Evaluation and Research on Antimicrobial Stewardship’s Effect on *Clostridium difficile* (ERASE *C. difficile*) Project Toolkit

Reduction of Clostridium difficile Infections in a Regional Collaborative of Inpatient Health Care Settings Through Implementation of Antimicrobial Stewardship

***Note:*** *The tools in this document can be adapted for your use. Any tools not included here are in a format that cannot be edited in Microsoft Word or are for reference only and do not need adaptation.*

**Prepared for:**

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##### *Ø* 1E TOOL: Assessment of Current Antimicrobial Stewardship Program Elements

**Purpose:** To help assess which ASP elements are currently in place in terms of staff and strategies.

**Source:** Adapted from Greater New York Health Association/United Hospital Fund ASP Chapter 2, “The Antimicrobial Stewardship Core Team,” and Chapter 3-B, “Core Strategies.”

**Instructions:** Complete checklist, review responses to ascertain the level of leadership support, and target areas that need strengthening to move forward.

|  |  |
| --- | --- |
| STAFF RESOURCE | Check If Available: |
| Infectious disease–trained physician | 🞎 |
| Clinical pharmacist | 🞎 |
| Clinical microbiologist | 🞎 |
| Infection control representative | 🞎 |
| Hospital epidemiologist | 🞎 |
| Information technology | 🞎 |
| STRATEGIES IN PLACE |  |
| *Prospective audit with intervention and feedback* | 🞎 |
| Education | 🞎 |
| Guidelines and clinical pathways | 🞎 |
| Antimicrobial cycling | 🞎 |
| Antimicrobial order forms | 🞎 |
| *Formulary restriction and preauthorization* | 🞎 |
| Combination therapy | 🞎 |
| Streamlining or de-escalation of therapy | 🞎 |
| Dose optimization | 🞎 |
| Parenteral to oral conversion | 🞎 |
| Health care information technology | 🞎 |

##### Ø 1F Tool: Common Evidence-Based Infection Prevention Measures

**Purpose:** To understand and assess infection control measures in use at your facility and give suggestions for additional measures to be taken.

**Source:** Clinical Practice Guidelines for *Clostridium difficile* Infection in Adults: 2010 Update by the Society for Healthcare Epidemiology of America (SHEA) and the Infectious Diseases Society of America (IDSA). Available at: [www.jstor.org/stable/10.1086/651706](http://www.jstor.org/stable/10.1086/651706).

**Instructions:** Complete checklist and review procedures currently in place for infection prevention. Consider additional measures that may be needed and identify areas that need strengthening.

##### Infection Control and Prevention for *C. difficile* Infection: What Health Care Workers, Patients, and Visitors Can Do

|  |  |  |
| --- | --- | --- |
| Precaution | In Use:  Y/N | Corrective Measures To Be Taken |
| Use of immediate contact precautions for suspected cases of *C. difficile* | 🞎 Yes  🞎 No |  |
| Hand hygiene protocol in place (soap and water preferred) before and after contact with *C. difficile* patients | 🞎 Yes  🞎 No |  |
| Personal protective equipment readily available/used (gloves, gowns) | 🞎 Yes  🞎 No |  |
| Policy for use of private rooms for *C. difficile* patients | 🞎 Yes  🞎 No |  |
| Policy for cohorting patients if private room not available | 🞎 Yes  🞎 No |  |
| Policy for dedicated commode for each patient | 🞎 Yes  🞎 No |  |

##### Ø 1G TOOL: Assessing Leadership Support

**Purpose:** To assess senior administrative leadership support for improving *C. difficile* prevention and allocating needed resources for improvement activities.

