"Facility Name"
Policy and Procedure

Title: IV to PO Conversion Protocol	Control No.:	Version: 3
Replaces: v.2 IV to PO Conversion Protocol		
Policy Owner:		
Reviewers:		
Approvers: Medical Executive Committee (Chairman), Medical Staff P.I. Committee (Chairman) Medical Staff Office	Date Approved: 09/26/2017	Date Last Reviewed: 09/26/2017

Purpose:

To define an evidence-based protocol that will facilitate transition of IV medications to oral medications.

Policy:

It is the policy of "Facility Name" to follow evidence based practice and to convert from IV to PO medications as soon as clinical appropriate, based on objective patient data.

Procedure:

A. A pharmacist will review patient profiles to determine eligibility for the IV to PO conversion regarding medications on the approved list. Medications not on the approved list being administered IV with the potential for conversion to a comparable PO dosage form will require direct approval from the prescriber in order for a dosage form change to be implemented.

B. Patients on IV dosage forms of medications listed in Appendix A will be flagged on the patient's acuity list in the electronic ordering system if they are a possible candidate, serving as a notification for the pharmacist to clinically assess the patient for appropriateness of IV to PO conversion. The pharmacist will then review the patient chart to determine appropriateness of conversion as per the inclusion and exclusion criteria defined in the protocol. Collaboration with the nurse that is caring for the patient should take place if there is any question as to whether or not the criteria for conversion are met.

C. Pharmacists shall select the appropriate dosage form for enteral administration. The pharmacist shall also be responsible for selecting the appropriate route of administration (e.g. oral, through enteral tubes). If any special administration instructions are required, including timing of medication to avoid drug interactions, the pharmacist shall include the additional information in the medication order. See Appendix C.

D. Nurses shall be responsible for appropriate administration of oral medications, according to the administration instructions. Nurses and pharmacists are responsible for ensuring the appropriate route is selected in the medication order. Pharmacists may alter orders to reflect the current enteral access being used as appropriate (PO, OG, NG, PEG, G-tube, J-tube, etc.).

E. When an appropriate conversion candidate is identified through review of the electronic medical record, the pharmacist shall discontinue the IV medication using the ordering mode "per pharmacy protocol". The pharmacist will then enter the new order in the electronic medical record, indicating the change from IV to PO with the comment "Per IV to PO Protocol" in the administration section of the order. Electronic orders will be entered under the original prescriber's name with the ordering mode "per pharmacy protocol".

F. All IV to PO conversions made in accordance with this policy shall be documented using the pharmacy intervention function type "IV to Enteral Pharmacist Auto-Interchange" within the electronic medical record and exported to a progress note as notification to the provider that the conversion has occurred. The intervention/progress note with highlighted sections marked for the pharmacist/system to fill in can be seen in Appendix B.

G. In the event enteral access is no longer available, the pharmacist may convert the medication back to the appropriate IV dose. The pharmacist shall enter an intervention, remove the note template from the comments and free form the PO to IV conversion text. A progress note is not required.
H. If a provider does not want a specific patient evaluated for IV to PO conversion, he/she may opt out by typing the administration instructions "no automatic IV to PO conversion" when ordering a medication.
I. A provider may override an automatic IV to PO conversion by entering an electronic order in the electronic medical record for the IV dosage form if he/she at any time disagrees with conversion.
J. Inclusion criteria for all target medications include the following:
    1. Patients 16 years of age and older
    2. Tolerating an oral diet (beyond clear liquids) or enteral feeds for 24 hours
    3. Receiving other PO medications for 24 hours
K. Inclusion criteria, in addition to those in section J., specific for **antibiotics** include the following:
    1. Afebrile (temperature less than 100.4F) for at least 24 hours.
    2. Clinically stable/improving (e.g. white blood count normalizing, cough improving, etc.)
L. Exclusion criteria for all target medications include the following:
    1. NPO, clear liquid diet
    2. Loading doses
    3. One-time doses
    4. Active gastrointestinal bleeding
    5. Aspiration risk
    6. Severe nausea and vomiting, gastrointestinal obstruction, malabsorption syndrome, ileus, or severe diarrhea
M. Exclusion criteria, in addition to those in section L., specific for **antibiotics** include the following:
    1. Less than 24 hours of intravenous antibiotics
    2. Unresponsive to previous oral therapy
    3. Conditions requiring IV therapy such as meningitis, endocarditis, osteomyelitis, febrile neutropenia, sepsis.

