Asthma and Biologics

Report for the Rapid Uptake Group

OXFORD ACADEMIC HEALTH SCIENCE NETWORK

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1.0 EXECUTIVE SUMMARY

1.1 This is a high-level summary report highlighting barriers and enablers to the uptake of asthma biologics commissioned by NHS England as part of the Rapid Uptake Programme

1.2 A wide search of databases, as well as grey literature, was performed to find evidence of the above.

1.3 The conclusions are:

Incidence and prevalence of difficult and severe asthma[7]

Approximately I million people have difficult asthma in the UK and about 200,000 people have severe asthma (around 17% and 1%-3.6% of the asthma population respectively)

Inequalities[1,8-28]

Asthma is diagnosed more frequently in the younger adult population (aged 25-34) who also tend to have more episodes of oral and inhaled corticosteroid treatment.

The proportion of children aged 0-15 with diagnosed asthma has decreased by ten per cent between 2001/02 to 2018.

Women make up the majority of people with difficult asthma.

The incidence of asthma is greater in ethnic minority groups, with second and third generation descendants of South Asian and Afro-Caribbean migrants experiencing a greater incidence.

The covid-19 pandemic has had a disproportionate effect on infection and mortality rates in ethnic minority communities. Evidence has revealed that socio-economic inequalities and co-morbidities have played a key role.

Many vulnerable groups including people with physical disabilities, the homeless, people with low incomes, low health literacy and high levels of deprivation, as well as undocumented migrants, asylum seekers, sex workers, people who misuse substances and travellers experience a higher incidence and prevalence of asthma

Access to care[1,7,9,29-31]

Access to care is influenced by a number of factors including:

- *Having asthma*

- *Awareness of the management of asthma by patient and clinicians*
- *Eligibility for treatment*
- *Receiving the optimal treatment*
- *Compliance with treatment*

The most appropriate care for people with severe asthma is a holistic assessment and support by a multi-disciplinary team based in secondary or tertiary care which provides an accurate diagnosis and assessment for access to biologic treatments

Around 160,000 people with asthma who are taking high-dose inhaled steroids are not being referred to specialist care and clinicians are not clear when to refer to these services

The service specification of severe asthma in England is insufficient to meet the needs of people who require specialist care.

Patient experience[30-40]

Asthma biologics treatment has been found to reduce asthma symptoms and attacks, enhance the quality of life and have an impact on steroid usage.

There is some evidence that tolerance and adherence to biologics is maintained by patients over the long-term.

Shared decision making/self-management[7,41-49]

Shared decision-making involves discussion between the patient and clinician about what decision needs to be made; providing the information about the health condition and treatment options; and helping patients to articulate the value they place on the benefits and harms of each option.

There is strong evidence that compared to usual care decision aids help people to have a more accurate understanding of the benefits and harms of treatment options. However, it is less clear what the outcomes are for patients with different levels of health literacy and if patients continue with their chosen option.

There are three key questions that patients can ask about their options for treatment which are:
- *What are my options?*
- *What are the possible benefits and risks of these options?*
- *How likely are the benefits and risks of each option to occur?*

Other factors at play in decision-making include:
- *whether a patient wishes to participate in decision-making,*
- *the competencies of the clinician*
- *conveying risk*
- *availability of decision-making aids*

- *the time spent in discussion and deliberation*
- *the outcomes of the decisions, e.g. quality of decision, the extent to which treatment goals of the patient are met, regret at decisions made and the care that patients experience*

There are shared decision guides published by NICE and NHSE.

Digital apps and online interactive tools have been shown to aid shared decision-making for people with asthma.

Patient Reported Outcome Measures (PROMs)[50-57]

There are many asthma specific PROMS available.

For severe asthma, the Asthma Quality of Life Questionnaire (AQLQ) has been used to demonstrate a long-term increase in Quality of Life in people with moderate to severe asthma taking omalizumab and a severe asthma questionnaire (SAQ) has been developed to gain an insight into patients' perceptions of the impact of severe asthma and treatment on their lives.

However, there are gaps in what asthma PROMS tools can measure, for example, no single PROM exists to measure initiation, implementation and persistence with asthma inhaled medication nor is it known how easy it is to incorporate the use of PROMs for the care of children in clinical practice

A systematic review for the evaluation of outcome measures including PROMs for the assessment of asthma control is underway for adults and children

2.0 BACKGROUND

2.1 This is a high-level summary report highlighting barriers and enablers to the uptake of asthma biologics commissioned by NHS England (NHSE) as part of the Rapid Uptake Programme

2.2 The report includes:

- populations that are more affected by severe asthma
- Access to biologics by these population groups
- Access to services by at-risk groups (i.e. those with protected characteristics and other vulnerable groups
- Patient engagement/ patient activation - Are there any shared decision-making tools / self-management tools that have had an impact
- Patient experience – what are the outcomes experienced by patients? Are there any issues around specific groups, (i.e. inequalities, access, etc.)
- Patient Reported Outcome Measures

3.0 DEFINITIONS OF DIFFICULT AND SEVERE ASTHMA AND BIOLOGIC THERAPIES

Difficult and severe asthma

3.1 The definitions of severe and difficult asthma are challenging as asthma is a heterogeneous condition and the experience of living with severe and difficult asthma is very different from the majority living with asthma[1].

3.2 The data on people with difficult and severe asthma is often described through the treatment they are being prescribed, i.e. oral or inhaled corticosteroids[1].

3.3 A definition of difficult asthma – *'people who have severe symptoms. because they do not take sufficient preventer (steroid) treatment and people who struggle with co-morbidities that compound the severity of their symptoms and make them more difficult to manage'* [1].

3.4 A definition of severe asthma – *'people who have severe symptoms despite taking optimal treatment and effectively managing co-morbidities'* [1] .

Biologic therapies

3.5 Biologics are monoclonal antibodies - a type of biologic drug that binds to specific antigens which are foreign to the body and provoke an immune response. Monoclonal antibodies act to reduce inflammation of the lungs which occurs in asthma.

Biologics approved by the National Institute for Health and Care Excellence (NICE)

3.6 There are currently five biologic treatments for the management of severe and difficult asthma

3.7 *Omalizumab* - this is for treating people with severe persistent allergic asthma aged 6 and over. It is given subcutaneously every 2 or 4 weeks[2].

3.8 *Mepolizumab* - this is for treating for treating severe refractory eosinophilic asthma in adults. It is administered subcutaneously every 4 weeks [3].

3.9 *Reslizumab* -this is for treating people with severe eosinophilic asthma and is administered intravenously every 4 weeks[4] .

