



## Yesterday

- Asthma was a poorly understood disease. Patients complained of not being able to breathe but there were no effective treatments and severe episodes frequently led to death.
- People with asthma were often unable to pursue life's normal activities. Asthma was especially difficult for children, who often had to forego routine playtime, and participation in sports or other rigorous events was often impossible.
- Scientists gained their first understanding of asthma physiology in the 1950s when they discovered that the difficulties patients experienced in breathing were due to smooth muscle constriction in the airway of the lungs.
- Researchers also learned that the airways of asthma sufferers were thousands of times more sensitive to a variety of environmental factors than the airways of people without asthma.
- Gradually, the pivotal role of the immune system in asthma was discovered and asthma was rightfully classified as an inflammatory disease.
- The first successful treatments—bronchodilators to ease airway constriction and corticosteroids to suppress airway inflammation— were developed and remain in use to this day.

## Today

- The prevalence of asthma in the United States has increased since the 1980s. In 2009, 23 million people had asthma; nearly 7 million of them were children.
- Treatment of asthma has dramatically improved. The National Asthma Education and Prevention Program (NAEPP) (<http://www.nhlbi.nih.gov/about/naepp/>) was initiated by the NIH in 1989 to (1) raise awareness of patients, health professionals, and the public that asthma is a serious chronic disease, (2) ensure the recognition of symptoms of asthma by patients, families, and the public and the appropriate diagnosis by health professionals, (3) ensure effective control of

asthma by translating research discoveries about therapies into evidence-based clinical practice guidelines, and (4) encourage a partnership among patients, physicians, and other health professionals to improve asthma management.

- Education programs, such as the NAEPP, revolutionized the way patients live with their asthma. The programs successfully encourage patients to take an active role in managing their asthma by helping them control asthma and prevent symptoms day-to-day by taking medication and avoiding conditions and environmental factors, such as allergens and irritants, that make their asthma worse, by recognizing the warning signs of an asthma attack, and by taking steps to treat it promptly to keep it from becoming severe and requiring an emergency department visit or hospitalization.
- Researchers established that secondhand smoke can trigger asthma episodes and increase the severity of attacks. Secondhand smoke is also a risk factor for the emergence of asthma in preschool aged children who never before exhibited asthma symptoms.
- Through asthma clinical research networks, NIH-funded investigators are making progress in increasing our understanding of asthma and improving its treatment. Asthma network trials evaluated asthma treatment options, including newer bronchodilators known as long-acting  $\beta$  agonists and leukotriene receptor antagonists and immunomodulators. Thanks to the networks, we now have better information on treatments for different levels of asthma severity. The networks have also discovered important individual asthma characteristics, called phenotypes, that predict response to treatment or progression to more severe disease.
- The NIH funded the National Cooperative Inner-City Asthma Study in 1991, and has since funded the Inner City Asthma Study (<http://www.icasweb.org/>) and the Inner City Asthma Consortium 1 (ICAC1). Researchers developed an effective intervention program focused on six major classes of allergens commonly found in urban environments that trigger asthma symptoms:

