



Controller Medications and Serious Early Childhood Lower Respiratory Tract Illnesses

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BACKGROUND

- Asthma controller medications (e.g. inhaled corticosteroids) have benefit in 2–5-year-old children with asthma or recurrent wheeze.
- Controller medications have not shown benefit after lower respiratory tract infections (LRTIs) (e.g. bronchiolitis).
- There is significant overlap between the clinical presentations of LRTIs and early-onset asthma.
- Deciding when to prescribe controller medications in children <2 years old is a challenging clinical judgment call.

OBJECTIVE

- To assess the association between time on controller medications and emergency department (ED) and inpatient (IP) visits for LRTI or asthma in children <2 years old after their first LRTI

METHODS

- Retrospective cohort study using administrative claims data from the Colorado All Payer Claims Database (2009-2017)
- Inclusion: Children <2 years old with at least one prior LRTI (bronchiolitis and pneumonia)
- Exclusion: complex chronic conditions, a diagnosis of asthma prior to first LRTI, or controller use prior to first LRTI
- Primary exposure variable: time-dependent indicator for presence of a prescription for controller medication
- Primary outcome: count of ED/IP visits for any diagnosis of LRTI or ED/IP visit for a primary diagnosis of asthma, after the first LRTI (using ICD9/10 codes)
- Analysis: Poisson regression accounting for correlation within subjects for person-time data

Figure 1: Timeline representation of primary exposure variable of time dependent indicator of controller medication

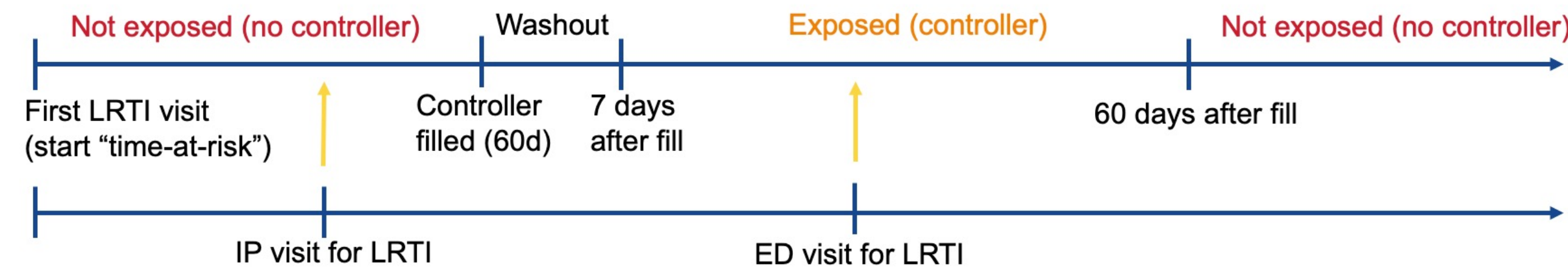


Table 1: Cohort Characteristics by Person-Months On Controller versus Off Controller

Predictor	On Controller person-months (column %) n=2,948	Off Controller person-months (column %) n=544,134	Total person-months (column %) n=547,082
Age			
0-1 years old	427 (14%)	146,559 (27%)	146,986 (27%)
1-2 years old	2,520 (86%)	397,575 (73%)	400,096 (73%)
Gender			
Female	1,010 (34%)	237,930 (44%)	238,939 (44%)
Male	1,909 (65%)	301,715 (55%)	303,624 (55%)
Unknown	29 (1.0%)	4,489 (0.8%)	4,518 (0.8%)
Insurance			
Commercial	525 (18%)	120,733 (22%)	121,257 (22%)
Medicaid	2,338 (79%)	413,621 (76%)	415,959 (76%)
Missing	48 (1.6%)	3,229 (0.6%)	3,277 (0.6%)
Premature			
Yes	167 (5.7%)	26,821 (4.9%)	26,988 (4.9%)
Family history of asthma			
Yes	470 (16%)	19,457 (3.6%)	19,927 (3.6%)
Prior wheeze			
Yes	1,459 (50%)	39,404 (7.2%)	40,863 (7.5%)
Prior atopy			
Yes	1,426 (48%)	88,866 (16%)	90,292 (17%)
Prior number of LRTI visits			
1	1,134 (38%)	474,973 (87%)	476,107 (87%)
2	843 (29%)	49,815 (9.2%)	50,658 (9.3%)
>=3	971 (33%)	19,346 (3.6%)	20,316 (3.7%)
Prior hospitalization for LRTI			
Yes	885 (30%)	54,978 (10%)	55,863 (10%)
Prior beta agonist use			
Yes	1,217 (41%)	9,797 (1.8%)	11,015 (2.0%)
Prior subspecialty Visit			
Yes	666 (23%)	6,620 (1.2%)	7,286 (1.3%)