**Source:** Developed by ERASE *C. difficile* project team**.**

**Instructions:** Complete checklist, review responses to ascertain the level of leadership support, and consider which areas and strategies need strengthening.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Leadership Support Assessment | Yes | No | Partial | Comment |
| *C. difficile* prevention beyond current practices is a high priority within the facility |  |  |  |  |
| There are visible role models/champions for antimicrobial stewardship for reducing *C. difficile* |  |  |  |  |
| The facility has implemented antimicrobial stewardship policies |  |  |  |  |
| There is a dedicated budget allocated for infection control activities |  |  |  |  |
| The budget includes funding for education and training on infection control, including antimicrobial targeting |  |  |  |  |
| The budget includes funding for information technology to support infection control, including antimicrobial targeting |  |  |  |  |

##### Ø 1H TOOL: Stakeholder Analysis

**Purpose:** To help identify how specific departments and disciplines will be involved in planning and implementing ASP strategies and to identify actions needed to obtain buy-in and participation.

**Source:** Adapted from Project Agency. Blank project management templates. Available at: http://www.businessballs.com/project%20management%20templates.pdf.

**Instructions:** Interview key institutional stakeholders, and identify actions to involve them in the planning and eventual implementation of an ASP. Modify stakeholder list to meet the needs of your institution.

| Stakeholder/ Discipline | What will be this stakeholder’s role in planning and implementing ASP? | What are the anticipated activities this stakeholder can be involved in to plan and implement ASP? | What are some of this stakeholder’s general perceptions about planning and implementing ASP? | What actions can be taken to strengthen the buy-in from this key stakeholder to plan for the implementation of ASP? |
| --- | --- | --- | --- | --- |
| Infectious disease physician |  |  |  |  |
| Clinical pharmacist |  |  |  |  |
| Microbiologist |  |  |  |  |
| Infection prevention representative |  |  |  |  |
| Information technology representative |  |  |  |  |
| Senior leadership representative |  |  |  |  |
| Prescribing provider |  |  |  |  |
| Other (e.g., hospital epidemiologist) |  |  |  |  |

##### *Ø* 1I TOOL: Survey of Staff Attitudes Toward ASP and Current Practices

**Purpose:** To assess prescribers’ perceptions about antimicrobial resistance, including the scope of the problem, antibiotic prescribing practices, and thoughts about antimicrobial stewardship programs. This information should inform implementation strategies and identify education needs.

**Source:** Developed by Greater New York Health Association/United Health Fund ERASE *C. difficile* Project team. Based on the AHRQ Hospital Survey on Patient Safety Culture. Available at <http://www.ahrq.gov/qual/patientsafetyculture/hospsurvindex.htm>.

**Instructions:** Have prescribers complete the survey. Consider handing it out and collecting it at a faculty meeting or Grand Rounds where they are already gathered. Tally results for use by the ASP team and clinical educators. Also consider presenting survey results to prescribers to provide feedback about the collective attitudes and perceptions in your facility.

**Note:** The survey is separate from these instructions so that it may be easily duplicated for use.

### ERASE- *C. diff.* Antimicrobial Stewardship Survey

(This survey is designed to be administered pre- and postintervention and to both intervention and control institutions.)

Please indicate your level of agreement with the following statements about your institution.

Antimicrobial Resistance: Scope of the Problem and Key Contributors

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Strongly Disagree | Disagree | Neither | Agree | Strongly Agree |
| 1. Antibiotic resistance is a problem in this institution. |  |  |  |  |  |
| 1. Patient rooms are cleaned according to hospital cleaning protocol once a *C. difficile* patient has been discharged. |  |  |  |  |  |
| 1. Adherence to hand hygiene protocols is excellent at this institution. |  |  |  |  |  |
| 1. Adherence to isolation and contact precautions is excellent at this institution. |  |  |  |  |  |
| 1. This institution does **NOT** do enough to control the development of *C. difficile*. |  |  |  |  |  |
| 1. This institution provides adequate staff education regarding *C. difficile.* |  |  |  |  |  |
| 1. A patient is likely to develop a *C. difficile* infection during a stay at this institution. |  |  |  |  |  |

