

Patterns of Allergy Immunotherapy Care Among Florida Medicaid Children with Allergic Rhinitis

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Background

- Despite evidence of the clinical benefits of IT in childhood allergic rhinitis, little is currently known about IT patterns of use and potential cost benefits.
- The present study was conducted to address the paucity of data on IT utilization and patterns of care, and the impact of IT on direct costs, among children with allergic rhinitis.

Study Objectives

- Retrospective Medicaid claims analysis (1997-2004) to address three major questions among children (<18 years) with allergic rhinitis (AR)
 - Who receives IT?
 - Demographic and comorbid allergy-related illness characteristics associated with receiving IT
 - What is the course of treatment?
 - Patterns of de novo IT care
 - Does IT save the healthcare system money?
 - Comparison of costs of care during the 6 months prior to IT initiation to costs incurred in the 6 months following IT termination

Methods

- Florida Medicaid provides access to health care for more than 2 million low-income individuals.
- More than half of enrollees are under 21 years of age.
- Computerized Florida Medicaid claims records contain basic demographic information, such as sex, age, and race/ethnicity; ICD and CPT diagnosis and treatments codes; and payment data.
- Information is patient de-identified and fully compliant with HIPPA Privacy Rule.
- Subjects were identified from enrollees in the Florida Medicaid program who had a paid claim from July 1997 through June 2004.

Methods: Analysis

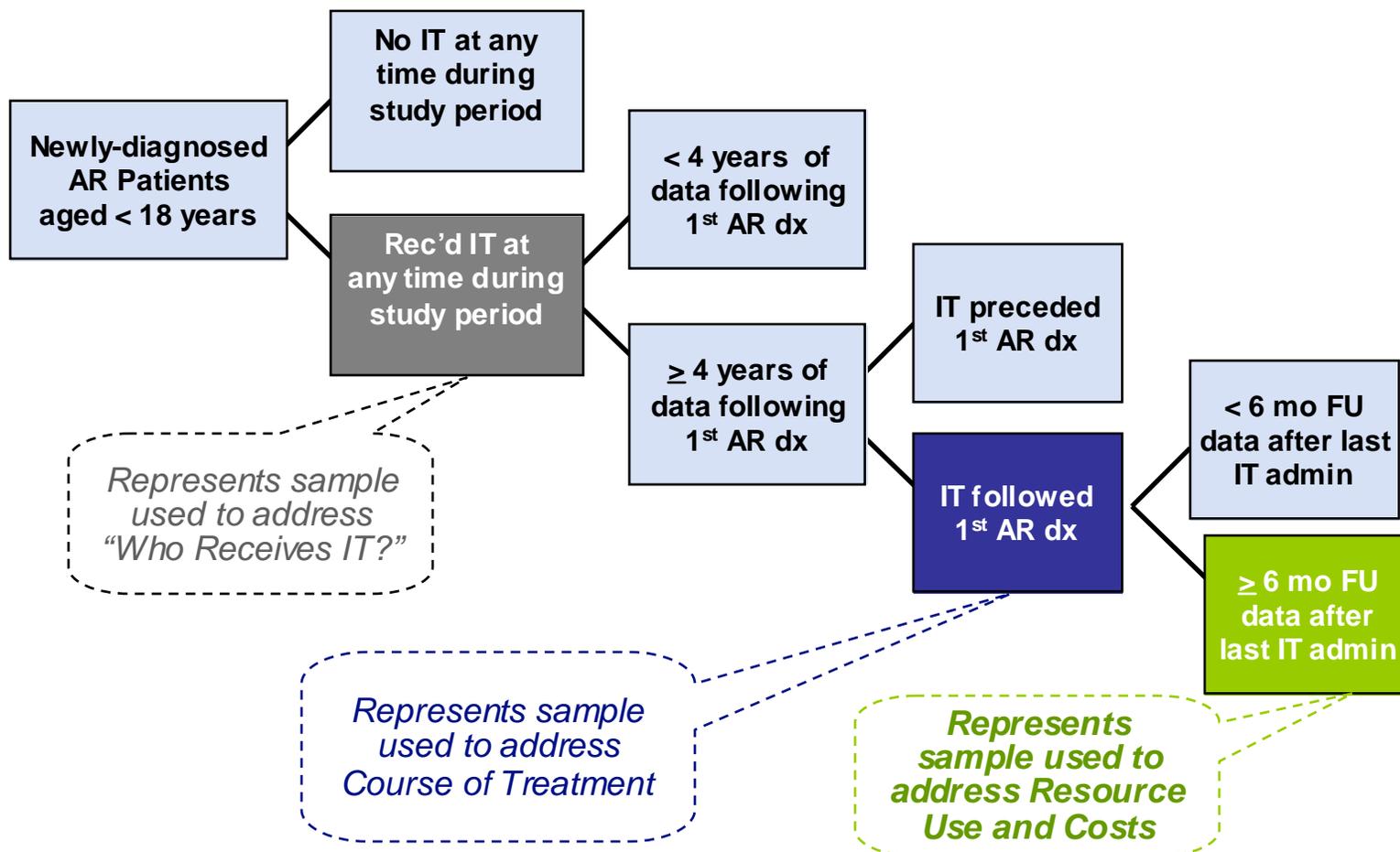
- Who receives IT?
 - T-tests compared continuous variables (e.g., age) and chi-square tests categorical variables (e.g., sex) for patients who either did or did not receive IT.
 - Logistic regression was performed to calculate likelihood estimates for variables associated with IT utilization
 - Cox proportional hazard analysis was used to evaluate predictors of premature IT discontinuation (< 3 years of IT).
- Does IT save the healthcare system money?
 - Cost data were logarithmically transformed to correct for skewed data.
 - Paired t-tests (6 months pre- and post-IT) were used to compare arithmetic means for resource utilization variables and geometric means for cost variables.

Methods: Definition of Terms

- **AR Diagnosis**: ICD-9 code 477.X.
- **Newly Diagnosed AR Patient**: Those whose first AR diagnosis was preceded by a full year in which no AR diagnosis occurred.
- **Allergy IT Utilization**: CPT codes 95115, 95117, 95120, 95125, 95144, 95165, 95180, or 95199.
- **Premature Termination of IT**: ≤ 3 years of IT.
- **De Novo IT**: Newly-diagnosed AR patients whose first documented IT claim followed (rather than preceded) their diagnosis of AR.

