Outcomes from an Inpatient Beta-Lactam Allergy Guideline Across a Large US Health System

Kimberly G. Blumenthal, MD, MSc1,2,3

Yu Li, MS4

Joyce T. Hsu, MD3,5

Anna R. Wolfson, MD1,3

David N. Berkowitz, PharmD6

Victoria A. Carballo, MPH7

Jesse M. Schwartz, MD, MSc, MPH8

Kathleen A. Marquis, PhD, PharmD4,9

Ramy Elshaboury, PharmD, BCPS-AQ ID10

Ronak G. Gandhi, PharmD, BCPS10

Barbara B. Lambl, MD, MPH11

Monique M. Freeley, RPh12

Alana Gruszecki, PharmD, RPh, BCPS13

Paige G. Wickner, MD, MPH3,5\*

Erica S. Shenoy, MD, PhD3,14,15\*

1Division of Rheumatology, Allergy, and Immunology, Department of Medicine, Massachusetts General Hospital, Boston, MA

2 The Mongan Institute, Massachusetts General Hospital, Boston, MA

3Harvard Medical School, Boston, MA

4 University of Pittsburgh School of Medicine, Pittsburgh, PA

5 Division of Rheumatology, Allergy and Immunology, Department of Medicine, Brigham and Women’s Hospital, Boston, MA

6 Department of Pharmacy, Newton-Wellesley Hospital, Newton, MA

7 Partners HealthCare System, Quality, Safety, and Value, Boston, MA

8 Division of Allergy and Clinical Immunology, Jewish General Hospital, McGill University, Montreal, Quebec, CA

9 Department of Pharmacy, Brigham and Women’s Hospital, Boston, MA

10 Department of Pharmacy, Massachusetts General Hospital, Boston, MA

11 Division of Infectious Diseases, Department of Medicine, North Shore Medical Center, Salem, MA

12 Pharmacy Department, North Shore Medical Center, Salem, MA

13 Pharmacy Department, Brigham and Women’s Faulkner Hospital, Boston, MA

14 Division of Infectious Diseases, Department of Medicine, Massachusetts General Hospital, Boston, MA

15 Infection Control Unit, Massachusetts General Hospital, Boston, MA

\* These authors contributed equally

**Corresponding Author**

Kimberly G. Blumenthal, MD, MSc, Division of Rheumatology, Allergy and Immunology, The Mongan Institute, Massachusetts General Hospital 100 Cambridge Street, 16th Floor, Boston, MA 02114**,** p-(617) 726-3850, f-(617) 724-7441**,** kblumenthal@mgh.harvard.edu

**Abbreviated Title:** Beta-Lactam Allergy Guideline Outcomes

**Contents:**

Supplemental material: Tables (2)

**Supplemental Table 1.** Hospital characteristics

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **MGH** | **BWH** | **NWH** | **NSMC\*** | **BWF** |
| **Hospital Type** | Academic | Academic | Community‡ | Community | Community† |
| **Massachusetts Location** | Boston | Boston | Newton | Salem/Lynn | Boston |
| **Number of Beds**§ | 1,035 | 793 | 265 | 396 | 162 |
| **Number of Annual Admissions**║ | 49,688 | 42,192 | 15,409 | 17,377 | 10,033 |
| **Clinical champion** | Allergy physician | Allergy physician | Pharmacist | Infectious Diseases  physician | Hospitalist  Physician\*\* |
| **Antibiotic Stewardship Program Members** | Physicians, Pharmacists, Infection Control, Clinical Microbiology | Physicians, Pharmacists, Infection Control, Clinical Microbiology | Physicians, Pharmacists, Infection Control,  Clinical Microbiology,  Nursing | Physicians, Pharmacists | Physicians, Pharmacists |
| **Allergy/Immunology Consultation Available** | Yes | Yes | No | Yes | No |
| **Inpatient penicillin skin testing available** | Yes | Yes | No | Yes | No |
| \* NSMC is comprised of Salem Hospital and Union Hospital  ‡ Housestaff from MGH  † Housestaff from BWH  § Licensedbeds of 9/30/17  ║ October 1, 2016 through September 30, 2017  \*\*Clinical champion during study period was not consistent; a new hospitalist joined our group 07/2017  *Abbreviations:* MGH, Massachusetts General Hospital; BWH, Brigham and Women’s Hospital; NWH, Newton Wellesley Hospital; NSMC, North Shore Medical Center; BWF, Brigham and Women’s Faulkner Hospital; ICU, Intensive Care Unit | | | | | | |

**Supplemental Table 2.** Patient and hospital predictors of hypersensitivity reactions and adverse drug reactions.

|  |  |  |
| --- | --- | --- |
| **Hypersensitivity Reactions** | **Odds ratio [95% CI]\*** | **p-value** |
| Female | 1.33 [0.68, 2.60] | 0.41 |
| Age | 0.99 [0.98, 1.01] | 0.47 |
| Allergy to penicillin | 1.08 [0.43, 2.71] | 0.87 |
| Allergy to cephalosporin | 2.96 [1.34, 6.58] | 0.008 |
| Historical reaction severe IgE | 1.59 [0.78, 3.25] | 0.20 |
| Allergy consultation | 1.83 [0.77, 4.35] | 0.17 |
| Ordering provider not a medical doctor | 1.12 [0.55, 2.27] | 0.76 |
| Community hospital | 0.61 [0.21, 1.78] | 0.36 |
| **Adverse Drug Reactions** | **Odds ratio [95% CI]\*** | **p-value** |
| Female | 1.86 [1.11, 3.13] | 0.02 |
| Age | 1.00 [0.99, 1.01] | 0.73 |
| Allergy to penicillin | 1.18 [0.58, 2.42] | 0.65 |
| Allergy to cephalosporin | 2.49 [1.37, 4.51] | 0.003 |
| Historical reaction severe IgE | 1.27 [0.74, 2.19] | 0.38 |
| Allergy consultation | 2.42 [1.30, 4.51] | 0.005 |
| Ordering provider not a medical doctor | 1.00 [0.53, 1.56] | 0.74 |
| Community hospital | 0.59 [0.27, 1.29] | 0.19 |
| \*Multivariable logistic regression model results | | |