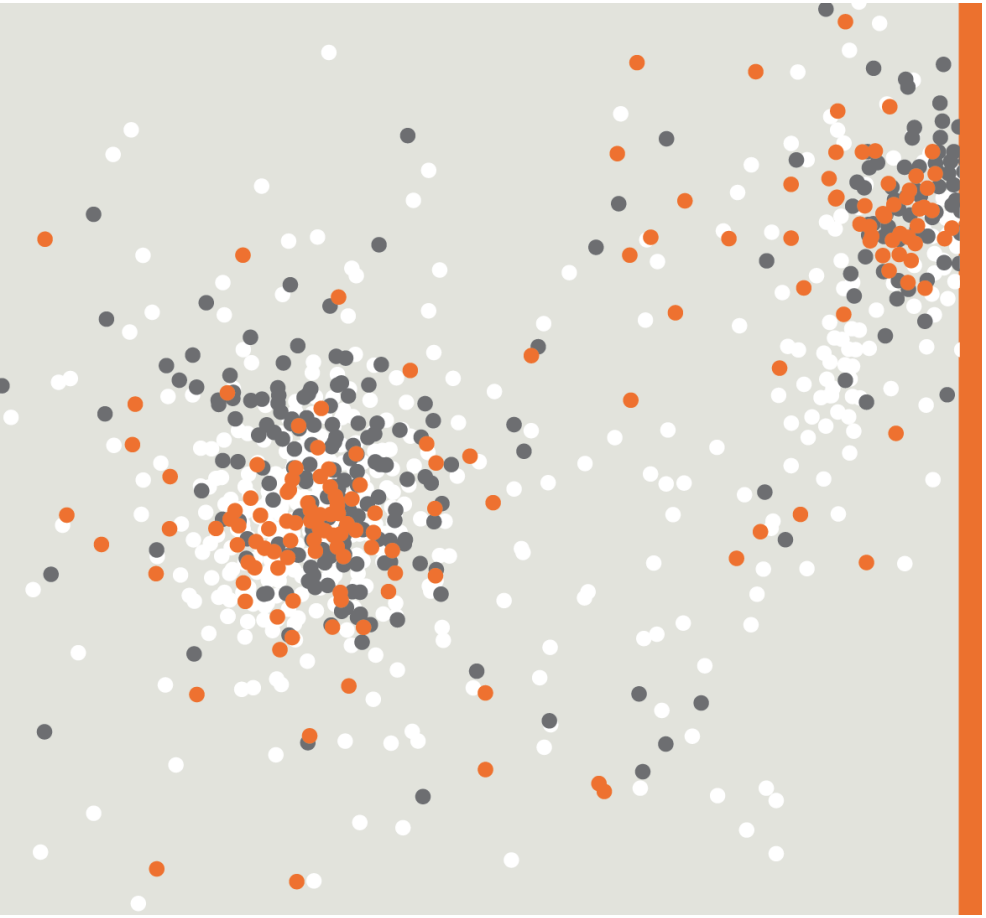

Priority Pipeline Specialty Drugs for Medicaid

Fall 2020

CONDUCTED FOR THE MEDICAID AND CHIP PAYMENT AND ACCESS COMMISSION (MACPAC) PREPARED BY NORC

The findings, statements, and views expressed in this report are those of the authors and do not necessarily reflect those of MACPAC

Note: This analysis seeks to be as current as possible but is subject to limitations due to constant changes in the drug development pipeline and source document publication dates.

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Summary of Approach and Methodology

Pipeline Review

NORC conducted an analysis of specialty drugs currently in Phase I-III trials or under review by the Food and Drug Administration.

Medicaid Focus: NORC created a framework for prioritizing the pipeline, including a broader focus on gene and cell therapies that will be very high cost, as well as products used to treat conditions with higher prevalence in Medicaid.

Sources: NORC conducted original secondary research and used published sources that compile data across the pipeline—see appendix for details.

Prevalence Analysis

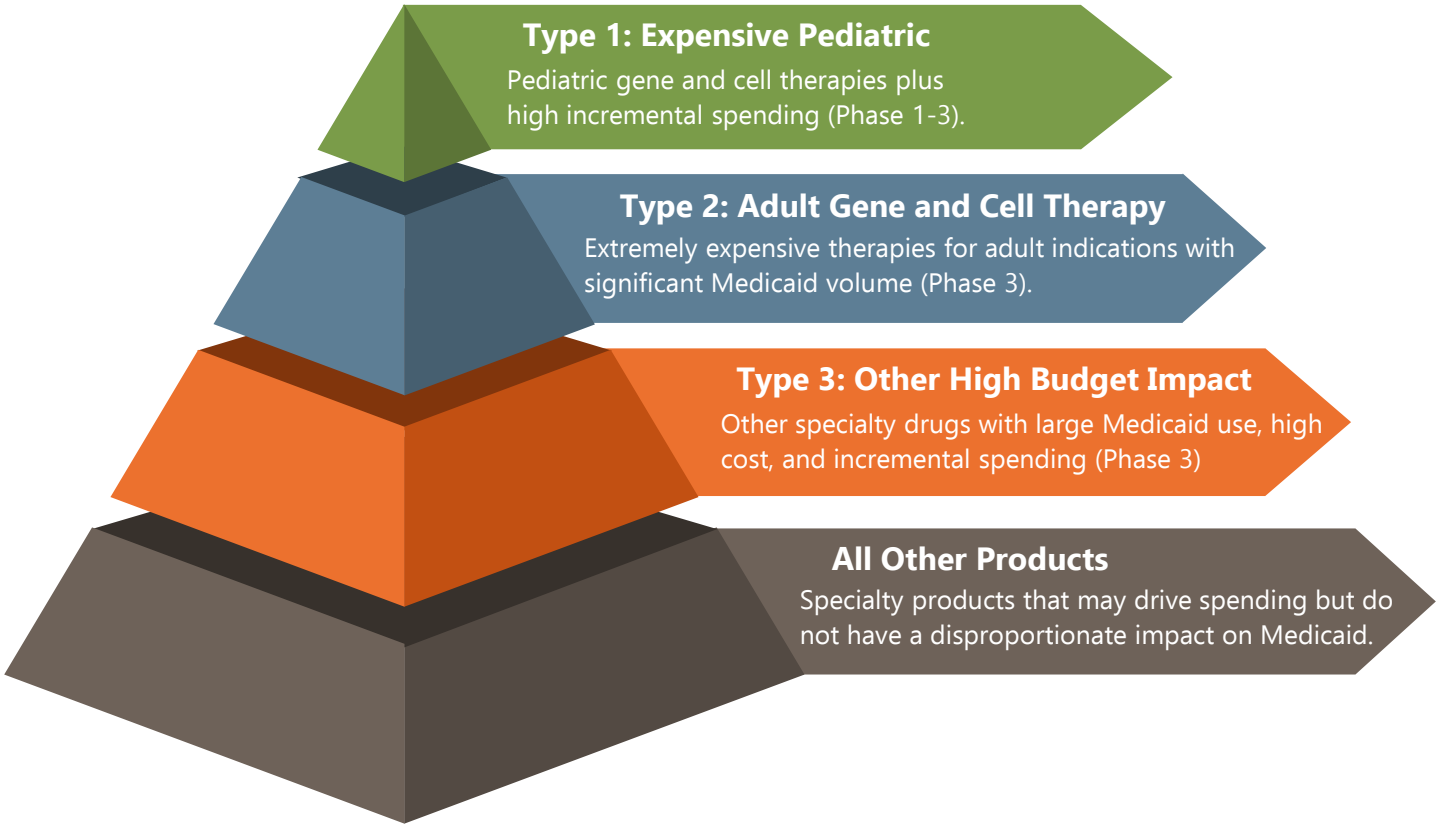
To inform the analysis of specialty pipeline products that are likely to have an impact on the Medicaid program, Acumen conducted a prevalence analysis of Medicaid fee-for-service and managed care claims.

Methods: The data includes T-MSIS claims from FY2018 for most conditions. For five conditions Acumen used a longer look-back period[1]. Prevalence rates are calculated using total months of enrollment per year. Acumen clinical experts conducting a coding analysis using ICD-9 and ICD-10.

Exclusion Criteria: Excludes beneficiaries who are dually eligible for Medicare and Medicaid and beneficiaries receiving limited benefits. Specifically, limited-benefit beneficiaries were identified as those receiving coverage of only emergency services due to non-citizen status[2] or only family planning services.[3]

1:Asthma, multiple sclerosis, schizophrenia, achromatopsia, and plaque psoriasis; **2**:Individuals who are eligible for a limited set of Medicaid or Medicaid Expansion CHIP benefits based on their alien status, including qualified non-citizens who entered the United States before August 1996, qualified immigrants who entered at the end of the five-year waiting period, and qualified immigrants exempt from the five-year waiting period; **3:** Medicaid benefits are restricted to family planning services, which may be received, for example, through a Section 1115 family planning waiver. This does not include individuals who may be eligible for services related to family planning via traditional Medicaid.

