Pediatric Utilization of New Molecular Entities (NMEs): A Summary of Early Post-Marketing Uptake in the Sentinel Distributed Database

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BACKGROUND

- 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.
- Pediatric patients are often excluded from clinical trials resulting in limited prescribing information to support safe and effective use.
- Understanding utilization of new medications in pediatric populations can facilitate post-marketing surveillance and provide insight into the overall patient population prescribed these medications.

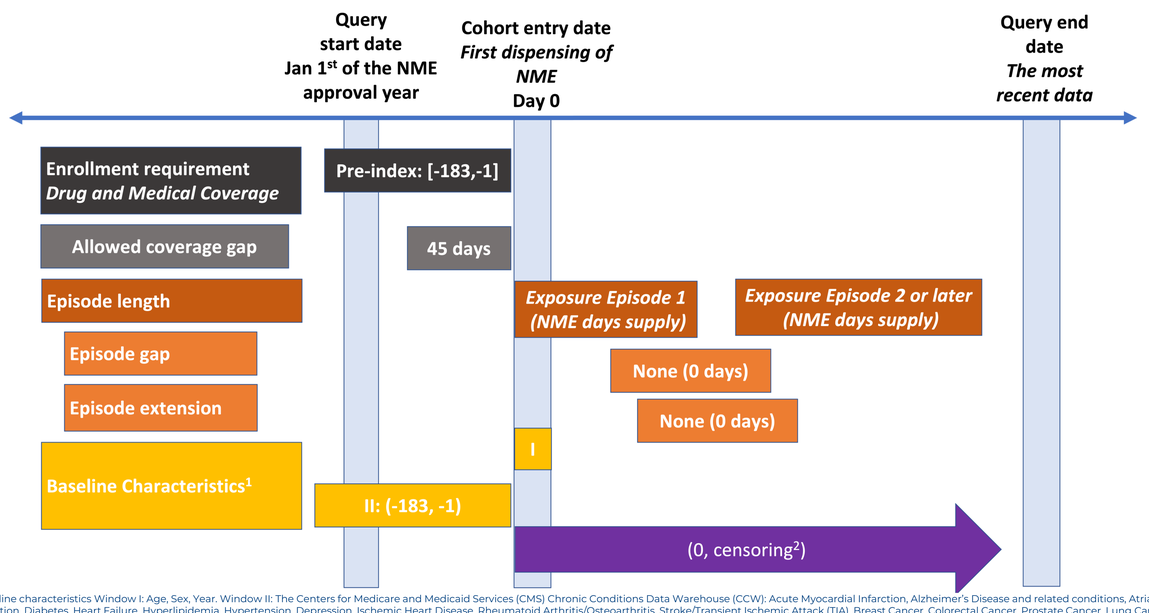
OBJECTIVES

- **To describe the trends in utilization of newly approved medications 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 Cohort:**
  - 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).
  - Some NMEs have medications with single or more than one ingredient. Medications with ≥1 medications were analyzed separately
  - Cohort was identified by utilization of index NME during the query period among individuals <18 years of age
  - 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
- Query period: Jan. 1st of the NME approval year to (1) query end date or (2) Most recent data (i.e., last day of the most recent month for which all Data Partners have at least 80% of the record count)
- 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
- Descriptive analysis conducted for each cohort defined per query period
- NME utilization was characterized as high (>50,000), moderate (10,000 to ≤50,000) and low (<10,000) overall initiators

