

Broad Spectrum Antibiotic Use at Choice, Change, and Completion throughout VA: Patterns of Initiation and De-escalation

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Background

Antibiotics are a mainstay of modern medicine, yet inappropriate antibiotic use accounts for up to 30-50% of all antibiotic use. Such unwarranted exposure raises the risk of multidrug-resistant organisms (MDRO) and *Clostridium difficile* infections.

Systematic population-based data on antimicrobial use are necessary to identify opportunities for improvement and to measure processes that affect antibiotic use. Over 70 VA facilities participate in the CDC's NHSN AU Module in which these facilities electronically submit monthly aggregated ward-level antibiotic use data to NHSN. Reports provide unadjusted antimicrobial days of therapy (DOT) per 1000 bed-days present for acute care patients by specific drugs/drug classes, wards and routes of administration. NHSN also provides indirect standardization of facility DOT data to generate observed to expected ratios or SAARs for total antibiotic use and for specific subcategories of agents.

The NHSN AU option data provide an invaluable tool that allows for inter-facility comparisons of antimicrobial use. However, these reports do not provide insights as to the indication for use or to temporal patterns that allow de-escalation assessments.

To assist antimicrobial stewardship programs in better identifying specific opportunities to improve antimicrobial usage, we developed a suite of tools that evaluate patterns of antibiotic choice, de-escalation and duration of therapy for patients with admission diagnoses of pneumonia, urinary tract infections and skin/soft tissue infections. Herein, we present an analysis of patterns of antimicrobial de-escalation for patients with pneumonia and skin/soft tissue infections

Methods

We characterized antibiotic use on days 0-2 (Choice), 3-4 (Change) and 5-6 (Completion) of therapy (CCC) for pneumonia, skin-soft tissue infections (SSTI) and urinary tract infections (UTI).

We then explored the relationship between total MRSA or multi-drug resistant GNR (MDRO) antibiotic use and use over CCC intervals for pneumonia and SSTI for patients in acute non-ICU settings in 33 high-complexity VA facilities (level 1A). Antibiotics were classified according to the schema in the CDC NHSN AU Module.

All data were from 2016 and extracted from the VA Corporate Data Warehouse.