Medicaid Specialty Pipeline Drug Types



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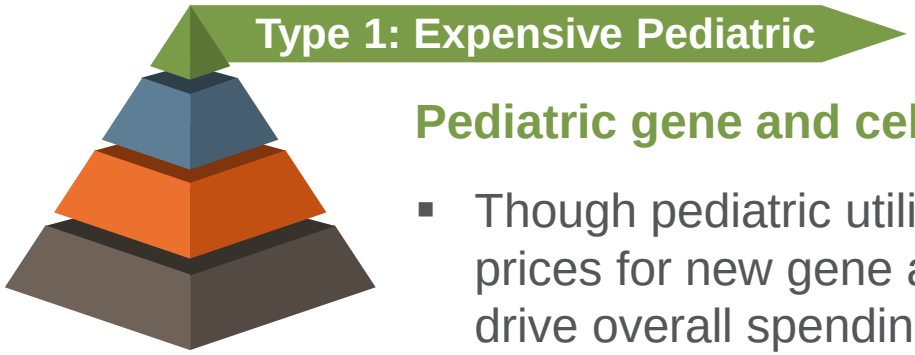
Pediatric Gene and Cell Therapies Will Impact Medicaid Drug Spending



Pediatric gene and cell therapies in Phase I-III

- Though pediatric utilization will be low, extremely high list prices for new gene and cell therapies have the potential to drive overall spending
- Many gene and cell therapies are indicated for genetic disorders that are diagnosed and treated in childhood
- Medicaid will be a top payer for these products

Other Potential Pediatric Cost Drivers

- Cystic Fibrosis drugs continue to be leading Medicaid cost drivers and new product launches are likely to sustain spending growth in the class
- Pipeline products for food allergies have the potential to create new pharmacy spending

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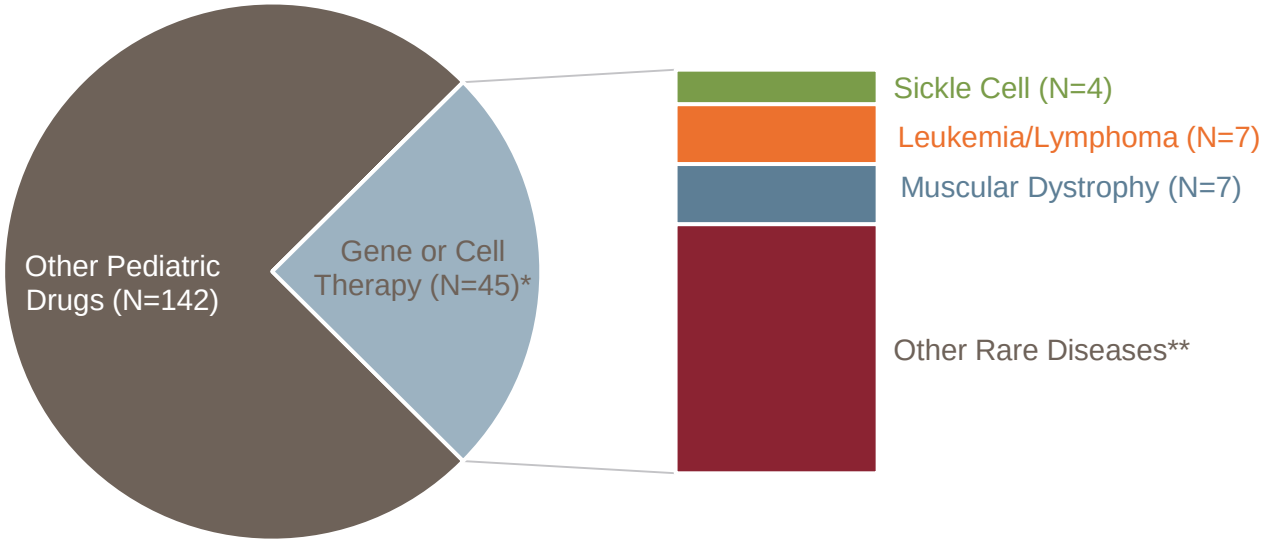
Overview of Pediatric Pipeline

- There are 186 drugs in the pipeline with pediatric indications, across all phases of development
- Of these, 45 are gene or cell therapies—3 products in Phase III trials and 4 products in Phase II with expedited approval
- The highlighted products are expected to have slightly larger patient populations

Pipeline Products for Children (Phase 1-3)



*Products with multiple indications are double counted
**Other rare diseases include but are not limited to achromatopsia, Fanconi syndrome, Batten disease, Fabry disease, Danon disease etc.

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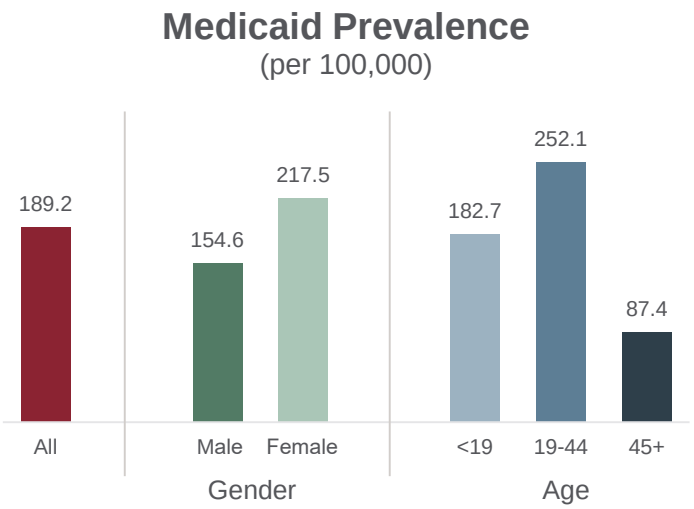
Sickle Cell Disease

Condition Overview: People with sickle cell disease (SCD) have atypical hemoglobin molecules that may cause frequent infections and severe pain among affected individuals.

The disease and its related disorders affects about 118,000 Medicaid beneficiaries or about 189 in 100,000. It it is typically diagnosed in childhood and disproportionately affects Blacks (1 in 500).

By 45 years old, the average lifetime health care spending for SCD is $953,640, with about 80% of this spending on inpatient costs from SCD complications.



Select Pipeline Products in all Phases of Development

Drug Name	Sponsor	Indication	Phase
EDIT-301	Editas Medicine	Sickle Cell Disease	IND Submission
Zynteglo®	bluebird bio	SCD (age 12+)	**Phase III**
BCL11a shRNA (miR)	bluebird bio	SCD (age 3+)	Phase I

Indicates gene or cell therapies; **Expedited approval pathway**

Impact on Spending: While treatments for SCD have not changed dramatically in the past decade, the pipeline contains numerous new specialty drugs, including bluebird bio's Zynteglo®, a gene therapy that is already approved in the EU for transfusion-dependent β-thalassemia. As a Fast Track product in Phase III trials, Zyntelgo® for sickle cell patients age 12 and older could be one of the most impactful pediatric gene therapies in the near term. Its anticipated US list price is $1.8 million.

Annual spending for SCD is about $10,000 for children and $30,000 per adult, so a gene therapy could dramatically increase near-term spending.

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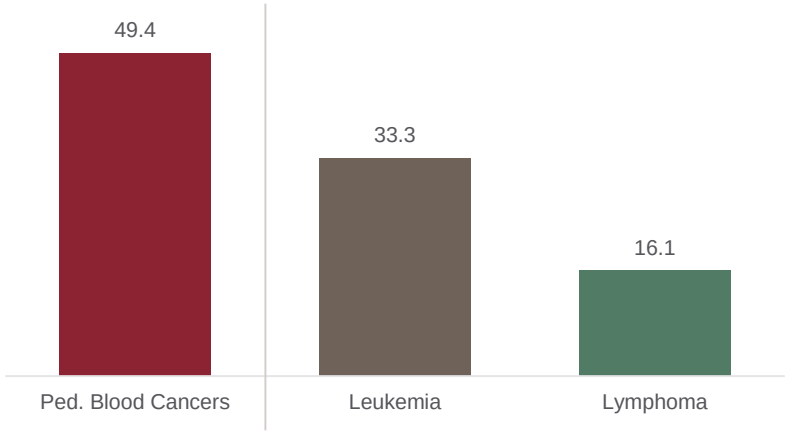
Pediatric Blood Cancers

Condition Overview: Blood cancers comprise 40% of all pediatric cancers. The prevalence of pediatric cancers in Medicaid (leukemia and lymphoma) is about 49 children per 100,000. With leukemia affecting about 10,000 children in Medicaid per year and pediatric lymphomas affecting about 5,000 per year.

