Mercer

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New Drug Update August 2024

AMPAA

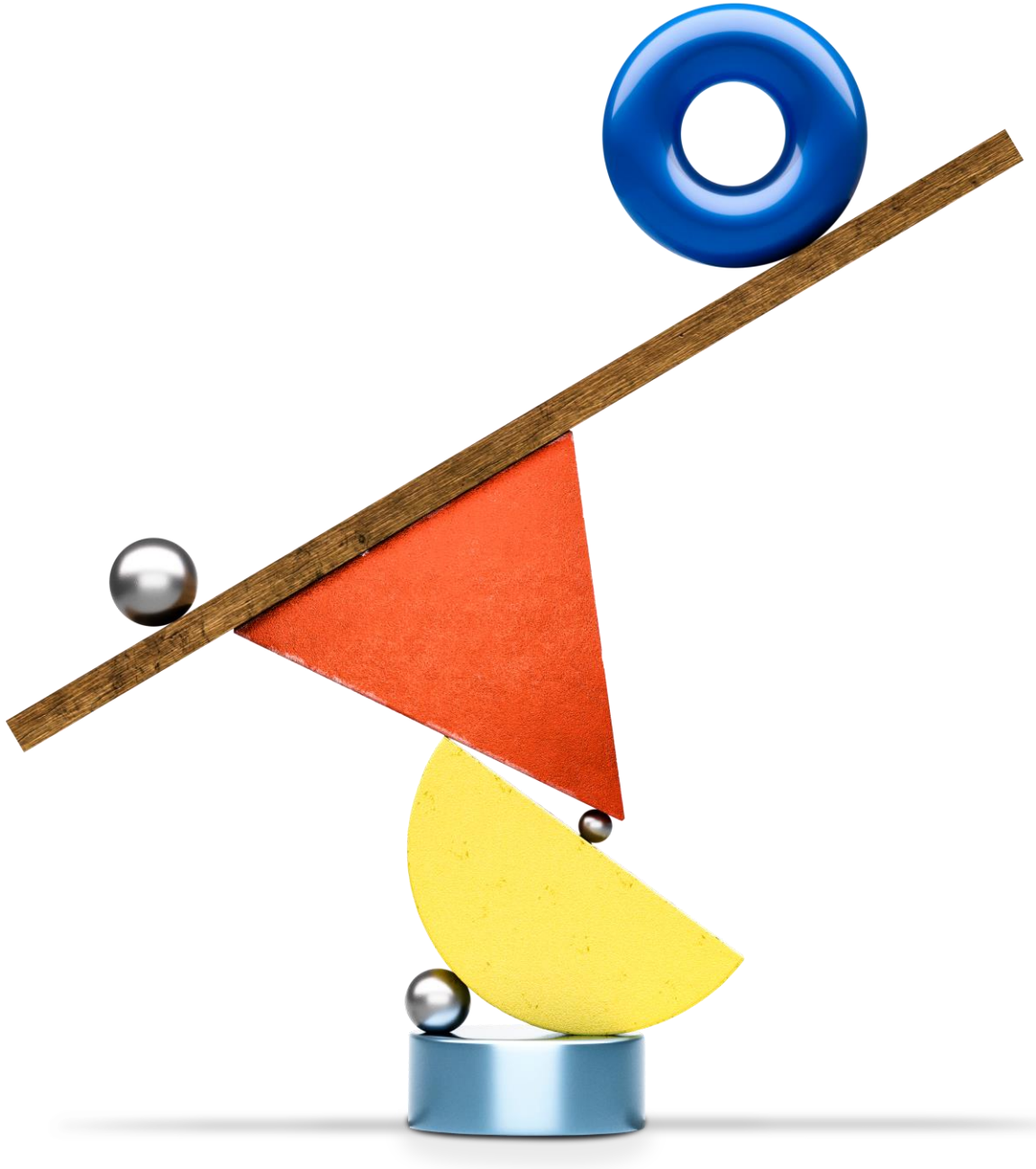
August 5, 2024

Bethany Holderread, Principal, Pharm.D.
Fargo, North Dakota

A business of Marsh McLennan

Statement of Disclosure

- ✓ I have no relevant conflicts of interest to report
- ✓ This presentation will include a discussion of unlabeled or investigational use of therapies that have not yet been approved by the FDA
- ✓ This presentation will focus on therapies approved by the FDA within the last year; this is not an all-inclusive review of new drugs approved in the past year



Learning Objectives

At the conclusion of this educational activity, participants will be able to:

Describe important considerations for therapies approved by the FDA within the last year regarding patient selection, dose, and administration.

List notable therapies approved by the FDA within the last year and their indications for use.

Identify novel therapies with limited therapeutic alternatives.

Learning Assessment Questions

True or False?

Lenmeldy (atidarsagene autotemcel) is indicated for metachromatic leukodystrophy.

Which of the following are important consideration(s) for Duvyzat (givinostat)?

1. No restrictions regarding genetic variants,
2. No restrictions regarding concomitant Duchenne Muscular Dystrophy therapy utilization
3. No restrictions regarding ambulatory status
4. All of the above

True or False?

Rezdiffra (resmetirom) use should be avoided in patients with decompensated cirrhosis.

Our Discussion Today

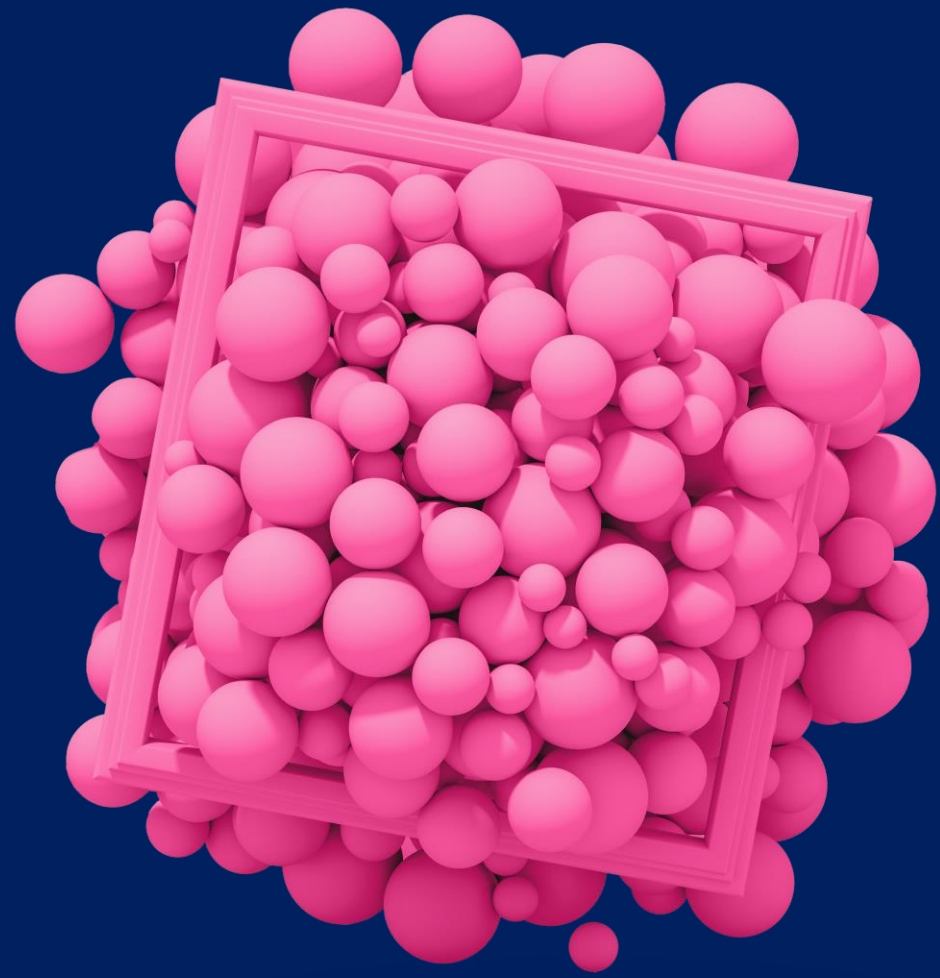
1. Overview of FDA New Drug Approval Patterns
2. Gene and Cell Therapy Products
3. Oncology
4. Neurology
5. Diabetes/Cardiology/Nephrology
6. Rare Diseases
7. Infectious Disease
8. Immunomodulators
9. Other Conditions
10. Biosimilars

Bethany Holderread, Pharm.D.

