

# Characteristics and Treatment Pathways in Pediatric and Adult Hidradenitis Suppurativa: An Examination Using Real-World Data

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## BACKGROUND

- Hidradenitis suppurativa (HS) is a chronic, recurring, inflammatory disease of the skin
- Age of onset typically occurs in the second or third decade of life<sup>1</sup>
- HS also occurs in pediatric patients, generally after the onset of puberty<sup>2</sup>
- Among adolescents, HS can be associated with significant comorbidities including diabetes, metabolic syndrome, psychiatric disorders, and inflammatory arthritis<sup>3,4</sup>
- Current treatment consists of topical and/or systemic antibiotics, hormonal interventions, analgesics and, in selected cases, the tumor necrosis factor (TNF) inhibitor monoclonal antibody adalimumab (FDA approved for pediatric patients ≥12 years of age), and surgical excision<sup>5-7</sup>
- Currently there is a paucity of contemporaneous, observational data describing pediatric HS drug and procedure treatments, and how pediatric HS patients compare to adult HS patients
- The objective of our analysis was to evaluate the clinical and treatment characteristics of the pediatric (<18) and adult (≥18 years) HS populations



Image courtesy of: <https://dermnetz.org/topics/hidradenitis-suppurativa/>

## METHODS

- Study Population:** Pediatric (<18) and adult (≥18) HS patients with 2 codes for HS (SNOMED 59393003) with at least 365 days of continuous observation time prior to the first HS diagnosis between January-1-2016 to December-31-2019
- Data Sources:** 3 US observational databases\* standardized to the Observational Medical Outcomes Partnership (OMOP) Common Data Model (version 5.3)<sup>9</sup>
  - IBM MarketScan® Commercial Claims and Encounters Database (CCAE)
  - Optum® De-Identified Clinformatics® Data Mart Database – Date of Death – (Optum)
  - IBM MarketScan® Multi-State Medicaid Database (MDCD)
- Analysis, Characterization<sup>†</sup>:**
  - Demographic and comorbidity information assessed in the 30 days after and 180 days prior to the index HS diagnosis
  - Treatment pathways illustrate the use of therapies at each line of treatment and included the following exposure categories: topical treatments, oral antibiotics, biologics, and surgical treatments
  - Oral antibiotics included tetracycline, doxycycline, lymecycline, minocycline, amoxicillin, pristinamycin, ceftriaxone, and metronidazole
  - Biologics included adalimumab, infliximab, anakinra, and anti-TNF
  - Topical treatments included clindamycin and resorcinol
  - Surgical treatments included laser procedures, incision and drainage of abscess, excision of skin and subcutaneous tissue, and acne surgery
  - Exposures prescribed within 14 days of each other were considered a combination therapy

\*The use of Optum and CCAE was reviewed by the New England Institutional Review Board and was determined to be exempt from broad Institutional Review Board approval as this project did not involve human subject research  
<sup>†</sup>The Observational Health and Data Sciences and Informatics (OHDSI) ATLAS tool<sup>8</sup> was used to generate the cohorts and conduct the characterization and treatment pathway analyses

### Characterization of pediatric and adult HS cohorts

- Among pediatric patients, HS occurred primarily (92% - 95% across 3 databases) in pediatric patients aged 12 to <18 years
- Depression and anxiety were less prevalent in pediatric than in adult HS patients; 8 – 11% of pediatric patients exhibited these comorbidities

