



## Pending drug approvals

Drug name	Manufacturer	Indication/use	Expected FDA decision date
<b>dronabinol</b>	Insys Therapeutics	<ul style="list-style-type: none"> <li>• AIDS-associated anorexia</li> <li>• Chemotherapy-associated nausea and vomiting</li> </ul>	4/2016
<b>methylnaltrexone (Relistor®)</b>	Valeant/Progenics	Opioid-induced constipation	4/2016
<b>venetoclax</b>	AbbVie/Genentech	Chronic lymphocytic leukemia	4/2016–5/2016
<b>pimavanserin (Nuplazid™)</b>	Acadia	Parkinson's psychosis	5/2016
<b>sodium zirconium cyclosilicate</b>	ZS Pharma	Hyperkalemia	5/26/2016
<b>arbaclofen extended-release (Ontinua™ ER)</b>	Osmotica	Spasticity associated with multiple sclerosis	5/2016–6/2016
<b>benzhydrocodone/acetaminophen</b>	KemPharm	Pain management	6/9/2016
<b>testosterone undecanoate</b>	Lipocine/AbbVie	Hypogonadism	6/28/2016
<b>sofosbuvir/velpatasvir</b>	Gilead	Hepatitis C	6/28/2016
<b>lixisenatide (Lyxumia®)</b>	Sanofi/Alkermes/Zeland	Type 2 diabetes mellitus	6/2016–7/2016
<b>lixisenatide/insulin glargine (LixiLan™)</b>	Sanofi/Alkermes/Zeland	Type 2 diabetes mellitus	6/2016–7/2016
<b>glycopyrrolate/formoterol</b>	AstraZeneca	Chronic obstructive pulmonary disease (COPD)	2Q2016

## dronabinol

Manufacturer: Insys Therapeutics

### Therapeutic use

Insys Therapeutics' dronabinol is an oral solution. It is being pursued for two indications: (1) treatment of anorexia associated with weight loss in patients with acquired immune deficiency syndrome (AIDS); (2) nausea and vomiting associated with chemotherapy in patients who have failed on conventional antiemetic treatments.

Currently, brand and generic dronabinol capsules are available for the same indications as the pending oral solution.

### Clinical profile

Dronabinol is a cannabinoid receptor agonist.

Dronabinol is one of the psychoactive compounds present in cannabis and has abuse potential. Thus, similar to Marinol® (dronabinol) capsules, it is expected to be listed as a Schedule III (C-III) controlled substance.

Dronabinol oral solution is supported by bioequivalency data, demonstrating bioequivalence to Marinol capsules.

The safety concerns are expected to be similar to Marinol capsules. Significant adverse events may include depersonalization, euphoria, hallucinations, paranoia, and abnormal reactions.

Similar to Marinol, the dose of dronabinol oral solution is expected to vary by the specific indication.

### Competitive environment

Dronabinol oral solution is a new formulation and may be useful for patients with difficulty swallowing.

However, there is no compelling clinical advantage over dronabinol capsules, which are generically available.

### Expected FDA decision date

An FDA decision regarding the approval of Insys Therapeutics' dronabinol oral solution is expected in April 2016.

- Treatment of anorexia associated with weight loss in AIDS patients
- Treatment of chemotherapy-associated nausea and vomiting
- Cannabinoid receptor agonist
- Controlled substance (C-III)
- Oral solution
- Bioequivalent to Marinol capsules
- Common adverse events: similar to Marinol capsules
- Advantages: new formulation, possible use in those unable to swallow
- Disadvantages: similar product is available (ie, dronabinol capsules), controlled substance
- PDUFA: 4/2016

## methylnaltrexone (Relistor)

Manufacturer: Valeant/Progenics

### Therapeutic use

Valeant, in partnership with Progenics, is developing a new oral formulation of methylnaltrexone, for the treatment of opioid-induced constipation in adults with chronic non-cancer pain.

Methylnaltrexone is currently available as Relistor for subcutaneous injection. The injection is approved for opioid-induced constipation in adults with chronic non-cancer pain and for opioid-induced constipation in adults with advanced illness.

### Clinical profile

Methylnaltrexone is a peripheral opioid receptor antagonist.

In a clinical trial, less patients in the oral methylnaltrexone group required rescue therapy to achieve laxation vs. the placebo group ( $p < 0.05$ ). In addition, more patients achieved laxation within 4 hours of the first dose vs. placebo.

The most common adverse events with oral methylnaltrexone use were abdominal pain, nausea, flatulence, and diarrhea. However, the overall incidence of adverse events was comparable to placebo.

Based on trial information, oral methylnaltrexone will be dosed once daily.

### Competitive environment

This formulation of methylnaltrexone has two primary benefits — it is orally administered and dosed once daily.

However, methylnaltrexone is not a unique product. It is already available as an injection. Moreover, other oral treatment options are available for treating opioid-induced constipation in adults with chronic non-cancer pain (ie, Amitiza<sup>®</sup>, Movantik<sup>™</sup>).

The projected annual U.S. sales for oral methylnaltrexone are \$225 million by 2020.

### Expected FDA decision date

An FDA decision regarding the approval of oral methylnaltrexone is expected in April 2016.