3.10 *Benralizumab* -this is for treating adults with severe eosinophilic asthma. It is administered subcutaneously every 4 weeks for three doses and then every 8 weeks[5].

3.11 *Dupilumab* This for treating severe asthma. This technology assessment guidance is in development by the National Institute for Health and Care Excellence[6].

3.12 These therapies are delivered by an injection and are generally well tolerated but can be associated with side effects such as injection site irritation and a flu-like reaction. The four biologics that have been approved by NICE can be administered at home as well as the clinic setting.

4.0 METHODOLOGY

4.1 A search was undertaken of the literature for papers, reviews etc, written in English dating from 2013 and 2021. Papers from other countries have been quoted where there was no UK literature available. A total of 200 papers and other sources of grey literature (e.g., voluntary sector websites, conference extracts etc.) were reviewed.

4.2 The search focussed on issues around inequalities (see appendix 1), patient experience, Patient Reported Outcomes Measures, shared decision-making tools, aids or techniques or self-management for people with severe or difficult asthma. Information on people with asthma was also included where there was no information for people with severe or difficult asthma.

4.3 Databases searched included: Cochrane Library of Systematic Reviews, Medline, Embase, Emcare, BNI, PubMed, CINAHL, NHS England, National Institute for Health and Care Excellence (NICE), NHS Digital, Social Care Institute for Excellence Online and other grey literature including Asthma UK, National Center for Biotechnology Information, the Kings Fund and Friends, Families and Travellers.

5.0 INCIDENCE AND PREVALENCE OF DIFFICULT AND SEVERE ASTHMA

5.1 There are around 5.4 million people with asthma in the UK[7].

5.2 Around 160,000 people receive an asthma diagnosis every year in the UK[7].

5.3 Approximately 1 million people have difficult asthma – about 17% of the asthma population[7].

5.4 The severe asthma population is approximately 200, 000 (between 1%-3.6% of the asthma population[7].

5.6 England has 5.1% people - as a percentage of the asthma population - on high dose ICS (high-dose inhaled corticosteroids) compared to the UK (5.7%) and 3.8% on OCS (three or more courses of oral corticosteroids in the previous 12 months) compared with the UK (3.4%)[1].

Conclusions:
Approximately I million people have difficult asthma in the UK and about 200,000 people have severe asthma (around 17% and 1%-3.6% of the asthma population respectively)

6.0 INEQUALITIES

6.0.1 Most of the information in inequalities covers asthma generally unless indicated. Evidence was limited on severe or difficult asthma.

For protected characteristics groups

6.1 Age and Sex

6.1.2 The Health Survey for England 2018(Asthma) shows that a higher proportion of younger adults reported diagnosed asthma (21% of adults aged 25 to 34) than those in older age groups (13% of adults aged 75 and over)[8].

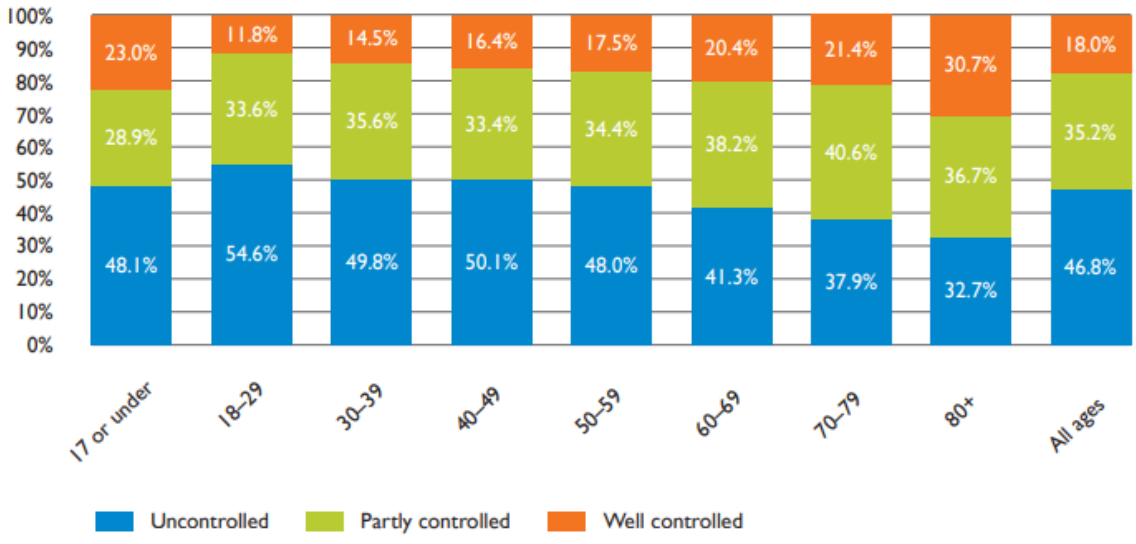
6.1.3 A higher percentage of people (39.4%) aged 35-44 are on three or more OCS compared to the general asthma population (28%). A similar percentage (36.2%) in the same age group are on ICS. There is little difference between males and females in this group when the data are broken down further[1].

6.1.4 Women make up the majority of people with severe and difficult asthma (70.6% on three or more courses of OCS) and 62.6% of those on high dose of ICS[1].

6.1.5 In 2018 more boys than girls had diagnosed asthma (12% and 7% respectively). Older children were more likely than younger children to have diagnosed asthma (16% of children aged 10 to 12 and 14% of children aged 13 to 15, compared with 7% of children aged 0 to 9)[8].

6.1.6 The proportion of children aged 0 to 15 with diagnosed asthma decreased by 10 percentage points from 20% in 2001/02 to 10% in 2018[8].

6.1.7 The Asthma UK Annual Asthma Survey 2019 reports that 18-29 year olds had the highest proportion of uncontrolled asthma[9]



From Asthma UK, The Annual Asthma Survey, 2019[9]

6.2 Ethnic minorities

6.2.1 Incidence rates of asthma are 36% higher in the most deprived communities than in the least deprived[10].

6.2.2 People from ethnic minority groups born outside the UK have a lower incidence of asthma (compared to their white counterparts) than those born in the UK, suggesting that second and third generation descendants of South Asian and African-Caribbean migrants are experiencing a higher incidence of asthma[10].

6.2.3 There is a higher incidence of asthma in the North West of England and higher prevalence of difficult and severe in the North East of England[10] .

6.2.4 Both points 6.2.2 and 6.2.3 suggest that asthma incidence is a complex area.

6.2.5 A report from the Kings Fund has found that the covid-19 pandemic has had a disproportionate effect on infection and mortality rates in ethnic minority communities (South Asian, South East Asian and African-Caribbean). Evidence has revealed that socio-economic inequalities and co-morbidities have played a key role[11].