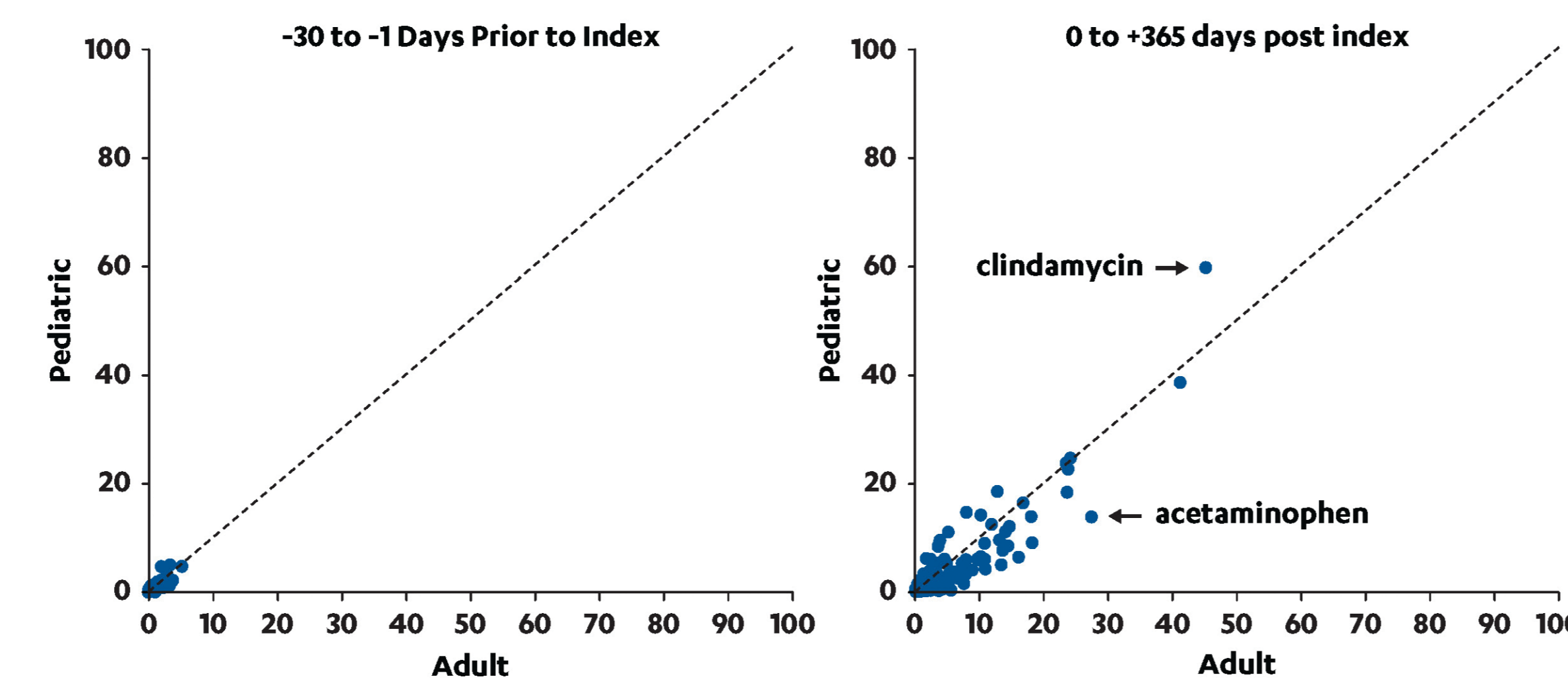
- Not unexpectedly and indirectly confirming the demographics of the pediatric population assessed, acne was 3- to 4-fold more prevalent in the pediatric population and Type 2 diabetes mellitus was 10- to 20-fold more prevalent in adult than in pediatric patients

	Adult			Pediatric		
	CCAE (n=22,113)	MDCD (n=15,228)	Optum (n=12,181)	CCAE (n=2,126)	MDCD (n=2,998)	Optum (n=737)
% Female	78.4	82.7	73.2	83.8	84.1	85.4
Mean age ± SD (years)	38 ± 13	36 ± 13	44 ± 16	15 ± 2	15 ± 2	15 ± 2
Age groups (%)						
0-3	0	0	0	<1	<1	0
4-6	0	0	0	0	<1	<1
7-11	0	0	0	5.2	7.6	6.9
12-17	0	0	0	94.7	92.1	92.9
18-64	99.8	97.8	86.3	0	0	0
≥65	<1	2.2	13.7	0	0	0
Select clinical characteristics <sup>‡</sup> (%)						
Type 1 diabetes mellitus	<1	2.8	2.1	<1	1.4	<1
Type 2 diabetes mellitus	12.2	22.2	21.8	1.1	3.9	<1
Depression	11.7	25.7	16.2	8.2	11.2	8.8
Anxiety	15.7	27.9	19.2	10.5	10.6	11.1
Cellulitis	10.2	14.9	12.3	8	11.4	8.5
Pilonidal cyst	1.4	1.7	1.4	2.1	1.7	<1
Acne	12.5	6.8	9.7	24.3	15.5	27.8
Folliculitis	5.5	5.7	6	6.6	6	5.6
Furuncle	5	5.3	5.4	5.9	5.6	5.2
Crohn's disease	1.3	1.5	1.4	<1	<1	<1
Ulcerative colitis	<1	<1	<1	<1	<1	0
Arthropathies						
Rheumatoid arthritis	1.4	1.8	2.3	<1	<1	<1
Psoriatic arthritis	<1	<1	<1	0	<1	0
Ankylosing spondylitis	<1	<1	<1	<1	0	0

