Pediatric Utilization of New Molecular Entities (NMEs)

A Summary of Early Post-Marketing Uptake in the Sentinel Distributed Database

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Celeste Ewig[1,3] ;Thuy Thai[1]; Bahareh Rasouli[1]; Mayura Shinde[1]; Sruthi Adimadhyam[1]; Jennifer G. Lyons[1];
Iara Costa[1]; June O'Neill[1]; Gifty Brisbane[1]; Amelia Thyen[1]; Derek Campbell[1];
Monica A. Muñoz[2]; José J. Hernández-Muñoz[2]

[1] Department of Population Medicine, Harvard Medical School and Harvard Pilgrim Health Care Institute, Boston, MA, USA

[2] Office of Surveillance and Epidemiology, Center for Drug Evaluation and Research, United States Food and Drug Administration, Silver Spring, MD

[3] Department of Pharmaceutical Outcomes and Policy, College of Pharmacy, University of Florida, Gainesville, FL

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Disclosures

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- TT, BR, MS, SA, JL, IC, JO, GB, AT, DC are employees at HPHCI, an organization that performs work for government and private organizations including pharmaceutical companies.
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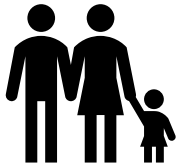
Introduction



- Most newly approved medications target conditions that primarily affect adult populations.
- While utilization among adult patients is expected, use of newly approved medications in patients <18 years old is not well-characterized.

- Understanding utilization of new medications in pediatric populations can facilitate post-marketing surveillance to provide insight into areas where timely research using real-world evidence is needed.

- **Objective:** To describe the trends in utilization of new medications approved by the US Food and Drug Administration (FDA) between 2017 to 2021 among patients <18 years of age.

Methods

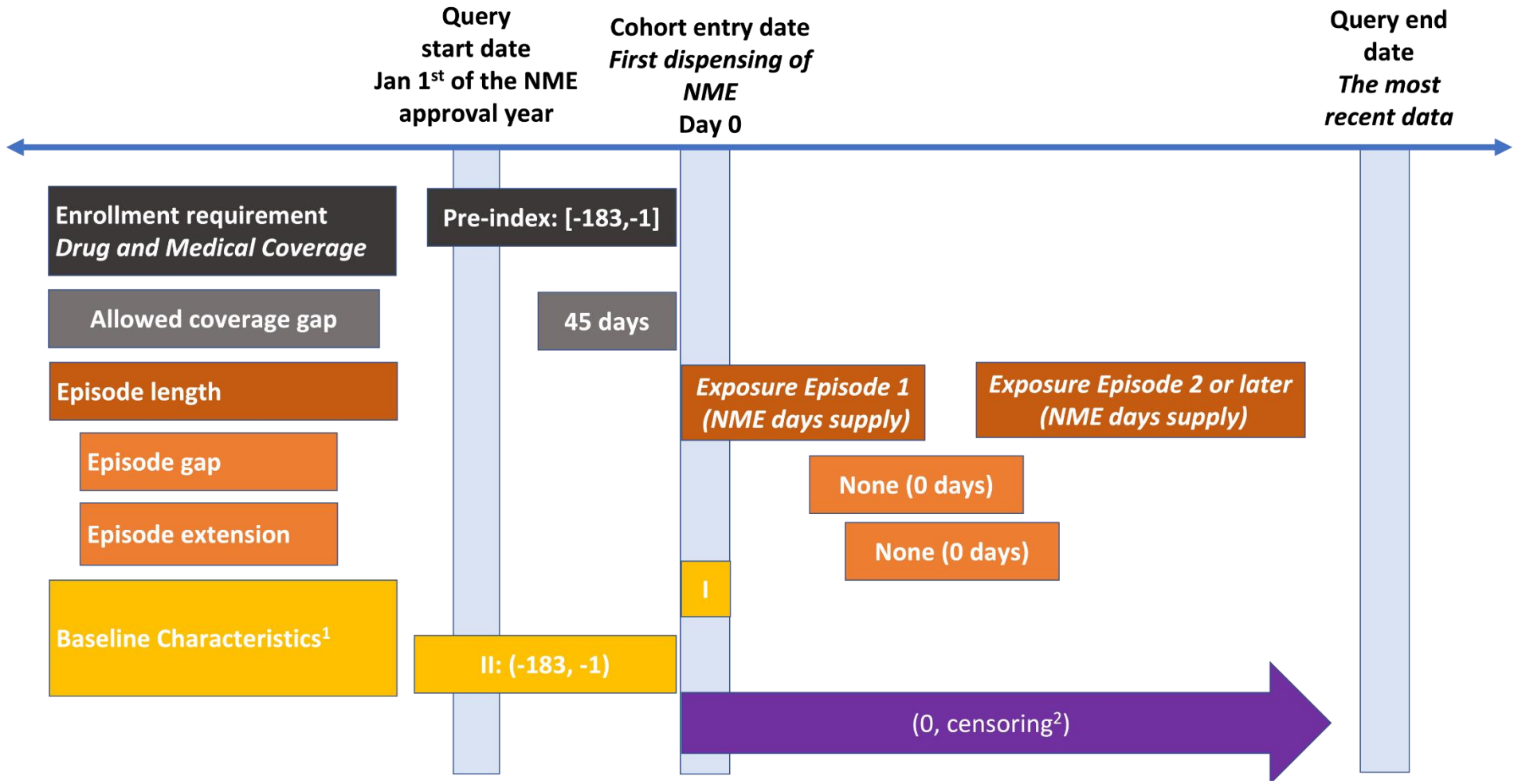
Data Source: Aggregated data partners from commercial and public health plans within the Sentinel Distributed Data Network

