Asthma Medications and NAEPP Guidelines 2
Table 1. Medication Use 2
Figure 1. SABA Medication Ownership 3
Figure 2. ICS Medication Ownership 4
Figure 3. Controller Medication Use 4

Complementary and Alternative Therapies 5
Figure 4. Adult Complementary and Alternative Therapy Use 5
Figure 5. Child Complementary and Alternative Therapy Use 6

Asthma Control Analyses 6
Table 2. Control Definitions for Adults and Children 12+ 7
Table 3. Control Definitions for Children Ages 0-11 7
Figure 6. Prevalence of Asthma Control Among Adults with Active Asthma 8
Figure 7. Prevalence of Asthma Control Among Children with Active Asthma 9
Figure 8. Asthma Control Level Among Adults with Active Asthma Stratified by Asthma Action Plans, Emergency Department Visits and Cost Barrier to Care 10
Figure 9. Children with Active Asthma Reported Having Asthma Action Plan 10

References 11
Appendix A 12
Appendix B 14
Asthma Management Report

The goal of effective asthma management is that children and adults with asthma will be able to live with minimal restrictions and enjoy a high quality of life. There are several components that are required for proper asthma management, but three components, including: types of medication and alternative medications; assessing asthma control; and factors that play a role in asthma control and management, will be discussed. Data on asthma management support the Utah Asthma Plan by helping to achieve the following objectives: “Increase awareness of how asthma affects daily life activities” and “Improve access to asthma management systems.”

Asthma control can be defined as the degree to which asthma symptoms are minimized by therapeutic interventions. Asthma control definition for physicians was delineated by the National Heart, Lung, and Blood Institute in the National Asthma Education and Prevention Program (NAEPP) Expert Panel Report. The NAEPP guidelines for asthma medication use and control can be found in the appendix. This report uses the NAEPP asthma control guidelines along with data collected from the Behavioral Risk Factor Surveillance System (BRFSS) Call-back Survey.

Medication Use

Table 1. Asthma Medication Use Among Adults and Children with Current Asthma, Utah, 2007-2009

<table>
<thead>
<tr>
<th></th>
<th>Adults (18+ years)</th>
<th>Children (0-17 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Percent (95% CI)</td>
<td>Percent (95% CI)</td>
</tr>
<tr>
<td>Ever used over-the-counter medication for asthma</td>
<td>33.3 (28.9-38.0)</td>
<td>20.9 (15.0-28.2)</td>
</tr>
<tr>
<td>Took prescription asthma medication using an inhaler during the past 3 months</td>
<td>59.0 (54.0-63.8)</td>
<td>64.8 (56.7-72.0)</td>
</tr>
<tr>
<td>Took asthma medication in pill form during past 3 months</td>
<td>14.9 (12.0-18.2)</td>
<td>27.9 (20.9-35.9)</td>
</tr>
<tr>
<td>Took asthma medication using nebulizer during past 3 months</td>
<td>10.1 (7.75-13.1)</td>
<td>23.0 (16.2-31.5)</td>
</tr>
</tbody>
</table>


Current asthma is defined as those who have ever been diagnosed with asthma by a doctor or other health professional and who report that they still have asthma.
The NAEPP Guidelines provide a stepwise approach for managing asthma through proper medication use (see Appendix). Step one is for those with intermittent asthma, meaning those who don’t suffer from symptoms on a daily basis and use a short-acting beta2-agonist (SABA) or “quick relief” inhaler.

Figure 1. Adults and Children with Current Asthma Who Possess a SABA Inhaler or Nebulizer, Utah, 2007-2009

Adults and parents with children who reported having current asthma were asked to report on the kinds of medications they currently possessed. More than half of the total respondents had a SABA inhaler and more children than adults were reported as having a SABA inhaler or SABA nebulizer.