Assessed in the 180 days prior to and 30 days post index

**In the 30 days prior to index, there are no notable differences between pediatric and adult populations drug prescriptions. In the 365 days after index, there are few differences between the pediatric and adult populations. Overall treatments were very similar.**

- Data points deviating from the dashed 45-degree line indicate absolute standard differences of ≥0.5 for individual drugs prescribed for adults and children
- Clindamycin is more often prescribed to the pediatric population than the adult population; conversely, acetaminophen is more often prescribed for adults compared to children
- Clindamycin was defined at the ingredient level. The dose and delivery form of clindamycin were not specified.

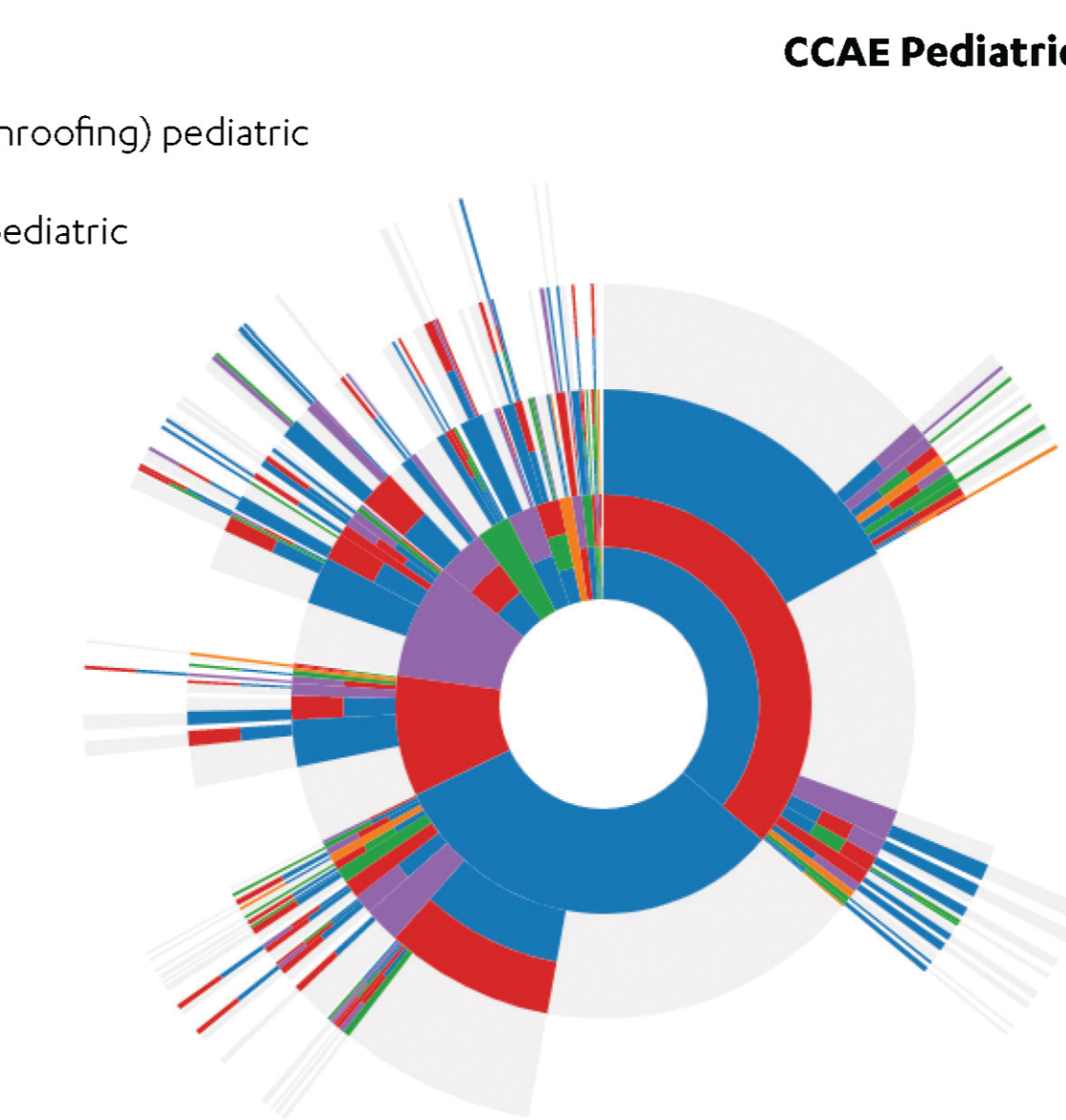


**Pediatric treatment pathways: 1<sup>st</sup> line treatments are similar in adult and pediatric populations.**

- Treatments are post HS diagnosis; innermost circle indicates 1<sup>st</sup> line treatments; next circle indicates 2<sup>nd</sup> line treatments, etc.
- 1<sup>st</sup> line treatments are oral antibiotics combined with topical treatments (red/blue section of inner circle) and oral antibiotics alone (solid blue section of inner circle); topical treatments alone are used less frequently as are surgical treatments

### Event Cohorts

- P1 – Surgical treatments (laser treatment on skin, excision, unroofing) pediatric
- E2 – Biologics (infliximab, adalimumab, anakinra, anti-TNF) pediatric
- E2 – Oral antibiotics pediatric
- E4 – Isotretinoin pediatric
- E1 – Topical treatments (clindamycin, resorcinol) pediatric

