

# Outcomes Comparison of Intravenous Antimicrobials Provided in a Physician Office Infusion Center (POIC) versus Traditional Home Care (HC) Services

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## Abstract

**Background:** Patients (pts) with moderate infections who are stable may obtain therapy on an outpatient basis. One option allows for intravenous antibiotics (IVAB) therapy to be received at home, typically with weekly visits from a nurse. Another allows for weekly evaluation in the physician office, with self-administration of medications and catheter and nursing care provided by the (POIC). Our study purpose was to compare pt management and outcomes in both settings.

**Methods:** We retrospectively reviewed pt records available for 10 randomly selected pts treated at 4 Infectious Disease POICs from Jan 2010 - Dec 2011. HC pts were case-controlled to POIC pts at the corresponding site and matched by diagnosis, treatment, age and gender. Treatment success was defined as cured or improved, no longer requiring IVAB therapy. Significant differences of clinical outcomes were determined using Fisher's exact and Chi Square test (p<0.05, significant).

**Results:** 80 pts were evaluated, with 40 HC pts and 40 POIC cases controlled based on study criteria. Pts were well matched in relation to diagnosis, severity of infection and demographics. The most commonly treated infections were osteomyelitis (28%) and prosthetic joint infection(15%). The predominant IVAB used was vancomycin in both groups. Treatment success was 100% in both groups, although cure (not requiring further intervention) was slightly higher in the POIC group (68% vs. 60%, p=0.49). Three pts (8%) in the HC group were admitted to the hospital for worsening of infection vs. 2 pts (5%) in the POIC group. Labs were not drawn or reported as ordered in 18 (45%) of HC pts vs. 1 (2%) POIC pt (p < 0.05). Reported adverse events related to IVAB were similar in both groups, 8 (20%) and 11 (28%) for HC and POIC, respectively. There were 2 catheter related infections (2 line, 1 site) in the HC group and none in the POIC group.

**Conclusion:** Outcomes upon completion of treatment were similar. However, laboratory data were not obtained in nearly half of the HC pts, which was highly significant. Catheter related infections were also higher in the HC group. The inability for the physician to closely monitor IVAB and catheter care in HC pts raises serious concerns for the overall safety of this modality when considered over a large number of pts. Further study is indicated.

## Introduction

Patients with moderate or severe infections requiring IVAB therapy in an outpatient setting are increasing. Outpatient parenteral antimicrobial therapy (OPAT) represents an attractive alternative based on the resulting reductions in hospital admissions, reduced length of hospitalization, a lessening in risks associated with hospitalization, cost savings and improved patient satisfaction [1, 2]. Patients requiring OPAT have traditionally been serviced through a home care company, but more frequently is offered through a POIC. The POIC, particularly when operated by an Infectious Disease physician, reportedly may allow for more timely service, consistent monitoring and follow-up. Therefore, we sought to report the management and outcomes of similar patients treated in the HC versus POIC setting.

## Methods

- A retrospective database and chart review was conducted of 4 Infectious Disease POIC sites.
- 10 HC pts from each site were matched to 10 POIC pts at the same site for a total of 40 pts in each group.
- Clinical data were collected through 90 days post treatment cessation.
- The patients selected for the HC arm were the first 10 pts receiving treatment in 2012 at each site meeting study criteria
- Case control POIC pts from the corresponding sites were then matched based on (in order of emphasis) date of service, diagnosis, treatment, age and gender.

### Inclusion Criteria

- IVAB therapy received in HC setting or POIC between January 1, 2010 and December 31, 2011.
- Age 18 years and older.

### Clinical Definitions

- Pathogen data was collected where available. Sensitivity data and resistance was noted. Multiple drug resistant organisms (MDRO) were defined as those pathogens resistant to 3 or more drug classes.
- IVAB efficacy at time of therapy completion:
  - Cured:** Clinical signs/symptoms resolved, and/or no additional antibiotic therapy needed, and/or negative culture at end of therapy.
  - Improved:** Partial resolution of clinical signs/symptoms, and/or additional oral antibiotic therapy necessary and/or wound care or surgical procedure pending.
  - Failed:** Resistant, worsening, or new clinical signs/symptoms at therapy completion.
- Success rate (%) defined as "Cure + Improved/Total number of patients".