The rest of the steps include recommendations for those with persistent asthma and include daily medication for managing asthma symptoms, along with a quick relief inhaler. These daily preventive medications are called inhaled corticosteroids (ICS) and reduce asthma symptoms and subsequent asthma attacks. For those with more severe asthma, ICS medications have been combined with a long-acting beta agonist (LABA) which lasts for at least 12 hours after each dose for more effective asthma control. The preferred method of asthma control for adults as outlined in the NAEPP Guidelines is an ICS+LABA medication for those adhering to steps three to six. For children ages 0-4, the ICS+LABA is a preferred method of control for steps four to six and for children ages 5-11, the ICS+LABA is a preferred method of control for steps three to six.1
Figure 2. Adults and Children with Current Asthma Who Possess a Controller Medication, Utah, 2007-2009


A large number of children (60.4%) with current asthma were reported as having ICS medications, with many fewer (16.1%) reporting having ICS+LABA medications. Among adults with current asthma, the number reporting having ICS medication (44.4%) was lower than for children but more adults (30.9%) had ICS+LABA medications. This is consistent with the NAEPP Guidelines in that the addition of LABA medication occurs earlier in the stepwise approach for adults than for children. When looking further into the use of ICS controller medications, of those adults with current asthma who had an ICS controller medication, only 31.5 percent reported having taken their ICS medication in the last three months. The findings regarding ICS medication use in the past three months were similar among children (32.3%).

Figure 3. Adults and Children with Current Asthma Who Reported Using a Controller Medication in the Past 3 Months, Utah, 2007-2009


Asthma symptoms and attacks can be reduced when controller medications are used correctly and consistently.
Complementary and Alternative Therapies

Complementary and alternative medicine (CAM) is defined as a group of healthcare systems, practices and products that are not currently used in conventional medicine.\(^2\) In the United States, findings from the National Health Interview Survey reported that approximately 38 percent of adults and 12 percent of children are using some form of CAM.\(^2\) Several studies have been done on the safety and efficacy of CAM use, but most of the studies were found to be of low quality.\(^3\) Because of this lack of evidence, CAM use is neither recommended nor not recommended for use along with medications for asthma. However, acupuncture has been listed in the NHLBI Guidelines as not recommended for the treatment of asthma.\(^1\)

Figure 4. Adults with Current Asthma Who Reported Having Used Complementary or Alternative Therapies in the Last 12 Months, Utah, 2007-2009.

[Bar chart showing percentages of adults with current asthma who used various CAMs.]

* Estimate has a coefficient of variation greater than 30% and does not meet Utah Department of Health standards for reliability.

For adults with current asthma, the three most commonly used CAMs were breathing techniques (70.4%), other CAMs than those listed in the graph (28%), and vitamins (19%).
For children with current asthma, the three most commonly used CAMs were breathing techniques (65.7%), other CAMs than those listed in the graph (30.2%), and vitamins (29.0%). In recent studies done among children in urban areas, CAM use has been associated with decreased adherence to prescribed asthma medications.\textsuperscript{45} In Utah, rates of ICS adherence are nearly the same for CAM users (32.7%) and non-CAM users (31.5%).

**Asthma Control Analyses**

Asthma control refers to the degree to which asthma symptoms are being minimized and properly managed. An asthma control variable was created by the Centers for Disease Control and Prevention Surveillance Workgroup, which is made up of state health department epidemiologists throughout the United States. The group used the 2007 NAEPP guidelines for control (see Appendix B) to identify questions from the Behavioral Risk Factor Surveillance System (BRFSS) Call-back questionnaire that would measure the components of asthma control. One limitation of this new control variable is that BRFSS does not collect forced expiratory volume (FEV) data, so this could not be included in the control variable. Table 2 lists the control variable classifications for adults and children over the age of 12. Table 3 lists these same classifications in children ages 0-4 and 5-11. The age ranges used are from the NAEPP guidelines for control.
Table 2. Asthma Control Definitions for Analysis of Adults and Children Ages 12+ (Based on NAEPP Guidelines)

<table>
<thead>
<tr>
<th>Control Components</th>
<th>Well Controlled</th>
<th>Not Well Controlled</th>
<th>Very Poorly Controlled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptoms</td>
<td>≤8 days in past 30 days</td>
<td>&gt;8 days in the past 30 days but not throughout the day</td>
<td>Every day in the past 30 days and throughout the day</td>
</tr>
<tr>
<td>Nighttime Awakenings</td>
<td>≤2 times in past 30 days</td>
<td>≥3 and ≤12 times in the past 30 days</td>
<td>≥13 times in the past 30 days</td>
</tr>
<tr>
<td>Rescue Medication Use</td>
<td>≤0.29 uses per day</td>
<td>&gt;0.29 and &lt;2.00 uses per day</td>
<td>≥2.00 uses per day</td>
</tr>
</tbody>
</table>

