

# Antimicrobial Stewardship Strategy: Formulary review/streamlining

*Formulary review and streamlining involves limiting the number of antimicrobials available to the minimum needed for effective treatment, while eliminating agents with duplicate spectrums of activity.<sup>1</sup>*



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## This is a PHO CORE strategy

Priority Level: A

Difficulty Level: 1

### Program Stage:

- ✓ Early
- Intermediate
- Advanced

For more information on these criteria and how they were developed, please see the [Antimicrobial Stewardship Strategy Criteria Reference Guide](#).

Updated June 2016

## Description

**This is an overview and not intended to be an all-inclusive summary. As a general principle, patients must be monitored by the health care team after changes to therapy resulting from recommendations made by the antimicrobial stewardship team.**

Institutions are encouraged to review and streamline the number and choice of antimicrobials they have available for use. This is also referred to as a “closed formulary.”

This strategy entails limiting the number of antimicrobials available on the institutional drug formulary to the minimum needed for effective treatment, while eliminating agents with duplicate spectrums of activity.<sup>1</sup> It usually involves selecting one or two representative antimicrobials from each class, rather than carrying all choices (e.g., identifying one first- and second-generation cephalosporin, one or two echinocandins). Agents are assessed based on therapeutic efficacy, safety, indications, potential for development of resistance, pharmacokinetics and cost, usually by a pharmacy and therapeutics committee or a similar group. Need and frequency of use are also considered: for example, smaller institutions may not require agents that are usually reserved for more complicated infections or resistant organisms (e.g., voriconazole, colistin, tigecycline), although these could be made available on a nonformulary basis for specific cases when justified.

Formulary review and streamlining also includes identifying and implementing restrictions for specific antimicrobial agents (see [Formulary restriction](#)).

The use of auto-substitutions (see [Formulary automatic substitution/therapeutic interchange policies](#)) may facilitate the management of some nonformulary drug requests; others must be addressed on a case-by-

case basis. Frequent requests for the same agent may prompt a review of the agent for addition to the formulary. Formularies may be specific for an institution, a group of institutions or a region.

## Advantages

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- One of the core strategies recommended in the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America guidelines.<sup>2</sup>
- Considered an effective strategy for controlling antimicrobial use.<sup>2</sup>
- Shown to reduce the costs of targeted antimicrobials and decrease the use of antimicrobials that are unavailable or restricted.
- May help with specific resistance issues in an institution, since resistance patterns can mirror usage patterns.
- Functions with minimal staff resources once established.
- Can be done without adversely affecting clinical outcomes.
- Minimal threat to physician autonomy.

## Disadvantages

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- Requires initial organized effort and buy-in from physicians, pharmacists, microbiology laboratory personnel and administration to streamline the formulary.
- Unclear if this is effective at reducing overall antimicrobial resistance.
- May direct (inappropriate) use to another antimicrobial agent that is available and unrestricted.
- May not be effective if there is a way for prescribers to circumvent the process and obtain nonformulary antimicrobials.

## Requirements

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- Process for reviewing requests to add new/alternate agents.
- Mechanism to contact prescribers when nonformulary antimicrobials are ordered and review one-time requests.

## Associated Metrics

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- Effectiveness of formulary streamlining with institutional costs of antimicrobials and/or drug utilization (drug class or individual agent).
- Resistance rates if a particular agent is removed from or added to formulary (note that it may take years to see measureable changes in resistance rates).

## References

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1. Bassetti M, Di Biagio A, Rebesco B, Amalfitano ME, Topal J, Bassetti D. The effect of formulary restriction in the use of antibiotics in an Italian hospital. *Eur J Clin Pharmacol.* 2001;57(6-7):529–34.

*Limited formulary antibiotics to the minimum number required for effective treatment, eliminated duplication within antibiotic classes, taking into consideration susceptibility patterns of nosocomial pathogens.*

*Successfully reduced costs and reduced use of specific antibiotics.*

2. Dellit TH, Owens RC, McGowan JE Jr, Gerding DN, Weinstein RA, Burke JP, et al. Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America guidelines for developing an institutional program to enhance antimicrobial stewardship. Clin Infect Dis. 2007;44(2):159–77. Available from: <http://cid.oxfordjournals.org/content/44/2/159.long>

## Additional Useful References

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Select articles to provide supplemental information and insight into the strategy described and/or examples of how the strategy was applied; not a comprehensive reference list. URLs are provided when materials are freely available on the Internet.

- Fagan M, Lindbæk M, Reiso H, Berild D. A simple intervention to reduce inappropriate ciprofloxacin prescribing in the emergency department. Scand J Infect Dis. 2014;46(7):481–5.