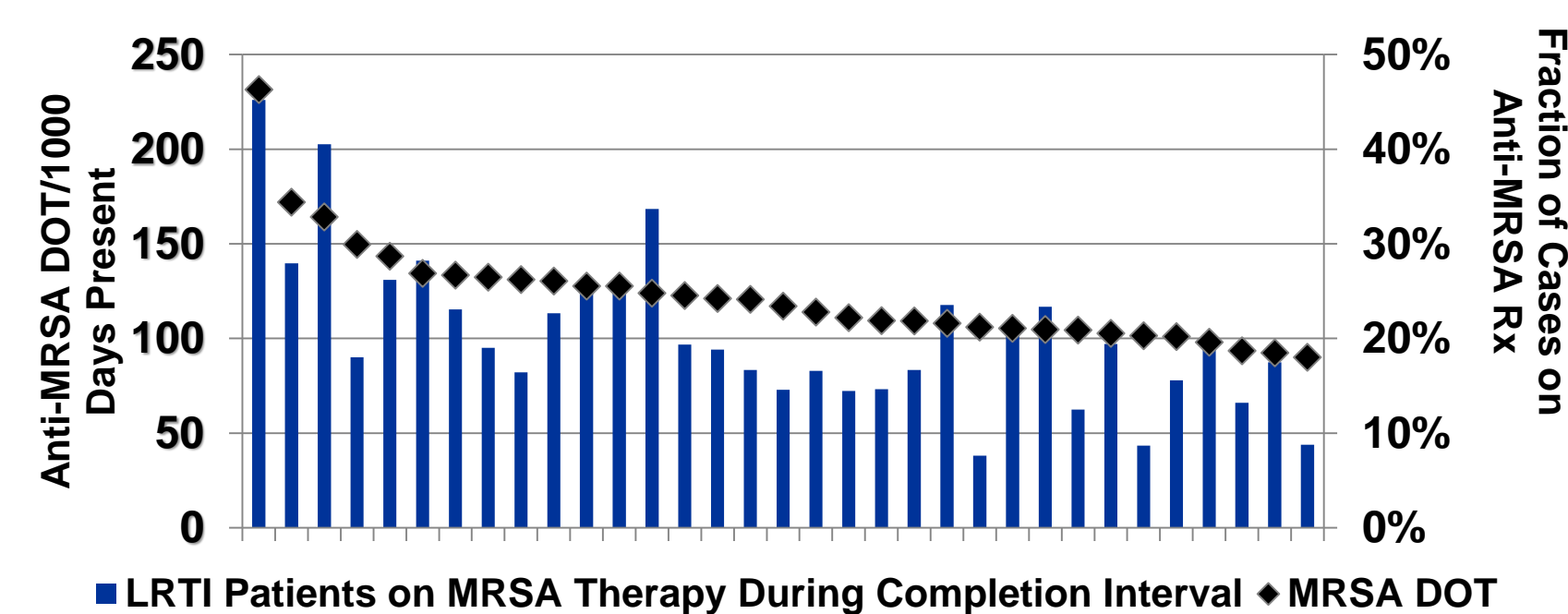
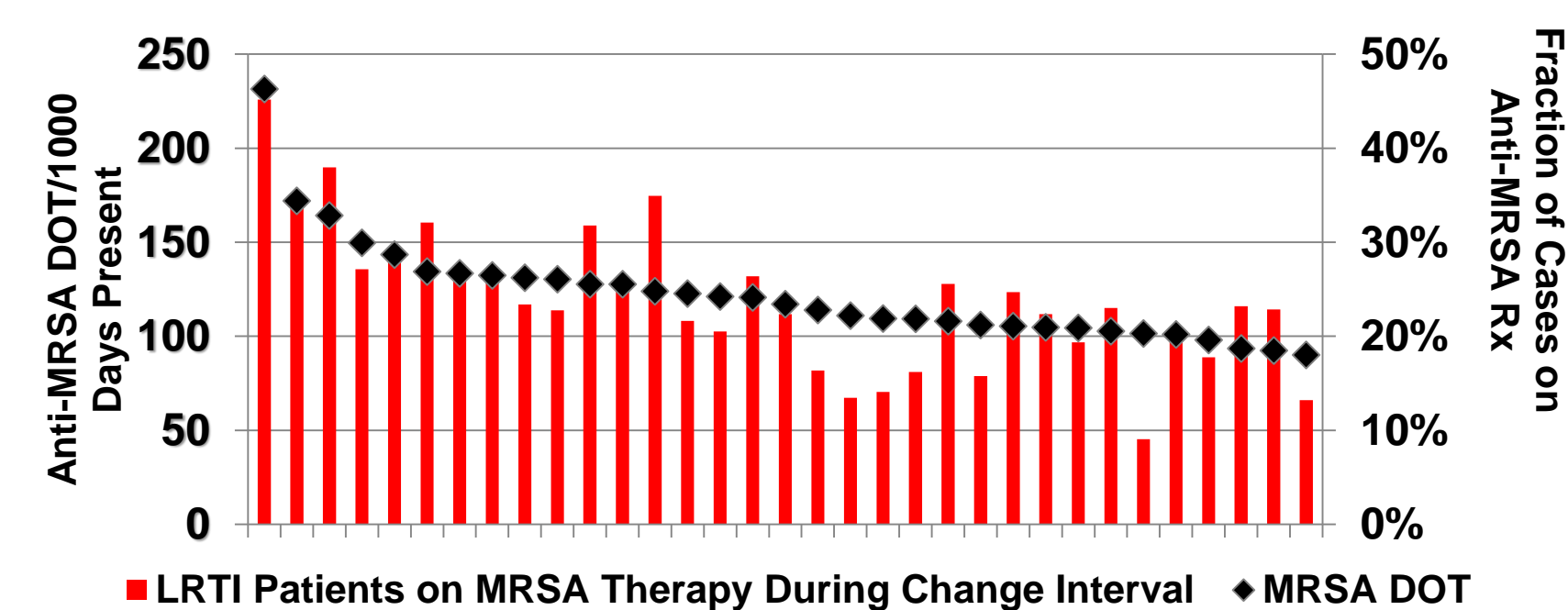
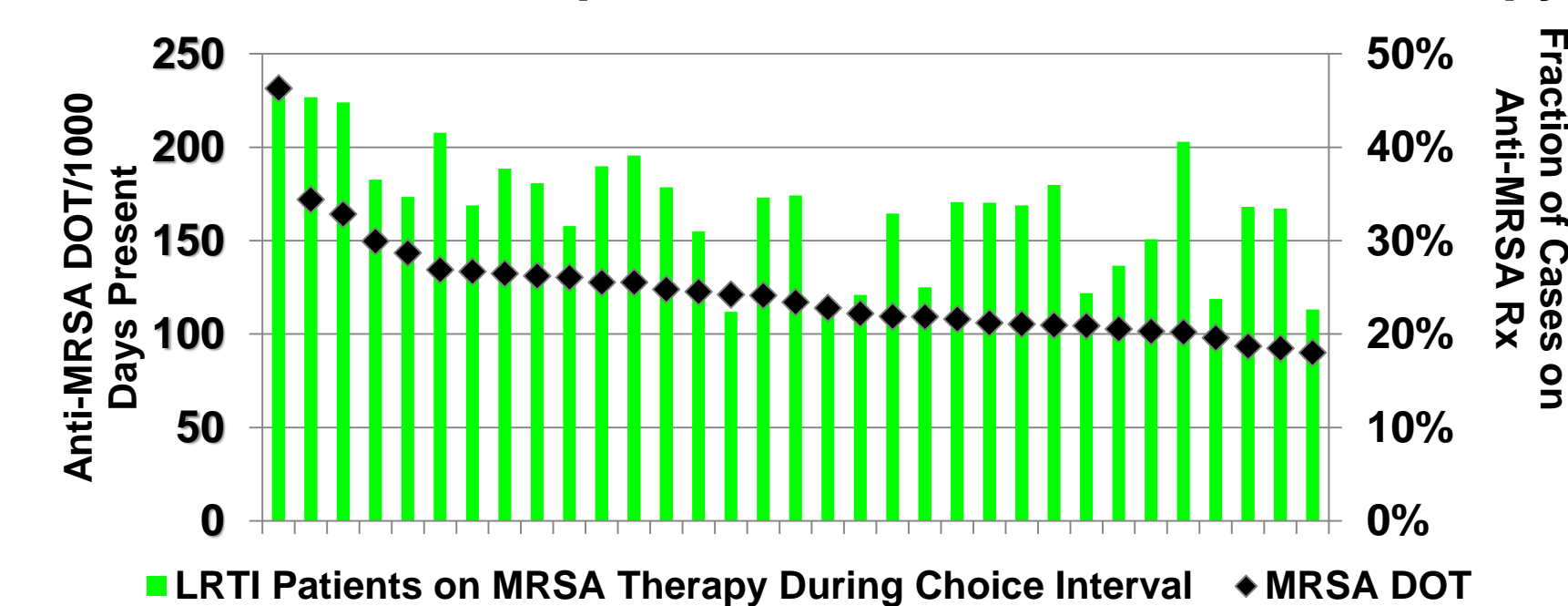
Results

The mean rates of anti-MRSA and anti-MDRO therapy were 108 and 123 DOT/1000 days present, respectively. The table shows the fraction (mean, range) of patients with SSTI or LRTI receiving anti-MRSA or anti-MDRO therapy at the CCC intervals and the change in use (i.e., de-escalation) over the treatment course.

