

Impact of Patient Diagnoses and Provider Years of Practice on Antimicrobial Stewardship Program (ASP) Activities at a Non-freestanding Children's Hospital



J. Michael Klatte, MD,¹ Frank Szczerba, PharmD, BCPS,² Alexander Knee, MS,^{3,4} Kathleen Kopcza, PharmD, BCPS,² Evan R. Horton, PharmD, BCPPS,^{2,5} Donna Fisher, MD¹

1. Department of Pediatrics, Baystate Children's Hospital, University of Massachusetts Medical School – Baystate, Springfield, MA, 2. Department of Acute Care Pharmacy Services, Baystate Medical Center, Springfield, MA, 3. Office of Research, Baystate Medical Center, Springfield, MA, 4. Department of Medicine, Baystate Medical Center, University of Massachusetts Medical School – Baystate, Springfield, MA, 5. MCPHS University, Worcester, MA

James.KlatteMD@baystatehealth.org
759 Chestnut Street, 3rd Floor
Springfield, MA 01199
Phone: 413-794-9580
Fax: 413-794-3207

ABSTRACT

Background: Baystate Children's Hospital (BCH) is a non-freestanding children's hospital with a recently implemented ASP. Patient populations of non-freestanding hospitals frequently differ from freestanding ones, with ASPs in the former often lacking. Our aim was to assess impact of patient diagnoses and primary provider years of practice on BCH ASP activities.

Methods: Chart review was performed for 1,170 antibiotic reviews from 808 patients evaluated by the ASP from 12/1/14 – 11/30/16 to determine seven clinical diagnostic categories and primary providers at the time of ASP review. We obtained provider years of practice via specialty board certification websites and years of BCH affiliation from credentialing records, with both grouped as <5, 5-15, or >15 years. Poisson regression was used to examine associations between diagnostic categories, years of practice and BCH affiliation, and likelihoods of ASP recommendation receipt and provider acceptance.

Results: Among 1,170 reviews, we found associations between recommendation receipt and both diagnostic category (highest probabilities were ENT/sinopulmonary = 55%; two distinct diagnoses = 57%) and provider years of practice (<5 years = 22%; 5-15 years = 37%; >15 years = 36%) (p<0.01 for both). Of 414 recommendations received (307 [74%] of which were accepted), diagnostic category was associated with recommendation acceptance (highest acceptance rates: skin/soft tissue infections = 99%, GI/genitourinary = 88%; lowest: two diagnoses = 62%) (p<0.01). Regarding recommendations made to those with a BCH affiliation (n=379), acceptance (n=278 [73%]) was associated with years of affiliation (<5 years = 69%; 5-15 years = 83%; >15 years = 63%) (p<0.01). The association was not as strong across provider years of practice (<5 years = 68%; 5-15 years = 79%; >15 years = 68%) (p=0.08).

Conclusions: Patient clinical diagnostic categories and provider years of practice were significantly associated with ASP recommendation receipt and acceptance. Targeted educational efforts regarding ASP aims and activities may therefore benefit experienced primary providers and patients with certain clinical diagnoses at non-freestanding children's hospitals without prior ASP exposure.

INTRODUCTION

- Baystate Children's Hospital (BCH): 110-bed hospital with a 7-bed PICU and 55-bed NICU, located within Baystate Medical Center
- BCH ASP¹ (established in 2014):
 - ID physicians & Clinical Pharmacy specialists
 - Thrice-weekly prospective-audit-with-feedback
 - Reviews use of certain predefined antibiotics 48 - 72 hours after provider initiation
- No prior studies assessing diagnoses likely to prompt ASP recommendations at non-freestanding pediatric hospitals²
- Rejection of ASP recommendations has been linked to behaviors of more experienced providers relying on past practices³

OBJECTIVES

- Identify patient diagnostic categories most likely to prompt ASP to suggest recommendations to providers
- Examine associations between diagnostic categories & provider likelihood of recommendation acceptance
- Evaluate impact of both provider years of practice & years of BCH affiliation on probabilities of provider recommendation receipt & acceptance

METHODS

Inclusion Criteria:

- All inpatients from 12/1/14 – 11/30/16 whose antibiotic courses underwent ASP review, as per the BCH ASP internal database¹
- All primary (1^o) providers listed for patients on dates of ASP review