A Senior Principal and pharmacist in the Mercer Government practice.

Bethany assists Mercer's Medicaid clients with the management of pharmacy benefits.

1
Overview of FDA New Drug Approval Patterns

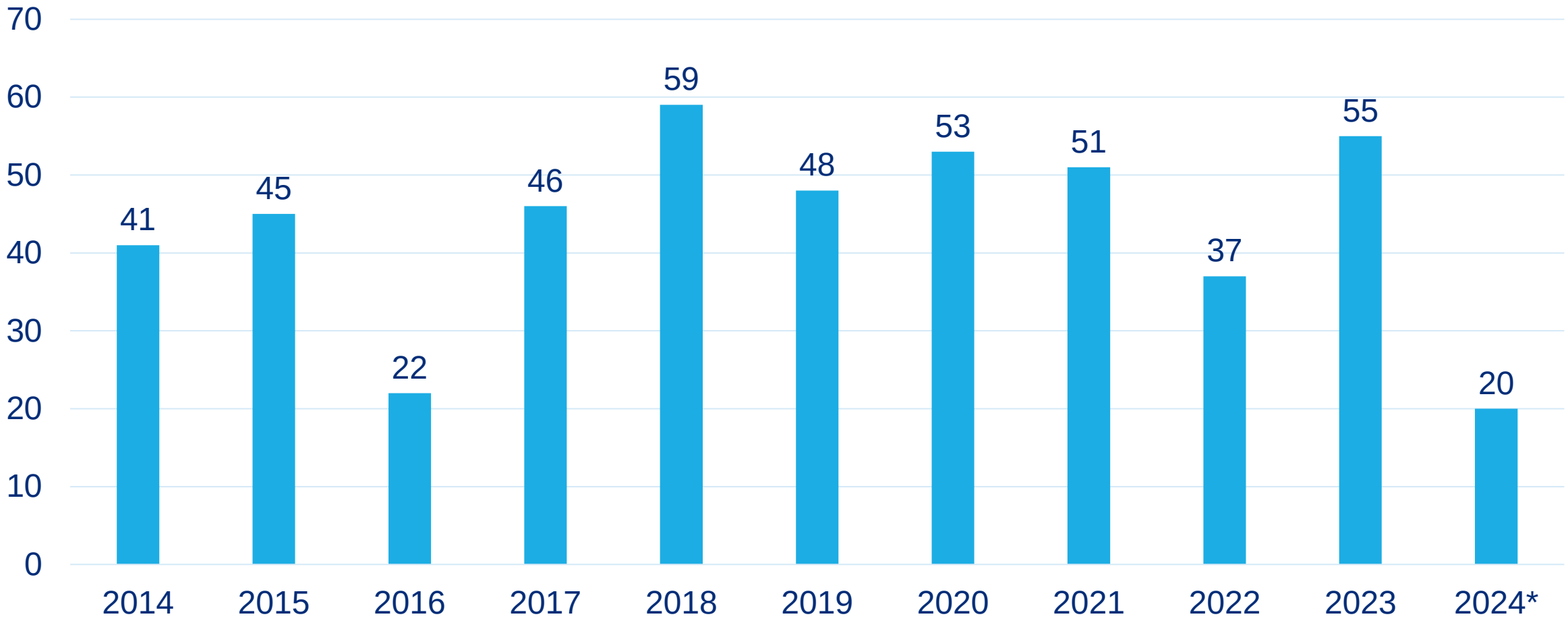


Random Food Fact 1:

Dentist William Morrison and candymaker John C. Wharton became famous for inventing the cotton candy machine in Nashville in 1897.

Thorp. https://www.lovefood.com/galleries/amp/149649/your-states-most-fascinating-food-fact-that-makes-it-unique.

FDA Approval Trends: New Molecular Entities



FDA. New Drug Therapy Approvals. https://www.fda.gov/drugs/new-drugs-fda-cders-new-molecular-entities-and-new-therapeutic-biological-products/novel-drug-approvals-2024. Accessed 06/14/2024.
*As of June 25, 2024

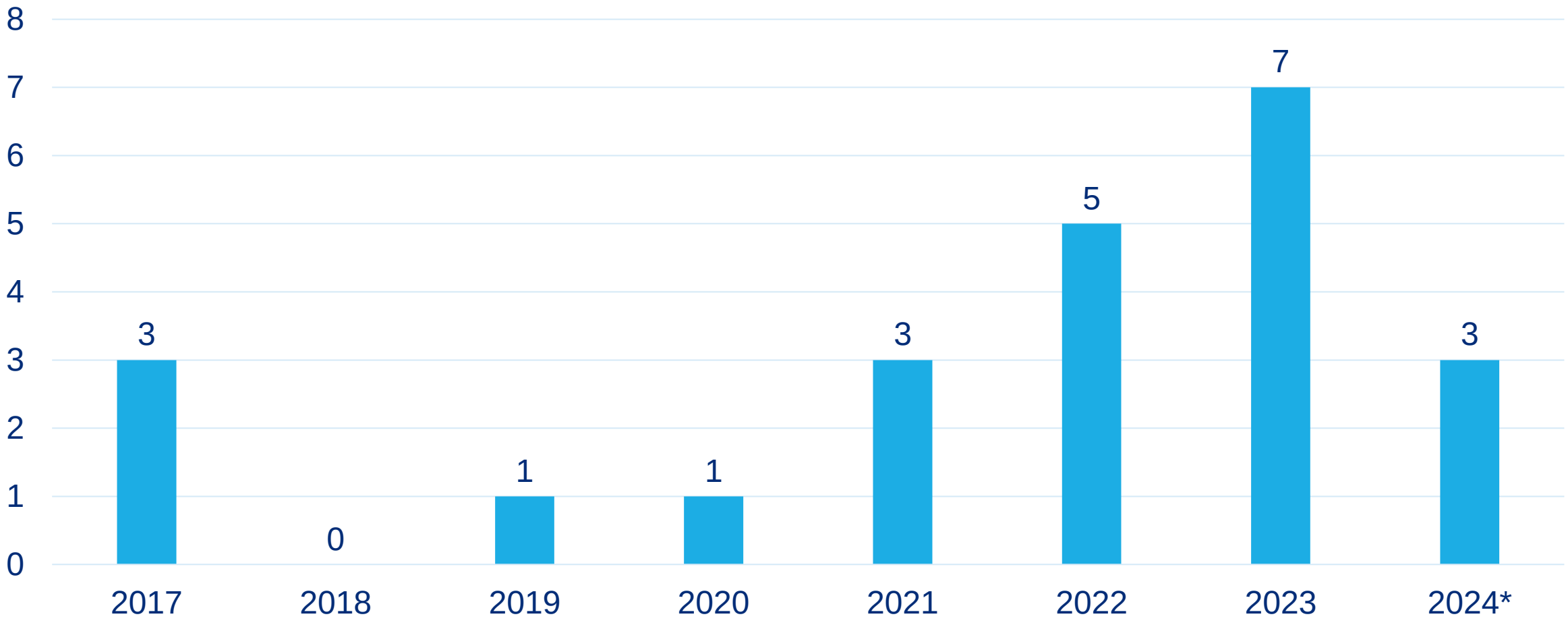
Summary of 2023 Novel Approvals

At Least One Expedited Development or Review Method: 65%

First-in-Class 36%	Orphan 51%	Fast Track 45%
Breakthrough Therapy 16%	Priority Review 56%	Accelerated Approval 16%

FDA. New Drug Therapy Approvals. https://www.fda.gov/drugs/development-approval-process-drugs/new-drugs-fda-cders-new-molecular-entities-and-new-therapeutic-biological-products. Accessed 06/14/2024.

