Pharmacy & Therapeutics Committee Meeting

Private Dining Room

November 3, 2022 7:00 a.m.

Next Meeting Date: December 15, 2022 at 7:00 a.m.

PHARMACY AND THERAPEUTICS COMMITTEE

DATE: August 11, 2022 CALLED TO ORDER: 7:00 a.m.
LOCATION: Private Dining Room ADJOURNED: 8:00 a.m.

Voting Member Attendance:				Non-Voting Member Attendance:		Guests:
X	**Nathan Chamberlain, MD- Chairman**	X	**Matthew Kodsi, MD- Quality**		Karen Babb, PharmD- Manager	**Hallie Butler, Pharmacy Resident**
X	**Mark Anderson, MD- Infectious Disease**	X	**Aditya Mandawat, MD- Cardiology**		Jamie Barrie, PharmD- Manager, HX	**Joseph Oh, Pharmacy Resident**
X	**Justin Blinn, MD- Anesthesiology**	X	**Daniel Marsh, PharmD- Director of Pharmacy**	X	**Kenneth Dyer, PharmD- Operations Manager**	**Jordan Tynes, Pharmacy Resident**
X	**David Dodson, MD- Hospitalist**		Chad Paxson, MD- Intensivist		Rodney Elliott- Purchasing	**Chris D'Amico, Pharmacy Resident**
X	**Karen Frank, RN- Quality**		Vimal Ramjee, MD- Cardiology	X	**Lori Hammon, RN- Quality**	**Petra McWhorter-Green, RN (CNO Proxy)**
	Sherry Fusco, RN- CNO		James Wahl, MD- Hospitalist, GA		Shannon Harris, RN- Infection Prevention	**DeAnn Champion, MD-ED**
	F. Lee Hamilton, MD- Hospitalist		Richard Yap, MD- Hospitalist		Kevin Hopkins, RT- Director of Resp Therapy	
	William Haren, MD- Psychiatry			X	**Rachel Kile, PharmD- Clinical Manager**	
				X	**Carey Smith, RPh- Manager, GA**	

This meeting will be convened under the protection of the Tennessee Statute 63-6-219 and the Health Care Quality Improvement Act of 1986, Public Law 99-660. All information, case reviews, meeting minutes, statistics and correspondence are confidential and protected. Included in that protection are those that are involved in the review of the information. Any discussion of this information outside the realm of Peer Review constitutes a breach and violates the protection of the persons involved in the breach.

AGENDA ITEM	FINDINGS OR CONCLUSION	ACTION, RESPONSIBILITY	STATUS
Minutes	The May minutes were approved as submitted.	Approved	Complete
CommonSpirit Health System P&T Committee	**May 2022 and July 2022 Decision Briefs:** The medication decisions that were approved at the CommonSpirit Health System P&T committee meetings were reviewed. All new system formulary medications or changes were either consistent with existing CHI Memorial formulary decisions or are described in the "Formulary Decisions & Therapeutic Interchanges" section of the minutes below, or will be reviewed at an upcoming P&T committee meeting.	Approved	Complete
Old Business	**A. Sedatives-Hypnotics for Sleep Policy:** Rachel reported that they did meet as a sub committee to further discuss the policy and would like to do a project to assess how agents used for sleep are utilized. We will provide another update at the next meeting.	Informational	Complete
Formulary Decisions & Therapeutic Interchanges	**A. Pentobarbital**: Pentobarbital is a barbiturate FDA approved for emergency control of seizures and for use as a sedative/hypnotic. At high doses pentobarbital exhibits anti-seizure properties and reduces brain metabolism and cerebral blood flow to decrease intracranial pressure. It was recommended by the neuroscience service line to add pentobarbital to formulary and adopt the following restrictions (all must apply): a. Status epilepticus restricted to cases refractory to or with contraindications to all other therapies (third line agent) b. Must be ordered by a Neurologist or Neurosurgeon c. Patient is undergoing invasive mechanical ventilation	Approved	Complete
	B. Hepatitis B vaccines: CommonSpirit Health shifted to a GSK/Merck vaccine portfolio to optimize vaccine contracting and improve resource stewardship. At CHI Memorial, Engerix-B and Heplisav are the formulary hepatitis B vaccines, with Engerix B being preferred. Recombivax HB was voted as the formulary preferred hepatitis B vaccine and Engerix was voted as non-formulary at the CSH July 2022 P&T committee meeting. Engerix-B and Recombivax- B are interchangeable for patients that may be partially vaccinated for hepatitis B. It was recommended to align with the system decision, in order to benefit from the contracting opportunity.	Approved	Complete

	The current CHI memorial restriction criteria for Engerix-B will apply to Recombivax HB. **C. Tezepelumab (Tezspire):** Tezepelumab is currently the first and only FDA-approved thymic stromal lymphopoietin (TSLP) monoclonal antibody for add-on maintenance treatment of severe asthma in adults and children aged 12 and above whose asthma cannot be controlled by their existing asthma medication. It is dosed as one injection every 4 weeks and must be administered by a healthcare provider. It can be used regardless of phenotype. It was recommended to add tezepelumab to formulary with restrictions to the outpatient setting subsequent to insurance approval or prior authorization for FDA approved indications or payer approved off-label indications. **D. Inclisiran (Leqvio):** Inclisrian is an antilipemic-small interfering ribonucleic acid (sIRNA) agent that prevents proprotein convertase subtilisin/kexin type 9 (PSK9) production in the liver. It is very similar to the PSK9 inhibitors, Praluent and Repatha. Rachel reported that this injection demonstrated lowering LDL but did not evaluate any patient-specific cardiovascular outcomes.The cost for inclisiran is $9,652 for year one and $6,435 for subsequent years, whereas Repatha costs $6,183 per year. Inclisiran also has to be administered by a healthcare provider, where Repatha is a self-administered agent. Inclisiran has a novel mechanism of action with the benefit of a twice yearly injection. Due to cost and not having a billing code, it was voted as non-formulary by the CSH System P&T Committee. Due to lack of published data on cardiovascular outcomes in addition to the cost of medication, it was recommended that inclisiran be non-formulary. It will be reviewed again once patient-specific clinical outcomes are published. **E. Paricalcitol:** Paricalcitol is a synthetic vitamin D analog which binds to and activates VDR in kidneys, parathyroid gland, intestine, and bone, thus reducing PTH levels and improving calcium and phosphate homeostasis. IV paricalcitol has been non-formulary for years, however, oral paricalcitol (1 mcg capsule) is on formulary. Rachel reported that in the past 12 months, oral paricalcitol has only been ordered for one dose for one patient in the ED. It was recommended to remove oral paricalcitol from formulary. Patients will be allowed to continue their own home supply.	Approved Approved Approved	Complete Complete Complete
Medication Use	**A. Anavip Antivenom Treatment Guidelines and Panel:** Rachel reported that we have exhausted the remaining supply of Crofab, so we have transitioned to Anavip. Anavip has a 133 hour half life, compared to the 15 half hour half life of Crofab. 95% of patients do not require a second dose. There was confusion with dosing Anavip for our first patient, therefore a guideline and EHR ordering panel were developed to provide dosing guidance. The provider education sheet was also reviewed, and it has already been shared with ED providers. **B. Rivaroxaban for VTE prophylaxis in medically ill: The newer indication for** rivaroxaban 10 mg daily for prophylaxis of VTE in medically ill patients was discussed. Rachel reported that we don't have this built into our VTE prophylaxis section of order sets. Rivaroxaban does have a longer half life than heparin or enoxaparin, which makes it more complicated because you generally have to stop it 2 days before surgery. There was a clear consensus by the committee to recommend against adopting it for VTE prophylaxis in medically ill patients at this time. **C. Injectable promethazine:**The ISMP 2018-2019 Targeted Medication Safety Best Practices for Hospitals recommendation to eliminate injectable promethazine from the formulary resulted in several CHI hospitals and other large hospitals across the nation eliminating injectable promethazine from their hospital formularies. ISMP Best Practice 2022-2023 still recommends eliminating promethazine from formulary. Utilization of IV promethazine in the last 6 months demonstrated for over 5000 doses administered, most are prescribed by internal medicine and emergency medicine. The primary concern of the committee was whether or not we have reasonable alternatives. It was suggested that droperidol could be a second line option. It was recommended approve the following actions:	Approved Informational Approved	Complete Complete Complete

	a. Implement an automatic therapeutic interchange (i.e. LMA pop-up alert) that provides a list of alternative antiemetics and routes of administration on formulary, provides easy-click ordering options for a few alternatives, and does not allow the ordering provider to continue with the current order for injectable promethazine b. Remove injectable promethazine from all order sets c. Designate injectable promethazine (IV and IM) as non-formulary and do not stock (including outpatient infusion center) d. Do not allow continuation of orders from home ***Addendum***: On behalf of the ICU intensivist team, Dr. Paxson proposed an appeal to the decision to remove injectable promethazine from formulary. The appeal is as follows: allow injectable promethazine to remain on formulary with restrictions to central line administration only and must have tried and failed another agent prior to using promethazine (cannot be used as first line agent). Rachel suggested that if approved, IV push should not be allowed and all doses should be mixed in normal saline administered over 10-15 minutes. The following actions will be implemented: a. Implement an automatic therapeutic interchange (i.e. LMA pop-up alert) that provides a list of alternative antiemetics and routes of administration on formulary, provides easy-click ordering options for a few alternatives, and allows the ordering provider to continue with the current order for injectable promethazine if patient meets the approved criteria b. Remove injectable promethazine from all order sets c. Must have tried and failed another agent prior to using injectable promethazine (cannot be used as first line agent) d. Restricted to central line administration only via slow IV infusion over 10-15 minutes	Approved by email vote	Complete
	D. Drug shortages-lorazepam: Rachel reported that a medication use evaluation was conducted to determine the appropriateness of injectable lorazepam prescribing. The prescribing of injectable lorazepam for the prophylaxis and treatment of alcohol withdrawal syndrome (AWS) utilizes a significant amount of IV lorazepam at our institution (approximately 40% of all parenteral lorazepam use). For patients with mild/moderate alcohol withdrawal, the existing AWS order set was rarely optimized to prevent breakthrough symptoms. This could have led to the prescribing of a lorazepam infusion. The order set was incorrectly initiated for patients experiencing severe AWS, and intoxicated patients at risk for AWS were initiated on the order set and started on lorazepam infusions as well. A panel of physician, nursing, and pharmacy leaders met urgently on July 28th to develop shortage strategies.The decisions were as follows: i. Pharmacists may automatically substitute orders for injectable lorazepam to oral lorazepam in a 1:1 ratio if the patient can take oral/NG/FT medications, unless indicated for seizure or alcohol withdrawal (approved emergently on 7/22/22) ii. Benzodiazepine equivalents: Lorazepam 1 mg = Midazolam 1 mg = Diazepam 5 mg iii. IV lorazepam is permanently formulary restricted for the treatment of only acute seizures, alcohol withdrawal, or chemotherapy-induced nausea and/or vomiting iv. Lorazepam infusions are permanently non-formulary (due to availability of safer alternatives for agitation such as propofol, dexmedetomidine, ketamine and risk of propylene glycol toxicity) v. Build a new EHR alert to drive ordering to alternatives (lorazepam PO or midazolam). Alert is suppressed for the alcohol withdrawal order set vi. Update the Midazolam Usage policy to allow administration of midazolam outside of ICU and procedural areas	Approved	Completed

	vii. There were six order sets that included IV lorazepam. Lorazepam was either removed from the order set, changed to oral lorazepam, or replaced with IV midazolam.		
Protocol & orders	**A. Alcohol Withdrawal Order Set-Phenobarbital:** Dr. Tucker and Rachel drafted an order set for phenobarbital for alcohol withdrawal syndrome. This would be a second order set in addition to the existing one. The existing order set is only for mild-moderate alcohol withdrawal syndrome (AWS) and the phenobarbital-based order set is for moderate-severe. Phenobarbital is a safe and effective treatment alternative, especially during a lorazepam shortage. The new order set requires providers to use the PAWSS (Prediction of Alcohol Withdrawal Severity Scale) score to determine the risk of complicated alcohol withdrawal. If the PAWSS score is ≥ to 4, the phenobarbital set should be used. It is RASS based monitoring, so hospital-wide nursing education will be required. The committee approved the development of the new order set.	Approved	Complete
Policies	**A. Therapeutic Duplication of PRN Medication Orders**: This policy was updated to align with EHR workflows and clinically appropriate pain management principles. Updates to this policy are as follows: a. 'Of the medications ordered for a specific given indication, one medication will be considered to be the provider's choice for the patient based on pharmacy defined medication hierarchy based on therapeutic potency (**least** potent agent will be used)' b. 'If no patient preference is specified and multiple home medications are ordered for the same PRN indication, one medication will be selected for the patient based on pharmacy defined medication hierarchy based on therapeutic potency (**least** potent agent will be used)'	Approved	Complete
	B. Mandatory ID Consultations: Rachel reported that this policy was only cleaned up for EPIC. There were no clinical changes.	Approved	Complete
	C. Look Alike Sound Alike Medication List: Humalog and Kenalog were added to the list following a near miss event in the Glenwood surgery department. There will be a Pyxis pop-up warning and they will not be stored next to each other.	Approved	Complete
	D. Renal Dose Adjustments: Baricitinib and Paxlovid have been added to the list of pharmacist-automatic renal dose adjusted medications.	Approved	Complete
	E. Midazolam Usage: This policy was updated to include 'During clinical shortages of alternative injectable benzodiazepines, midazolam may be administered in doses less than or equal to 2 mg by an RN WITHOUT procedural sedation training.'	Approved	Complete

There being no further business, the meeting was adjourned at 8:00 a.m. The next P&T meeting is **October 6, 2022.**

Respectfully submitted,
Daniel Marsh, Director of Pharmacy; Rachel Kile, PharmD, Pharmacy Clinical Manager

Approved by,
Nathan Chamberlain, MD, Chairman

CSH SYSTEM PHARMACY AND THERAPEUTICS COMMITTEE DECISION BRIEF

September 2022 Decisions

NOTE: Local/divisional P&T committees may implement more restrictive statuses

Medication Name	Medication Used For	Formulary Decision				Restrictions and Therapeutic Interchanges	Timeline to implementation
		Do Not Stock	Formulary Restricted	Formulary Unrestricted	NonFormulary		
crizanlizumab-tmca	To prevent vaso-occlusive crises in sickle cell patients ≥16		ADAKVEO			Restriction Criteria: Outpatient for FDA approved indications or payer approved off-label indications setting subsequent to insurance approval or prior authorization	Within 90 days of System P&T Committee approval
ophthalmic dexamethasone	To treat macular edema		OZURDEX			Restriction Criteria: Outpatient setting for FDA-approved indications or payer-approved off-label indications subsequent to insurance approval or prior authorization	Within 90 days of System P&T Committee approval
			DEXTENZA			Restriction Criteria: Outpatient procedural use	Within 90 days of System P&T Committee approval
ophthalmic triamcinolone	To treat macular edema		TRIESENCE			Restriction Criteria: Outpatient procedural use	Within 90 days of System P&T Committee approval
					XIPERE		Within 60 days of System P&T Committee approval
ophthalmic fluocinolone	To treat macular edema		RETISERT			Restriction Criteria: Outpatient setting for FDA-approved indications or payer-approved off-label indications subsequent to insurance approval or prior authorization	Within 90 days of System P&T Committee approval

Medication Name	Medication Used For	Formulary Decision				Restrictions and Therapeutic Interchanges	Timeline to implementation
		Do Not Stock	Formulary Restricted	Formulary Unrestricted	NonFormulary		
			ILUVIEN			Restriction Criteria: Outpatient setting for FDA-approved indications or payer-approved off-label indications subsequent to insurance approval or prior authorization	Within 90 days of System P&T Committee approval
			YUTIQ			Restriction Criteria: Outpatient setting for FDA-approved indications or payer-approved off-label indications subsequent to insurance approval or prior authorization	Within 90 days of System P&T Committee approval
tecovirimat	To treat monkeypox		TPOXX (NATIONAL STOCKPILE)			Restriction Criteria: Use restricted to local or federal guidance	Within 90 days of System P&T Committee approval
smallpox and monkeypox vaccine, live, nonreplicating/PF	To prevent monkeypox infection		JYNNEOS (NATIONAL STOCKPILE)			Restriction Criteria: Use restricted to local or federal guidance	Within 90 days of System P&T Committee approval
nivolumab-relatlimab-rmbw	To treat melanoma, unresectable or metastatic.		OPDUALAG			Restriction Criteria: Outpatient setting for FDA approved indications or payer approved off-label indications subsequent to insurance approval or prior authorization	Within 90 days of System P&T Committee approval
posaconazole	To treat fungal infections				posaconazole (NOXAFIL) 300MG/16.7 ml suspension)	Link to Therapeutic Interchange	Within 60 days of System P&T Committee approval