Methods: Sample Identification

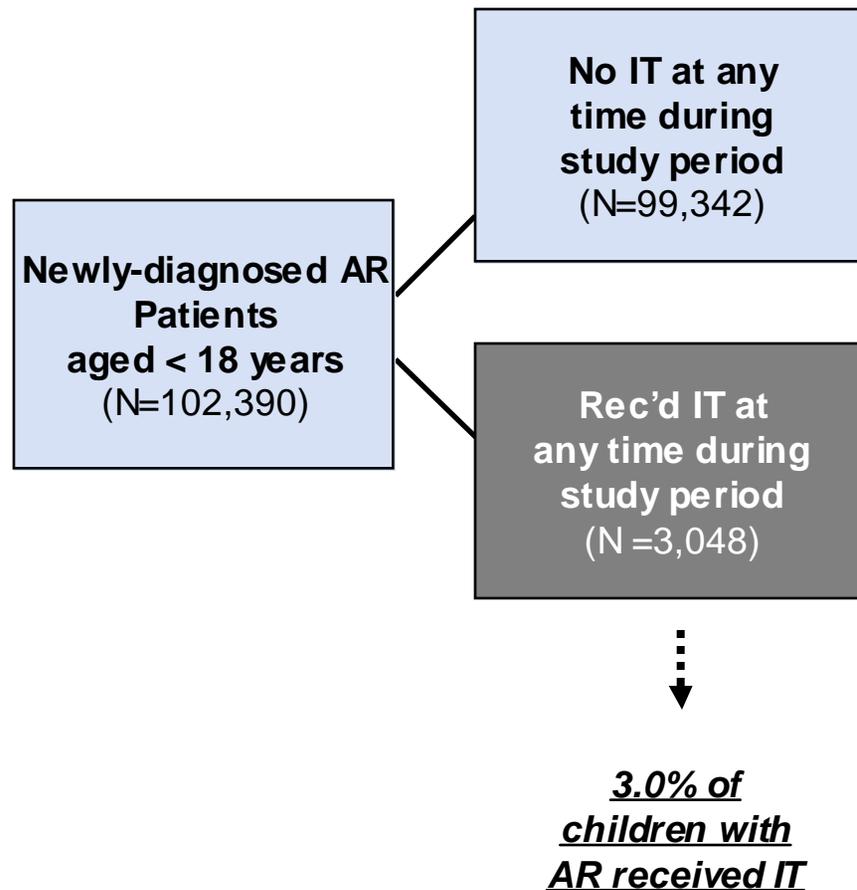
(Among 2,718,101 Florida Medicaid-enrolled children)



Results

Prevalence of Allergy IT

(Among 2,718,101 Florida Medicaid-enrolled children)



Likelihood of Receiving IT by Patient Sex

| Characteristic | All Patients (N=102,390) | Patients Receiving IT (N=3,048) | Patients Not Receiving IT (N=99342) | p-value IT vs. No IT |
|----------------|-----------------------------|------------------------------------|--|-------------------------|
| Male, % (N) | 52.9% (54,110) | 58.1% (1,771) | 52.7% (52,339) | <0.0001 |

- Adjusting for the sex distribution among children in the overall dataset, significantly more males than expected were diagnosed with AR.

- Males were 9% more likely to be diagnosed with AR than females (OR 1.09, 95% CI 1.08 to 1.10, $p < 0.0001$).

- After adjusting for the variation in AR diagnosis by sex, significantly more males received IT than females.

- Adjusted results indicated that males were 25% more likely to receive IT than females (OR 1.25, 95% CI 1.16 to 1.34, $p < 0.0001$).

Race/Ethnicity and Allergy

- **Hispanics** were 2.1 & 2.3 times more likely to receive IT than African-Americans and Caucasians, respectively.
- Those with **comorbid asthma** were 2.6 times more likely to receive IT than their counterparts without asthma (OR=2.564, 95% CI 2.38 to 2.75, $p<0.0001$).
- Those with **Comorbid atopic dermatitis** were nearly twice as likely to receive IT than those without AD (OR= 1.99, 95% CI 1.77 to 2.23, $p<0.0001$).

Likelihood of Receiving IT and Age at 1st AR Diagnosis

| Characteristic | All Patients (N=102,390) | Patients Receiving IT (N=3,048) | Patients Not Receiving IT (N=99,342) | p-value IT vs. No IT |
|--|-----------------------------|---------------------------------------|--|-------------------------|
| Age (years) at first AR diagnosis, mean (SD) | 7.1 (4.5) | 7.6 (3.6) | 7.0 (4.5) | < 0.0001 |

