Montana Asthma Home Visiting Program

Summary of Enrollment and Outcomes

August, 2015

In Montana…

- An estimated 16,700 (7.5%) children have current asthma
- Two in five (42%) children with asthma reported symptoms indicating their asthma was uncontrolled
- Only 4% of children with asthma reported having received all 5 of the main components of asthma self-management education

2006-2010 Asthma Call-back Survey

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5 components of ASME:
Avoidance of asthma triggers
Roles of medications & inhaler technique
Patient adherence to controller medication
Importance of regular check-ins with primary care provider or specialist
Importance of having a developed asthma action plan

Guidelines Recommend…

- "the use of home-based multi-trigger, multicomponent interventions with an environmental focus for children and adolescents with asthma"[1]
- Self-management education as an essential tool for people with asthma to control and improve their asthma symptoms[2]

1. The Community Preventive Services Task Force
2. The National Heart, Lung, and Blood Institute's Expert Panel Review-3 Asthma Guidelines, 2007

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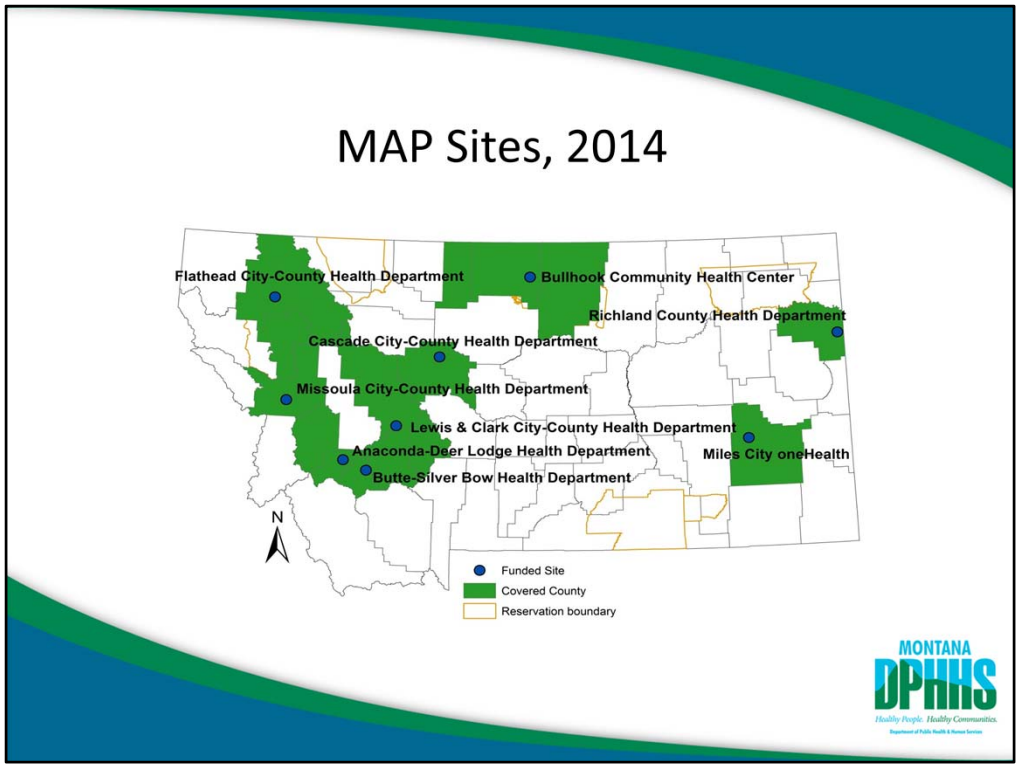

Summary of the MAP Program:

- 3 sites funded in 2011
- 6 more sites added in 2014
- 2 more sites will be funded in 2015

What MAP Participants Receive

- Six visits over the course of a year by a registered nurse who has received asthma focused training.
- An asthma home assessment to identify possible asthma triggers
- Asthma education
- Free asthma-friendly allergen proof mattress and pillow covers
- Free HEPA-grade air purifier to families with pets or smokers in the household
- Free educational materials
- Assistance coordinating with primary care provider
- Assistance coordinating with school nurse, landlords, and other helpful organizations.

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Summary of the MAP Program:

MAP participants receive 6 contacts (4 in the home, 2 phone contacts) from a registered nurse to address asthma education, asthma triggers in the home, inhaler technique, and linkages to health care over the course of 12 months

The Montana Asthma Control Program provides…

- Training on program implementation, foundations of asthma, pharmacotherapy, and asthma triggers
- Ongoing technical assistance through monthly conference calls, data analysis, and evaluation
- Participant and program supplies like HEPA filters, allergen impermeable bed sheets, marketing materials

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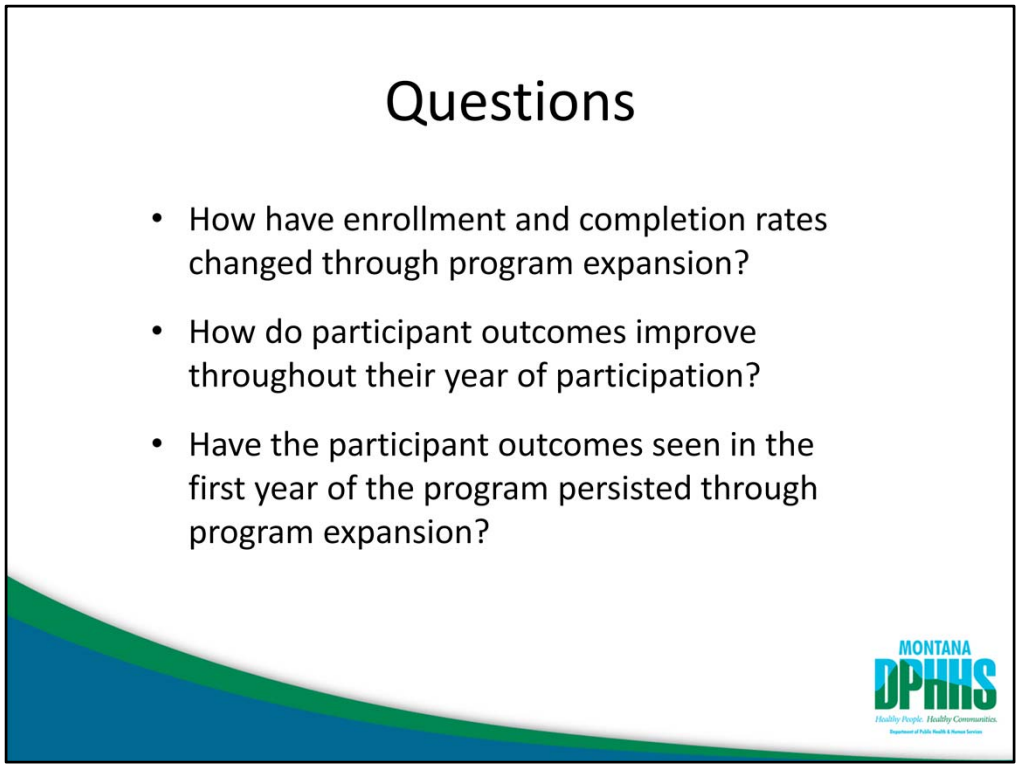
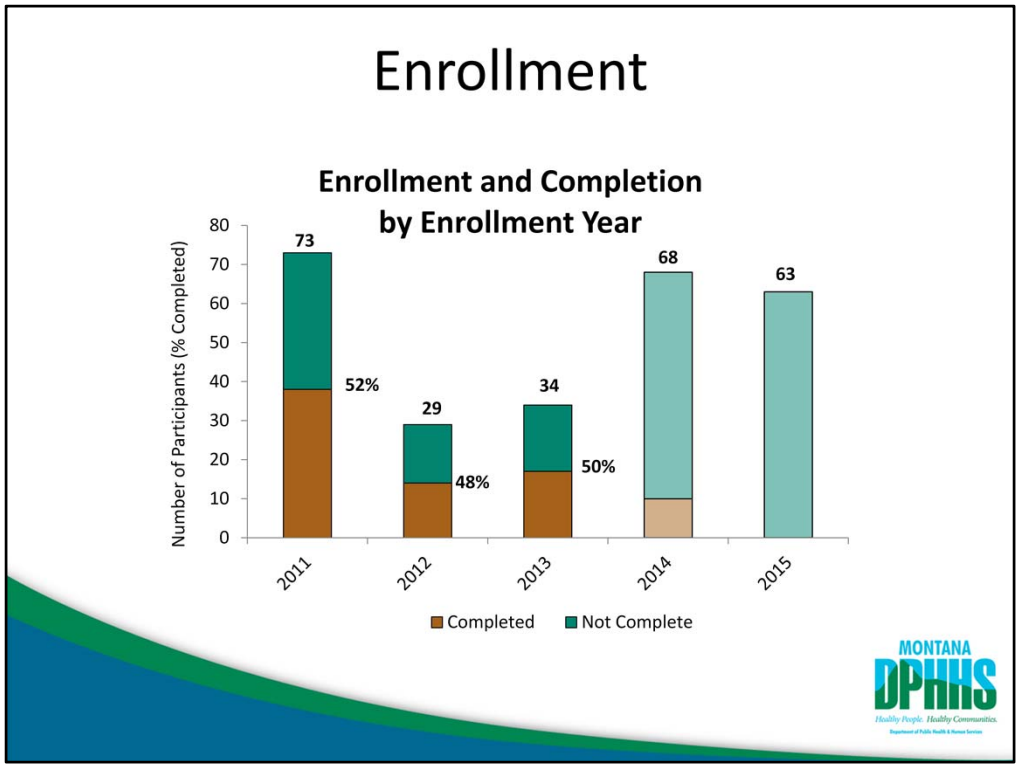
Summary of the MAP Program