Antibiotic Prescribing Practices

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Strongly Disagree | Disagree | Neither | Agree | Strongly Agree |
| 1. Microbiology lab results are efficiently communicated to the treating physician. |  |  |  |  |  |
| 1. I regularly refer to the susceptibility/sensitivity patterns at this institution (e.g., an antibiogram) when prescribing antibiotics. |  |  |  |  |  |
| 1. If medically appropriate, intravenous antibiotics should be stepped down to an oral alternative after 3 days. |  |  |  |  |  |
| 1. Restrictions on antibiotics impair my ability to provide good patient care. |  |  |  |  |  |
| 1. Antibiotics are overused at this institution. |  |  |  |  |  |
| 1. A majority of patients admitted to this institution will be prescribed at least one antibiotic during their hospital stay. |  |  |  |  |  |
| 1. Many of my patients receive 5 or more days of antibiotics during their stay at this institution. |  |  |  |  |  |
| 1. Few of my patients are discharged from this institution on antibiotics. |  |  |  |  |  |
| 1. When discharged to a nursing home or long-term care facility, most of my patients are on IV antibiotics. |  |  |  |  |  |

Antimicrobial Stewardship Programs (a formal program that monitors and manages the appropriate use of antibiotics)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Strongly  Disagree | Disagree | Neither | Agree | Strongly Agree |
| 1. Antimicrobial stewardship programs can improve patient care. |  |  |  |  |  |
| 1. Antimicrobial stewardship programs reduce the problem of antimicrobial resistance. |  |  |  |  |  |
| 1. Antimicrobial stewardship programs can affect this institution’s *C. difficile* rates. |  |  |  |  |  |
| 1. This institution has an effective antimicrobial stewardship program. |  |  |  |  |  |
| 1. This institution does **NOT** provide adequate training on antimicrobial prescribing and use. |  |  |  |  |  |
| 1. Additional staff education on antimicrobial prescribing is needed. |  |  |  |  |  |
| 1. Prescribing physicians are the only disciplines who need to understand antimicrobial stewardship. |  |  |  |  |  |

Background Information

**1. What is your primary work area or unit in this health care facility? (Please check ONE answer)**

|  |  |  |
| --- | --- | --- |
| Many different units/No specific unit | |  |
| Medicine (nonsurgical) | Intensive care unit (any type) | Radiology |
| Surgery | Psychiatry/mental health | Anesthesiology |
| Obstetrics | Rehabilitation | Other (please specify: |
| Pediatrics | Pharmacy | ) |
| Emergency department | Laboratory |  |

2. How long have you worked in this health care facility?

|  |  |
| --- | --- |
| Less than 1 year | 11 to 15 years |
| 1 to 5 years | 16 to 20 years |
| 6 to 10 years | 21 years or more |

3. What is your staff position in this health care facility?

|  |  |
| --- | --- |
| Attending/staff physician | Physician assistant |
| Resident physician/Intern | Nurse practitioner |
| Fellow | Infection control practitioner |
| Pharmacist | Other (please specify:                    ) |

4. How long have you worked in your current specialty or profession?

|  |  |  |
| --- | --- | --- |
| Less than 1 year | 6 to 10 years | 16 to 20 years |
| 1 to 5 years | 11 to 15 years | 21 years or more |

##### Ø 1K TOOL: Developing the Business Case

**Purpose:** To make the case for ASP implementation for reducing *C. difficile*. Early in the project, the arguments will be prospective, looking at expected benefits. After your ASP for reducing *C. difficile* is implemented, you can use the same form to document realized benefits.

