College of Pharmacy and Pharmaceutical Sciences
WASHINGTON STATE UNIVERSITY

Drug Information Center

Highlights of FDA Activities – 11/1/18 – 11/30/18

FDA Drug Safety Communications & Drug Information Updates:

Avoid Use of Genetic Tests with Unapproved Claims to Predict Response to Specific Medications 11/1/18
The FDA has become aware of genetic tests with claims to predict how a person will respond to specific medications in cases where the relationship between genetic (DNA) variations and the medication's effects has not been determined. There are a limited number of cases for which at least some evidence does exist to support a correlation between a genetic variant and drug levels within the body, and this is described in the labeling of FDA cleared or approved genetic tests and FDA approved medications.

EpiPen Auto-injectors May Not Readily Slide Out of Carrier Tube 11/2/18
FDA alerted patients, caregivers and health care professionals that the labels attached to some EpiPen 0.3 mg and EpiPen Jr 0.15 mg auto-injectors, and the authorized generic versions, may prevent easy access to the auto-injector. The label sticker on the auto-injector unit may have been improperly applied, causing resistance when removing it from the carrier tube. The carrier tube is the immediate package in which the auto-injector is contained. In some cases, the patient or caregiver may not be able to quickly remove the epinephrine auto-injector from the carrier tube. Pharmacists should inspect the device before dispensing to ensure quick access to the auto-injector; product that does not easily slide out of the carrier tube should not be dispensed.

Caution in Selection of Pain Medications for Intrathecal Administration via Implanted Pumps 11/14/18
Due to risk associated with intrathecal administration via implanted pump of medicines not approved for this use, the FDA issued several recommendations when considering a medicine for use in an implanted pump including reviewing the labeling to identify medicines and medicine concentrations approved for use in the specific pump. They also advise being aware of medicines that are NOT approved for intrathecal administration from an implanted pump such as hydromorphone, bupivacaine, fentanyl, and clonidine, mixtures of two or more medicines, or any compounded medicine. Additional recommendations can be found on the MedWatch site.

Warning Against Use of Sterile Drug Products from Pharm D Solutions 11/19/18
The FDA alerted health care professionals and patients not to use drug products intended to be sterile that are produced and distributed by Pharm D Solutions LLC, Houston, Texas, due to lack of sterility assurance.

Severe Worsening of Multiple Sclerosis After Stopping Fingolimod (Gilenya) 11/20/18
FDA warned that when the multiple sclerosis medicine fingolimod (Gilenya) is stopped, the disease can become much worse than before the medicine was started or while it was being taken. Disease "worsening" is rare but can result in permanent disability. Patients should be advised of the potential risk before initiating therapy, and closely monitored if therapy is discontinued.

FDA Update on Angiotensin II Receptor Blocker (ARB) Recalls 11/27/18
The FDA continues to update its information page on recalls of ARB and ARB-combination products due to the presence of N-nitrosodiethylamine (NDEA) and N-nitrosodimethylamine (NDMA), possible carcinogens. Complete lists of recalled products, products not under recall, and additional information on NDEA and NDMA can be found on the FDA site.

Risk of Stroke and Blood Vessel Wall Tears with Alemtuzumab (Lemtrada) 11/29/18
The FDA warned that rare but serious cases of stroke and tears in the lining of arteries in the head and neck have occurred in patients with multiple sclerosis shortly after they received alemtuzumab (Lemtrada). A new warning about these risks has been added to the prescribing information in the drug label and to the patient Medication Guide. The risk of stroke was also added to the existing Boxed Warning. Most reported cases occurred within 1 day of receiving alemtuzumab.

Recognition of Symptoms of Differentiation Syndrome with Enasidenib (Idhifa) 11/29/18
The FDA warned that signs and symptoms of a life-threatening side effect called differentiation syndrome are not being recognized in patients receiving the acute myeloid leukemia medicine enasidenib (Idhifa). The prescribing information and patient Medication Guide already contain a warning about differentiation syndrome; however, the FDA is aware of cases of differentiation syndrome not being recognized and patients not receiving the necessary treatment. Symptoms include fever, cough, shortness of breath, edema, bone pain, and dizziness; a diagnosis of differentiation syndrome should be considered in enasidenib-treated patients experiencing unexplained respiratory distress or other symptoms.

Major Medication/Drug-Related Product Recalls Announced Through MedWatch:

CoaguChek XS PT Test Strips by Roche Diagnostics: Inaccurate INR Test Results 11/1/18
Roche re-calibrated the CoaguChek XS PT Test Strips in January 2018 to correspond to a newly released INR International Standard. Since this re-calibration, Roche Diagnostics has received reports of patients experiencing abnormally high or inaccurate INR test results when testing with the affected CoaguChek XS PT Test Strips.