While survival rates for pediatric blood cancers have improved, 80% of childhood cancer survivors develop long-term chronic conditions as a result of their treatments. As such, new therapies that may reduce toxicity and side effects could add significant clinical value.

Medicaid Prevalence
(per 100,000 children)



Select Pipeline Products in all Phases of Development

Drug Name	Sponsor	Indication	Phase
Kymriah®	Novartis	NHL	Phase II
Rivo-cel	Bellicum	AML, MDS	Phase II
CAR-T CD19	ZIOPHARM Oncology	Leukemia, lymphoma	Phase II
Yescarta®	Gilead	ALL	Phase II
JCAR017	Celgene	ALL, NHL	Phase I
UCART19	Servier	ALL	Phase I
MB-102	Mustang Bio	AML, BPDCN	Phase I

Indicates gene or cell therapies

Impact on Spending: Kymriah® was the first gene therapy, approved in 2017, to treat some children with acute lymphoblastic leukemia (ALL)—priced at $475,000. At the time, the FDA estimated that only a few hundred children would be eligible for treatment annually.

There are seven additional CAR-T products in Phase I and II for ALL and other forms of leukemia and lymphoma. Competition among ALL products could help limit price growth, but the number of eligible patients may expand as additional indications come to market in the next 3-6 years.

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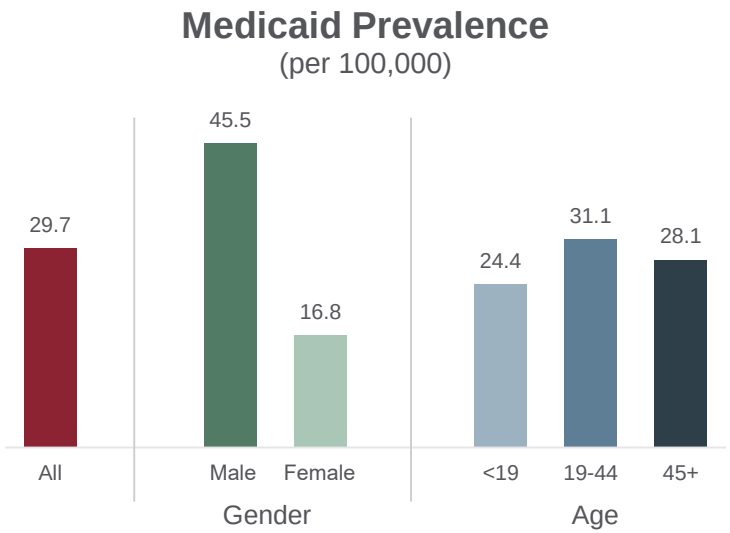
Muscular Dystrophy

Condition Overview : Muscular dystrophy (MD) is a group of diseases that cause progressive weakness and loss of muscle mass due to gene mutations. The most common form is Duchenne muscular dystrophy (DMD). Prevalence of MD in Medicaid is about 30 people per 100,000, it is roughly three times more common in males than females.

MD symptom onset usually occurs in early childhood. In 2014, Medicaid patients with DMD ages 15 to 18 had on average $58,411 in annual health care costs.



Select Pipeline Products in all Phases of Development

Drug Name	Sponsor	Indication	Phase
CAP-1002	Capricor Therapeutics	DMD 10+ yrs.	Phase II
GALGT2	Sarepta Therapeutics	DMD 4+ yrs.	Phase II
SGT-001	Solid Biosciences	DMD 4-17 yrs.	**Phase II**
SRP-9001	Sarepta Therapeutics	DMD 4-17 yrs.	**Phase II**
PF-06939926	Pfizer	DMD 5-12 yrs.	Phase I

Indicates gene or cell therapies; **Expedited approval pathway**

Impact on Spending: In 2016, Exondys 51™ was the first FDA approved product to treat a specific type of DMD with a price tag of $890k. There was significant controversy around its approval given that it was based on a surrogate endpoint and small clinical trial population. Emflaza® which was approved in 2017, and is used much more broadly than Exondys51™ has a price tag of $62k annually

In addition to the pipeline product above, there are currently a number of gene and cell therapies in the pipeline to treat various mutations of the dystrophin gene. It is unlikely that any of these will produce a cure for DMD but could make the effects less severe thus limiting non prescription drug costs of patients over time. However the incremental drugs cost will constitute as new spend for the Medicaid program

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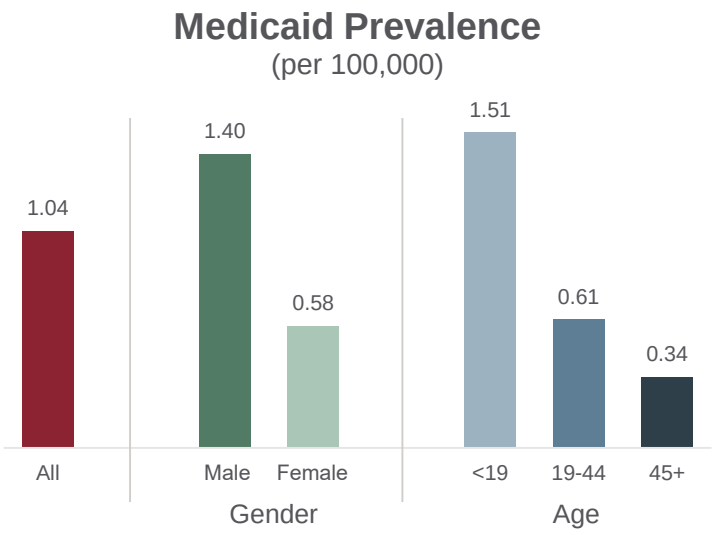
Achromatopsia

Condition Overview: Achromatopsia is a rare, hereditary vision disorder that affects the cones in the retina resulting in reduced vision, loss of color vision, and light sensitivity. There is a spectrum of severity from partial to complete achromatopsia.

Achromatopsia is estimated to impact fewer than 500 people in Medicaid, mostly children. Despite being a an extremely rare disease, there are currently four gene therapies in development for achromatopsia, which is likely to result in new spending for a subset of these beneficiaries.



Select Pipeline Products in all Phases of Development

Drug Name	Sponsor	Indication	Phase
ACHM-CNGA3	MeiraGTx	Achromatopsia 6+ yrs.	Phase II
ACHM-CNGB3	MeiraGTx	Achromatopsia 6+ yrs.	Phase II
AAV-CNGA3	MeiraGTx/ Janssen	Congenital achromatopsia 3-15 yrs.	Phase II
AAV-CNGB3	MeiraGTx/ Janssen	Congenital achromatopsia 3+ yrs.	Phase II

Indicates gene or cell therapies

Impact on Spending: Currently there are not any therapies available to threat achromatopsia, patients typically use dark of special filtered glasses and/or contact lenses, as well as other visual aids.

Given that this is a rare condition it is unlikely to have a significant impact on Medicaid spending. However, these products would increase incremental spending for Medicaid because there is currently no treatment for the disease.

It will be important to identify which patients will qualify for these gene therapies as well as the durability of treatments.

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Cystic Fibrosis

Condition Overview: Cystic fibrosis (CF) is a chronic hereditary disease of the lungs affecting about 30,000 people in the U.S. In 2012, the mean annual cost of care for patients with CF with mild impairment in lung function exceeded $43,000 and is primarily driven by medication costs.

The prevalence of CF in Medicaid is about 29 people per 100,000. It affects about 18,000 Medicaid beneficiaries per year, including more than 11,000 children.

Medicaid Prevalence
(per 100,000)

Select Pipeline Products to Restore CFCTR Function

Drug Name	Sponsor	Indication	Phase
ABBV-2222	AbbVie	CF	Phase II
ABBV-3067	AbbVie	CF	Phase II
ELX-02	Eloxx Pharmaceuticals	CF	Phase II
PTI-428+PTI-801+PTI-808	Proteostasis Therapeutics	CF	Phase II
VX-121	Vertex	CF	Phase II
VX-561	Vertex	CF	Phase II
MRT5005	Translate Bio	CF	Phase I

Impact on Spending: In 2019, oral CF therapies had the second highest net class spend by dollar impact on the Medicaid FFS benefit.

Today there are a number new specialty products in the pipeline to treat CF across five therapeutic approaches.