FDA Approval Trends: Gene and Cell Therapy Products



FDA. Approved Cellular and Gene Therapy Products. https://www.fda.gov/vaccines-blood-biologics/cellular-gene-therapy-products/approved-cellular-and-gene-therapy-products. Accessed 06/14/2024.
NOTE: Imlygic (talimogene laherparepvec), Provenge (sipuleucel-T), and collagen products not included on timeline
*As of June 14, 2024.

Approved Gene and Cell Therapy Products

2022

Adstiladrin
(nadofaragene firadenovec)
Carvykti
(ciltacabtagene autoleucel)
Hemgenix
(etranacogene dezaparvovec)
Skysona
(elivaldogene autotemcel)
Zynteglo
(betibeglogene autotemcel)

2023

Casgevy
(exagamglogene autotemcel)
Elevidys
(delandistrogene moxeparvovec)
Lantidra
(donislecel)
Lyfgenia
(lovotibeglogene autotemcel)
Omisirge
(omidubicel)
Roctavian
(valoctocogene roxaparvovec)
Vyjuvek
(beremagene geperpavec)

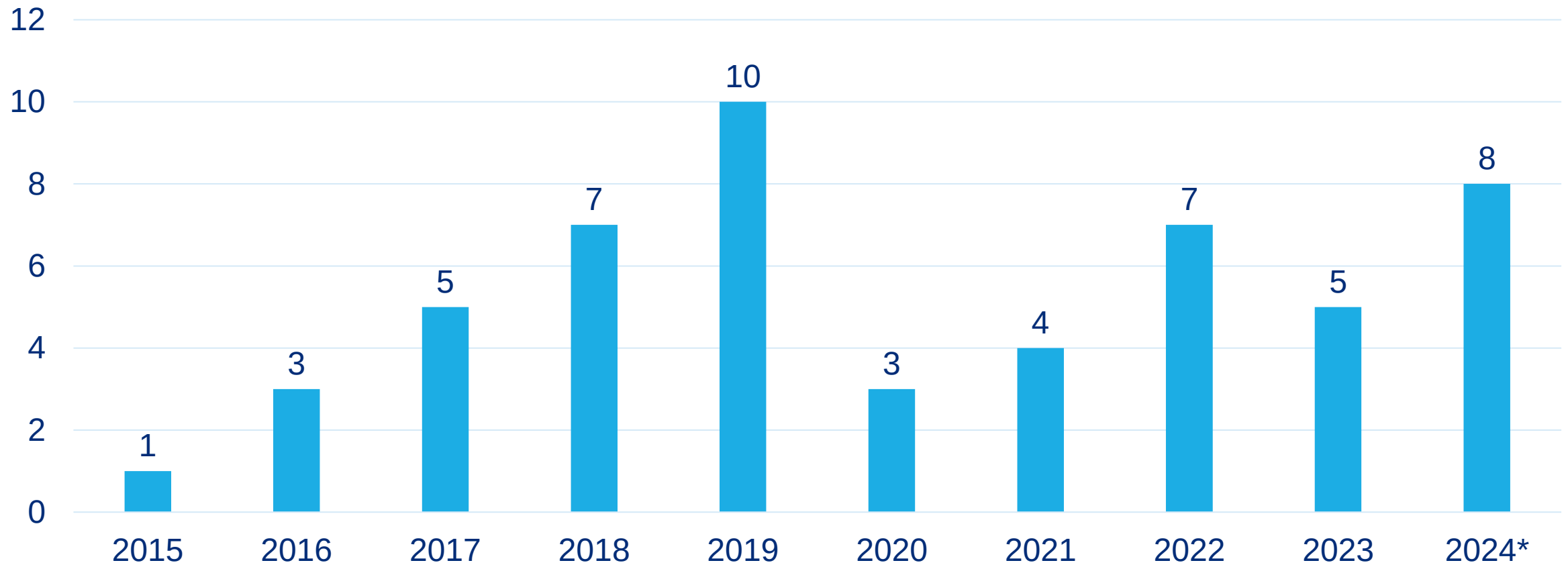
2024*

Amtagvi
(lifileucel)
Beqvez
(fidanacogene elaparvovec)
Lenmeldy
(atidarsagene autotemcel)

FDA. Approved Cellular and Gene Therapy Products. https://www.fda.gov/vaccines-blood-biologics/cellular-gene-therapy-products/approved-cellular-and-gene-therapy-products. Accessed 06/14/2024.
Note: Products approved prior to 2022 not included. Includes only initial approval and not label expansions.
*As of June 14, 2024.

Biosimilar Approvals

FDA has approved a total of 53 biosimilar products for 17 different reference products since 2015



FDA. FDA-Approved Biosimilar Products. https://www.fda.gov/drugs/biosimilars/biosimilar-product-information. Accessed 06/14/2024.
*As of June 14, 2024

2
Gene and Cell Therapy Products

Random Food Fact 2:

North Dakota is the number 1 honey-producing state in the nation. In 2022, North Dakota bees produced 31.2 million pounds of honey valued at over $82 million.

https://www.ndda.nd.gov/divisions/plant-industries/apiary-honey-bees#:~:text=1%20honey%2Dproducing%20state%20in,and%20registers%20hive%20locations%20annually.

2nd Half 2023 – 1st Half 2024 Gene and Cell Therapy Products

Drug Name	Approval Date	Indication
Beqvez (fidanacogene elaparvovec)	April 2024	Hemophilia B
Lenmeldy (atidarsagene autotemcel)	Mar 2024	Metachromatic leukodystrophy (MLD)
Amtagvi (lifileucel)	Feb 2024	Unresectable or metastatic melanoma
Casgevy (exagamglogene autotemcel)	Dec 2023	Sickle cell disease (SCD); transfusion-dependent ß-thalassemia (TDT)
Lyfgenia (lovotibeglogene autotemcel)	Dec 2023	SCD
Elevidys (delandistrogene moxeparvovec)	June 2023	Duchenne muscular dystrophy (DMD)

FDA. Approved Cellular and Gene Therapy Products. https://www.fda.gov/vaccines-blood-biologics/cellular-gene-therapy-products/approved-cellular-and-gene-therapy-products. Accessed 06/14/2024.

Beqvez (fidanacogene elaparvovec)

Indication	Moderate to severe hemophilia B
Market Landscape	• ~6,000 patients in U.S. with Hemophilia B (two-thirds have moderate-to-severe disease) • Regular infusions of factor IX (FIX) can cost approximately $550,000 to $750,000 annually; will compete with Hemgenix
Clinical Studies	45 adult males: Beqvez mean annualized bleed rate (ABR): 2.5 vs. 4.5 mean ABR in standard of care (SOC) group; bleeds were eliminated in 60% of patients compared to 29% in the SOC arm
Dosing	One-time treatment
Important Considerations	• FDA indication specific to adults using FIX prophylaxis therapy, with current or history of life-threatening hemorrhage, or have repeated, serious spontaneous bleeding episodes, and do not have neutralizing antibodies to adeno-associated virus (AAV) serotype Rh74var (AAVRh74var) capsid. • Warnings and precautions: hepatoxicity, infusion reactions, malignancy
Cost	$3.5 million for a one-time treatment

FDA. Beqvez. Accessed 6/2024.
IPD Analytics. Beqvez Update.

Hemophilia B Gene Therapy Comparison

Parameter	Beqvez (fidanacogene elaparvovec)	Hemgenix (etranacogene dezaparvovec)
Indication	Adults with moderate to severe hemophilia B who: • Currently use FIX prophylaxis therapy, or • Have current or historical life-threatening hemorrhage, or • Have repeated, serious spontaneous bleeding episodes, and • Do not have neutralizing antibodies to AAVRh74var capsid	Adults with hemophilia B who: • Currently use FIX prophylaxis therapy, or • Have current or historical life-threatening hemorrhage, or • Have repeated, serious spontaneous bleeding episodes
Clinical Trials	4.5 bleeds/year baseline vs. 2.5 bleeds/year post-Beqvez	4.1 bleeds/year baseline vs. 1.9 bleeds/year post-Hemgenix
Study Population	Adult males w/ FIX activity ≤2 IU/dL; negative for pre-existing neutralizing antibodies to AAVRh74var capsid	Adult males w/ FIX activity ≤2 IU/dL
Cost	$3.5 million	$3.5 million

FDA. Beqvez, Hemgenix. Accessed 6/2024.
IPD Analytics. Beqvez New Drug Review.

