

STATISTICAL BRIEF #374

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Changes in Adult Asthma Medication Use and Expenditures, United States, 1998-1999 to 2008-2009

Eric Sarpong, PhD

Introduction

Asthma is a common and chronic inflammatory disorder of the airways that affects persons of all ages. Over the past decade, the prevalence of asthma increased across all ages.¹ Indeed, a recent study found that the average annual proportion of adults with reported treatment for asthma in the U.S. rose by 1.8 percentage points from 2.7 percent in 1998–1999 to 4.5 percent in 2008–2009.² Poorly controlled asthma can lead to adverse health outcomes. The updated pharmacotherapy section of the National Asthma Education and Prevention Program's guidelines for the management of asthma recommend a stepwise approach to long-term asthma management to achieve and maintain asthma control.³ Three general types of asthma medications are recommended for the treatment of asthma:⁴ controllers, relievers, and oral corticosteroids (OCS). Inhaled corticosteroids (ICS), a type of controller and the preferred first-line therapy, are used to treat asthma symptoms by minimizing inflammation and reducing the risk of serious exacerbations and are recommended for patients with persistent asthma. Relievers are used, as required, to treat moderate or severe asthma attacks by promptly relaxing airway muscles and are recommended for patients with intermittent asthma. Use of relievers more than twice per week, however, generally indicates the need to initiate or intensify treatment with controller asthma medications. OCSs are used long-term to treat the most severe asthma symptoms that do not respond to other medications, or severe exacerbations.

This Statistical Brief examines changes in asthma medication use and expenditures among adults, age 18 and older, with reported treatment for asthma from 1998–1999 to 2008–2009 using nationally representative data from the Household Component and Medical Provider Component of the Medical Expenditure Panel Survey (MEPS-HC, MEPS-MPC). Data from 1998–1999 and 2008–2009 are pooled to increase sample sizes and the precision of estimates, thus results are presented as average annual estimates for these time periods. Expenditures for all years are expressed in constant 2009 U.S. dollars. All differences between estimates discussed in the text are statistically significant at the 0.05 level or better. This Brief begins by presenting results on the use of controllers, relievers, OCS, and two types of controller medications; followed by results on total health care, out-of-pocket health care, and asthma medications expenditures; and finally results on per user total and out-of-pocket expenditures for asthma medications.

Findings

The average annual proportion of adults with reported treatment for asthma who used controllers to treat their asthma increased from 54.3 in 1998–1999 to 59.9 percent in 2008–2009. During the same period, the average annual proportion using relievers fell from 67.7 percent to 61.7 percent. An estimated 12.4 percent of adults with reported treatment for asthma used oral corticosteroids (OCS) in 2008–2009 (figure 1).

The use of two specific types of controller asthma medications increased during the period. The average annual proportion of adults with reported treatment for asthma who used ICS increased from 39.9 to 51.2 percent and the average annual proportion using leukotriene antagonists (LTRA), rose from 12.4 to 20.4 percent (figure 2).

Highlights

- Among adults with reported treatment for asthma, the average annual proportion using controllers increased from 54.3 percent in 1998–1999 to 59.9 percent in 2008–2009, while the average annual proportion using relievers fell from 67.7 to 61.7 percent; an estimated 12.4 percent of adults used oral corticosteroids (OCS) in 2008–2009.
- Use for two classes of controllers increased during the period: the average annual proportion of adults using inhaled corticosteroids (ICS) rose from 39.9 to 51.2 percent; and the average annual proportion using leukotriene receptor antagonists (LTRA) increased from 12.4 to 20.4 percent.
- From 1998–1999 to 2008–2009, average annual total health care expenditures for adults with reported treatment for asthma rose nearly fourfold from \$27.8 to \$104.6 billion after adjustment for inflation, and average annual total out-of-pocket health care expenditures tripled from \$4.5 to \$14.3 billion.
- During the same period, average annual total expenditures on all prescribed asthma medications quadrupled from \$2.5 to \$10.2 billion, average annual total expenditures for controllers more than quadrupled from \$1.7 to \$7.8 billion, and average annual total expenditures for relievers tripled from \$793 million to \$2.4 billion.
- From 1998–1999 to 2008–2009, average annual expenditures per user on all prescribed asthma medications doubled from \$553 to \$1,126, average annual expenditures per user for controllers more than doubled from \$569 to \$1,258, and average annual expenditures per user for relievers rose 76.1 percent from \$212 to \$373.
- During the same period, average annual expenditures per user for OCS, fell 56.4 percent from \$39 to \$17 and average annual out-of-pocket expenditures per user on OCS fell 56.5 percent from \$23 to \$10.