*Removed ciprofloxacin from an emergency department formulary.*

*Reduced rate of ciprofloxacin use for cystitis from 6.3 per cent to 3.4 per cent without an increase in the rate of pyelonephritis.*

## Samples/Examples (updated June 2016)

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- [Example: Halton Healthcare - Hospital Formulary Anti-infective Agents \(includes therapeutic interchanges and restriction criteria \)](#)

***These documents have been generously shared by various health care institutions to help others develop and build their antimicrobial stewardship programs. We recommend crediting an institution when adopting a specific tool/form/pathway in its original form.***

***Examples that contain clinical or therapeutic recommendations may not necessarily be consistent with published guidelines, or be appropriate or directly applicable to other institutions. All examples should be considered in the context of the institution's population, setting and local antibiogram.***

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## Links with Other Strategies

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- [Formulary automatic substitution/therapeutic interchange policies](#)
- [Formulary restriction](#)

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## Citation

Ontario Agency for Health Protection and Promotion (Public Health Ontario). Antimicrobial Stewardship Strategy: Formulary review/streamlining. Toronto, ON: Queen's Printer for Ontario; 2016.

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## For further information

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Public Health Ontario acknowledges the financial support of the Ontario Government



## Example: Halton Healthcare - Hospital Formulary Anti-infective Agents (includes therapeutic interchanges and restriction criteria)

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### HOSPITAL FORMULARY

#### 8:00 ANTI-INFECTIVE AGENTS

##### 8:12 ANTIBACTERIALS

##### 8:12:02 Aminoglycosides

**Gentamicin** Garamycin®  
Injection 60mg/50ml, 80mg/50mL, 100mg/100ml, 120mg/100ml in NS premixed bags  
Injection 80mg/2ml, 40mg/ml 20ml vial

#### GENTAMICIN

General use is not restricted, but any use beyond 7 days requires pharmacist/Infectious Diseases review

Drug Ordered:	Drug Supplied:
Gentamicin injection	Tobramycin injection (same dose and frequency)

**Tobramycin PF** Tobramycin  
(Preservative Free)  
Injection 80mg/2ml

**Streptomycin sulphate** Streptomycin  
Injection 1000 mg vial

#### STREPTOMYCIN RESERVED INDICATIONS:

- Part of combination therapy of active tuberculosis (second-line)
- Brucellosis
- Plague
- Tularemia
- Infectious Disease Service consultation is recommended

**Amikacin** Amikacin  
Injection 500mg/2ml

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## Example: Halton Healthcare - Hospital Formulary Anti-infective Agents (includes therapeutic interchanges and restriction criteria) (continued)

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### 8:12:06 Cephalosporins

#### 8:12:06:04 First Generation Cephalosporins

##### Cefadroxil

Capsule 500mg

##### CEPHALEXIN Therapeutic Interchange

Drug Ordered	Drug Supplied
Cephalexin 250-500mg tablets any frequency	Cefadroxil 500 mg po q12h

**Exception:** no substitution for Cephalexin suspension

Cephalexin 750mg–1 g tablets any frequency	Cefadroxil 1 g po q12h
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**Exception:** no substitution for Cephalexin suspension

##### Cefazolin sodium

Ancef<sup>®</sup>, Kefzol<sup>®</sup>

Injection 1 g vial, 500mg vial  
1 g/50ml, 2 g/100ml NS premixed bags

##### CEFAZOLIN Therapeutic Interchange

Drug Ordered	Drug Supplied
Cefazolin IV any dose prescribed more frequent than q8h, ADULT only	Cefazolin same dose IV q8h

##### Cephalexin

Keflex<sup>®</sup>

Liquid 250mg/5mL

#### 8:12:06:08 Second Generation Cephalosporins

##### Cefoxitin

Injection 1 g  
Injection 2 g

##### Cefprozil

Cefzil<sup>®</sup>

Liquid 250 mg/5 mL

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## Example: Halton Healthcare - Hospital Formulary Anti-infective Agents (includes therapeutic interchanges and restriction criteria) (continued)



**Dose Equivalency Table for  
Cefuroxime Oral Suspension and Cefaclor Oral Suspension  
Interchange to Cefprozil Oral Suspension**

Indication	If Cefuroxime (Ceftin) Oral Suspension Ordered	If Cefaclor (Ceclor) Oral Suspension Ordered	Give Cefprozil (Cefzil) Oral Suspension
Skin/soft tissue	15mg/kg q12h	10mg/kg q12h	20mg/kg q24h
Otitis	15mg/kg q12h	20mg/kg q12h	15mg/kg q12h
Upper respiratory tract (pharyngitis/tonsillitis)	10mg/kg q12h	20 mg/kg q12h	7.5mg/kg q12h
Lower respiratory tract	No dose guidelines in children	13mg/kg q8h	15mg/kg q12h
<b>Maximum dose per day</b>	1g/day	1.5g/day	1g/day