- Treatment of opioid-induced constipation in chronic non-cancer pain

- Opioid receptor antagonist
- Improved rescue-free laxation vs. placebo
- Common adverse events: abdominal pain, nausea, flatulence, diarrhea

- Advantages: oral formulation, once daily dosing
- Disadvantages: related product is available (ie, Relistor injection), other oral therapeutic alternatives are available (eg, Amitiza, Movantik)

- PDUFAs: 4/2016

## venetoclax

Manufacturer: AbbVie/Genentech

### Therapeutic use

Venetoclax is in development for the treatment of chronic lymphocytic leukemia (CLL) in adults who have received at least 1 prior therapy, including patients with 17p deletion.

The 17p deletion is associated with rapid disease progression and short survival. An estimated 3%–10% of CLL patients have this deletion at diagnosis, and 30%–50% of relapsed or refractory CLL patients have this deletion.

### Clinical profile

Venetoclax is an oral apoptosis stimulator. It works by targeting the B-cell lymphoma-2 (BCL-2) family of proteins, which regulate apoptosis.

Currently, trial data are only available for one single-arm phase 2 trial, in which patients received venetoclax as monotherapy. The objective response rate (ORR) was 79.4%.

Significant safety concerns associated with venetoclax include pulmonary embolism, febrile neutropenia, infection, anemia, thrombocytopenia, and tumor lysis syndrome (TLS). However, the clinical risk for TLS may be reduced or eliminated by ramping-up the dose over several weeks.

Other trials are still in progress, including active-controlled trials comparing venetoclax as part of combination treatment regimens.

Based on trial information, the oral dose of venetoclax will be once daily.

### Competitive environment

Venetoclax is an oral, orphan drug that employs a novel mechanism for treating CLL patients. In addition, it is dosed once daily and may benefit patients with the 17p deletion.

However, venetoclax is not expected to be a first-line agent. Moreover, late-stage trial data are still lacking, and there are no overall survival data at this time.

The projected annual U.S. sales for venetoclax are over \$1 billion by 2020.

### Expected FDA decision date

An FDA decision regarding the approval of venetoclax is expected by April or May 2016.

- Treatment of CLL in adults who received  $\geq 1$  prior therapy, including patients with 17p deletion

- Apoptosis stimulator
- Oral formulation
- ORR = 79.4%
- Safety concerns: pulmonary embolism, febrile neutropenia, infection, anemia, thrombocytopenia, and TLS

- Advantages: novel mechanism, oral formulation, once daily dosing, orphan drug status, benefit in CLL 17p deletion
- Disadvantages: not first-line, late-stage trial results or overall survival data are not available

- PDUFA: 4/2016–5/2016

## pimavanserin (Nuplazid)

Manufacturer: Acadia

### Therapeutic use

Pimavanserin is in development for the treatment of psychosis associated with Parkinson's disease (PD).

### Clinical profile

Pimavanserin is an oral selective serotonin inverse agonist. It works by stabilizing the inactive conformation of the target receptor, thus, inhibiting the spontaneous conversion of the receptor to its active conformation in the absence of a ligand.

Trial results have been inconsistent for pimavanserin. While one trial did show greater improvement from baseline in psychotic symptoms compared to placebo ( $p = 0.001$ ), two other trials failed to demonstrate a statistically significant difference.

Common adverse events reported in trials include urinary tract infections, falls, drowsiness, headache, and dizziness.

Based on trial information, pimavanserin will be dosed once daily.

### Competitive environment

Currently, there are no FDA-approved drugs for the treatment of psychosis associated with PD. Thus, if approved, pimavanserin would be the first drug to hold this indication.

Unfortunately, the trial data are mixed, with two trials failing to achieve their primary endpoints.

The projected annual U.S. sales for pimavanserin are \$201 million by 2020.

### Expected FDA decision date

The FDA's Psychopharmacologic Drugs Advisory Committee (AdCom) is scheduled to meet on March 29, 2016 to discuss the risks and benefits of pimavanserin in psychosis associated with PD.

An FDA decision regarding the approval of pimavanserin is expected in May 2016.

- Treatment of psychosis associated with PD

- Selective serotonin inverse agonist
- Oral formulation
- Inconsistent trial results
- Common adverse events: urinary tract infections, falls, drowsiness, headache, and dizziness

- Advantage: no FDA-approved drugs for psychosis associated with PD
- Disadvantage: some trials failed to achieve their key endpoints

- FDA AdCom: 3/29/2016
- PDUFA: 5/2016

## sodium zirconium cyclosilicate

Manufacturer: ZS Pharma

### Therapeutic use

Sodium zirconium cyclosilicate is in development for the treatment of hyperkalemia.

### Clinical profile

Sodium zirconium cyclosilicate is an oral, non-absorbable potassium binder. In the gastrointestinal tract, this product preferentially traps potassium ions over other ions.

Sodium zirconium cyclosilicate is being developed as an odorless and tasteless powder or oral tablet.

In pivotal trials, sodium zirconium cyclosilicate normalized potassium levels in 84% of hyperkalemic patients within 24 hours and 98% of patients within 48 hours. In patients who were switched from the active drug to placebo, 46% of patients remained normal vs. 80%–94% of patients who continued on sodium zirconium cyclosilicate.

The most common adverse event reported in trials was diarrhea.