Lenmeldy (atidarsagene autotemcel)

Indication	Treatment of children with metachromatic leukodystrophy (MLD)
Market Landscape	• Approximately 2,500 patients in U.S. • Sulfatides accumulate resulting in nerve damage and subsequent loss of cognitive and motor function • Symptomatic and supportive care largely used prior to approval of Lenmeldy; stem cell transplant for pre-symptomatic or minimally symptomatic children
Clinical Studies	• 39 treated children vs. 49 untreated natural history controls • At 6 years, all of subset of treated patients were alive vs. 58% in controls • Treated patients saw slowing of motor and cognitive disease
Dosing	One-time treatment administered following myeloablative conditioning
Important Considerations	• Myeloablative conditioning required before infusion of Lenmeldy; patients will remain in hospital for 4-12 weeks following administration • Warnings and precautions: thrombosis, encephalitis, cancer
Cost	$4.25 million for a one-time treatment (does not include hospital stay or other medications required prior to treatment)

FDA. Lenmeldy. Accessed 4/2024.
IPD Analytics. Lenmeldy Update.

Casgevy (exagamglogene autotemcel)

Indication	• SCD in patients ≥ 12 with recurrent vaso-occlusive crises (VOCs) • Transfusion-dependent ß-thalassemia (TDT) in patients ≥ 12
Market Landscape	• Estimated 100,000 patients with SCD in the United States • Estimated 32,000 patients with SCD or TDT treatment eligible • Current treatments: stem cell transplant, increasing hemoglobin levels, or symptomatic relief; cost range $2,000 to $120,000 annually
Clinical Studies	• SCD: 29 of 31 patients (93.5%) free from severe VOC episodes for 12 months • TDT patients: 32 of 35 (91.4%) transfusion independent for 12 months
Dosing	One-time IV infusion
Important Considerations	• Myeloablative conditioning required • HIV-1/HIV-2, hepatitis B virus, and hepatitis C virus screening required • Warnings and Precautions: neutrophil engraftment failure, prolonged time to platelet engraftment, off-target genome editing risk
Cost	• $2.2 million for the one-time treatment (does not include hospital stay or other medications required prior to treatment) • ICER: cost-effective if priced at up to $2.05 million per treatment

FDA. Casgevy. Accessed 4/2024.
IPD Analytics. Casgevy Update.

Lyfgenia (lovotibeglogene autotemcel)

Indication	Patients ≥ 12 years with SCD & history of vaso-occlusive events (VOEs)
Market Landscape	• Similar to Casgevy • Manufacturer estimates 20,000 patients eligible
Clinical Studies	SCD patients 12 to 50 years of age: 28 of 32 patients (88%) experienced a complete resolution of VOEs between 6 and 18 months after infusion
Dosing	One-time IV infusion
Important Considerations	• Myeloablative conditioning must be administered before infusion • HIV-1/HIV-2 screening required • Patients with α-thalassemia trait may experience anemia that may require chronic red blood cell transfusions • Lifelong monitoring for malignancies
Cost	• $3.1 million for the one-time treatment (does not include hospital stay or other medications required prior to treatment) • ICER: cost-effective if priced at up to $2.05 million per treatment

FDA. Lyfgenia. Accessed 4/2024.
IPD Analytics. Lyfgenia Update.

Sickle Cell Gene Therapy Comparison

Parameter	Casgevy (exagamglogene autotemcel)	Lyfgenia (lovotibeglogene autotemcel)
Mechanism of Action	CRISPR/Cas9-editing technology	Lentiviral vector (LVV)
Clinical Trials	93.5% of patients free of severe VOCs for 12 months in 24 months after treatment	94% of patients free of severe VOCs 6-18 months after treatment
Study Population	12 to 35 years of age; ≥4 severe VOEs in previous 2 years	12 to 50 years of age; ≥2 severe VOEs per year in past 2 years
Cell Collection	At least 20×10^6 CD34+ cells/kg	At least 16.5×10^6 CD34+ cells/kg
Warnings	Risk of off-target editing	Insertional oncogenesis seen with other LVV therapies
Treatment Centers	19 activated	55 either activated or in progress
Cost	$2.2 million	$3.1 million

FDA. Lyfgenia, Casgevy. Accessed 6/2024.
IPD Analytics. Lyfgenia or Casgevy Update.

Elevidys (delandistrogene moxeparvovec)

Indication	Duchenne muscular dystrophy (DMD)
Market Landscape	• Estimated U.S. prevalence ranges between 10,000 and 15,000 males • First gene therapy for DMD patients; expanded approval June 2024 • Current treatment consists of exon skipping therapies and glucocorticoids
Clinical Studies	• Did not meet primary endpoint in Phase 3 confirmatory study: 125 patients with DMD 4 to 7 years of age • Statistically significant improvement in secondary endpoints • Postmarketing study requirement for accelerated approval in non-ambulatory patients
Dosing	One-time, single IV dose
Important Considerations	• Contraindicated in patients with deletion in exon 8 or exon 9 in DMD gene • Baseline testing for the presence of anti-AAVrh74 • Liver monitoring, myocarditis, and immune-mediated myositis
Cost	$3.2 million for one-time treatment

FDA. Elevidys. Accessed 06/2024.
IPD Analytics. Elevidys Update.

3
Oncology

Random Food Fact 3:

South Dakota is home to the world’s only corn palace, which attracts more than half a million visitors each year.

Blee. https://spoonuniversity.com/lifestyle/51-state-food-facts

Novel 1st Half 2024 Oncology Approvals

Drug Name	Approval Date	Indication
Rytelo (imetelstat)	June 2024	Myelodysplastic syndromes
Imdelltra (tarlatamab)	May 2024	Small cell lung cancer
Ojemda (tovorafenib)	April 2024	Pediatric low-grade glioma
Anktiva (nogapendekin alfa inbakicept)	April 2024	Bladder cancer
Lumisight (pegulicianine)	April 2024	Optical imaging agent for detection of cancer
Tevimbra (tislelizumab)	Mar 2024	Esophageal squamous cell carcinoma

FDA. Novel Drug Approvals for 2023 and 2024. https://www.fda.gov/drugs/new-drugs-fda-cders-new-molecular-entities-and-new-therapeutic-biological-products/novel-drug-approvals-2024. Accessed 06/14/2024.

Novel 2nd Half 2023 Oncology Approvals

Drug Name	Approval Date	Indication
Ogsiveo (nirogacestat)	Nov 2023	Desmoid tumors
Truqap (capivasertib)	Nov 2023	Breast cancer
Ryzneuta (efbemalenograstim alfa)	Nov 2023	Neutropenia
Augtyro (repotrectinib)	Nov 2023	Non-small cell lung cancer
Fruzaqla (fruquintinib)	Nov 2023	Metastatic colorectal cancer
Loqtorzi (toripalimab)	Oct 2023	Metastatic nasopharyngeal carcinoma
Ojjaara (momelotinib)	Sept 2023	Myelofibrosis in adults with anemia
Aphexda (motixafortide)	Sept 2023	To mobilize hematopoietic stem cells for collection and transplantation in multiple myeloma patients
Elrexfio (elranatamab)	Aug 2023	Multiple myeloma
Talvey (talquetamab)	Aug 2023	Multiple myeloma
Vanflyta (quizartinib)	July 2023	Newly diagnosed acute myeloid leukemia

FDA. Novel Drug Approvals for 2023. https://www.fda.gov/drugs/new-drugs-fda-cders-new-molecular-entities-and-new-therapeutic-biological-products/novel-drug-approvals-2023. Accessed 04/22/2024.