Table 3. Asthma Control Definitions for Analysis of Children Ages 0-11 (Based on NAEPP Guidelines)

<table>
<thead>
<tr>
<th>Control Components</th>
<th>Well Controlled</th>
<th>Not Well Controlled</th>
<th>Very Poorly Controlled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ages 0-4</td>
<td>Ages 5-11</td>
<td>Ages 0-4</td>
<td>Ages 5-11</td>
</tr>
<tr>
<td>Symptoms</td>
<td>≤8 days in past 30 days</td>
<td>&gt;8 days in the past 30 days but not throughout the day</td>
<td>Every day in the past 30 days and throughout the day</td>
</tr>
<tr>
<td>Nighttime Awakenings</td>
<td>≤1 time in past 30 days</td>
<td>&gt;1 and &lt; 4 times in past 30 days</td>
<td>≥2 and &lt; 8 times in past 30 days</td>
</tr>
<tr>
<td>Rescue Medication Use</td>
<td>≤0.29 uses per day</td>
<td>&gt;0.29 and &lt;2.00 uses per day</td>
<td>≥2.00 uses per day</td>
</tr>
</tbody>
</table>
Active Asthma Definition

The active asthma classification identifies persons with asthma who have either:
- gone to the doctor about their asthma or
- taken asthma medications or
- reported asthma symptoms
within the last year. This classification assisted in identifying more individuals with persistent asthma.

The graphs below will use the control classifications along with the new active asthma classification. This classification was used because a large portion of those who reported having current asthma had well-controlled asthma and hadn’t taken asthma medication in over a year.

Figure 6. Prevalence of Overall Asthma Control Level Among Adults with Active Asthma, Utah, 2007-2009.

A little over half of adults with active asthma had well controlled asthma (54.6%), which leaves the other half of respondents as having not well or very poorly controlled asthma.

The next graphs show the use of the control classification along with the active asthma definition to identify control levels among children. The child control levels were broken into three age groups because they are based on the NAEPP Guidelines.
In general, among children with active asthma, the rate of asthma control appears to increase as age increases.
Figure 8. Percent of Those Who Reported Having Ever Been Given an Asthma Action Plan, an Emergency Department Visit, or Cost Barrier to Care Among Adults with Active Asthma by Overall Asthma Control Level, Utah, 2007-2009.

*The primary diagnosis code ICD 493 was used to identify emergency department visits due to asthma. Data include only those who were treated and released but not admitted as inpatients.
+ In the last 12 months, could not see their primary doctor, specialist, or buy needed asthma medications because of cost.

For action plans, 15.9 percent of those classified as having well controlled asthma reported having ever been given an asthma action plan. Those classified as having very poorly controlled asthma had the highest emergency department usage (30.9%) and most often reported cost as a barrier to care (31.6%).

Only the subcomponent of having an action plan could be analyzed in children due to the small sample size.

Figure 9. Children with Active Asthma Who Reported Having Ever Been Given an Asthma Action Plan by a Two-level Control Variable, Utah, 2007-2009.

* Estimate has a coefficient of variation greater than 30% and does not meet Utah Department of Health standards for reliability.

For children ages 5 to 11, 47.0 percent of those classified as having well controlled asthma had ever been given an asthma action plan.
Conclusion

Asthma management remains an area that needs to be addressed on several levels. Improvements in asthma management require proper classification of asthma severity and regular use of asthma controller medications when prescribed by a physician.