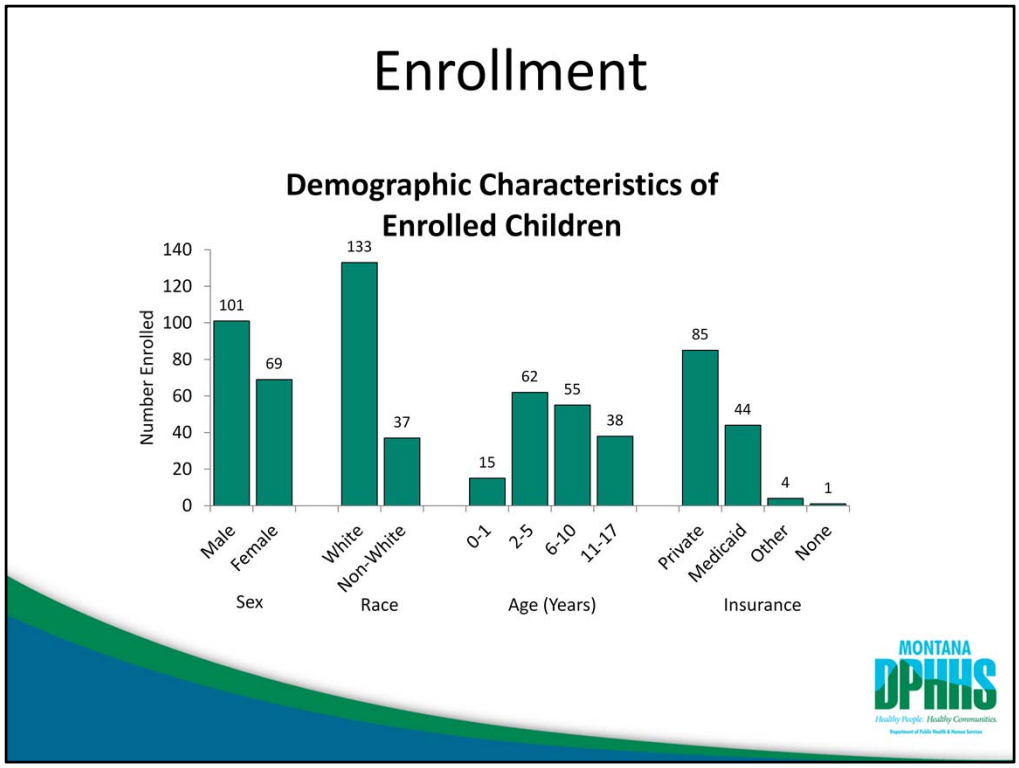
To examine the program processes and outcomes and how they may have changed through the expansion and duration of the program, we started with these three general questions. The data used was that provided by the home visiting nurses from 2011 through July, 2014.

Data Structure:

- Each visit with a program participant is recorded.
- At each visit, a set of data is collected from the family and child through a variety of questionnaires. Data on the logistics of the visit are also submitted by the home visiting nurse.
- Information collected covers aspects such as asthma education, control, and symptoms as well as participant demographics.

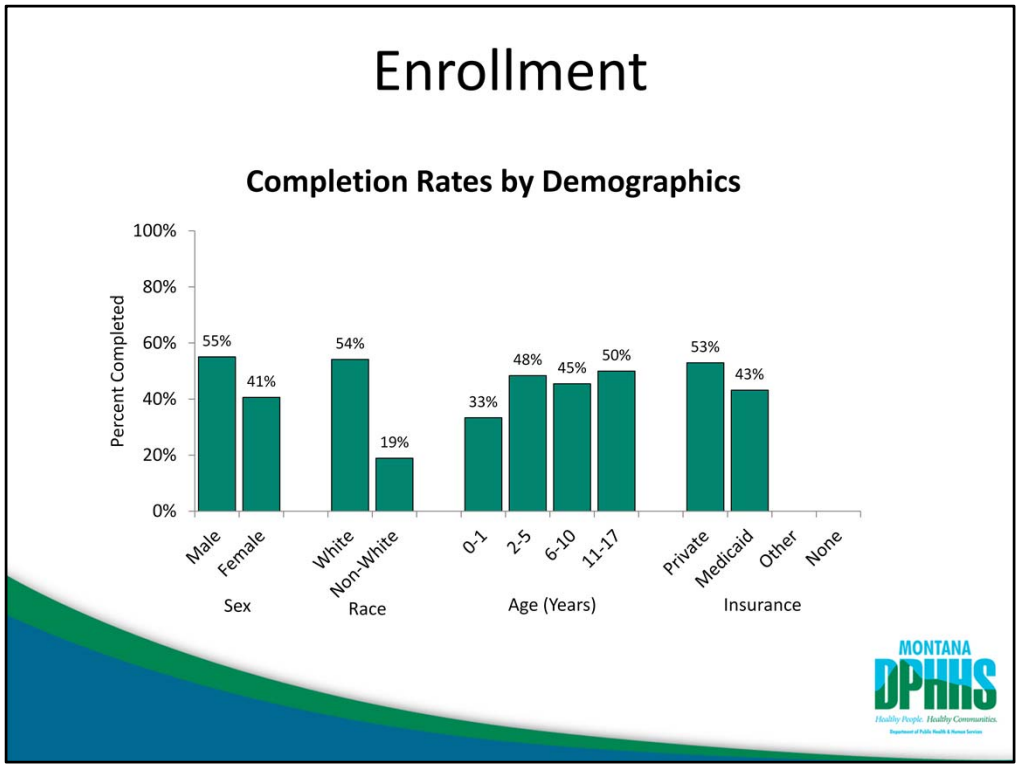


- Overall, we seem to be maintaining about a 50% completion rate from 2011 through 2013.
- Since the cut-point for the data in this report was July 2015, participants enrolled in the later half of 2014 or in 2015 have not yet had time to complete the program and the completion rates for these years are not known.



Demographic Characteristics of Enrolled Children

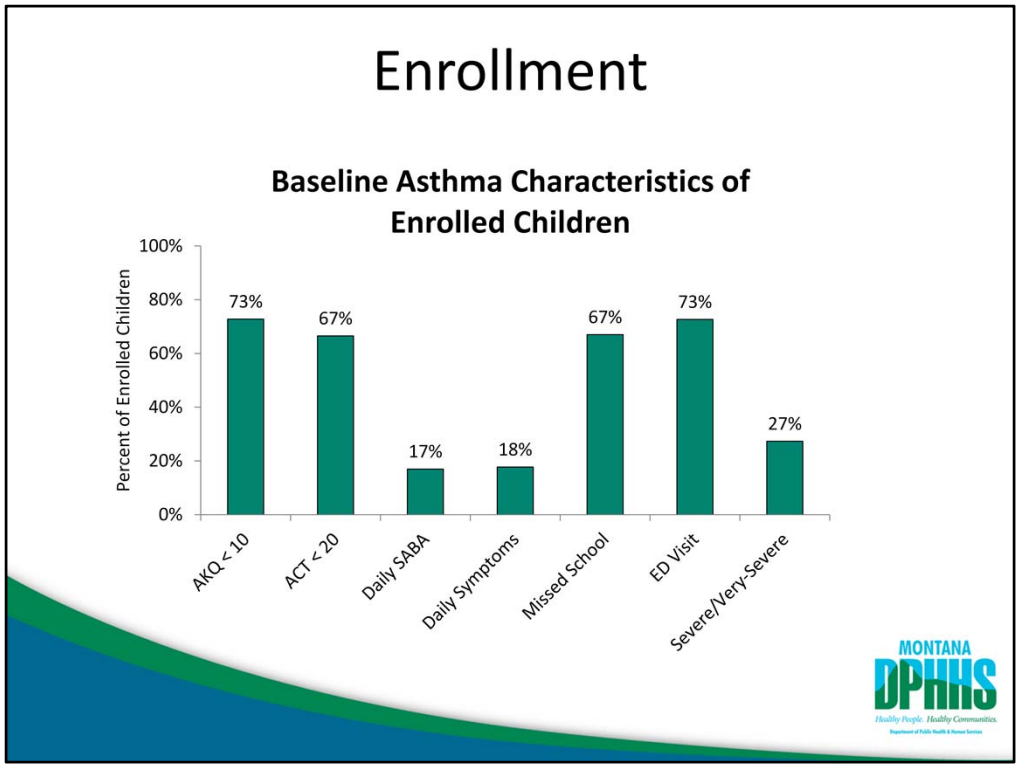
- More boys than girls were enrolled which we could expect given the higher prevalence of asthma among young boys than young girls.
- About 22% of participants were non-white, higher than the 10% seen in the MT population.
- There was a fairly wide age distribution, spanning all years of program eligibility (0 to 17 years of age).
- Medicaid as an insurer was slightly more common among participants than in the Montana child population (43% compared to about 34%, respectively).



This graph shows the completion rates among participants who were enrolled prior to July 1, 2014 and therefore had an opportunity to complete the program by July 1, 2015.