Exclusion Criteria:

- For years of BCH affiliation subgroup analyses: 1^o providers categorized as general pediatricians in private practice

Procedure:

- **Provider years of practice/years of BCH affiliation:**
 - List generation of potential 1^o providers from 12/1/14 – 11/30/16
 - Reviewed primary/subspecialty national board examination certification websites for provider initial certification dates
 - Initial hospital credentialing dates for potential providers with BCH affiliation obtained from Baystate Medical Staff Office
 - Potential provider years of practice & years of BCH affiliation categorization: < 5, 5-15, & > 15 years
 - Charts reviewed to discern patient providers at time of ASP review
- **Diagnostic category:**
 - Paper copies of ASP rounding sheets reviewed for working diagnoses at time of review
 - For patients without working diagnoses listed on rounding sheets: chart review of provider documentation at time of ASP review
 - Working diagnoses condensed into 7 diagnostic categories

RESULTS

- **Reviews prompting recommendations: 414/1,170 (35%)**
- **Received recommendations accepted: 307/414 (74%)**
- **BCH-affiliated provider acceptance: 278/379 (73%)**

Figure 1. Antibiotic Reviews by Diagnostic Category

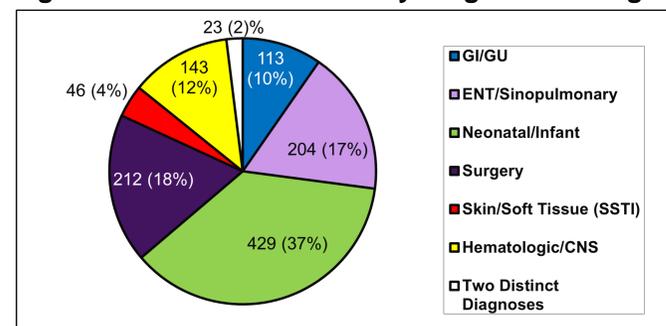


Table 1. Provider Data By Years of Practice, Reviews Performed & Years of BCH Affiliation

	Providers with patients reviewed by ASP (%) [*]	Reviews by Provider Years of Practice (%) [*]	Providers by Years of BCH Affiliation (%) [#]	Reviews by Provider Years of BCH Affiliation (%) [#]
< 5 years	15 (16)	199 (17)	12 (25)	232 (22)
5 - 15 years	31 (34)	534 (46)	19 (40)	485 (45)
> 15 years	46 (50)	437 (37)	17 (35)	355 (33)
Total	92	1,170	48	1,072

^{*}Includes general pediatricians in private practice
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RESULTS (continued)

