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Variation and Trends in Inpatient Systemic Corticosteroid Prescribing During Asthma-Related Hospitalizations Across Children's Hospitals

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Disclosures

- No financial relationships to disclose

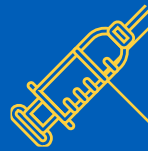


Background

- Asthma is the third-leading cause of non-injury related hospitalization among children less than 15 years of age
- Systemic steroids are the mainstay of treatment



Dexamethasone in Asthma Care



Systematic reviews found dexamethasone to be non-inferior to prednisolone



Potential practical benefits with the use of dexamethasone



High-quality studies in the ED found no difference in hospitalization outcomes



Studies in hospitalized children found no difference in hospitalization outcomes



Little mention of dexamethasone in national guidelines



Study Questions

- What are the current prescribing practices for systemic steroids in pediatric acute asthma?
- Have there been any changes in prescribing practices since the publication of the Cochrane reviews?



Objectives

- To describe variability and trends in inpatient systemic corticosteroid prescribing during acute asthma exacerbation hospitalizations
- To determine differences in hospitalization outcomes between children prescribed dexamethasone versus prednisone/prednisolone



Study Design

- Multicenter, retrospective, cross-sectional study utilizing PHIS database from 2016-2023

Inclusion Criteria

- Children aged 2-18 years
- Primary discharge diagnosis of asthma exacerbation
- Prescribed one of the following steroids: dexamethasone, prednisone, prednisolone, methylprednisolone

Exclusion Criteria

- Transfers from outside facilities
- Diagnoses of bronchiolitis, bacterial pneumonia, COVID-19, complex chronic conditions
- Children receiving other steroids
- Severe illness: LOS > 5 days, mechanical ventilation, NIV, ECMO, or CPR



Outcomes

- Primary
 - Percentage of hospitalization encounters with any dexamethasone ordered/prescribed within a hospital-year
- Secondary
 - Readmission rates at 7 days and 30 days post-discharge
 - ED revisits at 7 days and 30 days post-discharge
 - Hospital LOS