Percent completing significantly varied by sex, race, and age but not insurance type. Overall, participants who were male, white, and/or an older age at enrollment were more likely to complete the program than participants who were female, non-white, and/or a younger age at enrollment.

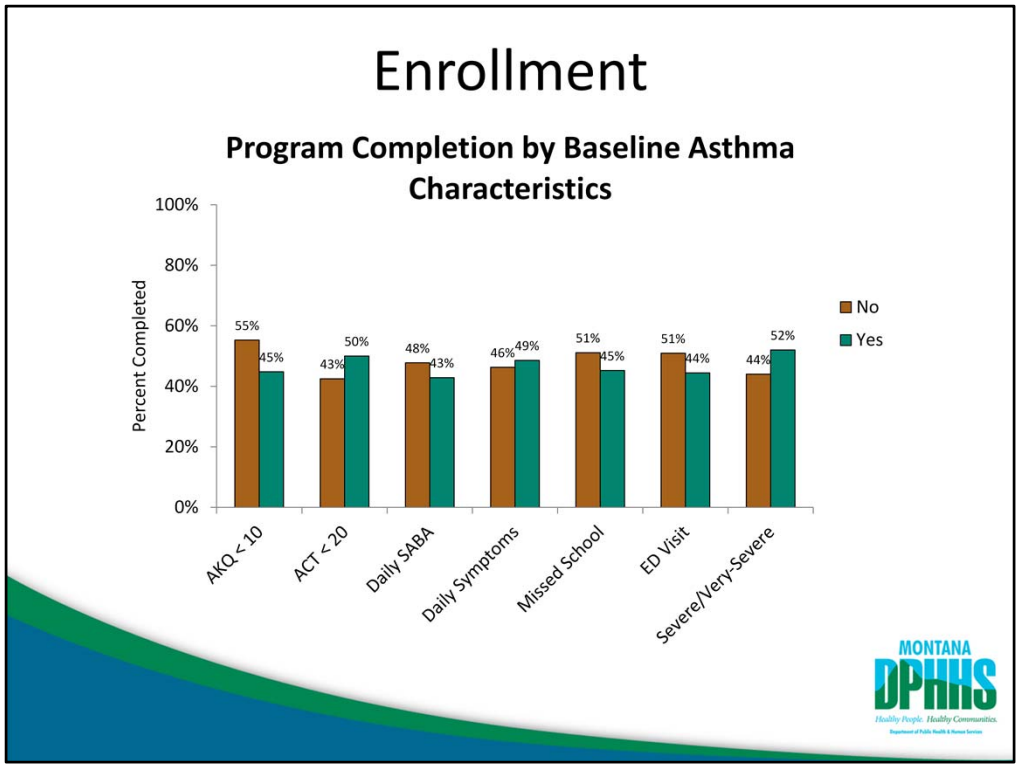
No significant difference was detected between the completion rates of participants with private or Medicaid insurance.



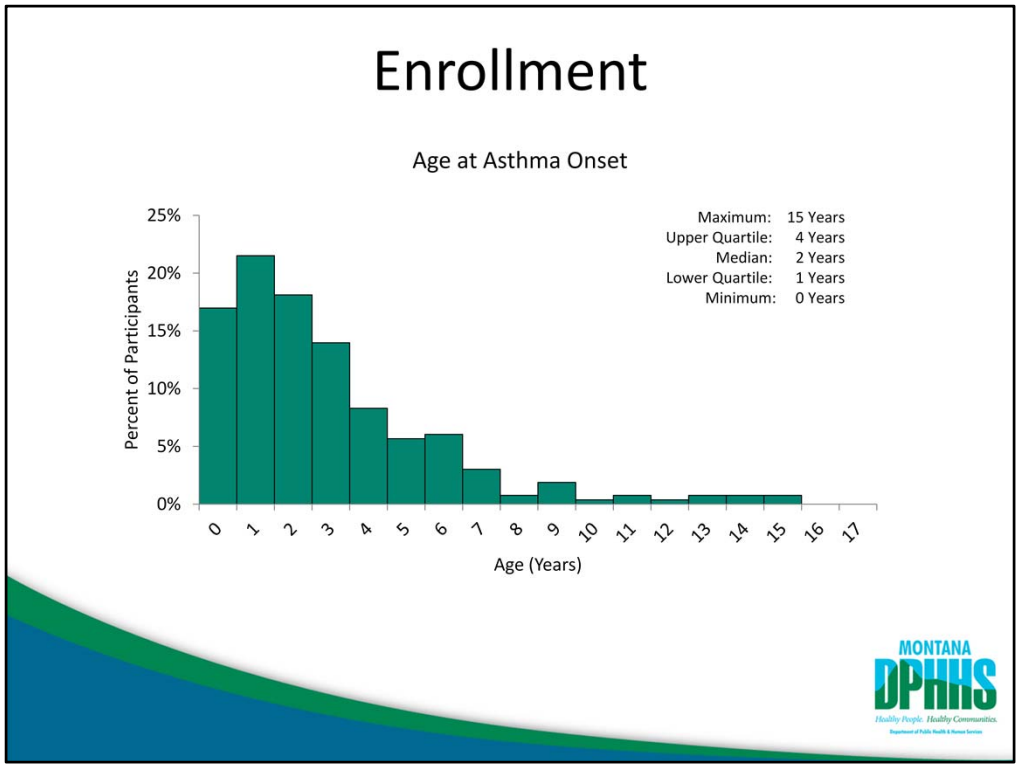
This chart summarizes the level of asthma control at baseline, as measured by 7 indicators, among program participants.

- All participants had at least one indicator of poor asthma control.

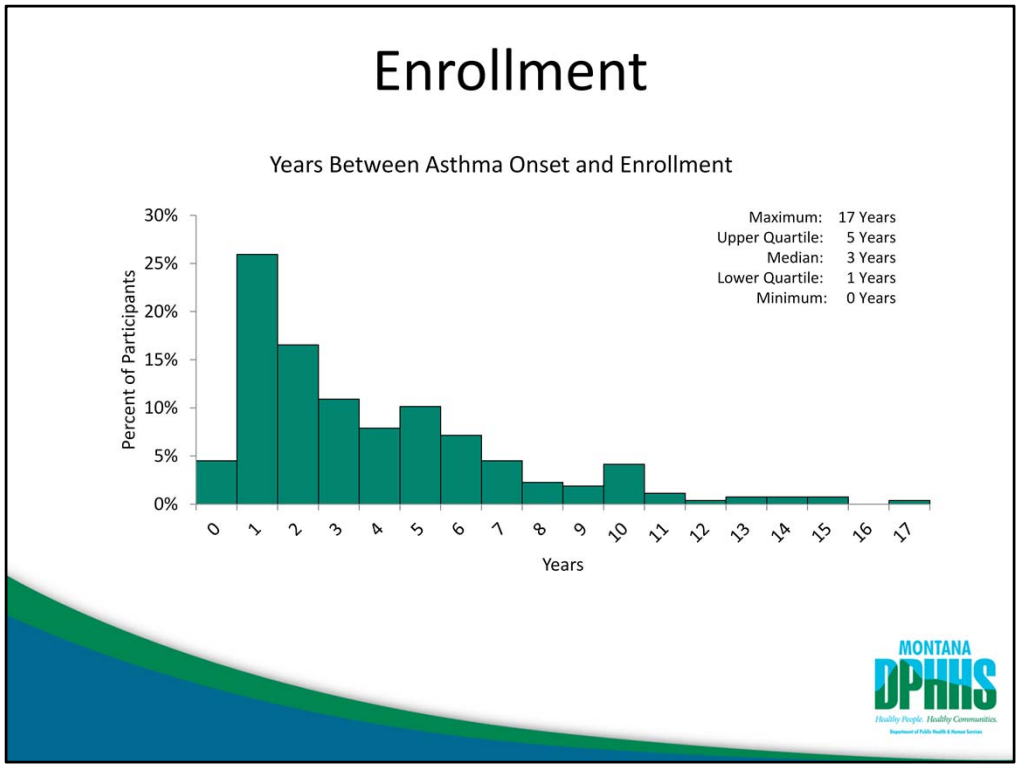
- The AKQ is the asthma knowledge quiz, an 11 item quiz where a score less than 10 indicates room for improvement in asthma education.
- The ACT is the asthma control test which is a 5-question 25 point validated test which includes questions about symptoms, medication use, and perceived asthma control. A score less than 20 is seen as an indicator of general uncontrolled asthma.
- "Daily SABA" is self-reported daily use of Short Acting Beta Agonist, or rescue, inhaler medication.
- "Missed School" is any reported missed school days due to asthma in the past 6 months among children old enough to be in school.
- "ED Visit" is any emergency department visit for asthma in the past 6 months.
- "Severe/Very-Severe" is self-reported severe/very-severe asthma in the past month.