### Cefuroxime

Injection 750 mg vial  
Tablet 250 mg, 500 mg

Zinacef®  
Ceftin®

#### **CEFUROXIME ORAL LIQUID Therapeutic Interchange**

Drug Ordered	Drug Supplied
Cefuroxime oral liquid	Cefprozil oral liquid (see table above for dose equivalency)

8:12:06:012

### Third Generation Cephalosporins

### Cefixime

Tablet 400 mg  
Suspension 100 mg/5 mL

Suprax®

#### **CEFIXIME RESERVED STATUS**

- Treatment of mild/moderate typhoid fever
- Penicillin-resistant gonococcus in pregnancy
- STDs in emergency treatment
- IV to PO step-down therapy

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## Example: Halton Healthcare - Hospital Formulary Anti-infective Agents (includes therapeutic interchanges and restriction criteria) (continued)

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**Cefotaxime** Claforan®  
Injection 500 mg, 1 g vial,

### **CEFOTAXIME Therapeutic Interchange**

<b>Drug Ordered</b>	<b>Drug Supplied</b>
Cefotaxime IV any dose prescribed more frequent than q8h, ADULT only	Cefotaxime same dose IV q8h

**EXCEPTION:**  
Meningitis or other CNS infection: no therapeutic interchange

**Either cefotaxime or ceftriaxone may be used. However, cefotaxime should preferentially be used in the following situations:**

- Treatment of pyelonephritis or UTI
- Severe liver/biliary disease
- Use in neonates ( $\leq 28$  days): Intravenous ceftriaxone use in neonates linked to neonatal jaundice (intramuscular route is acceptable). Intravenous/intramuscular use of ceftriaxone contraindicated in neonates receiving calcium-containing intravenous products (ceftriaxone and calcium-containing products should not be given within 48 hours of each other)

**Ceftazidime** Fortaz®  
Injection 1 g vial, 2 g vial

### **CEFTAZIDIME RESERVED INDICATIONS**

- Suspected/confirmed *Pseudomonas* infection
- Empiric therapy in CF and febrile neutropenia
- Empiric therapy of peritonitis in patients on chronic ambulatory peritoneal dialysis (CAPD)
- Suspected post-neurosurgical meningitis or ventriculoperitoneal (VP) shunt infection

**Ceftriaxone** Rocephin®  
Injection 250 mg, 1 g, 2 g vial

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## Example: Halton Healthcare - Hospital Formulary Anti-infective Agents (includes therapeutic interchanges and restriction criteria) (continued)



### 8:12:07 Miscellaneous B-Lactams

#### 8:12:07:08 Carbapenems

**Ertapenem** Invanz®  
Injection 1 g vial

##### ERTAPENEM RESERVED INDICATIONS

- Indicated for the following: complicated SSTI, pneumonia, complicated UTI/pyelonephritis, intra-abdominal infections and infection with an extended spectrum beta-lactamase (ESBL) producing organism
- Indicated where outpatient intravenous therapy is being considered for the above indications
- **Not indicated in:** febrile neutropenia, meningitis or other CNS infection, necrotizing pancreatitis suspected/confirmed *Pseudomonas* or *Acinetobacter* infection

**Meropenem** Merrem®  
Injection 500 mg vial

##### MEROPENEM RESERVED INDICATIONS

- Empirical therapy in febrile neutropenia
- Alternative to Ertapenem for infection with an extended spectrum beta-lactamase (ESBL) producing organism
- Treatment of gram negative meningitis/CNS infection, or treatment of meningitis/CNS infection in beta-lactam allergic patient (do not use if prior severe reaction such as anaphylaxis or angioedema to beta-lactam antibiotics)
- Piperacillin-Tazobactam is indicated **and** *Pseudomonas* is suspected/confirmed, but allergy to beta-lactam antibiotics (do not use if severe reaction such as anaphylaxis or angioedema to beta-lactam antibiotics)
- Usual dose is 500 mg IV q8h, or 2 g IV q8h for meningitis/CNS infection

### 8:12:12 Macrolides

**Azithromycin dihydrate** Zithromax®  
Tablet 250 mg  
Suspension 200 mg/5 mL  
Injection 500 mg vial

**Clarithromycin** Biaxin®  
Tablet 250 mg  
Suspension 125 mg/5 mL

**Erythromycin**  
Tablet as base 250 mg  
Liquid as estolate 250 mg/5 mL  
Injection 500mg, 1 g vial

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## Example: Halton Healthcare - Hospital Formulary Anti-infective Agents (includes therapeutic interchanges and restriction criteria) (continued)



### 8:12:16 Penicillins

#### Amoxicillin Amoxil®

Capsule 250 mg, 500mg  
Suspension 250 mg/5 mL  
125 mg/5mL

#### Amoxicillin/clavulanate Clavulin®

Tablet 250, contains Amoxicillin 250 mg/Clavulanic Acid 125 mg  
Tablet 500F, contains Amoxicillin 500 mg/Clavulanic Acid 125 mg  
Tablet 875, contains Amoxicillin 875 mg/ Clavulanic Acid 125 mg  
Liquid 125F, each 5 mL contains Amoxicillin 125 mg/Clavulanic Acid 31.25 mg  
Liquid 250F, each 5 mL contains Amoxicillin 250 mg/Clavulanic Acid 62.5 mg