Covariates

Demographic Variables

- Age
- Sex
- Race/ethnicity
- Primary insurance payor

Clinical Characteristics

- Illness severity
- PICU stay
- Admission source
- LOS

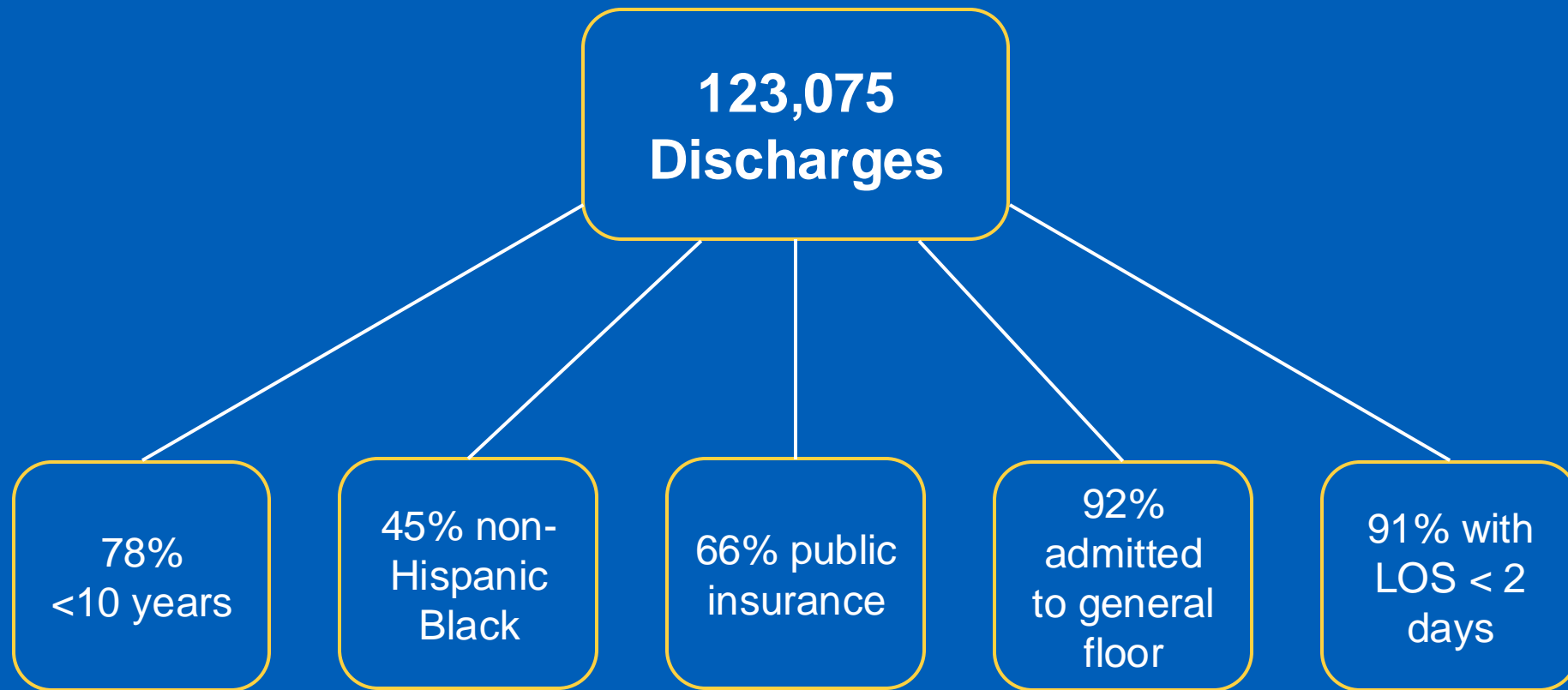


Statistical Analysis

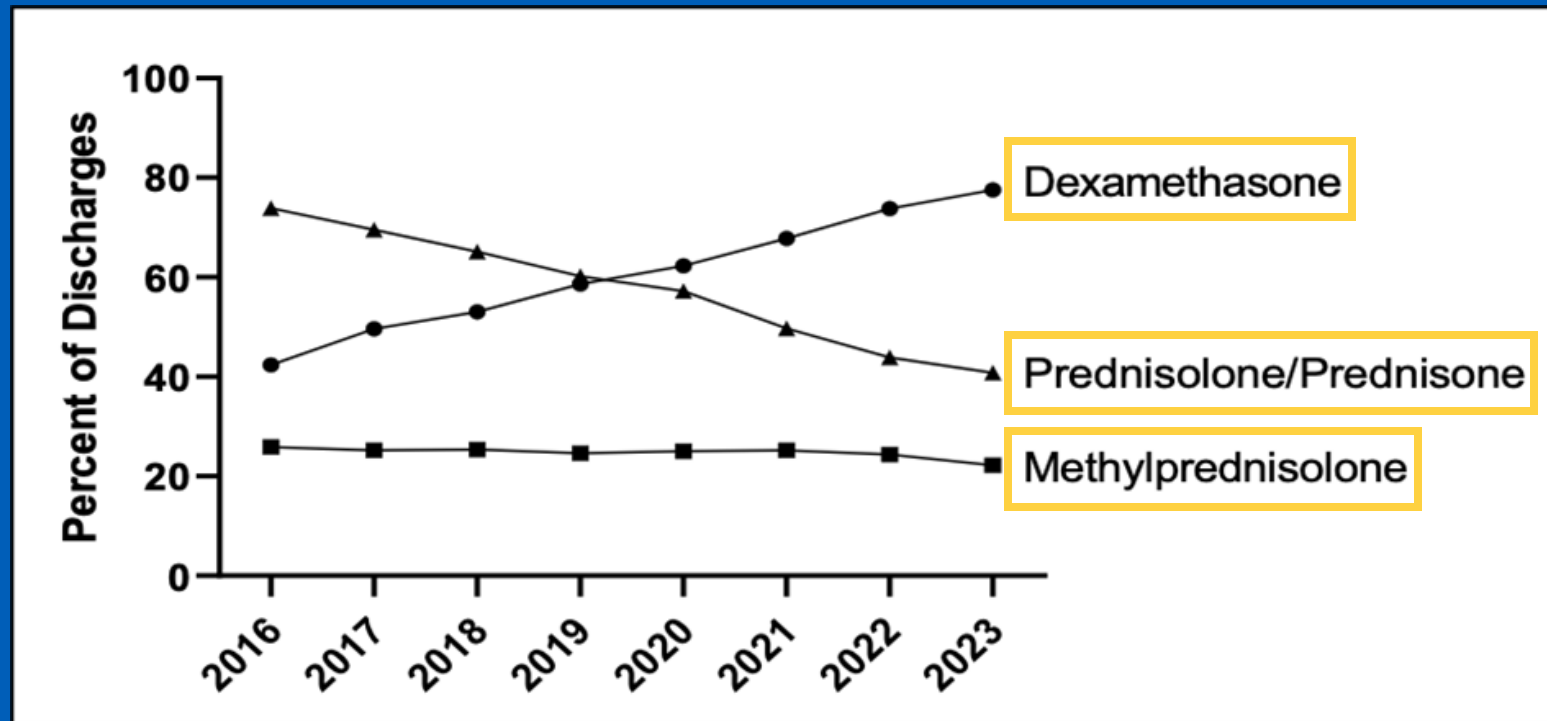
- Hospitals were grouped into quintiles based on dexamethasone use
- Generalized estimating equations used to analyze the association of annual hospital level dexamethasone use with hospitalization outcomes
- Sub analysis performed to investigate hospitalization outcomes for encounters with dexamethasone only versus prednisone/prednisolone only