Based on trial information, the dose of sodium zirconium cyclosilicate may vary depending on its use for acute or maintenance therapy.

### Competitive environment

Kayexalate® (sodium polystyrene sulfonate) is the primary oral drug used to treat hyperkalemia. However, Kayexalate is poorly tolerated. Gastrointestinal complaints are common, and its approval was not based on clinical trial data.

Nonetheless, Kayexalate is generically available. In addition, Veltassa™ (patiomer), another oral potassium binder, was recently approved for the same indication. But due to the absence of head-to-head trials, it is unclear whether sodium zirconium cyclosilicate offers a compelling clinical advantage over its competition.

The projected annual U.S. sales for sodium zirconium cyclosilicate are \$721 million by 2020.

### Expected FDA decision date

An FDA decision regarding the approval of sodium zirconium cyclosilicate is expected by May 26, 2016.

- Treatment of hyperkalemia
- Potassium binder
- Oral formulation
- 84% of patients achieved normal potassium levels within 24 hours
- More patients maintain normal potassium levels vs. placebo
- Common adverse event: diarrhea
- Advantages: Kayexalate is poorly tolerated and lacks clinical trial data
- Disadvantages: other options are available (ie, Kayexalate, Veltassa), no head-to-head trial data
- PDUFA: 5/26/2016

## arbaclofen extended-release (Ontinua ER)

Manufacturer: Osmotica

### Therapeutic use

Arbaclofen extended-release (ER) is in development for the treatment of spasticity in adults with multiple sclerosis (MS).

### Clinical profile

Arbaclofen is an oral derivative of baclofen, a gamma aminobutyric acid (GABA) receptor agonist and antispasmodic agent. GABA reduces neuronal excitability and is also responsible for the regulation of muscle tone.

In a clinical trial, arbaclofen ER was compared to baclofen and placebo. Muscle tone was measured using the Modified Ashworth Scale (MAS). In addition, symptom response and severity were measured using the Clinical Global Impression of Change (CGIC). Arbaclofen met its co-primary endpoints for MAS and CGIC.

Due to limited data, the degree of clinical improvement and safety concerns are not known at this time.

Based on trial information, arbaclofen ER will be dosed twice daily.

### Competitive environment

Arbaclofen ER is an oral drug dosed twice daily. In contrast, baclofen may require three to four doses per day to manage spasticity.

However, baclofen is a similar product that is generically available. Thus, arbaclofen is not a unique clinical treatment.

Currently, various products are available to manage spasticity in MS patients including tizanidine, diazepam, dantrolene, clonidine, and onabotulinumtoxin A.

An estimated 50%–80% of MS patients will suffer from spasticity at some point during the course of their disease.

### Expected FDA decision date

An FDA decision regarding the approval of arbaclofen extended-release is expected by May or June 2016.

- Treatment of spasticity in adults with MS

- GABA receptor agonist

- Oral formulation

- Arbaclofen ER met its co-primary endpoints vs. baclofen

- Approximately 50%–80% of MS patients will suffer from spasticity

- Advantages: oral, twice daily dosing

- Disadvantages: not a clinically unique offering, related product is available (ie, baclofen)

- PDUFA: 5/2016–6/2016



## benzhydrocodone/acetaminophen

Manufacturer: KemPharm

### Therapeutic use

Benzhydrocodone/acetaminophen (APAP) is a fixed-dose combination (FDC) product in development for the management of pain where the use of an opioid analgesic is appropriate.

### Clinical profile

The product combines an opioid receptor agonist, benzhydrocodone, with a non-opioid analgesic, APAP.

In a bioequivalency study, benzhydrocodone/APAP was compared to Norco® (hydrocodone/APAP), a commonly prescribed opioid combination agent. When given as a single dose, the plasma concentrations of hydrocodone, hydromorphone, and APAP were comparable to an equimolar dose of Norco.

Because benzhydrocodone is a prodrug of hydrocodone, a drug with high potential for abuse and diversion, benzhydrocodone/APAP will likely be classified as a Schedule II (C-II) controlled substance similar to other hydrocodone combination products.

However, benzhydrocodone/APAP is being developed as a tamper-resistant, abuse-deterrent product to prevent the release of the opioid by crushing, physical manipulation, or other extraction techniques.

In an intranasal human abuse liability trial, benzhydrocodone reduced the overall exposure to hydrocodone vs. hydrocodone bitartrate when both were administered intranasally. Moreover, benzhydrocodone showed reduced abuse potential, including lower drug liking scores vs. hydrocodone ( $p < 0.0001$ ). But in a second trial evaluating the FDC vs. Norco, drug liking scores were similar for all treatments, which KemPharm believes was due to the APAP component.

The common adverse events are expected to be similar to other related products containing hydrocodone and APAP.

The dosing frequency of benzhydrocodone/APAP is expected to be comparable to other immediate-release opioid-combination products.

- Management of pain where the use of an opioid analgesic is appropriate

- Opioid agonist/analgesic combination
- C-II controlled substance
- Oral formulation
- Bioequivalent to Norco
- Common adverse events: similar to other products containing hydrocodone and APAP

Continued...

## benzhydrocodone/acetaminophen (Continued...)

Manufacturer: KemPharm

### Competitive environment

If approved, benzhydrocodone/APAP would be the first immediate-release, abuse-deterrent opioid combination product. It would offer another pain management option to patients and add to the growing list of abuse-deterrent opioid agents.