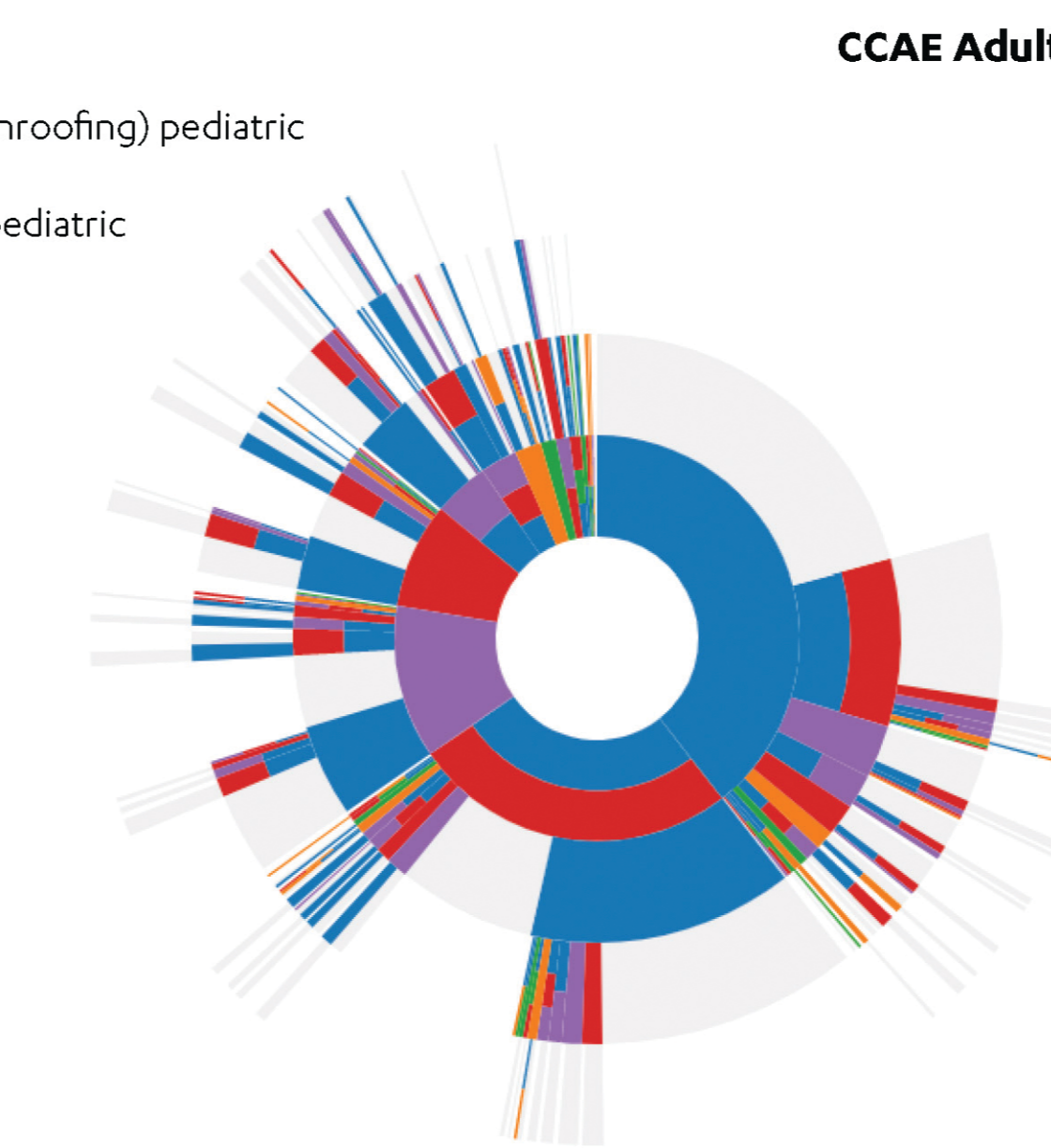


**Adult treatment pathways: 1<sup>st</sup> line treatments are similar in adult and pediatric populations.**

- Children and adults both frequently use oral antibiotics as a first line treatment for HS. Children were found to use an oral antibiotic in combination with a topical at a slightly higher rate, which is not surprising given that topical clindamycin (the drug used more frequently in pediatric patients compared to adults) is a common treatment of acne (which is more common in adolescents). Additionally, while the use of surgical procedures and biologics is infrequent in both children and adults, use in children appears more limited

### Event Cohorts

- P1 – Surgical treatments (laser treatment on skin, excision, unroofing) pediatric
- E2 – Biologics (infliximab, adalimumab, anakinra, anti-TNF) pediatric
- E2 – Oral antibiotics pediatric
- E4 – Isotretinoin pediatric
- E1 – Topical treatments (clindamycin, resorcinol) pediatric



## SUMMARY

- Our study leverages 3 large real-world databases to understand pediatric and adult HS patients' disease characteristics and treatment patterns
- Among the pediatric cohort <18 years, HS disease was primarily identified in patients ≥12 years of age
- Our results indicate that the drugs prescribed in the 30 days prior to and 365 days after the index HS are similar in children and adults
- The treatment pathway results illustrate slight variation between pediatric and adult HS patients when examining groupings of drugs and procedures for treatment of HS
  - Children and adults both frequently use oral antibiotics as a first line treatment for HS. Children were found to use an oral antibiotic in combination with a topical at a slightly higher rate, which is not surprising given that topical clindamycin (the drug used more frequently in pediatric patients compared to adults) is a common treatment of acne (which is more common in adolescents). Additionally, while the use of surgical procedures and biologics is infrequent in both children and adults, use in children appears more limited