Time period and medication of interest: all new molecular entities (NMEs) approved between 2017 to 2021

Study Design:

- 260 medications for 256 NMEs approved between 2017-2021 (48 in 2017, 60 in 2018, 48 in 2019, 53 in 2020, and 51 in 2021).
- Individuals were required to have continuous medical and drug coverage 6 months prior to first qualifying NME dispensing/administration (index date), allowing for 45-day gap in coverage
- NME initiators were identified based on the presence of the National Drug Code (NDC) in a pharmacy dispensing claim or ICD-10 Current Procedural Terminology (CPT) code in any healthcare setting

Study Design Diagram



1. Baseline characteristics Window I: Age, Sex, Year. Window II: The Centers for Medicare and Medicaid Services (CMS) Chronic Conditions Data Warehouse (CCW): Acute Myocardial Infarction, Alzheimer's Disease and related conditions, Atrial Fibrillation, Diabetes, Heart Failure, Hyperlipidemia, Hypertension, Depression, Ischemic Heart Disease, Rheumatoid Arthritis/Osteoarthritis, Stroke/Transient Ischemic Attack (TIA), Breast Cancer, Colorectal Cancer, Prostate Cancer, Lung Cancer, Endometrial Cancer, Acquired Hypothyroidism, Anemia, Asthma, Benign Prostatic Hyperplasia, Chronic Kidney Disease, COPD and Bronchiectasis, Glaucoma, Osteoporosis; and Other: Obesity Diagnosis/Procedure, Obesity NDCs, Overweight, Smoking Diagnosis/Procedure, Smoking NDCs, Alcohol Abuse or Dependence, Drug Abuse or Dependence, History of Cardiac Arrest, History of Coronary Angioplasty or Bypass
2. Censoring criteria: earliest of disenrollment, death, data partner end date, end of query period

Analysis

- Descriptive analysis conducted for each cohort defined per query period

- Outcome: the proportion of all new initiators of each NME <18 years of age during the query period
- NME utilization for overall new initiators was characterized as high (>50,000), moderate (10,000 to ≤50,000) and low (<10,000)

- Characteristics of the medication (i.e., indication, orphan status, priority approval) relevant to the study period were evaluated