Figure 2: Probability of Recommendation Receipt by Diagnostic Category

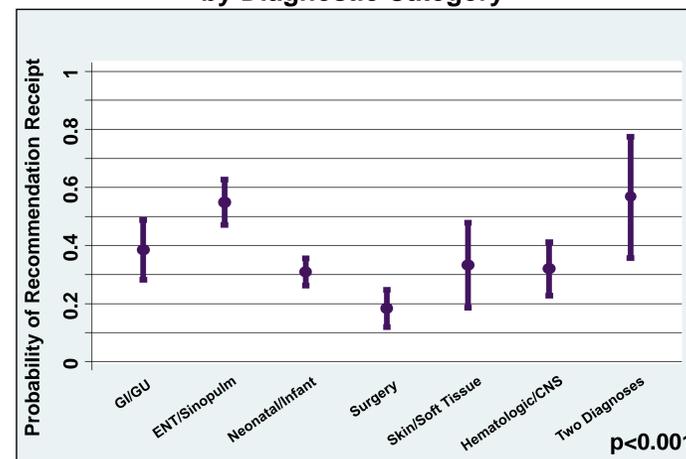


Figure 3: Probability of Recommendation Acceptance by Diagnostic Category

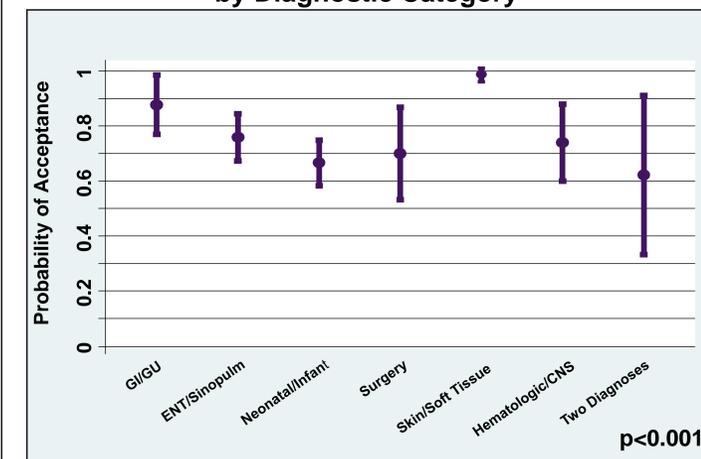


Figure 4: Probability of Recommendation Receipt by Provider Years of Practice & BCH Affiliation

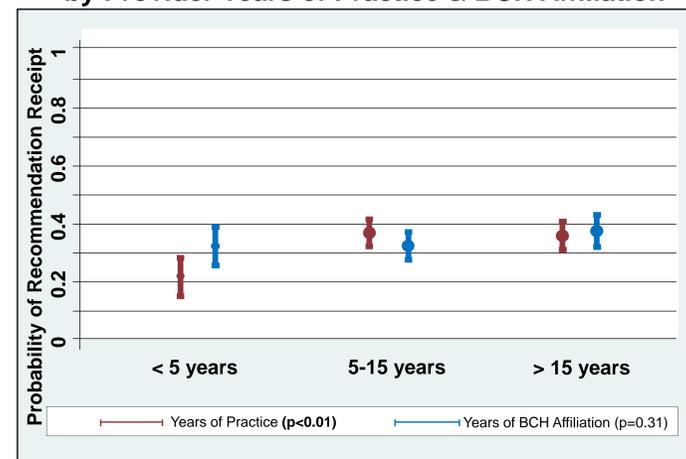
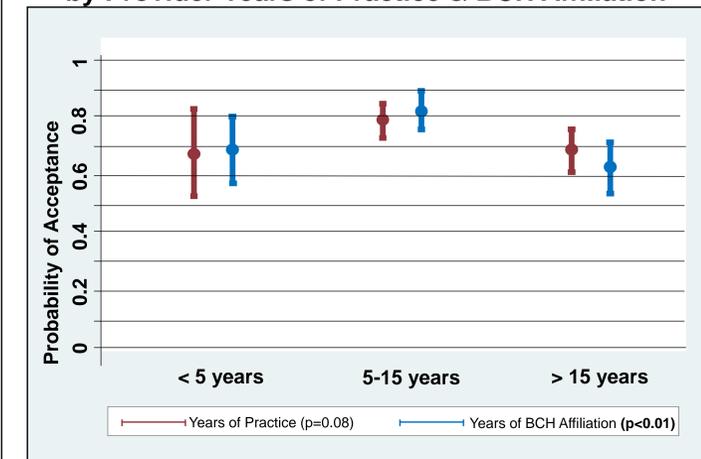


Figure 5: Probability of Recommendation Acceptance by Provider Years of Practice & BCH Affiliation



CONCLUSIONS

- **Diagnostic categories:**
 - Those with ENT/Sinopulmonary & Two Distinct Diagnoses had a > 50% mean likelihood of ASP recommendation receipt, while GI/GU, Neonatal/Infant, SSTIs, & Hematologic/CNS had a > 30% likelihood, & Surgery < 20%
 - Provider recommendation acceptance probabilities were > 80% for GI/GU & SSTIs, & between 60-80% for all others
- **Provider years of practice & years of BCH affiliation:**
 - Providers with < 5 years of practice were least likely to receive recommendations, but mean likelihood ~30% for all groups
 - Likelihood of recommendation acceptance similar amongst all groups in both analyses, with nearly all between 60-80%

FUTURE DIRECTIONS

- Institutional guideline development for empiric management of patients with working diagnoses associated with the lowest probabilities of ASP recommendation acceptance
- Educational efforts targeting all 1^o providers at BCH, with particular emphasis on:
 - Active inclusion of both accepting & resistant providers in guideline development processes

References

1. J Pediatr Pharmacol Ther. 2017; in press.
2. Infect Control Hosp Epidemiol. 2015; 36: 673-680.
3. Clin Infect Dis. 2016; 63: 532 - 538.