References

Appendix A

Stepwise Approach for Managing Asthma Long Term in Children 0-4 Years of Age

Stepwise Approach for Managing Asthma Long Term in Children 5-11 Years of Age
Stepwise Approach for Managing Asthma Long Term in Youths ≥ 12 Years of Age and Adults

Source: NAEPP Guidelines, 2007
### Appendix B

#### NAEPP Guidelines: Assessing Asthma Control in Children Ages 0-11

<table>
<thead>
<tr>
<th>Components of Control</th>
<th>Assessing Asthma Control and Adjusting Therapy in Children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Well Controlled</td>
</tr>
<tr>
<td>Ages 0-4 Ages 5-11</td>
<td>Ages 0-4 Ages 5-11</td>
</tr>
<tr>
<td><strong>Symptoms</strong></td>
<td>≤2 days/week but not more than once on each day</td>
</tr>
<tr>
<td><strong>Nighttime awakenings</strong></td>
<td>≥1x/month</td>
</tr>
<tr>
<td><strong>Interference with normal activity</strong></td>
<td>None</td>
</tr>
<tr>
<td><strong>Impairment</strong></td>
<td>≤2 days/week</td>
</tr>
<tr>
<td>Short-acting beta-agonist use for symptom control (not prevention of EIB)</td>
<td>N/A</td>
</tr>
<tr>
<td>Lung function</td>
<td>N/A</td>
</tr>
<tr>
<td>FEV1 (predicted) or peak flow personal best</td>
<td>N/A</td>
</tr>
<tr>
<td>FEV1/FVC</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Exacerbations requiring oral systemic corticosteroids</strong></td>
<td>0-1x/year</td>
</tr>
<tr>
<td><strong>Reduction in lung growth</strong></td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Risk</strong></td>
<td>Medication side effects can vary in intensity from none to very troublesome and worrisome. The level of intensity does not correlate to specific levels of control but should be considered in the overall assessment of risk.</td>
</tr>
</tbody>
</table>

**Recommended Action for Treatment**

(See “Stepwise Approach for Managing Asthma” for treatment steps.)

The stepwise approach is meant to assist, not replace, clinical decisionmaking required to meet individual patient needs.

- Maintain current step.
- Regular followup every 1-6 months.
- Consider step down if well controlled for at least 3 months.
- Before step up:
  - Review adherence to medication, inhaler technique, and environmental control.
  - If alternative treatment was used, discontinue it and use preferred treatment for that step.
  - Reevaluate the level of asthma control in 2-6 weeks to achieve control; every 1-6 months to maintain control.
  - Children 0-4 years old: If no clear benefit is observed in 4-6 weeks, consider alternative diagnoses or adjusting therapy.
  - Children 5-11 years old: Adjust therapy accordingly.
- For side effects, consider alternative treatment options.
<table>
<thead>
<tr>
<th>Components of Control</th>
<th>Classification of Asthma Control (≥ 12 years of age)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Well Controlled</td>
</tr>
<tr>
<td>Symptoms</td>
<td>≤2 days/week</td>
</tr>
<tr>
<td>Nighttime awakenings</td>
<td>≤2x/month</td>
</tr>
<tr>
<td>Interference with normal activity</td>
<td>None</td>
</tr>
<tr>
<td>Short-acting β₂-agonist use for symptom control (not prevention of EIB)</td>
<td>≤2 days/week</td>
</tr>
<tr>
<td>FEV₁ or peak flow</td>
<td>&gt;80% predicted/ personal best</td>
</tr>
<tr>
<td>Validated questionnaires</td>
<td>ATAQ</td>
</tr>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Risk</td>
<td>Exacerbations requiring oral systemic corticosteroids</td>
</tr>
<tr>
<td></td>
<td>Progressive loss of lung function</td>
</tr>
<tr>
<td></td>
<td>Treatment-related adverse effects</td>
</tr>
</tbody>
</table>

**Recommended Action for Treatment**

(See "Stepwise Approach for Managing Asthma" for treatment steps.)

- Maintain current step.
- Regular followup at every 1–6 months to maintain control.
- Consider step down if well controlled for at least 3 months.
- Step up 1 step.
- Reevaluate in 2–6 weeks.
- For side effects, consider alternative treatment options.
- Consider short course of oral systemic corticosteroids.
- Step up 1–2 steps.
- Reevaluate in 2 weeks.
- For side effects, consider alternative treatment options.

Source: NAEPP Guidelines, 2007