#### Ampicillin Ampicin®

Injection 250 mg, 500 mg, 1 g vial, 2 vial

#### **AMPICILLIN THERAPEUTIC INTERCHANGE**

Drug Ordered	Drug Supplied
Ampicillin PO (any dose or frequency) ADULT only	Amoxicillin 500mg PO q8h

#### Cloxacillin Orbenin®

Capsule 250 mg, 500 mg  
Suspension 125 mg/5 mL  
Injection 500 mg, 2 g vial, 1 gm vial

#### Penicillin G sodium Crystapen®

Injection 1 million units, 5 million units, 10 million units vial

#### **PENICILLIN G THERAPEUTIC INTERCHANGE**

Drug Ordered	Drug Supplied
Penicillin G (potassium or if no salt specified)	Penicillin G sodium (same dose/frequency)

#### Penicillin G Benzathine Bicillin LA®

Injection 1,200,000 IU prefilled syringe

#### **PENICILLIN G BENZATHINE RESERVED STATUS**

- Treatment of syphilis infection
- Infectious Disease Service consultation is recommended

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## Example: Halton Healthcare - Hospital Formulary Anti-infective Agents (includes therapeutic interchanges and restriction criteria) (continued)



**Penicillin V potassium** V-cillin-K®  
Tablet 500,000 units (300 mg)  
Suspension 300 mg/5 mL

### **PENICILLIN VK THERAPEUTIC INTERCHANGE**

Drug Ordered	Drug Supplied
Penicillin VK 250mg tablet	Penicillin VK (generic) 300mg tablet (same frequency)
Penicillin V oral	Pen VK oral

**Piperacillin** Pipracil®  
Injection 3 g, 4 g vial

### **PIPERACILLIN RESERVED STATUS**

Indicated for isolated *Pseudomonas* infection where the isolate is known to be susceptible. Use Piperacillin-Tazobactam for polymicrobial infections.

**Piperacillin/tazobactam** Tazocin®  
Injection 2.25 g, 3.375 g, 4.5 g vial

## **8:12.18 QUINOLONES**

**Ciprofloxacin** Cipro®  
Tablet 250 mg, 500 mg  
Injection 200 mg minibag,  
400 mg minibag  
100 mg/mL suspension

**Note:** oral bioavailability of ciprofloxacin is 80-90%

### **QUINOLONE THERAPEUTIC INTERCHANGE**

Drug Ordered	Drug Supplied
Norfloxacin 400 mg po	Ciprofloxacin 500 mg po (same frequency)

**Levofloxacin** Levaquin®  
Tablet 500 mg, 750 mg  
Injection 500mg, 750mg

**Note:** oral bioavailability of levofloxacin is ~99%

### **LEVOFLOXACIN THERAPEUTIC INTERCHANGE**

Drug Ordered	Drug Supplied
Levofloxacin 500 mg PO/IV daily	Levofloxacin 750 mg PO/IV q24h

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## Example: Halton Healthcare - Hospital Formulary Anti-infective Agents (includes therapeutic interchanges and restriction criteria) (continued)



### 8:12:20 SULFONAMIDES

**Cotrimoxazole** Bactrim®, Septra®  
(Sulfamethoxazole/Trimethoprim)

Injection 80 mg/16 mg per 1 mL  
Tablet 400 mg/80 mg (single strength)  
Suspension 400 mg/80 mg per 10 mL

### 8:12:24 Tetracyclines

**Doxycycline** Vibramycin®  
Capsule 100 mg

**Tetracycline** Tetracycl®  
Capsule 250 mg  
Suspension 125 mg/5 mL

### 8:12:24.12 Glycylcyclines

**Tigecycline** Tigacil®  
Injection 50 mg/vial

#### TIGECYCLINE RESERVED INDICATIONS

Notify or consult infectious disease service

- Severe *Clostridium difficile* infection unresponsive to conventional therapies
- Treatment of MRSA, VRE or highly resistant gram negative infections (e.g. ESBLs) for which conventional therapies are not appropriate

### 8:12:28 Miscellaneous Antibacterials

**Bacitracin**  
Injection 50 000 units

**Clindamycin** Dalacin C®  
Capsule 150 mg, 300 mg  
Injection 150 mg/mL, 9g/60mL vial and 600mg/50mL, 900mg/100mL in NS bags  
Suspension 75 mg/5 mL

**Colisitimethate** Colistin® \*\* Notify or consult infectious disease service"  
Injection 150mg vial

#### COLISITIMETHATE RESERVED INDICATIONS

- Highly resistant gram negative infections for which alternative therapies are not appropriate
- Infectious Disease Service consultation is recommended