Cohort Description

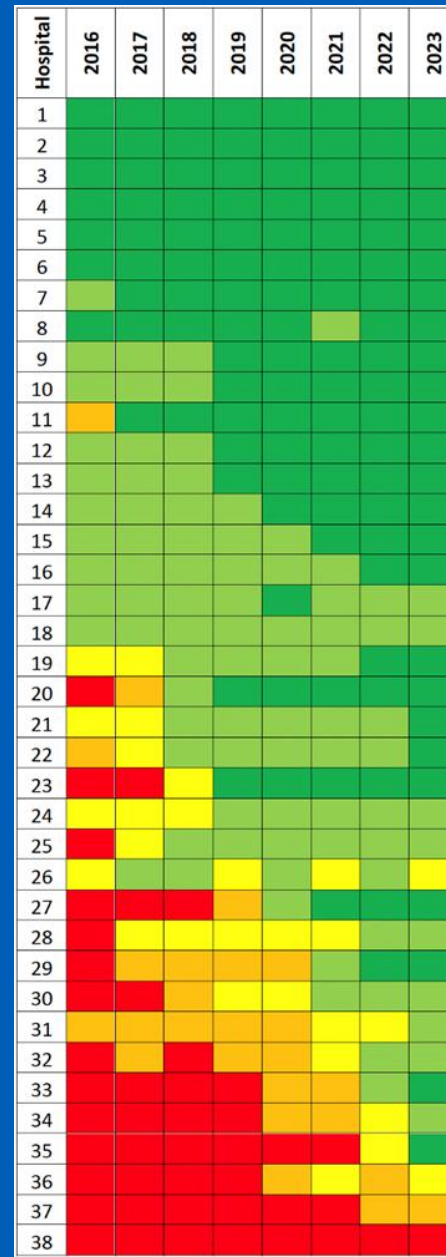


Results – Trends in Steroid Use



Results – Hospital-Level Variation

- Proportion of hospitals prescribing dexamethasone for >80% of encounters increased from 7 hospitals to 25 hospitals in 2023
- **Eight** hospitals exhibited no change in prescribing practices
- Only **four** hospitals prescribed dexamethasone for <60% of asthma encounters in 2023



	% Dexamethasone Use
Red	<20%
Orange	20-40%
Yellow	41-60%
Light Green	61-80%
Dark Green	81-100%



Results – Dexamethasone & Hospitalization Outcomes

- No difference in readmission, ED revisits, or LOS across hospitals when grouped by dexamethasone-use quintiles
- No difference in readmission, ED revisits, or LOS in encounters only receiving dexamethasone versus only prednisone/prednisolone



