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**Clinical Practice Standard** **1-20-6-1-010**

# TITLE: INTRAVENOUS TO ORAL CONVERSION FOR ANTIMICROBIALS

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| **APPLICABILITY:** | All sites and facilities |
| **RELATED POLICIES:** | 1-20-6-4-090: Medication Adaptation |
| **DEFINITIONS:** | **Antimicrobial:** An antibiotic, antifungal or antiviral; **Bioavailability:** amount of drug absorbed into the body; **Potency:** combination of bioavailability plus amount of actual body exposure to drug after administration of 1 dose (area under the curve = AUC) |
| **COMPETENCY REQUIREMENTS:** | |

## KEY POINTS

- Timely conversion from intravenous (IV) to oral (PO) antimicrobial therapy is effective for a variety of infections, especially for agents with excellent bioavailability.
- Conversion from IV to PO antimicrobials in select patients results in cost savings for the facility as well as aim for positive clinical outcomes such as shortened hospital stay, reduced risk of line-related infections and adverse events and no IV related mobility restrictions for patients.

## POLICY STATEMENT (ALL STAFF MUST COMPLY)

All patients initiated on IV antimicrobials will be assessed for conversion to oral antibiotics. Oral antimicrobials will be used preferentially whenever appropriate for the clinical circumstances of the patient.

## CLINICAL PRACTICE STANDARD (ALWAYS USE PROFESSIONAL JUDGMENT AND DOCUMENT ANY DEVIATION FROM THE STANDARD)

Consider a change in route of administration of antimicrobial drug therapy when the following circumstances apply:

1. Improving clinically

- Consistent improvement in fever over the last 24 hours or patient is afebrile (less than 38ºC), and
- White blood cells decreasing, and
- Hemodynamically stable

2. Able to tolerate and absorb oral medications
    - Tolerating enteral feeds or eating/drinking fluid diet; taking other medications orally
    - No severe or persistent nausea, vomiting or diarrhea
    - No gastrointestinal obstruction, ileus, malabsorption syndrome, active gastrointestinal (GI) bleed or continuous gastric suctioning if orogastric/nasogastric (N/G).
3. Pathogen is not known to be resistant to the oral antimicrobial to be used
4. Patient **does not** have any of the following **exclusion** criteria:
    - Patient is less than or equal to 18 years of age (paediatric patients)
    - Nothing by mouth (NPO) status with no medications being given orally
    - Continuous feeds that cannot be held if antimicrobial agent known to bind to enteral nutrition formulation
    - Difficulty swallowing or loss of consciousness and no orogastric/N/G available
    - Short Gut syndrome
    - Acute treatment phase of listed conditions (discuss with infectious disease physician involved)
        - Febrile neutropenia
        - Bacteremia with *staphylococcus aureus* or Enterococcus species
        - Severe sepsis
        - CNS infection (e.g., meningitis, encephalitis)
        - Endophthalmitis
        - Endocarditis
        - Osteomyelitis/discitis
        - Vertebral or deep abscesses
        - Bone and joint infections
        - Septic arthritis

## IV to PO Conversion Regimen Recommendations

| Oral antimicrobials **equally potent** to the IV formulation | | |
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| **Parenteral Therapy** | **Oral Therapy** | **Oral Bioavailability** |
| Ciprofloxacin 200 mg IV q12h<br>Ciprofloxacin 400 mg IV q12h | Ciprofloxacin 250 mg PO BID<br>Ciprofloxacin 500 to 750 mg PO BID<br><br>**NOTE**: space oral dose two hours before or six hours after calcium, magnesium and iron. Hold enteral feeds one hour before and after dose (do not use oral suspension in feeding tubes due to clogging) | 70% |
| Clindamycin 600 mg IV q8h | Clindamycin 450 mg PO TID | 90% |
| Fluconazole IV once daily (daily dose same for both IV and PO administration) | Fluconazole po once daily (daily dose same for both IV and PO administration) | 90% |
| Levofloxacin 750 mg IV q24h<br>Levofloxacin 500 mg IV q24h | Levofloxacin 750 mg PO daily<br>Levofloxacin 500 mg PO daily | 99% |
| Metronidazole 500 mg IV q8h<br>Metronidazole 500 mg IV q12h | Metronidazole 500 mg PO TID<br>Metronidazole 500 mg PO BID | 100% |
| Moxifloxacin 400 mg IV once daily | Moxifloxacin 400 mg PO once daily | 90% |
| Sulfamethoxazole –trimethoprim (co-trimoxazole) 800/160 mg IV q8h | Sulfamethoxazole –trimethoprim (co-trimoxazole) 1 DS tab PO BID | 85% |
| Voriconazole 400 mg IV q12h x 2 doses then 200 mg IV q12h | Voriconazole 400 mg PO BID x 2 doses then 200 mg PO BID | 96% |