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## Example: Halton Healthcare - Hospital Formulary Anti-infective Agents (includes therapeutic interchanges and restriction criteria) (continued)

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**Daptomycin**                      Cubicin®  
Injection 500 mg/vial

### **DAPTOMYCIN RESERVED STATUS**

Notify or consult the infectious disease service

- Isolated MRSA infection for which other first line therapies are contraindicated or not tolerated
- Isolated MRSA infection in a patient non-responsive to vancomycin
- Consider as first line therapy of MRSA bacteremia with MIC to vancomycin  $\geq 2\text{mcg/mL}$  and/or persistent bacteremia on vancomycin
- **Not** indicated in: pulmonary infections

**Fidaxomicin**                      Difidid®  
Tablet 200mg

### **FIDAXOMICIN RESERVED STATUS**

Notify or consult the infectious disease service

- Second or later recurrence (i.e. third or later episode) of *Clostridium difficile* Infection – restricted to ID physicians.
- Completion of therapy of CDI initiated prior to admission.

**Note:** New start orders for this agent are **restricted** to ID physicians. Therapeutic interchange to PO vancomycin applies to all other new start orders.

### **FIDAXOMICIN THERAPEUTIC INTERCHANGE**

<b>Drug Ordered</b>	<b>Drug Supplied</b>
Fidaxomicin any dose or frequency	Vancomycin 125 mg po q6hr

#### **Exceptions:**

- The order is written in person or as a telephone order by an ID physician
- Completion of CDI initiated prior to admission

**Note:** New start orders for this agent are restricted to ID physicians. Therapeutic interchange to PO Vancomycin applies to all other new start orders

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## Example: Halton Healthcare - Hospital Formulary Anti-infective Agents (includes therapeutic interchanges and restriction criteria) (continued)

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### Linezolid

Injection 600 mg/300 ml  
Tablets 600 mg

### Zyvoxam®

#### **LINEZOLID RESERVED STATUS**

Notify or consult the infectious disease service

- MRSA infection in a patient intolerant to or failed vancomycin
- MRSA infection in a patient with no intravenous access
- MRSA bacteremia with MIC to vancomycin  $\geq 2$  mcg/mL and/or persistent bacteremia on vancomycin
- VRE infection

Treatment of multi-drug resistant TB or non-tuberculous mycobacterial infection

### Vancomycin

Injection 500 mg, 1 g vial

**NOTE:** For all po orders, vancomycin injection will be administered orally, diluted in a beverage just prior to administration.

**USUAL DOSAGE OF VANCOMYCIN FOR *Clostridium Difficile* COLITIS:** 125-250 mg po Q6H

\*refer to Clostridium Difficile Diagnosis & Management Algorithm on HOPP

#### **VANCOMYCIN THERAPEUTIC INTERCHANGE**

<b>Drug Ordered</b>	<b>Drug Supplied</b>
Vancomycin IV any dose or frequency	Vancomycin 1g IV q12h

ADULT only

#### **Exceptions:**

- Meningitis or other CNS infection: use 1.5g IV q12h
- Dose adjustment in treatment of deep/severe staphylococcal infection with trough level  $<10$  mcg/mL: titrate dose to achieve trough 10-20 mcg/mL

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## Example: Halton Healthcare - Hospital Formulary Anti-infective Agents (includes therapeutic interchanges and restriction criteria) (continued)



### 8:14 ANTIFUNGALS

#### 8:14:08 Azoles

**Fluconazole** Diflucan®  
Tablet 50 mg, 100 mg  
Suspension 10 mg/mL  
Injection 200 mg/100 mL, 400mg/200mL in 0.9% NaCl

##### **FLUCONAZOLE RESERVED STATUS**

Unable to take oral medication and one of the following:

- Invasive candidiasis (endophthalmitis, hepatosplenic candidiasis, *Candida* isolated from sterile site)
- Empiric therapy in ICU patient at high risk of disseminated candidiasis **and** cultures of 3 non-sterile sites yield *Candida* species

**Voriconazole** Vfend®  
Injection 200mg VIAL  
Tablets 50mg, 200mg

##### **VORICONAZOLE RESERVED STATUS**

- Patients who are unresponsive to or intolerant of conventional Amphotericin B
- Suspected/confirmed infection with *Histoplasma*, *Blastomyces*, *Aspergillus*, *Fusarium*, *Scedosporium*
- Step-down therapy for confirmed or suspected invasive mycosis

**Itraconazole** Sporanox®  
Capsule 100mg

##### **ITRACONAZOLE RESERVED STATUS**

- Treatment of fluconazole-resistant *Candida*

#### 8:14:16 Echinocandins

**Caspofungin** Cancidas®  
Injection 70 mg, 50 mg vial

##### **CASPOFUNGIN RESERVED STATUS**

- Patients who are unresponsive to or intolerant of conventional Amphotericin B
- Suspected or confirmed fungal infection and impaired renal function
- Suspected/confirmed fluconazole resistant *Candida* infection
- Salvage aspergillosis therapy if failure with standard therapy