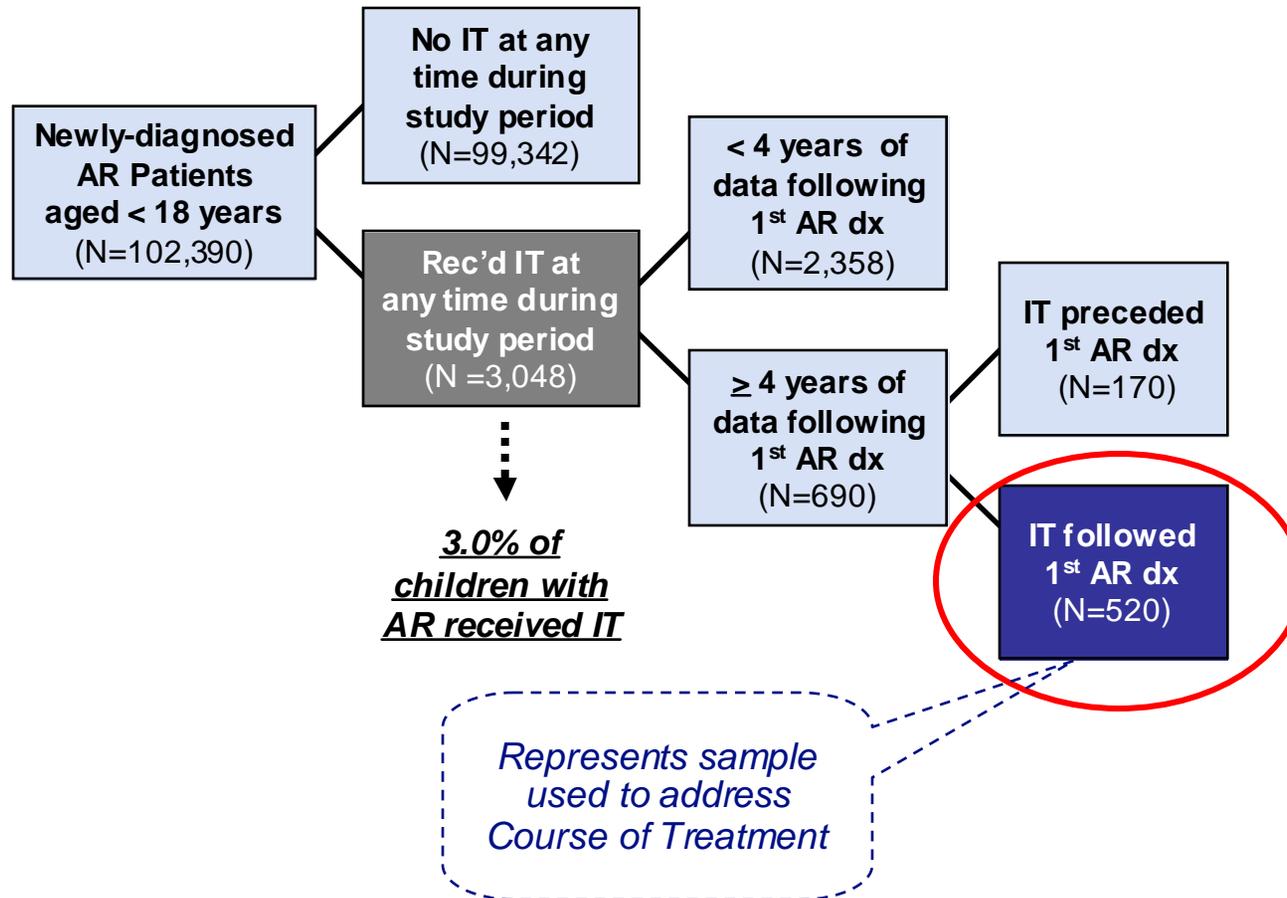
Children who received IT were significantly older at 1st AR diagnosis than those who did not receive IT

(mean age 7.6 years vs 7.0 years, $p < 0.0001$), although this may not be clinically significant

Time from 1st AR diagnosis to IT initiation was approximately 1.5 years (543 days, SD 571 days).

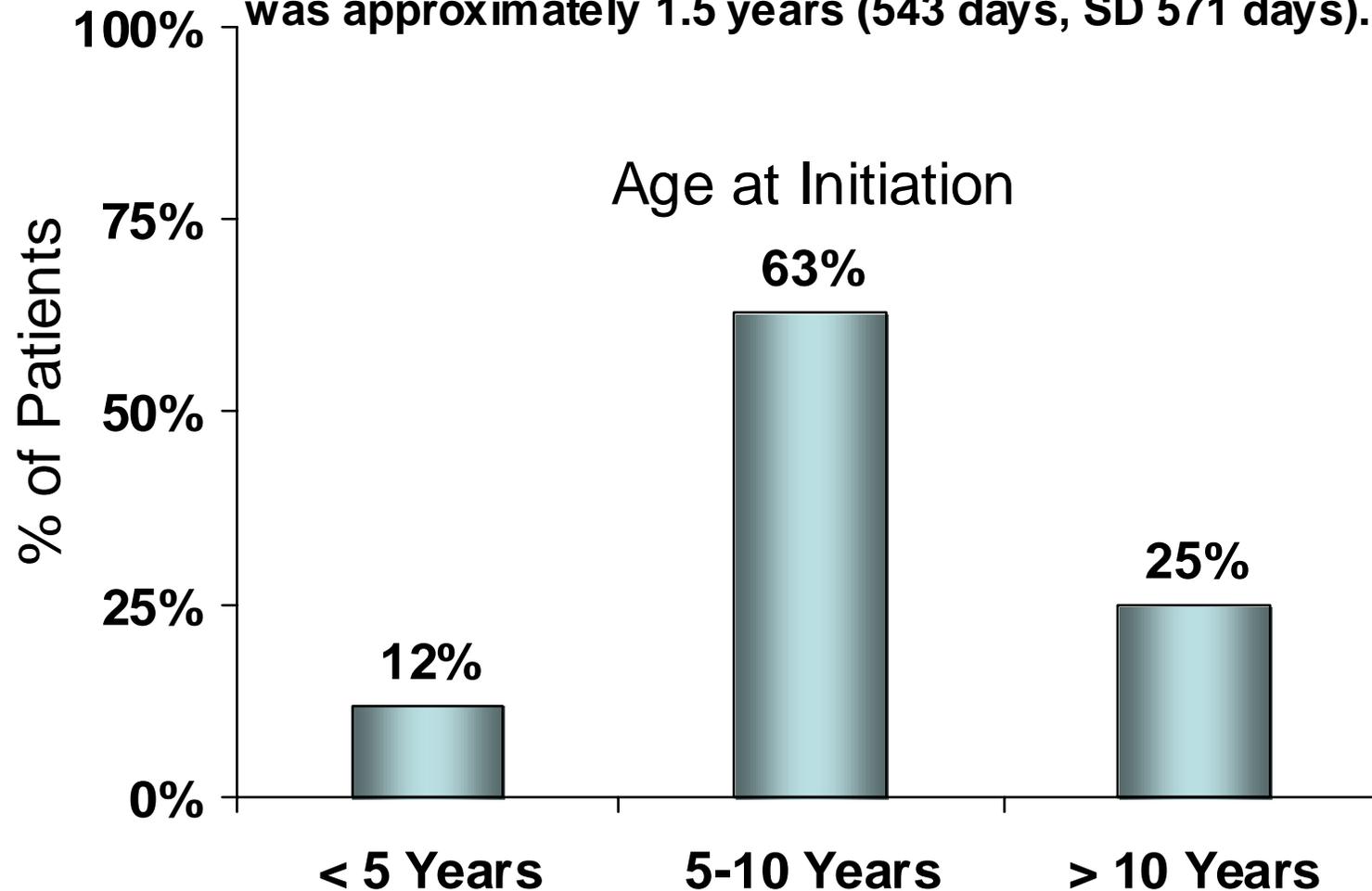
Sample Identification: Course of IT Treatment