Medication Name	Medication Used For	Formulary Decision				Restrictions and Therapeutic Interchanges	Timeline to implementation
		Do Not Stock	Formulary Restricted	Formulary Unrestricted	NonFormulary		
			Posacon-azole (NOXAFIL) 100mg tablets			Restriction Criteria: Restricted to Infectious Disease Consult and/or the following conditions: Antifungal prophylaxis in AML or SCT patients with neutropenia or myelodysplastic syndrome (MDS) Documented or suspected infection against Zygomycetes, resistant Aspergillus spp, or other rare mold infections on a case-by-case basis.	Within 90 days of System P&T Committee approval
coagulation factor VIIa recombinant-jncw	The treatment of bleeding episodes in patient with hemophilia A and B with inhibitors				SEVENFACT		Within 60 days of System P&T Committee approval
ocular ranibizumab	The treatment of neovascular, age-related macular degeneration		SUSVIMO			Restriction Criteria: Outpatient setting for FDA approved indications subsequent to insurance approval or prior authorization	Within 90 days of System P&T Committee approval
tick-borne encephalitis vaccine	To prevent tick-borne encephalitis		TICOVAC			Restriction Criteria: Outpatient for FDA approved indications or payer approved off-label indications setting subsequent to insurance approval or prior authorization	Within 90 days of System P&T Committee approval
velaglucerase alfa	Long-term treatment for patients with type 1 Gaucher disease		VPRIV			Restriction Criteria: Outpatient setting for FDA-approved indications or payer-approved off-label subsequent to insurance approval or prior authorization. Restrict to the outpatient setting; doses due while patients are inpatient will be deferred until after the patient has been discharged.	Within 90 days of System P&T Committee approval

Medication Name	Medication Used For	Formulary Decision				Restrictions and Therapeutic Interchanges	Timeline to implementation
		Do Not Stock	Formulary Restricted	Formulary Unrestricted	NonFormulary		
COVID-19 vaccine, recombinant (Novavax)/ adjuvant-Matrix/PF	To prevent COVID-19 infection			NOVAVAX COVID19 VAC,ADJ(UNA PP)			Within 90 days of System P&T Committee approval
lutetium Lu-177 vipivotide tetraxetan	The treatment of adult patients with prostate-specific membrane antigen (PSMA)-positive metastatic castration-resistant prostate cancer (mCRPC) who have already been treated with other anticancer treatments		PLUVICTO			Restriction Criteria: Outpatient setting for FDA approved indications or payer approved off-label indications subsequent to insurance approval or prior authorization	Within 90 days of System P&T Committee approval
phytonadione (vit K1) injection	To treat vitamin K deficiency bleeding in preterm neonates				Phytonadione 1mg/0.5ml injection prefilled syringes		Within 60 days of System P&T Committee approval
				Phytonadione 1mg/0.5ml injection ampules and vials			Within 90 days of System P&T Committee approval
abrocitinib	To treat refractory, moderate-to-severe atopic dermatitis				CIBINQO		Within 60 days of System P&T Committee approval
mitapivat sulfate	To treat hemolytic anemia in pyruvate kinase deficiency				PYRUKYND		Within 60 days of System P&T Committee approval

Medication Name	Medication Used For	Formulary Decision				Restrictions and Therapeutic Interchanges	Timeline to implementation
		Do Not Stock	Formulary Restricted	Formulary Unrestricted	NonFormulary		
pacritinib citrate	To treat intermediate or high-risk primary or secondary myelofibrosis in adults with low platelets				VONJO		Within 60 days of System P&T Committee approval
mavacamten	Treatment of symptomatic obstructive hypertrophic cardiomyopathy (New York Heart Association [NYHA] class II to III) in adults to improve functional capacity and symptoms.				CAMZYOS		Within 60 days of System P&T Committee approval
ganaxolone	Treatment of seizures associated with cyclin-dependent kinase-like 5 (CDKL5) deficiency disorder (CDD) in patients ≥ 2				ZTALMY		Within 60 days of System P&T Committee approval
Gallium Ga 68-PSMA-11	Diagnostic imaging of metastasized prostate cancer		LOCAMETZ			Restriction Criteria: Outpatient setting for FDA-approved indications or payer-approved off-label indications subsequent to insurance approval or prior authorization.	Within 90 days of System P&T Committee approval
			ILLUCCIX			Restriction Criteria: Outpatient setting for FDA-approved indications or payer-approved off-label indications subsequent to insurance approval or prior authorization.	Within 90 days of System P&T Committee approval
measles, mumps, rubella vaccine	Measles, mumps, rubella prevention	PRIORIX					Within 60 days of System P&T Committee approval

Medication Name	Medication Used For	Formulary Decision				Restrictions and Therapeutic Interchanges	Timeline to implementation
		Do Not Stock	Formulary Restricted	Formulary Unrestricted	NonFormulary		
hepatitis B vaccine	Hepatitis B prevention	PREHEVBRIO					Within 60 days of System P&T Committee approval

THERAPEUTIC INTERCHANGES

Posaconazole suspension

Ordered	Interchanged to
Posaconazole suspension loading dose for new starts	Posaconazole tablet loading dose as ordered
Posaconazole suspension any dose for continuation	Posaconazole tablets 300mg daily

FORMULARY UPDATE

THERAPEUTIC CLASS: Azole

GENERIC NAME: Posaconazole

PROPRIETARY NAME: Noxafil®

BACKGROUND/RATIONALE:

Posaconazole is an antifungal azole derivative approved to the CommonSpirit Health formulary. CHI Memorial approved isavuconazonium sulfate or isavuconazole (Cresemba®) to formulary in 2015 and substituted any potential patients in need of posaconazole to isavuconazole. This decision was made due to fewer drug-drug interaction, no QTc prolongation risk, no risk of nephrotoxicity with the intravenous formulation, similar spectrum of activity, and lower cost of isavuconazole. Since this decision, the cost of oral posaconazole tablets have significantly decreased.

INDICATIONS:
Posaconazole: Prophylaxis of invasive Aspergillus and Candida infections, oropharyngeal candidiasis
Isavuconazole: Invasive aspergillosis, Invasive mucormycosis

MECHANISM OF ACTION: Inhibits cytochrome P450 dependent 14α-lanosterol demethylation (essential for ergosterol synthesis)

PHARMACOKINETICS:

	Posaconazole	**Isavuconazole**
Cmax (ng/mL)	2,764	7,499
Tmax (hr)	4	3
AUC_{0-24} (h*ng/mL)	37,900	121,402
Protein Binding	98%	99%
Metabolism	UDP, p-gp	CYP3A4, 3A5, UGT
Excretion	Primarily via feces Low urinary concentrations	Primarily via feces <1% of active metabolite in urine

*Similar to voriconazole, isavuconazole metabolism map be affected by race; Chinese subjects have lower clearance and higher AUCs as compared to healthy white subjects (No dosage adjustments recommended thus far)

DOSAGE AND ADMINISTRATION:

Isavuconazole (IV/PO)	Loading dose: 372 mg q8h x 6 doses
	Maintenance dose: 372mg daily
Posaconazole (IV/DR caps)	Loading dose: 300mg q12h x 1 day
	Maintenance dose: 300mg daily

Oral capsules can be taken without regard to food
Renal Impairment: No dosage adjustments recommended for isavuconazole;
Posaconazole Injection: Avoid in patients with moderate or severe renal impairment (eGFR < 50 mL/min) due to accumulation of the intravenous vehicle, Betadex Sulfobutyl Ether Sodium
Hepatic impairment: No dosage adjustments in mild to moderate impairment; No data in severe impairment.

THERAPEUTIC MONITORING:
Isavuconazole: no recommendations
Posaconazole trough levels: 0.7 for prophylaxis; >1 for treatment; consider dose reduction if level >5

ADVERSE EFFECTS:

Posaconazole	**Isavuconazole**
N/V/D	N/V/D
Pyrexia	Headache
Hypoglycemia	Rash
QTc prolongation	QTc shortening Avoid in patients with familial short QT syndrome

Elevation of LFTs	Elevation of liver enzymes
Infusion related reactions	Infusion reactions; Use an in-line filter for IV infusion

CONTRAINDICATIONS: Known hypersensitivity to any azoles

DRUG INTERACTIONS:

Posaconazole	**Isavuconazole**
P-gp substrate ● Caution with inducers/inhibitors	3A4 substrate ● Inhibitors increase levels ● Inducers decrease levels
Strong CYP3A4 inhibitor ● Tacrolimus, sirolimus, cyclosporine ● Atorva, lova,simvastatin ● Ergot alkaloids	Moderate 3A4 inhibitor ● Significant effects on tacrolimus, sirolimus, cyclosporine ● Mild effects on statins, midazolam Weak P-gp inhibitor ● Higher digoxin levels Mild/no effect on warfarin

COST:

Product (form)	**Cost per dose**	**Cost (x 7 days)**	**Cost (x 14 days)**
Posaconazole (PO, tabs)	$46.50	$372	$697.50
Isavuconazole (PO)	$184.70	$2,031.50	$3,324.40
Posaconazole (IV)	$485.32	$3,882.32	$7,279.56
Isavuconazole (IV)	$314.32	$3,457.52	$5,657.76

RECOMMENDATION/DISCUSSION:

It is recommended to add posaconazole oral tablets to formulary, with restrictions to either of the following:

- Infectious Diseases providers for new initiation
- Continuation of patient home medication

FORMULARY UPDATE

THERAPEUTIC CLASS: β-lactam/β-lactamase inhibitor

GENERIC NAME: Ceftazidime/avibactam

PROPRIETARY NAME: Avycaz®

BACKGROUND/RATIONALE:
Ceftazidime/avibactam (Avycaz) is a β-lactam/β-lactamase inhibitor approved for the treatment of complicated urinary tract infections, hospital-acquired bacterial pneumonia, ventilator-associated bacterial pneumonia, and complicated intra-abdominal infections. Avibactam restores the activity of ceftazidime against several β-lactamases making it particularly useful in treating multi-drug resistant gram negative bacteria resistant to other conventional antibiotics. Ceftazidime/avibactam was approved to CHI Memorial formulary in 2015. Meropenem/vaborbactam (Vabomere), a similar agent, replaced ceftazidime/avibactam in 2019 due to cost and availability of a CMS New Technology Add-on Payment (NTAP) program which provided additional payments for the drug for qualifying cases. The NTAP program for meropenem/vaborbactam has since expired and the cost of ceftazidime/avibactam is now lower than that of meropenem/vaborbactam.

MICROBIOLOGY:

Organism/Resistance	**Ceftazidime/Avibactam**	**Meropenem/Vaborbactam**
Enterobacterales		
ESBL	+++	+++
AmpC	+++	+++
KPC	+++	+++
MBL	-	-
OXA-48-like	+++	-
Acinetobacter baumanii		
Carbapenem-resistant	-	-
Pseudomonas aeruginosa		
Carbapenem-resistant	++	-
Pan-β-lactam resistant	+	-
Stenotrophomonas maltophilia		
Ceftazidime-resistant	++ (when combined w/ aztreonam)	-

COST:

Drug	**Cost per day**	**Cost (x 7 days)**	**Cost (x 14 days)**
Ceftazidime/avibactam	$984.44	$6,891.07	$13,782.13
Meropenem/vaborbactam	$1,016.20	$7,113.40	$14,226.80

RECOMMENDATION:

- **Formulary, Restricted – Ceftazidime/avibactam (Avycaz)**
  - Restrict use to Infectious Diseases physicians and cases that meet the following criteria:
    - Documented infection due to a carbapenemase producing Gram-negative bacteria OR
    - Empiric therapy for critically ill patients with a history of a carbapenemase producing (carbapenem resistant) gram-negative bacteria with resistance to other non-restricted agents based on culture data and review by the antibiotic stewardship team.
    - Susceptible MDR Pseudomonas aeruginosa where anti-pseudomonal beta-lactams cannot be used
  - Ceftazidime/avibactam will be dose adjusted for renal function per existing pharmacist dose-adjustment protocol

- **Non-Formulary – Meropenem/vaborbactam (Vabomere)** should be replaced by ceftazidime/avibactam (Avycaz) as the formulary product for treatment of infections due to susceptible MDR gram-negative rod for which other preferred treatment options are unavailable

Beta-lactam Allergy Guideline

BACKGROUND:
The prevalence of penicillin allergies in the United States (US) has been estimated to be between 8 and 15%. Cephalosporin allergies are less frequent and are reported in approximately 1% of the US population. However, >97% of patients reporting a penicillin allergy are not truly allergic when assessed by skin testing and direct amoxicillin challenge. Among patients with a low severity penicillin allergy, over 95% can tolerate penicillin. This is due to the fact that most penicillin allergies are documented after the occurrence of delayed benign rashes that do not necessarily recur on re-exposure, intolerances due to penicillin, or other symptoms unrelated to an allergy such as urticaria due to a viral infection. Moreover, over 80% of patients with true IgE-mediated penicillin allergy outgrow their allergy after 10 years due to waning sensitization.

Overuse of second line agents such as fluoroquinolones due to over-cautious avoidance of a wide range beta-lactams can have significant negative consequences, including adverse drug reactions, *Clostridioides difficile* superinfection, and antimicrobial resistance.

The purpose of this guideline is to guide clinicians in prescribing antibiotics for inpatients with reported allergic reactions to penicillin or cephalosporin antibiotics by allowing these patients to receive more narrow-spectrum, more effective, less toxic, and/or less costly antibiotics.

RECOMMENDATION:
It is recommended to adopt the decision of the Antimicrobial Stewardship Subcommittee and approve these guidelines and associated policy.

Appendices:
Appendix 1: Patient allergy assessment tool (consider utilizing this tool when discussing allergy with your patient)
Appendix 2: Determining type of reaction and action plan
Appendix 3: Cross-reactivity matrix for antibiotics on formulary at CHI Memorial
Appendix 4: Test Dose Procedure

Appendix 1:

Patient Allergy Assessment Tool

1) What is the name of the antibiotic you are allergic to?

2) Please describe the details of the reaction.

3) Was it immediate or a few days after taking it?

4) When did your allergy occur?
    a. < 1 year ago, 1-10 years ago, >10 years ago

5) How was the reaction managed and what happened?

6) Have you taken any other antibiotics since (amoxicillin, Augmentin, Keflex, Ceftin etc.)?

Appendix 2:

Type of Reaction and Action Plan

<table>
<tr><th colspan="3">Dermatological</th><th colspan="2">Respiratory or Systemic</th><th colspan="2">Unknown Reaction</th></tr>
<tr><td colspan="2">Clinical manifestation</td><td>Severity or Allergy type</td><td>Clinical manifestation</td><td>Severity or Allergy type</td><td>Clinical manifestation</td><td>Severity or Allergy type</td></tr>
<tr><td colspan="2">Childhood rash</td><td>Unlikely to be significant</td><td>Laryngeal Involvement (“throat tightness”, “hoarse voice”)</td><td>Severe</td><td>Unknown reaction ≤ 10 years ago</td><td>Unknown</td></tr>
<tr><td rowspan="2">Diffuse rash or localized rash/swelling with no other symptoms</td><td>>10 years ago or unknown</td><td>Non-severe</td><td rowspan="2">Respiratory compromise (“shortness of breath”)</td><td rowspan="2">Severe</td><td rowspan="2">Unknown reaction >10 years or family history</td><td rowspan="2">Unlikely to be significant</td></tr>
<tr><td>≤ 10 years ago</td><td>Non-severe</td></tr>
<tr><td colspan="2">Angioedema (“lip, facial, or tongue swelling”)</td><td>Severe</td><td>Anaphylaxis, unexplained collapse</td><td>Severe</td><td colspan="2">Renal</td></tr>
<tr><td colspan="2">Generalized swelling (outside of angioedema)</td><td>Severe</td><td colspan="2">Hematological</td><td>Severe renal injury, failure, or AIN</td><td>Potential immune mediated</td></tr>
<tr><td colspan="2">Urticaria (“wheals and hives”)</td><td>Non-severe</td><td rowspan="3">Low platelets, neutrophils, hemoglobin, eosinophilia</td><td rowspan="3">Potential immune mediated</td><td>Mild renal impairment</td><td>Unlikely immune mediated</td></tr>
<tr><td colspan="2">Mucosal ulceration (“mouth, eye, or genital ulcers”)</td><td>Severe</td><td>Severe liver injury, failure</td><td>Potential immune mediated</td></tr>
<tr><td colspan="2">Pustular, blistering or desquamating rash (“skin shedding”)</td><td>Severe</td><td>Mild hepatic enzyme elevation</td><td>Unlikely immune mediated</td></tr>
<tr><th colspan="3">Reaction Risk (Color Coded) & Action Plan</th><th colspan="2">Gastrointestinal or Neurological</th></tr>
<tr><td colspan="3">Appropriate for oral re-challenge or direct de-labeling</td><td>Low Risk</td><td>GI symptoms (nausea, vomiting, diarrhea)</td><td>Unlikely immune mediated</td></tr>
<tr><td colspan="3">Appropriate for oral re-challenge or using full dose beta-lactam with dissimilar side chain (Appendix 3)</td><td>Low Risk</td><td rowspan="2">Mild neurological symptoms (headache, depression, mood disorder)</td><td rowspan="2">Unlikely immune mediated</td></tr>
<tr><td colspan="3">May be appropriate for test dose of beta-lactams with dissimilar side chains* or penicillin skin test</td><td>Moderate risk</td></tr>
<tr><td colspan="3">Not appropriate for allergy testing</td><td>High risk</td><td>Severe neurological manifestation (seizures, psychosis)</td><td>Unknown or unclear mechanism</td></tr>
</table>

*If moderate risk penicillin reaction, can consider test dose of cefazolin, 3rd, 4th, 5th generation cephalosporins or carbapenem.