6.3 Pregnant women

6.3.1 A systematic review of women's experiences of asthma care, its management and education, during pregnancy found that personalised care provided beneficial outcomes, e.g., maintaining good asthma control during pregnancy. However, as only five papers were considered eligible for the study further research is necessary to build an evidence base to establish the efficacy of such interventions[12].

6.4 People with disabilities

6.4.1 There was no evidence found in the literature search on people with physical disabilities, learning disabilities and hidden disabilities who have asthma in the UK.

6.4.2 A US study has shown that people with physical disabilities have higher rates of asthma (13.8% vs 5.9%) compared to able-bodied people[13].

Other groups facing inequalities

6.5 Homeless

6.5.1 An audit of people experiencing homelessness in London found that 20% of them had asthma[14].

6.5.2 Homeless Link, a charity working with the homeless, has reported that almost all long-term physical health problems were more prevalent in the homeless population compared to the general population[15].

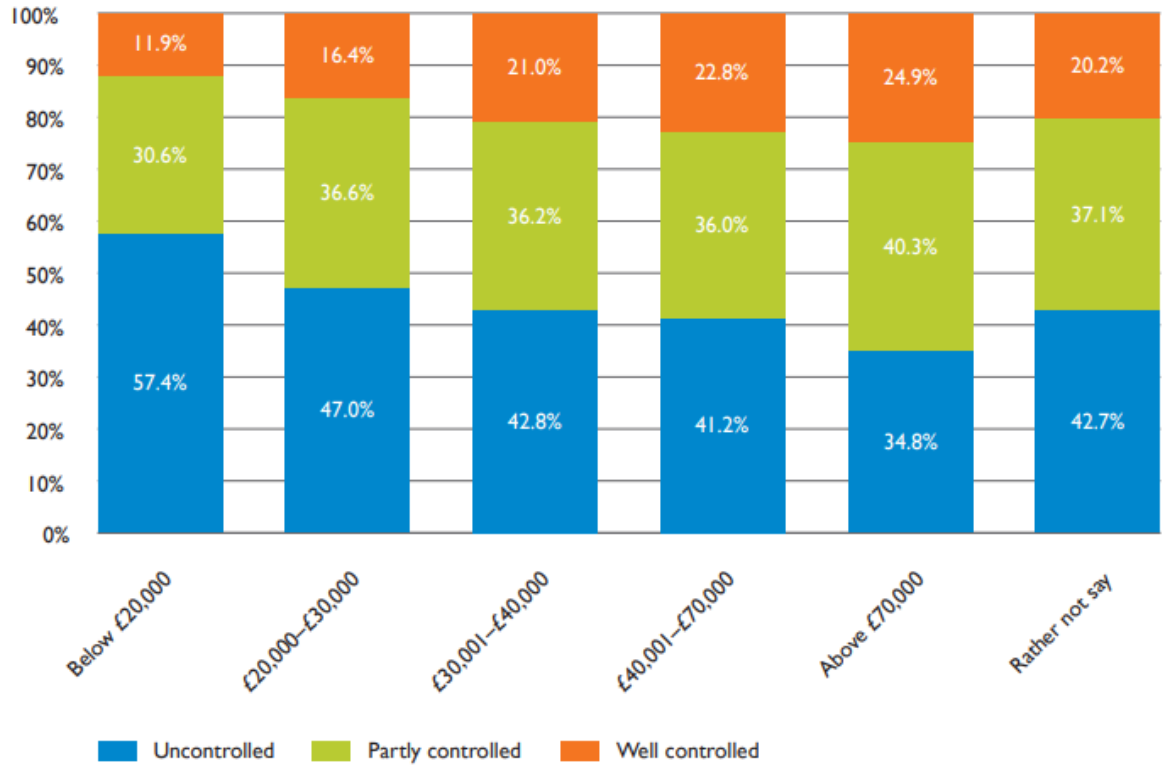
6.5.3 A French study showed that the prevalence of asthma-like symptoms in homeless children was 19.9%. Although 85.4% had used healthcare services the prevalence was lower than the general child population and barriers to accessing healthcare included having lived in France for less than 49 months, having poor French language and poor housing conditions[16].

6.6 People/families living on a low income

6.6.1 The proportion of adults with asthma varies by income, especially among women. In England those in the lowest income households are more likely to have asthma (10% of men and 15% of women) than those in the highest income households (9% of men and 8% of women)[8].

6.6.2 Among women with asthma, those in lower-income households, those reporting any exposure to other people's smoke, and those with some reported health problems are more likely to have uncontrolled asthma, after other factors are accounted for[8].

6.6.3 The Asthma UK Annual Asthma Survey 2019 found that the lower the household income, the poorer the level of control of asthma and therefore the greater the likelihood of more asthma attacks[9].



From Asthma UK, The Annual Asthma Survey, 2019 [9]

6.7 Poor literacy/Health literacy

6.7.1 Asthma treatment is mostly centred on self-management to prevent exacerbation of symptoms. Effective self-management requires personal engagement in health, however people with asthma tend to have low levels of engagement in managing their condition. Potential reasons for low levels of engagement include low health literacy and language barriers. This leads to lower use of preventative services and less effective communication with clinicians and therefore poor adherence to treatment[10].

6.7.2 Low health literacy is associated with social determinants such as education, poverty and employment

6.8 Social deprivation

6.8.1 In 2012 incidence rates of asthma were 36% higher in the most deprived groups compared to the least deprived[17].

6.8.2 Socially deprived groups are disproportionally exposed to causes of asthma and triggers of asthma attacks[10].

6.8.3 People living with asthma living in more deprived CCG (Clinical Commissioning Group) areas are more likely to go to hospital for their asthma, however the picture is not consistent suggesting that local solutions have addressed this issue, for example Hull which has a high level of deprivation does not have high rates of emergency asthma admissions[10].

6.8.4 Food insecurity is positively associated with asthma in the United States[18].

6.9 Young people

6.9.1 When transitioning from children's to adult services adolescents and young adults with asthma are faced with a number of challenges including significant changes in physical and mental health and may have developmental and psychosocial issues. Clinicians face the challenge of assessing readiness for transition and managing the complications that occur during this time, e.g. smoking, drug use and mental health conditions[19].

6.10 Looked after children

6.10.1 A study comparing the rates of chronic illness in looked-after children compared to those living in their own homes showed lower rates of asthma in looked after children in contrast to other conditions e.g. epilepsy. The authors suggest that this is probably related to lack of recognition of unmet need by clinicians and carers failing to identify other illnesses[20].