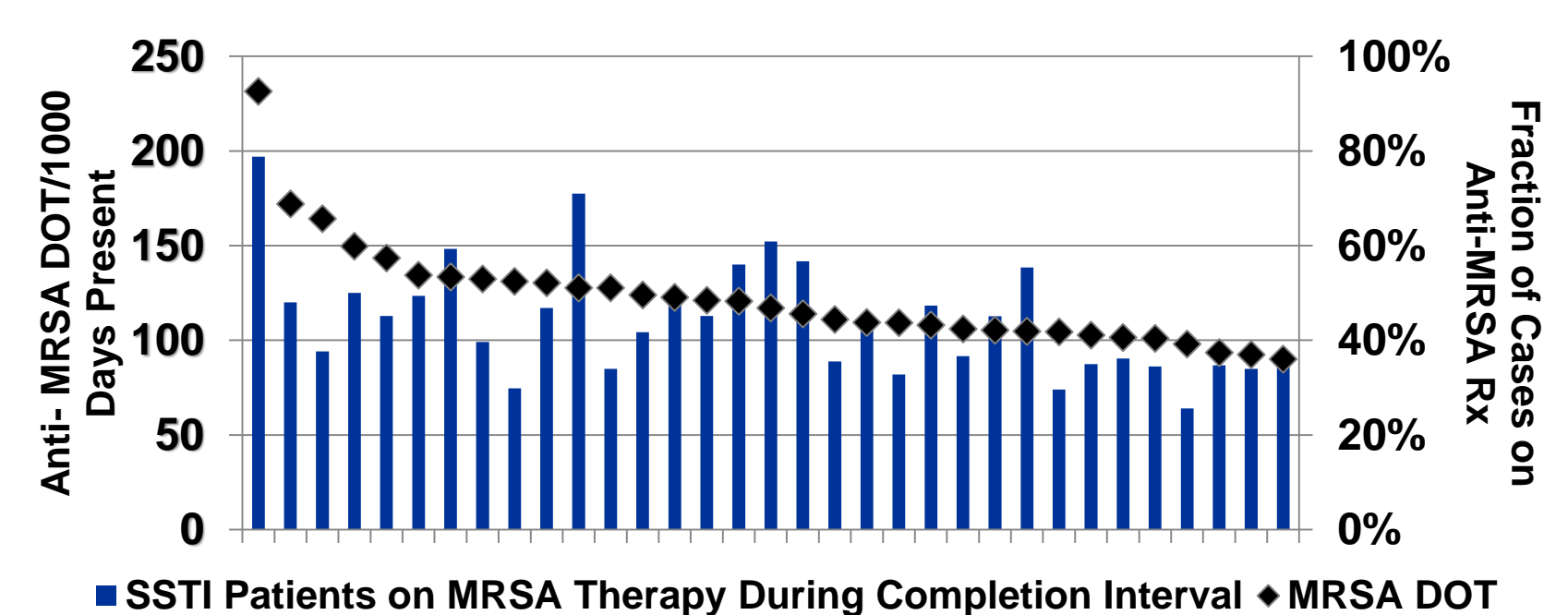
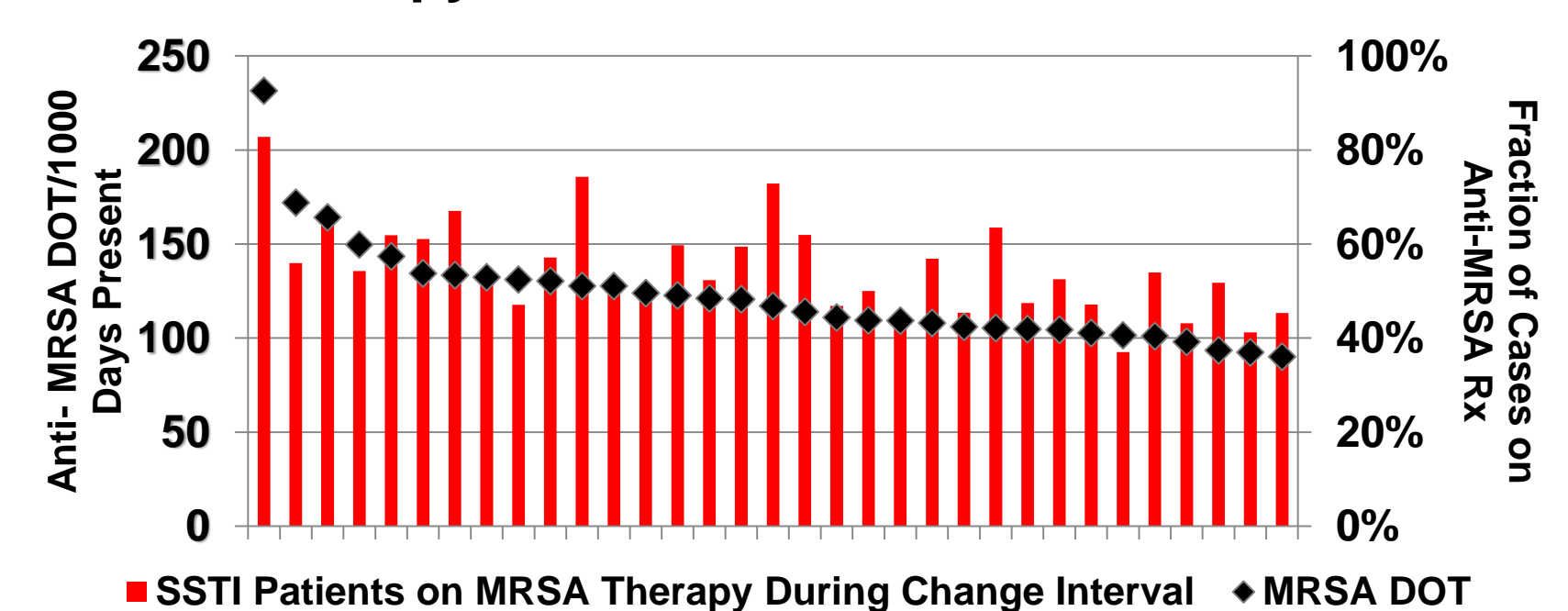
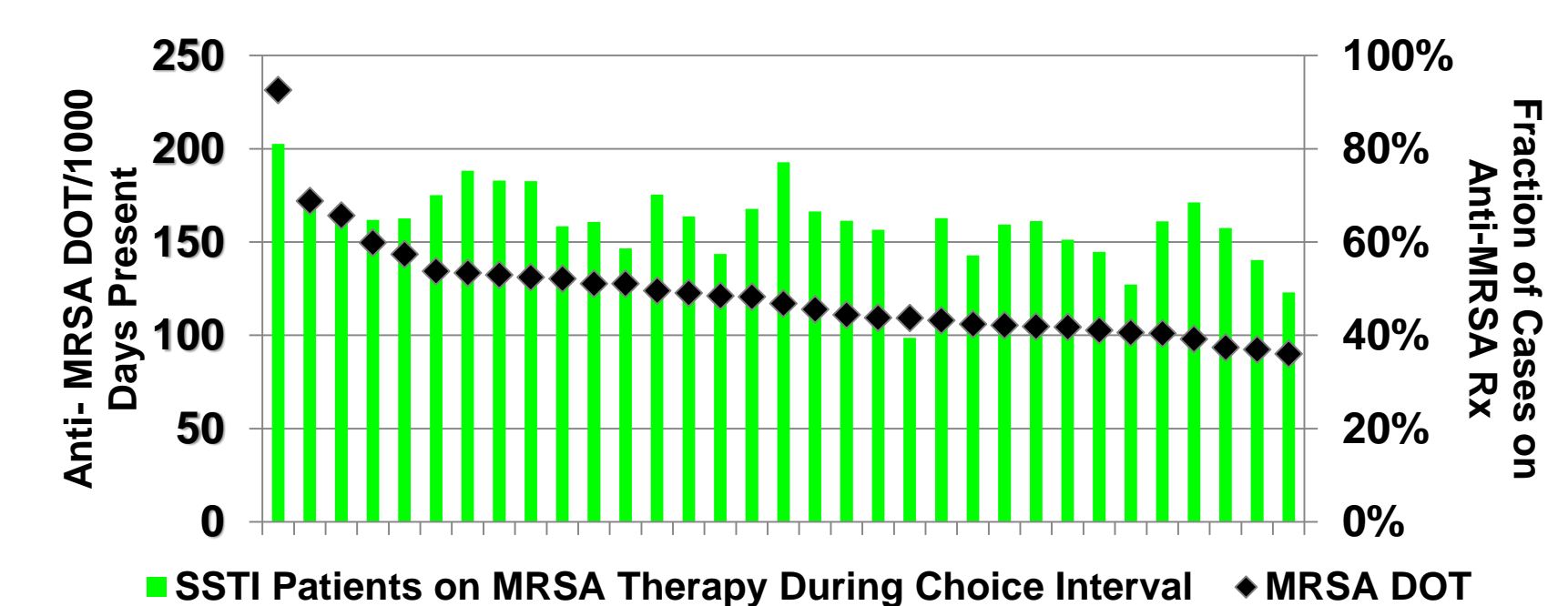
Diagnosis	Therapy	Fraction of Patients on Therapy			Difference from Choice to:	
		Choice	Change	Completion	Change	Completion
LRTI	Anti-MRSA	34% (22-47%)	26% (9-45%)	24% (8-45%)	8% (-10-26%)	11% (1-26%)
SSTI	Anti-MRSA	65% (39-81%)	56% (37-83%)	47% (26-79%)	9% (1-21%)	18% (-7-43%)
LRTI	Anti-MDRO	46% (20-64%)	39% (14-62%)	37% (10-66%)	7% (-1-18%)	8% (-4-27%)
SSTI	Anti-MDRO	47% (21-67%)	42% (13-69%)	36% (9-57%)	6% (-5-16%)	11% (0-25%)