If moderate risk cephalosporin reaction, can consider test dose of cephalosporins with dissimilar side chains (Appendix 3), penicillin (if reaction to 3rd, 4th, or 5th generation cephalosporin), or carbapenem.

Aztreonam full dose can be administered unless reaction was to ceftazidime

Adapted from Devchand *et al.* 2018

Appendix 3:

Cross-reactivity matrix

	Penicillin	**Amoxicillin**	**Ampicillin**	**Piperacillin**	**Cefazolin**	**Cefadroxil**	**Cefoxitin**	**Cefuroxime**	**Ceftriaxone**	**Ceftazidime**	**Cefepime**	**Ceftaroline**	**Ceftolozane**
Penicillin	=						*						
Amoxicillin		=	*	*		*							
Ampicillin		*	=	*		*							
Piperacillin		*	*	=		*							
Cefazolin					=								
Cefadroxil		*	*	*		=							
Cefoxitin	*						=	*					
Cefuroxime							*	=	*	*	*		*
Ceftriaxone								*	=	*	*		*
Ceftazidime								*	*	=	*		*
Cefepime								*	*	*	=		*
Ceftaroline												=	
Ceftolozane								*	*	*	*		=

A box with (*) Indicates that the two antibiotics share a similar or identical side chain and that there is a risk of cross-reactivity between them. Empty boxes indicate a lack of side-chain similarity and a lower risk for cross-reactivity. Cefazolin and Ceftaroline have dissimilar side chains to all other penicillins and cephalosporins.

Appendix 4:

Test Dose Procedure

Note: This procedure is NOT meant to be used for patients with Type II-IV reactions including SJS/TEN, DRESS/DISH, serum sickness, drug-induced cytopenias, other significant laboratory abnormalities such as nephrotoxicity or delayed reactions

1) Utilize Appendix 2 to identify appropriate candidates for the test dose
2) Review patient's current medications to ensure no antihistamines, famotidine, high dose steroids were given in the last 24 hours as these may mask an allergic reaction
3) Obtain patient's verbal consent prior to procedure
4) Drug order & monitoring
    a. Oral rechallenge for de-labeling
        i. Single dose penicillin VK 250 mg (if reported allergy penicillin) or amoxicillin 250 mg (if reported allergy amoxicillin or ampicillin)
        ii. Perform observation every 30 minutes for 1 hour post oral challenge
    b. Test dose of beta-lactam that you intend to use
        i. Give patient $1/10^{th}$ of full standard treatment dose (ex: for ceftriaxone (standard dose: 1-2 g), formulate 1 g dose in 50 mL of normal saline and give first 5 minutes of dose ~160 mg)
        ii. Monitor for 30 minutes. If the patient remains asymptomatic, give the full dose.

iii. Monitor patient for 60 additional minutes to ensure no reaction
iv. Subsequent doses can be given as per hospital's standard protocol

5) Order the Anaphylaxis & Acute Drug Hypersensitivity Protocol MCT order set to be available during the test dose procedure
6) If no evidence of reaction, ASP Team to document results of the procedure in the progress notes, remove allergy from medical record and inform patient of the allergy removal

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FORMULARY UPDATE

THERAPEUTIC CLASS: Respiratory stimulant

GENERIC NAME: Ammonia inhalant capsules (smelling salts; vaporole)

BACKGROUND/RATIONALE:

Ammonia inhalant capsules (smelling salts) are considered a medication. Traditionally, the most common use of ammonia inhalants is during venipuncture to assist with arousal upon syncope. Possible adverse reactions include headache, diarrhea, vomiting, cough, dyspnea, nasal mucosa irritation. Literature also reports risk of accident/injury with rapid return to consciousness. Johns Hopkins lab has recommended avoiding use of ammonia inhalants during venipuncture since at least 2009. According to the Clinical and Laboratory Standards Institute (CLSI), the use of ammonia inhalants may be associated with adverse effects and is not recommended.

In March, ammonia inhalants were removed from the CHI Memorial outpatient lab due to lack of medication orders for use and lack of secure storage. The lab's venipuncture policy was also updated to remove references to its use.

Many hospitals across the nation have removed ammonia smelling salts from their inventories due to similar regulatory issues.

Ammonia inhalant capsule utilization:

12 months 2021-2022-INPATIENT use							
Count of ACTION TYPE	Column La						
Row Labels	MCTH 200 SOUTH	MCTH EMERGENCY DEPT	MCTH INTERMEDIATE CARE UNIT	MCTHG EMERGENCY DEPT	MCTHG SURGERY	MCTHH EMERGENCY DEPT	Grand Total
AMMONIA AROMATIC 15 % (W/V) SOLUTION FOR INHALATION	1	29	4	1	2	1	38
Administration		9	2				11
Dispense	1	20	2	1	2	1	27
Grand Total	1	29	4	1	2	1	38
59% of dispensed doses were not documented as administered (charge not captured)							

DISCUSSION/RECOMMENDATION:
Ammonia inhalants are considered medications but have historically not been stored, documented, or ordered as such which is a regulatory issue. They are not benign and have several adverse effects associated.

~60% of dispensed doses at CHI Memorial are not documented as administered which leads to inaccurate medical record keeping and lost charges.

It is recommended to remove ammonia inhalant capsules from formulary. Alternative methods should be employed to prevent the need, such as raising patients to a standing position more slowly or allowing them to sit on the side of the bed for a longer period of time before standing to avoid syncope.

FORMULARY UPDATE

THERAPEUTIC CLASS: Vitamins

GENERIC NAME: IV fluids ("banana bag") containing:

- Sodium chloride 0.9%
- Thiamine
- Folic acid
- Multiple vitamins (MVI)

BACKGROUND/RATIONALE:

"Banana bag" therapy, which usually includes thiamine 100 mg, folic acid 1 mg, multivitamin, ± magnesium 2 gm in a 1 liter 0.9% sodium chloride bag, is a common treatment used in alcohol withdrawal patients. There is no literature to support administering a banana bag in the treatment of alcohol withdrawal. Some of the components in the banana bag are important to administer in an alcohol withdrawal patient. Below is a summary of the components with their recommended dosage regimens.

The CommonSpirit Health system P&T Committee recently approved removal of banana bags from formulary.

LITERATURE REVIEW:

Thiamine: The standard dose of 100 mg IV thiamine in a standard banana bag may not be sufficient to prevent or treat Wernicke's encephalopathy (WE) in patients with chronic alcohol use disorder (AUD) or alcohol withdrawal syndrome. An alternative dosing has been proposed at 200-500 mg IV (intravenous) thiamine every 8 hours for at least 72 hours. These higher doses of IV thiamine at more frequent intervals have been shown to increase cerebrospinal fluid (CSF) levels of thiamine, and increase symptom resolution or improvement of WE, with few if any adverse reactions. IV or IM (intramuscular) route of thiamine supplementation is preferred over oral (PO), although oral may be offered for prevention of WE in alcohol withdrawal patients at 100 mg a day for 3 to 5 days. For patients requiring glucose and thiamine, newer literature demonstrates that order of administration does not matter.

Folic Acid: Folate supplementation in patients with AUD may be considered as folate absorption is inhibited by alcohol intake and low levels of folate may be associated with an increased risk of seizures in alcohol withdrawal. If folate is administered, the dosing recommendation is 400-1000 micrograms IV for several days after admission. The normal dosing range of folate has limited toxicity, but risk of neurotoxicity increases at doses greater than 5 mg/day. As long as there is no concomitant alcohol use, switching to PO folate is reasonable.

Multivitamin: Neither IV nor PO multivitamin is likely to have a substantial benefit in patients with severe deficiencies. It is advised to evaluate symptoms and laboratory tests to confirm isolated nutritional deficiencies and prescribe targeted therapy based on those results.

Magnesium: Patients with WE may not respond to thiamine treatment in the setting of magnesium deficiency since magnesium is connected with thiamine via enzymatic processes. Empiric supplementation of magnesium should only be given if a patient's current levels are known, and if magnesium should be given, some recommended dosages are 64 mg/kg magnesium sulfate on day 1, followed by 32 mg/kg on days 2-4 or 10-30 mEq daily for the treatment of WE.

IV Fluids: Intravascular volume status and likelihood of starvation should be evaluated to determine the best IV fluid for critically ill AUD patients. In the setting of alcoholic ketoacidosis, dextrose fluids are recommended in place of normal saline. There is no recommendation for an exact amount of IV fluids that should be given in AUD patients.

The CommonSpirit Health system P&T Committee approved the following individual components for the treatment of alcohol withdrawal in place of a banana bag:

- Thiamine 100 mg-200 mg IV or PO daily for 3-5 days for (WE Prevention)
- Thiamine 200 mg-500 mg IV Q8 hours for at least 3 days (WE Treatment)
- Folic acid 400 mcg-1000 mcg IV or PO daily for 3-5 days
- Magnesium electrolyte replacement protocol
- IV fluids

IV Multivitamin was approved for use only in TPN.

Medication utilization (inpatient):

The pharmacy departments dispense an average of 85 banana bags per month.

PHARMACOECONOMICS/COST:

Product (Drug, Strength, Form)	Item Cost per Banana Bag
Sodium Chloride 0.9% IV Bag 1000 mL	$1.58
Multivitamin (with vitamin K) 10 mL	$7.97
Thiamine 100 mg (½ of 200 mg vial)	$1.88
Folic acid	$0.42
Total	**$11.85**

Anticipated annual cost savings (based on 85 dispenses/month)	**$12,087**

DISCUSSION/RECOMMENDATION:

It is recommended to adopt the decision of the CSH system P&T committee to designate "banana bags" or IV fluids with MVI +/- thiamine, +/- folic acid, or +/- magnesium as non-formulary with the modifications listed below. This will align with the newly approved alcohol withdrawal management protocol utilizing phenobarbital.

Providers may order the individual components for the treatment of alcohol withdrawal in place of a banana bag:

- Thiamine 100 mg PO daily for 3 days (WE Prevention)
- Thiamine 200 mg IV Q8 hours for 3 days (WE Treatment), followed by 100 mg PO daily for 3 days
- Folic acid 1000 mcg IV or PO daily for 3-5 days
- Standard electrolyte replacement orders for inpatients

-An ordering panel with the above options will be developed in the EHR to assist with ease of ordering the components in place of a banana bag.

-The alcohol withdrawal order set(s) will be updated to reflect this recommendation.

-Use of the "custom IV infusion" entry by providers to design their own banana bag will not be verified by the pharmacy dept. It is recommended to adopt an automatic therapeutic interchange by the pharmacist to the individual components above using the ordering panel.

Dexmedetomidine (Precedex) Infusion Weaning Orders

BACKGROUND/RATIONALE:

Dexmedetomidine is an alpha-2 adrenergic receptor agonist approved for the sedation of intubated and non-intubated patients for up to 24 hours. Due to its favorable pharmacodynamic properties, it has become a widely used agent for sedation in the intensive care setting. Furthermore, prolonged infusions beyond 24 hours have become more prevalent with studies demonstrating safety up to 5 days[2]. However, abrupt discontinuation of dexmedetomidine has been associated with symptoms such as tachycardia, reflex hypertension, agitation, and other hypersympathetic conditions[3]. As prolonged infusion durations continue to be used in practice, there is growing concern regarding these adverse events. Though the relationship between discontinuing prolonged dexmedetomidine infusions and the resulting adverse outcomes is not clearly established, practices minimizing these side effects have been encouraged and studied through the implementation of tapering and/or weaning protocols.

Literature review:
Currently there is a lack of evidence-based guidelines for the development of a dexmedetomidine infusion weaning protocol. However, there are studies that demonstrate successful utilization of clonidine when transitioning from dexmedetomidine[5,9-10]. In Bhatt et all[5], patients were allocated into two treatment groups - one group that was weaned from dexmedetomidine in combination with oral clonidine, and one group that was weaned from dexmedetomidine alone in patients that had received 3 days of continuous dexmedetomidine infusion. The primary outcome measure was incidence of dexmedetomidine withdrawal symptoms. Notable secondary outcome measures included average daily dexmedetomidine infusion rate throughout the total infusion duration, time to successful dexmedetomidine discontinuation, difference in drug cost using average wholesale price, time to transfer out of the ICU, and incidence of hypotension or bradycardia at any time during the weaning period. 15 patients in the clonidine weaning group and 27 patients in the dexmedetomidine alone group were included for analysis. This study found that patients were able to wean off dexmedetomidine more rapidly if they received clonidine - leading to substantial cost savings (average of $1553.47 per patient). Other outcome measures including the incidence of dexmedetomidine withdrawal symptoms were not significant.

PROPOSED WEANING ORDERS:

The proposed protocol was largely influenced by the small single-center prospective study by Bhatt et all[5]. A key difference in the proposed protocol and this study is the use of guanfacine instead of clonidine. The decision to include guanfacine rather than clonidine was made based upon pharmacokinetic differences between the two available enteral alpha-2 adrenergic receptor agonists. Due to its high affinity for the alpha-2a receptor subunit, guanfacine is proposed to have less effect on hemodynamics when compared to clonidine [6-8].

Medications

Dexmedetomidine-Second Line Agent bolus followed by infusion panel

- Dexmedetomidine 400 mcg in NS 100 ml infusion (current order)
  +Default: For 3 days duration
  (linked) followed by
- Dexmedetomidine 400 mcg in NS 100 ml infusion

  All defaults same as 1st order above *except* for admin instructions & start time
  Starting: T+3 (3 days from now)

  Admin instructions:
  When starting this order, document as "rate change" NOT "new bag".
  Open and print the associated reference link with instructions to this order.

  Precedex Weaning Orders: Use the below instructions and do not follow the Titrating Medications protocol.
  "**Initial Rate**" = rate currently infusing when weaning began.
  Change drip rate to be 75% of "**initial rate**" and run for 6 hours. Then,
  Change drip rate to be 50% of the "**initial rate**" and run for 6 hours. Then,
  Change drip rate to be 25% of the "**initial rate**" and run for 6 hours. Then,
  Stop infusion.
  (Total wean time = 18 hours)
  Notify physician if RASS GREATER than or EQUAL to +2 at any time during weaning.

  (linked) AND
- Guanfacine 1 mg tablet (ERX 10149)

  Starting: T+3
  2 mg, PO, Tab, twice daily, for 1 day
  Comments: Dexmedetomidine weaning orders. To start at weaning initiation.
  Followed by:
  1 mg, PO, Tab, twice daily, for 1 day
  Comments: Dexmedetomidine weaning orders. To start 24 hours after weaning initiation.
  Followed by:
  1 mg, PO, Tab, daily, for 1 day
  Comments: Dexmedetomidine weaning orders. To start 48 hours after weaning initiation.
  (Total guanfacine time = 3 days)

Nursing Reference Guide:

Dexmedetomidine (PRECEDEX) infusion attachment with weaning instructions
Nursing: Please print this sheet to reference throughout the weaning period

At the start of the weaning phase, please **circle** the starting rate for others to follow along and keep in the patient's room. Change infusion rate from left to right every (SIX) hours except for the initial change. All rates below are in ***mcg/kg/hr.***				
INITIAL rate	Change at hour 0	Hour 6	Hour 12	Hour 18
2	1.5	1.0	0.5	0
1.9	1.4	1.0	0.5	0
1.8	1.4	0.9	0.5	0
1.7	1.3	0.9	0.4	0
1.6	1.2	0.8	0.4	0
1.5	1.1	0.8	0.4	0
1.4	1.0	0.7	0.4	0
1.3	1.0	0.7	0.3	0
1.2	0.9	0.6	0.3	0
1.1	0.8	0.6	0.3	0
1.0	0.8	0.5	0.3	0
0.9	0.7	0.5	0.2	0
0.8	0.6	0.4	0	
0.7	0.4	0		
0.6	0.3	0		
0.5 and under	0			

CONCLUSION/RECOMMENDATION:
The implementation of a weaning protocol is recommended to standardize infusion durations of dexmedetomidine. The proposed changes will update the current “Intubation and Ventilator Weaning MCT” order set in addition to developing a new standalone medication entry for the dexmedetomidine infusion weaning protocol plus guanfacine taper. The non-weaning dexmedetomidine infusion will remain available as an ordering option.

Additionally, due to the lack of robust evidence with guanfacine when used to wean off dexmedetomidine, its use in this protocol could contribute to current gaps in literature. The impact of this dexmedetomidine weaning protocol will be evaluated through a retrospective research project in the 2022-2023 year and the results of that research will be shared with the P&T Committee in 2023.

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FORMULARY ADDITION

THERAPEUTIC CLASS: Antiviral agent

GENERIC NAME: Tecovirimat

PROPRIETARY NAME: Tpoxx

BACKGROUND/RATIONALE:

Monkeypox is an orthopoxvirus that is related to the smallpox virus. It has been associated with sporadic outbreaks over the past decades. Since May 2022, an outbreak of monkeypox has been ongoing in several countries, including the United States.