**Source:** Adapted from Project Agency. Blank project management templates. Available at: http://www.businessballs.com/project%20management%20templates.pdf

**Instructions:** Complete the form to be used in presentations and discussions with senior leaders and stakeholders.

|  |
| --- |
| Project Background |
| General Aims |
| Initial Risks |
| Expected Outcomes, Both Clinical and Financial |
| Benefits of Project |
| Initial Estimates of Cost and Time  $:  Time: |
| Outcome of the Business Case |
| Decision From (xxx) |
| Date |

##### Ø 1L TOOL: Assessing Resource Needs

**Purpose:** To identify resources needed to initially implement and later sustain an ASP for reducing *C. difficile*. The ASP team may revise or amend assessment as implementation proceeds and other resources are needed.

**Source:** Developed by AHRQ Pressure Ulcer Prevention Toolkit project team.

**Instructions:** Complete checklist to assess resources available and resources needed.

|  |  |  |
| --- | --- | --- |
| Resource Needs Assessment | Needed:  Yes/No | Notes on What Is Needed |
| Funds |  |  |
| Other resources: |  |  |
| Education department |  |  |
| Printing/copying |  |  |
| Graphics/design |  |  |
| Facilities and supplies |  |  |
| PT/OT consultation on work practices |  |  |
| Interdisciplinary implementation team |  |  |
| Nonclinical time for team meetings and activities |  |  |
| Information Technology support |  |  |
| Specific products/tools (e.g., mattress surfaces) |  |  |

##### *Ø* 4A TOOL: How Do We Sustain ASP for Reducing *C difficile* Over Time?

**Purpose:** To help assess systems currently in place and ability to maintain and sustain ASP over time.

**Source:** ERASE *C. difficile* Project team.

**Instructions:** Complete checklist, review responses to ascertain the level of leadership support, and consider which areas need strengthening to move forward.

|  |  |  |
| --- | --- | --- |
| **1. Will our current ASP staffing work on an ongoing basis?**  How well is your stewardship team working across departments and disciplines? What is the current distribution of responsibilities? Do you need to make changes? | | **Action/remedy/plan if needed**: |
| Who are the staff dedicated to [and $ supported] for ASP? | **List Staff:**  **Is this sustainable?**  yes  no | If Yes, describe:  If No, what is the plan? |
| What is the rotation/schedule for residents and fellows? | Describe:  Is this sustainable?  yes  no | If Yes, describe:  If No, what is the plan? |
| Is our ASP hospital wide? | yes  no  If No, describe: | If No, describe where implemented: |
| How do we maintain inter-disciplinary communication? | Describe processes [committees, meetings, etc.]: | |
| What are ASP members’ responsibilities? | Describe: | |
| Is the distribution of responsibilities fair? | yes  no | If No, describe changes needed: |
| Do we need to make changes? | yes  no | If Yes, describe changes needed: |
| **2. What is the plan for ongoing measurement and feedback?**  A plan is only as good as the systems in place that ensure sustainability. It is crucial to plan at the onset for ongoing monitoring, maintenance, and evaluation of the ASP for reducing *C. difficile* | | **Action/remedy/plan if needed:** |
| Do we have a plan for monitoring the ASP? | yes  no  If Yes, describe: | If No, what should the plan be? |
| Do we have a plan for maintenance of ASP? | yes  no  If Yes, describe: | If No, what should the plan be? |
| Do we have a plan for evaluation of ASP? | yes  no  If Yes, describe: | If No, what should the plan be? |
| Is our data in a workable format? | yes  no  If Yes, describe: | If No, what is the plan to obtain? |
| What are our current IT systems, staffing, and capabilities? | Describe: |  |
| Do we have appropriate IT software? | yes  no  If Yes, describe: | If No, what is the plan to obtain? |
| **3. What ongoing organizational support will be needed to keep the new ASP practices in place?**  Maintaining your ASP requires organizational support on multiple levels. Ongoing organizational support for ASP for reducing *C. difficile* will be strongest if you can demonstrate that it is aligned with the medical center’s strategic priorities and that it addresses pressing problems. | | **Action/remedy/plan if needed:** |
| Is there organizational support for ASP? | yes  no  If Yes, describe: | If No, what is the plan to obtain? |
| Do we have the resources to maintain adequate and dedicated ASP staffing? | yes  no  If Yes, describe: | If No, what is the plan to obtain? |
| Do we have the appropriate IT support to produce the most useful data? | yes  no  If Yes, describe: | If No, what is the plan to obtain? |
| Do we have educational opportunities and forums to keep staff current on our ASP practices? | yes  no  If Yes, describe: | If No, what is the plan to provide? |
| Do we have systems in place to maintain best practices for ASP? | yes  no  If Yes, describe: | If No, what is the plan to maintain? |
| Do we have clinical leadership support for ASP? | yes  no  If Yes, describe: | If No, what is the plan to obtain? |
| Do we have medical center leadership for ASP? | yes  no  If Yes, describe: | If No, what is the plan to obtain? |
| Does ASP fit in the hospital’s overall-strategic planning? | yes  no  If Yes, describe: | If No, what is the plan to include ASP in strategic planning? |
| **4. How do we develop an effective business case?**  Given the environment of tightening resources in most medical centers, you will likely need to make a strong business case for continued or expanded investment in your ASP. | | **Action/remedy/plan if needed:** |
| Are there financial barriers to implementing ASP? | yes  no | If Yes, describe: |
| Does your facility have a good estimate of cost savings realized through full implementation of ASP? | yes  no  If Yes, describe: | If No, what is the plan to obtain estimates? |
| Have you calculated anticipated savings? | yes  no  If Yes, describe: | If No, what is the plan to obtain? |
| Have you calculated actual savings? | yes  no  If Yes, describe: | If No, what is the plan to calculate? |
| Does your facility have a description of how ASP activities translate into cost savings? | yes  no  If Yes, describe: | If No what is the plan to create a description? |
| Does your facility have a description of how improved patient outcomes bring about cost savings? | yes  no  If Yes, describe: | If No, what is the plan to create a description? |

