

Comparison of the Effectiveness of Two Methods of Antibiotic Formulary Restriction: Front-End versus Back-End Approval for Piperacillin-Tazobactam

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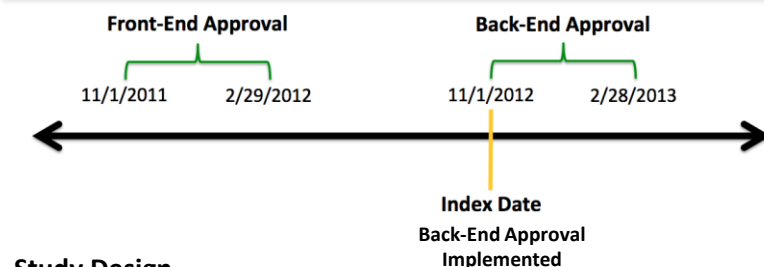
BACKGROUND

- VA Long Beach has traditionally used the **front-end approval** process: restricted antibiotics require ID approval prior to use.
- Piperacillin-tazobactam (P-T) is a restricted antibiotic but continues to be the **second most commonly prescribed** antibiotic at VALB and is rarely streamlined once approved.
- A **back-end approval** process was implemented in November 2012, whereby any provider is allowed to prescribe P-T for any reason for 72 hours but must obtain ID approval to continue thereafter.

STUDY OBJECTIVES

- To compare the effectiveness of back-end and front-end approval in decreasing the use of P-T at VALB
- Primary outcomes:** antibiotic usage (days of therapy), de-escalation and discontinuation rates of P-T
- Secondary outcomes:** clinical & microbiological failure rates, 30-day all-cause mortality rates, *C. difficile* rates, length of stay

METHODS



Study Design

- Retrospective cohort study
- Data source: chart review via CPRS

Inclusion Criteria

- VALB patients who received P-T for >72 hours:
 - During front-end approval: 11/1/2011 – 2/29/2012
 - During back-end approval: 11/1/2012 – 2/28/2013

RESULTS

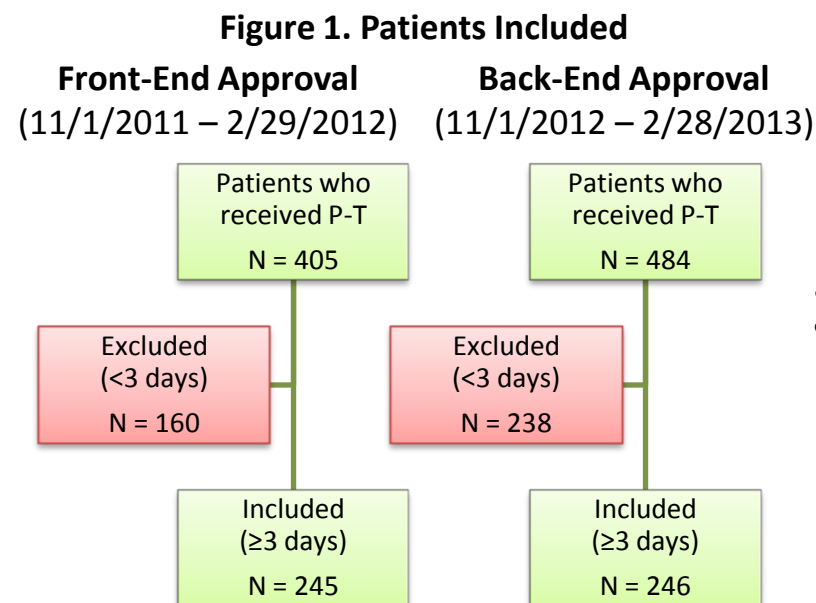


Table 1. Baseline Characteristics

| Characteristic | Front-End | Back-End | P-value |
|-------------------------|-------------|-------------|---------|
| Patients (N) | 245 | 246 | |
| Age (years) | 67.5 ± 11.7 | 66.3 ± 12.4 | 0.277 |
| Male Gender | 236 (96.3%) | 234 (95.1%) | 0.510 |
| Ward | | | |
| Intensive care unit | 44 (18.0%) | 47 (19.1%) | 0.744 |
| Medicine/surgery | 163 (66.5%) | 169 (68.7%) | 0.608 |
| Nursing home | 4 (1.6%) | 7 (2.8%) | 0.364 |
| Spinal cord injury unit | 34 (13.9%) | 23 (9.3%) | 0.117 |