### Data Analysis

- Descriptive statistics (mean, standard deviation, range) were used for demographic data.
- Percentages were used for efficacy and safety data.
- Fisher's exact and Chi-Square test was used with statistical significance defined as p<0.05.

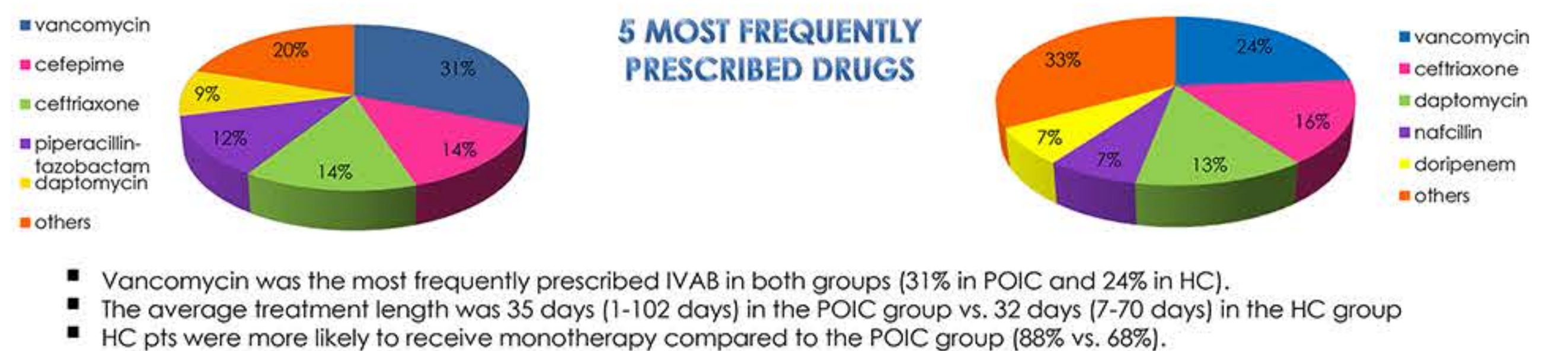
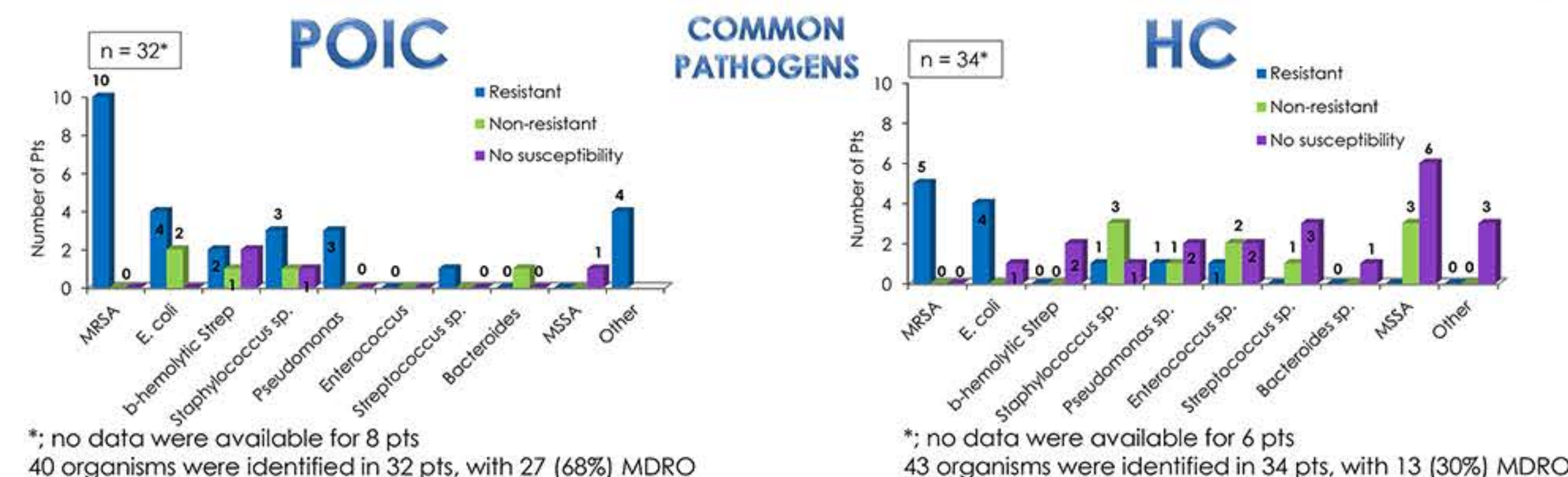
## Results

