



Topic Exploration Report ¹

Digital self-monitoring tools for people with asthma

What is a Topic Exploration Report?

Topic Exploration Reports are not health technology assessments. These reports provide a high-level briefing on new topics submitted to Health Technology Wales and are not based on exhaustive or systematic literature searches. Instead, they rely on a focussed scan of key resources.

What evidence is used in a Topic Exploration Report?

Priority is given to summarising the most relevant or useful evidence, rather than covering all possible evidence. Information reported is typically based on abstracts and study authors' own conclusions, rather than detailed scrutiny of full texts.

What are the aims of a Topic Exploration Report?

Topic Exploration Reports offer an overview of the available evidence on a topic and aim to highlight any uncertainties or gaps in the evidence. These reports outline the quantity and type of evidence found, but no critical appraisal or formal evidence synthesis is conducted.

How should a Topic Exploration Report be used?

Topic Exploration Reports can be used to indicate what evidence may be available for a topic, and do not provide definitive guidance on how a technology should be used. The evidence presented within the reports should be interpreted with caution.

¹ [Cyfieithu dogfennau HTW wedi'u cyhoeddi o'r Saesneg i'r Gymraeg](#)
[Translation of published technical HTW documents from English into Welsh](#)

Topic exploration report number	TER662
Topic	Digital self-monitoring tools for people with asthma
Summary findings	Asthma is a chronic respiratory condition and symptoms can include wheezing, breathlessness, tightness in the chest and coughing. Digital tools for the self-monitoring of asthma may help people manage their symptoms more effectively. Several systematic reviews and individual studies, including randomised controlled trials (RCTs) were identified. Where results are reported, the use of digital tools generally improved outcomes including asthma control and medication adherence. The digital interventions identified include a wide range of varying components (e.g. mode of delivery, education, symptom and medication tracking, the degree of health care professional involvement, modes of communication). This creates challenges in synthesising results from across studies evaluating similar but distinct interventions. Furthermore, digital tools can be used with connected devices (e.g. spirometers) and it is unclear what effect the use of these devices used in conjunction with the digital tools has on patient outcomes.

Introduction and aims

Asthma is a chronic respiratory condition and is caused by inflammation of the breathing tubes that carry air in and out of the lungs (NHS Wales 2024). Symptoms can include wheezing, breathlessness, tightness in the chest and coughing. The standard treatment for asthma largely includes inhalers (reliever inhalers quickly relieve symptoms for a short time and preventer inhalers are used daily to prevent symptoms occurring), but other medications may also be prescribed, alongside documented personalised action plans and education to help people manage their symptoms. In rare cases injections or surgery may be needed (NHS Wales 2024). Poorly controlled asthma, where people experience frequent symptoms that interfere with everyday life, can have a significant impact on quality of life. In Wales approximately 590,000 people are receiving treatment (Asthma + Lung UK 2026).

Digital tools have the potential to help people with chronic conditions, including asthma, manage and monitor their symptoms. Digital tools are often accessed through smart-phone applications, but can be web-based, and may consist of educational components and symptom and medication trackers. They may be used in conjunction with other devices (e.g. spirometers to measure lung function) and can facilitate remote management by health care professionals through the viewing of patient data.

AsthmaTuner is an example of a class IIb certified medical device software application for self-monitoring asthma in adults and children over 6 years of age. It consists of a smart-phone patient-facing application, a web-based interface for health care professionals (Careportal) and works with a Bluetooth spirometer for lung function assessment. Treatment recommendations are generated based on lung function, symptoms and healthcare professional prescribed treatment plans.

Health Technology Wales (HTW) researchers searched for evidence on digital tools for the self-monitoring of asthma.

Evidence overview

HTW Topic Exploration Reports

A similar topic was the subject of a previous HTW topic exploration report (TER051), which examined the evidence of myAsthma application, specifically, for the self-management of asthma. No published evidence evaluating myAsthma was identified, but one ongoing UK trial was found. The clinical trials record ([NCT03511482](#)) states that this trial was withdrawn due to lack of funding.