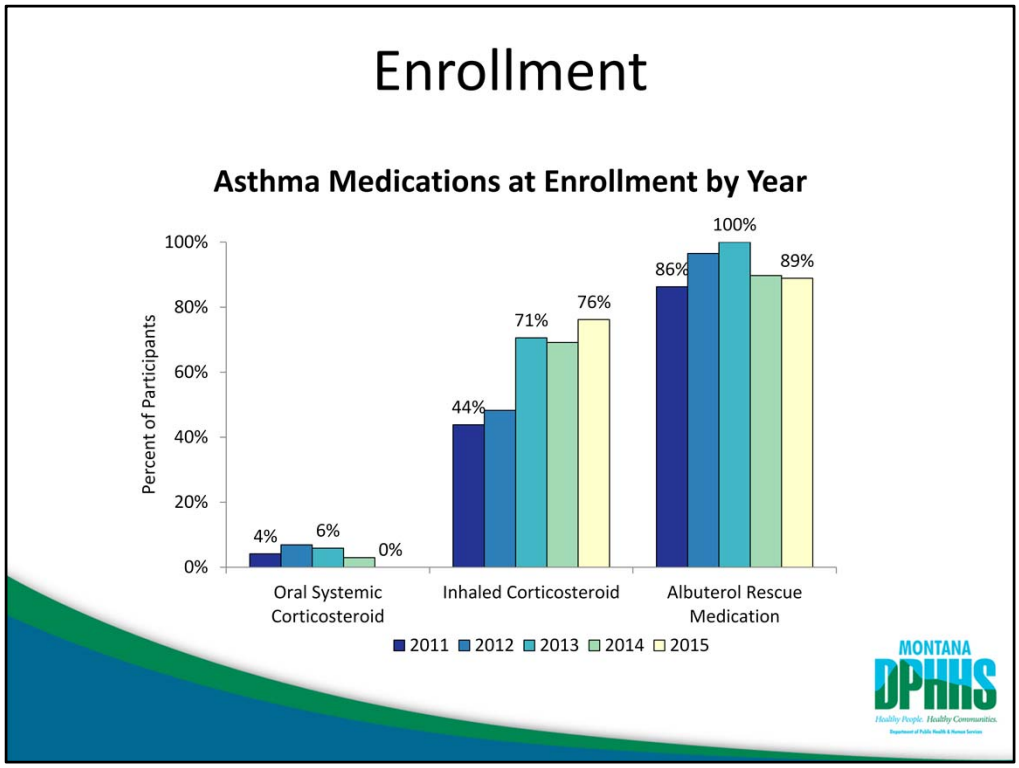
This chart summarizes completion rates by baseline indicators of asthma control among participants enrolled prior to July, 2014.
Overall, there is no clear pattern of increased or decreased likelihood of completing the program based on asthma control at baseline.



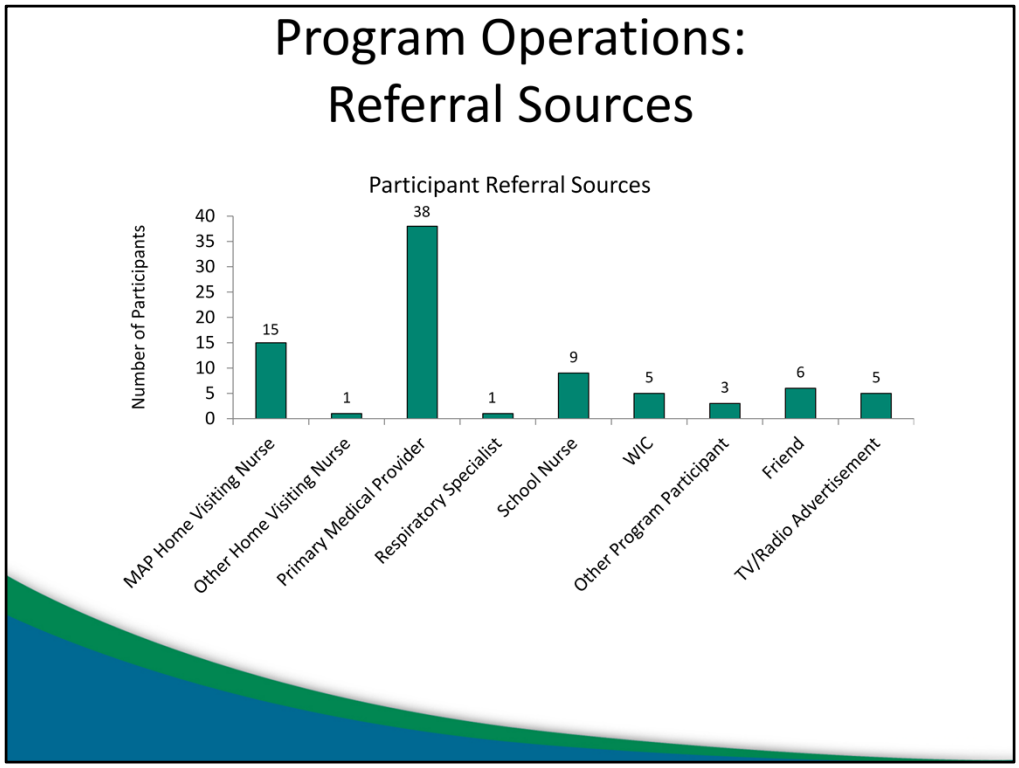
How long the child has been living with asthma prior to program enrollment is a concern for understanding the child's baseline familiarity with asthma symptoms and medication. Here we see that most enrolled children developed asthma before age 5. The next slide shows the time between asthma onset and program enrollment.



When we look at the difference between age at onset and age at enrollment, we see quite a bit of variance in the time the child has been living with asthma at enrollment. While many enroll within one or two years of onset, 25% of participants have had asthma for 6 or more years at enrollment.

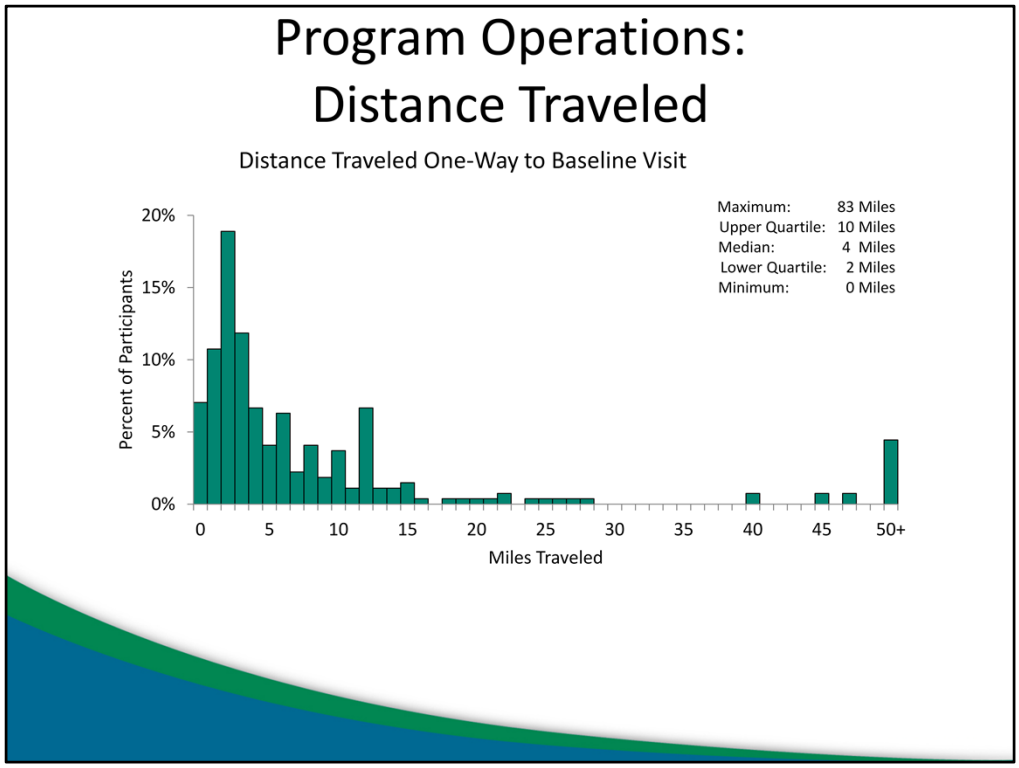


Finally, for enrollment data, we can see an interesting trend in baseline medication use. It is usually recommended that persons with uncontrolled asthma are prescribed a long-term controller medication, such as an inhaled corticosteroid. Looking at each yearly cohort of enrolled children, we can see an increase in the percent with a controller medication at baseline since 2011.



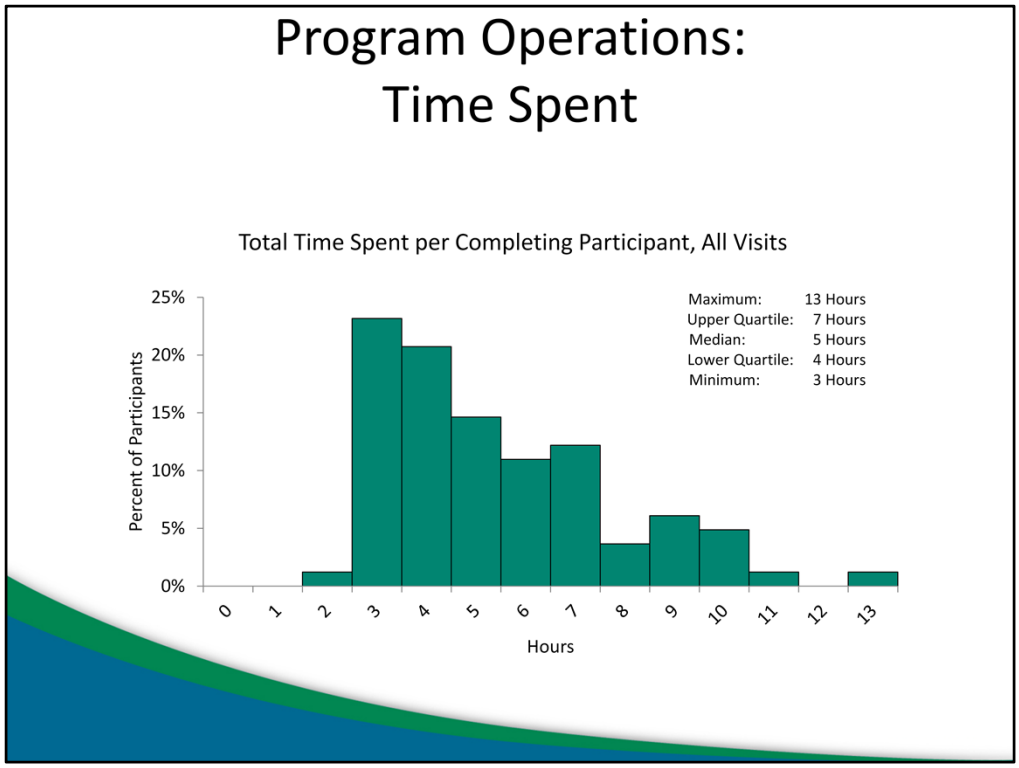
Moving from enrollment characteristics to program operations, we recently began collecting data on referral sources in 2014. The participant is asked how they heard of or where referred to the program.
From this, we can see a large number of participants report hearing about the program from their primary medical provider, and other health care workers such as school nurses. A substantial proportion are also recruited from direct outreach by the home visiting nurse.