### Demographics

- 40 pts from the HC group were matched with 40 pts in the POIC group based on diagnosis, treatment, age and gender.

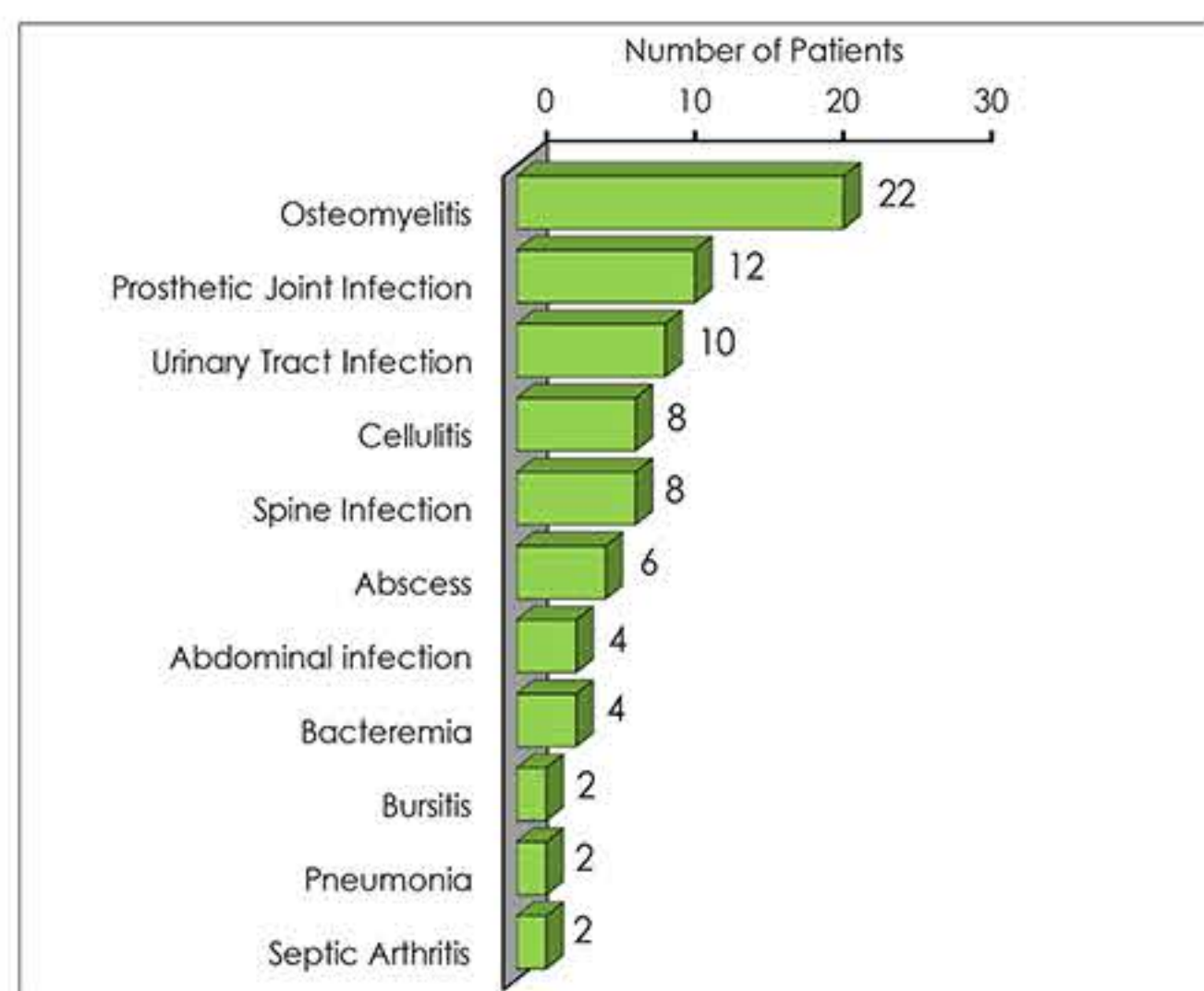
| Characteristics                  | POIC (n=40) | HC (n=40) |
|----------------------------------|-------------|-----------|
| <b>Gender</b>                    |             |           |
| Male (%)                         | 63          | 63        |
| <b>Avg. Age (years)</b>          | 59          | 57        |
| ≥ 65 years (%)                   | 12          | 10        |
| <b>Co-morbidities (%)</b>        |             |           |
| HTN                              | 70          | 40        |
| Diabetes mellitus                | 45          | 40        |
| CAD/Heart Disease                | 28          | 25        |
| COPD/Asthma                      | 15          | 10        |
| Cancer history                   | 15          | 7.5       |
| CKD/ESRD/Renal failure           | 10          | 0         |
| Mental illness                   | 10          | 10        |
| <b>No. of comorbidities (%)</b>  |             |           |
| 0                                | -           | 5         |
| 1                                | 13          | 15        |
| 2                                | 22          | 25        |
| ≥ 3                              | 65          | 60        |
| <b>Prior Hospitalization (%)</b> | 60          | 78        |