Guidance

The National Institute for Health and Care Excellence (NICE) published a guideline for asthma diagnosis, monitoring and chronic asthma management (NICE 2024), which was collaboratively developed by the British Thoracic Society (BTS), NICE and the Scottish Intercollegiate Guidelines Network. This guideline provides recommendations regarding self-management, which include offering a documented personalised action plan and education, including explanation of potential triggers. Strategies to aid the implementation of self-management programmes are outlined, including IT-based education and monitoring, but there is no further mention of digital tools. The NICE quality standard (NICE 2018) states that a documented personalised action plan should be agreed and offered to people aged five years and over and that people with asthma should have their asthma control monitored at every asthma review.

NICE has published an early-use assessment of digital technologies to support self-management of asthma (HTG778; NICE 2026), which identified seven technologies that can be

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used in the NHS during the evidence generation period as options to support self-management of asthma. These are: Astmahub; Astmahub for parents; digital health passport; Luscii; myAsthma; Respiratory Disease Management Platform (RDMP); and Smart Asthma. Also identified were AsthmaTuner (MediTuner) and JOE Digital Therapeutic, which are reported as planned for release in the NHS in 2026. Evidence from 20 studies reporting quantitative data on clinical effectiveness were reviewed. These included retrospective and prospective cohort studies, a pilot cross-over RCT and a service evaluation. Three studies were conducted in the UK, including one in Wales (Barry et al. 2025). NICE stated that the evidence on the clinical effectiveness of digital technologies to support self-management of asthma is limited, but studies suggest that the technologies may help to improve asthma control in the short term. NICE also highlighted the variation of the technologies in terms of target population, mode of delivery, components and functionality offered, and the frequency and level of support provided by healthcare professionals.

Health Technology Assessments

The Health Information and Quality Authority (HIQA) published a health technology assessment (HTA) of chronic disease self-management support interventions for adults over 18 years of age, which included a section on asthma (HIQA 2015). The HTA identified 12 systematic reviews, however the majority of these covered non-digital interventions.

Systematic reviews

Several systematic reviews were identified.

Bell et al. (2026) assessed the impact of pharmacist-led digital interventions on medication adherence and asthma control. The review identified nine studies, however only one evaluated a self-management application with educational, peer and pharmacist chat features. The remaining utilised telemedicine (n=5), educational videos (n=2) and data mining software (n=1).

Wellmann et al. (2024) examined the effectiveness of home monitoring systems in managing severe asthma. The authors identified 14 studies, of which two were conducted in the UK. The studies evaluated a range of interventions utilising a variety of components. These included mobile applications, web-based portals, with and without separate devices (e.g. portable spirometers, E-inhalation), alongside phone calls, SMS and e-mail communication methods. The results show that telemedicine using such tools positively impacts asthma control, self-management and quality of life. The authors note that digital spirometry shows strong agreement with clinic spirometry.

Quach et al. (2023) reviewed the features of mobile health applications for self-management in chronic lung diseases and identified seven publications for asthma. Common features included symptom tracking, medication reminders, education and clinical support.

Ramsey et al. (2020) reviewed randomised controlled trials (RCTs) of digital interventions for paediatric asthma management. Fifteen trials were identified; 87% showed improved adherence to medication and 53% improved health outcomes. Most interventions were three to six months in length and delivered via automated personalised texts, mobile health applications or websites.

McLean et al. (2016) reviewed interactive digital interventions for adults 16 years of age or over. Five trials were identified (total n = 592), of which three were included in a meta-analysis. No significant differences and extremely high heterogeneity were reported for asthma quality of life and asthma control. Removing one study, which aimed specifically to reduce the total dose of oral prednisolone without worsening control, from the meta-analysis reduced heterogeneity,

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with the meta-analysis of the remaining two studies reporting significant improvement in quality of life and asthma control. No evidence of harm was reported.

Morrison et al. (2014) identified ten systematic reviews outlining 19 clinical trials evaluating digital self-management support for adults and children with asthma. Intervention durations varied from single use to 12 months and incorporated varying degrees of healthcare professional involvement. Four RCTs evaluated use in adults, but none in those over 65 years of age. The reviews reported some evidence of improvement in groups using digital interventions for self-care, quality of life and medication use. No differences were reported for symptoms, school absence, lung function or health service use.

Marcano Belisario et al. (2013) reported a Cochrane systematic review of smartphone and tablet self-management apps for asthma. Included were RCTs comparing digital interventions to standard self-management interventions delivered via traditional methods (e.g. paper-based asthma diaries). Two RCTs (total n=408) were identified.