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## Example: Halton Healthcare - Hospital Formulary Anti-infective Agents (includes therapeutic interchanges and restriction criteria) (continued)



### 8:14:28 Polyenes

**Amphotericin B** Fungizone®  
Injection 50 mg vial

#### AMPHOTERICIN B RESERVED STATUS

- Suspected/confirmed disseminated/deep organ fungal infection
- Empiric therapy for patient with profound neutropenia and fever >5 days despite appropriate empiric antibacterial therapy
- Initiation therapy in suspected/confirmed endemic mycosis (*Aspergillus*, *Histoplasma*, *Blastomyces* etc.)

**Liposomal Amphotericin B** Ambisome®  
Injection 50 mg vial

#### LIPOSOMAL AMPHOTERICIN B RESERVED STATUS

Same indications as for non-lipid amphotericin (except not recommended for endophthalmitis), but:

- Intolerant to conventional Amphotericin B (infusion reactions, electrolyte disturbance)
- Nephrotoxicity: baseline serum creatinine >175 µmol/L or patient has developed acute renal failure while on Amphotericin B

**Nystatin** Mycostatin®, Nilstat®  
Suspension 100 000 units/mL  
Ointment 100 000 U/g

#### NYSTATIN THERAPEUTIC INTERCHANGE

Drug Ordered	Drug Supplied
Nystatin – any oral tablet or suspension dose/frequency, ADULT only	Nystatin 500 000 units (5mL) q6h
Nystatin topical (no dosage form specified)	Ointment will be supplied

### 8:16 ANTIMYCOBACTERIALS

#### 8:16:04 Antituberculosis Agents

**Ethambutol** Etibi®, Myambutol®  
Tablet 100 mg, 400 mg

**Isoniazid** Isotamine®  
Tablet 100 mg, 300 mg  
Vial 1000 mg (SAP)

#### ISONIAZID 1000 MG VIAL (SAP) RESERVED INDICATIONS

- Treatment of tuberculous meningitis where the patient is unable to tolerate medications via the enteral route
- Infectious Disease Service consultation is recommended

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## Example: Halton Healthcare - Hospital Formulary Anti-infective Agents (includes therapeutic interchanges and restriction criteria) (continued)



**Pyrazinamide**                      Tebrazid®  
Tablet 500 mg

**Rifampin**                              Rifadin®  
Capsule 150 mg, 300 mg  
Vial 600 mg (SAP medication)

### **RIFAMPIN 600 MG VIAL (SAP) RESERVED INDICATIONS**

- Treatment of tuberculous meningitis where the patient is unable to tolerate medications via the enteral route
- Infectious Disease Service consultation is recommended

### **8:16:92      Miscellaneous Antimycobacterials**

**Dapsone**                              Avlosulfon®  
Tablet 100 mg

### **8:18      ANTIVIRALS**

#### **8:18:04      Adamantanes**

**Amantadine**                          Symmetrel®  
Capsule 100 mg  
Syrup 50 mg/5 mL

**Zanamivir**                              Relenza®  
Diskhaler 5mg/disk

### **18:08      Antiretrovirals**

**Note:** Selected HIV medications are included in the Formulary primarily for the indications specified. However, these medications may be prescribed for the treatment of HIV on an as needed basis. For patients who are **maintained** on anti-retroviral therapy in the community, use of the patient's own medication supply is preferred, but in cases where it is not feasible for the patient to provide their own supply, HHS shall provide the medication. For **newly initiated** HIV therapy, HHS shall provide the medications as prescribed. (Permission of the Director of Pharmacy or delegate will be obtained when any HIV medication needs to be procured for an indication other than a listed reserved indication.)

**Raltegravir**                          Isentress®  
Tablet 400 mg

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## Example: Halton Healthcare - Hospital Formulary Anti-infective Agents (includes therapeutic interchanges and restriction criteria) (continued)



**Tenofovir/Emtricitabine**  
Tablet 300/200mg

Truvada®

**Raltegravir and Tenofovir/Emtricitabine Reserved Status Indication:**

- Post-exposure prophylaxis of HIV infection where indicated

Note: Selected HIV medications are included in the Formulary primarily for the indications specified. However, these medications may be prescribed for the treatment of HIV on an as needed basis. For patients who are **maintained** on anti-retroviral therapy in the community, use of the patient's own medication supply is preferred, but in cases where it is not feasible for the patient to provide their own supply, HHS shall provide the medication. For **newly initiated** HIV therapy, HHS shall provide the medications as prescribed. (Permission of the Director of Pharmacy or delegate will be obtained when any HIV medication needs to be procured for an indication other than a listed reserved indication.)