Many participants did not have a recorded referral source which may bias any proportional comparison of referral sources.

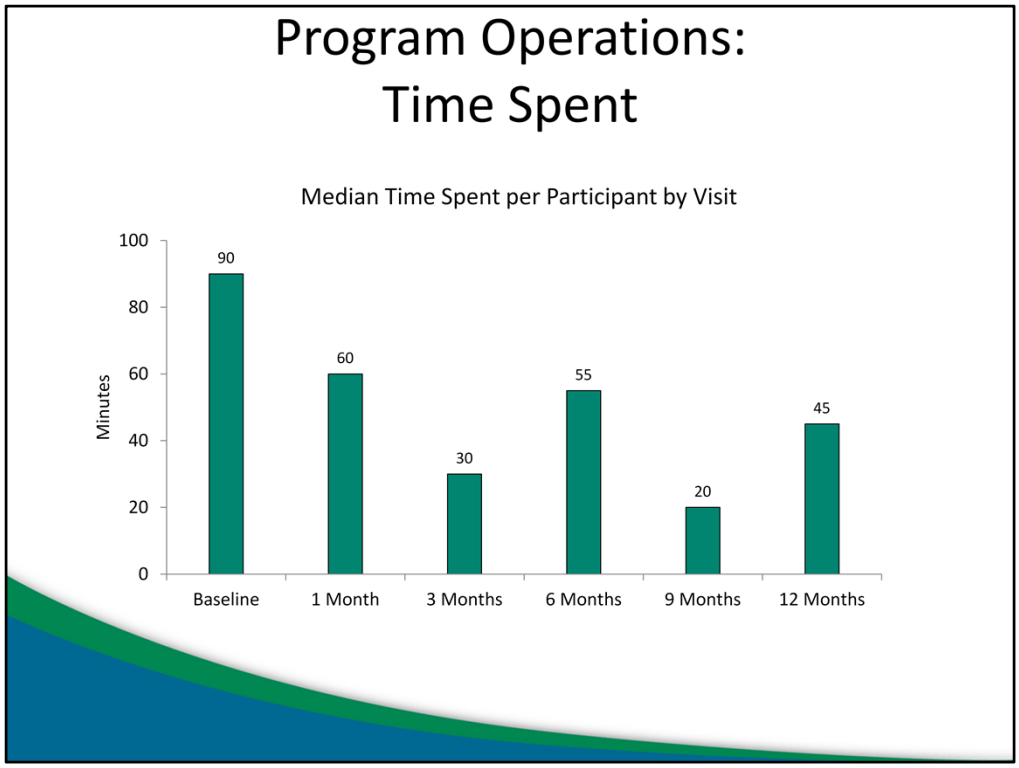


The distance the nurse travels to the child's home is one way to estimate the reach of the program.

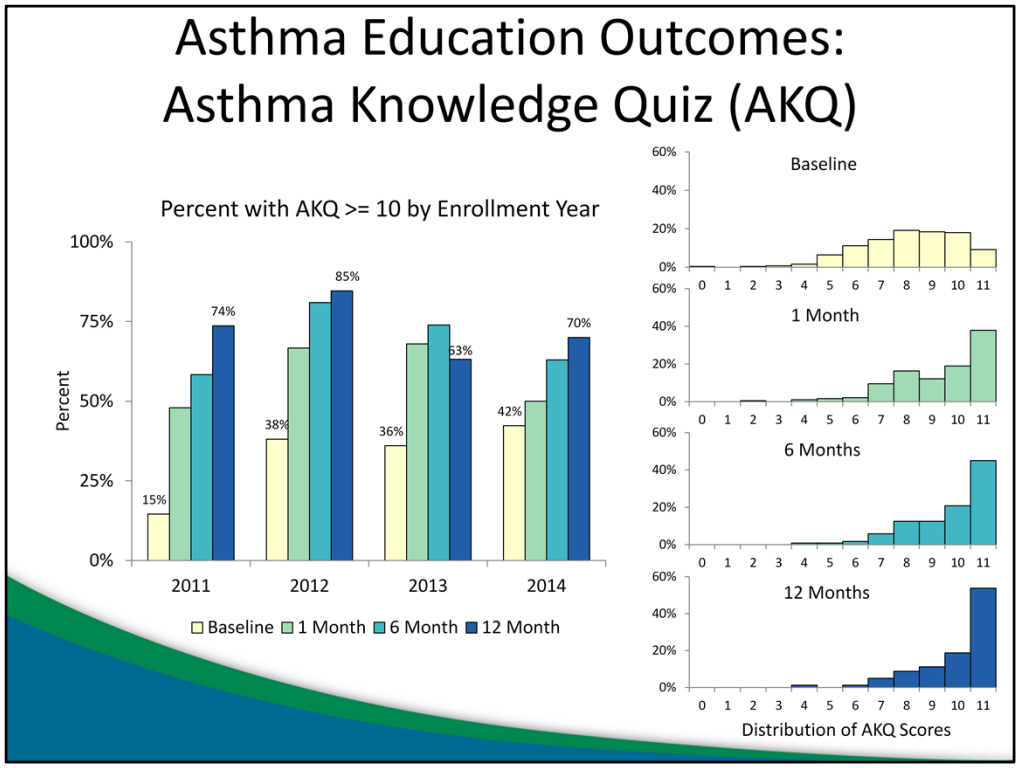
While the program sites are largely located in the larger population centers, the program is intended to reach children living in the more rural parts of the county or surrounding counties of a program site as well as those living in the population center. However, 75% of those enrolled live within 10 miles of the nurse's office. This may indicate that while the sites are intended to cover whole or multiple counties, the reach may actually be limited to a smaller radius centered on the city where the site is located.



The time spent per completing participant ranged from 3 to 13 hours. Anecdotal reports suggest that more time is spent with more difficult cases.
The median time spent per completing participant is about 5 hours.



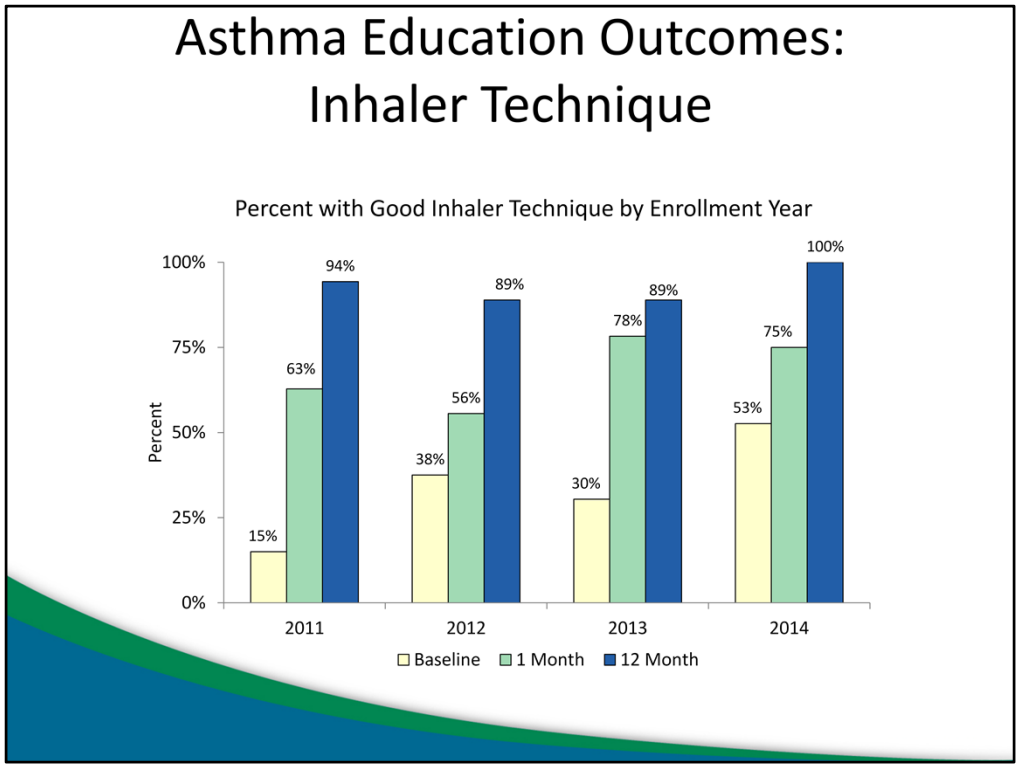
Breaking the time per completing participant down into the six visits, we can see the visits taking place in the home take about an hour (baseline, 1 month, 6 months, 12 months) and the visits taking place over the phone take about a half hour.