**Please note**: The following three tools are examples developed by facilities participating in the ERASE *C. difficile* Project to implement interventions.

##### *Ø* 4B TOOL: UTI Guidelines Form

**Purpose:** Urinary tract infection (UTI) treatment guidelines. Gives background, local microbiology data, and suggested empiric regimens.

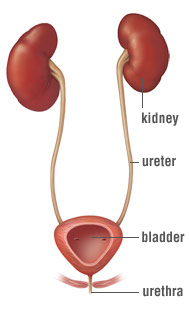
**Source:** F. Palmieri, Bronx-Lebanon Hospital.

**Instructions:** Review and adapt as appropriate.

# Empiric Therapy Regimen

|  |  |  |  |
| --- | --- | --- | --- |
| Acute Uncomplicated Cystitis | | | |
| Antibiotic Recommendations | Caution | Duration | Possible Side Effects (selected) |
| Nitrofurantoin (Macrobid) 100 mg twice daily | **Do not use if CrCl < 60.**  **Do not use for elderly patient > 65 years old.**  **Do not use during pregnancy at term** (38 to 42 weeks gestation).  Caution in cholestatic jaundice and hepatic dysfunction. | 5 days | GI intolerance; Lupus-like reactions; rash  Rare: peripheral neuropathy; trigeminal neuralgia pulmonary reactions; hepatitis; hemolytic anemia in G6PD deficiency |
| Cefuroxime 250 mg oral q12h | Avoid in penicillin allergy.  If CrCl < 10mL/min, administer once daily. | 7 days | Anaphylaxis (PCN allergic); diarrhea; other super infections; eosinophilia; positive Coombs test; interstitial nephritis; hemolytic anemia |
| Cefpodoxime 100 mg oral q12h | Avoid in penicillin allergy.  If CrCl < 30mL/min, administer once daily. | 7 days | As above |
| Ciprofloxacin 250 mg oral q12h - **3rd line therapy due to resistance.** If selected, urine culture with followup is recommended. | If CrCl < 30mL/min, administer once daily. | 5 days | *C. difficile* colitis; QTc prolongation; nephritis; tendon rupture; neuropathy |
| Acute Uncomplicated Pyelonephritis | | | |
| Antibiotic Recommendations | Caution | Duration | Possible Side Effects (selected) |
| Initial Therapy | | | |
| Ceftriaxone 1 g IV/IM 1st dose | Avoid in serious, type-I PCN allergy | Initial dose | As above for cefuroxime plus pseudocholelithiasis |
| Gentamicin IV 3 mg/kg x1 dose | No adjustment for ***initial dose*** needed for renal failure | Initial dose | Renal function |
| Followup Therapy – Tailor Therapy to Culture and Sensitivity Report; Otherwise: | | | |
| Ciprofloxacin 500 mg oral q12h | As above | 7 to 14 days | As above |
| Cefuroxime 250 mg oral q12h | As above | 7 to 14 days | As above |
| Cefpodoxime 200 mg oral q12h | As above | 7 to 14 days | As above |