**Lamivudine**

Epivir® 3TC®

Tablet 150 mg

Oral Liquid 10mg/ml (Reserved antiinfective agent)

**Nevirapine**

Viramune®

Tablet 200mg

Oral liquid 10mg/ml (Reserved antiinfective agent- SAP)

**Lamivudine And Nevirapine Reserved Status Indications:**

- Intrapartum suspected or confirmed HIV infection with no antiretroviral management during pregnancy (tablets)
- Prophylaxis of HIV in infants born to HIV infected mothers where indicated (oral liquid)

**Zidovudine**

Retrovir®

Capsule 100 mg

Oral liquid 50mg/5ml

Injection 200mg/20ml

**Zidovudine Reserved Status Indications:**

- Intrapartum suspected or confirmed HIV infection with no antiretroviral management during pregnancy (injectable)
- Postpartum suspected or confirmed HIV infection with no antiretroviral management during pregnancy (tablets)
- Neonatal prevention of mother to child transmission of HIV (oral liquid or injectable)

Note: Selected HIV medications are included in the Formulary primarily for the indications specified. However, these medications may be prescribed for the treatment of HIV on an as needed basis. For patients who are **maintained** on anti-retroviral therapy in the community, use of the patient's own medication supply is preferred, but in cases where it is not feasible for the patient to provide their own supply, HHS shall provide the medication. For **newly initiated** HIV therapy, HHS shall provide the medications as prescribed. (Permission of the Director of Pharmacy or delegate will be obtained when any HIV medication needs to be procured for an indication other than a listed reserved indication.)

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## Example: Halton Healthcare - Hospital Formulary Anti-infective Agents (includes therapeutic interchanges and restriction criteria) (continued)



### 8:18:28 Neuraminidase Inhibitors

#### Oseltamivir

Tamiflu®

Capsule 30 mg, 75 mg  
Suspension 6 mg/mL

#### Table for Interchange for Standard Dose Oseltamivir to Renally Adjusted Dose

##### Important notes:

- Applies to non-critically ill patients only – double dose oseltamivir may be prescribed in the critically ill, and Therapeutic Interchange must not be applied to these orders.
- Extended treatment duration (i.e. >5 days) may be requested by the prescriber for influenza treatment in severely ill children or in adults who are immunocompromized and/or critically ill. In such cases, do not interchange treatment to 5 days.

Drug	Substitution
Oseltamivir for influenza <b>treatment</b> , any standard dose prescribed for patient with CrCl 31-60mL/min - ADULT ONLY	Oseltamivir 75mg PO once daily
Oseltamivir for influenza <b>treatment</b> , any standard dose prescribed for patient with CrCl 10-30mL/min - ADULT ONLY	Oseltamivir 30mg PO once daily
Oseltamivir for influenza <b>treatment</b> , any standard dose prescribed for patient with CrCl <10mL/min on neither Hemodialysis nor CAPD – ADULT ONLY	Oseltamivir 75mg PO x 1 dose
Oseltamivir for influenza <b>treatment</b> , any standard dose prescribed for patient on regular Hemodialysis - ADULT ONLY	Oseltamivir 75mg PO stat, then 75mg PO post each hemodialysis session
Oseltamivir for influenza <b>treatment</b> , any standard dose prescribed for patient on CAPD – ADULT ONLY	Oseltamivir 30mg PO x 1 dose

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## Example: Halton Healthcare - Hospital Formulary Anti-infective Agents (includes therapeutic interchanges and restriction criteria) (continued)



Drug	Substitution
Oseltamivir for influenza <b>prophylaxis</b> , any standard dose prescribed for patient with CrCl 31-60mL/min – ADULT ONLY	Oseltamivir 75mg PO every 2 days
Oseltamivir for influenza <b>prophylaxis</b> , any standard dose prescribed for patient with CrCl 10-30mL/min – ADULT ONLY	Oseltamivir 30mg PO every 2 days
Oseltamivir for influenza <b>prophylaxis</b> , any standard dose prescribed for patient on regular Hemodialysis – ADULT ONLY	Oseltamivir 75mg PO stat, then 75mg PO post each hemodialysis session
Oseltamivir for influenza <b>prophylaxis</b> , any standard dose prescribed for patient on CAPD, or for patient with CrCl <10mL/min on neither Hemodialysis nor CAPD – ADULT ONLY	Oseltamivir 30mg PO every seven days

### 8:18:32 Nucleosides and Nucleotides

#### Acyclovir

Zovirax®

Tablets 200 mg  
Oral Suspension 40mg/ml  
Injection 500 mg vial

#### ACYCLOVIR IV RESERVED STATUS

- Patient unable to take oral therapy
- Disseminated varicella (chicken pox) in normal host not responding to oral therapy or in an immunocompromised host
- Herpes Zoster (shingles):
  - immunocompromised host
  - severe disease: >1 dermatome, disseminated, trigeminal nerve
- Suspected/confirmed HSV encephalitis or disseminated disease
- Suspected neonatal disease