¹ Zahran H. S., Bailey, C., & Garbe P. Vital Signs: Asthma Prevalence, Disease Characteristics, and Self-Management Education—United States, 2001–2009. Division of Environmental Hazards and Health Effects, National Center for Environmental Health, Centers for Disease Control and Prevention. *Journal of the American Medical Association*. 2011; 305(24): 2514–2516.

² Sarpong E., & Chevarley F. Trends in the Pharmaceutical Treatment of Asthma in Adults, 1998 to 2009. Research Findings No. 33. July 2012. Agency for Healthcare Research and Quality, Rockville, MD.

³ National Asthma Education and Prevention Program. Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma: Full Report 2007. Bethesda, MD: National Institutes of Health, U.S. Department of Health and Human Services, National Heart, Lung, and Blood Institute; 2007.

⁴ These classifications of asthma medication types are functional rather than drug classes per se.

Average annual total health care expenditures for adults with reported treatment for asthma rose nearly fourfold from \$27.8 billion in 1998–1999 to \$104.6 billion in 2008–2009 after adjustment for inflation. During the same period, average annual total out-of-pocket health care expenditures tripled from \$4.5 to \$14.3 billion (figure 3).

Average annual total expenditures on all prescribed asthma medications by adults with reported treatment for asthma quadrupled from \$2.5 billion in 1998–1999 to \$10.2 billion in 2008–2009 after adjustment for inflation. During the same period, average annual total expenditures for controllers more than quadrupled from \$1.7 to \$7.8 billion, and average annual total expenditures for relievers tripled from \$793 million to \$2.4 billion. Annual total expenditures for OCS averaged \$21 million in 2008–2009. In 2008–2009, average annual total expenditures for controllers were more than 3 times the corresponding expenditures for relievers and more than 366 times the corresponding expenditures for OCS (figure 4).

Average annual expenditures per user on all prescribed asthma medications by adults with reported treatment for asthma doubled from \$553 in 1998–1999 to \$1,126 in 2008–2009 after adjustment for inflation. During the same period, average annual expenditures per user for controllers more than doubled from \$569 to \$1,258; average annual expenditures per user for relievers rose 76.1 percent from \$212 to \$373, but average annual expenditures per user on OCS fell 56.4 percent from \$39 to \$17. Average annual expenditures per user for controllers were more than 3 times the corresponding expenditures for relievers and 76 times the expenditure per user for OCS in 2008–2009 (figure 5).

Out-of-pocket expenditures per user on all prescribed asthma medications by adults with reported treatment for asthma averaged \$227 in 1998–1999 and \$235 in 2008–2009 after adjustment for inflation. Out-of-pocket expenditures per user in 2008–2009 averaged \$239 for controllers and \$99 for relievers. Average annual out-of-pocket expenditures per user for OCS fell 56.5 percent from \$23 in 1998–1999 to \$10 in 2008–2009. In 2008–2009 average annual out-of-pocket expenditures per user for controllers were more than twice the annual average out-of-pocket expenditures per user for relievers and more than 22 times the annual average out-of-pocket expenditures per user for OCS (figure 6).

Data Source

The estimates presented in this Statistical Brief were derived from the MEPS Full Year Consolidated Data Files, the MEPS Medical Conditions Files, and the MEPS Prescribed Medicines Files for 1998, 1999, 2008, and 2009.

Definitions

Adults with reported treatment for asthma: The MEPS Condition Files for 1998, 1999, 2008, and 2009 and the three-digit ICD-9-CM diagnosis condition variable (ICD9CODX) were used to construct indicator variables for asthma. Adults with reported treatment for asthma within the sample were identified by tying the diagnosis code (ICD-9-CM "493") to any reported health services utilization (i.e., home health, inpatient hospital stays, outpatient, office-based, emergency room visits, and prescribed medicines) during the year.

Asthma medications: Each drug that was listed as purchased or otherwise obtained in the MEPS Prescribed Medicines (PMED) Files was linked to the Multum Lexicon database, a product of Cerner Multum, Inc. The Multum drug name variable gives the active ingredient(s) in each drug and was used to identify the three types of asthma medications: controllers, relievers, and oral corticosteroids. Controller medications include inhaled corticosteroids (ICS), inhaled long acting beta-agonists (LABA), oral long acting beta-agonists, leukotriene receptor antagonists, methylxanthines, non-steroidal anti-allergy agents, and combinations of ICS and LABA. Relievers were primarily comprised of inhaled short acting beta agonists, but also included anticholinergic bronchodilators, short acting non-beta selective agents, and combinations of inhaled short acting beta agonists and anticholinergic bronchodilators. Oral corticosteroids include prednisone, dexamethasone, and methylprednisolone and other steroids.