Facility Variation in the Fraction of Patients Treated at Choice, Change & Completion vs Overall MRSA or MDRO DOT

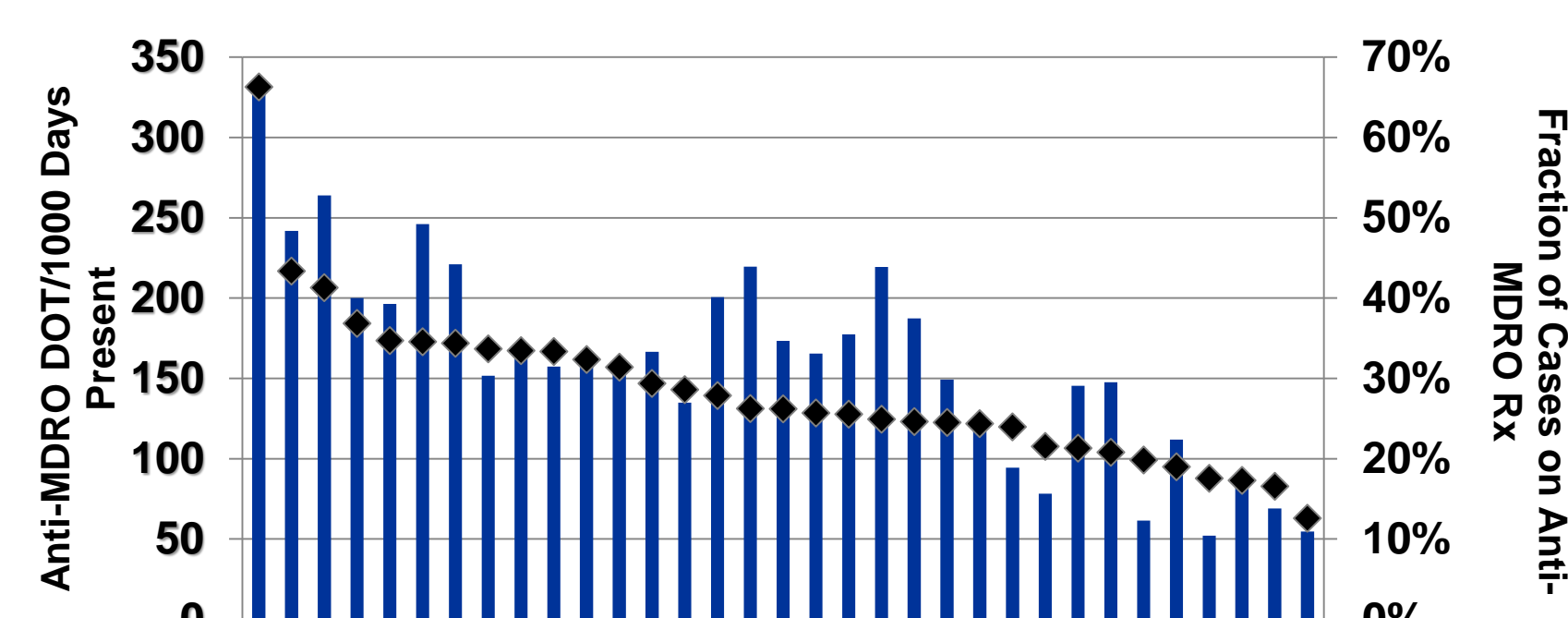
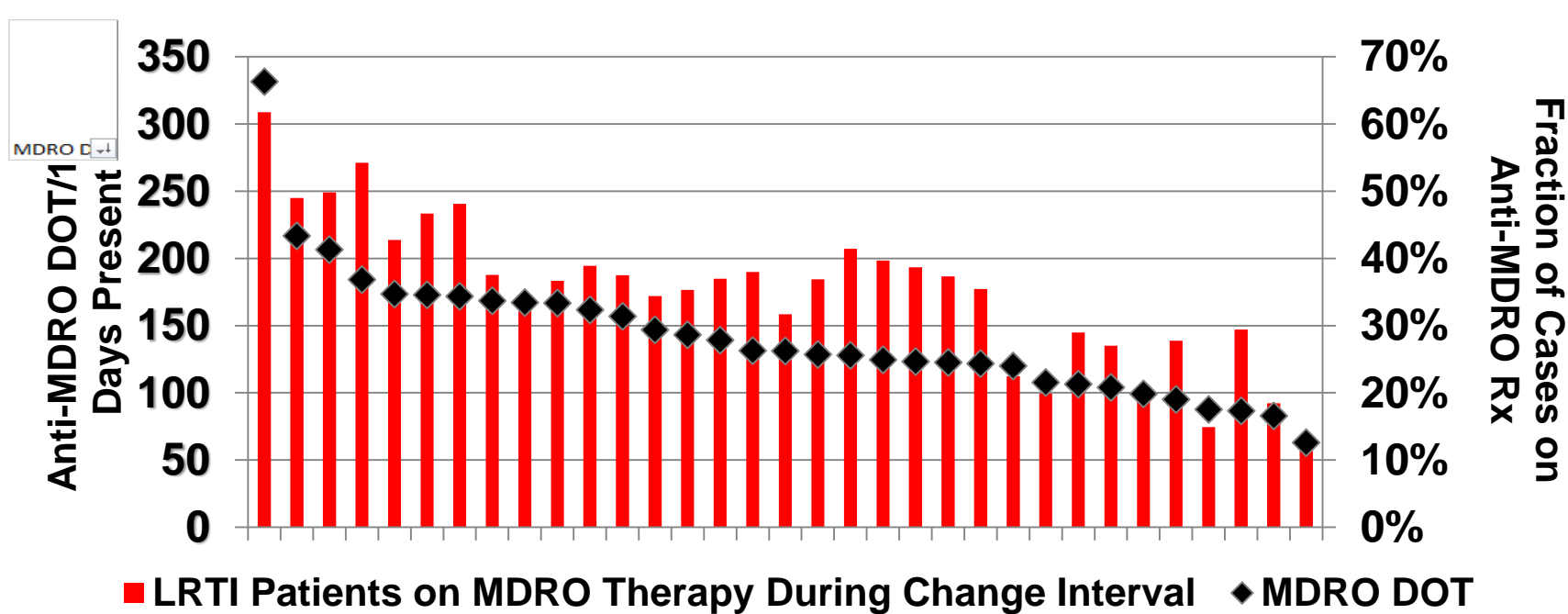
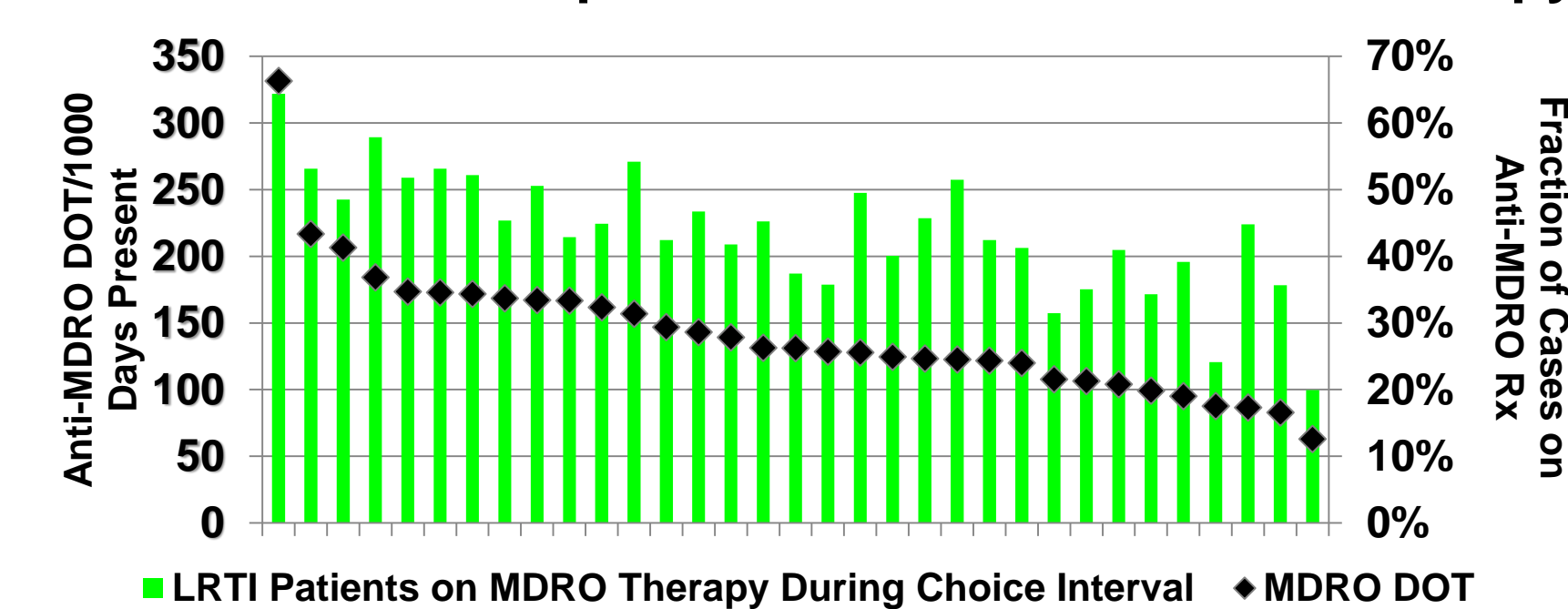
Patients treated for pneumonia with anti-MRSA Therapy