### Microbiology and Treatment



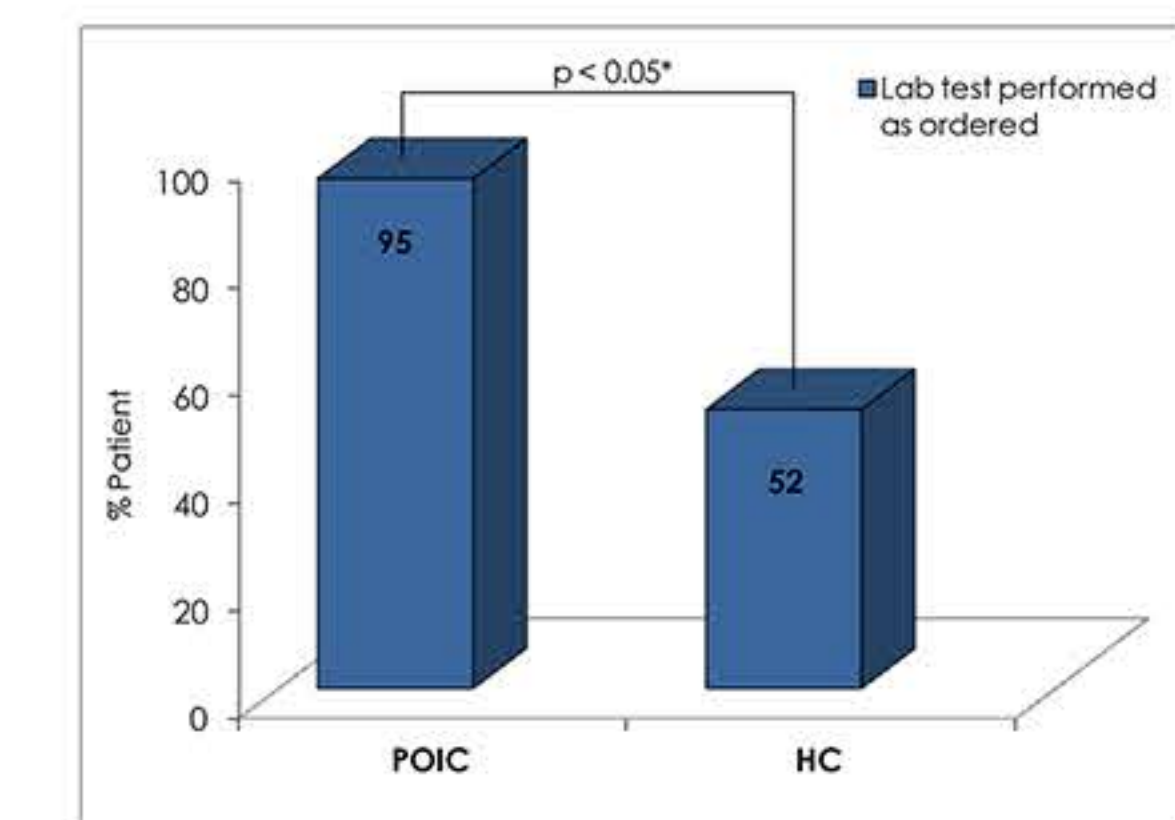
### Diagnoses

- The most frequently treated infections among all 80 pts were osteomyelitis (28%) followed by prosthetic joint infection (15%) and urinary tract infection (12%).



### Laboratory Tests

- Laboratory tests were performed in 38/40 pts (95%) in the POIC group
- Laboratory tests were performed in 21/40 pts (52%) in the HC group



### Adverse Events

|          | Adverse Events               | Total Pt        | Suspected Antibiotic  |                                   |
|----------|------------------------------|-----------------|---|-----------------------------------|
| POIC     | Vaginal candidiasis          | 3               | ceftriaxone<br>cefepime<br>daptomycin                               |                                   |
|          | Rash/itching                 | 3               | nafcillin   |                                   |
|          |                              |                 | ceftriaxone   |                                   |
|          |                              |                 | piperacillin/tazobactam   |                                   |
|          | Dry Mouth                    | 1               | telavancin  |                                   |
|          | Diarrhea                     | 2               | piperacillin/tazobactam<br>vancomycin or<br>piperacillin/tazobactam |                                   |
|          | Elevated LFTs                | 1               | oral linezolid  |                                   |
|          | Difficulty breathing/itching | 1               | vancomycin  |                                   |
|          | HC                           | Yeast Infection | 4   | imipenem-cilastatin<br>vancomycin |
|          |                              |                 |   | nafcillin                         |
|          |                              |                 | piperacillin/tazobactam   |                                   |
| Diarrhea |                              | 3               | piperacillin/tazobactam<br>ertapenem<br>daptomycin                  |                                   |
| Rash     |                              | 1               | daptomycin  |                                   |