Note: All outcomes shown are limited to those completing the program. Participants with a missing outcome measurement at a visit are excluded for the visit for which the measure is missing but not other visits. Likewise, those not completing one of the visits are excluded for that visit, but not other visits.

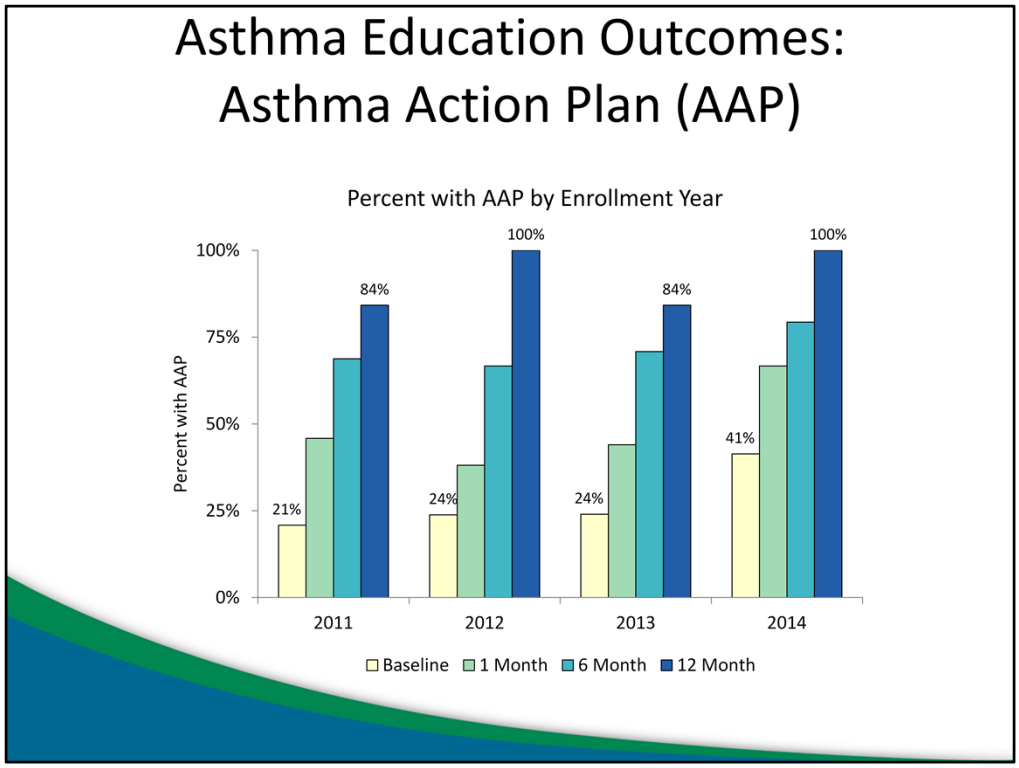
Program Outcomes – Asthma Education:

- Asthma Knowledge Quiz
    - Measured at baseline, 1-month, 6-months, and 12-months
    - A score of 10 or higher is an indicator of adequate asthma knowledge.
    - For each enrollment year there was a steady increase in the percent of participants scoring 10 or higher from baseline to 12-month visits.
    - Looking at the distributions of AKQ scores at each month (the four histograms on the right of the slide), we can see that while many participants are at the right end of the distribution at baseline, the low-scoring left tail steadily narrows out from baseline to 12 month.
    - The distribution of scores narrows and moves towards higher scores as participants move through the program.
    - This is an indicator that asthma education improves asthma knowledge throughout the full year.
        - The initial education provided at the baseline visit is not solely responsible for the improved outcomes over the course of the year. Continued reinforcement of education at subsequent visits continues to improve asthma knowledge.



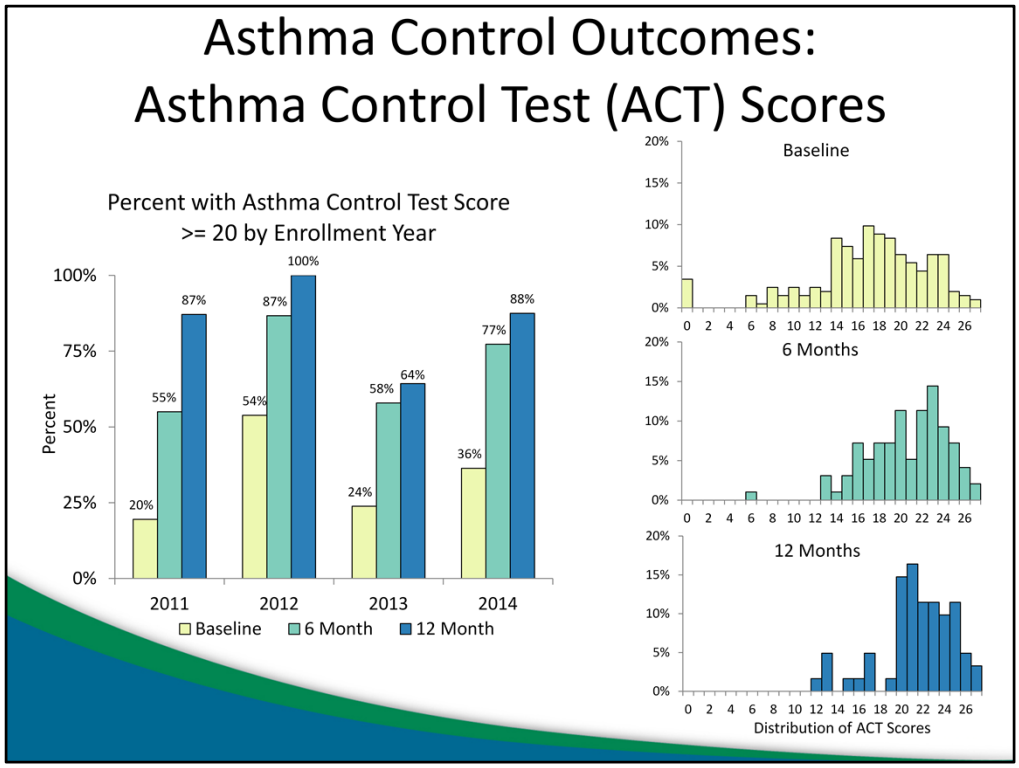
Program Outcomes – Asthma Education:

- Good Inhaler Technique
    - Measured at baseline, 1-month, and 12-months
    - For each enrollment year there was an increase in the percent of participants demonstrating good inhaler technique from baseline to 1-month and again from 1-month to 12-months.



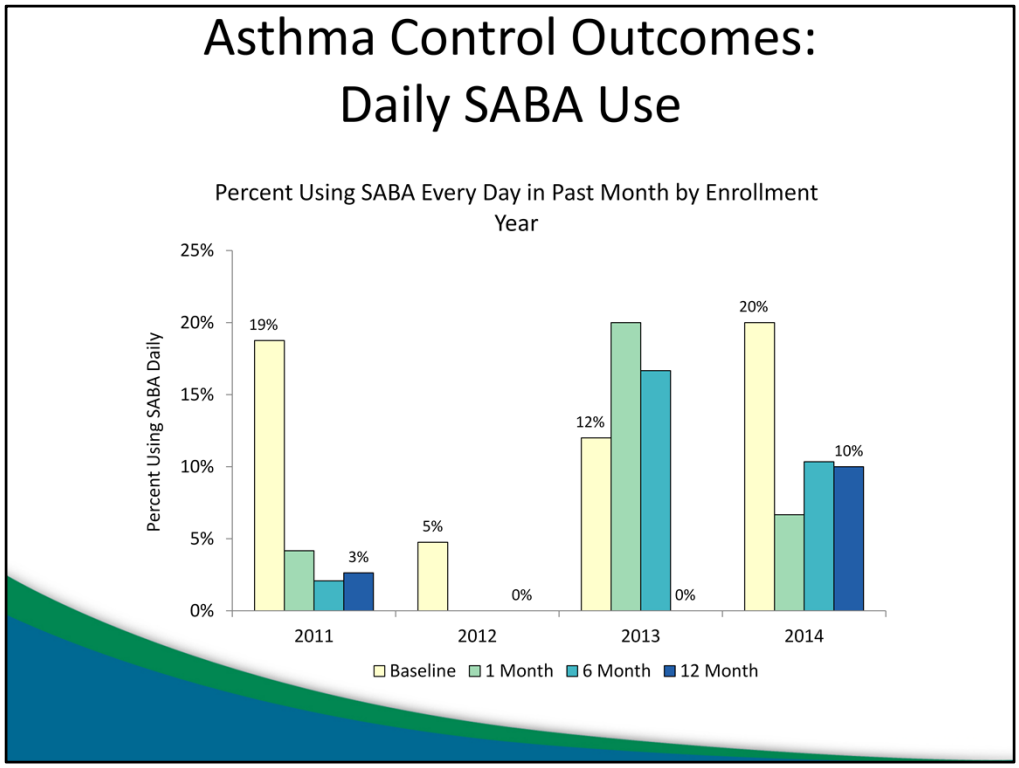
Program Outcomes – Asthma Education:

- Asthma Action Plan
    - Measured at baseline, 1-month, 6-months, and 12-months
    - For each enrollment year there was a steady increase in the percent of participants who have an asthma action plan from baseline to 12-months.
    - Having an asthma action plan depends on coordination between the family of the participant and their healthcare provider. That this sometimes takes up to a year was not surprising.