Utilization: Indicator variables were created to identify adults who used each of the major classes of asthma medications—controllers, relievers, and oral corticosteroids—during the year. Indicator variables were also created to capture use of subclasses of controller medications and their combinations. For combination drugs, an adult was identified as having had each medication comprising the combination therapy. For example, if an adult had a combination drug that included both an ICS and an LABA, then the adult was identified as having used each of these types of asthma medications. Utilization estimates are presented as the proportion of adults using each of the three general types of asthma medications, and each specific class of asthma controller medication during the year.

Expenditures: Expenditures include all amounts paid for health care from any source including payments by individuals and their families and payments by private insurance, Medicaid, Medicare, and other types of insurance. For this Brief, all expenditures were adjusted to constant 2009 U.S. dollars in a two-step process. First, to produce two-year pooled expenditure data for the beginning and ending point of our study period, the Consumer Price Index (CPI) for prescription drugs was used to adjust 1998 expenditures to 1999 dollars and to adjust 2008 expenditures to 2009 dollars. Next, to adjust for general inflation between the beginning and ending point of our study, the all item CPI for all urban consumers (CPI-U) was used to adjust the pooled 1999 expenditures to 2009 dollars. All estimates presented are average annual estimates for the 1998–1999 and the 2008–2009 periods.

About MEPS-HC

MEPS-HC is a nationally representative longitudinal survey that collects detailed information on health care utilization and expenditures, health insurance, and health status, as well as a wide variety of social, demographic, and economic characteristics for the U.S. civilian noninstitutionalized population. It is cosponsored by the Agency for Healthcare Research and Quality and the National Center for Health Statistics.

For more information about MEPS, call the MEPS information coordinator at AHRQ (301-427-1656) or visit the MEPS Web site at <http://www.meps.ahrq.gov/>.

References

For a detailed description of the MEPS survey design, sample design, and methods used to minimize sources of nonsampling error, see the following publications:

Cohen, J. *Design and Methods of the Medical Expenditure Panel Survey Household Component*. MEPS Methodology Report No. 1. AHCPR Pub. No. 97-0026. Rockville, MD: Agency for Health Care Policy and Research, 1997. http://www.meps.ahrq.gov/mepsweb/data_files/publications/mr1/mr1.pdf

Cohen, S. *Sample Design of the 1996 Medical Expenditure Panel Survey Household Component*. MEPS Methodology Report No. 2. AHCPR Pub. No. 97-0027. Rockville, MD: Agency for Health Care Policy and Research, 1997. http://www.meps.ahrq.gov/mepsweb/data_files/publications/mr2/mr2.pdf

Cohen, S. Design Strategies and Innovations in the Medical Expenditure Panel Survey. *Medical Care*, July 2003: 41 (7) Supplement: III-5-III-12.

Ezzati-Rice, T. M., Rohde, F., Greenblatt, J. *Sample Design of the Medical Expenditure Panel Survey Household Component, 1998-2007*. Methodology Report No. 22. March 2008. Agency for Healthcare Research and Quality, Rockville, MD. http://www.meps.ahrq.gov/mepsweb/data_files/publications/mr22/mr22.pdf