Ortho-Novum 1/35 and Ortho-Novum 7/7/7 by Janssen: Incorrect Veridate Dispenser Instructions 11/5/18
Janssen Pharmaceuticals, Inc. recalled one lot of Ortho-Novum 1/35 (norethindrone/ethinyl estradiol) Tablets (lot 18BM114) and two lots of Ortho-Novum 7/7/7 (norethindrone/ethinyl estradiol) Tablets (lots 18CM120 and 18BM110) to the pharmacy level. The patient information provided inside the affected packages does not include the appropriate instructions for the dispenser.

Puriton Eye Relief Drops by Kadesh Inc.: Non-Sterile Production Conditions 11/7/18
Kadesh, Inc. of Garden Grove, CA recalled all lots of Puriton Eye Relief Drops, 0.5 oz. (15 ml) bottle, UPC 7 36972 1679 0, to the consumer level. During a recent FDA inspection, investigators observed that ophthalmic drugs were manufactured without necessary production controls and conditions to assure sterility.

Losartan Potassium and Hydrochlorothiazide by Sandoz Inc.: Impurity 11/8/18
Sandoz Inc. recalled one lot of losartan potassium and hydrochlorothiazide tablets, USP 100 mg/25 mg (1000-count plastic bottles, NDC 0781-5207-10, Lot number JB8912; Exp. Date 06/2020) to the consumer level following identification of trace amount of NDEA impurity in the Losartan, USP ingredient manufactured by Zhejiang Huahai Pharmaceutical Co. Ltd. The affected product was distributed nationwide after October 8, 2018.

Valsartan Tablets, USP, Amlodipine and Valsartan Tablets, USP, and Valsartan and Hydrochlorothiazide Tablets, USP, by Mylan: Impurity 11/20/18
Mylan Pharmaceuticals recalled to the consumer level select lots of valsartan-containing products, including six lots of amlodipine and valsartan tablets, USP (including the 5 mg/160 mg, 10 mg/160 mg, and 10 mg/320 mg strengths), seven lots of valsartan tablets, USP (including 40 mg, 80 mg, 160 mg, and 320 mg strengths), and two lots of valsartan and hydrochlorothiazide tablets, USP 320 mg/25 mg strength. These products were recalled due to detected trace amounts of NDEA impurity in the valsartan, USP, ingredient manufactured by Mylan Laboratories Limited.

Sodium Chloride Injection, USP, 0.9% by Fresenius Kabi: Mislabeled Latex Content 11/20/18
Fresenius Kabi USA recalled 163 lots of sodium chloride injection, USP, 0.9%, 10 mL fill in a 10 mL vial and 20 mL fill in a 20 mL vial to the user level. The product insert states that stoppers for both the 10 mL and the 20 mL vials do not contain natural rubber latex; the tray label for the two vial sizes and the vial label for the 20 mL vial also state that the stoppers do not contain latex. The product is being recalled because the stoppers contain natural rubber latex.

ThermaCare® HeatWraps by Pfizer: Recall – Skin Injuries 11/26/18

Pfizer recalled six lots of ThermaCare® HeatWraps to the consumer level due to reports of leaking ingredients that may cause skin injuries. The recalled products are Muscle Pain Therapy 8HR (lots S68516 and T26686), Menstrual Pain Therapy 8HR (lots T26691 and T26693), and Joint/Muscle Pain Therapy 8HR (lots 8054HA and 8054HB).

Amlodipine/Valsartan Combination Tablets and Amlodipine/Valsartan/Hydrochlorothiazide Combination Tablets by Teva Pharmaceuticals USA: Impurity 11/27/18

Teva Pharmaceuticals recalled to the patient level all lots of amlodipine and valsartan combination tablets and amlodipine / valsartan / hydrochlorothiazide combination tablets following detection of NDEA impurity in the valsartan ingredient manufactured by Mylan India.

Dietary Supplement Recalls & Public Notifications

Notifications were issued regarding undeclared active ingredients or contaminants in the following products. Patients are advised not to purchase or use these products.

Product	***Promoted Use***	***Undeclared Ingredient(s) or Contaminants***
America Treasure	Sexual enhancement	Sildenafil[1]
Kratom	Pain, opioid withdrawal	Lead, nickel
MOB Candy	Sexual enhancement	Sildenafil and tadalafil[1]
Pink Granada	Weight loss	Sibutramine[2], phenolphthalein[3]
Rhino sexual enhancement products	Sexual enhancement	Sildenafil and tadalafil[1]
Tianaa Red, Tianaa White, Tianaa Green	Opioid use disorder, pain, anxiety	Tianeptine[4]
Vicaine	Opioid use disorder, pain, anxiety	Tianeptine[4]
Willy Go Wild	Sexual enhancement	Sildenafil and tadalafil[1]

[1]Sildenafil and tadalafil may interact with nitrates to lower blood pressure to dangerous levels

[2]Sibutramine has been associated with increased cardiovascular events; discontinued in 2010[FDA]

[3]Phenolphthalein identified as cancer-causing; discontinued in 1999

[4]Tianeptine is listed on the label; however dietary supplements containing tianeptine are considered adulterated because tianeptine is an unsafe food additive and should not be present in dietary supplements; tianeptine has not been FDA approved for any use. It has been associated with neurologic, cardiovascular, and gastrointestinal adverse effects.