However, there are many opioid options currently available on the market. Moreover, it is unclear whether existing abuse-deterrent opioids have significantly reduced the incidence of opioid abuse and dependence.

### Expected FDA decision date

The FDA has granted priority review for benzhydrocodone/APAP. Thus, a decision regarding the approval of benzhydrocodone/APAP is expected by June 9, 2016.

- Advantage: first immediate-release, abuse-deterrent opioid combination
- Disadvantage: many opioid alternatives are available

- PDUFA: 6/9/2016

## testosterone undecanoate

Manufacturer: Lipocine/AbbVie

### Therapeutic use

Lipocine and AbbVie's testosterone undecanoate is an oral prodrug of testosterone in development for the treatment of hypogonadism in adult male patients.

### Clinical profile

Testosterone is an androgenic hormone.

Because oral testosterone is heavily metabolized by the liver, existing testosterone products are formulated for either transdermal or intramuscular delivery.

However, testosterone undecanoate is an oral prodrug designed to bypass the first-pass hepatic effect, thus, allowing for more active drug to reach systemic circulation before being significantly metabolized.

In trials, 88% of patients were able to achieve normal testosterone levels with oral testosterone undecanoate, and 85% of subjects were able to achieve these levels with only 1 dose titration.

Common adverse events reported in trials include upper respiratory tract infection (URTI), fatigue, headaches, weight increase, hypertension, and acne. Less than or equal to 1% of patients experienced peripheral edema, polycythemia, and thrombocytopenia.

Similar to other testosterone products, oral testosterone undecanoate is expected to be listed as a Schedule III (C-III) controlled substance.

Based on trial information, testosterone undecanoate will be dosed twice daily.

### Competitive environment

Testosterone undecanoate is an oral agent formulated to bypass the first-pass hepatic effect. If approved, it may provide a convenient way for patients to treat their condition.

Furthermore, available testosterone products carry boxed warnings. The transdermal agents warn about the risks for secondary exposure to testosterone. The injectables warn about the risk for pulmonary microembolism and anaphylaxis. Oral testosterone undecanoate is expected to avoid these concerns and the need for a boxed warning.

However, testosterone undecanoate will still be a controlled substance. Moreover, its long-term adverse effects remain uncertain.

In 2015, an estimated 500,000 prescriptions per month were dispensed for testosterone products.

### Expected FDA decision date

An FDA decision regarding the approval of oral testosterone undecanoate is expected by June 28, 2016.

- Treatment of hypogonadism in adult male patients

- Androgen hormone
- Oral formulation
- 88% of patients achieved normal testosterone levels
- Common adverse events: URTI, fatigue, headaches, weight increase, hypertension, and acne

- Advantages: oral formulation, bypass first-pass hepatic effect, possibly no boxed warning
- Disadvantages: controlled substance, long-term effects uncertain

- PDUFA: 6/28/2016

## sofosbuvir/velpatasvir

Manufacturer: Gilead

### Therapeutic use

Sofosbuvir/velpatasvir is a FDC product for the treatment of chronic hepatitis C virus (HCV) infection in patients with genotypes 1–6.

### Clinical profile

Sofosbuvir is an NS5B polymerase inhibitor. Velpatasvir is an NS5A inhibitor. Together these agents work by different mechanisms to eradicate HCV.

There are multiple clinical trials that evaluated sofosbuvir/velpatasvir across different genotypes, including treatment-naïve, treatment-experienced, cirrhotic, and non-cirrhotic patients. The overall sustained virologic response 12 weeks after treatment (SVR12) were 97%–100%. Among genotype 2, genotype 3, and decompensated cirrhotics, the SVR12 rates were greater than 90%.

Common adverse events include fatigue, nausea, and headache. In the trials that evaluated sofosbuvir/velpatasvir in combination with ribavirin, anemia was a common and anticipated adverse event due to the addition of ribavirin.

Based on trial information, sofosbuvir/velpatasvir will be dosed as 1 pill orally once daily for 12 weeks, regardless of genotype.

### Competitive environment

If approved, sofosbuvir/velpatasvir would be the first pan-genotypic agent for HCV. In addition, it may have high efficacy in underserved and difficult-to-treat populations, including decompensated cirrhotic patients.

However, sofosbuvir/velpatasvir is entering an increasingly competitive market. Examples of all-oral HCV regimens include Harvoni®, Viekira Pak™, Technivie™, and Zepatier™. Sofosbuvir is also used in combination with other agents (eg, Daklinza™) for treating specific genotypes.

The projected peak U.S. sales for sofosbuvir/velpatasvir are \$5.1 billion by 2018.

### Expected FDA decision date

An FDA decision regarding the approval of sofosbuvir/velpatasvir is expected by June 28, 2016.

- Treatment of HCV genotypes 1–6 infection

- NS5B polymerase inhibitor/NS5A inhibitor combination
- Targets all HCV genotypes
- Overall SVR12 rates were 97%–100%
- Common adverse events: fatigue, nausea, headache

- Advantages: first pan-genotypic HCV drug, may benefit other genotypes and difficult-to-treat populations
- Disadvantage: other all-oral regimens are available

- PDUFA: 6/28/2016

## lixisenatide (Lyxumia) and lixisenatide/insulin glargine (LixiLan)

Manufacturer: Sanofi/Alkermes/Zealand

### Therapeutic use

Both lixisenatide and lixisenatide/insulin glargine are in development as an adjunct to diet and exercise to improve glycemic control in patients with type 2 diabetes mellitus (T2DM).