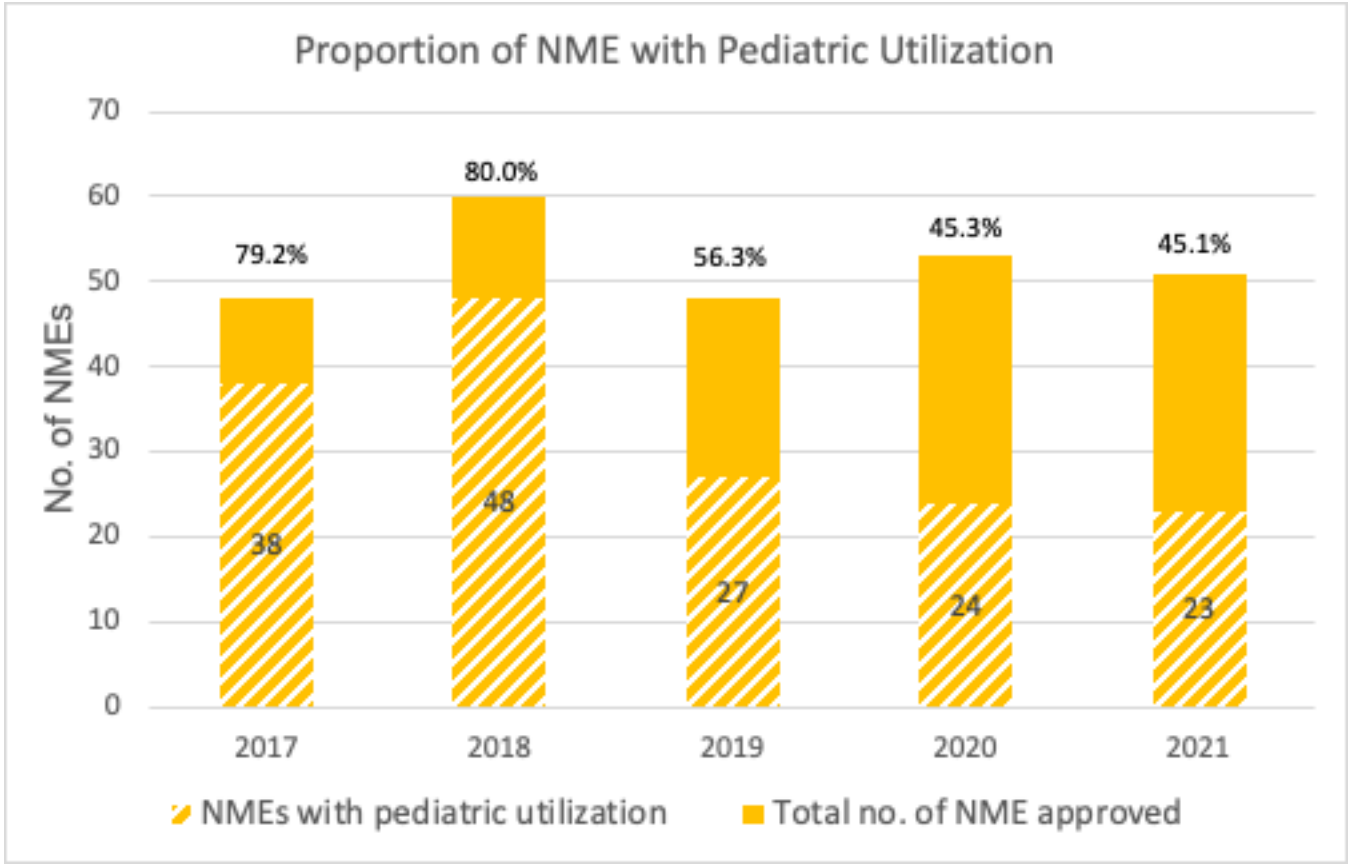
No. of Data Partners and Years of Available Data for Each NME Query

NME approval year	Part	Number of Data Partners included	Number of years and months with available data*
2017	1	14	5 years and 11 months
	2	14	6 years
2018	1	13	5 years and 5 months
	2	13	5 years and 5 months
2019	1	13	4 years and 5 months
	2	13	4 years and 5 months
2020	1	14	2 years and 8 months
	2	13	3 years
	3	12	3 years
2021	1	12	2 years and 5 months
	2	13	2 years and 6 months

Results

Of the 260 products (256 NMEs) approved between 2017 to 2021:

- 160 (61.5%) products had pediatric utilization
- 98 (37.7%) had accelerated (priority) approval
- 80 (30.8%) had orphan status designation
- 90 (57%) had information pertinent to adults only at the time of approval



Results: Medications with High Overall Utilization

Non-proprietary Name	Mean age (±SD) yrs	All patients n(% pediatric users)	Indication(s)[1]
High utilization (≥50,000 overall initiators)			
Baloxavir marboxil*,P (Approved: 2018)	41.6 (±16.1)	110,106 (17.3)	Treatment of acute uncomplicated influenza, post-exposure prophylaxis of influenzaC
DupilumabP (Approved: 2017)	48.0 (±16.9)	83,061 (8.5)	Treatment of moderate to severe atopic dermatitis, asthma, chronic rhinosinusitis, eosinophilic esophagitis, prurigo nodularisC
Galcanezumab-gnlm (Approved: 2018)	47.2 (±12.8)	50,086 (1.0)	Prevention and treatment of migraine and cluster headaches
Bictegravir, Emtricitabine, Tenofovir AlafenamideP (Approved: 2018)	47.3 (±12.6)	175,440 (0.6)	Treatment of HIV infection

*NME with more than 10,000 pediatric users. C= indication includes individuals<18 years of age. P= priority approval[1] . O= orphan status[1].