While the majority of beneficiaries with CF are already receiving treatment, ongoing utilization shifts to more costly therapies could create incremental spend in this class.

CFCTR: Cystic Fibrosis Transmembrane Conductance Regulator

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Phase III Gene / Cell Therapies for Orphan Conditions

Condition Overview: There are four additional gene and cell therapies in Phase III, each of which are indicated for very rare conditions that likely affect fewer than 1,000 children in Medicaid. We are highlighting these products given their proximity to launch and expected high list prices.

Transfusion-dependent ß-thalassemia: A potentially severe, genetic blood disease that is characterized by a reduced or no production of β-globin, a component of an oxygen-carrying protein called hemoglobin. The most severe type of β-thalassemia, transfusion-dependent β-thalassemia (TDT), is a type of β-thalassemia characterized by severe anemia and a lifelong dependence on red blood cell transfusions.

Leber's hereditary optic atrophy: Caused by a genetic mutation results in a painless loss of central vision in both eyes due to the death of optic nerve cells. It leads to blindness in young adults, typically between 12 and 30 years of age.

Mucopolysaccharidosis type IIIA: Also known as Sanfilippo syndrome, is a progressive disorder that primarily affects the brain and spinal cord and deteriorates neurological function, it is diagnosed in childhood.

Phase III Gene and Cell Therapies for Orphan Conditions

Drug Name	Sponsor	Indication	Phase
LentiGlobin™	BlueBird Bio	Transfusion-dependent ß-thalassemia	**Phase III**
GS010	GenSight Biologics	Leber's hereditary optic atrophy	Phase III
LYS-SAF302	Lysogene	Mucopolysaccharidosis type IIIA	Phase III
Lenti-D™	BlueBird Bio	Cerebral adrenoleukodystrophy	Phase III

Indicates gene or cell therapies; **Expedited approval pathway**

Cerebral adrenoleukodystrophy: A rare genetic condition that causes the buildup of long chain fatty acids in the brain. The earliest symptoms develop in boys ages 4-10. As the disease progresses, aggressive behavior, vision problems, difficulty swallowing, poor coordination, and impaired adrenal gland function may occur. The disease rapidly progresses to disability.

Impact on Spending: Given the extremely low prevalence of these conditions, the impact to Medicaid as a whole will be limited. However, these therapies will have extremely high-list prices and could create challenges a single state or plan with one or more eligible patients.

Food Allergy

Condition Overview: Food allergies, particularly to peanuts, are the most common cause of anaphylaxis, and approximately 100 people die in the United States each year from peanut-caused anaphylaxis.

Recent research showed that the prevalence of food allergy among Medicaid-enrolled children was less than 1% (0.6%), which is significantly lower than estimates of parent-reported, physician diagnosed food allergy in the general population.

Recently Approved Therapies: There is currently an inline product that treats peanut allergies (Palforzia®, approved 1/31/20). It is a powder manufactured from peanuts and administered orally for patients age 4 to 17. The list price is $890 per month, or more than $10,000 annually.

Select Pipeline Products in all Phases of Development

Drug Name	Sponsor	Indication	Phase
AR101	Aimmune Therapeutics	Peanut Allergy 4yrs-17 yrs.	**BLA Submitted**
Viaskin Peanut	DBV Technologies	Peanut Allergy 4yrs-11 yrs.	**BLA Submitted – FDA Requested Add'l Data**
Xolair®	Novartis/ Genentech	Prevention of Severe Allergic Reactions	Phase III
AR101	Aimmune Therapeutics	Peanut Allergy 1yrs-3yrs.	Phase III
AR201	Aimmune Therapeutics	Hen Egg Allergy 4yrs to 26 yrs.	Phase II

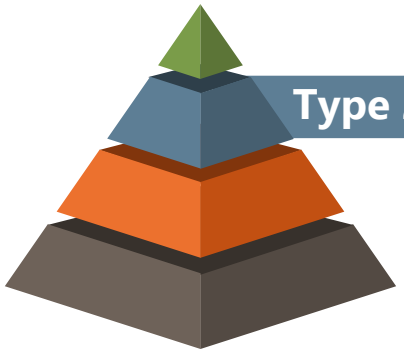
Expedited approval pathway

Impact on Spending: There are seven new pipeline products (11 indications) in development solely to treat peanut allergies, two of which are in Phase III or have submitted applications. Food allergies have traditionally been managed with no-cost behavioral interventions, rather than pharmaceuticals. The current expected price of Viaskin Peanut is $6,500 per year. Any widespread treatment of food allergies with prescription drugs could increase Medicaid spending dramatically given that current pipeline drugs will need to be taken in perpetuity.

Approval of new pharmaceutical agents for food allergies could increase diagnosis rates, since providers may not be coding these allergies if there is no reimbursed intervention being delivered.

Adult Gene and Cell Therapies

Adult Gene and Cell Therapies Will Have High List Prices but Modest Medicaid Utilization



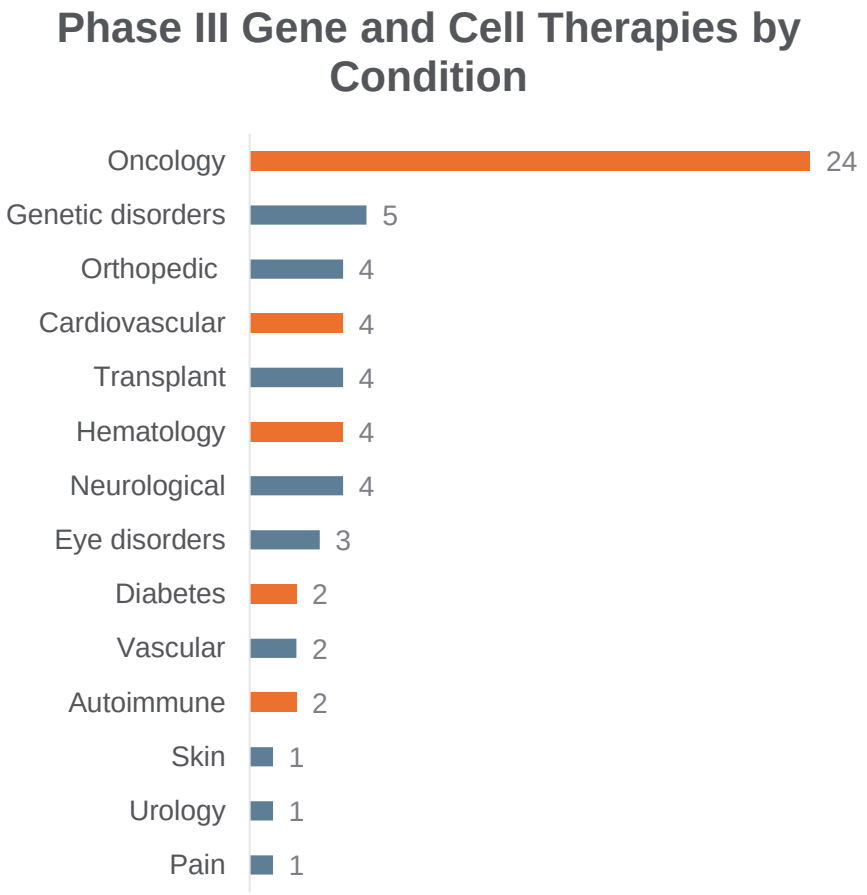
Type 2: Adult Gene and Cell Therapy

High-cost therapies for adult indications that have significant Medicaid volume

- Medicare and commercial insurers are likely to be the top payers for most adult gene and cell therapies
- However, given the expensive list prices for these products, any treatments with considerable Medicaid utilization could drive spending
- This portion of the pipeline analysis highlights adult therapies that will be most relevant for Medicaid

Overview of Priority Adult Gene and Cell Therapies for Medicaid

- There are 61 gene and cell therapies indicated for adults in Phase III
- Among these, 24 (39 percent) are indicated for various types of cancers. While many cancers are diseases of old age, some types have earlier onset and will be relevant for Medicaid
- Products for hemophilia, autoimmune diseases, diabetes, and cardiovascular disease could also have significant Medicaid utilization



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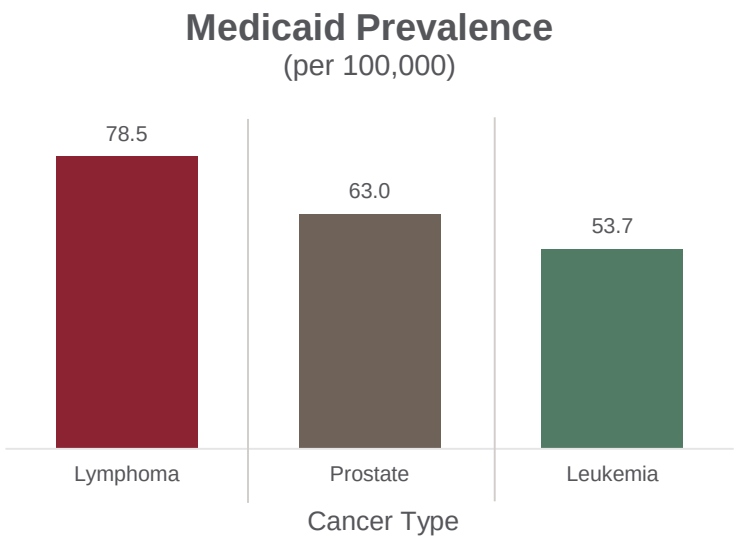
Cancer

Condition Overview: More than two million Americans (children and adults under age 65) with a history of cancer rely on Medicaid for their health care. As cancer treatments dramatically shift to gene, cell, and immunotherapies the potential cost is poised to increase.