URINARY TRACT INFECTION

Treatment Guidelines

**Bronx Lebanon Hospital Center**

**1650 Grand Concourse**

**Bronx, New York**

**Bronx-Lebanon Hospital Center**

**Antibiotic Stewardship Committee**

BACKGROUND

* *Escherichia coli* constituted 91 percent of community-acquired urinary isolates in the past year in BLHC.
* Bacterial resistance to sulfamethoxazole/trimethoprim (SMZ/TMP) and fluoroquinolones has increased.
* Urine culture and susceptibility (C & S) tests are strongly recommended for any therapy changes.
* Modify therapy according to BLHC UTI guidelines.
* **Do not use SMZ/TMP as empiric therapy or ciprofloxacin as initial therapy due to high resistance to *E. coli*.**

|  |  |
| --- | --- |
| % Sensitive Urinary Isolates, Community Acquired (2010) | |
| *E. COLI* | ANTIBIOTICS |
| 45 | Ampicillin/sulbactam |
| 75 | Amoxicillin/clavulanate |
| 92 | Ceftriaxone |
| 78 | Cefazolin |
| 74 | Ciprofloxacin |
| 87 | Cefuroxime |
| 94 | Nitrofurantoin |
| 95 | Piperacillin/tazobactam |
| 63 | Sulfamethoxazole/trimethoprim |
| 88 | Gentamicin |
| 39 | Ampicillin |

GUIDELINE RECOMMENDATIONS

**STEP 1: Urinalysis**

* Urinalysis (UA)
* Urine micro
* Urine culture
* Before antibiotics are started
* For ED patients
* Inpatients with UTIs
* All patients with suspected pyelonephritis

**STEP 2: Empiric Antibiotics**

* **See table on back.**

**STEP 3: Pathogen-Directed Therapy**

* With culture and susceptibility results, change antibiotic to pathogen-specific agent.
* Follow up on all discharged patients to provide appropriate therapy based on culture and sensitivity results.
* SMZ/TMP can be used at this point as dictated by the C & S results.
* Reserve fluoroquinolones for pyelonephritis and major systemic infections due to resistance development.

**STEP 4: Duration**

* As important as the therapy itself.
* Excessive use can lead to:
  + Adverse reactions.
  + Increased antimicrobial resistance.
  + See table on back for specific duration recommendations.

**STEP 5: Epidemiologic Surveillance**

* + With time and selective pressure, resistance patterns will change.
  + At least once a year, susceptibility patterns will be reassessed and the need to change treatment recommendations evaluated.

**ASYMPTOMATIC BACTERIURIA**

* Asymptomatic bacteriuria is defined as isolation of a specific quantitative count of bacteria in an appropriately collected urine specimen from an individual without sign or symptoms of a urinary tract infection.
* Avoiding treatment of asymptomatic bacteriuria is important for reducing the development of antibiotic resistance.
* Treatment of asymptomatic bacteriuria is not appropriate for: women (premenopausal, nonpregnant), diabetics, elderly people, nursing home residents, or patients with spinal cord injury or indwelling urethral catheters.
* Treatment of asymptomatic bacteriuria is appropriate for pregnant women and for patients undergoing urologic procedures in which mucosal bleeding is expected.

**REFERENCES**

Gupta K, Hooton TM, Naber KG, et al. International clinical practice guidelines for the treatment of acute uncomplicated cystitis and pyelonephritis in women. A 2010 update by the Infectious Diseases Society of America and the European Society for Microbiology and Infectious Diseases.Clin Infect Dis 2011:52(5):e103-20. Review.

Nicolle LE, Bradley S, Colgan R, et al Infectious Diseases Society of America guidelines for the diagnosis and treatment of asymptomatic bacteriuria in adults. Clin Infect Dis 2005;40:643-54.

##### *Ø* 4C TOOL: Pipercillan/Tazobactam De-Escalation Form

**Purpose:** Forms for tracking piperacillin/tazobactam audit/feedback. The tracking forms give a way to track number of patients with criteria for review and then a way to document stewardship interventions.

**Source:** Y Guo & B. Ostrowsky, Montefiore Medical Center.

**Instructions:** This 2-page form may be tailored for possible use at your facility; review and adapt as appropriate.

**ANTIMICROBIAL STEWARDSHIP TEAM (AST) SUGGESTIONS**

1. Run/obtain daily list of piperacillin/tazobactam utilization report.
2. Select patient who has been on piperacillin/tazobactam for >72 hours without ID consult.
3. Review Carecast/chart for indication, duration, culture susceptibility, etc., to determine the appropriateness of piperacillin/tazobactam usage.

Date:

Total number of patients who have been on piperacillin/tazobactam:

Total number of patients who have been on piperacillin/tazobactam for >72 hours:

Total number of patients who have been on piperacillin/tazobactam >72 hours with ID consult

Total number of patients who have been on piperacillin/tazobactam >72 hours without ID consult

From patients who have been on piperacillin/tazobactam >72 hours without ID consult, number of patients reviewed:

Date: Patient name: MR# Unit/room

Presumptive diagnosis:

* Culture documented pseudomonas/gram negative resistant infection
  + Site of documented culture
* Healthcare-associated pneumonia (continued empiric coverage)
* Healthcare-associated intra-abdominal infection (continued empiric coverage)
* Healthcare-associated urinary tract infection (continued empiric coverage)
* Necrotizing soft tissue infection (not cellulitis) (continued empiric coverage)
* Other healthcare-associated sepsis/infection. List syndrome
* Other. List syndrome

Piperacillin/tazobactam (dose/frequency/duration)

Based on information available, we suggest the following modifications to your patient’s antimicrobial therapy.

1.

2.

3.

These changes are recommended based on:

* Culture/sensitivity data
* Drug toxicities/side effects
* Opportunity to change to oral therapy
* More narrow spectrum antibiotic regimen
* Specific diagnosis
* Others:

Comments:

Notes left in the chart:

❑ Yes ❑ No

Did the team accept your recommendation?

❑ Yes ❑ No

If a thorough analysis of this case is desired, please request an ID consultation.

Pharmacist

##### *Ø* 4D TOOL: Medication Use Evaluation Template

**Purpose:** A template for reviewing use patterns, including graphic comparison over time.

**Source:** S. Brown & B. Ostrowsky, Montefiore Medical Center.

**Instructions**: This template may be tailored for possible use at your facility; review and adapt as appropriate.

MEDICATION USE EVALUATION

Unit/Area: XXX Medical Center (XXX Campus)

Submitted by: Antibiotic Stewardship Program

Title: Oral Azithromycin Utilization Evaluation

Date: XXX

========================================================================

**INDICATORS:** (1) Usage and mean duration of oral azithromycin before and after unrestriction; and (2) whether there is a decrease in quinolone use before and after unrestricting azithromycin.