Figure 1. 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

RESULTS

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

- 158 (60.8%) 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

Figure 2. Number of NME with pediatric utilization per year

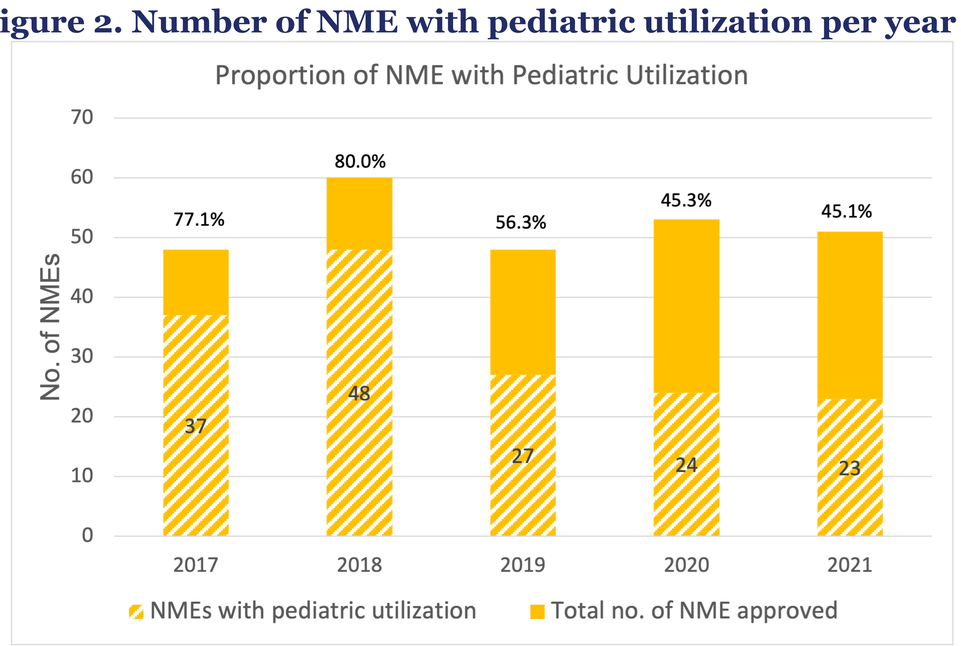


Table 1. Proportion of pediatric users across levels of NME utilization

Non-proprietary Name	All patients n(% pediatric users)	Indication(s)[1]
High utilization		
Baloxavir marboxil*,P	110,106 (17.3)	Treatment of acute uncomplicated influenza, post-exposure prophylaxis of influenza[c]
Dupilumab[P]	83,061 (8.5)	Treatment of moderate to severe atopic dermatitis, asthma, chronic rhinosinusitis, eosinophilic esophagitis, prurigo nodularis[c]
Galcanezumab-gnlm	50,086 (1.0)	Prevention and treatment of migraine and cluster headaches
Bictegravir, Embitcitabine, Tenofovir Alafenamide[P]	175,440 (0.6)	Treatment of HIV infection
Moderate utilization		
Cannabidiol*, P,O	20,980 (52.8)	Treatment of severe forms of seizures, tuberous sclerosis complex[c]
Sarecycline	14,322 (44.1)	Treatment of moderate to severe acne vulgaris[c]
Trifarotene	21,437 (39.5)	Topical treatment of acne vulgaris[c]
Clascoterone	10,769 (24.7)	Topical treatment of acne vulgaris[c]
Prucalopride	33,124 (1.3)	Treatment of chronic idiopathic constipation
Lumateperone Tosylate	17,075 (0.6)	Treatment of schizophrenia, depressive episodes associated with bipolar I/ II disorder
Upadacitinib[P]	23,228 (0.4)	Treatment of moderate to severe rheumatoid arthritis, psoriatic arthritis, atopic dermatitis, ulcerative colitis, ankylosing spondylitis[c]
Low utilization		
Lonapegsomatropin-tcgd[O]	211 (100)	Treatment of endogenous growth hormone deficiency[c]
Vosoritide[P,O]	36 (100)	Pediatric patients with achondroplasia[c]
Cerliponase Alfa[P,O]	18 (100)	Batten disease[c]
Naxitamab[P,O]	14 (100)	Relapsed or refractory high-risk neuroblastoma in pediatric patients[c]
Fish Oil Triglycerides[P,O]	141 (78.0)	Parenteral nutrition-associated cholestasis in pediatric patients[c]
Deflazacort[P,O]	1,129 (76.9)	Duchenne's muscular dystrophy[c]
Stiripentol[P,O]	402 (75.4)	Seizures associated with Dravet's syndrome[c]
Asparaginase Erwinia Chrysanthemi[O]	67 (74.6)	Acute lymphoblastic leukemia and lymphoblastic lymphoma[c]
Viloxazine	7,859 (63.0)	Attention deficit hyperactivity disorder[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].

CONCLUSION

- Utilization among pediatric patients was observed in more than half of all newly approved medications.
- Proportion of pediatric users varied across the different levels of utilization. NMEs with low overall utilization had higher proportion of pediatric users.
- Post-marketing studies in pediatric patients are needed to generate real-world evidence to obtain age-specific safety and efficacy information.
- The limited number of pediatric users of NMEs with low utilization pose a challenge to timely monitoring of safety outcomes.

LIMITATIONS

- The number data partners and the data available from each data partner varied across each NME query.
- Pediatric patients were broadly categorized as <18 years of age at the time of incident use which may not reflect the actual age distribution of users.

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- The contents are those of the authors and do not necessarily represent the official views of, nor and endorsement, by FDA/HHS, or the U.S. Government.

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