There are at least 24 gene therapies in phase III trials for cancer. The right handle table shows some of the products targeting populations with the highest overall Medicaid prevalence, including lymphoma (79 per 100,000), prostate cancer (63 per 100,000), and leukemia (54 per 100,000).



Select Pipeline Products Phase III/NDA/BLA Submitted

Drug Name	Sponsor	Indication	Phase
Kymriah®	Novartis	Diffuse large B-cell lymphoma (1st relapse), follicular lymphoma	Phase III
Liso-cel	Bristol-Myers Squibb, Juno Therapeutics	Relapsed/refractory aggressive, large B-cell NHL	Phase III
Provenge®	Dendreon	Newly-diagnosed prostate cancer	Phase III
Nalotimagene carmaleucel	MolMed	Acute leukemia	Phase III
RIVO-CEL™	Bellicum Pharmaceuticals	AML (12 years and older)	Phase III

Indicates gene or cell therapies; **Expedited approval pathway**

Impact on Spending: While cancer is not a top spending driver in Medicaid, there are two Phase III immunotherapies for cervical cancer that may be important given the disease's earlier onset and number of women covered in Medicaid.

There are a number of additional phase III gene therapies indicated to treat cancer in the pipeline, some of which are more relevant to Medicaid than others (see slide 23)

AML: Acute Myeloid Leukemia
NHL: Non-Hodgkin Lymphoma

Diabetes

Condition Overview: Diabetes is one of the most common chronic conditions in Medicaid.
Out-of-pocket costs for Americans with commercial insurance and type 1 diabetes average $2,500 a year not accounting for deductibles. The overall financial burden imposed on Medicaid programs by diabetes is substantial; in 2013, medical expenditures associated with diabetes (type 1 and 2) paid by Medicaid programs was estimated to be $25.7 billion. The prevalence of type 1 diabetes in Medicaid is 563 people per 100,000.

Impact on Spending: There are currently eight cell/gene therapies in development for the treatment of type I diabetes. Currently only one has an FDA designation and it is on an expedited approval pathway (orphan, fast track).

If there were a potential cure for diabetes, Medicaid programs could stand to spend a large amount of money upfront but could prevent costs over the course of a beneficiary's life.

It is unclear if the current pipeline therapies will be approved for broad indications or more specific populations; this specification will drastically impact the potential cost to the Medicaid program.

Select Pipeline Products

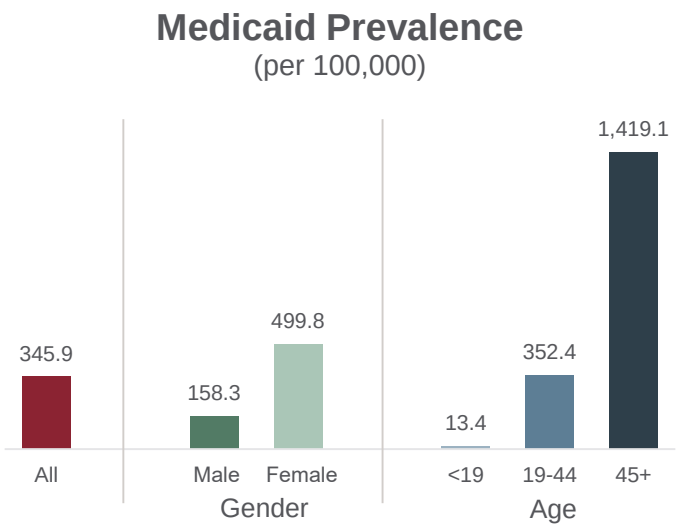
Drug Name	Sponsor	Indication	Phase
Donislecel	CellTrans	Type 1 diabetes	Phase III
CLBS03	Caladrius Biosciences	Recent onset type 1 diabetes	**Phase II**
Islet cell replacement therapy	Sernova	Type 1 diabetes	Phase I/II
PEC-Direct™	ViaCyte	Type 1 diabetes	Phase I/II
PEC-Encap™	ViaCyte	Type 1 diabetes	Phase I/II
TOL-3021	Tolerion	Type 1 diabetes	Phase II
AG019	ActoBio Therapeutics	Early onset type 1 diabetes	Phase I/II
AVT001	Avotres	Type 1 diabetes	Phase I/II

Indicates gene or cell therapies; **Expedited approval pathway**

Rheumatoid Arthritis

Condition Overview: Autoimmune conditions are caused by immune system deficiency or over activity. Rheumatoid arthritis is the most common autoimmune disease, affecting more than 2 million Medicaid beneficiaries.

RA prevalence in Medicaid is about 346 people per 100,000. However, onset is generally between the ages of 30 and 60 years of age, resulting in Medicaid prevalence of 1,419 per 100,000 people over age 45. Women in Medicaid are three times more likely to have RA than men.



Select Pipeline Products

Drug Name	Sponsor	Indication	Phase
HB-adMSC	Hope Biosciences	Rheumatoid arthritis	Phase II
Rexlemestrocel-L	Mesoblast	Rheumatoid arthritis	Phase II
BCMA-CD19	iCell Gene Therapeutics	Autoimmune disorders	Phase I

Indicates gene or cell therapies; **Expedited approval pathway**

Impact on Spending: In 2019, Cytokine and CAM antagonists (treatments for chronic inflammatory diseases) was the class with the 10th highest spend in Medicaid. This large impact is due to high price tag therapies and high patient volumes.

In the current pipeline, there are two cell therapies for rheumatoid arthritis both in phase II – if these therapies were found to be curable, they could result in high-upfront cost for Medicaid but may result in long-term savings over a patient's lifetime.

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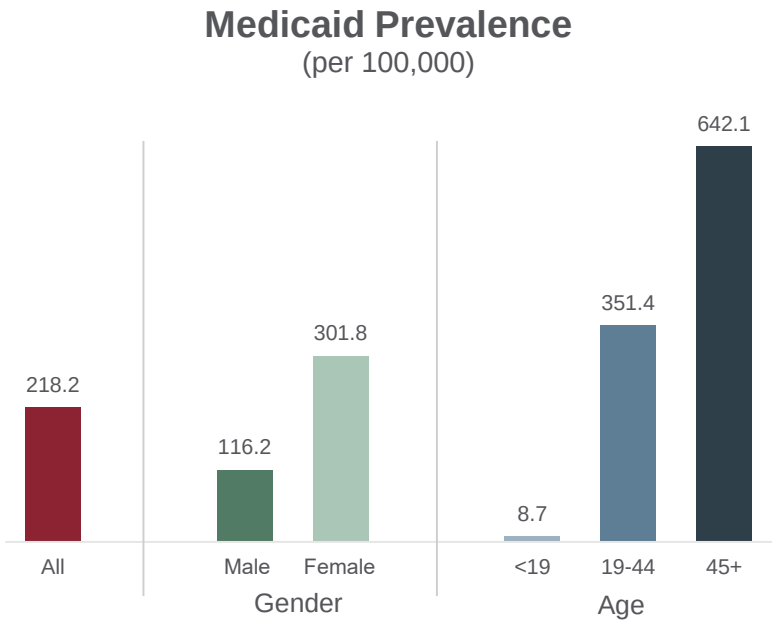
Multiple Sclerosis

Condition Overview: Multiple sclerosis (MS) is a potentially debilitating disease of the brain and spinal cord. The prevalence of MS in Medicaid is 218 people per 100,000, rising to 642 per 100,000 among beneficiaries age 45 and older. The disease is over twice as common in women than men.

Average annual health care costs for people with MS in Medicaid are over $33,000. There are currently no cures for MS.