Ojemda (tovorafenib)

Indication	Treatment of patients ≥6 months of age with relapsed or refractory (R/R) pediatric low-grade glioma (pLGG) harboring a BRAF fusion or rearrangement, or *BRAF V600* mutation
Market Landscape	• First FDA-approved systemic therapy for patients with pLGG who have *BRAF* rearrangements, including fusions (approximately 75% of pLGG cases involve a *BRAF* alteration, 80% of which have fusions) • Only previously approved treatment was Mekinist + Tafinlar, which is indicated only for pLGGs harboring *BRAF V600E* mutations
Clinical Studies	• Single-arm, open-label study of 76 patients with R/R pLGG with BRAF alteration and received at least 1 prior line of systemic therapy • Overall response rate was 51%; median duration of response 13.8 months
Dosing	380 mg/m^2 by mouth once weekly
Important Considerations	• Accelerated approval • Also being studied in patients 6 months to 25 years of age with pLGG as first-line therapy compared to chemotherapy
Cost	Wholesale Acquisition Cost (WAC) of $33,916 for a 28-day supply

Ojemda Prescribing Information.
IPD Analytics Ojemda New Drug Review.

4
Neurology

Random Food Fact 4:

For many years North Dakota was home to a delicious world food record: the world's largest hamburger, created in the tiny town of Rutland in 1982.

Mercer

Gabriel. https://www.thefactsite.com/100-random-food-facts/

Novel 2nd Half 2023 – 1st Half 2024 Neurology Approvals

Drug Name	Approval Date	Indication
Duvyzat (givinostat)	Mar 2024	Duchenne muscular dystrophy
Wainua (eplontersen)	Dec 2023	Polyneuropathy of hereditary transthyretin-mediated amyloidosis
Agamree (vamorolone)	Oct 2023	Duchenne muscular dystrophy
Zilbrysq (zilucoplan)	Oct 2023	Generalized myasthenia gravis
Exxua (gepirone)	Sept 2023	Major depressive disorder
Zurzuvae (zuranolone)	Aug 2023	Postpartum depression

FDA. Novel Drug Approvals for 2023 and 2024. https://www.fda.gov/drugs/new-drugs-fda-cders-new-molecular-entities-and-new-therapeutic-biological-products/novel-drug-approvals-2024. Accessed 06/14/2024.

Duvyzat (givinostat)

Indication	Duchenne muscular dystrophy (DMD)
Market Landscape	• Estimated prevalence ranges between 10,000 and 15,000 males • Current treatment consists of exon skipping therapies and glucocorticoids • First nonsteroidal drug approved to treat patients with all genetic variants of DMD
Clinical Studies	• 18-month placebo-controlled study of 179 male patients between 6 and 17 years of age with DMD who were receiving corticosteroids • Less decline in the timed four-stair climb (-1.78 second difference from placebo)
How Supplied	Oral suspension: 8.86 mg/mL
Dosing	Weight-based; by mouth twice daily
Important Considerations	• Novel histone deacetylase (HDAC) inhibitor; may activate repair mechanisms • Broad label; no restrictions regarding genetic variants, ambulatory status, history of gene therapy, or concomitant DMD therapy utilization • Warnings related to hematologic changes, increased triglycerides, GI disturbances, QTc prolongation
Cost	Annual WAC of $675,260.95 at a dose of 3.5mL twice daily (30kg patient)

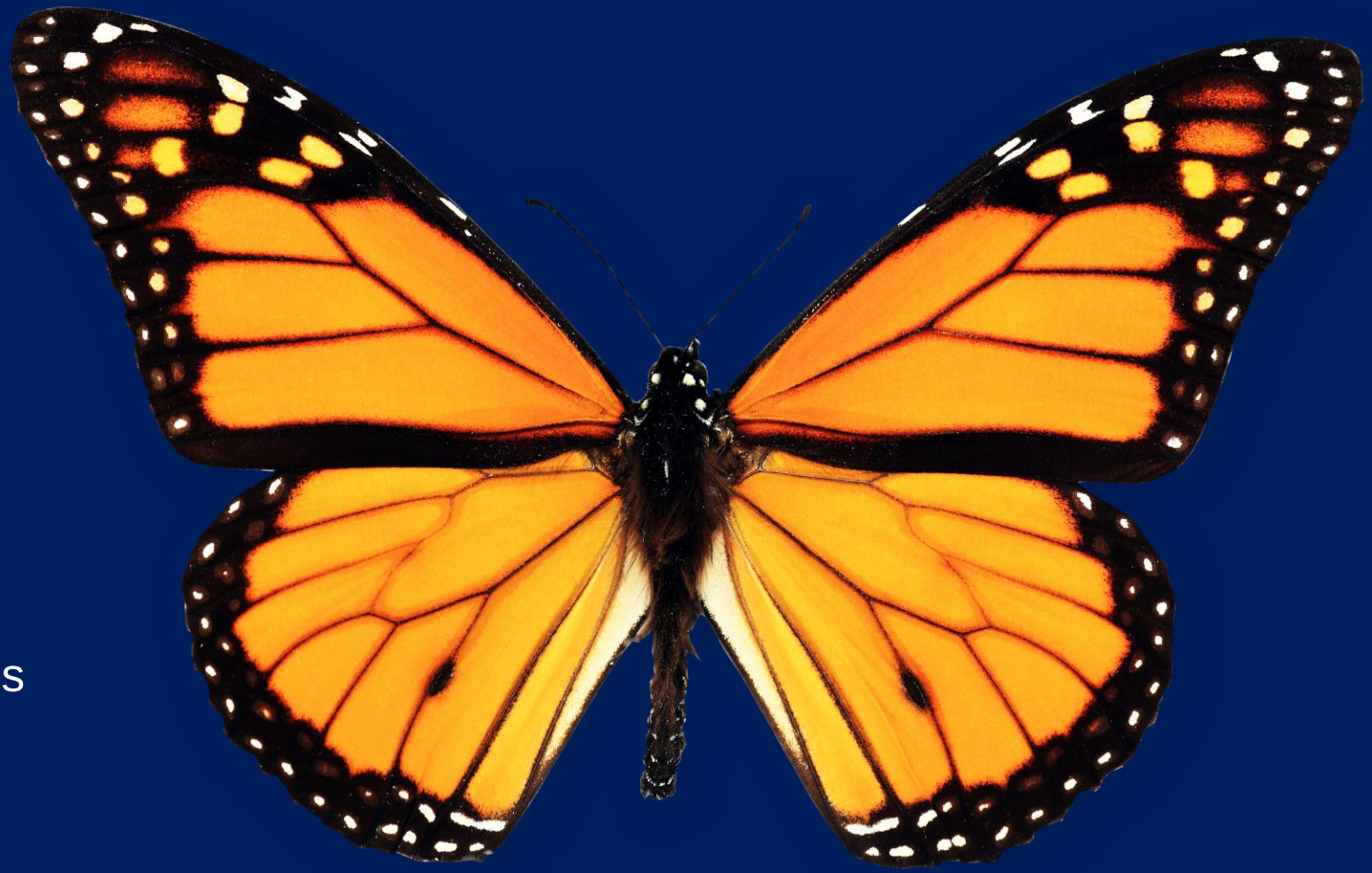
Duvyzat Prescribing Information
IPD Analytics Duvyzat Market and Financial Insights.

Agamree (vamorolone)

Indication	Duchenne muscular dystrophy (DMD)
Market Landscape	• Estimated prevalence ranges between 10,000 and 15,000 males • First-in-class dissociative steroid • Current treatment consists of exon skipping therapies and glucocorticoids
Clinical Studies	• Studied in 121 boys with DMD, 4-6 years of age, and able to ambulate • At 24 weeks, the vamorolone group had significant improvement vs. placebo in time to stand test and the 6-minute walk test
How Supplied	40 mg/mL oral suspension
Dosing	6 mg/kg orally once daily up to a maximum daily dosage of 300 mg
Important Considerations	• Inhibits the NF-κB pathway and may offer reduced side effects compared to other glucocorticoids • Warnings and precautions similar to other oral glucocorticoids
Cost	$156,038 annual WAC cost at a dose of 4.5mL daily (30kg patient)

Agamree Prescribing Information
IPD Analytics Agamree Market and Financial Insights.

5
Diabetes/ Cardiology/ Nephrology



Random Food Fact 5:

A common red food dye, carminic acid, is made from the crushed bodies of a beetle called the Dactylopius coccus.