New Product Shortages

No new product shortages were announced in November

Product Discontinuations/Withdrawals	***Date Posted***
Moexipril HCl and hydrochlorothiazide tablets (Teva): remain available from other manufacturers	11/6/18
Pramipexole dihydrochloride tablets (Mirapex, Boehringer Ingelheim Pharmaceuticals): generics remain available	11/6/18

New Drug Approvals:	***Description (See Attached Drug Summaries)***	***Date Approved***
Pegfilgrastim-cbqv / Udenyca / Coherus BioSciences, Inc.	Biosimilar to Neulasta (pegfilgrastim)	11/2/18
Lorlatinib / Lorbrena / Pfizer Inc.	A kinase inhibitor indicated for the treatment of patients with anaplastic lymphoma kinase (ALK)-positive metastatic non-small cell lung cancer (NSCLC) whose disease has progressed on other select therapies	11/2/18
Revefenacin / Yupelri / Mylan	Nebulized anticholinergic bronchodilator approved for the maintenance treatment of patients with chronic obstructive pulmonary disease	11/9/18
Rifamycin / Aemcolo / Aries Pharmaceuticals, Inc.	Approved for the treatment of adult patients with travelers' diarrhea caused by noninvasive strains of *Escherichia coli*, not complicated by fever or blood in the stool	11/16/18
Emapalumab / Gamifant / Novimmune SA	Approved for the treatment of pediatric (newborn and above) and adult patients with primary hemophagocytic lymphohistiocytosis (HLH) who have refractory, recurrent or progressive disease or intolerance with conventional HLH therapy	11/20/18
Glasdegib / Daurismo / Pfizer, Inc.	Approved for use in combination with low-dose cytarabine for the treatment of newly-diagnosed acute myeloid leukemia in adults who are 75 years of age or older or who have comorbidities that may preclude the use of intensive chemotherapy	11/21/18
Larotrectinib / Vitrakvi / Loxo Oncology	Approved for the treatment of adult and pediatric patients whose cancers have a neurotrophic receptor tyrosine kinase (NTRK) gene fusion	11/26/18
Rituximab-abbs / Truxima / Celltrion Inc	Biosimilar to Rituxan (rituximab); indicated only for the treatment of non-Hodgkin's lymphoma	11/28/18
Gilteritinib / Xospata / Astellas Pharma	Approved for the treatment of adult patients with relapsed or refractory acute myeloid leukemia with a FLT3 mutation	11/28/18
Amifampridine / Firdapse / Catalyst Pharmaceuticals Inc.	Approved for the treatment of Lambert-Eaton myasthenic syndrome in adults	11/28/18

New Indications:	***Description***	***Date Approved***
Elotuzumab / Empliciti / Bristol-Myers Squibb	In combination with pomalidomide and dexamethasone for the treatment of adult multiple myeloma patients who have received at least two prior lines of therapies	11/6/18
Sweet vernal orchard, perennial rye, Timothy, and Kentucky blue grass mixed pollens allergen extract / Oralair / Stallergenes Greer	Indication expanded to include treatment of grass pollen-induced allergic rhinitis in pediatric patients aged 5 to 9 years	11/14/18
Brentuximab / Adcetris / Seattle Genetics	In combination with chemotherapy for adult patients with previously untreated systemic anaplastic large cell lymphoma or other CD30-expressing peripheral T-cell lymphomas	11/16/18
Eltrombopag / Promacta / Novartis	In combination with standard immunosuppressive therapy for the first-line treatment of adult and pediatric patients 2 years and older with severe aplastic anemia	11/16/18

New Indications: (continued…)	***Description***	***Date Approved***
Venetoclax / Venclexta / Abbvie	As part of a regimen for the treatment of newly diagnosed acute myeloid leukemia in adults 75 years and older, or who have comorbidities that preclude use of intensive induction chemotherapy	11/21/18
Tacrolimus / Astagraf XL / Astellas	Indication in renal transplant expanded to include use in pediatric patients 4 years of age and older who can swallow capsules intact.	11/29/18