### Clinical profile

Lixisenatide is a glucagon-like peptide-1 (GLP-1) receptor agonist. Insulin glargine is a long-acting insulin. These agents work by different mechanisms to improve glycemic control.

In clinical trials, lixisenatide was non-inferior to Byetta® (exenatide) at lowering average blood glucose levels (ie, hemoglobin A1c) and achieved lower hemoglobin A1c values than insulin glargine. In addition, there was a 6-fold lower risk for hypoglycemia with lixisenatide vs. exenatide.

Similarly, the combination of lixisenatide and insulin glargine achieved lower hemoglobin A1c levels than either lixisenatide or insulin glargine alone. Moreover, some trials suggest that the risk of hypoglycemia with lixisenatide plus insulin glargine may be no greater than with insulin glargine.

Common adverse events reported in trials with lixisenatide use were nausea, vomiting, diarrhea, and hypoglycemia.

Based on trial information, both lixisenatide and lixisenatide/insulin glargine will be dosed once daily by subcutaneous injection.

### Competitive environment

Lixisenatide is another GLP-1 agonist, similar to agents such as Byetta, Victoza®, Trulicity®, and Tanzeum®.

Some trials suggest that lixisenatide plus insulin glargine may have no greater risk for hypoglycemia than insulin glargine; nonetheless, GLP-1 agonists and long-acting insulin products are already available. Thus, the main benefit to patients may be the convenience of the combination product, which reduces the number of injections needed in those who require both a GLP-1 agonist and a long-acting insulin product.

The projected annual U.S. sales for lixisenatide are \$146–\$249 million by 2020.

The projected annual U.S. sales for lixisenatide/insulin glargine are \$283–\$500 million by 2020.

### Expected FDA decision date

An FDA decision regarding the approval of lixisenatide and lixisenatide/insulin glargine is expected by June or July 2016.

- Adjunct to diet and exercise to improve glycemic control in T2DM

- GLP-1 agonist with or without long-acting insulin
- Superior reductions in hemoglobin A1c vs. insulin glargine
- Common adverse events: nausea, vomiting, diarrhea, and hypoglycemia

- Advantages: another treatment option, combination product, possibly no greater hypoglycemic risk vs. insulin glargine
- Disadvantages: other GLP-1 agonists are available, crowded market

- PDUFA: 6/2016–7/2016

## glycopyrrolate/formoterol

Manufacturer: AstraZeneca

### Therapeutic use

Glycopyrrolate/formoterol is a FDC product in development for the treatment of chronic obstructive pulmonary disease (COPD).

### Clinical profile

Glycopyrrolate is a long-acting muscarinic antagonist (LAMA) combined with formoterol, a long-acting beta agonist (LABA).

This FDC product is being formulated as a hydrofluoroalkane metered-dose inhaler. Hydrofluoroalkane is a propellant, which is replacing the chlorofluorocarbon propellants due to environmental concerns.

In clinical trials, the FDC product showed greater improvement in lung function compared to glycopyrrolate or formoterol alone.

Common adverse events are expected to be similar to the individual components, which may include nasopharyngitis, hypertension, and URTI.

### Competitive environment

Overall, glycopyrrolate/formoterol offers another treatment option for patients and may provide a convenient alternative to the individual agents, which are marketed as Seebri™ Neohaler® (glycopyrrolate) and Foradil® (formoterol).

However, there are many treatment options available for COPD, including other LAMA/LABA combinations (eg, Utibron™ Neohaler®, Anoro® Ellipta®). Thus, glycopyrrolate/formoterol is not a unique clinical offering.

The projected annual U.S. sales for glycopyrrolate/formoterol are \$432 million by 2020.

### Expected FDA decision date

An FDA decision regarding the approval of glycopyrrolate/formoterol is expected in the second quarter of 2016.

- Treatment of COPD

- LAMA/LABA combination
- Inhaled formulation
- Greater improvement in lung function vs. individual components
- Common adverse events: nasopharyngitis, hypertension, and URTI

- Advantages: another treatment option, may offer convenience as a combination product
- Disadvantage: other treatment options are available (eg, Utibron Neohaler, Anoro Ellipta)

- PDUFA: 2Q2016

### OptumRx brand pipeline forecast

OptumRx closely monitors and evaluates the pipeline landscape for upcoming brand drug approvals, including both traditional and specialty medications. This report provides a summary of developmental drugs that may be approved in the upcoming two years.

[Read more](#)

### OptumRx generic pipeline forecast

OptumRx closely monitors and evaluates the pipeline landscape for upcoming first-time generics and biosimilars. This report provides a summary of upcoming first-time generic drugs and biosimilars that may be approved in the upcoming two years.