Gabriel. https://www.thefactsite.com/100-random-food-facts/

Novel 2nd Half 2023 – 1st Half 2024 Diabetes/ Cardiology/ Nephrology Approvals

Drug Name	Approval Date	Indication
Vafseo (vadadustat)	Mar 2024	Anemia due to chronic kidney disease (CKD)
Winrevair (sotatercept)	Mar 2024	Pulmonary arterial hypertension
Tryvio (aprocitentan)	Mar 2024	Hypertension
Rivfloza (nedosiran)	Sept 2023	Primary hyperoxaluria type 1

FDA. Novel Drug Approvals for 2023 and 2024. https://www.fda.gov/drugs/new-drugs-fda-cders-new-molecular-entities-and-new-therapeutic-biological-products/novel-drug-approvals-2024. Accessed 06/14/2024.

Winrevair (sotatercept)

Indication	Pulmonary arterial hypertension (PAH)
Market Landscape	• Manufacturer estimates ~ 40,000 people in the U.S. diagnosed with PAH • First activin signaling inhibitor approved; first PAH treatment with potential to be disease-modifying • Current treatment consists of vasodialotors (e.g., phosphodiesterase-5 inhibitors, endothelin receptor antagonists)
Clinical Studies	• Efficacy evaluated vs. placebo as an add-on to standard-of-care (SOC) background therapies in 323 adults with PAH • Winrevair patients ~41–meter improvement in 6-minute walk distance at 24 weeks vs. placebo
Dosing	Weight-based (0.3mg/kg to 0.7mg/kg) sub-q every 3 weeks
Important Considerations	• ICER: B+ Rating • Warnings increased hemoglobin, thrombocytopenia, serious bleeding, potential for embryo-fetal toxicity, and impaired fertility
Cost	• ≤ 85 kg: WAC ~ $240,000 annually; >85 kg WAC ~$480,000 annually • ICER: cost-effectiveness threshold ~$35,000 per year

Winrevair Prescribing Information.
IPD Analytics IPD Analytics Payer and Provider Update: Merck’s Winrevair Approved for the Treatment of Pulmonary Arterial Hypertension

6
Rare Diseases

Random Food Fact 6:

Nutella is so popular, 25% of all hazelnuts end up in a jar!

Gabriel. https://www.thefactsite.com/100-random-food-facts/

Novel 2nd Half 2023 – 1st Half 2024 Rare Disease Approvals

Drug Name	Approval Date	Indication
Piasky (crovalimab)	June 2024	Paroxysmal nocturnal hemoglobinuria
Xolremdi (mavorixafor)	Apr 2024	WHIM syndrome (warts, hypogammaglobulinemia, infections, & myelokathexis)
Voydeya (danicopan)	Mar 2024	Extravascular hemolysis with paroxysmal nocturnal hemoglobinuria
Fabhalta (iptacopan)	Dec 2023	Paroxysmal nocturnal hemoglobinuria
Pombiliti (cipaglucosidase)	Sept 2023	Late-onset Pompe disease
Veopoz (pozelimab-bbfg)	Aug 2023	CD55-deficient protein-losing enteropathy (PLE)
Sohonos (palovarotene)	Aug 2023	Fibrodysplasia ossificans progressiva

FDA. Novel Drug Approvals for 2023 and 2024. https://www.fda.gov/drugs/new-drugs-fda-cders-new-molecular-entities-and-new-therapeutic-biological-products/novel-drug-approvals-2024. Accessed 06/14/2024.

Xolremdi (mavorixafor)

Indication	Patients 12 years of age and older with warts, hypogammaglobulinemia, infections, and myelokathexis (WHIM) syndrome
Market Landscape	• Primary immunodeficiency caused by genetic variations to the CXCR4 receptor • Manufacturer estimates ~1,000 patients with WHIM syndrome in the U.S. • Current treatment consists of granulocyte-colony stimulating factor, immunoglobulin, and antibiotics
Clinical Studies	• 52-week study in 31 participants ≥12 years with WHIM syndrome: Xolremdi increased time above threshold for absolute neutrophil count and absolute lymphocyte count vs. placebo • Annualized infection rate reduced by ~60% in Xolremdi-treated patients
Dosing	300mg to 400mg orally once daily
Important Considerations	• First FDA-approved treatment indicated for WHIM syndrome; manufacturer granted a Rare Pediatric Disease Priority Review Voucher • Contraindicated with drugs dependent on CYP2D6; warnings for embryo-fetal toxicity and QTc interval prolongation
Cost	≤ 50kg: annual WAC of $372,300; > 50kg: annual WAC of $496,400

Xolremdi Prescribing Information
IPD Analytics Xolremdi New Drug Review.

7
Infectious Disease

Random Food Fact 7:

Pineapples have no relation to pine. The name comes from early explorers. When they saw pineapples for the first time, they thought they looked like pine cones which is how the fruit got its name!

Gabriel. https://www.thefactsite.com/100-random-food-facts/

Novel 2nd Half 2023 – 1st Half 2024 Infectious Disease Approvals

Drug Name	Approval Date	Indication
Zevtera (ceftobiprole medocaril sodium)	Apr 2024	Bloodstream infections, bacterial skin and associated tissue infections, and community-acquired bacterial pneumonia
Exblifep (cefepime, enmetazobactam)	Feb 2024	Complicated urinary tract infections
Zelsuvm (berdazimer)	Jan 2024	Molluscum contagiosum
Defencath (taurolidine, heparin)	Nov 2023	To reduce catheter-related bloodstream infections in adults receiving hemodialysis through a central venous catheter
Beyfortus (nirsevimab)	July 2023	Prevention of respiratory syncytial virus (RSV) lower respiratory tract disease (LRTD)

FDA. Novel Drug Approvals for 2023 and 2024. https://www.fda.gov/drugs/new-drugs-fda-cders-new-molecular-entities-and-new-therapeutic-biological-products/novel-drug-approvals-2024. Accessed 06/14/2024.

Beyfortus (nirsevimab)

Indication	Prevention of RSV LRTD in newborns and infants their first RSV season and for children up to 24 months of age who remain vulnerable to severe RSV disease through their second RSV season
Market Landscape	• 1% to 3% of children < 12 months of age are hospitalized each year due to RSV • Synagis (palivizumab) previously only FDA-approved product for prevention of RSV in infants • Prenatal vaccine, Abrysvo now also approved
Clinical Studies	Statistically significant reduction in incidence of medically attended lower respiratory tract infection (LRTI) in Beyfortus group (1.2%) vs. placebo group (5.0%) in healthy late, preterm, and term infants (35 weeks or more) during their first RSV season
Dosing	Single IM injection during or prior to the RSV season
Important Considerations	• CDC Advisory Committee unanimously voted to include Beyfortus in the Vaccines for Children (VFC) program • In contrast to Synagis, approval of Beyfortus was in a broader patient population, including healthy term infants • Infant should not receive Beyfortus if pregnant mother received Abrysvo
Cost	$495 per IM injection

Beyfortus Prescribing Information
IPD Analytics Beyfortus New Drug Review.

Zelsuvm (berdazimer)

Indication	Molluscum contagiosum (MC) in adults and pediatric patients ≥ 1 year
Market Landscape	• Contagious skin infection caused by a poxvirus (molluscum contagiosum virus) • Affects an estimated 6 million Americans • Current treatment consists of Ycanth (cantharidin), physical procedures (e.g., physical ablation), off-label topical treatments (e.g., tretinoin, imiquimod)
Clinical Studies	32.4% (144) of Zelsuvmi patients achieved complete skin infection clearance at week 12 vs. 19.7% (88) of placebo patients
How Supplied	• Box containing 1 blue tube containing berdazimer gel (Tube A) and 1 yellow tube containing hydrogel (Tube B) • The gels in Tube A and Tube B must be mixed together and then applied to the skin
Dosing	Applied topically once daily for up to 12 weeks
Important Considerations	• First FDA-approved topical drug indicated for MC that can be administered at home • Warnings related to application site reactions, including allergic contact dermatitis
Cost	Not yet available

Zelsuvm Prescribing Information
IPD Analytics Zelsuvm New Drug Review.

8 Immunomodulators

Random Food Fact 8:

Certain Music can make you drink faster. Researchers had an experiment to see how people's drinking habits changed based on the music that was playing.