Tecovirimat (Tpoxx) is an antiviral agent FDA indicated for smallpox. Based on the CDC interim clinical guidance for the treatment of monkeypox, tecovirimat may be considered for treatment of monkeypox in patients with severe disease or those who may be at high risk for severe disease (eg, patients who are immunocompromised, pediatric patients [particularly those <8 years of age], patients with atopic dermatitis or other active exfoliative skin conditions, patients who are pregnant or breastfeeding, patients with one or more complications [eg, secondary bacterial skin infection, severe gastroenteritis, bronchopneumonia]) and patients with aberrant infections (eg, accidental implantation in the eyes, mouth, or other anatomical areas where monkeypox infection may constitute a special hazard [eg, genitals, anus].) Tecovirimat is available through the strategic national stockpile and is accessible through state governance.

Tecovirimat (Tpoxx) was recently approved to the CommonSpirit Health system formulary.

CHI Memorial has obtained oral Tpoxx from the state of TN and is now a “pre-positioned” site in order to ensure expedited treatment of patients, especially those that may present through the ED. CHI Memorial hospital may distribute Tpoxx to the Hixson campus and the ID physician’s office if needed. Tpoxx distributed from TN cannot be shared with GA per state guidelines.

DOSING:
Oral dosing (weight-based):
40 to <120 kg: 600 mg twice daily for 14 days.
≥120 kg: 600 mg 3 times daily for 14 days.

Missed doses: Administer missed oral dose as soon as possible if up to 8 hours prior to next scheduled dose. If <8 hours until the next scheduled oral dose, skip the missed dose and resume dosing at regular scheduled time.

No dosage adjustments required for renal or hepatic impairment

RECOMMENDATION/DISCUSSION:

It is recommended to add Tecovirimat (Tpoxx) to formulary.

Medications for COVID-19: Update

Emergency Use Authorization (EUA) Medications		
	Current Process	**Recommended Action**
Tocilizumab (Actemra)	Pharmacist automatic therapeutic interchange to either product based on product availability	Maintain current process
Baricitinib (Olumiant)		
Bamlanivimab/etesevimab	Federal government (HHS) manages supply and determines which product will be shipped to each state. State of TN then allocates mAb to select sites. Use of agent determined by activity against current variant(s) of concern (VOC).	Maintain current process
Casirivimab/imdevimab (Regen-COV)		
Sotrovimab		
Bebtelovimab		
Nirmatrelvir and ritonavir (Paxlovid)*	Formulary (stocked by retail pharmacy) Allow continuation of the patient's own home supply upon hospital admission, if ordered to continue by the admitting physician. Federal government (HHS) manages supply and determines which product will be shipped to each state. State of TN then allocates products to select sites.	Maintain current process
Molnupiravir	Non-formulary. Federal government (HHS) manages supply and determines which product will be shipped to each state. State of TN then allocates products to select sites.	Maintain non-formulary status

*Per the PAXLOVID fact sheet: “Should a patient require hospitalization due to severe or critical COVID-19 after starting treatment with PAXLOVID, the patient should complete the full 5-day treatment course per the healthcare provider’s discretion.”

COVID-19 Vaccines		
	Current Process	**Recommended Action**
Pfizer-BioNTech COVID-19 Vaccine	Formulary for inpatient use	Maintain current process
Pfizer-BioNTech COVID-19 Bivalent BOOSTER Vaccine	N/a	Add to formulary for inpatient use
Moderna COVID-19 Vaccine	Non-formulary for inpatient use	Maintain current process
Janssen (J&J) COVID-19 Vaccine	Non-formulary for inpatient use	Maintain current process

Use/Restriction Criteria Approved by COVID-19 Medications Subcommittee

Remdesivir Criteria: Inpatients (updated 2/1/22)**:** 5 (FIVE) day course of IV remdesivir (200 mg IV x 1 dose, followed by 100 mg IV daily x 4 days) or until hospital discharge, whichever comes first.

Inclusion criteria:
- COVID-19 (+)
- ≤5 days since symptom onset or positive test (whichever comes first)

Exclusion criteria:
- No greater than 5L of supplemental oxygen to maintain an O2 Sat of 92%
- ALT > 5x ULN
- If the provider determines the patient has end stage comorbidities, it is reasonable to withhold remdesivir and the palliative care screening tool is available to assist with decision making regarding therapy initiation.

-Renal function must be tested prior to starting remdesivir. Remdesivir should be used with caution in patients with an eGFR <30 mL/min (dose has not been studied & the infusion may cause further injury)

-If patient does not meet the specified criteria but you feel your patient may benefit from remdesivir, ID approval must be obtained.

Ritonavir-boosted nirmatrelvir (Paxlovid) Criteria: Inpatients (approved 4/12/22):

Inclusion criteria:
- COVID-19 (+) with mild to moderate symptoms
- <= 5 (FIVE) days since symptom onset or positive test (whichever comes first)
- High risk of progressing to severe COVID-19

Exclusion criteria:
- Hospitalized due to COVID-19
- eGFR < 30mL/min (dosage adjustment required for eGFR < 60mL/min)
- Severe Hepatic Impairment (Child-Pugh Class C)
- High risk for serious toxicity due to drug interactions unmanageable via therapy modification

Remdesivir Criteria: Incidental COVID+ (symptomatic) while admitted for non-COVID diagnosis (updated 4/12/22)**:**
(SOTROVIMAB preferred, when available/effective against VOC)

3 (THREE) day course of IV remdesivir (200 mg IV x 1 dose, followed by 100 mg IV daily x 2 days) or until hospital discharge, whichever comes first.

Inclusion criteria:
- COVID-19 (+) with mild to moderate symptoms
- ≤7 (SEVEN) days since symptom onset or positive test (whichever comes first)
- High risk of progressing to severe COVID-19
- Patient is not a candidate for sotrovimab or ritonavir-boosted nirmatrelvir due to specific patient factors and/or drug availability

Exclusion criteria:
- Hospitalized due to COVID-19
- ALT > 5x ULN
- If the provider determines the patient has end stage comorbidities, it is reasonable to withhold remdesivir and the palliative care screening tool is available to assist with decision making regarding therapy initiation.

-Renal function must be tested prior to starting remdesivir. Remdesivir should be used with caution in patients with an eGFR <30 mL/min (dose has not been studied & the infusion may cause further injury)

-If patient does not meet the specified criteria but you feel your patient may benefit from remdesivir, ID approval must be obtained.

Sotrovimab Criteria (approved 4/12/22):
Update [4/5/2022] Sotrovimab is no longer authorized to treat COVID-19 in any U.S. region due to increases in the proportion of COVID-19 cases caused by the Omicron BA.2 sub-variant

Inclusion criteria:

- COVID-19 (+) with mild to moderate symptoms
- <= 10 (TEN) days since symptom onset or positive test (whichever comes first)
- High risk of progressing to severe COVID-19

Exclusion criteria:

- Hospitalized due to COVID-19

Bebtelovimab Criteria (approved 4/12/22):

Inclusion criteria:

- COVID-19 (+) with mild to moderate symptoms
- <=7 (SEVEN) days since symptom onset or positive test (whichever comes first)
- ONLY if none of the preferred therapies are available, feasible to deliver, or clinically appropriate (e.g., due to drug-drug interactions, concerns related to renal or hepatic function)

Exclusion criteria:

- Hospitalized due to COVID-19

<u>Medication Protocols</u> – TJC Annual Review

November 2022

[See Appendix A for Policies]

Protocol	**Key contact(s)**	**Action Required 2022**
MCT RIS Contrasts Order Set/ Contrast Media Administration Policy	Director of Imaging Services Dr. Rowlett	*Eliminating the need to check a patient's renal function when they are going to be receiving a MultiHance contrasted MRI. The GFR < 30 cutoff will thus be eliminated.*
Anaphylaxis & Acute Drug Hypersensitivity Protocol	Pharmacy Review Team	Order set and policy up to date. No medication edits are required.
Hypoglycemia Protocol	Diabetes education, Pharmacy Review Team	Order set and policy up to date. No medication edits are required.
Narcan (Naloxone) Opioid Reversal Protocol	Pharmacy Review Team; Clinical educator critical care	Order set and policy up to date. No medication edits are required.
Respiratory Distress Protocol	Pulmonary management team	Order set and policy up to date. No medication edits are required.
Bradycardia Management Protocol	Clinical educator critical care	Change symptomatic SBP to $\underline{\leq}$80 instead of <70 mmHg. No medication edits are required.

Use of the below CHI Memorial MEDITECH order sets have been approved by the Pharmacy & Therapeutics Committee for temporary use during the October 2022 Epic Downtime.
If not listed here, the downtime version of the set on Policy Manager should be used: https://mhcs.ellucid.com/manuals/binder/301

Order Set name (MEDITECH)
Abscess and Cyst Drainage: Post
Abscess and Cyst Drainage: Pre
Acute Coronary Syndrome/Non-Stemi Orders
Admission Orders: Hospitalist
Amiodarone (Cordarone) Protocol
Anaphylaxis & Hypersensitivity Protocol
Arthroscopies: Post-Op
Aspirin Desensitization
Biliary/Nephrostomy Tube Change
Biliary/Nephrostomy Tube Placement
Cardiac Cath Lab Intra-Procedure Orders
Cardiac Surgery Orders: Transfer
Cardiac Surgery: Post-op
Cardioversion Orders: Post Procedure
Cardioversion Orders: Post Procedure
Cardioversion Orders: Pre Procedure
Cardioversion Orders: Pre Procedure
Carotid Surgery: Post-op
Continuous Nerve Plexus Catheters - Upper Extremity
Continuous Renal Replacement Therapy CRRT
Continuous Renal Replacement Therapy CRRT (for patients intolerant of citrate anticoagulation)
Coronary Arteriograms Possible PCI: Pre Procedure (3)
Coronary Arteriograms: Post- Procedure (6)
CT Guided Biopsy Post Procedure
CT Guided Biopsy Pre Procedure
Dialysis Procedure Standing Orders
Diltiazem Protocol
Electrolyte Replacement Guidelines
EP Study Orders: Post-Procedure (2)
EP Study Orders: Pre-Procedure (1)
EP Study with Ablation Orders: Post-Procedure (3)
EP Study with Ablation Orders: Pre-Procedure (1)
Epidural Standing Orders- Patient Controlled Analgesia (AA)
Extracorporeal Membrane Oxygenation (ECMO)
Heparin IV Drip Protocol
Hypertonic Saline for Hyponatremia
ICD (Defibrillator) Implant Orders: Post-Procedure (2)
ICD (Defibrillator) Implant Orders: Pre-Procedure (2)
ICD (Defibrillator) Testing Orders: Post-Procedure (1)
ICD (Defibrillator) Testing Orders: Pre-Procedure (1)
Implantable ECG (Loop) Recorder Post Procedure (1)
Implantable ECG (Loop) Recorder Pre Procedure (2)
Implantable ECG (Loop) Recorder Removal Post Procedure (1)
Kyphoplasty Orders: Post-Procedure
Kyphoplasty Orders: Pre-Procedure
PACU Anesthesia Orders
Paracentesis Orders
PCA Infusion
PCI Post-Procedure/AMI
PCI: Pre-Procedure (3)
Permanent Pacemaker Insertion: Post-Procedure (2)
Permanent Pacemaker Insertion: Pre-Procedure (2)
PFT AND LUNG DIFFUSION STUDIES ORDERS
Pleurex Catheter Insertion Orders: Post-Procedure
Pleurex Catheter Insertion Orders: Pre-Procedure
Pre-Operative Anesthesia Orders for Adult Patients
Special Procedure Orders: Post
Special Procedure Orders: Pre
STEMI Orders
Therapeutic Plasma Exchange (TPE)
Thoracentesis Orders
Thyroid Biopsy By Ultrasound
Tikosyn
Total Hip Replacement Standing Orers: Post-Op
Total Knee Replacement Standing Orers: Post-Op
Total Shoulder Arthroplasty Post Op
TPN Daily Orders for Adults
TPN Initiation Orders
Transesophageal Echocardiography: Intra Procedure (1)
Transesophageal Echocardiography: Intra Procedure (1)
Transesophageal Echocardiography: Post Procedure (1)
Transesophageal Echocardiography: Post Procedure (1)
Transesophageal Echocardiography: Pre Procedure (1)
Transesophageal Echocardiography: Pre Procedure (1)
Vancomycin Initiation by Pharmacist
Vascular Postoperative Orders: Abdominal Aortic Surgery
VASOACTIVE, SEDATIVE/ANALGESIC, & NEUROMUSCULAR BLOCKER TITRATABLE IV MEDICATION ORDERS
Warfarin Initiation by Pharmacist

10/17/2022

Reviewed by:

Daniel Marsh, Director of Pharmacy; Rachel Kile, PharmD, Pharmacy Clinical Manager

Approved by:

Nathan Chamberlain, MD, Chairman, P&T Committee

Matthew Kodsi, MD, CMO

Use of the below CHI Memorial MEDITECH CHEMOTHERAPY order sets have been approved by the Pharmacy & Therapeutics Committee for temporary use during the October 2022 Epic Downtime.	
Order Set name (MEDITECH)	**PSO**
AML Induction 7+3	1446
Chemoembolization: Post-Procedure	2072
Chemotherapy	1489
High Dose Methotrexate	1527
Lung Cancer- Carboplatin + Etopiside	2324
Non-Hodgkins Lymphoma DHAP	1421
Non-Hodgkins Lymphoma ESHAP	1422
Ovarian Protocols	1423
R-CHOP	2326
R-EPOCH Protocol	2328
R-Hyper CVAD Regimen A	2327
R-Hyper CVAD Regimen B	2329
Rasburicase (Elitek) Orders	2456
Rituximab (Rituxan)	1528
Taxol and Carboplatin	1846
10/6/2022	
Reviewed by:	
Daniel Marsh, Director of Pharmacy; Rachel Kile, PharmD, Pharmacy Clinical Manager	
Approved by:	
Nathan Chamberlain, MD, Chairman, P&T Committee	
Matthew Kodsi, MD, CMO	

POLICY

Title: **24 HOUR STOP ON ROUTINE PERI-OPERATIVE ANTIBIOTIC PROPHYLAXIS**			
		Page **1** of **1**	
Policy Number: MM-05433		Date Last reviewed/Revised: 1/20	Valid Until: 1/23
Campus: ☒ CHI Memorial Glenwood ☒ CHI Memorial Hixson ☒ CHI Memorial Georgia ***Check all that apply***			
Department(s) Affected: All Clinical Areas		Review Period: Every 3 years	

OUTCOME:
Ensure adherence to evidence-based practice regarding management of routine, peri-operative antibiotic prophylaxis in patients with uneventful clinical course.

POLICY:
Routine, peri-operative prophylactic antibiotics will be automatically stopped after 24 hours for patients whose clinical course does not suggest infection. *The 24 hour time frame will include the first documented peri-operative dose given by Surgery.*

For exceptions to this policy,

A. The physician must enter an order to continue antibiotic therapy.

B. Medical record documentation by the physician must state indication for continuation of antibiotics beyond the automatic 24 hour stop time. Indications might include but are not limited to: abscess, sepsis, surgical site or wound infection, or osteomyelitis.

If it is unclear whether antibiotics are for routine prophylaxis or for treatment of infection, the pharmacist will contact the surgeon for clarification before any changes are made.

Key Contact: Pharmacy Review Team
Approved/Reviewed by: Director of Pharmacy; Pharmacy & Therapeutics Committee: Nursing Professional Practice Council:
Reference(s): SCIP Guidelines
Date First Effective/Revisions: 10/08, (10/10) (9/13) (9/16) (12/16) (1/20)

POLICY

Title: **RENAL DOSING ADJUSTMENTS**			
		Page **1** of **4**	
Policy Number: PHRM-0579		Date Last reviewed/Revised: 11/22	Valid Until: 11/25
Campus: ☒ CHI Memorial Glenwood ☒ CHI Memorial Hixson ☒ CHI Memorial Georgia *Check all that apply*			
Department(s) Affected: Pharmacy		Review Period: Every 3 years	

OUTCOME:
To ensure appropriate medication dosing based on patient's renal function and optimize pharmacodynamics and pharmacokinetic properties of renally eliminated medications while decreasing toxicities associated with inappropriate dosing.

POLICY:
Pharmacists may automatically adjust the dose of renally eliminated antimicrobials, anticoagulants, and other medications as approved per the Pharmacy and Therapeutics committee after evaluation of a patient's renal function. In instances where a renal dosage change is warranted, but the medication is not included for automatic dosage adjustment, the pharmacist may contact the prescriber with the recommended dosage change.