[Read more](#)

## Getting acquainted with pipeline forecast terms

### Clinical trial phases

Phase I trials	Researchers test an experimental drug or treatment in a small group of people for the first time to evaluate its safety, determine a safe dosage range, and identify side effects.
Phase II trials	The experimental study drug or treatment is given to a larger group of people to see if it is effective and to further evaluate its safety.
Phase III trials	The experimental study drug or treatment is given to large groups of people to confirm its effectiveness, monitor side effects, compare it to commonly used treatments, and collect information that will allow the experimental drug or treatment to be used safely.
Phase IV trials	Post marketing studies delineate additional information including the drug's risks, benefits, and optimal use.

### Pipeline acronyms

ANDA	Abbreviated New Drug Application
BLA	Biologic License Application
CRL	Complete Response Letter
FDA	Food and Drug Administration
NME	New Molecular Entity
NDA	New Drug Application
sBLA	Supplemental Biologic License Application
sNDA	Supplemental New Drug Application
OTC Drugs	Over-the-Counter Drugs
PDUFA	Prescription Drug User Fee Act
REMS	Risk Evaluation and Mitigation Strategy



**References:**

- AbbVie Press Release. AbbVie website. Phase 2 study of venetoclax in patients with relapsed/refractory chronic lymphocytic leukemia with 17p deletion meets primary endpoint. <http://abbvie.mediaroom.com/2015-08-12-Phase-2-Study-of-Venetoclax-in-Patients-with-Relapsed-Refractory-Chronic-Lymphocytic-Leukemia-with-17p-Deletion-Meets-Primary-Endpoint>. August 12, 2015. Accessed January 14, 2016.
- Acadia Pharmaceuticals News Release. Acadia Pharmaceuticals website. Acadia Pharmaceuticals announces publication of data from its -015 open label safety study in Parkinson's disease in the Journal of the American Medical Directors Association. <http://news.acadia-pharm.com/phoenix.zhtml?c=125180&p=iroi-newsArticle&ID=2076645>. August 6, 2015. Accessed January 12, 2016.
- Acadia Pharmaceuticals News Release. Acadia Pharmaceuticals website. Acadia Pharmaceuticals announces publication in The Lancet of pivotal phase III Parkinson's disease psychosis trial with pimavanserin. <http://ir.acadia-pharm.com/phoenix.zhtml?c=125180&p=iroi-newsArticle&ID=1871177>. October 31, 2013. Accessed January 12, 2016.
- Acadia Pharmaceuticals News Release. Acadia Pharmaceuticals website. Acadia Pharmaceuticals announces results from phase III trial of pimavanserin in Parkinson's disease psychosis. <http://ir.acadia-pharm.com/phoenix.zhtml?c=125180&p=iroi-newsArticle&ID=1326134>. September 1, 2009. Accessed January 12, 2016.
- Acadia Pharmaceuticals News Release. Acadia Pharmaceuticals website. Acadia Pharmaceuticals presents integrated data from its phase III program with Nuplazid (pimavanserin) for Parkinson's disease psychosis at the 19th International Congress of Parkinson's Disease and Movement Disorders. <http://phx.corporate-ir.net/phoenix.zhtml?c=125180&p=iroi-newsArticle&ID=2059705>. June 16, 2015. Accessed January 12, 2016.
- Acadia Pharmaceuticals News Release. Acadia Pharmaceuticals website. Acadia Pharmaceuticals provides update on pimavanserin collaborative development program. <http://ir.acadia-pharm.com/phoenix.zhtml?c=125180&p=iroi-newsArticle&ID=1338963>. October 6, 2009. Accessed January 12, 2016.
- AstraZeneca Press Release. AstraZeneca website. AstraZeneca announces positive phase III top-line results for PT003 from PINNACLE 1 and PINNACLE 2 studies in COPD. <https://www.astrazeneca.com/our-company/media-centre/press-releases/2015/astrazeneca-pt003-results-chronic-obstructive-pulmonary-disease-18032015.html>. March 18, 2015. Accessed January 23, 2016.
- Bernard C, Wang E, Lin J, Davies M, and Fonseca V. Meta-Analysis of Randomized Controlled Trials of Lixisenatide as Add-On to Basal Insulin in Patients with Type 2 Diabetes Mellitus [abstract]. 73rd Scientific Sessions. American Diabetes Association. <http://www.abstractsonline.com/Plan/ViewAbstract.aspx?sKey=e68ac573-fe45-4c2f-9485-6270854fc10b&cKey=d55bf200-3712-4286-ab46-7a00f7902fa9&mKey={89918D6D-3018-4EA9-9D4F-711F98A7AE5D}>. June 21–25, 2013. Accessed January 23, 2016.
- BioMedTracker Drug Intelligence Platform. BioMedTracker website. <http://www.biomedtracker.com/>.
- BusinessWire News Release. BusinessWire website. Advancements in Osmotica's CNS pipeline for spasticity in MS patients and LID in Parkinson's patients. <http://www.businesswire.com/news/home/20150708005668/en#.VZ6FsEYQJMu>. July 8, 2015. Accessed January 13, 2016.
- BusinessWire News Release. BusinessWire website. Osmotica Pharmaceutical announces initiation of phase III studies with arbaclofen ER tablets. <http://www.businesswire.com/news/home/20121210006058/en/Osmotica-Pharmaceutical-Announces-Initiation-Phase-III-Studies>. December 10, 2012. Accessed January 13, 2016.