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## Example: Halton Healthcare - Hospital Formulary Anti-infective Agents (includes therapeutic interchanges and restriction criteria) (continued)



**Gancyclovir** Cytovene®  
Injection 500 mg vial

### GANCYCLOVIR RESERVED STATUS

- Treatment of suspected/confirmed cytomegalovirus (CMV) deep organ disease: retinitis, esophagitis, colitis, etc.
- Suspected/confirmed disseminated CMV viremia or focal CMV infection
- Graft rejection post solid organ transplant

**Valacyclovir** Valtrex®  
Tablet 500 mg

### VALCYCLOVIR THERAPEUTIC INTERCHANGE

Drug Ordered	Drug Supplied
Famciclovir (any dose or frequency), ADULT only	Valacyclovir 1g PO q8h

## 8:30 ANTIPROTOZOALS

### 8:30:08 Antimalarials

**Hydroxychloroquine** Plaquenil®  
Tablet 200 mg

**Quinine sulphate** Quinine®  
Capsule 200 mg, 300 mg

**Quinine Dihydrochloride**  
Injectable 600mg/2ml

### QUININE INJECTABLE RESERVED STATUS

- Severe malaria in pregnant patient during first trimester
- Therapy of non-severe malaria where oral treatment is not possible
- Infectious Disease Service consultation is recommended

**Choloroquine phosphate**  
Tablet 250mg

**Atovaquone/Proguanil** Malarone®  
Tablet 250mg/100mg

**Primaquine Phosphate** Primaquine®  
Tablet 15mg

### PRIMAQUINE RESERVED STATUS

- Primaquine in combination with clindamycin is an option for the treatment of PCP in patient who are unable to

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## Example: Halton Healthcare - Hospital Formulary Anti-infective Agents (includes therapeutic interchanges and restriction criteria) (continued)



tolerate co-trimoxazole

- Primaquine is also indicated for terminal prophylaxis for prevention of relapses of malaria caused by *Plasmodium vivax* or *Plasmodium ovale*
- The possibility of G6PD deficiency should be excluded before treatment is initiated
- Infectious Disease Service consultation is recommended

### Atovaquone

Mepron®

Oral Suspension 150mg/ml

### Artesunate

Injectable 110mg vial

#### **ARTESUNATE RESERVED STATUS**

- First line choice for severe malaria in adults and children (parasitemia greater than 5%, signs of end organ disease, etc.)

**EXCEPTIONS:** Pregnant patient, first trimester only

- Therapy of non-severe malaria where the patient is unable to tolerate medication via the enteral route
- Infectious Disease Service consultation is recommended

## 8:30:92 Miscellaneous Antiprotozoals

### MetroNIDazole

Flagyl®

Tablet 250 mg

Injection 500 mg mini-bag

#### **METRONIDAZOLE THERAPEUTIC INTERCHANGE**

##### **Drug Ordered**

MetroNIDazole 250 mg PO q6h

##### **Drug Supplied**

MetroNIDazole 500 mg q8h

##### **Exception:**

Gastrointestinal intolerance

MetroNIDazole IV (any dose or frequency) MetroNIDazole 500mg IV q12h

ADULT only

##### **Exceptions:**

- Use **500mg IV q8h** for *C. difficile* infection, flare of Crohns/Ulcerative Colitis, *H. pylori*, CNS infection where MetroNIDazole is indicated, or pediatric use
- Use **750mg IV q8h** for parasitic infections

#### **USUAL DOSAGE OF METRONIDAZOLE FOR *Clostridium Difficile* COLITIS:**

250 mg po Q6H or 500 mg po Q8H

\*refer to Clostridium Difficile Diagnosis & Management Algorithm on HOPP

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## Example: Halton Healthcare - Hospital Formulary Anti-infective Agents (includes therapeutic interchanges and restriction criteria) (continued)

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### Pentamidine

Injection 300 mg vial

#### **PENTAMIDINE RESERVED STATUS**

Suspected/confirmed *pneumocystis jiroveci* pneumonia (PCP) for which intravenous administration is required **and** patient is allergic to or intolerant of co-trimoxazole

### 8:36 URINARY ANTI-INFECTIVES

#### **Nitrofurantoin macrocrystals**      Macrochantin®

Capsule 50 mg

#### **NITROFURANTOIN THERAPEUTIC INTERCHANGE**

<b>Drug Ordered</b>	<b>Drug Supplied</b>
Nitrofurantoin microcrystals (tablets)	Nitrofurantoin macrocrystals (Macrochantin®) same dose and frequency

#### **Nitrofurantoin macrocrystals**      Macrobid®

Capsule 100 mg

#### **Trimethoprim**      Proloprim®

Tablet 100 mg

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