Definitions:

N/A

Supportive Data:

Several medications commonly used in hospitalized patients have similar bioavailability between intravenous (IV) and oral (PO) administration. Therapeutic interchange programs in which patients are switched from IV to PO medications have demonstrated clinical efficacy, positive outcomes, and theoretical cost savings.[1] Cost savings may be achieved through lowering direct acquisition costs, eliminating the need for ancillary supplies such as IV sets and pumps, reducing Pharmacy and Nursing time, and shortening the length of hospital stay. Direct benefits to the patient include eliminating adverse events associated with IV therapy, increasing comfort and mobility, facilitating a more active role for the patient in his/her treatment, and increasing the possibility of earlier discharge. Improved quality of patient care and the potential for significant and meaningful cost savings make IV to PO conversion a desirable treatment option.[2]

Equipment:

N/A

References:

1. Fox ER, Beckwith C, Tyler LS. Pharmacy-administered IV to oral therapeutic interchange program: Development, implementation, and cost-assessment. Hosp Pharm 2003;38:444-452,462.
2. Wetzstein GA. Intravenous to oral (IV:PO) anti-infective conversion therapy. Cancer Control 2000;7(2):170-176.
3. Kuper KM. Intravenous to oral therapy conversion. Competence Assessment Tools for Health-System Pharmacies, 4th ed. ASHP 2008
4. Micromedex 2.0. Truven Health Analytics., http://micromedexsolutions.com/micromedex2, Date Accessed May 30, 2017.
5. Barlam TF, Cosgrove SE, Abbo LM, et al. Implementing an antibiotic stewardship program: guidelines by the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America. Clin Infect Dis 2016; 61:e51-e77.
6. Cyriac JM, James E. Switch from intravenous to oral therapy: a consise overview. J Pharmacol Pharmacother 2014; 5: 83-7.
7. Fischer MA, Solomon DH, Teich JM, et al. Conversion from intravenous to oral medications: assessment of a computerized intervention for hospitalized patients. Arch Intern Med 2003; 163: 2585-9.
8. Galanter W, Liu XF, Lambert BL, et al. Analysis of computerized alerts suggesting oral medication use during computerized order entry of i.v. medications. Am J Health Syst Pharm 2010; 67: 1101-5.
9. Approved by MSPIC on 9/18/2017.

Appendix A. Approved IV to PO Medication Conversion List

IV	PO
Azithromycin IV	1:1 IV to PO conversion
Ciprofloxacin 200 mg IV	Ciprofloxacin 250 mg PO
Ciprofloxacin 400 mg IV	Ciprofloxacin 500 mg PO
Clindamycin 600 mg IV q8h	Clindamycin 300 mg PO q6h
Clindamycin 900 mg IV q8h	Clindamycin 450 mg PO q6h
Doxycycline IV	1:1 IV to PO conversion
Famotidine IV	1:1 IV to PO conversion
Fluconazole IV	1:1 IV to PO conversion
Folic Acid IV	1:1 IV to PO conversion
Levetriacetam[a] IV	1:1 IV to PO conversion
Levofloxacin IV	1:1 IV to PO conversion
Levothyroxine[b] IV	1:**2** IV to PO conversion[c]
Linezolid IV	1:1 IV to PO conversion
Metronidazole IV	1:1 IV to PO conversion
Moxifloxacin IV	1:1 IV to PO conversion
Multivitamin IV	1:1 IV to PO conversion
Pantoprazole IV	1:1 IV to PO conversion
Thiamine[d] IV	1:1 IV to PO conversion
Trimethoprim/Sulfamthoxazole (dosing is based on trimethoprim component)	1:1 IV to PO conversion[e]
Voriconazole	1:1 IV to PO conversion[e]

a. Patients currently admitted for the management of seizures, epilepsy, or status epilepticus are not eligible for conversion
b. Patients currently admitted for the management of myxedema coma are not eligible for conversion
c. Verify home dose and initial dose conversion to intravenous therapy, if applicable
d. Patients currently admitted for the management of Wernicke's encephalopathy are not eligible for conversion
e. Round to nearest tablet or capsule size

*The frequency of the new PO order will match the frequency of the current IV order with the exception of Clindamycin.