6.11 Carers

6.11.1 A review of the literature on the effects of caregiver depression on childhood asthma in the USA showed that treating caregiver depression improved child stress and depression.

Therefore, there is a strong rationale for treating depressed caregivers of children with asthma as part of the treatment plan to improve childhood asthma control[21].

6.12 Undocumented Migrants and Asylum Seekers and other groups

6.12.1 A Doctors of the world UK document [22] reporting on attendees, including undocumented migrants, asylum seekers, homeless people, drug users and sex workers at their clinics highlights the multiple barriers affecting their access to healthcare such as lack of a permanent address, poor living and working conditions, social isolation, uncertain immigration status, exploitation, language difficulties, poverty and hunger.

The majority of the patients treated were migrants. Despite living in the UK for six years on average, they often had difficulty registering with a GP or accessing secondary care because they lacked understanding of the healthcare system, experienced language barriers, or were refused because of a lack of documentation or misapplication of the law.

Many of the patients were found to be in urgent need of healthcare with over one quarter of medical conditions recorded being acute (26%), and half had a long-term, chronic condition.

6.13 Travellers

6.13.1 There are 300,000 Roma, Gypsy and Traveller people in the UK (1 in 200 people) living in various accommodation including caravans, chalets, housing, roadside, in public spaces or narrowboats and barges. Average life expectancy is 10-25 year shorter than the general population and have 6 fewer years in good health before life expectancy is taken into account[23]

6.13.2 Between 2005-2012 the Roma Support Group (a voluntary sector organisation) reported that 60% of the Roma population in touch with them had poor physical health including respiratory conditions generally. [23]

6.14 People with addictions/or use substances

6.14.1 A primary care database study of people aged 16-65 with asthma who were using opioids showed that attendance at annual review was 30% although they had a higher use of steroid use[24].

6.14.2 There was no evidence found in the literature search on people with asthma who misuse alcohol

6.15 People living in remote or rural or island locations

6.15.1 The Equality Impact Assessment on diagnosis, monitoring and chronic asthma management produced by the NICE guideline committee noted variation in geography in relation to urban and rural areas. The report notes '*Rural areas often have smaller primary care*

practice with asthma management lead by a practice nurse rather than a specialist asthma nurse. Rural locations often have reduced access to tertiary healthcare for more specialist treatment. However conversely children in rural areas also benefit from lower levels of air pollution which has been shown to worsen asthma symptoms.' [25]

6.15.2 A US study showed that children living in rural areas experienced factors unique to the location which impacted on asthma development and outcomes, including housing quality, cigarette smoke exposure, and small/large-scale farming. Additionally, other factors were identified including, lack of access to primary care providers and pulmonary specialists, knowledge deficits (both patient and clinician), and a lack of culturally tailored asthma interventions. The authors suggest the use of school-based services or telemedicine to mitigate access to asthma care[26].

6.16 People in the criminal justice system

6.16.1 A study showed an association between neighbourhood incarceration rate and asthma prevalence and morbidity among New York City adults. This was explained by the sociodemographic composition of the neighbourhoods[27].

6.16.2 There was no evidence found in the literature search on people with asthma who are in the criminal justice system in the UK

6.17 Transgender people

6.17.1 A review of chronic disease burden, including respiratory conditions, amongst transgender populations globally demonstrated a poor level of evidence on chronic physical health morbidity, reporting a varying asthma prevalence ranging from 6% to 33% (information taken from a small number of studies)[28].

Conclusions:

Asthma is diagnosed more frequently in the younger adult population (aged 25-34) who also tend to have more episodes of oral and inhaled corticosteroid treatment.

The proportion of children aged 0-15 with diagnosed asthma has decreased by ten per cent between 2001/02 to 2018.

Women make up the majority of people with difficult asthma.

The incidence of asthma is greater in ethnic minority groups, with second and third generation descendants of South Asian and Afro-Caribbean migrants experiencing a greater incidence.

The covid-19 pandemic has had a disproportionate effect on infection and mortality rates in ethnic minority communities. Evidence has revealed that socio-economic inequalities and co-morbidities have played a key role.

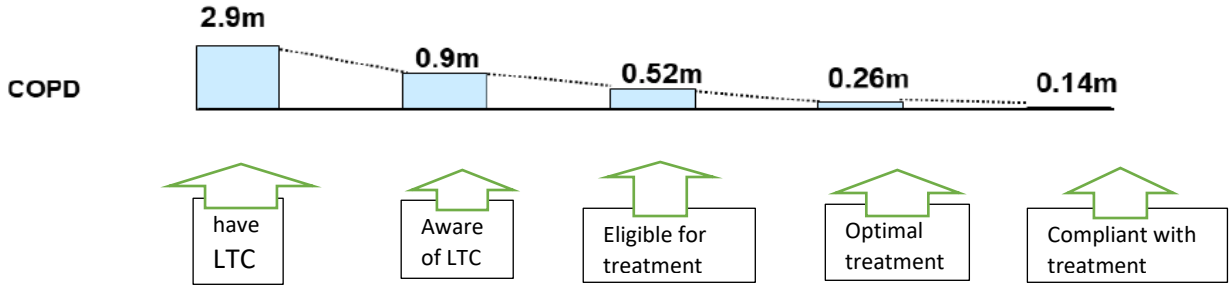
Many vulnerable groups including people with physical disabilities, the homeless, people with low incomes, low health literacy and high levels of deprivation as well as undocumented migrants, asylum seekers, sex workers, people who misuse substances and travellers experience a higher incidence and prevalence of asthma