- Overall, our data demonstrate that the treatment patterns for HS are similar between adult and pediatric patients**



Image courtesy of <https://www.sciencephoto.com/media/1053222/view/hidradenitis-suppurativa-of-the-arm> credit: ISM / SCIENCE PHOTO LIBRARY

## STRENGTHS & LIMITATIONS

- Limitations**
  - Over the counter drug exposures are not captured
  - Claims coding can be distorted by the requirement to code for reimbursement
  - The indications for drug exposures are not known definitively
  - Data are captured only when a patient seeks care. Individuals who lack or have insufficient medical insurance could be underrepresented in the data; therefore, the total patient population will be larger
  - These numbers describe the populations captured by these respective databases, and care should be taken when generalizing findings to the broader US population
- Strengths**
  - Our study examines multiple US claims data sources with substantial populations of pediatric HS patients
  - Our study is retrospective and utilizes claims data that are not subject to volunteer bias
  - We analyzed multiple databases that capture different (although potentially overlapping) populations (CCAE and Optum: commercial, employer-supplemented insurance coverage; MDCD: government-sponsored insurance coverage)

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## DISCLOSURES

All authors declare no conflict of interest.  
**J. Hardin, PhD; R. Makadia, PhD; S. Black, PhD; and C.M. C. DeKlotz, MD** – employees of Janssen Research and Development, LLC. **E. Brouwer, PhD** – former employee of Janssen. **I. Lara-Corrales, MD** has participated in Advisory Boards for Janssen and been a site investigator for Janssen initiated research studies. **L. Diaz, MD and J. Kirby, MD** are consultants for Janssen Research and Development.