Among 2,718,101 Florida Medicaid-enrolled children)



Treatment Initiation (n=520)

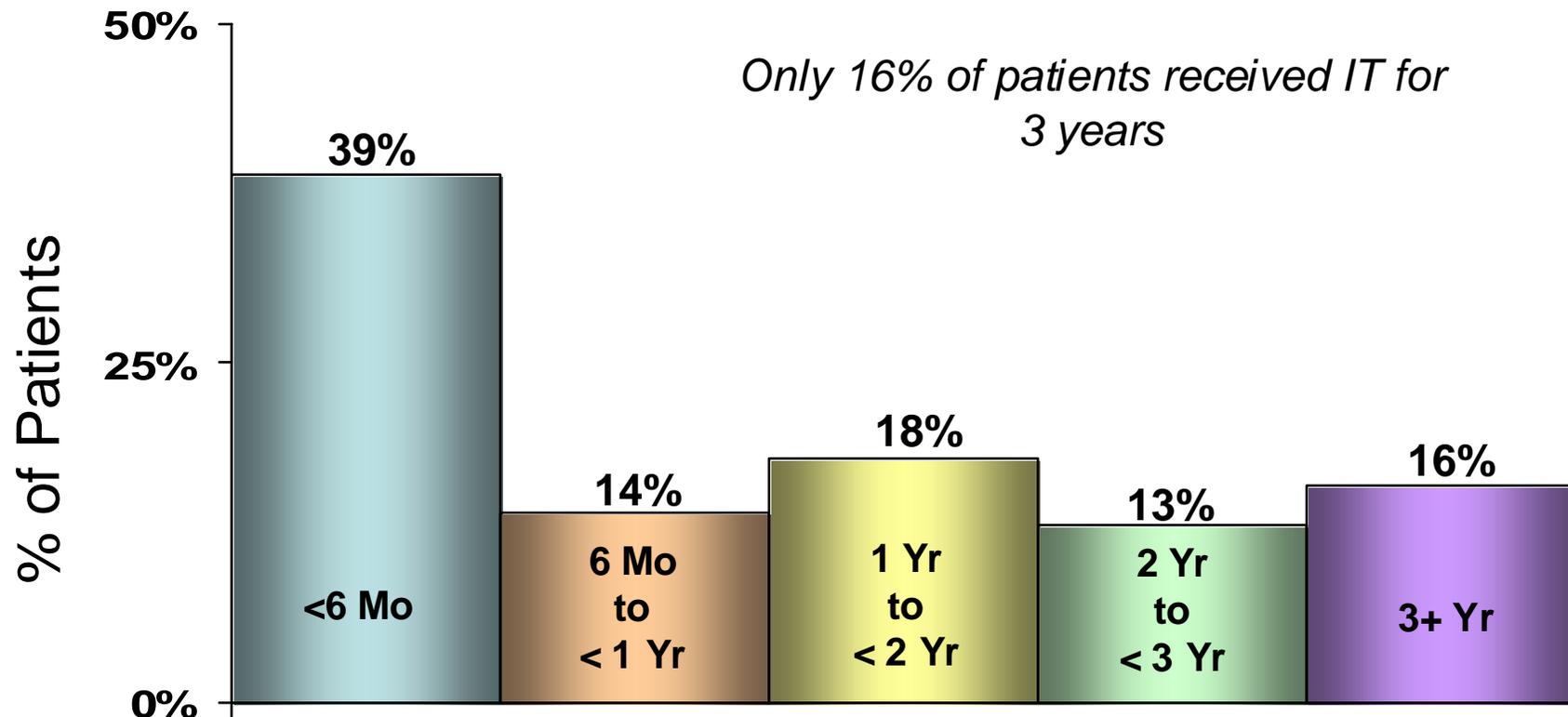
Time from 1st AR diagnosis to IT initiation was approximately 1.5 years (543 days, SD 571 days).



Treatment Regimen (n=520)

- **Average number of days between administrations**
 - **Overall**
 - 27.2 (SD 68.8, range 1 to 1,117)
 - **Buildup phase**
 - 16.2 days (SD 17.5, range 1 to 171)
 - 33.8% of patients received injections on average > 2 weeks apart
 - **Maintenance phase**
 - 24.9 days (SD 31.8, range 1 to 363)
 - 9.7% received injections on average > 6 weeks apart