Individual studies

Silberman et al. (2025) reported a RCT evaluating a digital asthma self-management program compared to usual care in the United States. The RCT recruited 901 participants, and the main outcome measure was change in asthma control. Analysis including participants with uncontrolled asthma (n = 550), showed improvement after 12 months compared to the control group (adjusted difference, 2.8 [95% CI, 2.0-3.6] points; $P < .001$).

Kandola et al. (2024) reported an attention-placebo RCT evaluating 'juli', a commercially available smartphone self-management platform compared to a version of the application with limited functionality. The RCT was conducted in the UK and recruited 411 participants over the age of 18; 37% of participants engaged with the application over the 8 week course of the intervention. The per-protocol analysis reported that participants using juli had greater odds of achieving or exceeding the minimal clinically important difference at 8 weeks (adjusted odds ratio 2.38, 95% CI 1.20 to 4.70; $p = 0.01$).

A feasibility RCT was conducted evaluating the digital self-management tool 'My Breathing Matters' in seven GP practices in the UK (Ainsworth et al. 2019). The RCT recruited primary care patients with asthma aged 18 years of age or over. The tool includes tailored support for the pharmacological and non-pharmacological management of asthma symptoms. The study demonstrated that a definitive RCT is possible and is required to determine the clinical and cost-effectiveness of the intervention. No publications reporting a follow on RCT were identified.

Ljungberg et al. (2019) reported an evaluation of the AsthmaTuner tool in a multi-centre physician-blinded crossover RCT. AsthmaTuner was compared to conventional treatment using a personalised printed treatment plan. Participants crossed over to the other trial group after eight weeks, plus two weeks wash out period. Seventy-seven adults and children were recruited. The asthma control score was significantly improved in the intervention group compared to control (mean difference 0.70, 95% CI 0.06-1.34; $p = 0.03$). Adherence to asthma medication was only significantly improved in those participants recruited from primary care who used AsthmaTuner once a week or more on average (mean difference 0.45, 95% CI 0.13-0.77; $p = 0.01$).

Economic evidence

The NICE early-use assessment reported health economic evidence in HTG776. Four economic evaluations specific to the identified technologies were included, as well as an additional five economic evaluations and the economic model developed for NICE guidance NG245. Due to the lack of data on clinical outcomes the model could not be fully developed and was instead used

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to explore different value propositions. The results suggested that the technologies could be cost-effective if they could improve asthma control. However, the assessment notes that the inputs were highly uncertain.

One study included in the Bell et al. (2026) systematic review assessed economic outcomes, but no further information was provided in the abstract.

Areas of uncertainty

Digital interventions for the self-monitoring/self-management of asthma include a wide range of varying components (e.g. mode of delivery, education, symptom and medication tracking, the degree of health care professional involvement, modes of communication). This creates challenges in synthesising results from across studies evaluating similar but distinct interventions.

A number of systematic reviews and individual studies were identified, including RCTs. The eligibility criteria of an Evidence Appraisal Report should clearly delineate inclusion and exclusion criteria, e.g. the degree of health care professional involvement, and the purpose of the intervention to be mainly telemedicine, purely self-monitoring or wider self-management.

Tools were identified for use both in adult and paediatric populations.

It is unclear how many studies included in the systematic reviews were conducted in the UK.

Some of the digital tools identified are used in conjunction with connected devices, e.g. remote spirometry. It is unclear what effect the use of these devices used in conjunction with the digital tools has on patient outcomes.

Literature search results

Health technology assessments and guidance

Health Technology Wales. (2019). myAsthma for the management of asthma in adults and adolescents. Topic Exploration Report. Available at: <https://healthtechnology.wales/reports-guidance/myasthma-app/>

NICE. (2024). Asthma: diagnosis, monitoring and chronic asthma management (BTS, NICE, SIGN). NICE guideline NG245. National Institute for Health and Care Excellence. Available at: <https://www.nice.org.uk/guidance/ng245>

NICE. (2018). Asthma. Quality standard. QS25. National Institute for Health and Care Excellence. Available at: <https://www.nice.org.uk/guidance/qs25>

NICE. (2026). Digital technologies to support self-management of asthma: early-use assessment. HealthTech guidance. HTG778. National Institute for Health and Care Excellence. Available at: <https://www.nice.org.uk/guidance/htg778>