Figure 2. Piperacillin-Tazobactam Usage

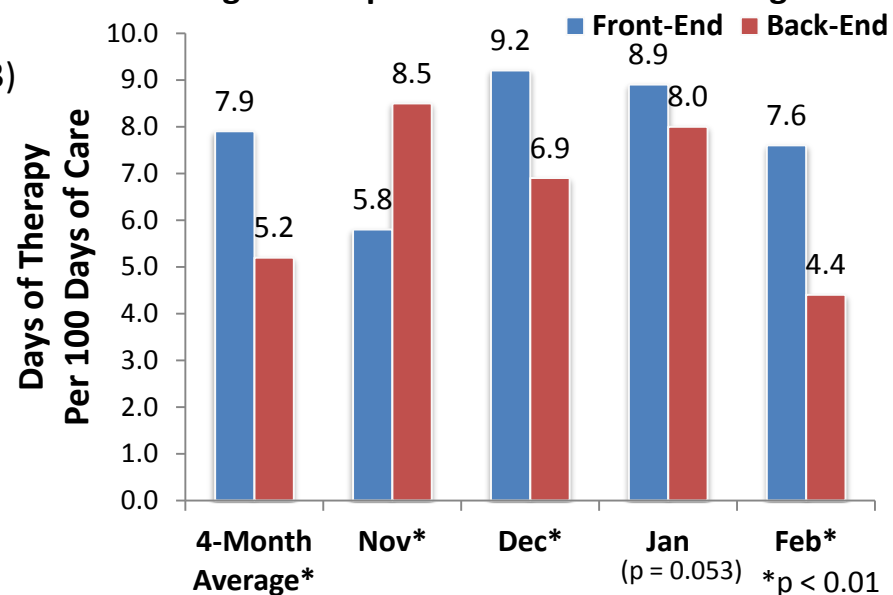


Table 2. Infectious Disease Diagnoses

| Infectious disease | Front-End | Back-End | P-value |
|------------------------------|------------|------------|---------|
| Unknown etiology | 47 (19.2%) | 68 (27.6%) | 0.027 |
| Pneumonia | 59 (24.1%) | 54 (22.0%) | 0.575 |
| Skin & soft tissue infection | 55 (22.4%) | 34 (12.8%) | 0.013 |
| Urinary tract infection | 27 (11.0%) | 20 (8.1%) | 0.276 |
| Intra-abdominal infection | 14 (5.7%) | 28 (11.4%) | 0.025 |
| Osteomyelitis | 21 (8.6%) | 15 (6.1%) | 0.293 |
| Bacteremia | 11 (4.5%) | 6 (2.4%) | 0.214 |
| Diabetic foot ulcer | 4 (1.6%) | 12 (4.9%) | 0.043 |
| Upper respiratory tract | 6 (2.4%) | 9 (3.7%) | 0.436 |
| Septic arthritis | 1 (0.4%) | 0 (0.0%) | 0.316 |

Table 3. Outcomes

| Outcome | Front-End | Back-End | P-value |
|--|--------------------|--------------------|--------------|
| Average days of P-T therapy per patient | 8.8 ± 9.1 (3 – 42) | 8.3 ± 9.0 (3 – 61) | 0.542 |
| Average day of de-escalation | 5.7 ± 4.9 (3 – 39) | 6.9 ± 6.9 (3 – 52) | 0.100 |
| De-escalated patients | 121 (49.4%) | 151 (61.4%) | 0.008 |
| IV antibiotics | 42 (34.7%) | 56 (37.1%) | 0.685 |
| PO antibiotics | 79 (65.3%) | 95 (62.9%) | 0.685 |
| Clinical failure | 82 (33.5%) | 76 (30.9%) | 0.541 |
| Microbiological eradication | N = 90 (36.7%) | N = 96 (39.0%) | 0.601 |
| Achieved | 43 (47.8%) | 48 (50.0%) | 0.872 |
| Not achieved | 47 (52.2%) | 48 (50.0%) | 0.762 |
| 30-day mortality (all-cause) | 31 (12.7%) | 34 (13.8%) | 0.703 |
| <i>C. difficile</i> | 15 (6.1%) | 11 (4.5%) | 0.414 |
| Average length of stay | 20.6 (3 – 107) | 20.9 (3 – 179) | 0.400 |
| ≤30 days | 10.7 ± 7.0 | 10.1 ± 5.8 | 0.333 |
| >30 days | 56.3 ± 23.8 | 60.4 ± 33.7 | 0.514 |
| ID service consulted | 64 (26.1%) | 82 (33.3%) | 0.080 |

CONCLUSION

- Overall usage of piperacillin-tazobactam **decreased** with back-end approval
 - 4-month average: back-end **5.2** vs front-end 7.9 days of therapy per 100 days of care (p<0.001)
- De-escalation occurred in a greater number of patients with back-end approval
 - Back-end **61.4%** (151/246) vs front-end 49.4% (121/245) (p=0.008)
- Clinical outcomes were the same