ACCESS TO CARE

7.1 Access to care is influenced by a number of factors including[29]:

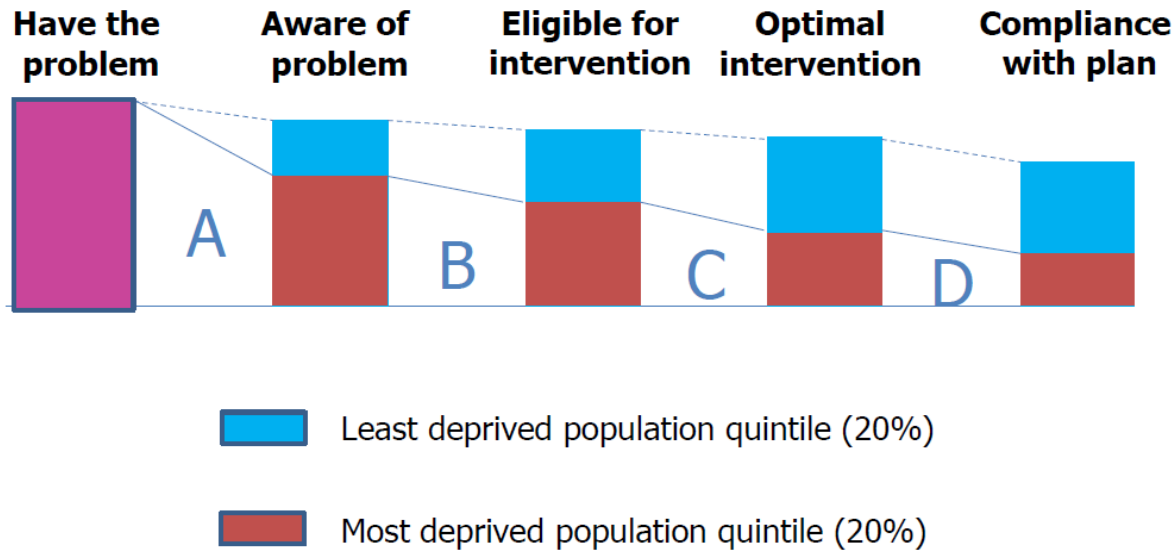
- Having asthma
- Awareness of the management of asthma by patient and clinicians
- Eligibility for treatment
- Receiving the optimal treatment
- Compliance with treatment

The diagram illustrates the number of people with a respiratory condition (COPD) receiving and being adherent to treatment



NOTE: Figures are for UK. Taken from Harrison W, Marshall T, Singh D & Tennant R **"The effectiveness of healthcare systems in the UK – scoping study"**; Department of Public Health & Epidemiology and HSMC University of Birmingham, July 2006.

7.2 With deprivation the number of people receiving and being adherent to treatment is less in the most deprived groups[29].



From Bentley, 2019 PowerPoint Slides[29]

7.3 The factors at play with regard to awareness of having a long-term condition include[29]:

- perceiving poor health as a series of crises
- downgrading warning signs, e.g. lack of positive conception of health, low expectations for self, normalisation of symptoms within the community
- different cultural conceptions of health and healthcare
- Lack of awareness of what the service provides
- Low self-esteem/ poor literacy skills, may not cope with demands of formal system
- Practicalities of transport and childcare
- Inflexibility in work situations
- Can manage if ill or crisis event but less likely to attend for 'optional' services such as health checks, prevention/health promotion
- Effectiveness of the consultation influenced by patient's and practitioner's personal and social attributes
- Patient: Self -esteem, expectations, fears:
    - Of formal situations and required behaviours
    - 'will I be able to say what I need to say and ask what I need to ask?' 'Will I be heard?'
    - 'Am I entitled to present myself as ill?' 'If I am not ill, might I be humiliated?'
- Patient knowledge and understanding; literacy, personal skills and competencies
- Interaction with clinician
    - Power differential
    - Use of language
    - Cultural understanding

7.4 A report from Asthma UK estimates that around 160,000 people with asthma who are taking high-dose inhaled steroids are not being referred to specialist care[1].

7.5 Clinicians are uncertain when to refer to specialist care. Asthma UK found that the responses varied from referral when two courses of OCS occur (11% of responses) to continuous use of OCS (15% of responses)[1].

7.6 Referral guidelines to specialist care not included in the NICE NG80 asthma guideline[7].

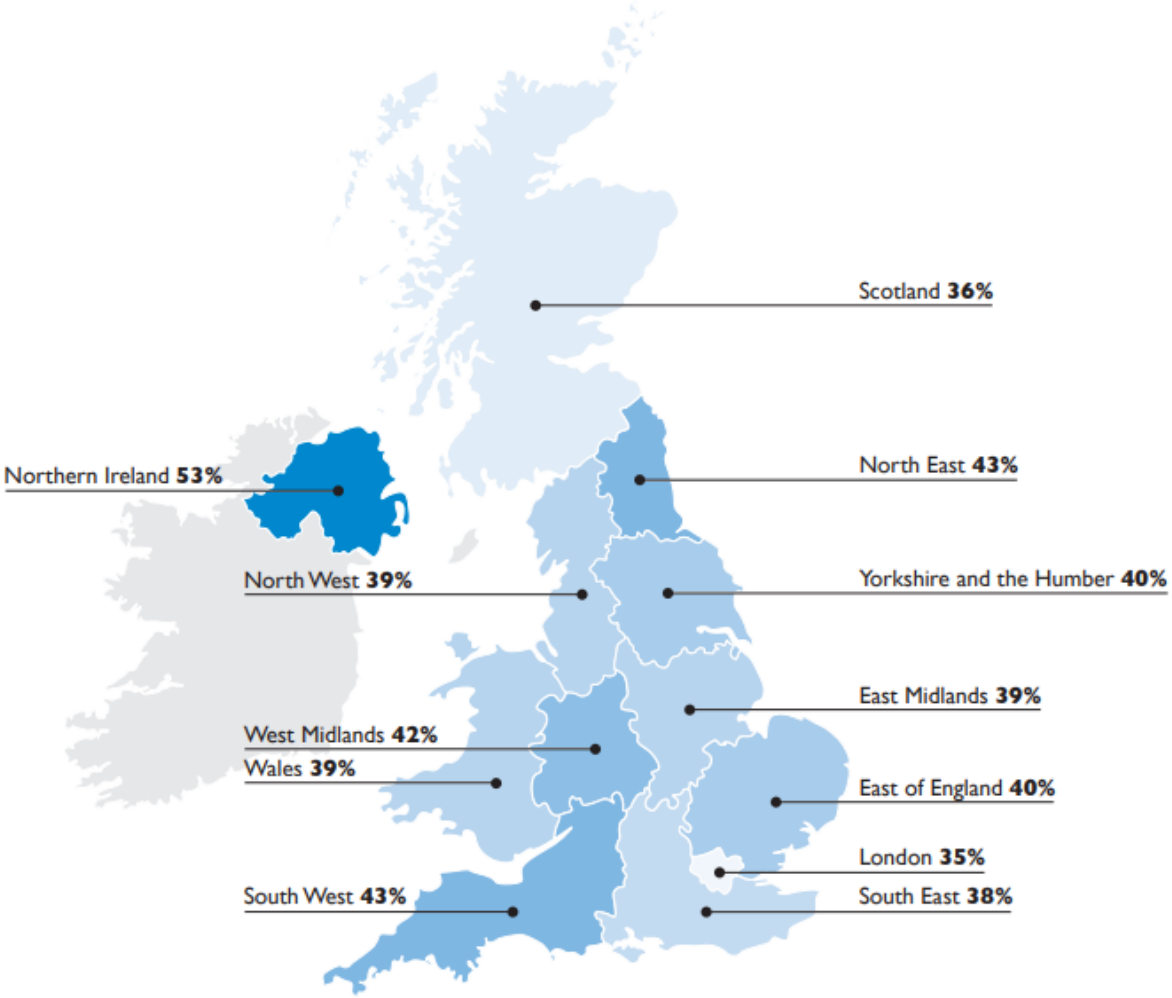
7.7 There is a lack of awareness in primary care about severe asthma and treatments available[30].