SIGN. (2025). SIGN158 British guideline on the management of asthma. SIGN Evidence-based clinical guidelines. Scottish Intercollegiate Guidelines Network. Available at: <https://www.sign.ac.uk/media/2342/sign-158-2024-british-guideline-on-the-management-of-asthma-may-2025.pdf>

This refers to the collaborative guideline developed jointly by the BTS, NICE and SIGN (NG245 above)

Evidence reviews and economic evaluations

Bell M, Burns B, King A, et al. (2026). Impact of pharmacist-led digital interventions on asthma outcomes: A systematic review. J Am Pharm Assoc. 66(3): 103054. <https://doi.org/10.1016/j.japh.2026.103054>

Quach S, Michaelchuk W, Benoit A, et al. (2023). Mobile health applications for self-management in chronic lung disease: a systematic review. Netw Model Anal Health Inform Bioinform. 12(1): 25. <https://doi.org/10.1007/s13721-023-00419-0>

Ramsey RR, Plevinsky JM, Kollin SR, et al. (2020). Systematic Review of Digital Interventions for Pediatric Asthma Management. J Allergy Clin Immunol Pract. 8(4): 1284–93. <https://doi.org/10.1016/j.jaip.2019.12.013>

McLean G, Murray E, Band R, et al. (2016). Interactive digital interventions to promote self-management in adults with asthma: systematic review and meta-analysis. BMC Pulm Med. 16(1): 83. <https://doi.org/10.1186/s12890-016-0248-7>

Morrison D, Wyke S, Agur K, et al. (2014). Digital asthma self-management interventions: a systematic review. J Med Internet Res. 16(2): e51. <https://doi.org/10.2196/jmir.2814>

Marcano Belisario JS, Huckvale K, Greenfield G, et al. (2013). Smartphone and tablet self management apps for asthma. Cochrane Database Syst Rev. (11). <https://doi.org/10.1002/14651858.CD010013.pub2>

Wellmann N, Marc MS, Stoicescu ER, et al. (2024). Enhancing Adult Asthma Management: A Review on the Utility of Remote Home Spirometry and Mobile Applications. J Pers Med. 14(8). <https://doi.org/10.3390/jpm14080852>

Individual studies

Ainsworth B, Greenwell K, Stuart B, et al. (2019). Feasibility trial of a digital self-management intervention 'My Breathing Matters' to improve asthma-related quality of life for UK primary care patients with asthma. BMJ Open. 9(11): e032465. doi: 10.1136/bmjopen-2019-032465

Silberman J, Sarlati S, Harris B, et al. (2025). A Digital Asthma Self-Management Program for Adults: A Randomized Clinical Trial. JAMA Netw Open. 8(7): e2521438. https://doi.org/10.1001/jamanetworkopen.2025.21438 Kandola A, Edwards K, Straatman J, et al. (2024). Digital Self-Management Platform for Adult Asthma: Randomized Attention-Placebo Controlled Trial. J Med Internet Res. 26: e50855. https://doi.org/10.2196/50855	
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Ljungberg H, Carleborg A, Gerber H, et al. (2019). Clinical effect on uncontrolled asthma using a novel digital automated self-management solution: a physician-blinded randomised controlled crossover trial. Eur Respir J. 54(5). https://doi.org/10.1183/13993003.00983-2019	
Background information	
Asthma + Lung UK. (2026). Wales. Available at: https://www.asthmaandlung.org.uk/wales [Accessed. 250626] NHS Wales. (2024). Asthma. Health A-Z. NHS 111 Wales. Available at: https://111.wales.nhs.uk/asthma/#Overview [Accessed.250626]	

Date of search	26/06/26 and 3/07/26
Concepts used	Asthma; digital; self-management

Proposed research question and evidence selection criteria (if selected)

Proposed Research question	What is the clinical and cost-effectiveness of digital self-monitoring tools for asthma?
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	Inclusion criteria	Exclusion criteria
Population	Adults with asthma (18 years of age or over)	Paediatric populations
Intervention	Digital self-monitoring/self-management tools. The digital tools may be used in conjunction with devices to monitor symptoms (e.g. spirometers).	Interventions where the main active component or majority of components are delivered 1-1 by health professionals via telehealth (remotely), e.g. the phone or virtually
Comparison/Comparators	Standard care. For example, paper based personalised treatment plans, in person clinician monitoring	
Outcome measures	Asthma control Medication use Morbidity/symptoms Health related QoL Resource use Economic outcomes	

Proposed speciality	Respiratory system
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