New Dosage Forms or Formulation:	***Description***	***Date Approved***
Clobazam oral film / Sympazan / Aquestive Therapeutics	Oral film formulation of clobazam for the adjunctive treatment of seizures associated with Lennox-Gastaut syndrome in patients 2 years of age and older	11/1/18
Sufentanil / Dsuvia / AcelRx Pharmaceuticals Inc.	Sublingual tablet indicated for use in adults in a certified medically supervised healthcare setting, such as hospitals, surgical centers, and emergency departments, for the management of acute pain severe enough to require an opioid analgesic and for which alternative treatments are inadequate	11/2/18
Halobetasol propionate / Bryhali / Dow	0.01% lotion for the treatment of psoriasis	11/6/18
Epinephrine / Primatene Mist / Armstrong Pharmaceuticals	Epinephrine HFA inhaler approved for over-the-counter availability for temporary relief of mild symptoms of intermittent asthma	11/7/18
Lamivudine; tenofovir disoproxil fumarate / Temixys / Celltrion	Combination tablet for use in combination with other antiretroviral agents for the treatment of HIV-1 infection in adults and children weighing at least 35 kg	11/16/18
Indocyanine green / Spy Agent Green / Novadaq	Indocyanine formulation for intravenous administration for use with a fluorescence imagine device for visualization of vessels, blood flow and tissue perfusion before, during and after surgical procedures, and for visualization of extrahepatic biliary ducts, lymph nodes, and lymphatic vessels	11/21/18
Tocilizumab / Actemra / Genentech	ACTPen autoinjector for subcutaneous administration	11/26/18

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Lorlatinib / Lorbrena / Pfizer Labs	
Generic Name / Brand Name / Company	Lorlatinib / Lorbrena / Pfizer Labs
Date of approval	11/2/18
Drug Class (Mechanism of Action if novel agent)	Kinase Inhibitor
Indication	Anaplastic lymphoma kinase (ALK) positive metastatic non-small cell lung cancer (NSCLC) that has progressed on: - crizotinib and at least one other ALK inhibitor for metastatic disease; or - alectinib as the first ALK inhibitor therapy for metastatic disease; or - ceritinib as the first ALK inhibitor therapy for metastatic disease.
Comparative agent – Therapeutic interchange?	None
Dosage forms/strengths. Common Dose/sig	Tablets: 25 mg & 100 mg Dose: 100 mg orally once daily
DEA Schedule	Not applicable
Date of market availability	Available
Similar Medication Names	Loratadine
Clinical Use Evaluation	
Common Adverse Effects (>20%):	>20%: edema, peripheral neuropathy, cognitive effects, dyspnea, fatigue, weight gain, arthralgia, mood effects, and diarrhea
Severe Adverse Effects	Pneumonia, dyspnea, pyrexia, respiratory failure, acute pulmonary edema, myocardial infarction, embolism, peripheral artery occlusion, cognitive effects, and mood effects
Severe Drug-Drug Interactions	Strong CYP3A4 inducers: contraindicated; moderate CYP3A4 inducers: avoid, if not avoidable, monitor AST, ALT, and bilirubin; strong CYP3A4 inhibitors: avoid, reduce lorlatinib dose if not avoidable; narrow therapeutic index CYP3A substrates: avoid
Severe Drug-Food Interactions	Grapefruit or grapefruit juice
Important Labs Values to assess prior to order entry or at point of clinical follow up.	Cholesterol and triglycerides
Used in Pediatric Areas	Safety and efficacy in pediatric patients not established
Renal or Hepatic Dosing	No dose adjustment needed in mild hepatic impairment or mild or moderate renal impairment; dose not established in moderate or severe hepatic impairment or severe renal impairment
Critical Issues (i.e., contraindications, warnings, etc) that should be emphasized	Risk of serious hepatotoxicity with concomitant use of strong CYP3A4 inducers; use is contraindicated. Central nervous system effects such as hallucinations, seizures, changes in cognitive function and mood (suicidal ideation). Hyperlipidemia: 80% of patients required lipid-lowering medication. Atrioventricular Block: monitor ECG Interstitial Lung Disease/Pneumonitis. Embryo-fetal toxicity.
Special administration technique or considerations	Administered with or without food, at the same time each day. Do not chew, crush, or split tablets. Dose reduction for adverse reactions: First dose reduction: 75 mg orally once daily Second dose reduction: 50 mg orally once daily Permanently discontinue if unable to tolerate 50 mg once daily.
Prepared by	Sean Long, PharmD. Candidate – Class of 2019
Source	Lorbrena (lorlatinib) [package insert]. New York, NY: Pfizer Labs; 2018

