Progress in Universal cPOE Indication Based Antibiotic Ordering

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Introduction/Problem

A gap analysis was conducted for the 144 antimicrobial agents on the Inpatient Formulary and cPOE programmed indication selection with clinical decision support for dosing including adjustment s for renal impairment or obesity. In May of 2016, we determined that indication based requirements were in place for 47% of antimicrobials, dosing guidance for 65%, indication based dosing for 10%, and 37.5% require preprescriptive approval, with less than 5% programmed for calculated weight based dosing, therapeutic interchange, or automated IV to PO conversion.

New mandates around antimicrobial stewardship including those from the Centers for Medicare & Medicaid Services include evidence of indications for all antibiotic orders in the medical record.

The combination of indication based entry and clinical decision support has been shown to optimize the pharmacokinetics and clinical outcomes, decrease potential for adverse events, and improve costs when incorporated for antimicrobial ordering.

At BIDMC, the Antimicrobial Stewardship program with Pharmacy and Infectious Diseases began programming cPOE so that order entry requires an indication starting as early as 2002. This requires light programming but time and resources have been limited.

A new endeavor to revisit programming for all antibiotics was started in May of 2016 and covers all inpatient areas.

Aim/Goal

We have completed an internal audit of all antibiotics and the order screens in cPOE as well as clinical decision support including dosing guidance, and weight based dosing.

We endeavored to complete soft programming for indication based ordering screens for 100% of the antibiotics after second quarter of FY17, that include clinical decision support for renally-based or weight-based dosing.

The Team

- Christopher McCoy, PharmD — Pharmacy/Stewardship
- Monica Mahoney, PharmD — Pharmacy/Stewardship
- Tiffany Lee, PharmD — Pharmacy
- Howard Gold, MD — Infectious Diseases/Stewardship
- Steve Maynard — Pharmacy

The Interventions

- Gap analysis performed by reviewing all cPOE order screens for 160 antibiotics looking for indication based documentation at the point of entry.
- Stewardship, Infectious Diseases and Pharmacy task force reviewed literature for indication based dosing for all antibiotics to optimize pharmacokinetics and consider weight and renal function.
- Using a “soft” programming approach performed by Stewardship and Pharmacy staff, screens and rules were created systematically for antibiotics lacking support.
- To validate and ensure correct entries and programming, testing of indication based dosing was performed by Pharmacy residents.

Results/Progress to Date

Total	Non Formulary	Indications	Dosing provided	Guideline links	Weight Based dose	Indication based dose	Therapeutic Interchange	IV TO PO	Restricted
144	26	56	65	3	5	14	3	2	54
	Formulary total 118	47%	55%			10%			38%

In May of 2016, our initial gap analysis and inventory for antibiotic indication based ordering was 47%.
Dosing guidance was at 55%, with preprescriptive approvals required for 38%.
Since then, we have advanced towards 80% of antibiotics with indication based ordering.

For more information, contact:

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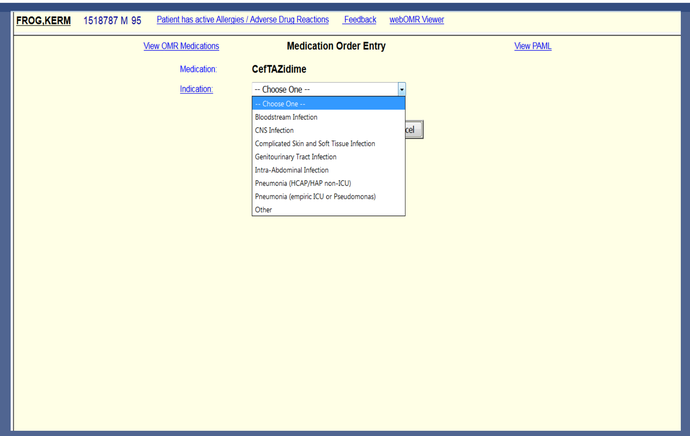
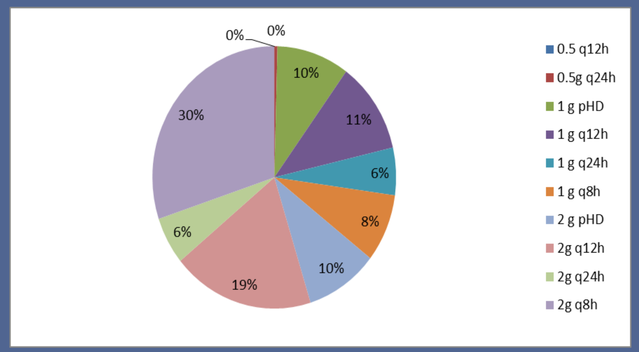
More Results/Progress to Date