RESULTS

Table 2: Person-Time Model, Crude and Adjusted Associations with ED or IP visits for LRTI or Asthma

Variable (Level vs Reference)	Crude RR (95% CI)	Adjusted RR (95% CI)
Controller meds (Yes vs No)	1.51 (1.11, 2.06)	0.77 (0.57, 1.05)
Age (0-1 vs 1-2yrs)	1.98 (1.89, 2.09)	2.13 (2.01, 2.25)
Gender (F vs M)	0.82 (0.77, 0.87)	0.84 (0.80, 0.89)
Insurance (Medicaid vs Commercial)	2.24 (2.06, 2.44)	2.09 (1.93, 2.27)
Premature (Yes vs No)	1.29 (1.15, 1.44)	1.18 (1.05, 1.31)
Family History of Asthma Claim (Yes vs No)	3.68 (3.36, 4.02)	3.11 (2.85, 3.41)
Prior wheeze claim* (Yes vs No)	1.39 (1.26, 1.52)	1.29 (1.16, 1.43)
Prior atopy claim* (Yes vs No)	1.11 (1.03, 1.18)	1.17 (1.09, 1.25)
Prior Number of LRTI visits* (2 vs 1)	0.90 (0.82, 0.99)	1.01 (0.91, 1.12)
(>=3 vs 1)	1.67 (1.49, 1.88)	1.52 (1.33, 1.72)
Prior hospitalization for LRTI* (Yes vs No)	1.33 (1.22, 1.45)	1.04 (0.95, 1.13)
Prior outpatient beta agonist prescription* (Yes vs No)	1.88 (1.62, 2.20)	1.44 (1.22, 1.70)
Prior subspecialty claim* (Yes vs No)	1.50 (1.22, 1.85)	1.02 (0.82, 1.27)

Bold in the adjusted RR column indicates statistically significant association
Baseline covariates: gender, insurance type, prematurity, family history of asthma claim
*Time-dependent covariates (prior to outcome): prior wheeze claim, atopy claim, number of LRTI visits, LRTI hospitalizations, prior subspecialty claim (Allergy/Immunology or Pulmonology), and outpatient beta agonist prescriptions

CONCLUSIONS

- In children under 2 with LRTIs, controllers are more often prescribed in the following patients: older age, male gender, Medicaid insurance, family history of asthma claim, prior atopy claim, prior wheeze claim, more prior LRTI visits, and prior outpatient beta agonist prescription.
- Concurrent prescription for controllers was not statistically associated with respiratory ED/IP visits in children <2 years of age.
- This lack of an association could indicate a need for increased prescription stewardship.
- However, limitations include potential for incompletely controlled indication bias, limited indicator of time on controller, and claims data imperfections (missing data, reliance on ICD codes).

IMPLICATIONS

- Future prospective studies should consider focusing on controllers in children < 2 years of age with recurrent LRTIs, as the benefits of controllers in this population remains unclear.
- Providers should consider increased prescription stewardship in prescribing controllers to children <2 years of age.

DISCLOSURES

- The authors have no financial relationships relevant to this article to disclose.