Mercer

Gabriel. https://www.thefactsite.com/100-random-food-facts/

Novel 2nd Half 2023 – 1st Half 2024 Immunomodulator Approvals

Drug Name	Approval Date	Indication
Omvoh (mirikizumab)	Oct 2023	Ulcerative colitis
Bimzelx (bimekizumab)	Oct 2023	Plaque psoriasis
Velsipity (etrasimod)	Oct 2023	Ulcerative colitis

FDA. Novel Drug Approvals for 2023. https://www.fda.gov/drugs/new-drugs-fda-cders-new-molecular-entities-and-new-therapeutic-biological-products/novel-drug-approvals-2023. Accessed 06/14/2024.

Bimzelx (bimekizumab)

Indication	Moderate to severe plaque psoriasis in adults
Market Landscape	• 7.5 million people in the U.S. have psoriasis • Crowded treatment landscape including topical therapies, phototherapy, conventional oral agents, and targeted immunomodulators
Clinical Studies	• Bimzelx demonstrated superior rates of complete skin clearance in head-to-head trials with Cosentyx, Stelara, and Humira • 59% to 68% of patients treated with Bimzelx reached PASI 100 by Week 16
How Supplied	160 mg/mL in a single-dose prefilled syringe or single-dose prefilled autoinjector
Dosing	320 mg (two 160 mg injections) by SC injection every 8 weeks
Important Considerations	• Dual inhibition of IL-17A and IL-17F • May be dosed once every 8 weeks during maintenance therapy for most patients • Liver monitoring and warnings related to suicidal ideation
Cost	$7,200/syringe, resulting in an annual therapy cost of $93,600

Bimzelx Prescribing Information
IPD Analytics Bimzelx Market and Financial Insights.

9
Other Conditions

Random Food Fact 9:

The famous Three Musketeers candy bar originally had vanilla, strawberry, and chocolate flavors in one! Hence the name.

Mercer

Gabriel. https://www.thefactsite.com/100-random-food-facts/

Novel 2nd Half 2023 – 1st Half 2024 Other Approvals

Drug Name	Approval Date	Indication
Sofdra (sofpironium)	June 2024	Primary axillary hyperhidrosis
Iqirvo (elafibranor)	June 2024	Primary biliary cholangitis
Rezdiffra (resmetirom)	Mar 2024	Noncirrhotic non-alcoholic steatohepatitis with moderate to advanced liver scarring
Letybo (letibotulinumtoxinA)	Feb 2024	To improve the appearance of moderate-to-severe glabellar lines
Filsuvez (birch triterpenes)	Dec 2023	Wounds associated with dystrophic and junctional epidermolysis bullosa
Izervay (avacincaptad pegol)	Aug 2023	Geographic atrophy secondary to age-related macular degeneration
Xdemvy (lotilaner)	July 2023	Demodex blepharitis

FDA. Novel Drug Approvals for 2023 and 2024. https://www.fda.gov/drugs/new-drugs-fda-cders-new-molecular-entities-and-new-therapeutic-biological-products/novel-drug-approvals-2024. Accessed 06/14/2024.

Iqirvo (elafibranor)

Indication	Primary biliary cholangitis (PBC) in combination with ursodeoxycholic acid (UDCA) in adults who have an inadequate response to UDCA
Market Landscape	• First-in-class peroxisome proliferator-activated receptor (PPAR) agonist • PBC is rare chronic liver disease; impaired bile flow leads to leading to scarring and inflammation of small bile ducts • ~100,000 patients in the U.S.; most commonly affects women • Will compete with Ocaliva (obeticholic acid)
Clinical Studies	13 times more patients achieved composite primary endpoint of biochemical response with Iqirvo with or without UDCA (n = 108) vs. placebo with or without UDCA (n = 53) (respectively 51% versus 4% for a 47% treatment difference)
Dosing	80 by mouth once daily
Important Considerations	• Accelerated approval for indication • Avoid use in patients with decompensated cirrhosis • Warnings related to myalgia, fractures, fetal toxicity, and liver injury
Cost	Annual WAC of $139,430

Iqirvo Prescribing Information
IPD Analytics Iqirvo Executive Edge.
Lutton. https://www.managedhealthcareexecutive.com/view/accelerated-fda-approval-granted-for-treatment-of-rare-autoimmune-liver-disease

Rezdiffra (resmetirom)

Indication	Treatment of adults with noncirrhotic nonalcoholic steatohepatitis (NASH) with moderate to advanced liver fibrosis (consistent with stages F2 to F3 fibrosis)
Market Landscape	• First FDA-approved treatment for NASH • NASH is most severe form of nonalcoholic fatty liver disease (NAFLD) • NASH affects ~1.5% to 6.5% of U.S. adults of which 33% estimated to be F2 or F3 • Manufacturer to focus on ~315,000 patients with NASH, F2 to F3 fibrosis, & under the care of a liver specialist • Current treatment consists of management of obesity, T2D, and cardiovascular risk
Clinical Studies	• 888 patients with F2 and F3 fibrosis • Biopsy readings for the NASH resolution readings were 26-27%, 24-36%, and 9-13% for Rezdiffra 80 mg, Rezdiffra 100 mg, and placebo, respectively.
Dosing	80 to 100mg by mouth once daily
Important Considerations	• Accelerated approval for indication • No requirement for liver biopsy for diagnosis in prescribing information • Avoid use in patients with decompensated cirrhosis • Warnings related to hepatotoxicity and gall bladder reactions
Cost	WAC is $48,058 per year

Rezdiffra Prescribing Information
IPD Analytics Rezdiffra New Drug Review.

Filsuvez (birch triterpenes)

Indication	Wounds associated with dystrophic epidermolysis bullosa (DEB) and junctional epidermolysis bullosa (JEB) in adult and pediatric patients 6 months of age and older
Market Landscape	• Rare, inherited connective tissue disorder; results in fragile skin • 4 major types of EB; DEB and JEB are more severe types; ~3,000 patients with DEB and <200 patients with JEB in the U.S. • 1st approved treatment for JEB and 2nd approved for DEB; Vyjuvek (beremagene geperpavec) was approved to treat DEB in May 2023
Clinical Studies	223 patients with EB: 41.3% achieved complete target wound closure within 45 days vs. 28.9% in the placebo group (*P* = 0.013)
How Supplied	Topical gel: 10% birch triterpenes w/w supplied in 25 mL sterile tubes
Dosing	Apply at wound dressing changes until the wound is healed
Important Considerations	• Applied to all open partial-thickness wounds; no maximum dosage • Each tube is for one-time use only
Cost	• WAC of $1,800 per 23.4-gram, single-use tube; cost will vary based on the frequency of wound dressing changes • Patients used average of 27 tubes per month equating to average annual WAC of $583,200

Filsuvez Prescribing Information
IPD Analytics Filsuvez Market and Financial Insights.

10
Biosimilars

Random Food Fact 10:

Fruit loops are all the same flavor. As colorful as they are, you’d think they were flavored accordingly!