Select Pipeline Products

Drug Name	Sponsor	Indication	Phase
NurOwn®	BrainStorm Cell Therapeutics	Progressive multiple sclerosis	Phase II
ATA188	Atara Biotherapeutics	Progressive multiple sclerosis	Phase I
ATA190	Atara Biotherapeutics	Progressive multiple sclerosis	Phase I

Indicates gene or cell therapies; **Expedited approval pathway**

Impact on Spending: There are a number of oral therapies to treat varying stages of multiple sclerosis and they have fairly even distribution of market share in the Medicaid program. Additionally a number of approved therapies are currently in the early stages of seeking pediatric indications.

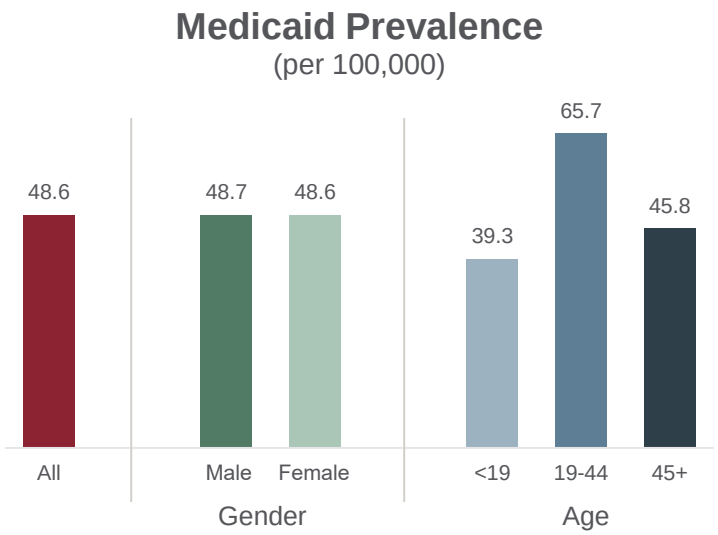
In 2019, there was a decrease in net spend in this class driven by an increased rebate for a commonly used therapy (Copaxone 40). This decrease in net spend is expected to shrink over the next couple years.

There are three pipeline gene/cell therapies indicated to treat progressive multiple sclerosis that, if approved, could dramatically shift spending in the class.

Hemophilia

Condition Overview: Hemophilia is a clotting disease that is commonly treated with infusions of factor several times per week. The prevalence in Medicaid is about 49 people per 100,000, meaning it affects more than 325,000 Medicaid beneficiaries.

In 2018 and 2019, hemophilia treatments were the third highest spend class in Medicaid FFS. In 2018, Hemlibra® was approved for adult and pediatric patients with hemophilia A. ICER deemed Hemlibra cost effective with an annual price of more than $448,000. In its first full year on the market, it was the eighth highest net spend product in Medicaid FFS.



Select Pipeline Products Phase III/NDA/BLA Submitted

Drug Name	Sponsor	Indication	Phase
valoctocogene roxaparvovec	BioMarin	Hemophilia A	**Phase III**
AMT-061	uniQure	Hemophilia B	Phase III
fidanacogene elaparvovec	Pfizer	Hemophilia B	**Phase III**
SPK-8011	Spark	Hemophilia A	Phase III

Indicates gene or cell therapies; **Expedited approval pathway**

Impact on Spending: There are four new hemophilia gene therapies in Phase III trials and expected to launch in the next few years. The BioMarin product will treat hemophilia A and has been submitted for FDA review but will require two more years of clinical trial data prior to approval. It is expected to have a launch price between $2M and $3M.

Current hemophilia treatment is expensive (can be more than $480,000 per year) and new gene therapies may prevent the need for ongoing factor. However, these products' list prices may not offset their long-term savings for more than a decade.

There are also six additional Phase III+ specialty products for hemophilia in the pipeline.

Other High Budget Impact Drugs

Other Specialty Drugs May Drive Spending by Increasing Costs Relative to Existing Treatments

Type 3: Other High Budget Impact

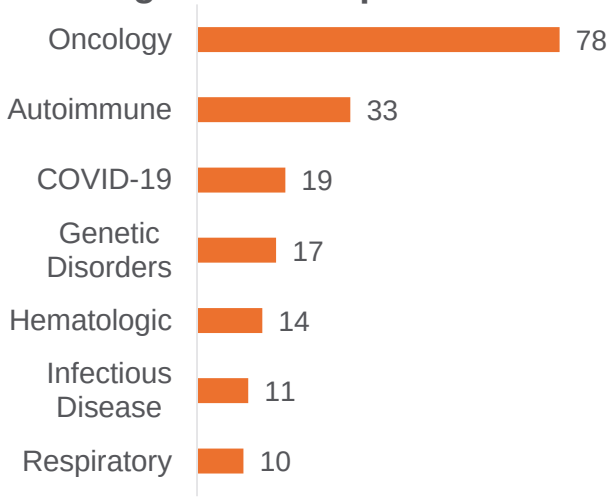
Other Phase III specialty drugs with large Medicaid volumes and incremental costs

- Beyond cell and gene therapies, other specialty products can drive Medicaid drug spending
- These products are likely to have moderate to high prices (i.e., $30,000 to $1M), significant utilization, and higher incremental costs relative to current treatments
- This section focuses on products with the highest anticipated Medicaid volumes

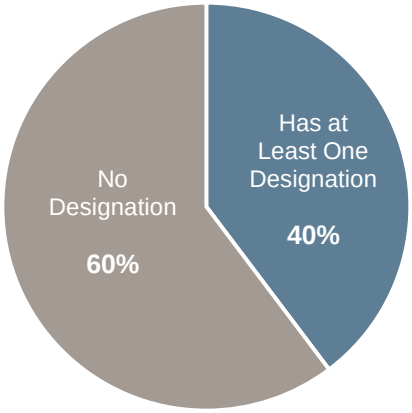
Overview of Specialty Pipeline Products that Could Drive Medicaid Spending Medicaid

- There are 282 drugs currently in phase III trials or with submitted NDAs/BLAs, meaning they are within 2-3 years of approval
- 44% drugs are on an expedited approval pathway and 40% have at least one special designation (e.g., orphan)
- The three therapeutic areas with the largest number of drugs in development are oncology, autoimmune diseases, and COVID-19

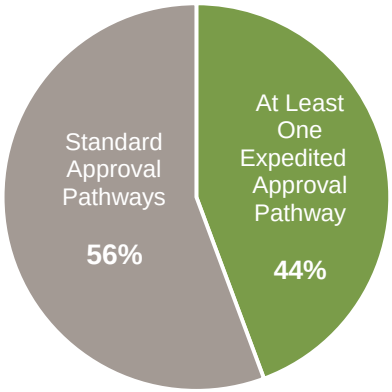
Phase III, Submitted NDA/BLA Pipeline with 10+ Drugs Per Therapeutic Class