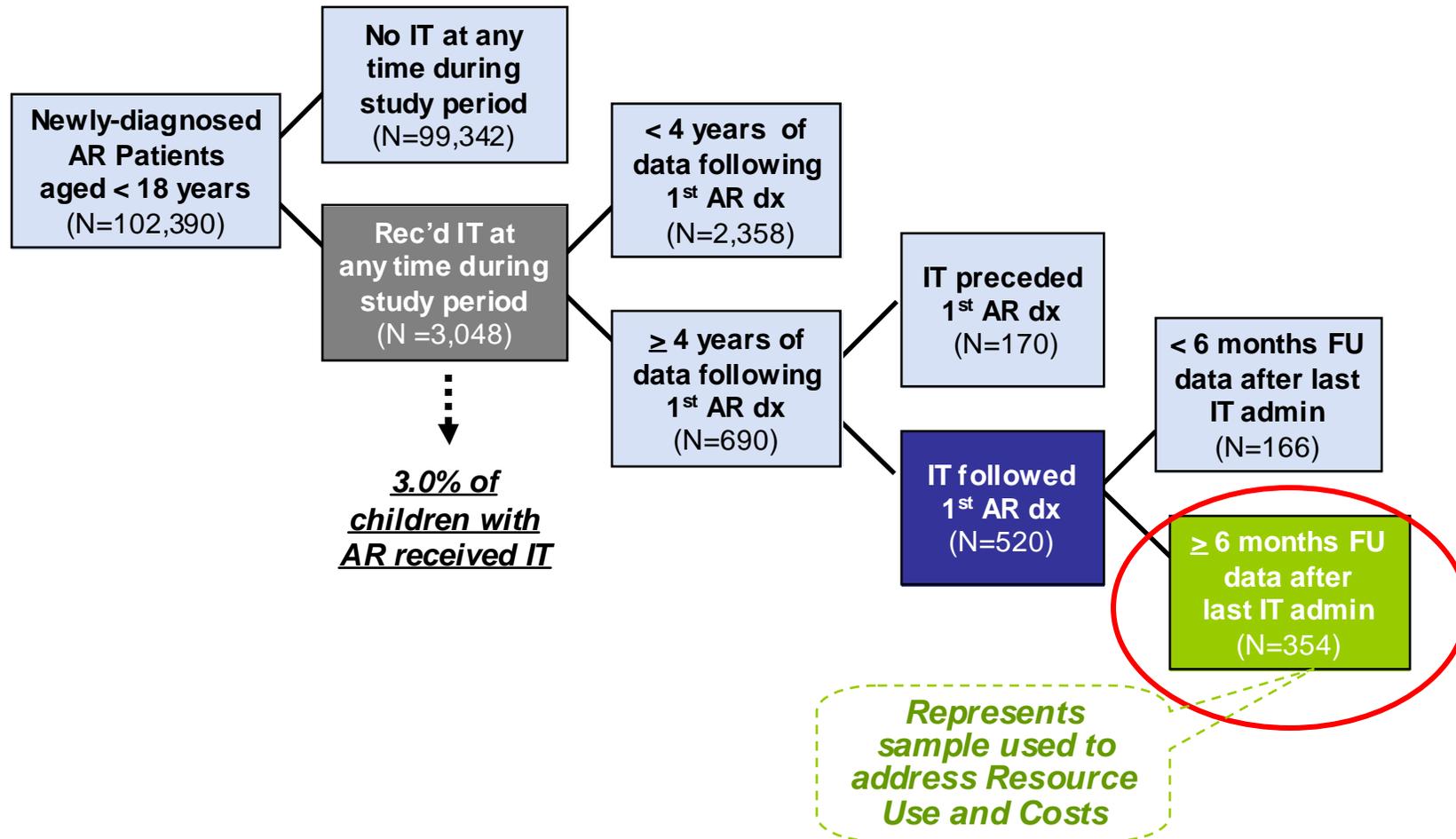
Duration of Treatment (n=520)



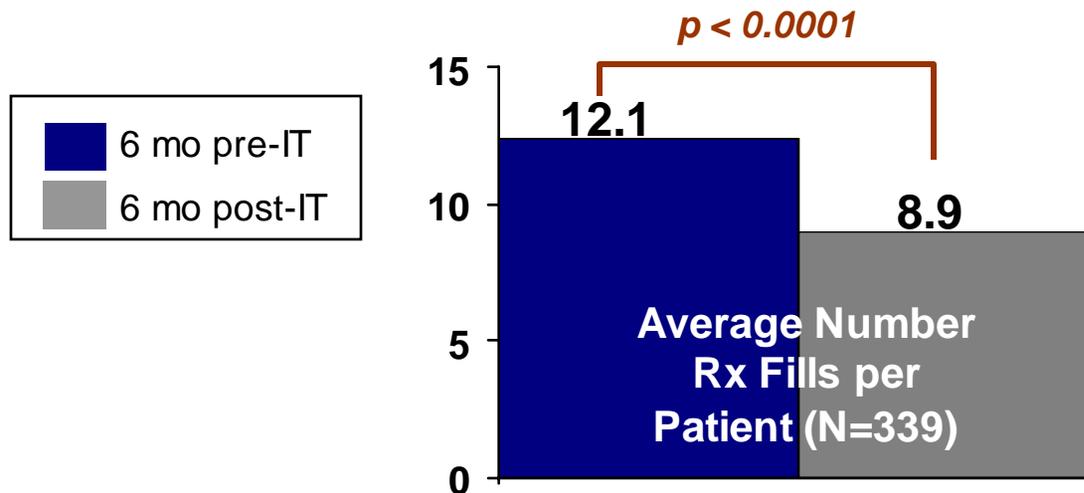
- Patients received an average of 31.3 IT administrations (SD 34.3).
- The mean duration of treatment was 17 months (SD 17.6).

Change in Resource Use and Cost

Among 2,718,101 Florida Medicaid-enrolled children)