Revefenacin / Yupelri / Mylan	
Generic Name / Brand Name / Company	Revefenacin / Yupelri / Mylan
Date of approval	11/9/18
Drug Class (Mechanism of Action if novel agent)	Long acting muscarinic agonist
Indication	Maintenance treatment of chronic obstructive pulmonary disease
Comparative agent – Therapeutic interchange?	Ipratropium, glycopyrrolate
Dosage forms/strengths. Common Dose/sig	Inhalation solution: 175 mcg/3 mL unit dose vial Dose: one 175 mcg vial (3 mL) once daily via standard jet nebulizer
DEA Schedule	Not applicable
Date of market availability	Before the end of 2018
Similar Medication Names	Darifenacin
Clinical Use Evaluation	
Common Adverse Effects	>2%: cough, nasopharyngitis, upper respiratory tract infection, headache, and back pain.
Severe Adverse Effects	Bronchospasm, hypersensitivity reactions, narrow-angle glaucoma
Severe Drug-Drug Interactions	Anticholinergics: additive effects; avoid coadministration with other anticholinergic-containing drugs. OATP1B1 & OATP1B3 inhibitors (e.g. rifampicin, cyclosporine, etc.) may increase exposure to active metabolite; coadministration not recommended
Severe Drug-Food Interactions	None known
Important Labs Values to assess prior to order entry or at point of clinical follow up.	None
Used in Pediatric Areas	Not intended for use in children
Renal or Hepatic Dosing	Not recommended in patients with any degree of hepatic impairment. No dosage adjustment necessary in patients with renal impairment.
Critical Issues (i.e., contraindications, warnings, etc) that should be emphasized	Contraindicated: hypersensitivity to revefenacin or any ingredients Use alternative treatments if hypersensitivity or paradoxical bronchospasm occurs Monitor for worsening of narrow-angle glaucoma or urinary retention. Avoid concomitant use with other anticholinergic-containing medications.
Special administration technique or considerations	Orally inhaled via jet nebulizer with mouthpiece Foil pouches should only be opened immediately before use. Treatment should take about 8 minutes.
Prepared by	Sean Long, PharmD. Candidate – Class of 2019
Source	Yupelri (revefenacin) [package insert]. Morgantown, WV: Mylan Specialty L.P.; 2018.

Rifamycin / Aemcolo / Aries Pharmaceuticals, Inc.	
Generic Name / Brand Name / Company	Rifamycin / Aemcolo / Aries Pharmaceuticals, Inc.
Date of approval	11/16/18
Drug Class (Mechanism of Action if novel agent)	Rifamycin belongs to the ansamycin class of antibacterial drugs and acts by inhibiting the beta-subunit of the bacterial DNA-dependent RNA polymerase, blocking one of the steps in DNA transcription. This results in inhibition of bacterial synthesis and consequently growth of bacteria.
Indication	Treatment of travelers' diarrhea caused by noninvasive strains of *Escherichia coli* in adults.
Comparative agent – Therapeutic interchange?	• Aztreonam – No therapeutic interchange • Norfloxacin – No therapeutic interchange • Ofloxacin – No therapeutic interchange • Azithromycin – No therapeutic interchange • Rifaximin – No therapeutic interchange
Dosage forms/strengths. Common Dose/sig	Delayed Release Tablets: 194 mg Dose: two 194 mg tablets orally twice daily for 3 days
DEA Schedule	Not applicable
Date of market availability	1st quarter 2019
Similar Medication Names	Rifampicin, rifaximin
Clinical Use Evaluation	
Common Adverse Effects (Incidence > 2%)	>2%: headache, constipation
Severe Adverse Effects	None known
Severe Drug-Drug Interactions	None known
Severe Drug-Food Interactions	None known
Important Labs Values to assess prior to order entry or at point of clinical follow up.	None
Used in Pediatric Areas	Safety and efficacy not established in pediatric patients
Renal or Hepatic Dosing	Not studied; dose adjustments not necessary
Critical Issues (i.e., contraindications, warnings, etc) that should be emphasized	• Contraindicated in patients with a known hypersensitivity to rifamycin, any of the other rifamycin class antimicrobial agents (e.g. rifaximin), or any of the product ingredients • Rifamycin was not shown to be effective in patients with diarrhea complicated by fever and/or bloody stool or diarrhea due to pathogens other than noninvasive strains of *E. coli* and is not recommended for use in such patients. Discontinue use if diarrhea gets worse or persists more than 48 hours and consider alternative antibacterial therapy. • Evaluate if diarrhea occurs after therapy or does not improve or worsens during therapy.
Special administration technique or considerations	• Taken morning and evening with full glass of liquid (6-8 ounces) • Can be taken with or without food • Do NOT take concomitantly with alcohol • Do NOT crush, break, or chew the tablets
Prepared by	Sean Long, PharmD. Candidate – Class of 2019
Source	Aemcolo (rifamycin) [package insert]. Dublin, Ireland: Cosmo Technologies; 2018.