7.8 At -risk people may not be on the GP register or on asthma Quality and Outcomes Framework list for asthma, e.g. the homeless, people with Learning Disabilities, travellers etc

7. 9 Over 82% of people with severe and difficult asthma are not getting the care they need[7].

7.10 The Asthma UK Annual Asthma Survey 2019 found that the level of basic asthma care (asthma review, inhaler technique and asthma action plan) varied between London (35.1%

receiving basic care) and 43.1% receiving basic care in the North East and South West in England[9].



From Asthma UK, The Annual Asthma Survey, 2019 [9]

7.11 Patient factors in accessing care for severe asthma include an underestimation of disease severity, overestimation of asthma control, poor communication with clinicians and lack of awareness about treatment options[30].

7.12 System barriers include long waiting lists and inequitable access to specialist severe (tertiary) asthma centres due to geographical location and ease of transport, or lack of awareness of these services by referral clinicians[30].

7.13 In addition, the existence of co-morbidities potentially has an impact on the uptake and effect of new medication for severe and difficult asthma.

7.14 Access to care could be enhanced through the use of community pharmacies. Patients tend to collect their medication even if they do not attend their GP. Pharmacists are best placed for providing asthma reviews for non-GP attenders[31].

Access to biologics

7.15 The most appropriate care for people with severe asthma is a holistic assessment and support by a multi-disciplinary team based in secondary or tertiary care which provides an accurate diagnosis and assessment for access to biologic treatments[1].

7.16 Only 20% of people with severe asthma who are eligible for biologics are receiving this treatment. Asthma UK estimates that approximately 12,000 are currently receiving omalizumab, mepolizumab and reslizumab[1].

7.17 Three quarters of people on three or more courses of oral corticosteroids have not had an appointment with an asthma specialist. This means they have had multiple asthma attacks but have not been referred according to guidelines[1].

7.18 Asthma UK has estimated that the number of people eligible for omalizumab and mepolizumab is 60,000. The service specification of severe asthma in England estimates that 7,700 people require specialist care, a significant underestimation of unmet need[1].

Conclusions:

Access to care is influenced by a number of factors including:

- *Having asthma*
- *Awareness of the management of asthma by patient and clinicians*
- *Eligibility for treatment*
- *Receiving the optimal treatment*
- *Compliance with treatment*

The most appropriate care for people with severe asthma is a holistic assessment and support by a multi-disciplinary team based in secondary or tertiary care which provides an accurate diagnosis and assessment for access to biologic treatments

Around 160,000 people with asthma who are taking high-dose inhaled steroids are not being referred to specialist care and clinicians are not clear when to refer to these services

The service specification of severe asthma in England is insufficient to meet the needs of people who require specialist care.

8.0 PATIENT EXPERIENCE

8.1 A survey of 214 people on biologics carried out by Asthma UK reported that 64% found that biologics reduced their symptoms and asthma attacks, 43% had reduced hospital admissions, 23% found biologics completely life changing (45% of these reducing or stopping oral steroid use), 23% had less time off work and 29% could exercise more[30].

Children and young people

8.2 School children with sub-optimally controlled asthma tend to have lower emotional and behavioural wellbeing[32].

8.3. A study on the Quality of Life in children and adolescents with asthma who are taking omalizumab has found that there is a reduction in inhaled corticosteroids and correlates well with the improvement of quality of life for caregivers[33].

Carers

8.4 A systematic review of the experiences of parents and carers caring for a child with asthma, wheeze or bronchiolitis and managing their condition highlighted six main issues including[34]:

- negotiating the meaning of having a child with asthma,
- the impact on family life
- the process of getting a diagnosis and learning about asthma
- the relationships with clinicians and the A&E experience
- views on medication beliefs
- concerns and management strategies
- the need for support

With time, parents and carers become more comfortable managing their child's asthma,

Medication adherence

8.5 Patients with moderate to severe asthma have shown better adherence to omalizumab when given every 4 weeks rather than every 2 weeks[27] and for a subcutaneous route rather than intravenous injection[35].

8.6 A single-use, pre-filled autoinjector containing mepolizumab for patient self-administration has been developed[36]. A study showed that less than a third of mepolizumab patients were willing to switch over to home injection while the remaining patients preferred non-autoinjector in-clinic injections therefore enhancing the potential for providing biologic injections at home[37]. All four biologics approved by NICE are approved for self-administration at home.

8.7 In patients with severe asthma, suboptimal adherence to preventer inhaler therapy is common before and after omalizumab treatment. Although patients have high levels of motivation and knowledge about asthma treatment, adherence to inhaler preventer therapy declined after omalizumab therapy[34].

8.8 Studies have shown that patients with severe asthma report an improved quality of life with biologics but there are still concerns around the use of steroids and incomplete treatment responses or adherence[38,39].

8.9 Long-term (10 years) follow up of patients on omalizumab has shown that tolerance to the biologic is maintained despite experience of mild to moderate adverse events[40].

Conclusions:

Asthma biologics treatment has been found to reduce asthma symptoms and attacks, enhance the quality of life and have an impact on steroid usage.

There is some evidence that tolerance and adherence to biologics is maintained by patients over the long-term.

9.0 SHARED DECISION-MAKING/SELF-MANAGEMENT

General approaches

9.1 A definition of shared decision-making: Shared decision making involves clinicians and patients working together to select appropriate care, based on clinical evidence and the patient's informed preferences[41]

9.2 Shared decision-making follows a clear process, the typical features of which include[42]:

- Explicitly stating the decision that needs to be considered
- Providing evidence-based information about a health condition, the options, and associated benefits or harms
- Helping patients to recognise and articulate the value they place on the benefits and harms of each option.

9.3 A systematic review showed that[42]:

- Compared to usual care in using decision aids people were more knowledgeable about options for treatment, felt better informed and were clearer about personal values. (high quality evidence)
- Using decision aids people probably had more accurate expectations of the benefits and harms of options and probably participated more in decision making (moderate-quality evidence).