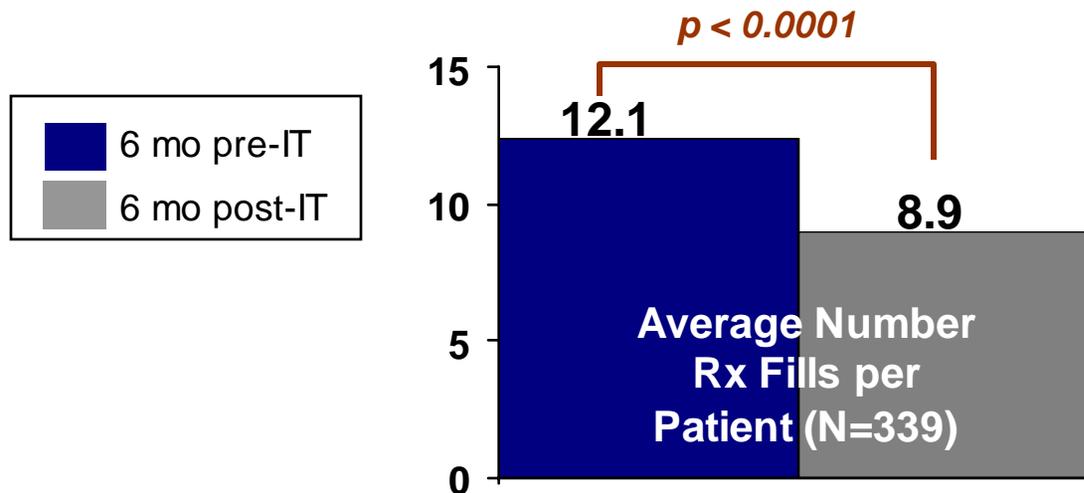


Medical Resource Utilization

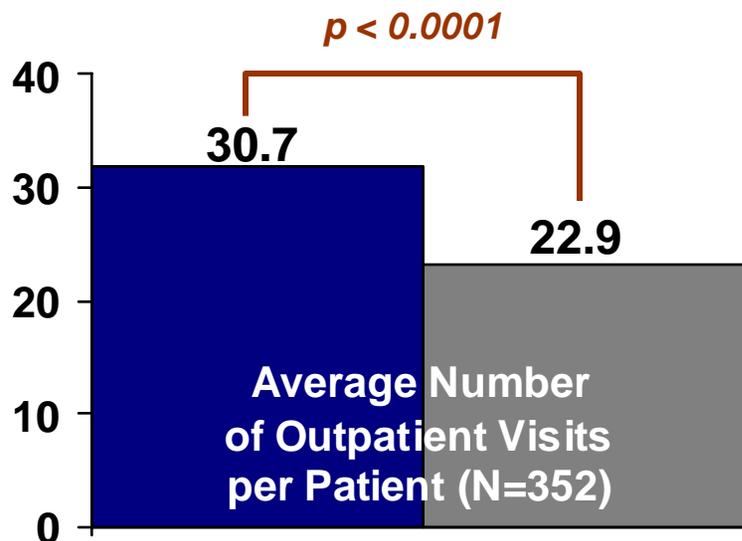


Medical resource utilization significantly decreased in the 6 months following IT discontinuation versus the 6 months prior to IT initiation, despite the fact that the average duration of therapy was 17 months.

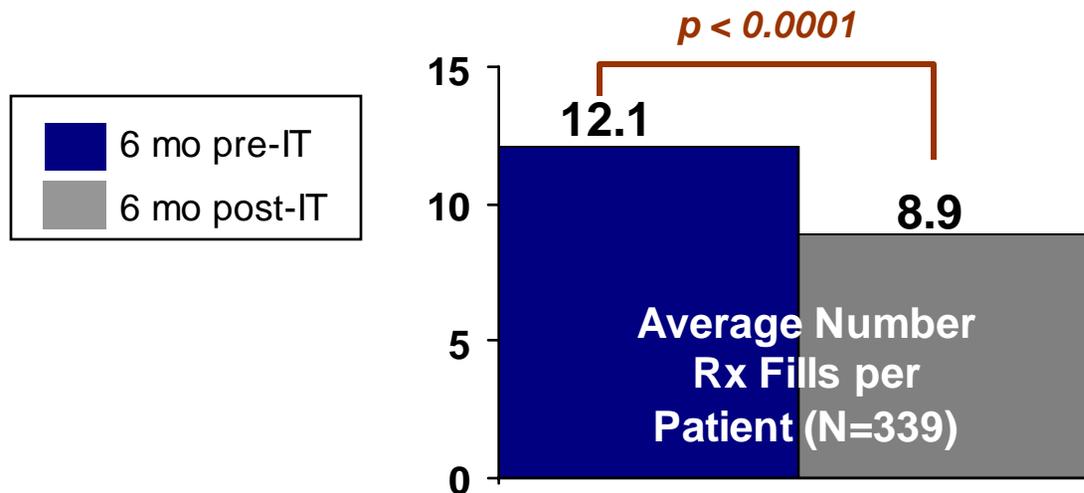
Medical Resource Utilization



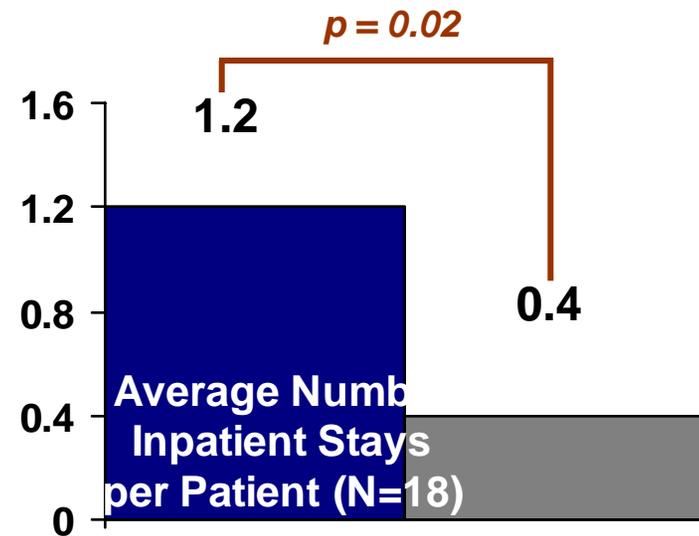
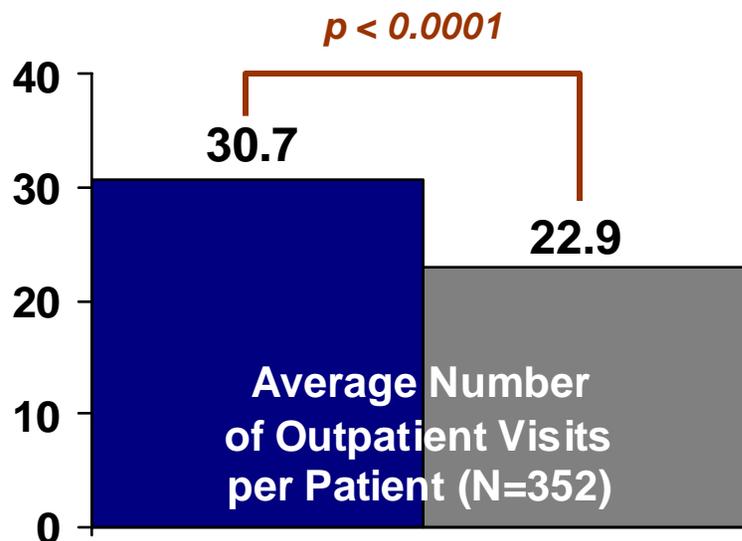
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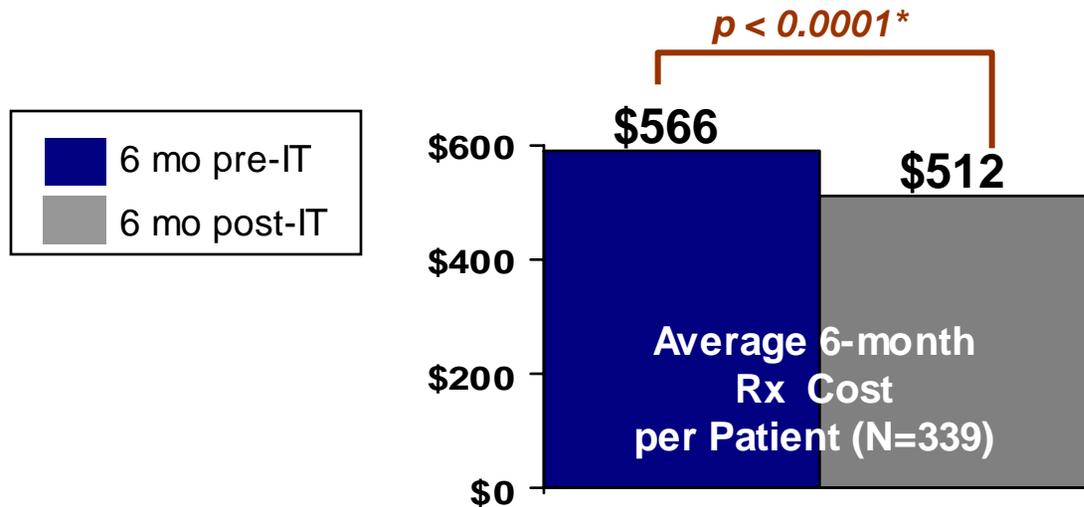
Medical Resource Utilization



