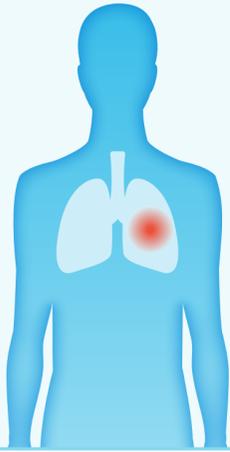


UNDERSTANDING TYPE 2 INFLAMMATION IN UNCONTROLLED PERSISTENT ASTHMA

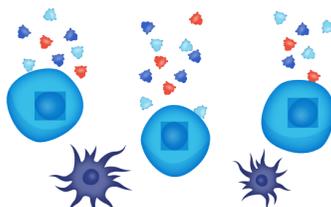


Asthma is an airway disease driven by **persistent underlying inflammation**.¹

Most people with asthma can effectively manage their disease with controller medicines, like inhalers.² People with uncontrolled persistent asthma symptoms may live with

- Coughing
- Wheezing
- Difficulty breathing
- Risk of life-threatening asthma attacks

Type 2 inflammation contributes to the cause of uncontrolled persistent asthma symptoms. It is driven by an imbalance or overactivity of the immune system, which can affect the inflammatory response in different ways.³



~50-70%

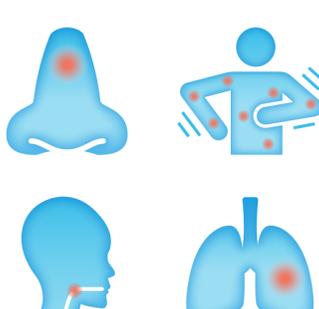
of people with asthma have underlying Type 2 inflammation.^{4,5}

^aN=205

^bN=37

People who have asthma that is described as **'allergic', 'eosinophilic' or 'a mix of allergic and eosinophilic'** have a disease that is driven by Type 2 inflammation.^{6,7,8}

Type 2 inflammation underlies other diseases such as **allergic rhinitis, nasal polyps** (growths in the sinus cavity), **atopic dermatitis** (the most common form of eczema), and **eosinophilic esophagitis**, which may explain why many people with uncontrolled persistent asthma may also struggle with some of these conditions.³



THERE ARE FOUR MAIN GOALS TO OPTIMIZE ASTHMA CONTROL

1 Reduce severe and potentially life-threatening asthma attacks (exacerbations)

Some people with uncontrolled persistent asthma continue to experience:

FREQUENT OR SEVERE EXACERBATIONS

3x

more likely in people with recent severe exacerbations than in people with controlled asthma⁹

INCREASING USE OF RESCUE, CONTROL OR STEROID MEDICINES

2x

per week is the most a rescue inhaler would be used for a person's asthma to be considered controlled²

HOSPITALIZATIONS

40%

risk of emergency room (ER)/hospital readmission within 90 days of prior ER/hospitalization in people with uncontrolled persistent asthma¹⁰

2 Improve the ability to breathe (lung function)

Some people with uncontrolled persistent asthma with severe exacerbations experience **DECREASED LUNG FUNCTION**

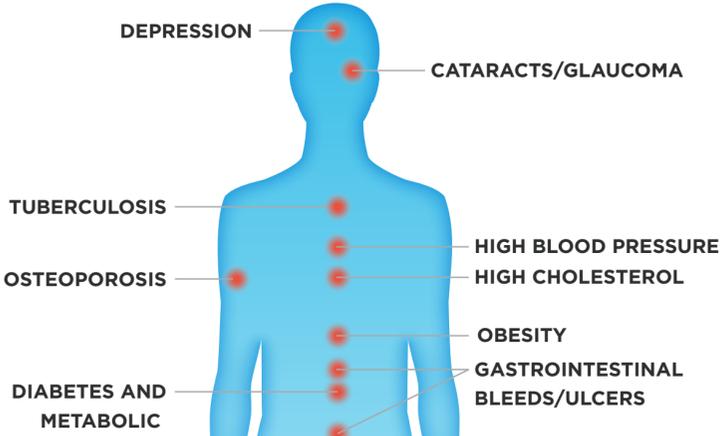
2x

faster decline than people with controlled asthma over 3 years¹¹

Decreased lung function can increase the risk of future severe exacerbations.

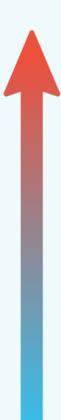
3 Reduce dependence on oral corticosteroids

Oral corticosteroids can provide relief for severe symptoms. However, current asthma guidelines do not recommend long-term use due to potential for serious side effects:^{12,13,14}



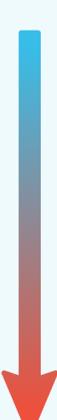
4 Improve asthma symptoms and quality of life

Uncontrolled persistent asthma limits people's quality of life and can be associated with:^{15,16}



INCREASED

- Shortness of breath
- Coughing or wheezing
- Chest pain
- Use of rescue inhaler
- Feelings of concern and frustration due to having asthma
- Avoidance of environments for fear of asthma attack



DECREASED

- Daily activities like housework, playing with children, or visiting friends
- Amount and quality of sleep
- Symptom control
- Ability to exercise
- Ability to participate in activities that may cause asthma attacks

1 Bjerner L. Time for a paradigm shift in asthma treatment: From relieving bronchospasm to controlling systemic inflammation. *J Allergy Clin Immunol.* 2007;120(6):1269-1275. 2 Global Initiative for Asthma. Global Strategy For Asthma Management and Prevention, 2017. Available from www.ginasthma.org. 3 Gandhi NA, BL Bennett, NM Graham, et al. Targeting key proximal drivers of type 2 inflammation in disease. *Nat Rev Drug Discov* 2016;15(1):35-50. 4 Seys AF, Scheers H, Van den Brande, P, et al. Cluster analysis of sputum cytokine-high profiles reveals diversity in T(h)2-high asthma patients. *Respir Res.* 2017;18(1):39. doi: 10.1186/s12931-017-0524-y. 5 Peters MC, Mekonnen ZK, Yuan S, et al. Measure of gene expression in sputum cells can identify TH2-high and TH2-low subtypes of asthma. *J Allergy Clin Immunol.* 2014;133(2):388-394. 6 Ray A, TB Oriss, SE Wenzel. Emerging molecular phenotypes of asthma. *Am J Physiol Lung Cell Mol Physiol* 2015;308(2):L130-40. 7 Muraro A, RF Lemanske, PW Hellings, et al. Precision medicine in patients with allergic diseases: Airway diseases and atopic dermatitis-PRACTALL document of the European Academy of Allergy and Clinical Immunology and the American Academy of Allergy, Asthma & Immunology. *J Allergy Clin Immunol* 2016;137(5):1347-58. 8 Matsusaka M, K Fukunaga, H Kabata, et al. Subphenotypes of type 2 severe asthma in adults. *J Allergy Clin Immunol Pract* 2018;6(1):274-276.e2. 9 Haselkorn T, Fish JE, Zeiger RS, et al. Consistently very poorly controlled asthma, as defined by the impairment domain of the Expert Panel Report 3 guideline, increases risk for future severe asthma exacerbations in The Epidemiology and Natural History of Asthma: Outcomes and Treatment Regimens (TENOR) study. *J Allergy Clin.* 2009;124(5):895-902. 10 Suruki, Robert Y. et al. The Frequency of Asthma Exacerbations and Healthcare Utilization in Patients with Asthma from the UK and USA. *BMC Pulmonary Medicine* 17 (2017): 74. PMC. Web. 23 Aug. 2017. 11 O'Byrne PM, Pedersen S, Lamm CJ, et al. Severe exacerbations and decline in lung function in asthma. *Am J Respir Crit Care Med.* 2009;179(1):19-24. 12 Daugherty J et al. The impact of long-term systemic glucocorticoid use in severe asthma: A UK retrospective cohort analysis. *J Asthma.* 2017 Sep 19:1-8. 13 Lefebvre et al. Burden of systemic glucocorticoid-related complications in severe asthma. *Curr Med Res Opin.* 2017 Jan;33(1):57-65. 14 Prednisolone 5 Mg Tablets Package Leaflet. Available at: <http://www.hpra.ie/img/uploaded/swedocuments/m1-3-2-5mg-92522331211-April%202013-2109545-10052013150607-635037951694072500.pdf>. Last accessed May 2018. 15 Schatz M, et al. Asthma Control Test: reliability, validity, and responsiveness in patients not previously followed by asthma specialists. *J Allergy Clin Immunol.* 2006;117(3):549-56. 16 Juniper EF, et al. Measuring quality of life in asthma. *Am Rev Respir Dis.* 1993;147(4):832-8.