PROCEDURE:
1. A pharmacist may evaluate a patient's medication profile for renally eliminated medications. If relevant renal labs have not been ordered within 24 hours of the medication order, the pharmacist may order a basic metabolic profile (BMP) in order to complete this evaluation.
2. During the evaluation, the pharmacist may assess the doses of renally eliminated medications. Based on the patient's calculated creatinine clearance and clinical status, the pharmacist may make necessary adjustments. In instances where a renal dosage adjustment is warranted, but the medication is not approved for automatic adjustment, the pharmacist may contact the prescriber recommending a dosage change.
3. When an automatic dosage adjustment is made, the pharmacist will enter the new order as "Rx Drug Therapy Management-no cosign required."
4. The pharmacist will follow up on dosage adjustments as appropriate, evaluating subsequent changes in patient's renal function and clinical status. If relevant renal labs have not been ordered within 48 hours after a dosage adjustment, the pharmacist may order a basic metabolic profile (BMP).
5. If any dosage adjustment made by a pharmacist is subsequently changed by a prescriber, the pharmacist will make not further automatic adjustments on that medication during the current admission, unless otherwise directed.
6. The following medications have been approved for automatic dose adjustment per pharmacist by the Pharmacy and Therapeutic committee:

CHI Memorial Pharmacy Renal Dose Adjustments

Antimicrobials

Drug Name	CrCl > 50 ml/min	CrCl 10 – 50 ml/min	CrCl < 10 ml/min	Dialysis (HD)
Ampicillin Meningitis or endovascular infection	2 g IV Q4h	30-50 ml/min 2 g IV q6h	10-29 ml/min 2 g IV q8h	<10 ml/min or HD 2 g IV q12h
Uncomplicated infection	2 g IV Q6h	2 g IV q8h	2 g IV q12h	1 gm IV q12h

Ampicillin/sulbactam (Unasyn®)	3 g IV Q6h	1.5 g IV Q6h	1.5 g IV Q12h	1.5-3 g IV Q12h
Aztreonam (Azactam®)	>30 ml/min 2 g IV Q8h UTI (no sepsis) 1 g IV Q8h	10-30 ml/min 2 g IV Q12h UTI (no sepsis) 1 g IV Q12h	≤10 ml/min 1 g IV Q12h UTI (no sepsis) 1 g IV Q24h	1 g IV x1 dose, then Q PM
Cefazolin (Ancef®)	>30 ml/min 2 g IV Q8h Uncomplicated Gram Positive, UTI (no sepsis) 1 g IV Q8h	10-30 ml/min 2 g IV Q12h Uncomplicated Gram Positive, UTI (no sepsis) 1 g IV Q12h	≤10 ml/min 1 g IV Q24h	1 g IV Q PM
Cefepime (Maxipime®) Febrile Neutropenia, critically ill with BMI ≥ 30, or recent or confirmed infection with below organisms &/or MIC* *Excluding treatment of lower UTIs: GNR with an MIC of 4, Pseudomonas spp., Acinetobacter spp., Hafnia alvei, Enterobacter cloacae, Citrobacter freundii, Klebsiella aerogenes, or Serratia marcescens	>50 ml/min 2 gm IVP x1, then 2 gm IV q8h (over 4 hrs)	30-49 ml/min 2 gm IVP x1 dose, then 2 gm IV q12h (over 4 hrs)	11-29 ml/min 2 gm IVP x1 dose, then 2 gm IV q24h (over 4 hrs)	≤ 10 ml/min or HD: 1 gm IV Q PM
UTI, no sepsis	1 gm IVP q12h	1 gm IVP q24h		
All other indications	1 gm IVP q6h	1 gm IVP q8h	1 gm IVP q12h	
Cefoxitin (Mefoxin®)	1-2 g IV Q6h	1-2 g IV Q8-12h	500 mg-1 g IV Q24h	1 g IV Q PM

Drug Name	**CrCl > 50 ml/min**	**CrCl 10 – 50 ml/min**		**CrCl < 10 ml/min**	**Dialysis (HD)**
Ceftaroline (Teflaro®)	>50 ml/min 600 mg IV Q12h Pneumonia, Severe Infections 600 mg IV Q8h	30-50 ml/min 400 mg IV Q12h 600 mg IV Q12h	15-29 ml/min 300 mg IV Q12h 400 mg IV Q12h	≤15 ml/min 200 mg IV Q12h 300 mg IV Q12h	200-300 mg IV Q12h
Ceftolozane/tazobactam (Zerbaxa®)	>50 ml/min 1.5 g IV q8h Pneumonia, Severe Infections 3 g IV q8h	30-50 ml/min 750 mg IV q8h 1.5 g IV q8h		15-29 ml/min 375 mg IV q8h 750 mg IV q8h	2.25 g-750 mg IV x 1, then 450-150 mg IV q8h

Ciprofloxacin (Cipro®)	>= 30 ml/min 400 mg IV Q12h 500-750 mg po Q12h *Pseudomonas* 400 mg IV Q8h 750 mg po Q12h	10-30 ml/min 400 mg IV Q12-24h 500 mg po Q12-24h	<10 ml/min 400 mg IV Q24h 500 mg po Q24h	400 mg IV Q PM 500mg po Q PM
Clindamycin (Cleocin®)	600 – 900 mg IV Q8h		No adjustment for renal dysfunction	
Levofloxacin (Levaquin®)	750 mg IV/po Q24h	20-49 ml/min 750 mg IV/po Q48h	<20 ml/min 750 mg x1, then 500 mg IV/po Q48h	750 mg x1, then 500 mg IV/po Q48h
Meropenem (Merrem®)	≥ 50 ml/min 500 mg IV Q6h	26 – 50 ml/min 500 mg IV Q8h	10-25 ml/min 500 mg IV Q12h	<10 ml/min or HD: 500 mg IV Q PM
Excluding treatment of lower UTIs (no sepsis): Confirmed or recent infection with a GNR with MIC ≥ 2, Pseudomonas spp., or Acinetobacter spp.	≥ 50 ml/min 1 gm IV x1 dose (over 30 mins), then 1 gm IV q8h (over 3 hrs)	26 – 50 ml/min 1 gm IV x1 dose (over 30 mins), then 1 gm IV q12h (over 3 hrs)		
Meropenem/vaborbactam (Vabomere®) eGFR (ml/min/1.73m^2) All doses given over 3 hrs	≥ 50 ml/min 4 g IV Q8h	30 – 50 ml/min 2 g IV Q8h	15-29 ml/min 2 g IV Q12h	<15 ml/min 1 g IV Q12h	1 g IV Q12h
Oseltamivir (Tamiflu®)	≥ 60 ml/min 75 mg PO BID	30-60 ml/min 75 mg PO Daily	≤ 30ml/min 30 mg PO Daily	30 mg PO post-HD only
Piperacillin/ tazobactam (Zosyn®)	Loading dose for all patients 4.5 g IV x 1 dose (over 30 min)	BMI >30 & CrCl >20 ml/min 4.5 g IV Q8h (over 4 hrs)	BMI<30 & CrCl >20 ml/min 3.375 g IV Q8h (over 4 hrs)	<20 ml/min or HD: 3.375 g IV Q12h (over 4 hrs)

Antimicrobials in Continuous Renal Replacement Therapy (CRRT)

Drug	Loading Dose	Maintenance Dosage for CRRT			High Dose*
		CVVH	CVVHD	CVVHDF	
Ampicillin	2 g	1-2 g q8-12h	1-2 g q8h	1-2 g q6-8h	2 g q4-6h
Ampicillin/sulbactam	3 g	1.5-3 g q8-12h	1.5-3 g q8h	1.5-3 g q6-8h	3 g q6h
Aztreonam	2 g	1-2 g q12h	1 g q8h or 2 g q12h	1 g q8h or 2 g q12h	2 g q8h
Cefazolin	2 g	1-2 g q12h	1 g q8h or 2 g q12h	1 g q8h or 2 g q12h	2 g q8h
Cefepime	2 g	1-2 g q12h	1 g q8h or 2 g q12h	1 g q8h or 2 g q12h	1 g q6h or 2 g q8h
Ceftaroline	600 mg	400-600 mg q12h			600 mg q8h
Ceftazidime/avibactam	2.5 g	1.25g IVq8h			2.5 g q8h (based on ceftazidime data)
Ceftolozane/tazobactam	3 g	750 mg q8h	1.5 g q8h	1.5 g q8h	1.5 g q8h (data lacking for higher dose)
Ciprofloxacin	N/A	400 mg q12-24h	400 mg q12-24h	400 mg q12h	400 mg q8-12h

Levofloxacin	750 mg	750 mg q48h	750 mg q48h	750 mg q24h	750 mg q24h
Meropenem	1 g	500 mg-1 g q12h	500 mg-1 g q8-12h	500 mg-1 g q8-12h	500 mg q6h/1 g q8h
Meropenem/vaborbactam	4 g	1-2 g q8h (extended)			2 g q8h (extended); based on meropenem data
Piperacillin/tazobactam	4.5 g	3.375-4.5 g IV q8h (extended)			

**High Dose Parameters:*
- Ultrafiltration/dialysate flow rate of >2 L/hr
- Residual renal function

Miscellaneous Medications

Enoxaparin (Lovenox®)		
CrCl (ml/min)	**Prophylactic Dose**	**Treatment Dose**
≥ 30	40 mg daily	1 mg/kg BID*
< 30	30 mg daily	1 mg/kg daily*

* If CrCl < 20 ml/min and on treatment dose, dose will be decreased to once daily and anti-factor Xa level drawn 4 hours post-dose to evaluate if continued Lovenox use is appropriate.

* If patient weight > 190 kg and on treatment dose, pharmacy will automatically obtain anti-factor Xa level 4 hours post-dose.

Famotidine (Pepcid®)	
CrCl (ml/min)	**Renal Adjustment**
≥ 50	20 mg PO/IV BID
< 50	20 mg PO/IV daily

Fondaparinux (Arixtra®) (contraindicated in patients with CrCl < 30 ml/min)
For patients with CrCl < 30 ml/min who are on the prophylactic dose of Arixtra (2.5 mg daily), pharmacy will automatically change to Lovenox 30 mg daily.

Baricitinib (Olumiant®) for COVID-19	
Estimated glomerular filtration rate (eGFR)	**Renal Adjustment**
≥60 mL/min/1.73 m2	4 mg once daily
30 to 60 mL/min/1.73 m2	2 mg once daily
15 to 30 mL/min/1.73 m2	1 mg once daily
< 15 mL/min/1.73 m2	Not recommended

Nirmatrelvir and ritonavir (Paxlovid®)	
Estimated glomerular filtration rate (eGFR)	**Renal Adjustment**
≥60 mL/min/1.73 m2	300 mg/100 mg BID
≥30 to <60 mL/min/1.73 m2	150 mg/100 mg BID
< 30 mL/min/1.73 m2	Not recommended

Key Contact: Pharmacy Review Team
Approved/Reviewed by: Director Pharmacy, VP of Medical Affairs
Reference(s): ASHP Guidelines
Date First Effective/Revisions: 9/13 (12/16) (10/19) (8/22) (11/22)

POLICY

Title: **BETA-LACTAM ALLERGY**			
		Page **1** of **2**	
Policy Number:		Date Last reviewed/Revised: 11/22	Valid Until: 11/25
Campus: ☒ CHI Memorial Glenwood ☒ CHI Memorial Hixson ☐ CHI Memorial Georgia *Check all that apply*			
Department(s) Affected: All Clinical Areas		Review Period: Every 3 years	

PURPOSE:
The prevalence of penicillin allergies in the Unites States (US) has been estimated to be between 8 and 15%. Cephalosporin allergies are less frequent and are reported in approximately 1% of the US population. However, >97% of patients reporting a penicillin allergy are not truly allergic when assessed by skin testing and direct amoxicillin challenge. Among patients with a low severity penicillin allergy, over 95% can tolerate penicillin. This is due to the fact that most penicillin allergies are documented after the occurrence of delayed benign rashes that do not necessarily recur on re-exposure, intolerances due to penicillin, or other symptoms unrelated to an allergy such as urticaria due to a viral infection. Moreover, over 80% of patients with true IgE-mediated penicillin allergy outgrow their allergy after 10 years due to waning sensitization.

Overuse of second line agents such as fluoroquinolones due to over-cautious avoidance of a wide range beta-lactams can have significant negative consequences, including adverse drug reactions, *Clostridioides difficile* super-infection, and antimicrobial resistance.

POLICY:
This policy, in conjunction with the *Beta-lactam Allergy Guideline,* is intended to improve the management of patients with beta-lactam allergies.

PROCEDURE:
A. Medication History Pharmacy Technicians will conduct allergy interviews for patients with penicillin and cephalosporin allergies using patient allergy assessment tool and update allergy documentation in the EHR (Appendix 1 of the *Beta-lactam Allergy Guideline*)
B. Pharmacists and providers will identify patients for allergy de-labeling (Appendix 2 of the *Beta-lactam Allergy Guideline*)
C. Pharmacists and providers will follow test dose procedure detailed in Appendix 4 of the *Beta-lactam Allergy Guideline*
   i. The attending, a consulting provider or an Infectious Diseases physician may authorize the test dose

References:

1) Castells M, Khan DA, Phillips EJ. Penicillin allergy. N Engl J Med 2019; 381:2338-51.
2) Krishna MT, Misbah SA. Is direct oral amoxicillin challenge a viable approach for 'low risk' patients labelled with penicillin allergy. J Antimicrob Chemother 2019;74(9):2475-79.
3) Anstey K, Tsao, L, Otani IM. Drug allergy delabeling programs: recent strategies and targeted populations. Clin Rev Allergy Immunol. 2022;62(3):484-504.
4) Confino-Cohen Ronit, Rosman Y, Meir-Shafrir K, et al. Oral challenge without skin testing safely excludes clinically significant delayed-onset penicillin hypersensitivity. J Allergy Clin Immunol Pract. 2017;5(3):669-675.
5) Chua KY, Vogrin S, Bury S, et al. The penicillin allergy delabeling program: a multicenter whole-of-hospital health services intervention and comparative effectiveness study. Clin Infect Dis 2021;73(3):487-96.
6) Devchand M, Kirkpatrick CMJ, Stevenson W., et al. Evaluation of a pharmacist-led penicillin allergy delabelling ward round: a novel antimicrobial stewardship intervention. J Antimicrob Chemother 2019; 74(6):1725-30.
7) Macy E, Contreras R. Health care use and serious infection prevalence associated with penicillin "allergy" in hospitalized patients: A cohort study. J Allergy Clin Immunol 2014;133(3):790–6.
8) Blumenthal K. G., et al. Impact of a clinical guideline for prescribing antibiotics to inpatients reporting penicillin or cephalosporin allergy. Ann. Allergy. Asthma Immunol. 115, 294–300.e2 (2015).

9) Lin RY. A perspective on penicillin allergy. Arch Intern Med 1992;152:930-937.
10) Weiss MR. Drug allergy. Med Clin North Am 1992;76:857-882.
11) DePestel DD, Benninger MS, Danziger L, et al. Cephalosporin use in treatment of patients with penicillin allergies. Journal of the American Pharmacists Association 2008;48:530- 540.
12) Pichichero ME. Use of selected cephalosporins in penicillin-allergic patients: a paradigm shift. Diagnostic Microbiology and Infectious Disease 2006;57:13S-18S.
13) Romano A, Viola M, Guéant-Rodriguez RM, et al. Brief communication: tolerability of meropenem in patients with IgE-mediated hypersensitivity to penicillins. Ann Intern Med 2007;146(4):266.
14) Pichichero ME, Zagursky R. Penicillin and cephalosporin allergy. Ann Allergy Asthma Immunol 2014;112:404-12.
15) Romano A, Gaeta F, Valluzzi RL, et al. IgE-mediated hypersensitivity to cephalosporins: cross-reactivity and tolerability of alternative cephalosporins. J Allergy Clin Immunol 2015;136:685-691.e683.
16) Skalweit MJ. Profile of ceftolozane/tazobactam and its potential in the treatment of complicated intra-abdominal infections. Drug Des Devel Ther 2015;9:2919-25.
17) Blumenthal KG, Shenoy ES, Wolfson AR, et al. Addressing inpatient beta-lactam allergies: a multihospital implementation. J Allergy Clin Immunol Pract 2017;5:616-25.

Key Contact: Pharmacy Review Team
Approved/Reviewed by: Pharmacy & Therapeutics Committee
Date First Effective & (Revision/Review dates): 11/22

POLICY

Title: PHARMACY & THERAPEUTICS COMMITTEE			
		Page **1** of **4**	
Policy Number: PHRM-0624		Date ~~Last~~ reviewed/Revised: 11/22	Valid Until: 11/25
Campus: ☒ CHI Memorial Glenwood ☒ CHI Memorial Hixson ☒ CHI Memorial Georgia *Check all that apply*			
Department(s) Affected: Pharmacy		Review Period: Every 3 years	

PURPOSE:
The Pharmacy and Therapeutics (P&T) Committee establishes and maintains CHI Memorial, CHI Memorial Hixson, and CHI Memorial Georgia medication formularies and assists in the formulation of policies-procedures regarding the evaluation, selection, procurement, distribution, safety procedures, and other matters relating to the safe use of medications. The Committee assists in the formulation of programs designed to meet the needs of the professional staffs for complete current knowledge on matters and practices related to medications. CHI Memorial Georgia will maintain a sub-committee to review quality improvement and Georgia specific issues related to this practice site. Formulary decisions will be made as a CHI Memorial system and communicated to the appropriate leadership at each facility.

POLICY/PROCEDURE:

Committee Membership & Structure:
Authority – The P&T Committee members consist of the Director of Pharmacy, Pharmacy Clinical Manager, Chief Medical Officer (or designee), physician representatives from selected disciplines of medicine, hospital administration, nursing, education and selected ancillary departments.

Chairperson – A physician member of the committee appointed by the CMO and/or Chief of Staff. Chairmanship shall be for a 2-year term but can be extended for an additional term(s) upon approval by CMO and/or Chief of Staff.

Physician Membership – Physician members shall be appointed by the CMO or Chief of Staff, in collaboration with the chairperson, to assure broad representation sufficient to meet the committee's needs regarding the committee's functions and purposes.

Reporting Structure – The Committee reports to the Medical Executive Committee (MEC) on matters that affect all disciplines of medical staff.