Gabriel. https://www.thefactsite.com/100-random-food-facts/

Biosimilar Approvals in 2nd Half 2023 – 1st Half 2024

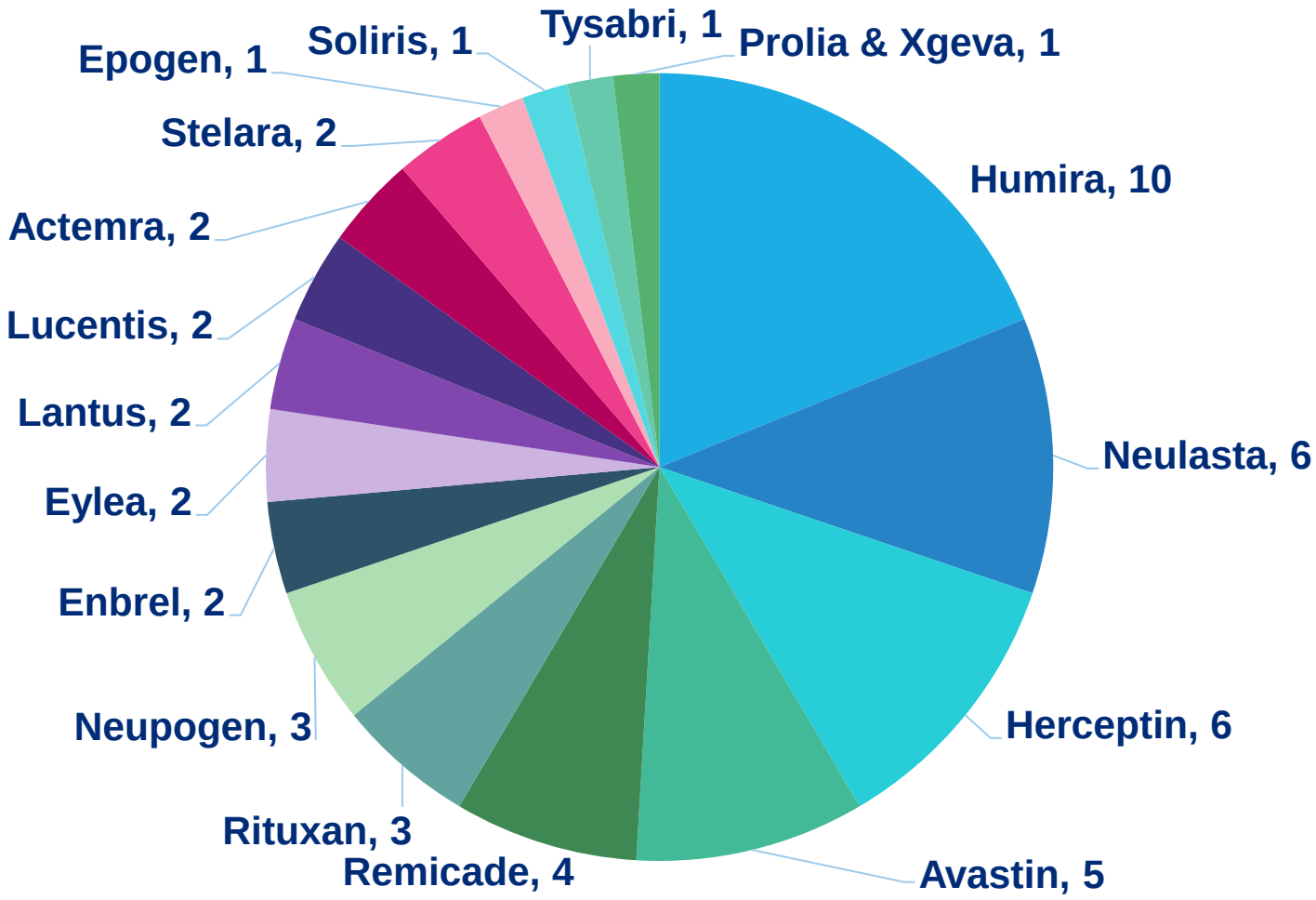
Drug Name	Approval Date	Reference Product	Potential Launch Date
Bkemv (eculizumab-aeeb)	**May 2024**	**Soliris (eculizumab)**	**Mar 2025**
Yesafili (aflibercept-jbvf)	**May 2024**	**Eylea (aflibercept)**	**2024 - 2032**
Opuviz (aflibercept-yszy)	**May 2024**	**Eylea (aflibercept)**	**2024 - 2032**
Hercessi (trastuzumab-strf)	Apr 2024	Herceptin (trastuzumab)	2024
Selarsdi (ustekinumab-aekn)	Apr 2024	Stelara (ustekinumab)	Feb 2025
Tyenne (tocilizumab-aazg)	Mar 2024	Actemra (tocilizumab)	2024
Jubbonti and Wyost (denosumab-bbdz)	**Mar 2024**	**Prolia and Xgeva (denosumab)**	**2024**
Simlandi (adalimumab-ryvk)	Feb 2024	Humira (adalimumab)	2024
Avzivi (bevacizumab-tnjn)	Dec 2023	Avastin (bevacizumab)	2024
Wezlana (ustekinumab-auub)	**Oct 2023**	**Stelara® (ustekinumab)**	**Jan 2025**
Tofidence (tocilizumab-bavi)	**Sep 2023**	**Actemra® (tocilizumab)**	**May 2024**
Tyruko (natalizumab-sztn)	**Aug 2023**	**Tysabri® (natalizumab)**	**2024**

Bold = first time biosimilar products

FDA. FDA-Approved Biosimilar Products. https://www.fda.gov/drugs/biosimilars/biosimilar-product-information. Accessed 06/14/2024
IPD Analytics. Biosimilar Projected and Launched Schedules.

Biosimilar Approvals

FDA has approved a total of 53 biosimilar products for 17 different reference products since 2015



FDA. FDA-Approved Biosimilar Products. https://www.fda.gov/drugs/biosimilars/biosimilar-product-information. Accessed 06/14/2024.

Conclusions

49

novel FDA drug approvals in 2nd half 2023 and 1st half 2024

10

gene and cell therapy approvals in 2023-2024 with an acceleration in approvals in recent years

Oncology

continues to grow at a rapid pace with the most novel approvals in 2023-2024

Neurology and Infectious Disease

approvals saw innovative therapies in 2023-2024

Learning Assessment Questions

True or False?

Lenmeldy (atidarsagene autotemcel) is indicated for metachromatic leukodystrophy.

Which of the following are important consideration(s) for Duvyzat (givinostat)?

1. No restrictions regarding genetic variants,
2. No restrictions regarding concomitant Duchenne Muscular Dystrophy therapy utilization
3. No restrictions regarding ambulatory status
4. *All of the above*

True or False?

Rezdiffra (resmetirom) use should be avoided in patients with decompensated cirrhosis.

Questions

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Abbreviations

AAV	Adeno-associated virus
ABR	Annualized bleed rate
BRAF	Proto-oncogene B-Raf
CAR-T	Chimeric antigen receptor T-cell
Cas9	CRISPR-associated protein 9
CD55	Complement decay-accelerating factor
CDC	Centers for Disease Control and Prevention
CI	Confidence interval
CKD	Chronic kidney disease
CMS	Centers for Medicare & Medicaid Services
CNS	Central nervous system
CRISPR	Clustered regularly interspaced short palindromic repeats
CRL	Complete response letter
DEB	Dystrophic epidermolysis bullosa
dL	Deciliter
DMD	Duchenne muscular dystrophy
EB	Epidermolysis bullosa
ESA	Erythropoiesis-stimulating agents
F2, F3	Fibrosis Stage 2 or 3
FDA	Food and Drug Administration
FIX	Factor IX
G-CSF	Granulocyte colony stimulating factor
Hb	Hemoglobin
HDAC	Histone deacetylase
HIV	Human Immunodeficiency Virus
HSC	Hematopoietic stem cells
ICER	Institute for Clinical and Economic Review
IL-17	Interleukin-17
IOPD	Infantile-onset Pompe disease
IV	Intravenous
JEB	Junctional epidermolysis bullosa
Kg	Kilogram
LOPD	Late-onset Pompe disease
LRTD	Lower respiratory tract disease
LRTI	Lower respiratory tract infection
LVV	Lentiviral vector
M	Meter
MACE	Major adverse cardiovascular events
MC	Molluscum contagiosum
Min	Minute
mg	Milligram
MLD	Metachromatic leukodystrophy
mL	Milliliter
NAFLD	Nonalcoholic fatty liver disease
NASH	Nonalcoholic steatohepatitis
NF-κB	Nuclear factor kappa-light-chain enhancer of activated B cells
PAH	Pulmonary arterial hypertension
PASI	Psoriasis area and severity index
PBC	Primary biliary cholangitis
PLE	Protein-losing enteropathy
pLGG	Pediatric low-grade glioma
PPAR	Peroxisome proliferator-activated receptor agonist
QTc	Corrected QT interval
R/R	Relapsed or refractory
RSV	Respiratory syncytial virus
SC	Subcutaneous
SCD	Sickle cell disease
SOC	Standard of care
T2DM	Type 2 diabetes
TDT	Transfusion-dependent ß-thalassemia
UDCA	Usodeoxycholic acid
VFC	Vaccines for Children
VOC	Vaso-occlusive crisis
VOE	Vaso-occlusive episode
WAC	Wholesale acquisition cost
WHIM	Warts, hypogammaglobulinemia, infections, & myelokathexis

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