- ClinicalTrials.gov [Internet]. Bethesda (MD): National Library of Medicine (US). ClinicalTrials.gov website. Comparative bioavailability of dronabinol oral solution versus branded capsule 5 mg under fasting conditions. <https://clinicaltrials.gov/ct2/show/NCT01448772>. Updated January 31, 2016. Accessed February 1, 2016.
- Cortellis database. Thomas Reuters Cortellis website. <https://cortellis.thomsonreuterslifesciences.com>.
- Curry MP, O'Leary JG, Bzowej N, et al. Sofosbuvir and velpatasvir in HCV patients with decompensated cirrhosis. *N Engl J Med* 2015;373:2618–2628.
- Feld JJ, Jacobson IM, Hezode C, et al. Sofosbuvir and velpatasvir for HCV genotype 1, 2, 4, 5, and 6 infection. *N Engl J Med* 2015;373:2599–2607.
- Fischer K, Fink AM, Bishop H, et al. 496 results of the safety run-in phase of CLL14 (BO25323): a prospective, open-label multicenter randomized phase III trial to compare the efficacy and safety of obinutuzumab and venetoclax (GDC-0199/ABT-199) with obinutuzumab and chlorambucil in patients with previously untreated CLL and coexisting medical conditions [abstract]. American Society of Hematology website. <https://ash.confex.com/ash/2015/webprogram/Paper80082.html>. December 7, 2016. Accessed January 14, 2016.
- Foster GR, Afdhal N, Roberts SK, et al. Sofosbuvir and velpatasvir for HCV genotype 2 and 3 infection. *N Engl J Med* 2015; 373:2608-2617.
- Insys Therapeutics News Release. Insys Therapeutics website. Insys Therapeutics submits NDA for its new oral formulation of dronabinol. <http://investors.insysrx.com/phoenix.zhtml?c=115949&p=iroi-newsArticle&ID=2033846>. August 12, 2014. Accessed January 12, 2016.
- Insys Therapeutics News Release. Insys Therapeutics website. Insys Therapeutics updates timing of NDA for dronabinol oral solution. <http://investors.insysrx.com/phoenix.zhtml?c=115949&p=iroi-newsArticle&ID=2033849>. July 8, 2014. Accessed January 12, 2016.
- KemPharm News Release. KemPharm website. KemPharm, Inc. Announces Positive Data From Intranasal Human Abuse Liability Study of KP201/APAP; Reports Q2 2015 Results. <http://investors.kempharm.com/phoenix.zhtml?c=253970&p=iroi-newsArticle&cat=news&id=2079573>. August 13, 2015. Accessed January 23, 2016.
- KemPharm News Release. KemPharm website. KemPharm, Inc. Completes human abuse liability program for KP201/APAP. <http://investors.kempharm.com/phoenix.zhtml?c=253970&p=iroi-newsArticle&cat=news&id=2099179>. October 21, 2015. Accessed January 23, 2016.
- Khera M, Dobs AS, Wang C, et al. Dose titration and safety of oral testosterone in hypogonadal men: results from the SOAR study [abstract]. Sexual Medicine Society of North America website. [http://smsna.org/V1/index.php?option=com\\_content&view=article&id=265&abstract\\_id=136](http://smsna.org/V1/index.php?option=com_content&view=article&id=265&abstract_id=136). Accessed January 12, 2016.
- Kosiborod M, Rasmussen HS, Lavin P, et al. Effect of sodium zirconium cyclosilicate on potassium lowering for 28 days among outpatients with hyperkalemia. *JAMA* 2014;312(21):2223-2233.
- Kosiborod M. Sodium zirconium cyclosilicate for urgent therapy of severe hyperkalemia [editorial]. *N Engl J Med* 2015;372:1577-1578.
- Lipocine Press Release. Lipocine website. Lipocine announces positive top-line results in its phase 3 study of LPCN 1021 for oral testosterone replacement therapy. <http://ir.lipocine.com/releasedetail.cfm?ReleaseID=872351>. September 24, 2014. Accessed January 12, 2016.
- Lipocine Press Release. Lipocine website. Lipocine's oral testosterone well tolerated in phase 3 study. <http://ir.lipocine.com/releasedetail.cfm?ReleaseID=919919>. July 29, 2015. Accessed January 12, 2016.
- Mills R, Friedman JH, Ondo W, Pahwa R, Black K, Chi-Burris K, Williams H. Efficacy and tolerability of pimavanserin in PD psychosis: analysis of an integrated phase 3 placebo-controlled dataset [abstract]. <http://www.mdsabstracts.com/abstract.asp?MeetingID=802&id=112702&meeting=MDS062015>. June 14–18, 2015. Accessed January 12, 2016.
- National Multiple Sclerosis Society. National Multiple Sclerosis Society website. Spasticity. <http://www.nationalmssociety.org/Symptoms-Diagnosis/MS-Symptoms/Spasticity>. Accessed January 13, 2016.
- Packham DK, Rasmussen HS, Lavin PT, et al. Sodium zirconium cyclosilicate in hyperkalemia. *N Engl J Med* 2015;372:222-231.
- R&D Insight database. Adis Insight website. <http://bi.adisinsight.com/>.
- Rosenstock J, Germe M, Wang E, et al. Expanding the Basal-Plus Regimen: Basal Insulin + Lixisenatide is More Likely to Achieve the Composite Outcome of Hba1c <7%, No Documented Symptomatic Hypoglycemia and No Weight Gain Compared with Basal + Prandial Insulin [abstract]. American Diabetes Association. <http://www.abstractsonline.com/Plan/ViewAbstract.aspx?sKey=e68ac573-fe45-4c2f-9485-6270854fc10b&cKey=9f20e66d-b96d-4521-9299-a646ef33c04d&mKey={89918D6D-3018-4EA9-9D4F-711F98A7AE5D}>. 73rd Scientific Sessions. June 21–25, 2013. Accessed January 23, 2016.