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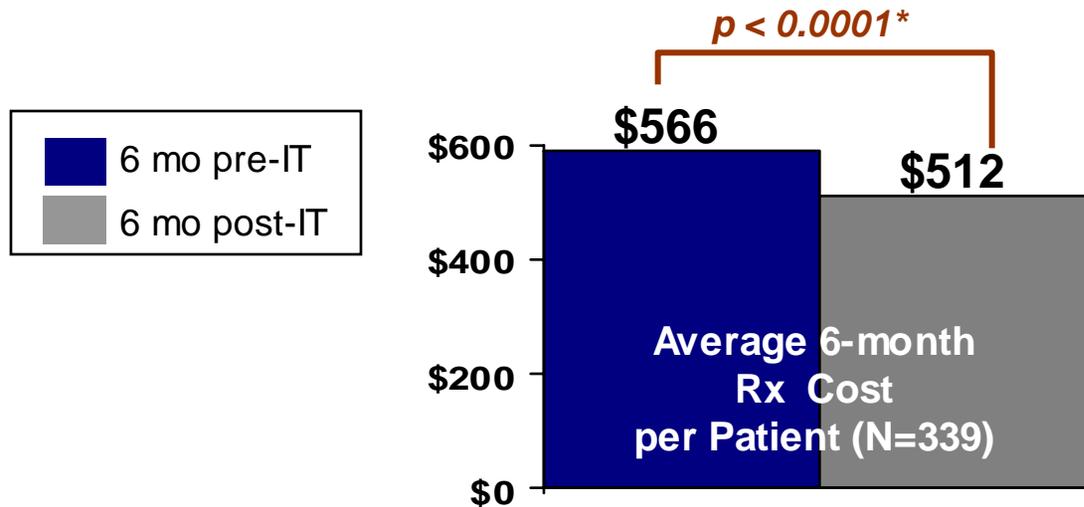
Medical Costs



Medical costs significantly decreased in the 6 months following IT discontinuation versus the 6 months prior to IT initiation, despite the fact that the average duration of therapy was 17 months.

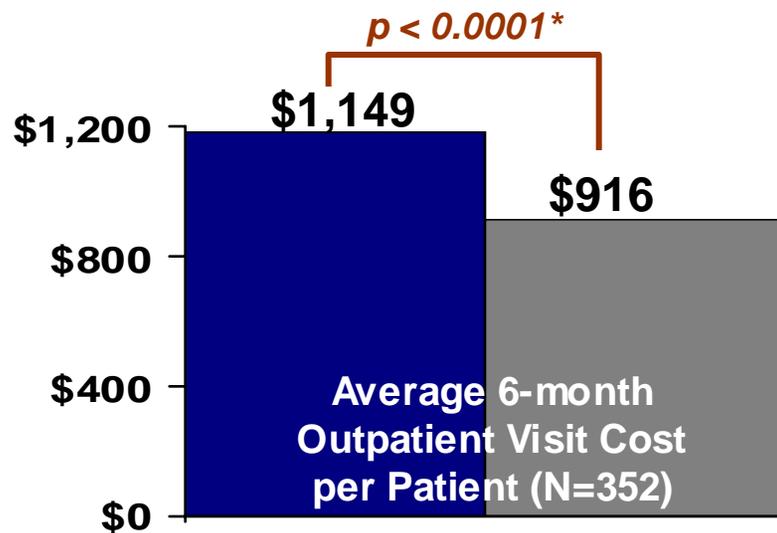
** P-value for t-test comparing geometric means*