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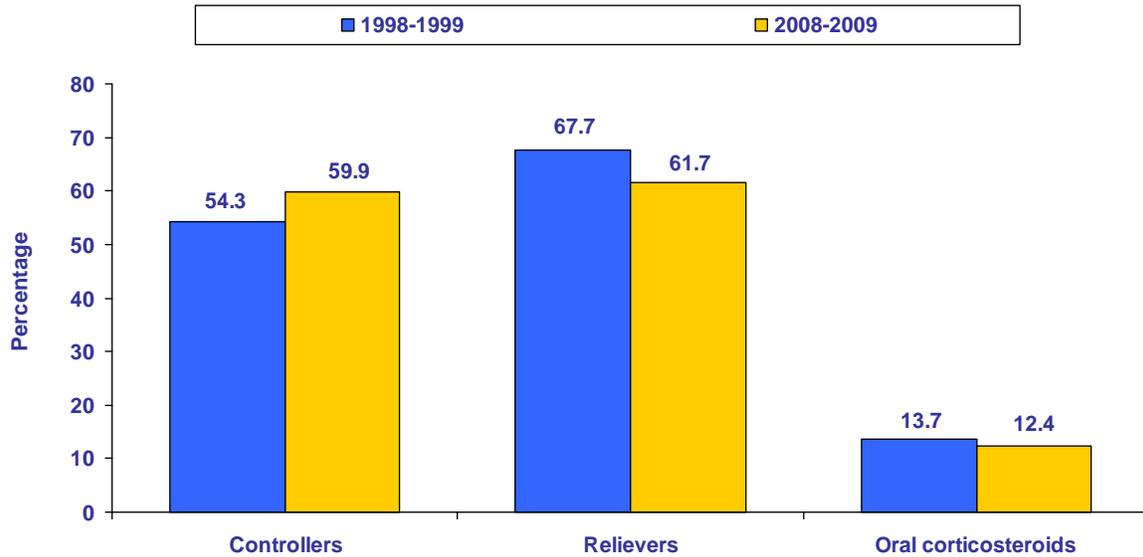
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AHRQ welcomes questions and comments from readers of this publication who are interested in obtaining more information about access, cost, use, financing, and quality of health care in the United States. We also invite you to tell us how you are using this Statistical Brief and other MEPS data and tools and to share suggestions on how MEPS products might be enhanced to further meet your needs. Please e-mail us at MEPSProjectDirector@ahrq.hhs.gov or send a letter to the address below:

Steven B. Cohen, PhD, Director
Center for Financing, Access, and Cost Trends
Agency for Healthcare Research and Quality
540 Gaither Road
Rockville, MD 20850



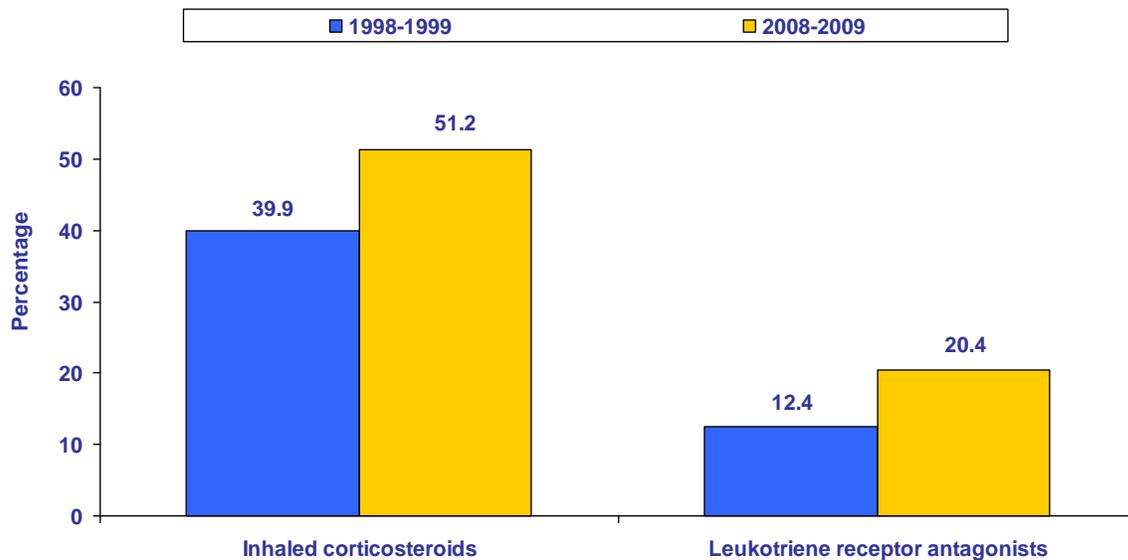
Figure 1. Percentage of adults using major types of asthma medications among adults (18 years and older) with reported treatment for asthma, 1998–1999 and 2008–2009



Source: Center for Financing, Access, and Cost Trends, AHRQ, Household Component of the Medical Expenditure Panel Survey, 1998–1999 and 2008–2009