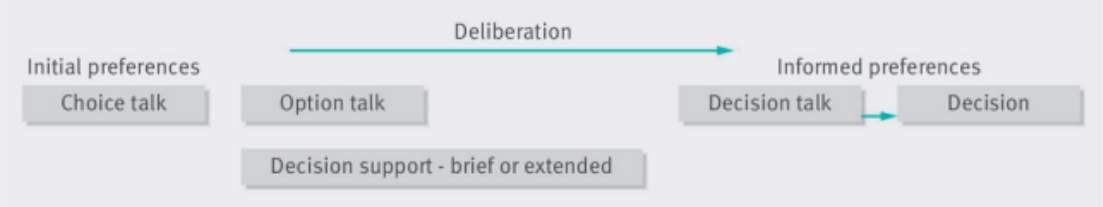
However, there was little or no evidence that people who used decision aids achieved decisions that were consistent with their informed values or any adverse effects of decision aids on health outcomes or satisfaction.
Overall, the review suggests that patient decision aids are effective at facilitating informed decision making

9.4 The systematic review, however did not cover outcomes for patient with different levels of health literacy or compared cost effectiveness. In addition, further research is required to assess if people continue with their chosen option[42].

9.5 The Health Foundation's MAGIC (Making good decisions in collaboration) improvement programme identified three key questions for patients to ask when considering treatment options[43]:

- What are my options?
- What are the possible benefits and risks of these options?
- How likely are the benefits and risks of each option to occur?

The table below shows the process that is suggested that primary and secondary care clinicians follow to support shared decision-making.



From Joseph-Williams N et al 2017 [44]

9.6 NICE has produced general guidance on shared decision-making which promotes the exploration of the three key areas identified by the Health Foundation [45]:

- discussion of treatment options including risks and benefits
- the different choices that are available
- a decision that is reached together between the patient and healthcare professional

9.7 NHS England has also produced a general guide which not only describes decision-making for individuals but also for systems to support the development of personalised care[46].

9.8 Other factors at play in shared decision-making include [47]:

- features of the patient, clinician or organisation may influence the decision-making process, e.g. the health literacy of patients, whether patient want to participate in decision-making, the competencies of the clinician, conveying risk or the availability of decision aids
- the amount of time spent in deliberation on the part of patients and clinicians
- the outcomes of the decisions, such as the quality of the decision, the extent to which the treatment goals of patients are met, regret at decisions made and the care that patients experience

9.9 Conveying information and communicating risk requires skill on the part of the clinician and can be done in a number of different ways including using pictures and diagrams as well as written information. A study found that tailoring the information to an individual's preferences for message delivery led to better understanding of a patient's condition[48].

9.10 Digital tools are being used in the management of condition such as diabetes to support behaviour change, encourage patients to take their medicines and improve health outcomes and therefore could be similar for the management of asthma[7].

9.11 An Asthma UK reports proposed that tools such as smart inhalers that can measure accurately and report adherence to medicine in primary care prior to referral and, before prescribing biologics should be tested and rolled out[7].

9.12 In addition, the same report suggests that as young age groups e.g. 18-29 have a high level of digital engagement and are likely to use technology in different areas of their lives,

this would provide better engagement in their asthma management if it is delivered through digital means rather than face-to-face[7].

9.13 An App has been developed in Denmark to help patients on biologics manage their medication and for providing important patient data to the Danish Severe Asthma Register. The App includes notifications and reminders to take the medication as well as information on the biologic treatment and the patient's own data. It also sends an alert to the clinician if the patient does not take the medication[49]. There was no evidence found in the literature search any Apps for the management of asthma in the UK

Conclusions:

Shared decision-making involves discussion between the patient and clinician about what decision needs to be made; providing the information about the health condition and treatment options; and helping patients to articulate the value they place on the benefits and harms of each option.

There is strong evidence that compared to usual care decision aids help people to have a more accurate understanding of the benefits and harms of treatment options. However, it is less clear what the outcomes are for patients with different levels of health literacy and if patients continue with their chosen option.

There are three key questions that patients can ask about their options for treatment which are:

- *What are my options?*
- *What are the possible benefits and risks of these options?*
- *How likely are the benefits and risks of each option to occur?*

Other factors at play in decision-making include:

- *whether a patient wishes to participate in decision-making,*
- *the competencies of the clinician*
- *conveying risk*
- *availability of decision-making aids*
- *the time spent in discussion and deliberation*
- *the outcomes of the decisions, e.g. quality of decision, the extent to which treatment goals of the patient are met, regret at decisions made and the care that patients experience*

There are shared decision guides published by NICE and NHSE.

Digital apps and online interactive tools have been shown to aid shared decision-making for people with asthma.

10.0 PATIENT REPORTED OUTCOME MEASURES (PROMs)

Asthma

10.1 Patient-reported outcome measures (PROMs) are used to assess the quality and impact of experiences patients have on their healthcare and treatment. These measures help healthcare providers, commissioners and other stakeholders to make informed changes to their services[50].

10.2 The Mapi Research Trust has a database of asthma specific PROMs[51]. A list is in appendix 2

10.3 There are gaps in what asthma PROMS tools can measure, for example, no single PROM exists to measure initiation, implementation and persistence with asthma inhaled medication[52] nor is it known how easy it is to incorporate the use of PROMs for the care of children in clinical practice[53].

10.4 A systematic review for the evaluation of outcome measures including PROMs for the assessment of asthma control is underway for adults and children. The aim will be to facilitate the choice of the optimum instrument for use and highlight gaps in available tools[54].

Severe asthma

10.5 A call for core outcomes measuring the differences between the biologic therapies in patients with severe asthma as well as comparing biologics with traditional medication has been made [55].

10.6 There is evidence that the Asthma Quality of Life Questionnaire (AQLQ) is helpful in demonstrating a long-term increase in Quality of Life in people with moderate to severe asthma taking omalizumab[56].

10.7 In addition, the severe asthma questionnaire (SAQ) has been developed to gain an insight into patients' perceptions of the impact of severe asthma and treatment on their lives[57].

Conclusions:

There are many asthma specific PROMS available.

For severe asthma, the Asthma Quality of Life Questionnaire (AQLQ) has been used to demonstrate a long-term increase in Quality of Life in people with moderate to severe asthma taking omalizumab and a severe asthma questionnaire (SAQ) has been developed to gain an insight into patients' perceptions of the impact of severe asthma and treatment on their lives.

However, there are gaps in what asthma PROMS tools can measure, for example, no single PROM exists to measure initiation, implementation and persistence with asthma inhaled medication nor is it known how easy it is to incorporate the use of PROMs for the care of children in clinical practice

A systematic review for the evaluation of outcome measures including PROMs for the assessment of asthma control is underway for adults and children

11.0 CONCLUSIONS:

11.1 Incidence and prevalence of difficult and severe asthma

Approximately I million people have difficult asthma in the UK and about 200,000 people have severe asthma (around 17% and 1%-3.6% of the asthma population respectively)

11.2 Inequalities

Asthma is diagnosed more frequently in the younger adult population who also tend to have more episodes of oral and inhaled corticosteroid treatment.

The proportion of children aged 0-15 with diagnosed asthma has decreased by ten per cent between 2001/02 to 2018.

Women make up the majority of people with difficult asthma.

The incidence of asthma is greater in ethnic minority groups, with second and third generation descendants of South Asian and Afro-Caribbean migrants experiencing a greater incidence.

The covid-19 pandemic has had a disproportionate effect on infection and mortality rates in ethnic minority communities. Evidence has revealed that socio-economic inequalities and co-morbidities have played a key role.

Many vulnerable groups including people with physical disabilities, the homeless, people with low incomes, low health literacy and high levels of deprivation, as well as undocumented migrants, asylum seekers, sex workers, people who misuse substances and travellers experience a higher incidence and prevalence of asthma

11.3 Access to care

Access to care is influenced by a number of factors including:

- *Having asthma*
- *Awareness of the management of asthma by patient and clinicians*
- *Eligibility for treatment*
- *Receiving the optimal treatment*
- *Compliance with treatment*

The most appropriate care for people with severe asthma is a holistic assessment and support by a multi-disciplinary team based in secondary or tertiary care which provides an accurate diagnosis and assessment for access to biologic treatments

Around 160,000 people with asthma who are taking high-dose inhaled steroids are not being referred to specialist care and clinicians are not clear when to refer to these services

The service specification of severe asthma in England is insufficient to meet the needs of people who require specialist care.

11.4 Patient experience

Asthma biologics treatment has been found to reduce asthma symptoms and attacks, enhance the quality of life and have an impact on steroid usage.

There is some evidence that tolerance and adherence to biologics is maintained by patients over the long-term.

11.5 Shared decision making/self-management

Shared decision-making involves discussion between the patient and clinician about what decision needs to be made; providing the information about the health condition and treatment options; and helping patients to articulate the value they place on the benefits and harms of each option.

There is strong evidence that compared to usual care decision aids help people to have a more accurate understanding of the benefits and harms of treatment options. However, it is less clear what the outcomes are for patients with different levels of health literacy and if patients continue with their chosen option.
There are three key questions that patients can ask about their options for treatment which are:

- *What are my options?*
- *What are the possible benefits and risks of these options?*
- *How likely are the benefits and risks of each option to occur?*

Other factors at play in decision-making include:

- *whether a patient wishes to participate in decision-making,*
- *the competencies of the clinician*
- *conveying risk*
- *availability of decision-making aids*
- *the time spent in discussion and deliberation*
- *the outcomes of the decisions, e.g. quality of decision, the extent to which treatment goals of the patient are met, regret at decisions made and the care that patients experience*

There are shared decision guides published by NICE and NHSE.

Digital apps and online interactive tools have been shown to aid shared decision-making for people with asthma.

11.6 Patient Reported Outcome Measures (Proms)

There are many asthma specific PROMS available.

For severe asthma, the Asthma Quality of Life Questionnaire (AQLQ) has been used to demonstrate a long-term increase in Quality of Life in people with moderate to severe asthma taking omalizumab and a severe asthma questionnaire (SAQ) has been developed to gain an insight into patients' perceptions of the impact of severe asthma and treatment on their lives.

However, there are gaps in what asthma PROMS tools can measure, for example, no single PROM exists to measure initiation, implementation and persistence with asthma inhaled medication nor is it known how easy it is to incorporate the use of PROMs for the care of children in clinical practice

A systematic review for the evaluation of outcome measures including PROMs for the assessment of asthma control is underway for adults and children

APPENDIX 1

The search focussed on issues of inequality facing people with Protected Characteristics as defined by the Equality Act 2010 and other vulnerable groups to treatment for people with asthma, severe asthma and difficult asthma

Protected Characteristics

The nine Protected Characteristics identified in the Equality Act 2010 are:

- age
- disability
- sex
- gender reassignment
- sexual orientation
- race
- marriage and civil partnership
- religion or belief
- pregnancy and maternity.

Other population groups that face inequalities include:

- looked after children and young people
- carers
- people who are homeless
- people involved in the criminal justice system
- people with addictions and/or who use substances
- low income people or families
- people with poor literacy or health Literacy
- people living in areas of social deprivation
- people living in remote, rural or island locations
- refugees, asylum seekers or those experiencing modern slavery

APPENDIX 2

List of asthma specific PROMs from the Mapi Research Trust eprovide database available here:

- Adherence Starts with Knowledge-20 (ASK-20)
- AmbuFlex/asthma
- Assessment of Burden of Chronic Conditions (ABCC)-tool' for multiple chronic conditions
- Asthma Control Questionnaire (ACQ-5, ACQ6)
- Asthma Control Test (ACT) Childhood Asthma Control Test (C-ACT)
- Asthma daily symptom diary (ADSD)
- Asthma Life Impact Scale (ALIS)
- Asthma Quality of Life Questionnaire (AQLQ) and mini-AQLQ for adults
- Asthma Quality of Life Utility Index-5 Dimensions (AQL-5D)
- Asthma Self-Efficacy Scale
- Asthma Symptom Utility Index (ASUI)
- Beliefs about Medication Questionnaire
- Dyspnea-12 (D-12)
- EuroQol-5-Dimensions 5-Level (EQ-5D-5L),
- Hyland Scale
- Juniper's Asthma Quality of Life Questionnaire (AQLQ-J)
- Mark's AQLQ (AQLQ-M)
- Mini-Asthma Quality of Life Questionnaire
- National Asthma Education and Prevention Program (NAEPP)
- Patient Needs in Asthma Treatment (NEAT) questionnaire
- Patient Reported Outcomes Measurement Information System (PROMIS) (and variants)
- Pediatric Asthma Quality of Life Questionnaire
- Pediatric Symptom Checklist-17 (PSC-17)
- RAND negative Impact of Asthma on Quality of Life short form-12 (RAND-IAQL-12)
- Self-Reported Medication-Taking Scale,
- Symptom Free Days Questionnaire (SFDQ),
- St George's Respiratory Questionnaire (SGRQ)

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