Emapalumab-lzsg / Gamifant / Novimmune SA	
Generic Name / Brand Name / Company	Emapalumab-lzsg / Gamifant / Novimmune SA
Date of approval	11/20/18
Drug Class (Mechanism of Action if novel agent)	Monoclonal antibody that binds and neutralizes interferon gamma (IFNγ)
Indication	Treatment of adult and pediatric (newborn and older) patients with primary hemophagocytic lymphohistiocytosis (HLH) with refractory, recurrent or progressive disease or intolerance with conventional HLH therapy
Comparative agent – Therapeutic interchange?	None
Dosage forms/strengths. Common Dose/sig	Injection: 10 mg/2 mL (5 mg/mL) or 50 mg/10 mL (5 mg/mL) solution in a single-dose vial Recommended starting dosage: 1 mg/kg as an IV infusion over 1 hour twice per week.
DEA Schedule	Not applicable
Date of market availability	1st quarter 2019
Similar Medication Names	
Clinical Use Evaluation	
Common Adverse Effects	Infection (56%), hypertension (41%), infusion related reactions (27%), pyrexia (24%), hypokalemia (15%), constipation (15%)
Severe Adverse Effects	Most common serious adverse reactions (≥ 3%) included infections, gastrointestinal hemorrhage, and multiple organ dysfunction. Fatal adverse reactions occurred in two (6%) of patients and included septic shock and gastrointestinal hemorrhage.
Severe Drug-Drug Interactions	Emapalumab may normalize CYP450 activities which may reduce the efficacy of drugs that are CYP450 substrates due to increased metabolism Avoid live vaccines
Severe Drug-Food Interactions	None known
Important Labs Values to assess prior to order entry or at point of clinical follow up.	Efficacy: monitor platelets, neutrophil count, ferritin, D-dimer, fibrinogen Safety: monitor for tuberculosis, adenovirus, Epstein-Barr virus, and cytomegalovirus infection every 2 weeks and as clinically indicated
Used in Pediatric Areas	Newborn and older
Renal or Hepatic Dosing	No dosage adjustments recommended
Critical Issues (i.e., contraindications, warnings, etc) that should be emphasized	Warnings: Monitor for infection, test for latent tuberculosis prior to initiation Monitor for infusion-related reactions
Special administration technique or considerations	Administer prophylaxis for herpes zoster, Pneumocystis jirovecii, and for fungal infections prior to emapalumab administration. Administer dexamethasone: in patients who are not receiving baseline dexamethasone treatment, begin dexamethasone at a daily dose of at least 5 to 10 mg/m^2 the day before emapalumab treatment begins. For patients who were receiving baseline dexamethasone, they may continue their regular dose provided the dose is at least 5 mg/m^2.
Prepared by	Franklin Rodriguez, PharmD. Candidate – Class of 2019
Source	Gamifant (emapalumab-lzsg)[package insert]. Geneva, Switzerland: Novimmune SA; Revised November. 2018.

Glasdegib / Daurismo / Pfizer	
Generic Name / Brand Name / Company	Glasdegib / Daurismo / Pfizer
Date of approval	11/21/18
Drug Class (Mechanism of Action if novel agent)	Hedgehog pathway inhibitor
Indication	Indicated, in combination with low-dose cytarabine, for the treatment of newly-diagnosed acute myeloid leukemia (AML) in adult patients who are ≥75 years old or who have comorbidities that preclude use of intensive induction chemotherapy.
Comparative agent – Therapeutic interchange?	Venetoclax
Dosage forms/strengths. Common Dose/sig	Tablets: 25 mg and 100 mg Dose: 100 mg orally once daily
DEA Schedule	Not applicable
Date of market availability	Available
Similar Medication Names	Daunorubicin
Clinical Use Evaluation	
Common Adverse Effects	≥20% with glasdegib and low-dose cytarabine: anemia, fatigue, hemorrhage, febrile neutropenia, musculoskeletal pain, nausea, edema, thrombocytopenia, dyspnea, deceased appetite, dysgeusia, mucositis, constipation, rash
Severe Adverse Effects	The most common (≥5%) serious adverse reactions in patients receiving glasdegib with low-dose cytarabine were febrile neutropenia (29%), pneumonia (23%), hemorrhage (12%), anemia (7%), and sepsis (7%).
Severe Drug-Drug Interactions	QTc prolonging drugs: avoid if possible, monitor if unavoidable Strong CYP3A inhibitors: avoid co-administration, monitor if unavoidable Strong CYP3A inducers: avoid co-administration
Severe Drug-Food Interactions	Avoid grapefruit or grapefruit juice
Important Labs Values to assess prior to order entry or at point of clinical follow up.	Pregnancy testing prior to initiation; assess complete blood counts, electrolytes, renal, and hepatic function prior to initiation and at least once weekly for the first month; monitor electrolytes and renal function monthly for the duration of therapy; assess serum creatine kinase prior to initiation and as clinically indicated thereafter
Used in Pediatric Areas	Safety and effectiveness have not been established in pediatric patients
Renal or Hepatic Dosing	Not studied in severe renal impairment or moderate-to-severe hepatic impairment. No recommendations for dosage adjustments.
Critical Issues (i.e., contraindications, warnings, etc) that should be emphasized	Warnings: Embryo-fetal toxicity QTc Interval Prolongation, monitor ECG
Special administration technique or considerations	To be used combination with cytarabine 20 mg subcutaneously twice daily on days 1 to 10 of each 28-day cycle Administer with or without food at the same time each day Do not split or crush tablets
Prepared by	Franklin Rodriguez, PharmD. Candidate – Class of 2019
Source	Daurismo (glasdegib) [package insert]. New York, NY: Pfizer; November 2018.