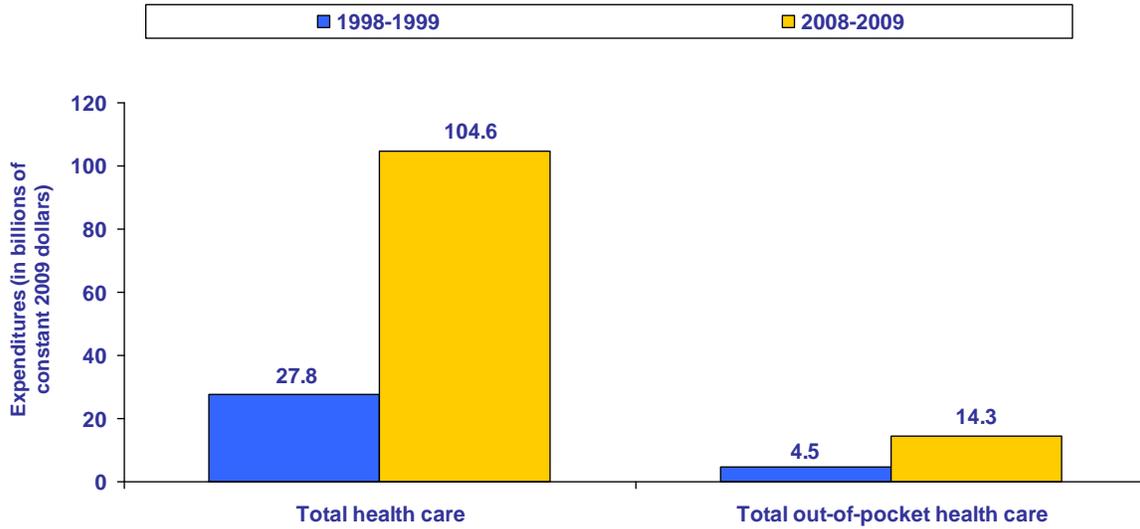
Figure 2. Percentage of adults using specific classes of asthma controller medications among adults (18 years and older) with reported treatment for asthma, 1998–1999 and 2008–2009



Source: Center for Financing, Access, and Cost Trends, AHRQ, Household Component of the Medical Expenditure Panel Survey, 1998–1999 and 2008–2009



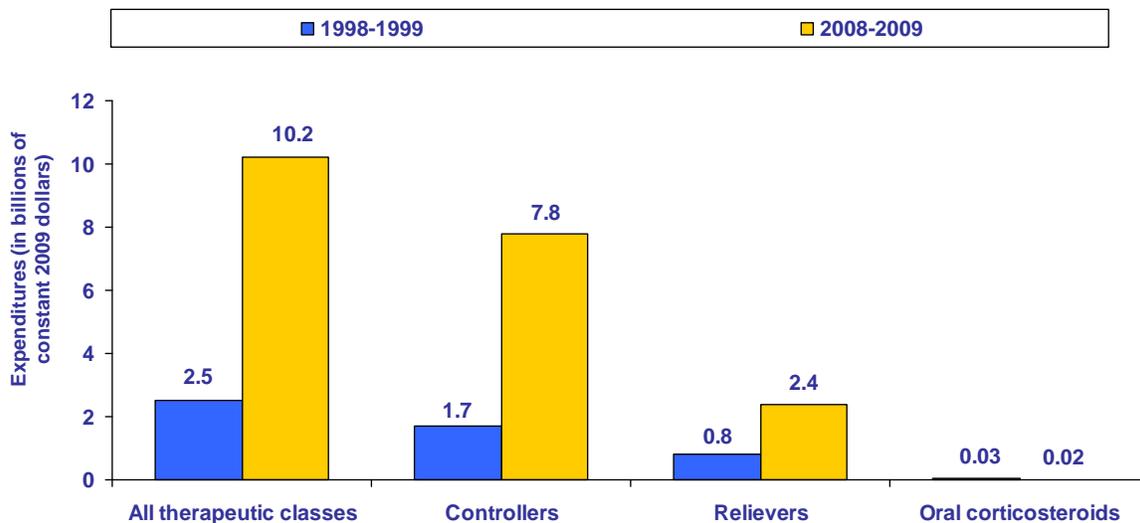
Figure 3. Average annual total health care expenditures among adults (18 years and older) with reported treatment for asthma, 1998–1999 and 2008–2009



Source: Center for Financing, Access, and Cost Trends, AHRQ, Household Component of the Medical Expenditure Panel Survey, 1998–1999 and 2008–2009