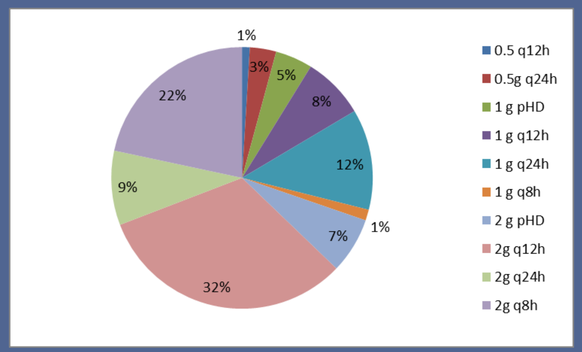


Indication based dosing was designed by the group to be user friendly for the prescriber with a prepopulated drop down list

Ceftazidime pre-support

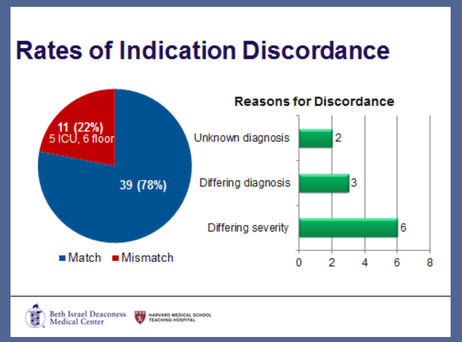


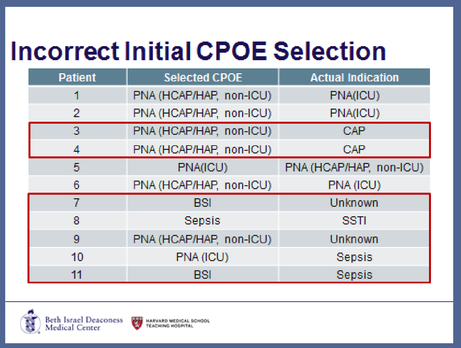
Post-support



Ceftazidime indication based entry and dosing support was turned live in November. Post-support, there was more optimized utilization of correctly selected dosing, including a trend away from 2g q8h toward 2g q12h.

Cefepime indication validation





Patient	Selected CPOE	Actual Indication
1	PNA (HCAP/HAP, non-ICU)	PNA(ICU)
2	PNA (HCAP/HAP, non-ICU)	PNA(ICU)
3	PNA (HCAP/HAP, non-ICU)	CAP
4	PNA (HCAP/HAP, non-ICU)	CAP
5	PNA(ICU)	PNA (HCAP/HAP, non-ICU)
6	PNA (HCAP/HAP, non-ICU)	PNA (ICU)
7	BSI	Unknown
8	Sepsis	SSTI
9	PNA (HCAP/HAP, non-ICU)	Unknown
10	PNA (ICU)	Sepsis
11	BSI	Sepsis

A medication utilization evaluation was performed for cefepime, an agent with indication based support since 2006 to assess the concordance of prescriber entered indication and medical records. Discordance was low with dosing off by 1 or 2g a day.

Lessons Learned

- Given limited information technology support for “hard” programming, clinician resources were utilized to design and build soft programming in Pharmacy dictionaries. This is a significant time commitment and quality assurance testing is a must given the multiple entry permutations.
- Based on previously built indication based dosing, e.g. cefepime from 2006, prescriber order entry was generally well documented and matched the medical record.
- Indications for antimicrobial order entry assist in more optimized dosing for the site of infection and can turn the dial toward better prescribing.

Next Steps

- In order to meet Antimicrobial Stewardship mandates, the group will continue to program and test indication based dosing towards 100%.
- Documentation of indications will help with Stewardship goals toward better utilization reviews and potential for better defined durations.

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