Drugs with FDA Special Designation



Drugs on an FDA Expedited Pathway



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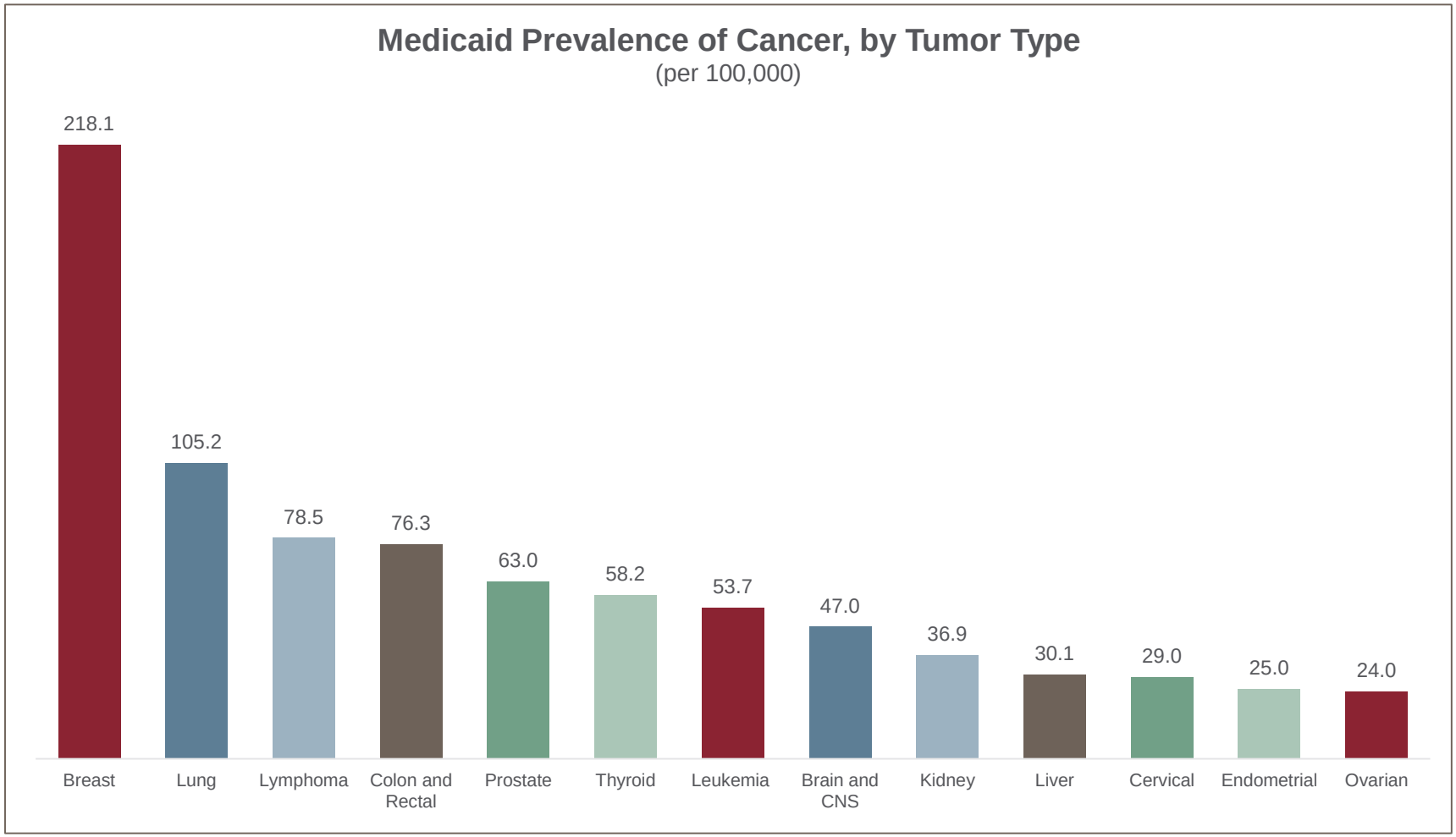
Breast and Lung Cancer Are the Top Two Most Common Cancers in the Medicaid Population



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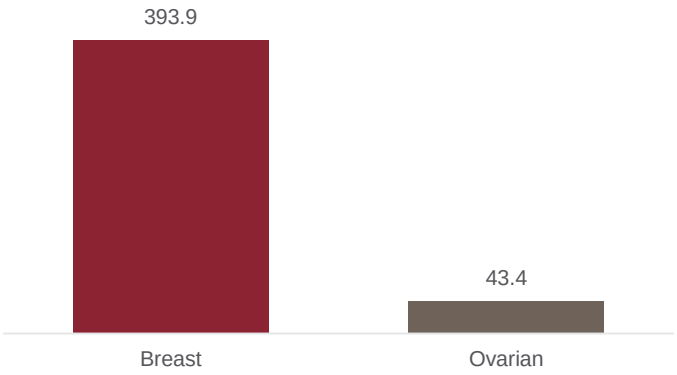
Cancer

Condition Overview: An earlier assessment of therapies in the pipeline to treat cancer (slide 6,15) focus on cell and gene therapies. In addition to these, there are over 78 specialty cancer drugs that are in phase III trials or awaiting FDA approval.

Several new products treat cancers specific to women (e.g. breast cancer, ovarian cancer). Breast cancer affects more than 130,000 women in Medicaid per year and ovarian cancer affects 15,000.

The pipeline also includes an expedited approval for a first-line therapy to treat diffuse-large B-cell lymphoma. Medicaid prevalence across all lymphomas is 78 people per 100,000, affecting nearly 50,000 beneficiaries.

Medicaid Prevalence
(per 100,000 women)



Select Pipeline Products Phase III/NDA/BLA Submitted

Drug Name	Sponsor	Indication	Phase
Polivy	Genentech	Diffuse –large B-cell lymphoma (1st line)	**Phase III**
Veliparib	AbbVie	Breast cancer, ovarian cancer	Phase III
Perjeta®	Genentech	Breast cancer (HER2+, adjuvant, with ado-trastuzumab)	Phase III

Expedited approval pathway

Impact on Spending: Given that a number of these therapies are already on the market treating cancers and are seeking FDA label expansions, they are not likely to have a large incremental impact on Medicaid spending.

However, given the number of women in Medicaid and the focus of new specialty products on treating cancers that have a high prevalence in women could increase costs depending on the breadth of the label and the cost relative to previous treatments.

Infectious Disease: COVID-19

Condition Overview: Today, the COVID-19 global pandemic has brought the coronavirus front and center in infectious disease related research and development. As of late September, there had been almost 200,000 deaths, and over 6 million cases of COVID-19 in the United States.

There are currently therapies in development that cover three strategies of treating COVID-19:

Vaccines: Prophylactic therapeutics for creating immunity to COV2. Examples include traditional protein-based and viral-based vaccines to newer nucleic acid and nanoparticle-based vaccines.

Antivirals: Drugs that directly interact with the virus or disrupt its ability to replicate. Examples include inhibitors of COV2 spike/ACE2 interaction, COV2 proteolytic processing for cell entry or intracellular trafficking, RNA replication, as well as antibodies that directly bind COV2 surface proteins.

Treatments: Drugs that treat the various COVID-19 illness resulting from the COV2 viral infection. Examples include anti-inflammatory, cardiovascular and respiratory medicines.

Select Pipeline Products All Phases

Drug Name	Sponsor	Indication	Phase
Remdesivir	Gilead	COVID-19 Treatment	Phase III - EUA
AZD1222	Astra Zeneca	COVID-19 Vaccine	Phase III
mRNA-1273	Moderna	COVID-19 Vaccine	**Phase III**
BNT162	Pfizer	COVID-19 Vaccine	Phase II/III

Expedited approval pathway

Impact on Spending: COVID-19 could be a major new cost-driver for Medicaid. Products for COVID-19 are a combination of vaccines, new-indications of previously-approved products for treatment, as well as new treatments. Given that COVID-19 is a new infectious disease, the incremental cost for Medicaid is likely to be significant and possibly time-bound.

Infectious Disease: HIV/AIDS

Condition Overview: There are a number of infectious diseases that commonly affect people in the United States. One of the most impactful is HIV/AIDS. In addition to treatment of HIV/AIDS with antiretrovirals, recent FDA approvals have yielded Pre-Exposure Prophylaxis (PrEP) therapies.

Antiretrovirals: HIV antiretrovirals are commonly the highest net spend class in Medicaid (2018, 2019). In 2019, this class was also the highest positive trend driver, with the number one net spend drug (Biktarvy®), as well.

Pre-Exposure Prophylaxis: PrEP is taken by people that are at high-risk for HIV and is highly effective when taken daily. Given that PrEP has/will treat a population that had not been treated previously, as more people take it there will be cost implications for the Medicaid program.

Select Pipeline Products Phase III/NDA/BLA Submitted

Drug Name	Sponsor	Indication	Phase
LA cabotegravir (for intramuscular injection)	ViiV	Prevention of HIV infection	III

Impact on Spending: In 2019, the HIV/AIDS drug class was the number one top spend class, likely driven by increased utilization for PrEP, rather than pipeline products. There are currently two approved PrEP drugs (Truvada® and Descovy®). Today a month's supply of Truvada for PrEP costs about $1,600 per month and it needs to be taken in perpetuity.

Additionally a generic version of Truvada for PrEP will become available starting September 30, 2020, however significant savings are unlikely to materialize until there is more generic competition. Another relevant pipeline therapy is long-acting injectable PrEP which is projected to cost more than oral daily PrEP therapies.

Mental Health

Condition Overview: Behavioral health conditions such as anxiety disorders, major depression, bipolar disorder, and schizophrenia affect a large number of people in the United States and are particularly common among low income individuals. As of 2015, Medicaid covered 21% of adults with mental illness and 26% of adults with serious mental illness (SMI).

Impact on Spending: Overall, Medicaid is the single largest payer for mental health services in the US. Specifically, Medicaid spends a significant amount on antipsychotic drugs. In 2019, these drugs constituted the class with the second highest drug spend. Traditionally, there is a high utilization of generic drugs; however, utilization of long-acting injectables which account for only 4% of market share make up 39% of net spend in the class.