Sanofi Press Release. Sanofi website. Lyxumia (lixisenatide) one-step regimen as effective as two-step regimen in improving glycemic control in type 2 diabetes. [http://en.sanofi.com/press/\\_medias/20110912\\_EASD-Lyxumia\\_en.pdf](http://en.sanofi.com/press/_medias/20110912_EASD-Lyxumia_en.pdf). September 12, 2011. Accessed January 23, 2016.

Sanofi Press Release. Sanofi website. Lyxumia (lixisenatide) in combination with basal insulin plus oral anti-diabetics significantly improved glycemic control. [http://en.sanofi.com/Images/31166\\_20121002\\_LYXUMIAEASD\\_en.pdf](http://en.sanofi.com/Images/31166_20121002_LYXUMIAEASD_en.pdf). October 2, 2012. Accessed November 30, 2015.

Sanofi Press Release. Sanofi website. Lyxumia (lixisenatide) in combination with basal insulin plus oral anti-diabetics significantly reduced HbA1c and post-prandial glucose. [http://en.sanofi.com/Images/30524\\_20120609\\_LYXUMIA\\_en.pdf](http://en.sanofi.com/Images/30524_20120609_LYXUMIA_en.pdf). June 9, 2012. Accessed November 30, 2015.

Sanofi Press Release. Sanofi website. Once daily lixisenatide (AVE0010) given as monotherapy successfully meets phase III study endpoints in diabetes. [http://en.sanofi.com/Images/13734\\_20100415\\_AVE010\\_en.pdf](http://en.sanofi.com/Images/13734_20100415_AVE010_en.pdf). April 15, 2010. Accessed January 23, 2016.

Sanofi Press Release. Sanofi website. Sanofi announces that first LixiLan phase III study met primary endpoint. <http://hugin.info/152918/R/1941461/701757.pdf>. July 29, 2015. Accessed January 23, 2016.

Sanofi Press Release. Sanofi website. Sanofi GetGoal program on Lyxumia, as an add-on to basal insulin, shows significant positive phase III results. [http://en.sanofi.com/Images/26678\\_20110531\\_LYXUMIA\\_en.pdf](http://en.sanofi.com/Images/26678_20110531_LYXUMIA_en.pdf). May 31, 2011. Accessed January 23, 2016.

Sanofi Press Release. Sanofi website. Sanofi reports positive results for once-daily Lyxumia (lixisenatide) in combination with Lantus (insulin glargine) in type 2 diabetes. [http://en.sanofi.com/Images/29252\\_20111206\\_GETGOAL-DUO\\_en.pdf](http://en.sanofi.com/Images/29252_20111206_GETGOAL-DUO_en.pdf). December 6, 2011. Accessed November 30, 2011.

Sanofi Press Release. Sanofi website. Sanofi reports positive top-line results in second pivotal LixiLan phase III study. <http://hugin.info/152918/R/1951405/709619.pdf>. September 14, 2015. Accessed January 23, 2016.

Stilgenbauer S, Eichhorst BF, Schetelig J, et al. LBA-6 venetoclax (ABT-199/GDC-0199) monotherapy induces deep remissions, including complete remission and undetectable MRD, in ultra-high risk relapsed/refractory chronic lymphocytic leukemia with 17p deletion: results of the pivotal international phase 2 study [abstract]. American Society of Hematology website. <https://ash.confex.com/ash/2015/webprogram/Paper87302.html>. December 8, 2015. Accessed January 14, 2016.

United States Securities and Exchange Commission. Form S-1: KemPharm, Inc. [http://www.sec.gov/Archives/edgar/data/1434647/000119312515087360/d793437ds1.htm#toc793437\\_10](http://www.sec.gov/Archives/edgar/data/1434647/000119312515087360/d793437ds1.htm#toc793437_10). March 11, 2015. Accessed January 23, 2016.

Ward JW, Mermin JH. Simple, effective, but out of reach? Public health implications of HCV drugs [editorial]. *N Engl J Med* 2015;373(27):2678–2680.

Zealand Pharma News Release. Zealand Pharma website. Positive top-line phase III data in type 2 diabetes achieved for lixisenatide once-daily vs. exenatide twice-daily. <https://newsclient.omxgroup.com/cdsPublic/viewDisclosure.action?disclosureId=436271&lang=en>. February 2, 2011. Accessed January 23, 2016.

Zealand Pharma News Release. Zealand Pharma website. Zealand Pharma announces further positive results presented by Sanofi from GetGoal phase III program for lixisenatide (Lyxumia) in type 2 diabetes. <https://newsclient.omxgroup.com/cdsPublic/viewDisclosure.action?disclosureId=481544&lang=en>. December 8, 2011. Accessed January 23, 2016.



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