**PLAN**

**Disciplines Involved:** Antibiotic Stewardship Program

**Monitoring Period:** XXX – XXX

**Sample Size:** XXX patients at Campus and XXX patients at Campus according to SYBASE query listing.

**Methodology:** Retrospective reviews of antibiotic usage were conducted in patients who received oral azithromycin from XXX to XXX. The total numbers of patients on oral azithromycin, ciprofloxacin, moxifloxacin, and various other antibiotic combinations (i.e., azithromycin plus ceftriaxone, piperacillin/tazobactam, ciprofloxacin, or moxifloxacin) were calculated. Analyses were conducted to determine the usage and mean duration of oral azithromycin before and after unrestriction.

**DO**

Reports were generated using the SYBASE query listing all patients who received oral azithromycin, ciprofloxacin, moxifloxacin, piperacillin/tazobactam, and ceftriaxone between XX and XX.

**CHECK**

* A total of XXX (nonexclusive) patients were included in this review (Table 1).

Table 1

|  |  |  |  |
| --- | --- | --- | --- |
|  | Month | Month | Month |
| Campus | | | |
| Mean duration of azithromycin (range), days of therapy | X (Y-Z) | X (Y-Z) | X (Y-Z) |
| Antibiotics | Number of Patients | | |
| Azithromycin PO | XX | XX | XX |
| Moxifloxacin PO | XX | XX | XX |
| Ciprofloxacin PO | XX | XX | XX |
| Campus | | | |
| Mean duration of azithromycin (range), days of therapy | X (1-X) | X (1-X) | X (1-X) |
| Antibiotics | Number of Patients | | |
| Azithromycin PO | XX | XX | XX |
| Moxifloxacin PO | XX | XX | XX |
| Ciprofloxacin PO | XX | XX | XX |

Table 2. Azithromycin PO and Ceftriaxone

|  |  |  |  |
| --- | --- | --- | --- |
|  | Month | Month | Month |
| Campus | | | |
| Number of patients | XX | XX | XX |
| Duration of azithromycin (range), days of therapy | X (1-X) | X (1-X) | X (1-X) |
| Campus | | | |
| Number of patients | XX | XX | XX |
| Duration of azithromycin (range), days of therapy | X (1-X) | X (1-X) | X (1-X) |

Table 3. Number of Patients on Azithromycin PO and Moxifloxacin

|  |  |  |  |
| --- | --- | --- | --- |
|  | Month | Month | Month |
| Moses | XX | XX | XX |
| Weiler | XX | XX | XX |

Table 4. Number of Patients on Azithromycin PO and Ciprofloxacin

|  |  |  |  |
| --- | --- | --- | --- |
|  | Month | Month | Month |
| Moses | XX | XX | XX |
| Weiler | XX | XX | XX |

Table 5. Number of Patients on Azithromycin PO and Piperacillin/ tazobactam

|  |  |  |  |
| --- | --- | --- | --- |
|  | Month | Month | Month |
| Moses | XX | XX | XX |
| Weiler | XX | XX | XX |

Figure 1. Comparison of Oral Azithromycin and Quinolone Usage at Campus, Before Unrestriction

Campus

Figure 2. Comparison of Oral Azithromycin and Quinolone Usage at Campus, After Unrestriction

Campus

**ACT**

* There was a trend of XX oral azithromycin usage comparing XX to XX after unrestriction.
* There was a trend of decreasing oral moxifloxacin usage comparing XX to XX; however, it might be an artifact of seasonal change. Comparing XX to XX, the total number of patients on oral moxifloxacin did not change significantly.
* The antibiotic stewardship program will continue to monitor oral azithromycin usage via pharmacist/house staff education on duration of therapy and prevent double atypical coverage for asthma, COPD, or CAP.