Voting Members – The voting members of the committee consist of the following members: physicians (including Chief Medical Officer), Director of Pharmacy, Chief Nursing Officer, and the Vice President of Quality (or designee).

Quorum – A quorum shall consist of at least 3 physician members (or their proxy), the Director of Pharmacy (or designee), and at least one member of hospital leadership (Chief Nursing Officer, Chief Medical Officer, or Vice President of Quality).

Meeting Frequency – The P&T Committee will meet a minimum of five times per year at a date and time convenient for the majority of its members. Ad-hoc Committee meetings occur on an agenda driven basis at a mutually convenient time and place for those attending. The Ad-hoc Committee(s) reports findings and recommendations to the P&T Committee.

Committee Functions:
The Committee functions may include, but are not limited to:

- Formulary Management: Works in collaboration with the medical staff to evaluate, determine therapeutic use, and select drugs for inclusion in the CHI Memorial formulary by evaluating relevant clinical data and evidence-based medicine. Provides final approval of CHI Memorial drug formulary that is maintained to meet the needs of patients treated within CHI Memorial facilities. Additionally, provides recommendations to the national CommonSpirit Health Pharmacy & Therapeutics Committee. Ongoing formulary maintenance will also be conducted via medication class reviews to ensure ideal, evidence-based formulary selections are in place.

- Policy Management: Works in collaboration with the medical staff to review polices related to the use and evaluation of pharmaceutical, therapeutic, and related therapies in an effort to standardize clinical practice and to avoid unintended consequences.

- Medication Use Evaluations: Reviews evaluations of medication use for formulary medications and reviews data for the purpose of optimizing medication utilization and/or patient safety on an as needed basis. These reviews shall be conducted for the purpose of optimizing safety, efficacy, best practices, and/or cost.

- Patient Safety: Investigates and oversees all medication related safety concerns for opportunities to optimize or improve medication related therapies. This may include but is not limited to reviews of reported adverse drug reactions related to inpatient or outpatient drug administrations.

- Staff Education: Plans and establishes suitable educational programs for the medical staff on pertinent matters relating to drugs and their use regarding safe and effective best practices for use of medications.

- Communication: Ensures bi-directional communication with the CHI Memorial medical staffs/committees and the national CHI Pharmacy & Therapeutics Committee.

Formulary Requests – Formulary requests will be requested via a Formulary Addition Request Form for drugs in which the physician would like to be considered for formulary (see Appendix A). The requestor must also submit a Disclosure Statement with the Formulary Addition Request Form (see Appendix B). The Pharmacy Department Clinical Lead (or designee) will receive and assign the request to be presented at the most appropriate P&T Committee meeting. The requestor (or designee) must be present at the assigned Committee meeting. Once assigned to a Committee agenda, a formulary evaluation will be conducted by assigned members. The evaluation shall include, but not be limited to, monograph production with a literature evaluation, a Safety and Efficacy Evaluation and an Operational/Safety addendum as necessary.

Key Contact: Pharmacy Review Team, Clinical Pharmacy Manager
Approved/Reviewed by: Director of Pharmacy, Chief Medical Officer
Attachments: FORMULARY ADDITION REQUEST FORM (Appendix A)
DISCLOSURE STATEMENT (Appendix B)
Date First Effective/Revisions: 10/20/88, 5/09, (1/10) (1/13) (7/15) (11/18) (11/19) (11/22)

Appendix A

POLICY

Title: CONTRAST MEDIA ADMINISTRATION			
		Page 1 of 8	
Policy Number: PC-07335		Date Last reviewed/Revised: 11/22	Valid Until: 11/23
Campus: ☒ CHI Memorial Glenwood ☒ CHI Memorial Hixson ☒ CHI Memorial Georgia ☒CHI Memorial Ooltewah Imaging ☒ CHI Memorial Parkway Imaging *Check all that apply*			
Department(s) Affected: Imaging Services, Radiation Oncology, Pharmacy, Emergency Care Center		Review Period: Annually	

OUTCOME: To provide safe contrast media administration.

POLICY:
This policy is a joint responsibility of the All Imaging Services/Radiation Oncology locations, Emergency Care Centers, and Pharmacy departments.

A. Patients receiving IV contrast media (Gadolinium)

a. Prior to receiving IV contrast media

CONTRAST MEDIA ASSESSMENT (154403) will be completed and all the information confirmed by the patient and technologist to include a history of allergies and any past X-ray studies and/or adverse drug reactions.

Patients receiving MultiHance (Gadobenate dimeglumine), a group II gadolinium-based-contrast-agent (GBCA), no longer need to have a GFR assessment prior to imaging.

Patients receiving Eovist (Gadoxetate disodium), a group III GBCA, will continue to need to be assessed for renal failure and risks of renal failure.

The following guidelines will be followed for administration of Eovist:

Risk Factors

- Age > 60
- History of Renal Disease, including:
  - Dialysis
  - Kidney Transplant
  - Single Kidney
  - Kidney Surgery
  - History of known cancer involving the kidney(s)
- History of hypertension requiring medical therapy
- History of Diabetes mellitus

If risk factors are identified, the patient will have a creatinine/eGFR drawn and sent to Lab prior to administration of Eovist.

GFR > 30: Eovist contrast will be calculated by weight per protocol 0.1mmol/kg (0.2ml/kg) not to exceed 20ml IV for standard MRI's. .

GFR < 30: Do not administer Eovist. In consultation with the radiologist, the exam needs to be converted to a MultiHance post-contrast exam, or a non-contrast exam.

The patient does not need to sign informed consent except for exams performed in Georgia. If there is a calculated eGFR, it will be documented on the contrast history assessment and maintained in the patient's medical record.

b. **Administration of IV contrast media and Observation of Patient (Gadolinium or Iodinated)**
   i. Contrast media injection will not be administered without a Radiologist, Radiation Oncologist, MHI or Emergency Care Center physician being available at time of the injection.
   ii. Contrast injections may be administered by any radiologic technologist or didactically trained RN.
   iii. The nurse or technologist administering the contrast will observe the patient for five minutes following the completion of the injection. If any adverse drug reaction is noted, the RN or technologist will immediately follow the appropriate management of adverse reaction guidelines for minor, intermediate, or major reactions.

c. **For EXTRAVASATION OF CONTRAST MATERIAL:**
Refer to **EXTRAVASATION OF CONTRAST MATERIAL (RAD-10105)**

NOTE: For returning patients with follow-up exams, use the same gadolinium contrast agent used in the previous "like" exam.

All CHI Memorial locations will be consistent with the current FDA recommendations as they evolve in the use of Gadolinium based contrast agents

B. **Patients receiving Iodinated Contrast Materials (ionic or non-ionic):**
   a. Intravenous contrast dosage is calculated according to patient's weight (1ml/lb) up to 100 pounds, at which patients 100 pounds and over will receive a dose of 100ml.
   b. All other contrast agent dosage will be determined using a standard dose chart per Radiologist/MHI physician protocol (attached).
   c. These standard protocols may be altered based on patient history and Creatinine/GFR calculation if applicable.
   d. Contrast dosage will be recorded on **CONTRAST MEDIA ASSESSMENT (154403)** to include type of contrast and amount given.
   e. For patients **without** concomitant conditions or medications listed on the **CONTRAST MEDIA ASSESSMENT (154403)**:
      i. Patients with a serum creatinine of 1.8 mg/dl or less may have IV contrast media administered.**See special consideration for CTA Stroke Protocol
      ii. Patients with a serum creatinine greater than 1.8 mg/dl may only have IV contrast administered at the discretion of the Radiologist/MHI physician, Radiation Oncologist, or ED physician. Clearance to administer contrast will be documented on the contrast history form by the technologist and signed by the physician who has given the clearance.
      iii. **Special Consideration for CTA Stroke Protocol**: If a patient is on hemodialysis for chronic ESRD with a serum creatinine that is > 1.8, contrast may be administered if approved by the attending neurologist.
   f. **Administration of IV contrast media and Observation of Patient (Gadolinium or Iodinated)**
      i. Contrast media injection will not be administered without a Radiologist, Radiation Oncologist, MHI or Emergency Care Center physician being available at time of the injection.
      ii. Contrast injections may be administered by any radiologic technologist or didactically trained RN.
      iii. The nurse or technologist administering the contrast will observe the patient for five minutes following the completion of the injection. If any adverse drug reaction is noted, the RN or technologist will immediately follow the appropriate management of adverse reaction guidelines for minor, intermediate, or major reactions.
   g. **For EXTRAVASATION OF CONTRAST MATERIAL:**
Refer to **EXTRAVASATION OF CONTRAST MATERIAL (RAD-10105)**

C. **STANDARD DOSING:**
   a. For all procedures, the contrast dosage and contrast agent will be determined using a standard dose chart per Radiologist protocol (**Refer to section I. below DOSING GUIDELINES FOR CONTRAST ADMINISTRATION)**
   b. Contrast dosage will be recorded on **CONTRAST MEDIA ASSESSMENT (154403)** to include type of contrast and amount given.

D. **SPECIAL CONSIDERATIONS when using IV Contrast Media**
   i. The decision to use IV contrast of any kind during pregnancy is determined by the radiologist/radiation oncologist.
   ii. Contrast injections for CT will require 20G intravenous access for use during procedure.
   iii. For outpatient procedures, IV access will not be discontinued until the procedure is complete and the patient is determined to have no symptoms of adverse reaction.
   iv. **Patients on Metformin medications receiving contrast- patients who are on Metformin medications will be advised to stop taking these medications for 48 hours post procedure as recommended by the American College of Radiology. The patient will receive form 198224 – "Patients on Metformin" upon discharge from Imaging Services. A Physician Alert letter, form 198223 will be faxed to the ordering physician for follow up with the patient.**
   v. It is recommended that patients undergoing routine dialysis be scheduled within 24 hours after contrast administration. Patients experiencing acute renal failure in which urine output is < 0.3 mg/kg/h for 12 h or anuria for 12 h may have contrast exams performed without undergoing dialysis. This is at the discretion of the ordering physician.
   vi. When using a contrast warmer, Contrast warmer will be checked and temperature logged daily (Form#198542). To ensure a ready supply of contrast media at body temperature (98.6 F / 37C) the contrast warmer will be stocked prior to AM exams. At or before noon ,12 PM the inventory will be evaluated and additional product added as needed for afternoon exams. Added product will be stocked behind any already prepared media to create a "first in, first out" process and allow newly added product time to reach appropriate temperature. Contrast should be stored in a locked cabinet between 68 F 20 C and 77 F 25 C away from light when not in the warmer.

E. **CLASSIFICATION OF CONTRAST MEDIA REACTIONS are as follows:**
   a. Minor reactions are those which cause the patient some, but not excessive discomfort or apprehension and are of short duration and not life-threatening.
      i. These reactions include headache, light headedness and dizziness, swelling of the salivary glands, pain at injection site, and chills.
      ii. Usually no treatment is required. The patient responds to reassurance and non-specified measures or to limited medication.
   b. Intermediate reactions are transient episodes of hypotension or bronchospasm, and any skin reaction that is slow to respond to treatment, rash, urticaria, diaphoresis (sweating) or edema.
   c. Major reactions are those which threaten life.
      i. Severe hypotension and shock, loss of consciousness, convulsions, pulmonary edema, laryngeal edema, bronchospasm, cardiac arrhythmias, and cardiac arrest are in this category.
      ii. Treatment is urgent and mandatory.
   d. Chemotoxic reactions are defined as those occurring secondary to angiographic examination of organs or regions when local or regional circulation are perfused by a concentrated solution of contrast medium for a short time. The injurious effects are related to total dose, concentration of the contrast media and its application time.
   e. Gadolinium dermopathy – related reactions (i.e. dermopathy) will be reported through the ADR system.

F. **MANAGEMENT OF ADVERSE REACTIONS:**
Refer to ANAPHYLAXIS – REACTION INTERVENTION (MM-05449)

Refer to ADVERSE DRUG REACTION & REPORTING (MM-05424) -- All reactions to contrast media must be reported immediately as noted below, documented in the patient's medical record, recorded in IRIS as an occurrence INCIDENT REPORTING SYSTEM (IRIS), OCCURRENCE REPORT (LD-01003), and reported to Pharmacy.

a. Minor reactions
   i. **Glenwood/Hixson/Georgia** campus- Immediately notify Radiologist/Radiation Oncologist or Emergency Care Center physician
   ii. **Ooltewah/MHI** all campuses- Immediately notify Radiologist/MHI physician and complete IRIS report.
b. Intermediate reactions
   i. **Glenwood/Hixson/Georgia** campus- Immediately notify Radiologist/Radiation Oncologist/ Emergency Care Center physician and/or initiate a call to the rapid response team
   ii. **Ooltewah/MHI** all campuses- Immediately notify Radiologist/MHI physician
c. Major Reactions
   i. **Glenwood/Hixson/Georgia** campus- Activate Code button or Call 555 and initiate Code Blue. IRIS report will be completed.
   ii. **Ooltewah/MHI/Parkway** all campuses- Call 911 Immediately notify Radiologist/MHI physician.
d. All Chemotoxic reactions and Gadolinium dermopathy - will also be reported in the IRIS system and following the process as outlined in the Adverse Drug Reporting policy. ADVERSE DRUG REACTION & REPORTING (MM-05424)

When treating a contrast reaction in the outpatient setting, the following guidelines may be utilized as suggested by the American College of Radiology. These guidelines are for reference purposes only and are not intended to substitute for the judgment and expertise of a physician or other user.

HIVES/DIFFUSE ERYTHEMA

1. Observation; monitor vitals q 15 min. Preserve IV access.
2. If associated with hypotension or respiratory distress then considered Anaphylaxis:

A. O2 6-10 L/min by face mask
B. IVF 0.9% NS wide open; elevate legs > 60°
C. Epinephrine 0.3 mL of 1mg/mL IM (or auto-injector) OR Epinephrine 1 mL of 1mg/10ML (0.1 mg/mL) IV with slow flush or IV fluids
D. Call 911 or CODE BLUE

3. If ONLY skin findings but severe or progressive may consider Benadryl 50 mg PO, IM, IV but may cause or worsen hypotension.

HYPOTENSION WITH TACHYCARDIA (ANAPHYLAXIS)

1. Preserve IV access, monitor vitals q 15m
2. O2 6-10 L/min by face mask
3. Elevate legs > 60°
4. IVF 0.9% NS wide open
5. Epinephrine 0.3 mL of 1mg/mL IM (or auto-injector) OR Epinephrine 1 mL of 1mg/10mL (0.1 mg/mL) IV with slow flush or IV fluids
6. Call 911 or CODE BLUE

HYPOTENSION WITH BRADYCARDIA

1. Preserve IV access; monitor vitals
2. O2 6-10 L/min by face mask
3. Elevate legs > 60°

4. IVF 0.9% NS wide open
5. Atropine 0.6-1 mg IV if refractory
6. Consider calling 911 or CODE BLUE

LARYNGEAL EDEMA (INSPIRATORY STRIDOR)

1. Preserve IV access, monitor vitals
2. O2 6-10 L/ min by face mask
3. Epinephrine 0.3 mL of 1mg/ mL IM (or auto-injector) OR Epinephrine 1 mL of 1mg/10mL (0.1 mg/mL) IV with slow flush or IV fluids
4. Call 911 or CODE BLUE

BRONCHOSPASM (EXPIRATORY WHEEZE)

1. Preserve IV access, monitor vitals
2. O2 6-10 L/min by face mask
3. Beta-2 agonist inhaler 2 puffs; repeat x 3
4. If not responding or severe, then use Epinephrine 0.3 mL of 1mg/ mL IM (or auto-injector) OR Epinephrine 1 mL of 1mg/10mL (0.1 mg/mL) IV with slow flush or IV fluids
5. Call 911 or CODE BLUE

G. PRE-MEDICATION FOR ADVERSE REACTION PROTOCOL:

a. **Outpatients:** Should an outpatient present with indications of contrast media allergy, the exam will not be performed. The licensed professional will notify the physician overseeing the procedure to obtain a prescription for premedication for the patient and will reschedule the patient accordingly.
b. **Inpatients**: Should a procedure be ordered and the patient has a known contrast allergy, the ordering physician will be notified, and ACR guidelines for premedication should be followed accordingly.
c. **Emergent Procedures**: ACR guidelines for premedication for emergent procedures should be followed accordingly.
d. **ACR Guidelines for Premedication of Contrast Allergy** (refer to physician order/protocol)
Contrast allergy (do not give for history of shellfish allergy- only pre-medicate for KNOWN contrast allergy):
   - ☐ **Inpatient:**
     Medrol 32 mg PO 12 hours (evening before procedure) and 2 hours before procedure (morning of procedure), PLUS Benadryl 50 mg IV/PO 1 hour prior to procedure
   - ☐ **Outpatient**
     Medrol 32 mg PO 12 hours (evening before procedure) and 2 hours before procedure (morning of procedure), PLUS Benadryl 50 mg PO 1 hour prior to procedure
   - ☐ **Emergent:**
     Solu-Medrol 40 mg IV Q 4 hours x2 doses prior to procedure (call procedure department when 2nd dose administered), PLUS Benadryl 50 mg IV/PO 1 hour prior to procedure.
     If both doses of Solu-Medrol are unable to be administered prior to the procedure, the following should be administered:
     Solu-Medrol 40 mg IV x1 PLUS Benadryl 50 mg IV x1