Medical Costs

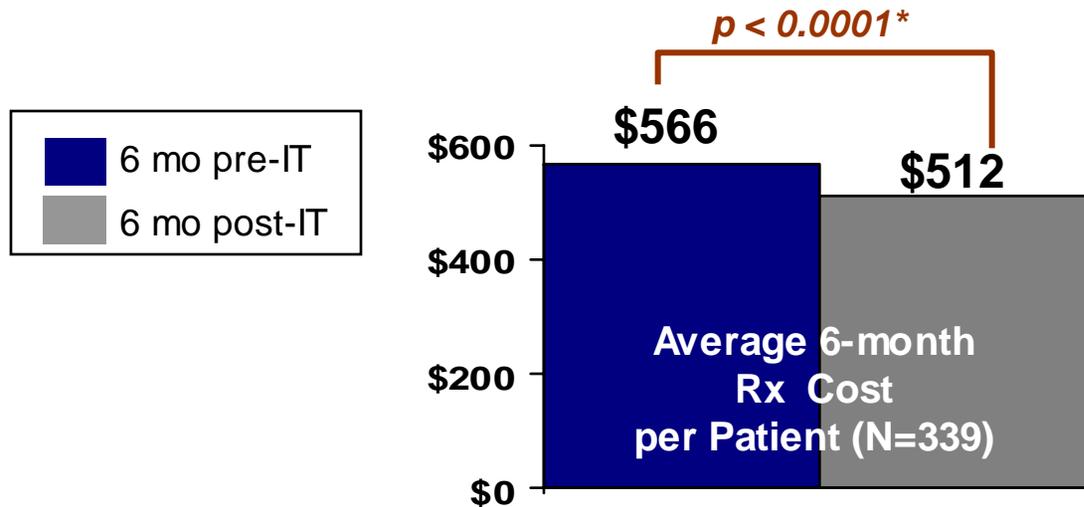


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** P-value for t-test comparing geometric means*

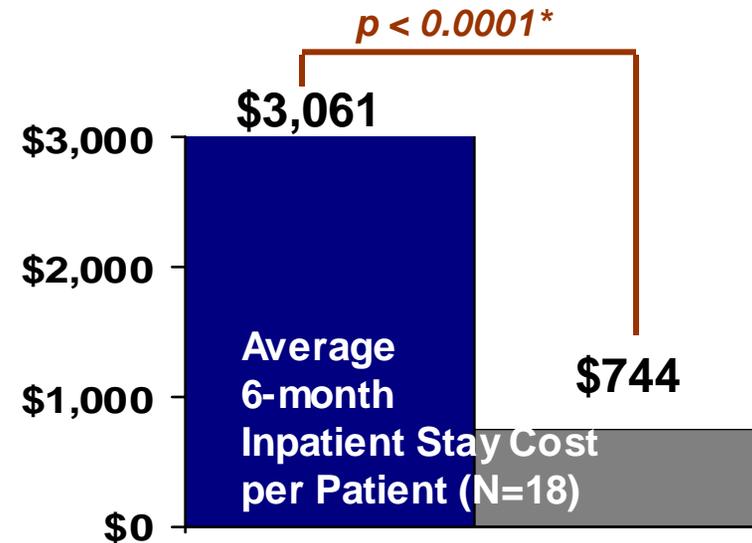
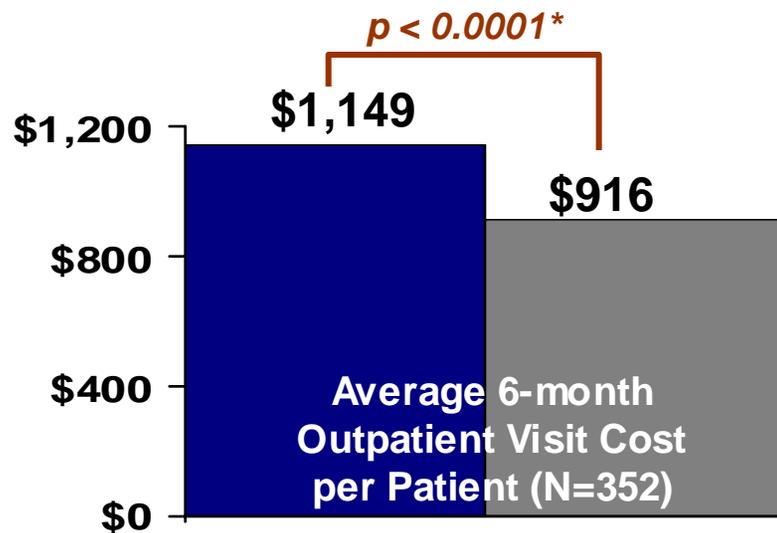


Medical Costs



Medical costs significantly decreased in the 6 months following IT discontinuation versus the 6 months prior to IT initiation, despite the fact that the average duration of therapy was 17 months.

** P-value for t-tests comparing geometric means*



Summary of Results

- Only 3.0% (3,048) of Medicaid-enrolled children with allergic rhinitis received IT during the 7-year study period.
- After adjusting for the distribution of sex among enrollees, males were 25% more likely to receive IT than females ($p < 0.0001$).
- Only 16% of patients completed 3 years duration of therapy.
- There was a significant reduction in utilization and costs of health care services, especially inpatient care, from the 6 months before IT initiation to the 6 months following IT termination.
- The mean 6-month cost savings from pre- to post-IT was \$401, which was almost sufficient to offset the cost of IT (mean \$424).

Conclusions

- The present retrospective analysis of children who were enrolled in Florida Medicaid found that only 16% of those with AR who initiated IT received a 3-year course of treatment.
- Despite this sub-optimal duration of treatment, IT was associated with significant pre- versus post-treatment medical cost savings.
- Our study constitutes a first step towards establishing the cost benefits of IT in the U.S.
- Further studies examining the impact of comorbid medical conditions, concomitant pharmacotherapy, and quality (regimen and duration) of IT care on medical cost offsets are warranted.

Publication/Presentation of Research

- Hankin CS, Cox L, Lang D, Levin A, Gross G, Eavy G, Meltzer E, Burgoyne D, Bronstone A, Wang Z. Allergy Immunotherapy Among Medicaid-enrolled Children with Allergic Rhinitis: Patterns of Care, Resource Use, and Costs. *Journal of Allergy and Clinical Immunology*. In press.
- Invited Oral Presentation at the 63rd AAAAI Annual Meeting; RSOD Interest Section Forum, February 25, 2007; San Diego, CA.
- Featured Poster presented at the 63rd AAAAI Annual Meeting; RSOD Interest Section Forum, February 25, 2007; San Diego, CA. (Awarded “Best of the Best”).
- Poster presented at the 12th Annual International Society for Pharmacoeconomics and Outcomes Research, May 22, 2007 Arlington, VA. (Awarded Poster Finalist).
- Invited Oral Presentation at the Florida Allergy, Asthma, and Immunology Society’s 2007 Annual Meeting, June 10, 2007; Sarasota FL.
- Oral Presentation at the 135th Annual Meeting & Exposition of the American Public Health Association (APHA); November 2007 Washington, DC.