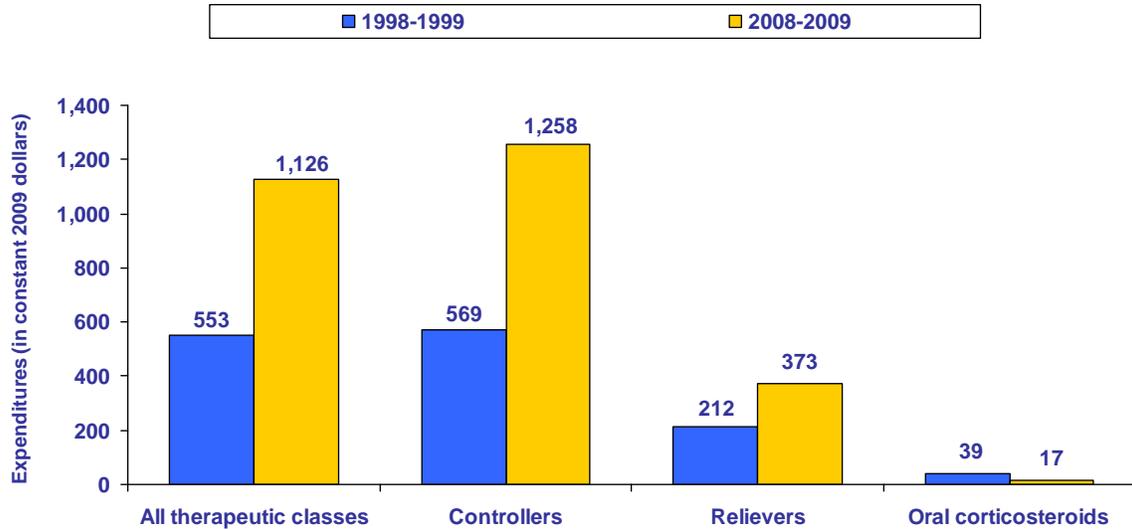
Figure 4. Average annual total drug expenditures on major types of asthma medications among adults (18 years and older) with reported treatment for asthma, 1998–1999 and 2008–2009



Source: Center for Financing, Access, and Cost Trends, AHRQ, Household Component of the Medical Expenditure Panel Survey, 1998–1999 and 2008–2009



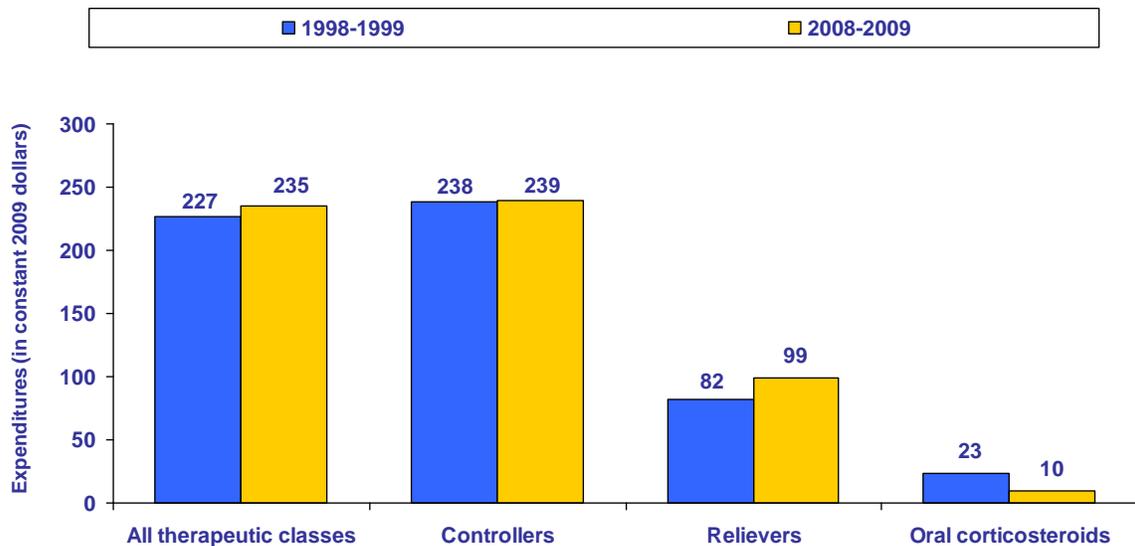
Figure 5. Average annual per user expenditures on major types of asthma medications among adults (18 years and older) with reported treatment for asthma, 1998–1999 and 2008–2009



Source: Center for Financing, Access, and Cost Trends, AHRQ, Household Component of the Medical Expenditure Panel Survey, 1998–1999 and 2008–2009



Figure 6. Average annual out-of-pocket expenditures per user on major types of asthma medications among adults (18 years and older) with reported treatment for asthma, 1998–1999 and 2008–2009



Source: Center for Financing, Access, and Cost Trends, AHRQ, Household Component of the Medical Expenditure Panel Survey, 1998–1999 and 2008–2009