H. DOSING GUIDELINES FOR CONTRAST ADMINISTRATION:

Per Radiologist/MHI physician/Radiation Oncologist's protocol along with recommendations from the ACR Contrast manual, the following dosing guidelines will be followed for contrast administration:

COMPUTED TOMOGRAPHY

BODY PART	METHOD OF ADMINISTRATION	AMOUNT	PRODUCT
IAC	IV	100 ml	Isovue 370
Brain	IV	100 ml	Isovue 370
Sinus	IV	100 ml	Isovue 370
Facial	IV	100 ml	Isovue 370
Abdomen and/or Pelvis	IV	100ml	Isovue 370
Abdomen and/or Pelvis OP/IP	Oral	675 ml	Readicat Barium Suspension
Abdomen and/or Pelvis ER	Oral	10 ml	Gastrografin (+12 oz. liquid)
Abdomen and/or Pelvis IP	Oral	30 ml	Gastrografin (+12 oz. liquid)
Abdomen and/or Pelvis with Rectal Contrast	Rectal	30 ml	Gastrografin (+2000ml. of water)
Chest	IV	Weight specific	Isovue 370
Soft Tissue Neck	IV	100 ml	Isovue 370
C Spine	IV	100 ml	Isovue 370
T Spine	IV	100 ml	Isovue 370
L spine	IV	100 ml	Isovue 370
Lower Extremity	IV	100 ml	Isovue 370
Upper Extremity	IV	100 ml	Isovue 370
Chest PE	IV	Weight specific	Isovue 370
Dissection Chest Abd	IV	Weight specific	Isovue 370
AAA Abd/Pel	IV	Weight specific	Isovue 370
CTA Chest/Coronary Arteries	IV	Weight specific	Isovue 370
CTA Abdomen	IV	Weight specific	Isovue 370
CTA Pelvis	IV	Weight specific	Isovue 370
CTA Neck	IV	Weight specific	Isovue 370
CTA Head	IV	Weight specific	Isovue 370
CTA Aorta	IV	Weight specific	Isovue 370
CTA Runoff	IV	Weight specific	Isovue 370
CT Brain Perfusion	IV	40ml	Isovue 370
CTA Upper/Lower Extremity	IV	100 ml	Isovue 370

DIAGNOSTIC RADIOGRAPHY

BODY PART	METHOD OF ADMINISTRATION	AMOUNT	PRODUCT
Enema Barium	rectal	2000 ml	EZ Paque
Enema Air Contrast	rectal	1900 ml	Liquid Polibar
Esophagram	Oral	355 ml	Liquid EZ Paque or

BODY PART	METHOD OF ADMINISTRATION	AMOUNT	PRODUCT
			EZ HD
Esophagram Gastro	Oral	120 ml	Gastrografin
Enema Gastro	Rectal	480 ml	Gastrografin (Water to 2000 ml)
Upper GI	Oral	135 ml	Liquid EZ Paque or EZ HD
Upper GI Gastro	Oral	120 ml	Gastrografin
Small Bowel	Oral	432 ml	Liquid EZ Paque
Small Bowel Gastro	Oral	240 ml	Gastrografin
Barium Pill	Oral	700 mg	EZ Disk Barium Sulfate Tablet
UGI- gas	Oral	4 g	EZ Gas II
Modified Barium Swallow	Oral	90 cc	Varibar Thin
Modified Barium Swallow	Oral	90 cc	Liquid EZ Paque
Modified Barium Swallow	Oral	90 cc	EZ HD
Modified Barium Swallow	Oral	1 Tsp	EZ Paste
IVP	IV	100 ml	Isovue 300
Myelogram Cervical	Intrathecal	10 ml	Isovue-M 300
Myelogram Thoracic	Intrathecal	10 ml	Isovue-M 200
Myelogram Lumbar	Intrathecal	10 ml	Isovue-M 200
Venogram	IV	100 ml	Isovue 300 or 370
VCUG	Bladder	550 ml	Cystografin
Cystogram	Bladder	550 ml	Cystografin
Tube Placement	Intracavital	120 ml	Gastrografin
Arthrogram with MR	Intracapsular	10 ml	Isovue 300 and Multihance
Arthrogram without MR	Intracapsular	20 ml	Isovue 300
Port Patency	IV	20 ml	Isovue 300 or 370
HSG	Intrauterine	30 ml	Isovue 300
Lumbar Puncture	Intrathecal	Radiologist discretion	Isovue-M 200
Urethrogram	Bladder	Radiologist discretion	Isovue 300 or Cystografin
Loopogram	Intracavital	Radiologist discretion	Isovue 300 or Cystografin
Fistulagram	Intracavital	20 ml	Isovue 300 or Gastrografin

MAGNETIC RESONANCE IMAGING (MRI)

BODY PART	METHOD OF ADMINISTRATION	AMOUNT	PRODUCT
Abdomen	IV	*use calculation	Multihance
Abdomen- Liver	IV	Radiologist discretion	Multihance
Arthrogram-Shoulder	IV	1 ml	Multihance
Brain	IV	*use calculation	Multihance

Breast	IV	*use calculation	Multihance
Chest	IV	*use calculation	Multihance
C Spine	IV	*use calculation	Multihance
T Spine	IV	*use calculation	Multihance
L Spine	IV	*use calculation	Multihance
Lower Extremity Joint	IV	*use calculation	Multihance
Upper Extremity Joint	IV	*use calculation	Multihance
Lower Extremity	IV	*use calculation	Multihance
Upper Extremity	IV	*use calculation	Multihance
Orbit/Face/Neck	IV	*use calculation	Multihance
Pelvis	IV	*use calculation	Multihance
Pituitary	IV	*use calculation	Multihance
MRA Abdomen	IV	20 ml	Multihance
MRA Chest	IV	20 ml	Multihance
MRA Head	IV	20 ml	Multihance
Sacrum	IV	Use Calculation	Multihance
MRA Neck	IV	20 ml	Multihance
MRA Runoff	IV	40 ml	Multihance

Key Contact: Directors of Imaging Services; Radiation Oncology; Radiology Manager, CHI Memorial Georgia
Approved/Reviewed by: Medical Director of Imaging; Market Director of Imaging; Director of Pharmacy; P&T Committee
Reference(s): ACR Contrast Manual
Related Forms: Contrast Assessment Form
Date First Effective & Revision/Review dates: (3/12) (3/12) (1/15) (9/15) (9/16) (12/16) (12/18) (5/19) (8/19) (1/21) (10/21) (2/22) (11/22)

POLICY

Title: **ANAPHYLAXIS & ACUTE DRUG HYPERSENSITIVITY REACTION PROTOCOL**			
		Page **1** of **2**	
Policy Number: MM-05449		Date Last reviewed/Revised: 11/22	Valid Until: 11/23
Campus: ☒ CHI Memorial Glenwood ☒ CHI Memorial Hixson ☒ CHI Memorial Georgia *Check all that apply*			
Department(s) Affected: All Clinical Areas, Pharmacy		Review Period: Annually	

OUTCOME:
Standing orders to be used for immediate intervention in response to a suspected hypersensitivity or anaphylactic reaction to a medication or therapy.

DEFINITIONS & TREATMENTS:

- Mild drug reactions
  A mild hypersensitivity reaction should be suspected in patients exhibiting any of the following symptoms and treatment may be initiated as indicated below:
  - **Isolated skin reactions such as urticaria, itching, rash, or flushing**
    If after stopping the infusion the signs/symptoms do not resolve within 10 minutes or begin to progress proceed with the following and notify physician:
    Diphenhydramine IVP x 1 dose (age < 65: 50 mg, age ≥ 65: 25 mg). If no IV access may administer as IM injection.

- Moderate drug reactions
  A moderate hypersensitivity reaction should be suspected in patients exhibiting any of the following symptoms and treatment may be initiated as indicated below:
  - **Acute onset diffuse skin reactions**
    Treatment: Methylprednisolone 125 mg IVP x 1 dose
  - **Progressive urticaria, itching, rash, or flushing despite treatment with Benadryl**
    Treatment: Methylprednisolone 125 mg IVP x 1 dose
  - **Rigors**
    Treatment: Methylprednisolone 125 mg IVP x 1 dose
  - **Mild dyspnea without significant wheezing or hypoxemia**
    Treatment: Methylprednisolone 125 mg IVP x 1 dose

- Severe or possible Anaphylactic reactions
  A severe hypersensitivity or anaphylactic reaction should be suspected for any of the following symptoms. These symptoms may also be accompanied by acute skin reactions as described above.
  - **Respiratory compromise:** severe respiratory compromise with significant wheezing, airway edema and/or hypoxemia
  - **Angioedema:** diffuse and painful swelling of loose subcutaneous tissue, dorsum of hands and feet, eyelids, lips, genitalia and mucous membranes
  - **Cardiovascular compromise:** evidenced by symptomatic hypotension (SBP < 90 or 30% decrease in SBP)
    Treatment: Stop infusion immediately and call Code BLUE. Administer 0.5 mg (0.5 ml) Epinephrine 1:1000 (1mg/1ml) x 1 dose **IM** to mid-outer thigh. Epinephrine may be repeated every 5 to 10 minutes, up to 3 total doses as needed. Patient should immediately be placed on monitor after epinephrine administration. Lactated ringers 500 ml IV bolus x1 dose. Administer oxygen to keep O2 sats > 88-90%.

If no response to Epinephrine x 1, OR if symptoms worsen, repeat Epinephrine dosing as indicated above and proceed with the following:

- ✓Diphenhydramine 50 mg IV x 1 dose (if not already given)
- ✓Methylprednisolone 125 mg IV x 1 dose (if not already given)

POLICY:

Standing orders for anaphylaxis and acute drug hypersensitivity intervention may be initiated by a registered nurse in any inpatient or outpatient care area for any suspected acute medication reaction, while awaiting physician contact. Physician should be notified ASAP.

PROCEDURE:

1. Immediately stop all medications being infused for all reactions severities and follow ***Anaphylaxis & Acute Drug Hypersensitivity Protocol MCT*** **orders [3040001225].**
2. For all reaction severities all medications being infused should be immediately stopped.
   a. Mild & Moderate reactions: If treatment indicated the patient may be treated according to the above and as outlined in the ***Anaphylaxis & Acute Drug Hypersensitivity Protocol MCT.*** Orders entered by the RN should be signed with the order mode "Per protocol: cosign required". If treatment administered the patient's provider should be immediately contacted for further orders and for authentication of the standing orders – see below.
   b. Severe hypersensitivity or anaphylactic reactions: Code BLUE should be called immediately (Refer to policy *RAPID RESPONSE TEAM*) and immediate treatment should proceed as indicated above and as outlined in the ***Anaphylaxis & Acute Drug Hypersensitivity Protocol MCT***. Orders entered by the RN should be signed with the order mode "Per protocol: cosign required". The patient's provider should also be contacted for further orders and for authentication of the standing orders – see below.
3. Medications for treatment of mild, moderate, or severe reactions may be removed from the Pyxis MedStation via override function.
4. Physician must sign/authenticate the orders as soon as possible following enactment of the standing orders.
5. If at any time the patient's symptoms deteriorate and the patient experiences respiratory or cardiovascular compromise a CODE BLUE should be called for additional support.
6. If symptoms are relieved, follow physician orders for additional medications.
7. Document medication administration appropriately in the electronic medical record.
8. Return unused items to Pyxis MedStation.

Key Contact: Pharmacy Review Team
Approved/Reviewed by: P&T Committee, Pharmacy Director; Chief Nursing Officer; Nursing Professional Practice Council
Reference(s):

1. MM.04.01.01
2. eCRS Clinical Key: Evidence-Based Nursing: Monographs: Anaphylaxis and Anaphylactic Shock contributed by Melanie Atkinson, RN, MSN, CCRN, 2009
3. Simons, Ardusso, Bilo, et al. World Allergy Organization Guidelines for the Assessment and Management of Anaphylaxis. WAO Journal. 2011, 4: 13-37.

Date First Effective/ Reviewed/Revised: 3/13 (8/16) (3/18) (11/19) (5/20) (12/20)(10/21) (11/22)

Title: **HYPOGLYCEMIA PROTOCOL**			
		Page **1** of **3**	
Policy Number: PC-07013		Date Last reviewed/Revised: 11/22	Valid Until: 11/23
Campus: ☒ CHI Memorial Glenwood ☒ CHI Memorial Hixson ☒ CHI Memorial Georgia ***Check all that apply***			
Department(s) Affected: All Clinical Areas		Review Period: Annually	

OUTCOME: To provide prompt treatment of the patient when hypoglycemia is present.

DEFINTIONS:

a. **BG:** Blood Glucose
b. **Hypoglycemia**: a BG value ≤70 and should be considered a medical emergency.
c. **Validated Range** for Nova StatStrip is 50-599; ***any value outside of this range needs to be rechecked with a stat lab draw within the hour***.
d. **Critical Values**: Any glucose value <50 and >350. To fulfill the Joint Commission/College of American Pathologists/State of Tennessee requirements for Critical Values, you need to create a comment that is attached to the critical value result.
e. **Critical Value Comments**
   - **RN Notified** - used if test performed by a tech
   - **DR Notified** - used if test performed by an RN who will notify the doctor
   - **BY RN c MD Protocol** - used if test performed by an RN with existing MD orders for critical glucose values
f. **Questioning the Patient's Glucose Result**: If the results do not match the patient's condition, the user can do any of the following:
   - Re-stick and retest patient (use comment "Will Repeat")
   - Order a lab draw
   - Run QC on strips you are using to ensure strips have not been exposed to too much moisture

Note: *if you place the meter into the docking station before entering a comment or lay the meter down without touching the screen for 5 minutes, the meter will save the result without a comment. This is in direct violation of the state and federal rules for documenting critical values and an e-mail report to the manager will be generated.*

POLICY:

The nurse will manage the care and treatment of the patient with Hypoglycemia per protocol.

Possible causes of hypoglycemia are: not eating on time, not eating the entire meal, skipping a meal, interruption of enteral/parenteral feedings, decreased rate of IV dextrose, reduction of corticosteroids, emesis, sepsis, the "peaking" of insulin and/or inappropriate timing of short- or rapid-acting insulin in relation to meals, too much insulin in relation to food and/or activity, failure of the clinician to make adjustments to glycemic therapy based on daily BG patterns, prolonged use of SSI as monotherapy, poor communication during times of patient transfer, or an unusual amount of exercise.

PROCEDURE:

If the patient is symptomatic, do a finger stick blood glucose test with a hospital BG meter. Symptoms may include sweating, shaking, dizzy, faint, headache, hunger, pounding heart, confusion, irritability, stammering, combative or convulsing, or if the patient tells you, "I am having an insulin reaction," or "a low blood sugar". If the BG meets parameters, treat according to protocol.

Initiate Hypoglycemic Protocol MCT Order Set (3040004906) and notify physician.

Insulin Reaction/Hypoglycemia Protocol is as outlined:

CRITERIA FOR TREATMENT:
■ **Blood Glucose ≤ 70**.

TREATMENT:
Patients who are alert and able to tolerate PO intake:
Blood Glucose 50-70

1. Give 15 grams carbohydrate: 4 oz. fruit juice (not OJ) or 3 glucose tablets (in Pyxis).
2. Recheck BG in 15 minutes and repeat treatment if BG < 80.
3. After 2nd treatment, recheck BG in 15 minutes and repeat treatment if BG remains < 80. If BG fails to increase to > 80 after repeat treatment, treat again and call MD for further orders.
4. For hypoglycemic episodes between 8:00 PM and 6:00 AM: after initial treatment has increased BG to > 80, give 8 oz. of skim or low fat milk and either six saltine crackers or 3 graham crackers.

Blood Glucose ≤ 50

1. Give 30 grams carbohydrate: 8 oz. fruit juice (not OJ) or 6 glucose tablets (in Pyxis).
2. Get stat lab draw due to blood glucose being outside the validated range.
3. Enter critical values comment in Nova StatStrip meter.
4. Recheck BG in 15 minutes and repeat treatment if BG < 80.
5. After 2nd treatment, recheck BG in 15 minutes and repeat treatment if BG remains < 80. If BG fails to increase to > 80 after repeat treatment, treat again and call MD for further orders.
6. Once BG > 80, recheck BG in 1 hour then resume point-of-care BG as previously ordered.
7. For hypoglycemic episodes between 8:00 PM and 6:00 AM: after initial treatment has increased BG to > 80, give 8 oz. of skim or low fat milk and either six saltine crackers or 3 graham crackers.

Patients who are NOT alert or NPO:
With no IV access:

1. Administer Glucagon 1 mg IM x 1 dose – ***obtain IV access ASAP***.
2. If BG < 50, get stat lab draw due to blood glucose being outside the validated range.
3. If BG < 50, enter critical values comment in Nova StatStrip meter.
4. Recheck BG in 15 minutes and if BG < 80 re-treat using D50 as outlined below (if IV access now available). If IV access not yet available, repeat Glucagon 1 mg IM x 1 additional dose and obtain IV access.
5. After 2nd treatment, check BG in 15 minutes and administer D50 as outlined below and call MD for further orders.
6. Once BG > 80, recheck BG in 1 hour then resume point-of-care BG as previously ordered.