Limitations

- Lack of patient- and provider-level characteristics
- Medication prescription details and discharge medication data
- Focus on children's hospitals
- Direct admissions included
- PICU versus floor steroid administration



Conclusions



Dexamethasone use is increasing during hospitalizations for acute asthma exacerbation



Substantial variability in steroid prescribing practices between hospitals



No differences in LOS, ED revisits or hospital readmission rates between dexamethasone versus prednisone/prednisolone



Future Directions/Next Steps

- Need for randomized controlled trials or comparative effectiveness studies assessing dexamethasone versus prednisone/prednisolone for hospitalized children
- Analysis of prescribing practices in the PICU versus general inpatient floors
- Dexamethasone dosing variability
- Potential updates to national guidelines and institution-specific practice pathways to decrease variability



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Thank You!

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Extra – Steroid Trends

	Overall	2016	2017	2018	2019	2020	2021	2022	2023	p (Trend)
Dexamethasone	74199 (60.3)	7567 (42.4)	8416 (49.6)	8917 (53)	9256 (58.6)	4402 (62.3)	9061 (67.8)	13566 (73.8)	13014 (77.5)	<.001
Methylprednisolone	30396 (24.7)	4618 (25.9)	4272 (25.2)	4269 (25.4)	3892 (24.6)	1768 (25)	3366 (25.2)	4482 (24.4)	3729 (22.2)	<.001
Prednisolone/ Prednisone	71073 (57.7)	13196 (73.9)	11793 (69.5)	10968 (65.1)	9517 (60.2)	4039 (57.2)	6635 (49.7)	8077 (43.9)	6848 (40.8)	<.001



Extra – Analysis Results

	Annual Hospital-Level Dexamethasone Use					
	<20%	20-40%	41-60%	61-80%	81-100%	P-value
Readmission 7 day	0.8 (0.6, 1)	0.5 (0.3, 0.8)	0.5 (0.4, 0.6)	0.6 (0.5, 0.8)	0.6 (0.6, 0.8)	0.200
Readmission 30 day	2.7 (2.2, 3.3)	2.5 (2, 3.1)	2.1 (1.8, 2.6)	2.4 (2, 2.8)	2.4 (2, 2.8)	0.426
ED Revisit 7 day	0.7 (0.7, 0.8)	0.6 (0.5, 0.8)	0.6 (0.4, 0.9)	0.7 (0.6, 0.8)	0.7 (0.6, 0.8)	0.701
ED Revisit 30 days	3.1 (2.7, 3.6)	2.8 (2.5, 3.3)	2.8 (2.3, 3.4)	2.7 (2.5, 3)	2.9 (2.6, 3.3)	0.812
LOS	1.4 (1.3, 1.4)	1.3 (1.2, 1.4)	1.4 (1.3, 1.5)	1.3 (1.3, 1.4)	1.3 (1.3, 1.4)	0.344



Extra – Sub Analysis Results

	Annual Hospital-Level Dex Use					
	<20%	20-40%	41-60%	61-80%	81-100%	p
Readmission 7 day	0.7 (0.5, 1)	0.6 (0.4, 0.9)	0.4 (0.3, 0.5)	0.7 (0.6, 0.9)	0.7 (0.6, 0.8)	0.085
Readmission 30 day	2.6 (2, 3.3)	2.6 (2.1, 3.2)	1.9 (1.6, 2.3)	2.3 (2, 2.7)	2.2 (1.9, 2.7)	0.228
ED Revisit 7 day	0.8 (0.7, 0.9)	0.7 (0.5, 0.9)	0.7 (0.4, 1.1)	0.7 (0.6, 0.9)	0.8 (0.7, 0.9)	0.902
ED Revisit 30 days	3.2 (2.7, 3.7)	2.9 (2.4, 3.4)	2.7 (2.2, 3.5)	2.8 (2.4, 3.3)	3 (2.6, 3.5)	0.742
LOS	1.3 (1.2, 1.4)	1.2 (1.2, 1.3)	1.3 (1.2, 1.3)	1.2 (1.2, 1.3)	1.2 (1.1, 1.2)	0.116