**NOTE: Adjust the above doses for the indication, patient's age, weight, and renal function when necessary.**

| Oral antimicrobials **less potent** than IV formulation.<br>Step-down to a less potent oral agent requires **individual patient assessment** | | |
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| **Parenteral Therapy** | **Oral Therapy*** ** | **Oral Bioavailability** |
| Azithromycin 500 mg IV once daily x 3 days (5 days if suspected legionella) | Azithromycin 500 mg PO x 1 then 250 mg PO once daily x 4 days<br>Or<br>Azithromycin 500 mg PO daily x 3 days | 37%* |

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| Cefazolin 1 g IV q8h | Cephalexin*** 500 mg PO QID | 90% |
| Cefuroxime 750 mg IV q8h<br>Cefuroxime 1.5 g IV q8h | Cefuroxime 500 mg PO BID with food | 50% |
| Cloxacillin 1 to 2 g IV q6h | Cloxacillin 500 mg PO QID one hour before or two hours after meals<br>**or** Cephalexin 500mg po QID | 50% |
| Penicillin G 1 to 2 million units IV q6h | Penicillin V 300 mg PO QID<br>**or** Amoxicillin 500 mg PO TID | 60-73%<br>Amoxi = 80% |
| Acyclovir# 5mg/kg IV q8h | Acyclovir# 400 mg PO TID<br>**or** Valacyclovir# 1 g po BID | Acyclovir = 10 – 20%<br>Valacyclovir = 54% |

**NOTE: The above doses should be adjusted for the indication, patient's age, weight, and renal function when necessary.**

***low bioavailability but rapidly moves into tissues resulting in low serum concentrations but high and persistent tissue concentrations (note 500mg oral dose = loading dose)

*** If a pathogen has been identified ensure the organism is susceptible. Note: cephalothin is the representing agent in microbiology testing for cephalexin

# Doses vary depending on indication

| Intravenous antimicrobials **without oral formulations** | | |
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| **Parenteral Therapy** | **Oral Therapy**** | **Oral Bioavailability** |
| Ampicillin 500 mg IV q8h<br><br>Ampicillin 1 g IV q6h | Amoxicillin 500mg PO TID | 80% |
| Ceftazidime 2 g IV q8h | Ciprofloxacin 750 mg PO BID (for Pseudomonas species) | 70% |
| Ceftriaxone 1 to 2 g IV q24h | Depends on indication (consult pharmacist)<br><br>Amoxicillin-Clavulanate 875 mg PO BID<br><br>Or<br><br>Cefuroxime 500 mg PO BID<br><br>Or<br><br>Cefixime 400 mg PO daily | Amoxicillin = 80%<br>Clavulanate = 30 – 98%<br>Cefuroxime = 50% (with food)<br>Cefixime = 50% |
| Gentamicin 6 mg/kg ideal body weight** IV q24h<br>**or** | Ciprofloxacin 750 mg PO BID (for Pseudomonas species) | Cipro = 70% |

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| Tobramycin 6 mg/kg ideal body weight** IV q24h | | |
| Piperacillin/Tazobactam 3.375 g IV q6hr | Amoxicillin/clavulanate 500/125mg PO TID<br><br>**or** Ciprofloxacin 500 to 750 mg PO BID + Metronidazole 500 mg PO BID<br><br>**or** Ciprofloxacin 500 to 750 mg PO BID + Clindamycin 450 mg PO TID | Amoxicillin= 80%<br>clavulanate = 30 -98%<br><br>Cipro = 70%<br><br>Metro = 100%<br><br>Clinda = 90% |

**NOTE: The above doses should be adjusted for the indication, patient's age, weight, and renal function when necessary.**
** Contact pharmacy for dosing
*** If a pathogen has been identified ensure the organism is susceptible. Note: cephalothin is the representing agent in microbiology testing for cephalexin

## DOCUMENTATION

Document recommendations to the most responsible physician for oral antimicrobial conversion in the physician progress notes section of patient's chart.

Document accepted recommendations as a medication order in the physician's order section of the patient's chart.

## KEYWORDS

Antimicrobials, antimicrobial stewardship, antimicrobial conversion, IV to PO step-down. OG, ng, og, NG

## REFERENCES

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