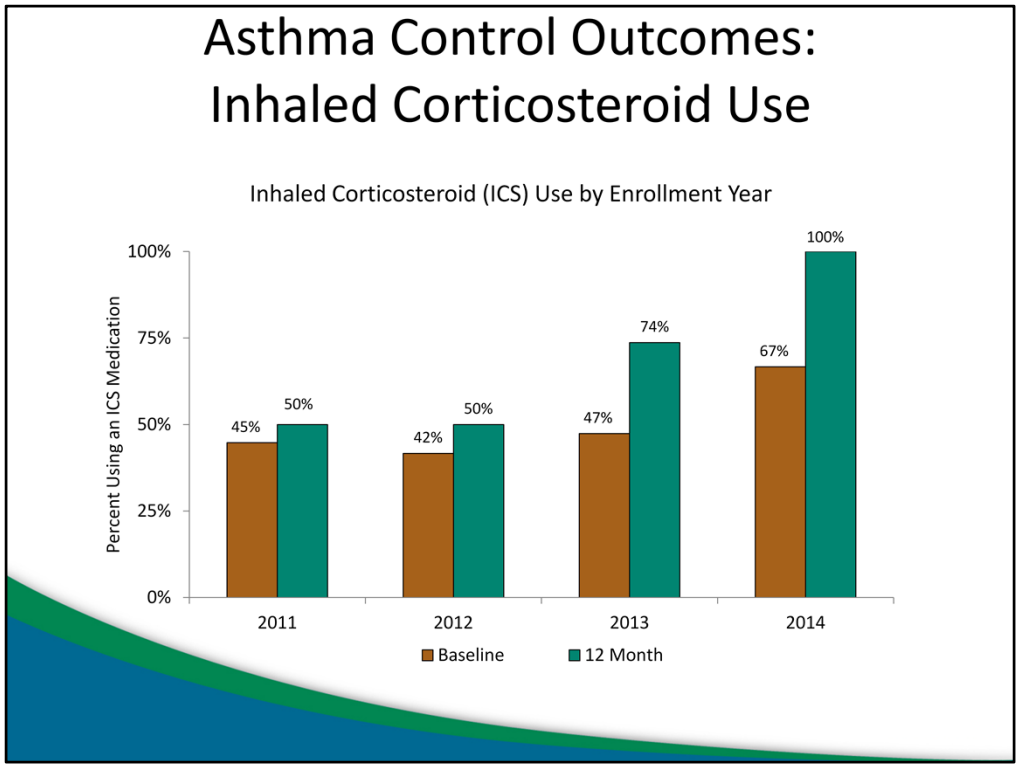
Program Outcomes – Asthma Control:

- Asthma Control Test
    - Measured at baseline, 6-months, and 12-months
    - The ACT is a validated index of asthma control that incorporates measures of symptoms, medication use, and other aspects of asthma control.
    - A score of 20 or higher is an indicator of well-controlled asthma.
    - For each enrollment year there was an increase in the percent of participants who scored 20 or higher from baseline to 6-months and again from 6-months to 12-months.
    - The distribution of ACT scores at each visit shown in the histograms on the right of the slide suggest a narrowing of the distribution and movement toward higher scores among all participants as the program progresses.



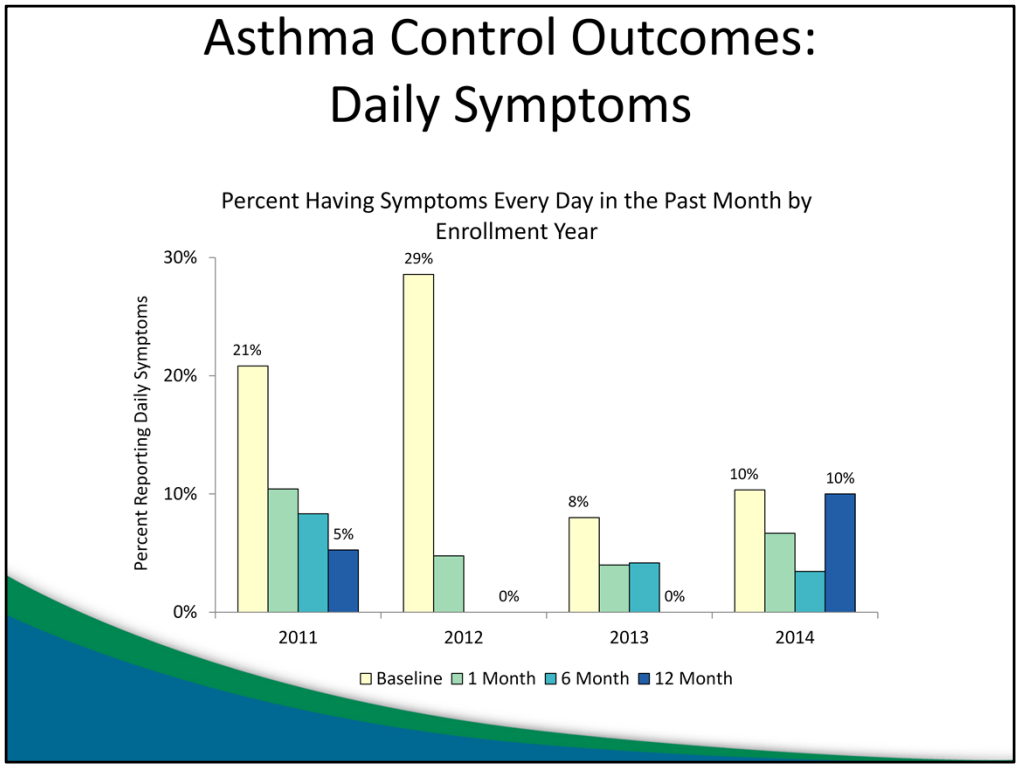
Program Outcomes – Control:

- Daily SABA (Short Acting Beta Agonist, rescue medication) Use
    - Measured at baseline, 1-month, 6-months, and 12-months
    - For each enrollment year there was a decline in the percent of participants who reported using SABA every day in the past month from baseline to 12 months. However, there was some discrepancy between cohorts on when this decline occurred.
        - In 2011, 2012 and 2014 the decline appears to have occurred primarily between baseline and 1-month.
        - In 2013 appeared to occur between 6-months and 12-months.



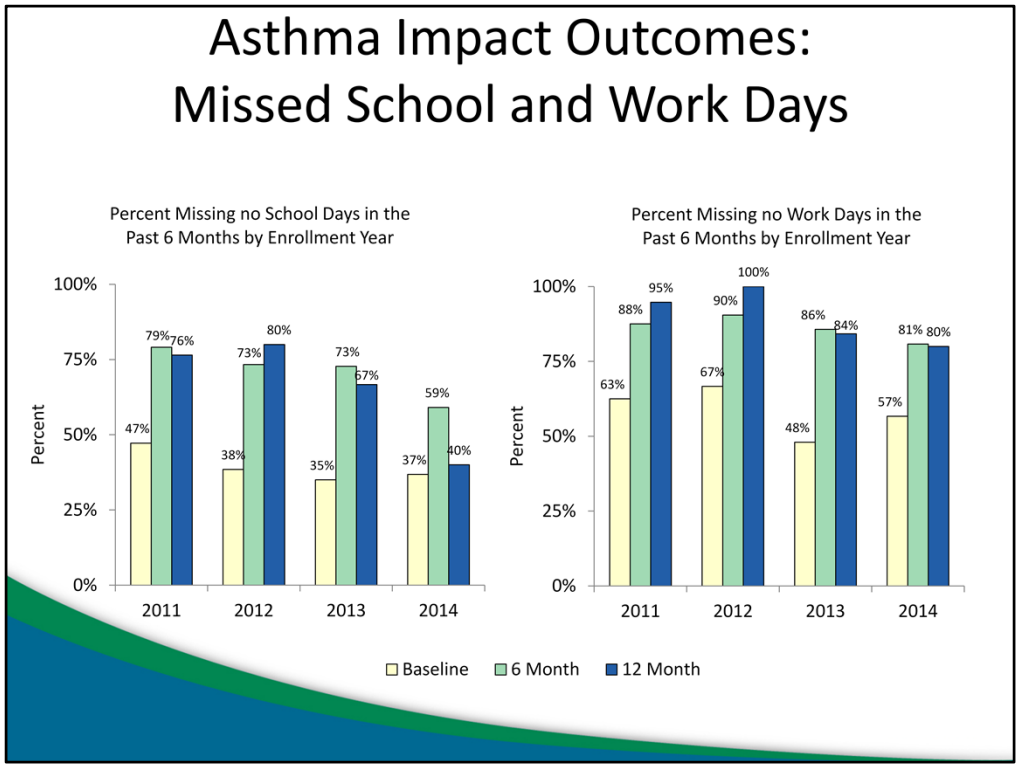
Program Outcomes – Control:

- Having an ICS (Inhaled Corticosteroid, controller medication)
    - Measured at baseline and 12-months
    - For each enrollment year there was an increase in the percent of participants who had an ICS.
    - The magnitude of the increase appears to have improved between 2011 and 2014.
        - Percent change by year:
            - 2011 – 5%
            - 2012 – 8%
            - 2013 – 27%
            - 2014 – 33%



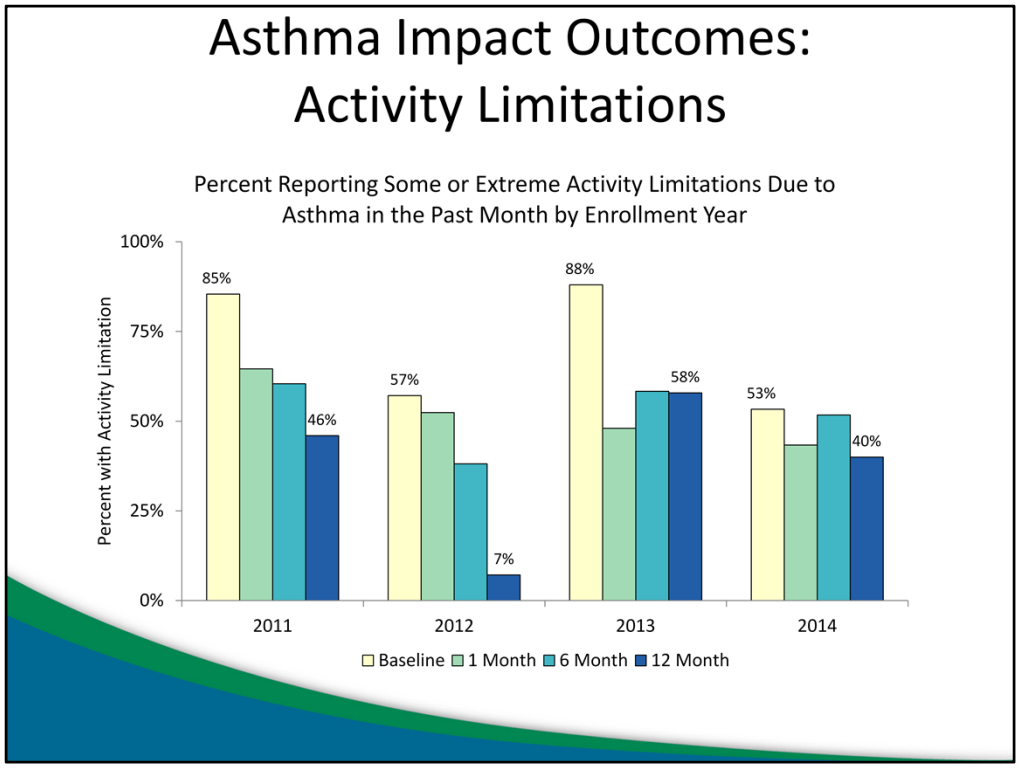
Program Outcomes – Control:

- Asthma symptoms every day in the past month
    - Measured at baseline, 1-month, 6-months, and 12-months
    - In 2011, 2012, and 2013 the decline in the percent of participants reporting asthma symptoms every day in the past month appeared to decrease steadily from baseline to 12-months.
    - In 2014, there was a decrease between baseline and 6-months but then a rise between 6-months and 12-months.
        - This could potentially be influenced by seasonality of program enrollment since the 2014 cohort in this analysis was all enrolled prior to July, 2014.



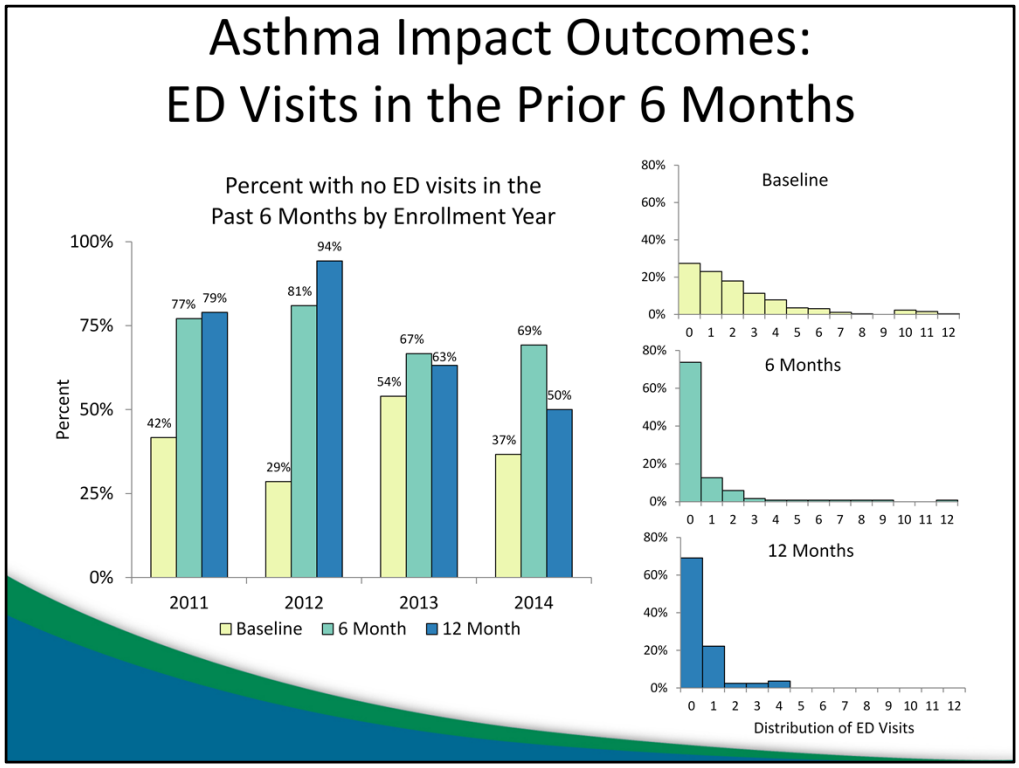
Program Outcomes – Impact of Asthma:

- Missed school days due to asthma in the past 6 months among school aged participants.
    - Measured at baseline, 6-months, and 12-months
    - The increase in the percent of participants not missing school days due to asthma in the past 6 months seems to occur primarily between baseline and 6-months with limited further improvement or decline between 6-months and 12-months.
- Parent missed work days due to child's asthma
    - Measured at baseline, 6-months, and 12-months.
    - The increase in the percent reporting not missing work days appears to occur primarily between baseline and 6-months with limited or no change between 6-months and 12-months.
    - Each year of enrolled participants showed similar results on this indicator.



Program Outcomes – Impact of Asthma:

- Participants reporting some or extreme activity limitations due to asthma in the past month.
    - Measured at baseline, 1-month, 6-months, and 12-months.
    - A steady decline between baseline and 12-months was apparent in 2011 and 2012.
    - In 2013 and 2014 the improvement appeared to occur primarily between baseline and 1-month.



Program Outcomes – Impact of Asthma:

- Emergency Department Visits in the Past 6 Months
    - Measured at baseline, 6-months, and 12-months.
    - The improvement in the percent of participants reporting no ED visits in the past 6 months appears to occur primarily between baseline and 6-months with limited further improvement between 6 and 12 months.
        - However, looking at the distributions of the number of ED visits in the past 6 months at each visit, a narrowing of the right-tail of the distribution between 6- and 12-months is apparent. While participants who had many ED visits reported at 6-months may not go on to have no ED visits reported at 12 months, they do seem to have a decreased number of ED visits at 12-months.
        - The overall improvement may be best seen by comparing the distribution of ED visits reported at baseline (top, right distribution) to the distribution reported at 12-months (bottom, right distribution).

Key Points

- Completion rates appear to be unrelated to baseline asthma control and severity
  - Participants who are male, white race, or an older age at enrollment are still significantly more likely to complete the program than participants who are female, non-white race, or younger at enrollment.
- Completion rates and participant outcomes have been maintained throughout program expansion.
- Participant outcomes improve throughout their year of enrollment.
  - Improvements in education and asthma control outcomes are not limited to the first months of the program.
  - Some participants do not show improvement until later in the program.

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New Measurements

- How many urgent care and/or unscheduled medical office visits for asthma has the child had in the last **six months**?
- Has the child been admitted to the hospital for asthma in the last **six months**?
- Does your child have a healthcare provider they usually see (i.e. MD, NP, PA)? During the past 12 months, how many times did your child see their ***usual health provider*** for a routine checkup for his/her asthma?
- Which asthma medications is your child currently taking?
  - ICS, Rescue Medication, Leukotriene Modifiers
- What is the average cost of your child's asthma medications?
- Inhaler technique at 6 month visit

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Adding these new measurements will provide us with more data that can help us assess cost benefit of the MAP.

CDC is asking us to start reporting "Phase 2 Performance Measures" beginning April 2016. New Phase 2 Measures that relate to the MAP:

H. # of participants completing intensive self management education who successfully demonstrate basic asthma self-management knowledge and skills.

- (4-6 visits or more, 60%, is considered complete)
- We will continue to measure inhaler technique- adding it to the six month visit

I. Number of participants completing the program who are without a primary care provider at the time of enrollment and are referred to and access care for asthma

K. # of program participants who were not using a long-term control medication regularly on enrollment: who reported better adherence to long-term control medication a month or more after completing intensive self-management education