcare professionals to agree treatment plans and complete asthma reviews⁶. Online social networks allow people with asthma to share information and advice about their condition in a supportive environment⁷.

The evidence

As well as increasing the likelihood of patients taking their medication as recommended and improving patients' asthma control and self-management, a 2022 Cochrane Review⁴ from the Centre found that digital innovations and tools can also:

- increase patients' quality of life, and
- have the potential to reduce the number of asthma attacks

There are an increasing number of digital innovations which can support a variety of aspects of asthma management, from prevention⁴, diagnosis and treatment⁴, through to assessing inhaler technique⁸, monitoring⁹ and self-management⁶.

Other technologies, which allow safe remote clinical consultations, such as screen-sharing tools, can help people living with asthma and their healthcare professionals to collaborate during an asthma review and share the revision of asthma action plans⁶. They can also offer access to unscheduled clinical advice.

Evidence has emerged over recent years about the potential role of digital tools in supporting when and how people with asthma take their medication, and how people manage their own asthma with advice from and support of their healthcare professional.

Electronic medication monitoring, adherence to medication and reminders

These innovations include electronic inhaler monitors which can record how often and when an inhaler is used and some have added feedback features to give dosing reminders and real-time feedback on inhaler technique⁸, which can increase the effectiveness of the inhaled medications.

Adherence continues to be an issue in asthma because if people do not take their medications as prescribed and according to their asthma action plan then optimal asthma control will not be achieved. Non-adherence is a complex, multifactorial issue and can be intentional or non-intentional¹⁰. That said, a Cochrane Review has demonstrated that those who had an electronic monitor specifically for their adherence were more likely take their medications as recommended⁴.

Text messages can be set up as reminders to support unintentional non-adherence and have also been applied to incentivise individuals to use their medications. This has shown to be successful and acceptable in adolescents¹¹, a group that is particularly hard to reach and one which finds it difficult to regularise its lifestyle.

Asthma control

Text message reminders can help improve asthma control⁴, as can web-based self-management support systems for both adults^{12;13} and children^{14;15}. Trials have shown that mobile phone health applications can improve asthma control, but the clinical effectiveness of individual applications vary and is dependent on the features available within them¹⁶.

Within mobile phone applications, there can be multiple functions to support asthma self-management, including:

- education
- monitoring/electronic diaries for medication, peak flow and symptoms
- action plans (though these are often limited by the need for medical device regulation)

- medication reminders/prompts
- facilitating professional support, including remote communication
- raising patient understanding of asthma control
- decision support for professionals and patients/carers.

When targeting quality of life, separate digital mindfulness applications can be an extra tool for people with mild to moderate asthma¹⁷.

The data from smart devices could be used to develop artificial intelligence to detect early evidence of loss of asthma control and identify when individuals might be heading towards an asthma attack¹⁸. These will require regulatory approval before they can be used in routine clinical practice.

Self-management

During the COVID-19 pandemic, clinical services for people with asthma, including annual reviews, were frequently delivered remotely. Research suggests that these remote telephone or video consultations can be as effective as face-to-face consultations and are safe ways to deliver care for many people with asthma¹⁹. Telephone reviews can increase asthma review rates²⁰, and delivering asthma remote reviews¹⁹ including completing asthma action plans was feasible⁶. Many patients found these equally acceptable as in-person consultations, and often gave more convenient access to services¹⁹.

Online social networks could also support asthma self-management. Studies have found that online social networks focused on a shared condition were beneficial to a wide range of individuals from adolescents²¹ to older patients²². They gave participants added information, motivation and access to supportive groups who understood the impact the illness has on their day to day lives²², which could relieve anxiety. Another study found that ‘superusers’ (knowledgeable people who are regularly active online) helped to spread helpful information and provide support, binding together and maintaining the online community⁷.

Moving forward, while the use of digital tools to support asthma self-management continues to evolve²³, artificial intelligence algorithms guided by clinicians could be developed to help to further personalise asthma management, with asthma action plans²⁴.

Acceptance by patients and healthcare professionals

Overall, a Cochrane Review of publications showed that patients, caregivers and health professionals had positive attitudes towards digital technologies for asthma, such as text message reminders, web-based tools and smart inhalers⁴. Caregivers of children were highly satisfied and found the tools helpful in improving their child’s asthma control.

Conclusion

In summary, there is considerable potential for digital tools to improve people’s medication adherence, their asthma management and control and quality of life. Whilst uncertainties remain, careful implementation of evidence-based approaches will deliver benefits for patients. However, it is fundamental to reflect the needs of patients, carers and healthcare providers and align these with organizational incentives. Digital tools in asthma care need continuing research investment to understand the potential they hold for routine care, while keeping in mind patients’ preferences, digital literacy skills and health inequalities. Further research is needed to understand how implementation and adoption of digital tools at scale can be enabled. Researchers and regulators also need to adapt their approaches and study designs so these remain agile and appropriate for an ecosystem in which technology and algorithms are evolving at pace.

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