With IV access:
Blood Glucose 50-70

1. Administer 25 ml (1/2 amp) D50 – 12.5 gm IVP x 1 dose.
2. Recheck BG in 15 minutes and repeat treatment if BG < 80.
3. After 2nd treatment, check BG in 15 minutes and repeat treatment if BG remains < 80. If BG fails to respond to repeat treatment, treat again and call MD for further orders (dextrose infusions, etc.).

Blood Glucose < 50

1. Administer 50 ml (1 amp) D50 – 25 gm IVP x 1 dose.
2. Get stat lab draw due to blood glucose being outside the validated range.
3. Enter critical values comment in Nova StatStrip meter.
4. Recheck BG in 15 minutes and repeat treatment if BG < 80.
5. After 2nd treatment, check BG in 15 minutes and repeat treatment if BG remains < 80. If BG fails to respond to repeat treatment, treat again and call MD for further orders (dextrose infusions, etc.).
6. Once BG > 80, recheck BG in 1 hour then resume point-of-care BG as previously ordered.

DOCUMENTATION:
Document all hypoglycemic episodes including treatment and physician contact in the "Notes" section and in "Flowsheets" in Daily Care/Safety under Nutrition/Hypoglycemia Management in EPIC, the Electronic Health Record (EHR) Plan of Care.

Key Contact: Diabetes Educator
Approved/Reviewed by: **P&T Committee;** Nursing Professional Practice Council; CNO.
Reference(s):
Order Set Hypoglycemia Protocol MCT (3040004906)
American Diabetes Association. Diabetes Care 2020 Jan; 43 (Supplement 1): S193-S202
American Association of Clinical Endocrinologists and American Diabetes Association. Consensus Statement on Inpatient Glycemic Control 2009.
Joint Commission Standard: Provision of Care Chapter (PC) PC 01.01.01
Date First Effective/Revisions: 5/09, 12/13, 7/15, 4/17, 5/20, 8/20, 10/21, 11/22

POLICY

Title: NARCAN (NALOXONE) OPIOID REVERSAL PROTOCOL			
		Page **1** of **2**	
Policy Number: PC-07373		Date Last reviewed/Revised: 11/22	Valid Until: 11/23
Campus: ☒ CHI Memorial Glenwood ☒ CHI Memorial Hixson ☒ CHI Memorial Georgia ***Check all that apply***			
Department(s) Affected: All Clinical Areas		Review Period: Annually	

OUTCOME:
Standing orders to be used for immediate intervention in response to a suspected narcotic overdose.

EXCEPTIONS*:*
Patients on Hospice/palliative care must have an MD order to prior to reversal

DEFINITIONS & TREATMENTS:

- When to suspect a narcotic overdose with unknown narcotic exposure:
  - History of narcotic overdose according to bystanders
  - Drug paraphernalia present
  - Medical/pertinent history consistent with narcotic use
- Signs and symptoms of narcotic overdose
  - Unresponsive or only responsive to painful stimuli
  - Shallow, slow, or absent respirations
  - Cyanosis
  - Slow, erratic, or absent pulse
  - Constricted/pinpoint pupils
  - Hypotension
  - Weakness
- Treatment
  - The goal of treatment is to achieve ADEQUATE VENTILATION, not necessarily a normal level of consciousness
  - *Inpatient with* **RECENT** *narcotic administration by RN/LPN:*
    - Narcan (naloxone) 0.4 mg IV (or IM if no IV access)
    - If there is no effect or response in 2-3 minutes after administration, repeat same dose x2 if needed.
  - *Inpatient/Outpatient/Visitor with* ***UNKNOWN*** *narcotic exposure:*
    - Narcan (naloxone) 2 mg IM/IV (do NOT delay administration to obtain IV access)
    - If there is no effect or response in 2-3 minutes after administration, repeat same dose x2 if needed.

POLICY:
Standing orders for narcotic overdose may be initiated by a registered nurse in any inpatient or outpatient care area for any suspected narcotic overdose while awaiting physician contact. Physician should be notified ASAP. Use clinical judgment to call a Rapid Response at any time.

PROCEDURE:

1. Assess for known or unknown narcotic exposure and follow **Narcan (Naloxone) Opioid Reversal Protocol MCT [3040004919].**
2. Perform primary survey (ABCs)
   A. If patient is unresponsive and not breathing:
      - Call a CODE BLUE

- Administer Narcan per protocol
    - Narcan may be removed from the Pyxis Med Station via override function or from an Intubation Kit.
    - Physician must sign/authenticate the orders as soon as possible following enactment of the standing orders.

B. If RR < 10 **AND** vigorous stimulation needed to arouse **OR** unable to arouse patient (POSS = 4):

- Administer Narcan per protocol
    - Narcan may be removed from the Pyxis Med Station via override function or from an Intubation Kit.
    - Physician must sign/authenticate the orders as soon as possible following enactment of the standing orders.
- Apply cardiac monitor and pulse oximetry.
- Provide oxygen 100% non-rebreather mask if intubation is not indicated
- Call RRT if unresponsive to 1-2 doses of Narcan or if patient condition worsens
- Document medication administration appropriately in the medical record
- Return unused items to Pyxis Med Station/Intubation Kit

POST-NARCAN ADMINISTRATION:

1. Monitor vital signs closely
    a. Every 15 min x4
    b. Every 30 min x 2
    c. Every hour x 2
2. Administer oxygen to keep sats > 88-90%
3. Notify MD of all actions taken and have them sign/authenticate the Narcan (Naloxone) Opioid Reversal Protocol MCT orders.

Key Contact: Clinical Educator Critical Care
Approved/Reviewed by: Pharmacy Team; P&T Committee; Nursing Professional Practice Council; CNO
Date First Effective & (Revision/Review dates): 3/18 (5/21) (11/21) (11/22)

Title: RESPIRATORY DISTRESS PROTOCOL - PULMONARY SERVICES			
		Page 1 of 1	
Policy Number: PUL-01928		Date Last reviewed/Revised: 11/22	Valid Until: 11/23
Campus: ☒ CHI Memorial Glenwood ☒ CHI Memorial Hixson ☒ CHI Memorial Georgia *Check all that apply*			
Department(s) Affected: Pulmonary Services		Review Period: every year	

OUTCOME: To open and maintain obstructed airways.

PERSONNEL: Registered Respiratory Therapists.

POLICY:
When a patient is having respiratory distress hospital personnel may notify the Respiratory Therapist for that area stat to evaluate the patient.

PROCEDURE:
Respiratory Therapist will evaluate the patient and initiate treatment for wheezing and/or signs of bronchospasm, or stridor.

RESPIRATORY DISTRESS PROTOCOL:

1. Notify Respiratory Therapist STAT to evaluate patient.
2. Respiratory Therapist to initiate treatment(s) below based on the following patient assessment criteria:
   a. Oxygen:
      i. SpO2 or SaO2 < 90%
      ii. PaO2 < 60 mmHg
      iii. Respiratory Distress
      iv. AMI, Acute Coronary Syndrome, or Angina
      v. Altered mental status, or suspected stroke
   b. Bronchodilator:
      i. For wheezing and/or signs of bronchospasm administer Albuterol 2.5mg/NS via nebulizer.
      ii. For signs of stridor administer *Racemic Epinephrine 1.125mg (0.5ml 2.25%) via nebulizer, if no signs of cardiac rhythm disturbances.
   c. Arterial Blood Gas (ABG)
      i. SpO2 < 90%
      ii. Respiratory rate (f) > 30 breaths per minute
      iii. Altered mental status
      iv. Change in level of consciousness (LOC)
      v. Hemodynamic instability
3. Respiratory Therapist to notify physician/Licensed Independent Practitioner (LIP). Respiratory therapist to enter the order for the treatment(s) in the electronic health record (EHR) and sign the order in a manner which requires the physician/LIP to cosign the order.

Key Contact: Pulmonary Management Team
Approved/Reviewed by: Pulmonary Medical Director; P&T Committee
Date First Effective & Revision/Review dates: 1/12 (4/15) (1/16) (11/18) (04/19) (2/21) (2/22) (11/22)

POLICY

Title: **BRADYCARDIA MANAGEMENT PROTOCOL**			
		Page **1** of **1**	
Policy Number: PC-07408		Date Last reviewed/Revised: 11/22	Valid Until: 11/23
Campus: ☒ CHI Memorial Glenwood ☒ CHI Memorial Hixson ☒ CHI Memorial Georgia *Check all that apply*			
Department(s) Affected: All Departments		Review Period: Annually	

OUTCOME:
Standing orders to be used for immediate intervention in response to a symptomatic bradycardia patient event.

DEFINITIONS:
- Bradycardia: heart rate (HR) less than 60 beats per minute (bpm)
- Symptomatic bradycardia: HR < 40 AND one of the following: Systolic blood pressure ≤80, altered mental status, signs of shock, ischemic chest discomfort, OR acute heart failure

PERSONNEL: Medications to only be ordered by ACLS certified nurses

POLICY:
Standing orders for symptomatic bradycardia interventions may be initiated by a registered nurse that has ACLS certification in any inpatient or outpatient care area for any symptomatic bradycardia event, while awaiting physician contact. Physician should be notified ASAP.

PROCEDURE & TREATMENTS:
All RNs:
1. Maintain patent airway- assist breathing as necessary
2. Maintain oxygen SpO2 ≥ 92%
3. Contact Primary MD and call a RRT
4. Connect patient to crash cart with pacing pads and leads
5. Ensure IV access
6. Obtain 12 Lead EKG

ACLS Certified RN:
7. Identify heart rate is < 40 bpm
8. Identify patient is symptomatic: SBP ≤ 80, altered mental status, signs of shock, ischemic chest discomfort, or acute heart failure
9. If HR < 40 and patient is symptomatic, administer Atropine 1 mg IVP. May repeat every 3-5 minutes to a max dose of 3 mg.
10. Atropine may be removed from the Pyxis Med Station via override function.
11. Physician must sign/authenticate the orders as soon as possible following enactment of the standing orders.
12. If at any time the patient's symptoms deteriorate and the patient experiences respiratory or cardiovascular compromise a CODE BLUE should be called for additional support.
13. Document medication administration appropriately in the electronic medical record.
14. Return unused items to Pyxis Med Station

Key Contact: Clinical Educator Critical Care
Approved/Reviewed by: Pharmacy & Therapeutics Committee, Pharmacy Director; Code Blue Committee; NPPC, Chief Nursing Officer
Related Forms: AHA ACLS Guidelines, AHA Bradycardia Protocol
Date First Effective & Revision/Review dates: 2/22, 11|22

Appendix B

Antimicrobial Subcommittee Meeting
6/30/2022
Time: 12:00-1:00pm
Meeting Minutes

Attendees	Mark Anderson, Lee Hamilton, Ryan McNamara, Paul Cornea, & Linda Johnson

Agenda Item	Highlights

Research Project	• Impact of a Microbiology Reporting Change on the Management of Patients with Blood Cultures Positive for Coagulase-Negative Staphylococci
	• Linda presented Doug Dertien's residency research project
	• In February 2021, a new microbiology laboratory policy was implemented regarding the reporting of CoNS blood cultures:
	  o Blood cultures resulting as CoNS in two sets will be marked as likely contaminants with no sensitivity assessment if both cultures appear to be collected from the same site at the same time from electronic health record documentation
	• This project was a pre- and post-intervention
	• Results:
	  o No difference in workup of contaminated CoNS blood cultures between pre- and post-intervention groups
	  o Most TTEs and ID consults ordered post-gram stain result but pre-contamination comment
	  o Antistaphylococcal antibiotics often appropriately discontinued once culture finalized in pre- and contamination comment placed in post-intervention periods
	  o Many blood cultures ordered in the absence of appropriate indication
	  o No patients with true infections experienced delay in IV antibiotic therapy and workup
	• Add micro comment with BioFire result about probable contamination
	• Create & give pharmacist/physician education regarding:
	  o Appropriate indications for ordering blood cultures
	  o Interpretation of Staphylococcus Biofire Filmarray® results
	  o Evaluating risk factors for true CoNS bacteremia versus contamination
	• Re-evaluate post-intervention

Microscan gram-negative & gram-positive panels	• Group discussed the selection of new Microscan gram-negative and gram-positive panels
	• Discussed CLSI breakpoints for Enterobacterales & Staph spp.
	• Selected panels that included most agents we would be interested in testing as well as lower dilutions to include current CLSI Breakpoints
	  o Gram negative panel: Neg Urine Combo 103
	  o Gram positive panel: Pos Combo 43/ MICroSTREP plus 2

Vancomycin AUC:MIC (update)	• Delay in obtaining Bayesian modeling software (estimated go-live: Dec 2023) • Would like to move forward with home grown calculator utilizing first-order PK-equations (per ASHP guideline recommendations) • Draft protocol presented • Timeline: protocol, calculator, training plan to be finalized by July, followed by pharmacist/provider/lab/nursing training, with an estimated go-live Fall 2022

TJC Requirements Update	• Discussed updated TJC requirements to ensure meeting expectations • EP 10, 11, 13, 14, 16, 17, 18, 20, 21 are met by current ASP program • EP12: Providing competency-based training and education for staff, including medical staff, on the practical applications of antibiotic stewardship guidelines, policies, and procedures o Plan to use CommonSpirit Pathways created by Linda • EP15: The antibiotic stewardship program documents the evidence-based use of antibiotics in all departments and services of the hospital o Following up with Karen Frank to determine what interventions/documentations would ensure we meet this EP • EP19: The antibiotic stewardship program evaluates adherence (including antibiotic selection and duration of therapy, where applicable) to at least one of the evidence-based guidelines the hospital implements. Note 1: The hospital may measure adherence at the group level (that is, departmental, unit, clinician subgroup) or at the individual prescriber level. Note 2: The hospital may obtain adherence data for a sample of patients from relevant clinical areas by analyzing electronic health records or by conducting chart reviews. o Plan to do chart review this year as part of resident MUE but need plan for future years

Antimicrobial Subcommittee Meeting
9/08/2022
Time: 12:00-1:00pm
Meeting Minutes

Attendees	Dr. Mark Anderson, Dr. Hal Hill, Dr. Ryan McNamara, Beth Davis, Rachel Kile , Linda Johnson, Hallie Butler, Chris D'Amico

Agenda Item	Highlights

ICU Dosing Guidelines	• Loading doses pre-extended infusions may be beneficial to achieve faster time above the MIC in critically- ill patients (sepsis/shock). Because of this, the following was recommended:
	  ○ Adjust the Zosyn maintenance dose to start 4 hours post loading dose instead of 6 hours
	  ○ Add a loading dose for meropenem prior to 1 gram q8h extended infusion doses
	• Discussed adding specific pathogens to consider using a 2 gram dosing strategy for cefepime. This would include a 2 gram load followed by 8 hours later with a 2 gram extended infusion.
	  ○ Specific pathogens: Pseudomonas spp., Acinetobacter spp., Hafnia alvei, Enterobacter cloacae, Citrobacter freundii, Klebsiella aerogenes, Serratia marcescens
	• Ampicillin dose adjustment will be presented at next P&T meeting
	○

Beta-lactam Allergy Guideline	• Pharmacy resident is completing a medication use project attempting to de-label penicillin allergies
	• Guideline will be made that suggests to clinicians to prescribe antibiotics for inpatients with reported allergic reactions to penicillin or cephalosporin antibiotics by allowing these patients to receive more narrow-spectrum, more effective, less toxic, and/or less costly antibiotic
	• Patient allergy assessment tool has been created and the med rec pharmacy technicians will utilize it to interview patients presenting to the ED
	• Table was presented with the type of reaction and action plan. There were questions about the yellow moderate risk action plan and it including the yellow severe reactions in the reaction type table.
	  ○ Modifications will be made to lessen confusion
	• Test-dose procedure rough draft was presented that is not to be used for patients with Type II-IV reactions
	  ○ Will hopefully be able to build an EPIC panel with desensitization medications
	○

Coagulase Negative Staphylococcus Provider Education	• Discussed the importance of distinguishing between contamination and bloodstream infections • Algorithm was created that evaluated patients with blood cultures growing coagulase negative staphylococci (CoNS) ○ It was suggested to add artificial heart valve with where it says "indwelling devices" and to add "repeat blood cultures" where it says "investigate further"

Meropenem-Vaborbactam vs. Ceftazidime-Avibactam Formulary Decision	• Vabomere was previously selected as our formulary agent due to cost and the NTAP program, which no longer exists
	• Suggested Avycaz now be selected as our formulary agent for treatment of infections due to susceptible MDR gram-negative rods for which no other preferred treatment options are available
	  ○ Activity against OXA-48 producers, Pseudomonas, and Stenotrophomonas when combined with aztreonam
	  ○ lower cost than Vabomere
	• Avycaz would be restricted for use to ID and some cases that meet a specific criteria

Posaconazole PO Addition to Formulary	• Suggested that po (tabs only which can be crushed) posaconazole be added to formulary with restrictions to ID or continuation of a patient home medication • Similar indications to isavuconazole but different DDIs & side effects • PO posaconazole is cheaper

HIV Post-Exposure Prophylaxis	• There was confusion with the policy and whether or not an ID physician had to be called to give permission to start the first few doses of PEP. • Clarified that the first few doses should be given, regardless of whether they have spoken to ID physician, so we do not postpone therapy • House administrator can give PEP initially while attempting to get in touch with ID • Will update policy to reflect this clarification