Appendix B. IV to PO Conversion Note/I Vent Template Sample

NAME is a AGE year old M/F being treated with IV MEDICATION [select one: azithromycin, ciprofloxacin, clindamycin, doxycycline, famotidine, fluconazole, folic acid, levetiracetam, levothyroxine, linezolid, metronidazole, multivitamin, moxifloxacin, pantoprazole, thiamine, trimethoprim/sulfamethoxazole, voriconazole].

Patient Data:
VITALS (last 3 days)

Relevant Labs:
CBC (last 3 days)
CMP or BMP (last 3 days)

Dietary Orders: DIET ORDERS (last 48 hours)

Based on the following criteria, this patient qualifies for intravenous to oral conversion:
[x] The patient's gastrointestinal tract is functioning (tolerating medications via oral or enteral route for 24 hours and tolerating food or enteral feeds for 24 hours).
[x] The patient is hemodynamically stable for 24 hours (heart rate <100 beats per minute, systolic blood pressure >99 mm Hg, and respiratory rate $\leq$20 breaths per minute).
[x] The patient shows clinical improvement (afebrile for at least 24 hours and white blood cell count downtrending or normalized). Additionally, the patient must be non-neutropenic (absolute neutrophil count >500 cells/mm^3).
[x] For antimicrobials, the patient has received IV therapy for at least 24 hours.

IV MEDICATION WITH DOSE AND FREQUENCY (free text) will be changed to ORAL MEDICATION WITH DOSE AND FREQUENCY (free text)

PHARMACIST'S NAME
PHARMACIST'S EXTENSION

Appendix C. Administration Considerations for PO Medications

Drug	Administer with or without food	Chelation medication[a] interaction
Azithromycin	With or without food. Increased tolerability seen when taken with food	Avoid simultaneous administration of azithromycin and antacids
Ciprofloxacin	Give with liberal fluids, with or without food. It should not be taken with dairy products (like milk or yogurt) or calcium-fortified juices alone; however, may be taken with a meal that contains these products	Administer Ciprofloxacin 2 hours before or 6 hours after chelation medication
Clindamycin	Give with full glass of water, with or without food.	None
Doxycycline	Give with adequate fluids. If GI irritation occurs, may be given with food	Absorption decreased, no recommendation given in product labeling
Fluconazole	With or without food	None
Levofloxacin	With or without food (tablets). 1 hour before or 2 hours after meals (oral liquid).	Administer Levofloxacin 2 hours before or 2 hours after chelating medication
Linezolid	With or without food. Avoid tyramine-containing[b] food and beverages	None
Metronidazole	With or without food	None
Moxifloxacin	With or without food	Administer Moxifloxacin 4 hours before or 8 hours after chelation medication
Trimethoprim/ Sulfamethoxazole	Give with adequate fluids, with or without food	None

a Chelation medications generally include tube feeds, antacids containing magnesium and aluminum, sucralfate, metal cations (e.g., iron), multivitamins containing zinc, and didanosine chewable/buffered tablets or powder for solution.

b Meals with high tyramine content (>100mg per meal) should be avoided during linezolid therapy. Foods high in tyramine content include those that may have undergone protein changes by aging, fermentation, pickling or smoking to improve favor, such as aged cheeses (0-15 mg tyramine per ounce), fermented or air-dried meats (0.1-8 mg tyramine per ounce), tap beers (4 mg tyramine per 12 ounces), red wine (0-6 mg tyramine per 8 ounces).