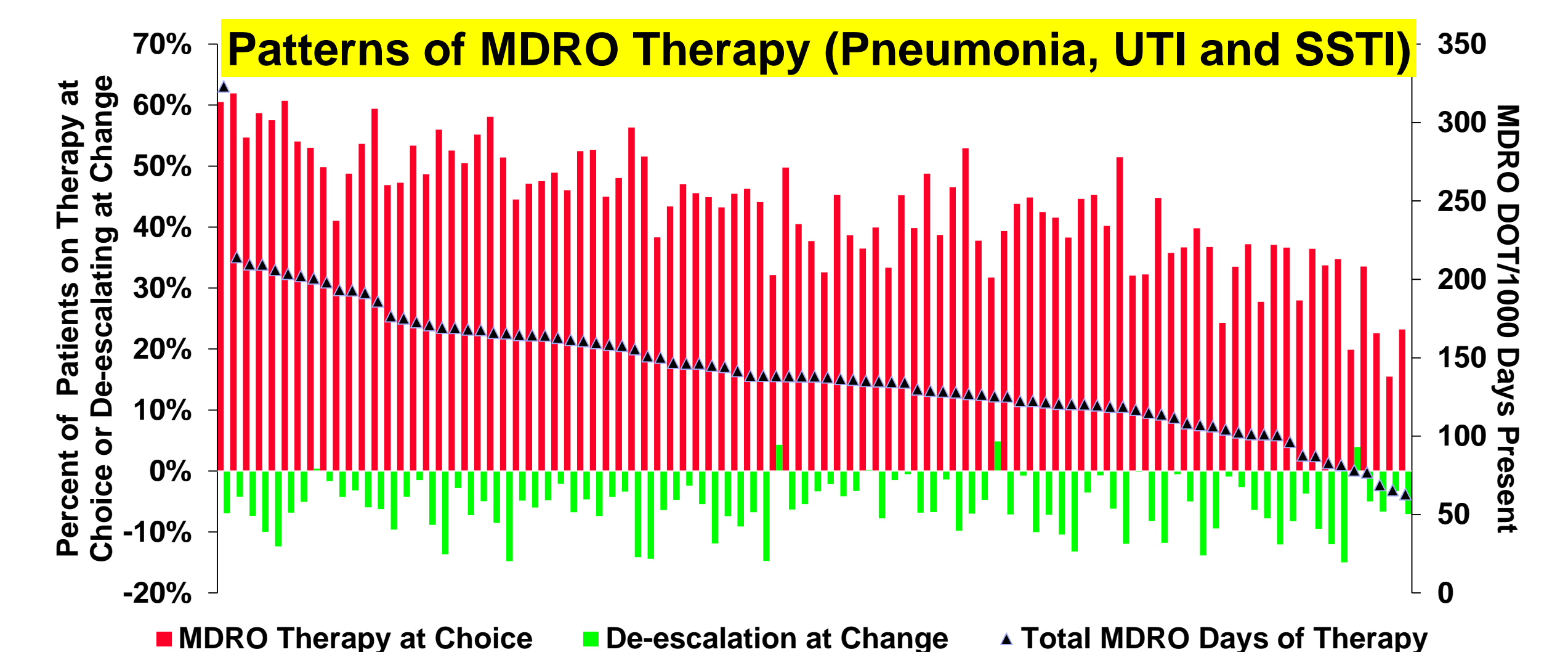
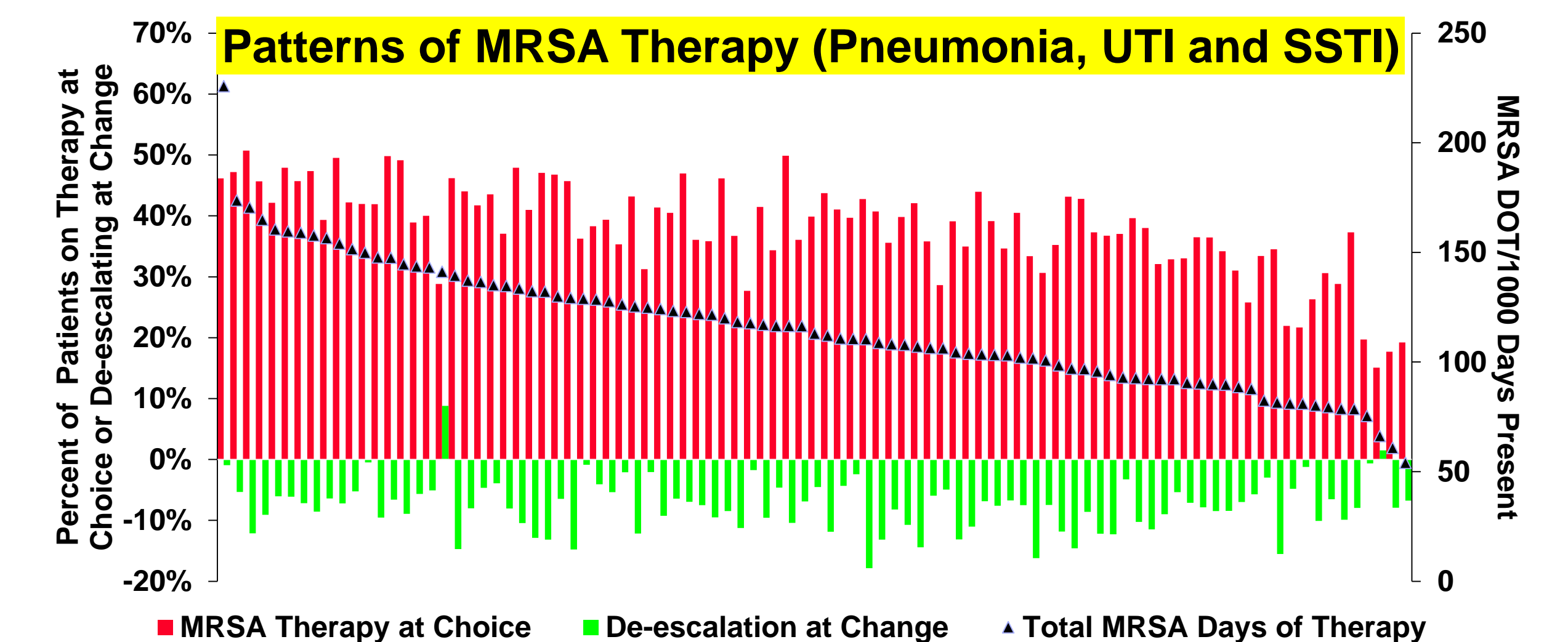
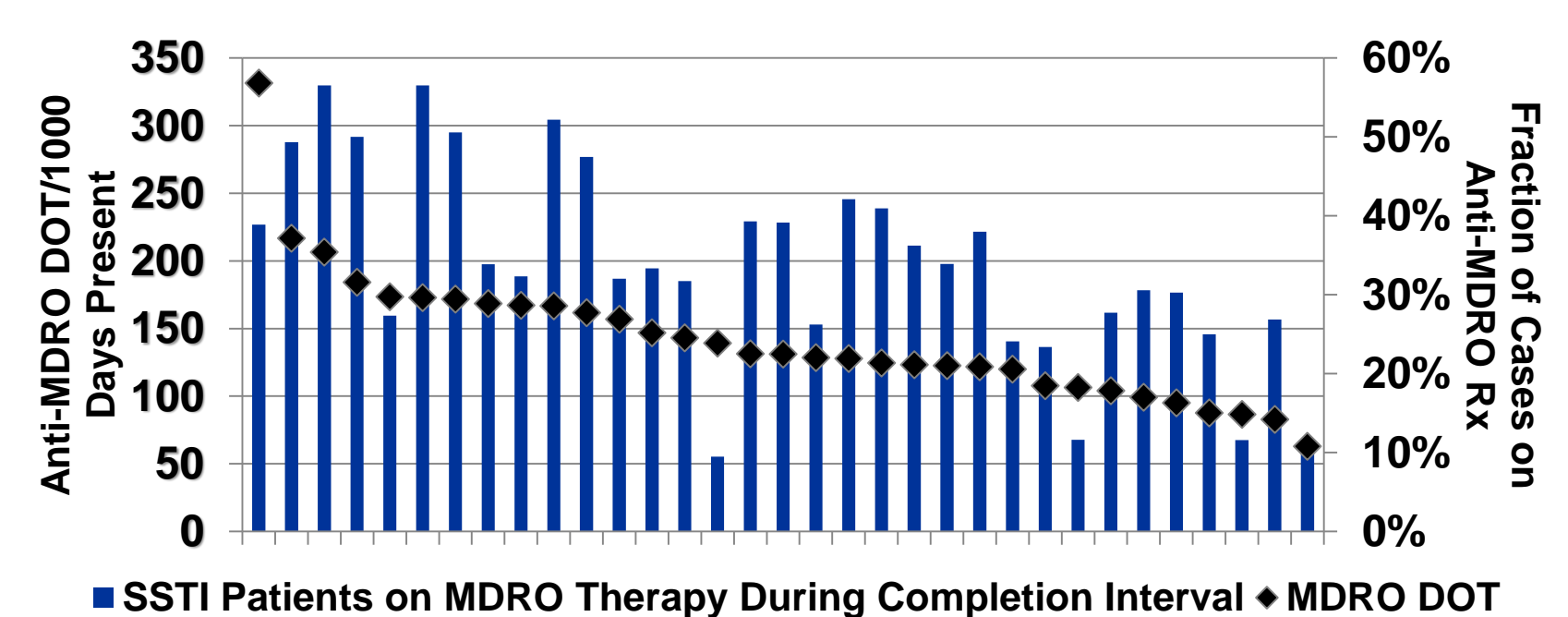
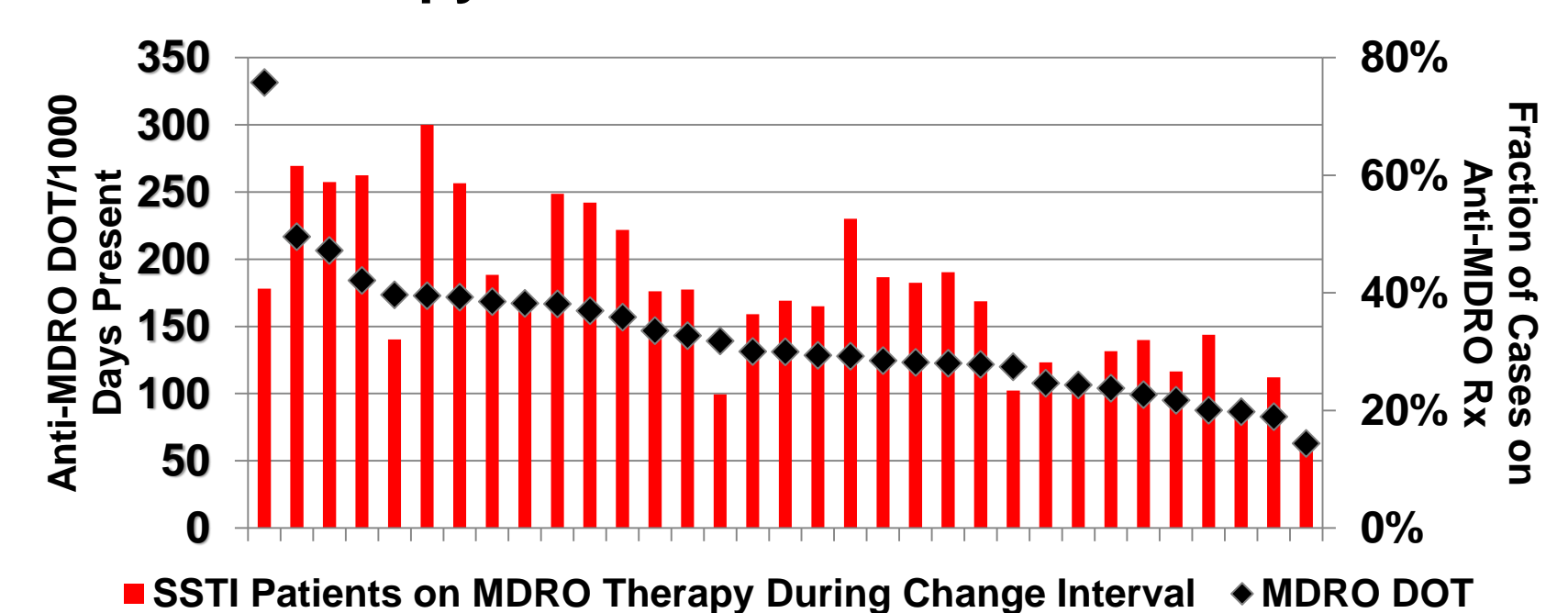
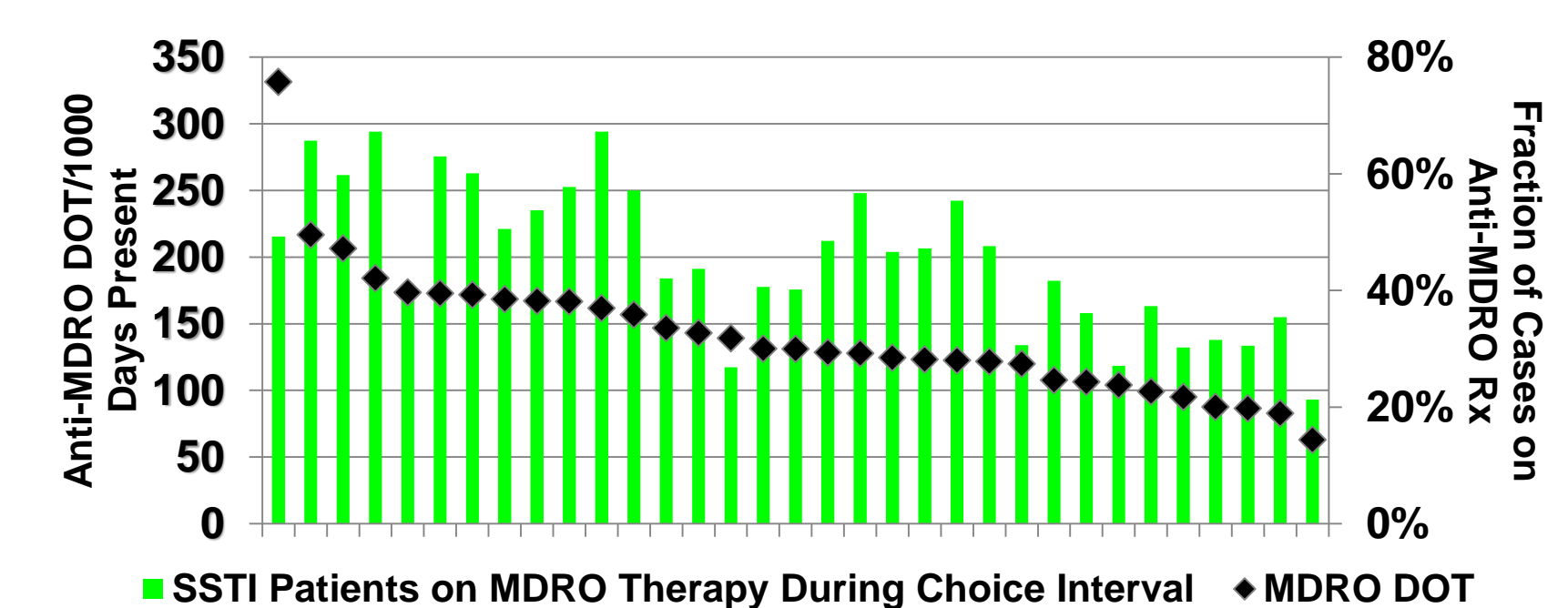
Patients treated for Skin & Soft Tissue Infections with anti-MRSA Therapy



Patients treated for pneumonia with anti-MDRO Therapy



Patients treated for Skin & Soft Tissue Infections with anti-MDRO Therapy



Conclusions

- Characterization of antibiotic use on days 0-2 (Choice), 3-4 (Change) and 5-6 (Completion) of therapy (CCC) for pneumonia, urinary tract infection and skin-soft tissue infections provides novel insights into patterns of antibiotic use.
- CCC metrics show substantial variations in the rates of de-escalation of antimicrobial use over treatment courses.
- Use of MRSA and MDRO antibiotics show poor correlation with overall MRSA and MDRO antibiotic use
- Insights provided by these metrics allow facilities to identify specific areas for improvement by targeting syndrome-specific initial choices of therapy or antibiotic de-escalation.

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