Larotrectinib / Vitrakvi / Loxo Oncology	
Generic Name / Brand Name / Company	Larotrectinib / Vitrakvi / Loxo Oncology
Date of approval	11/26/18
Drug Class (Mechanism of Action if novel agent)	Tropomyosin receptor kinase (TRK) inhibitor
Indication	Indicated for the treatment of adult and pediatric patients with solid tumors that: • have a neurotrophic receptor tyrosine kinase (NTRK) gene fusion without a known acquired resistance mutation, • are metastatic or where surgical resection is likely to result in severe morbidity, and • have no satisfactory alternative treatments or that have progressed following treatment.
Comparative agent – Therapeutic interchange?	None
Dosage forms/strengths. Common Dose/sig	Capsule: 25 mg & 100 mg Oral Solution: 20 mg/mL Dose: if BSA > 1 m^2 then 100 mg orally twice daily; if BSA < 1 m^2 then 100 mg/m^2 orally twice daily
DEA Schedule	Not applicable
Date of market availability	Available
Similar Medication Names	Victoza, Viekira
Clinical Use Evaluation	
Common Adverse Effects (incidence > 20%)	≥ 20%: fatigue, nausea, dizziness, vomiting, increased AST, cough, increased ALT, constipation, and diarrhea
Severe Adverse Effects	Pyrexia, diarrhea, sepsis, abdominal pain, dehydration, cellulitis, vomiting
Severe Drug-Drug Interactions	Strong CYP3A4 inhibitors: avoid co-administration, if unavoidable decrease larotrectinib dose Strong CYP3A4 inducers: avoid co-administration, if unavoidable increase larotrectinib dose Sensitive CYP3A4 substrates: avoid co-administration
Severe Drug-Food Interactions	Avoid grapefruit or grapefruit juice
Important Labs Values to assess prior to order entry or at point of clinical follow up.	ALT & AST prior to initiation, every 2 weeks during the first month of treatment, and then monthly thereafter and as clinically indicated.
Used in Pediatric Areas	Yes
Renal or Hepatic Dosing	Reduce starting dose in moderate-to-severe hepatic impairment. No dosage adjustment in mild hepatic impairment or any degree of renal impairment.
Critical Issues (i.e., contraindications, warnings, etc) that should be emphasized	• Neurologic adverse reactions occurred in 53% of patients. Do not drive or operate hazardous machinery if experiencing such conditions. • Increased transaminases occurred in 45% of patients. Monitor liver tests as defined above. • Embryo-fetal toxicity
Special administration technique or considerations	• Capsule and oral solution can be used interchangeably • Take with or without food • Swallow capsules whole with water; do not crush or chew • Store the glass bottle of oral solution in the refrigerator. Use the supplied oral syringe to measure and administer the oral solution
Prepared by	Sean Long, PharmD. Candidate – Class of 2019
Source	Vitrakvi (larotrectinib) [package insert]. Stamford, CT: Loxo Oncology; 2018.