\*; not available

### Safety

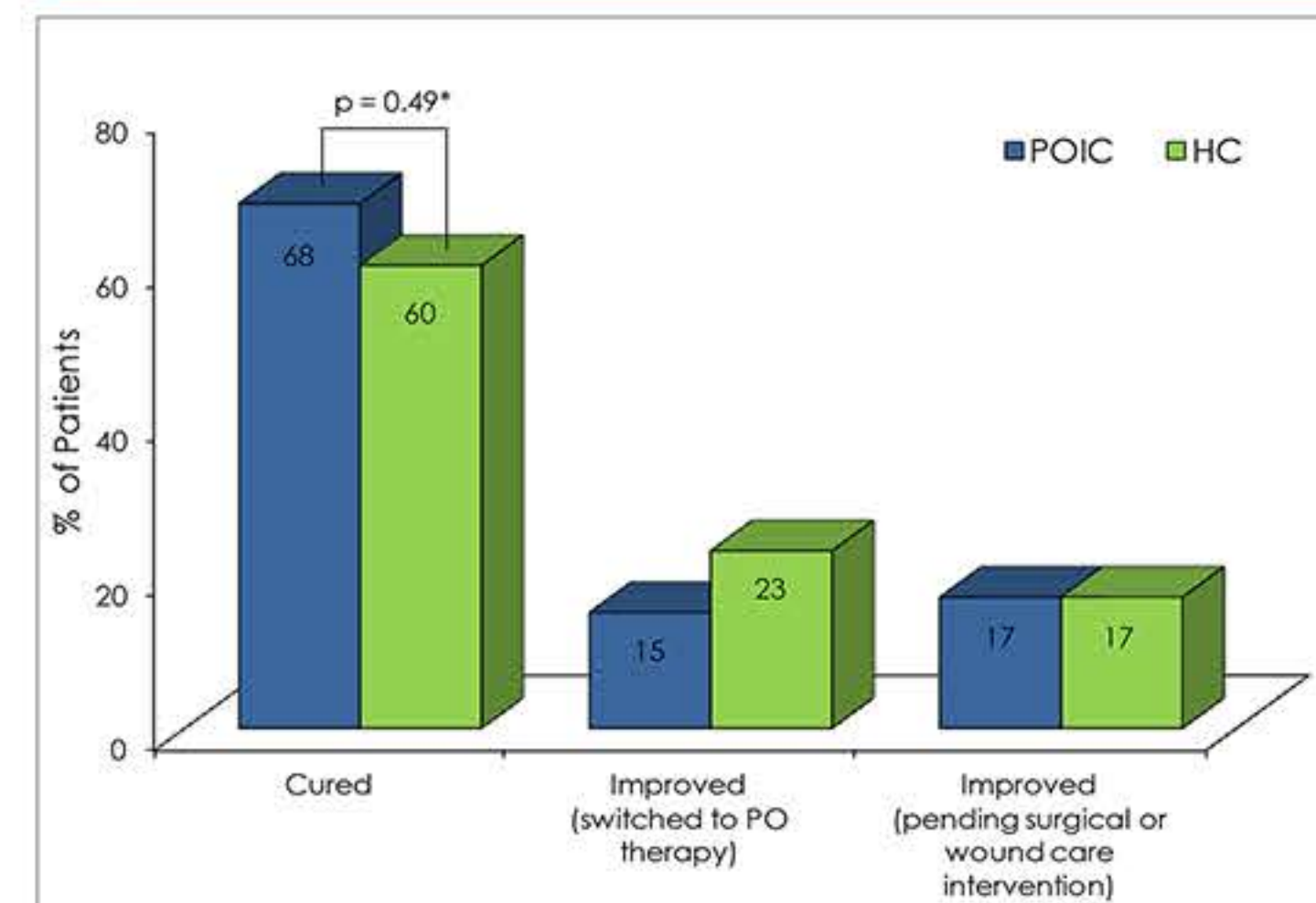
#### Hospital Admission

- 2 pts (5%) in the POIC group were admitted to the hospital during treatment due to pain and infected prosthesis removal
- 4 pts (10%) in the HC group were admitted to the hospital during treatment (2 for PICC line infections, 1 for severe pain, 1 for fever and chills)

#### Catheter Days

- Total catheter days in the POIC group were 1528 (no data for 3 pts) and 1339 in the HC group (no data for 8 pts)
- No patients in the POIC group experienced a catheter infection compared to 2 pts in the HC group (5%)

### Clinical Outcome



- Treatment success defined as improved plus cured was 100% in both groups

- Cure rates were slightly higher in the POIC group, 67.5% vs. the HC group 60%, which was, however, not statistically significant (p= 0.49, Chi square test)

- 22.5% of HC pts and 15% of POIC pts improved and were switched to oral antibiotics while pts in both groups improved with a pending surgery or intervention

## Discussion and Conclusion

- Pts were treated for a wide range of diagnoses, most commonly osteomyelitis (28%) and prosthetic joint infection(15%)
- Infections were due most commonly to Staphylococcus species; MRSA for POIC (25%) and MSSA for HC (21%).
- Notably, pts in the POIC group were more frequently infected with MDRO (68% versus 30%).
- More adverse events were reported for POIC pts, which may be due to the limited data availability for HC pts or the fact that HC pts received mostly antibacterial monotherapy.
- Labs were not drawn as ordered for 52% of HC pts, whereas it was consistent in the POIC group (95%); p<0.05.
- Hospital admissions during therapy occurred in 2 POIC pts versus 4 HC pts. In the HC group, 2 admissions were due to catheter infections. No catheter infections occurred in the POIC group.
- In the POIC group, 68% cured cases were reported compared to 60% in the HC group.
- Trends suggest differences in POIC versus HC treated pts with resistance patterns, lab draws (statistically significant), hospital admissions, catheter infections, and cure rates. However the study size limits conclusions. A prospective study is warranted.

## References

- Chapman AN, et al. J Antimicrob Chemother 2012; 67:1053-1062
- Paladina JA and Poretz D. Clinical Infectious Diseases 2010; 51(Suppl 2):S198-S208.