# HHS Antimicrobial Guidelines for Surgical Intra-abdominal Infections (IAI)

This resource is based on current published guidelines by AMMI Canada and IDSA and taking into consideration HHS microbiology, resistance patterns and hospital formulary. Optimal antimicrobial selection should be based on adherence to guideline recommendations in addition to clinical judgment, individual patient history (including allergies, previous antimicrobial use/intolerance), and culture results where applicable.

***** At HHS, *E. coli* susceptibility rates for ceftriaxone are greater than 90% vs. less than 80% for fluoroquinolones** (HHS antibiogram: http://corpweb.hhsc.ca/body.cfm?id=3056)**. Fluoroquinolones to be used only for patients with severe allergy to penicillins such as anaphylaxis or well documented allergy (e.g. rash) to cephalosporins. Cephalosporins can be used in patients with rash to penicillins. *****

***** This resource only applies to adult patients who have achieved adequate source control. *****

*User friendly APACHE II calculator can be found at: http://clincalc.com/IcuMortality/APACHEII.aspx*

## Empiric Antimicrobial Therapy for Low to Moderate Severity Community Acquired Surgical Intra-abdominal Infections (APACHE II score lower than 15)

| **Ceftriaxone 2 g IV Q24H plus metronidazole 500mg IVQ12H → po BID** |
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| Alternative**:** Only if severe allergy (e.g. anaphylaxis) to penicillins and allergy to cephalosporins<br>Ciprofloxacin 400mg IV Q12H → 500mg po BID* plus metronidazole 500mg IV Q12H → po BID |

*requires dosing modification in renal dysfunction. IV→po, IV to oral sequential therapy.

## Empiric Antimicrobial Therapy for Severe Community Acquired Surgical Intra-abdominal Infections (APACHE II score of ≥15) or Health Care Associated Infections†

| **Piperacillin/tazobactam 4.5 g* IV Q8H** |
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| Alternative: Only if severe allergy (e.g. anaphylaxis) to penicillins and allergy to cephalosporins<br>Ciprofloxacin 400mg IV Q12H → 500mg po BID* plus metronidazole 500mg IV Q12H → po BID<br>+/- gentamicin* 5-7 mg/kg/Q24H (use IBW) +/- vancomycin 15mg/kg IV Q12H |

†includes patients with prolonged previous hospitalization (5 days or more) or previous antimicrobial therapy (2 days or more). IV→po, IV to oral sequential therapy. Blood and intraoperative cultures are recommended. Broad-spectrum antimicrobial therapy should be tailored when culture and susceptibility reports are available. *requires dosing modification in renal dysfunction.

### Duration of Therapy

- Surgical prophylaxis in the absence of established infection. In patients with penetrating bowel trauma repaired within 12 h, intraoperative contamination by enteric contents or nonperforating appendicitis in the absence of abscess or local peritonitis: **24 hrs or less**
- Antimicrobial therapy of established infection should be **5-7 days**, unless it is difficult to achieve adequate source control. Treatment duration should be guided by intraoperative findings and clinical response as assessed by resolution of fever and leukocytosis, abdominal examination and gastrointestinal function.
- If source control was difficult to achieve, consider to discontinue antibiotics no longer than **48 hrs** after achieving source control, e.g. pulling of drains.

**References:** Solomkin et al. Clin Infect Dis 2010;50:133-64
Chow et al. Can J Infect Dis Med Microbiol 2010;21:11-37
Sawyer et al. N Engl J Med 2015;372:1996-2005

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## RESISTANCE CONSIDERATIONS

**Enteroccoci**
Routine Enterococci coverage is not recommended in mild to moderate severity community acquired IAI. Piperacillin/tazobactam provides *E. faecalis* coverage while ceftriaxone and ciprofloxacin do not. Consider to add vancomycin in beta-lactam allergic patients with severe community-acquired or health-care associated infections.

**MRSA**
Anti-MRSA coverage for empiric treatment or perioperative prophylaxis should be considered for health-care associated IAI in patients known to be colonized with the organism or have a history of MRSA infection. Vancomycin remains the drug of choice.

**Extended spectrum beta-lactamase (ESBL)**
Increasing fluoroquinolone use and prolonged use of oxyimino-cephalosporins (ceftazidime, ceftriaxone and cefotaxime) has contributed to emergence of resistance among Enterobacteriaceae species, particularly ESBL producing strains. Patients with documented or history of ESBL producing gram negative bacilli or inducible beta-lactamase producing gram negative organisms such as SPICE organisms (*Serratia*, indole-positive *Proteus*, *Providencia*, *Pantoeae*, *Morganella*, *Citrobacter freundii*, and *Enterobacter spp*.) should be treated with a carbapenem (ertapenem or meropenem).

**Candida**
Routine antifungal therapy for IAI should not be used especially in community-acquired IAI where candida species is not a common pathogen. Targeted antifungal therapy is recommended for patients with severe community acquired or health care associated IAI if Candida species is isolated from intra-abdominal or blood cultures. Fluconazole is the agent of choice if *C. albicans* is isolated. For non-albicans Candida species, treatment is dependent on the specific species.

Antifungal therapy is recommended in critically ill patients with risk factors for invasive candidiasis including broad-spectrum antibiotic use, receiving parenteral nutrition, use of central venous catheters, on continuous renal replacement therapy, neutropenic or receiving immunosuppressive agents (including glucocorticoids, chemotherapy, immunomodulators). In these patients an Infectious Diseases consult is recommended and initial therapy with anidulafungin or caspofungin needs to be considered.

## ADEQUATE SOURCE CONTROL

**Recommendations**
A) An appropriate source control procedure to drain infected foci, control ongoing peritoneal contamination by diversion or resection, and restore anatomic and physiological function to the extent feasible is recommended for nearly all patients with intra-abdominal infection (B-II).

B) Patients with diffuse peritonitis should undergo an emergency surgical procedure as soon as is possible, even if ongoing measures to restore physiologic stability need to be continued during the procedure (B-II).

C) Where feasible, percutaneous drainage of abscesses and other well-localized fluid collections is preferable to surgical drainage (B-II).

D) For hemodynamically stable patients without evidence of acute organ failure, an urgent approach to achieve source control should be taken. Intervention may be delayed for as long as 24 h if appropriate antimicrobial therapy is given and careful clinical monitoring is provided (B-II).

E) In patients with severe peritonitis, mandatory or scheduled relaparotomy is not recommended in the absence of intestinal discontinuity, abdominal fascial loss that prevents abdominal wall closure, or intra-abdominal hypertension (A-II).

F) Highly selected patients with minimal physiological derangement and a well-circumscribed focus of infection, such as a periappendiceal or pericolonic phlegmon, may be treated with antimicrobial therapy alone without a source control procedure, provided that very close clinical follow-up is possible (B-II).