1. Drugs@FDA: FDA-Approved Drugs. https://www.accessdata.fda.gov/scripts/cder/daf/index.cfm

Results: Medications with Moderate Overall Utilization

Non-proprietary Name	Mean age (±SD) yrs	All patients n(% pediatric users)	Indication(s)[1]
Moderate utilization (10,000 to 50,000 overall initiations)			
Cannabidiol*, P,O (Approved: 2018)	20.4(±10.8)	20,980 (52.8)	Treatment of severe forms of seizures, tuberous sclerosis complex[C]
Sarecycline (Approved: 2018)	23.4(±10.9)	14,322 (44.1)	Treatment of moderate to severe acne vulgaris[C]
Trifarotene (Approved: 2018)	24.1(±10.9)	21,437 (39.5)	Topical treatment of acne vulgaris[C]
Clascoterone (Approved: 2018)	27.7(±11.6)	10,769 (24.7)	Topical treatment of acne vulgaris[C]
Prucalopride (Approved: 2018)	55.5(±15.0)	33,124 (1.3)	Treatment of chronic idiopathic constipation
Lumateperone Tosylate (Approved: 2018)	45.8 (±13.6)	17,075 (0.6)	Treatment of schizophrenia, depressive episodes associated with bipolar I/ II disorder

*NME with more than 10,000 pediatric users. C= indication includes individuals<18 years of age. P= priority approval[1] O= orphan status[1].

1. Drugs@FDA: FDA-Approved Drugs. https://www.accessdata.fda.gov/scripts/cder/daf/index.cfm

Results: Medications with Low Overall Utilization

Non-proprietary Name	Mean age (±SD) yrs	All patients N (% pediatric users)	Indication(s)[1]
Low utilization (<10,000 overall initiators)			
Lonapegsomatropin-tcgd[O] (Approved: 2021)	11.6(±3.2)	211 (100)	Treatment of endogenous growth hormone deficiency[C]
Vosoritide[P,O] (Approved: 2021)	9.1(±3.4)	36 (100)	Pediatric patients with achondroplasia and open plates[C]
Cerliponase Alfa[P,O] (Approved: 2017)	7.0 (±3.5)	18 (100)	Batten disease[C]
Naxitamab[P,O] (Approved: 2020)	8.1 (±4.9)	14 (100)	Relapsed or refractory high-risk neuroblastoma in pediatric patients[C]
Fish Oil Triglycerides[P,O] (Approved: 2018)	13.0 (±13.0)	141 (78.0)	Parenteral nutrition-associated cholestasis in pediatric patients[C]
Deflazacort[P,O] (Approved: 2017)	14.2 (±6.2)	1,129 (76.9)	Duchenne's muscular dystrophy[C]
Stiripentol[P,O] (Approved: 2018)	12.6 (±6.9)	402 (75.4)	Seizures associated with Dravet's syndrome[C]

*NME with more than 10,000 pediatric users. C= indication includes individuals<18 years of age. P= priority approval[1] O= orphan status[1].

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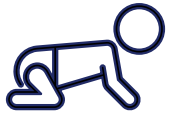
Takeaways and Considerations

- Utilization among pediatric patients was observed in more than half of all newly approved medications

- Varying proportions of pediatric users were observed across different NMEs reflect the target population of users
  - NMEs with low overall utilization but high proportion of pediatric users pertained to conditions that affect younger populations



- The limited number of pediatric users of NMEs with low utilization pose a challenge to timely monitoring of safety outcomes

- Subsequent analysis to examine the observed trend and relative proportion of patient population with the condition is underway

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University of Florida:

Almut Winterstein RPh, PhD, FISPE

Questions / Suggestions:

Celeste Ewig
Email: ewigc@ulf.edu