Select Pipeline Products Phase III/NDA/BLA Submitted

Drug Name	Sponsor	Indication	Phase
esketamine (Spravato®)	Janssen	MDD (with suicidal ideation with intent)	**sNDA Submitted**
paliperidone (Invega Sustenna®) 6-month injectable	Janssen	Schizophrenia	Phase III - sNDA

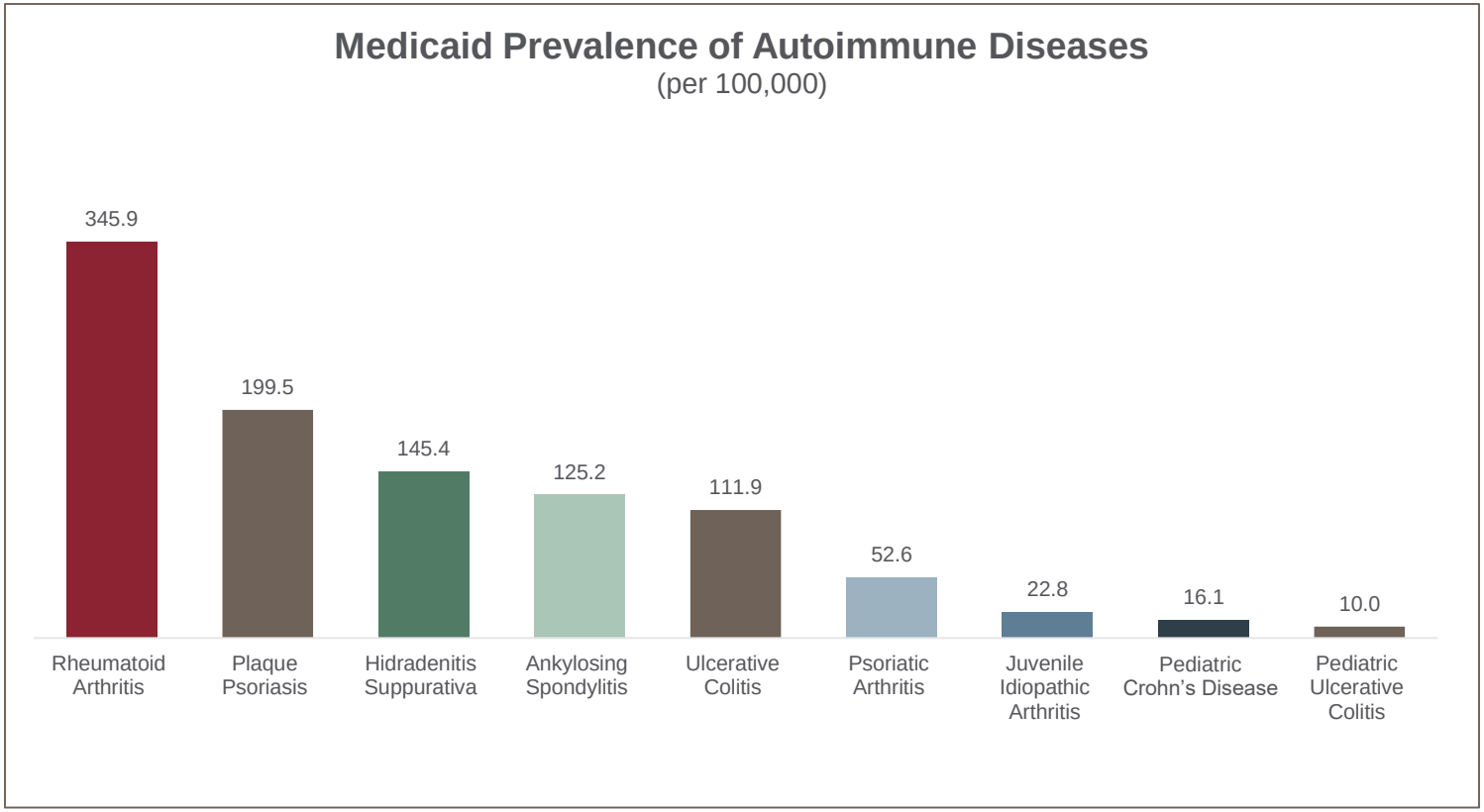
Expedited approval pathway

Pipeline Products: Each of the phase III products have previously been approved for different mental health indications.

Spravato is a self-administered nasal spray that requires physician oversight and a period of observation. It was approved for major depressive disorder in Spring 2019 and can cost up to $6,700 for the first month of treatment and is taken in conjunction with anti-depressants.

Invega Sustenna is a physician administered drug that treats schizophrenia and schizoaffective disorder. Currently the trial is testing its ability to be a long-acting agent. A single injection of Invega Sustenna can cost anywhere from $400 to more than $2,000, depending on dosage, according to Medicaid data.

RA and Psoriasis Are the Most Common Autoimmune Diseases in the Medicaid Population



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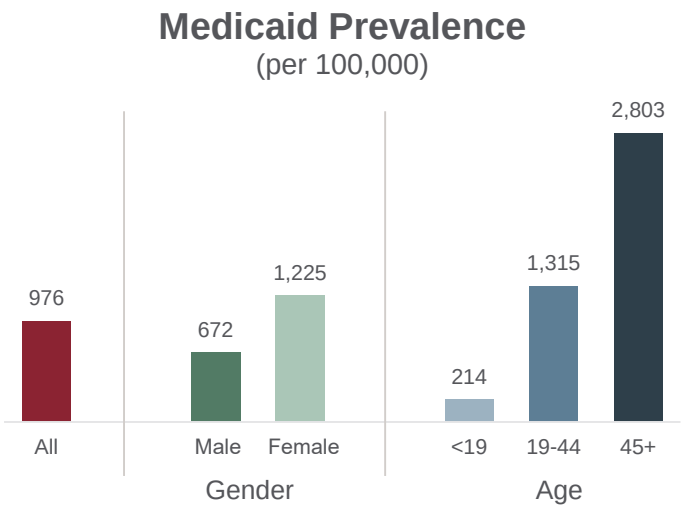
Autoimmune Diseases

Condition Overview: In addition to the gene therapies there are 33 (not unique) specialty drugs that are in phase III trials or awaiting FDA approval with indications to treat a range of autoimmune diseases. It is also common that these therapies are seeking label expansion or are indicated for a number of autoimmune diseases.
Overall, there are 6.5 million Medicaid beneficiaries affected by autoimmune diseases. The prevalence in Medicaid is almost 1,000 people per 100,000. These conditions are more common in women as well as those over the age of 45.



Select Pipeline Products Phase III/NDA/BLA Submitted

Drug Name	Sponsor	Indication	Phase
Bimekizumab	UCB	PsA, PsO, axial spondyloarthritis	Phase III
Etrolizumab	Roche	Ulcerative colitis, Crohn's disease	Phase III
Nemolizumab	Galderma	Atopic dermatitis	Phase III

Impact on Spending: In 2019, Cytokine and CAM antagonists (treatments for chronic inflammatory diseases) was the class with the 10th highest spend in Medicaid.

This market is expected to see injectable and oral agents that may be more efficacious than current treatments but will have significantly higher net costs – resulting in replacement spending instead of a decline as current products age.

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Respiratory

Condition Overview: Some of the most common chronic reparatory diseases are asthma and chronic obstructive pulmonary disease (COPD).

Chronic respiratory diseases affected millions of people in the US. More than 25 million people have asthma and 14.8 million have COPD – these conditions also tend to disproportionately affect those with lower incomes. The early proliferation of biologics to treat these diseases could greatly impact Medicaid budgets.

Tezepelumab is a potential first in class injectable therapy (anti-thymic stromal lymphopoietin (TSLP) monoclonal antibodytherapy) that has shown to significantly reduce asthma exacerbations in a broad population of patients with severe asthma. In 2018 it was granted FDA breakthrough status and given its early efficacy in broad populations, it has the potential to be a blockbuster drug.

Competition: Tezepelumab is poised to be a strong competitor to current eosinophilic asthma therapies like GlaxoSmithKline's IL-5 inhibitor Nucala which currently costs about $32,500 per year.

Select Pipeline Products Phase III/NDA/BLA Submitted

Drug Name	Sponsor	Indication	Phase
Tezepelumab	AstraZeneca /Amgen	Asthma (severe, uncontrolled)	**Phase III**

Expedited approval pathway

Impact on Spending: Currently drugs to treat chronic reparatory conditions have high utilization in Medicaid but the class is quite competitive and benefits from large rebates.

As of 2019, inhaled glucocorticoids was the 28th highest net spend class in Medicaid. Another high volume class are bronchodilators, each of these classes experienced a change in the AMP calculation that took effect in October of 2019 that determines the federal rebate amount for these products.

Given recent innovation in this space (novel therapies, increased administration indications, etc.) it is likely to have a larger impact on Medicaid as the pipeline comes to market assuming it is as successful as clinical trial data is showing.

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