Gilteritinib / Xospata / Astellas Pharma US, Inc.	
Generic Name / Brand Name / Company	Gilteritinib / Xospata / Astellas Pharma US, Inc.
Date of approval	11/28/18
Drug Class (Mechanism of Action if novel agent)	Small molecule that inhibits multiple receptor tyrosine kinases, including FMS-like tyrosine kinase 3 (FLT3).
Indication	Indicated for the treatment of adult patients who have relapsed or refractory acute myeloid leukemia (AML) with a FLT3 mutation as detected by an FDA-approved test.
Comparative agent – Therapeutic interchange?	Midostaurin
Dosage forms/strengths. Common Dose/sig	Tablet: 40 mg Dose: 120 mg (3 tablets) orally once daily
DEA Schedule	Not applicable
Date of market availability	Available
Similar Medication Names	Gilotrif, Zostavax
Clinical Use Evaluation	
Common Adverse Effects	≥20%: myalgia/arthralgia, transaminase increase, fatigue/malaise, fever, noninfectious diarrhea, dyspnea, edema, rash, pneumonia, nausea, stomatitis, cough, headache, hypotension, dizziness and vomiting
Severe Adverse Effects	Posterior reversible encephalopathy syndrome (PRES), QT prolongation, pancreatitis
Severe Drug-Drug Interactions	Combined P-gp and strong CYP3A inducer: avoid concomitant use Strong CYP3A inhibitor: consider alternative therapies that are not strong CYP3A inhibitors, monitor if unavoidable Concomitant use of gilteritinib may reduce the effects of drugs that target the 5HT2B receptor or the sigma nonspecific receptor (e.g., escitalopram, fluoxetine, sertraline). Avoid concomitant use of these drugs unless their use is considered essential for the care of the patient
Severe Drug-Food Interactions	None known
Important Labs Values to assess prior to order entry or at point of clinical follow up.	Assess blood counts and blood chemistries, including creatine phosphokinase, prior to initiation, at least weekly for the first month, every other week for the second month, and monthly thereafter.
Used in Pediatric Areas	Safety and effectiveness in pediatric patients have not been established.
Renal or Hepatic Dosing	No adjustments necessary for mild-to-moderate renal or hepatic impairment. The effect of severe hepatic (Child-Pugh Class C) or severe renal impairment (CLCr ≤ 29 mL/min) is unknown.
Critical Issues (i.e., contraindications, warnings, etc) that should be emphasized	Contraindicated in patients with hypersensitivity to gilteritinib or any of the excipients. Anaphylactic reactions have been observed in clinical trials Posterior reversible encephalopathy syndrome (PRES) with symptoms including seizure and altered mental status QT prolongation. Monitor ECG. Pancreatitis Embryo-fetal harm
Special administration technique or considerations	Do not break, chew, or crush tablets. Swallow whole with water. Administer tablets orally with or without food at about the same time each day.
Prepared by	Sean Long, PharmD. Candidate – Class of 2019
Source	Xospata (gilteritinib) [package insert]. Northbrook, IL: Astellas Pharma US, Inc.; 2018

Amifampridine / Firdapse / Catalyst Pharmaceuticals, Inc.	
Generic Name / Brand Name / Company	Amifampridine / Firdapse / Catalyst Pharmaceuticals, Inc.
Date of approval	11/28/18
Drug Class (Mechanism of Action if novel agent)	Broad spectrum potassium channel blocker.
Indication	Indicated for the treatment of Lambert-Eaton myasthenic syndrome (LEMS) in adults
Comparative agent – Therapeutic interchange?	None
Dosage forms/strengths. Common Dose/sig	Tablets: 10 mg Starting dosage: 15 mg to 30 mg daily, taken orally in divided doses (3 to 4 times daily).
DEA Schedule	Not applicable
Date of market availability	Early 1st quarter 2019
Similar Medication Names	Dalfampridine, fampridine
Clinical Use Evaluation	
Common Adverse Effects	> 10%: paresthesia, upper respiratory tract infection, abdominal pain, nausea, diarrhea, headache, elevated liver enzymes, back pain, hypertension, and muscle spasms
Severe Adverse Effects	Seizures, anaphylaxis
Severe Drug-Drug Interactions	Drugs that lower seizure threshold may lead to an increased risk of seizures. Drugs with cholinergic effects (e.g., direct or indirect cholinesterase inhibitors) may increase the cholinergic effects of amifampridine and of those drugs and increase the risk of adverse reactions.
Severe Drug-Food Interactions	None
Important Labs Values to assess prior to order entry or at point of clinical follow up.	Monitor for adverse effects in patients with renal or hepatic impairment or N-acetyltransferase 2 (NAT2) poor metabolizers
Used in Pediatric Areas	Safety and effectiveness in pediatric patients have not been established.
Renal or Hepatic Dosing	In patients with renal impairment (creatinine clearance 15 to 90 mL/min) or any degree of hepatic impairment, the recommended starting dose is 15 mg/day, administered in 3 divided doses. No dosage recommendations are available for patients with end-stage renal disease.
Critical Issues (i.e., contraindications, warnings, etc) that should be emphasized	Contraindicated in patients with: A history of seizures Hypersensitivity to amifampridine phosphate or another aminopyridine Warnings: Seizures Hypersensitivity reactions and anaphylaxis Reduce starting dose in known N-acetyltransferase2 (NAT2) poor metabolizers.
Special administration technique or considerations	The dosage can be increased by 5 mg daily every 3 or 4 days. Tablets may be split at the score. The maximum recommended total daily dosage is 80 mg. The maximum single dose is 20 mg. Can be taken without regard to food.
Prepared by	Sean Long, PharmD. Candidate – Class of 2019
Source	Firdapse (amifampridine) [package insert]. Coral Gables, FL: Catalyst Pharmaceuticals, Inc.; 2018.