

# Rebecca Yates Coley, Ph.D.

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## Education

**Ph.D., Biostatistics, University of Washington** 2014  
Advisor: Elizabeth Brown  
Dissertation: *Bayesian Hierarchical Frailty Models for Heterogeneity in Risk*

**M.S., Biostatistics, University of Washington** 2010

**A.B., Environmental Sciences and Policy, Duke University** 2006  
Certificate: Documentary Studies

## Professional Positions

**Assistant Investigator, Group Health Research Institute** 2016- Present  
Biostatistics Unit

**Postdoctoral Fellow, Johns Hopkins Univeristy** 2014- 2016  
Department of Biostatistics  
Advisor: Scott Zeger

**Research Assistant, Fred Hutchinson Cancer Research Center** 2012 - 2014  
Microbicide Trials Network

**Research Assistant, School of Dentistry, University of Washington** 2008 - 2012  
Northwest Practice-Based Research Collaborative in Evidence-Based Dentistry

**Associate in Research, Nicholas School of the Environment, Duke University**  
Children's Environmental Health Initiative 2006 - 2008

## Teaching

**Instructor, Department of Public Health Studies, Johns Hopkins University**  
Data Visualization for Individualized Health Spring 2016

**Co-Instructor, Department of Biostatistics, Johns Hopkins Bloomberg School of Public Health**  
Advanced Data Science (140.711) Fall 2015

**Teaching Assistant, Department of Biostatistics, University of Washington**  
Applied Biostatistics (BIOS 514/7) 2013  
Regression Methods for Dependent Data (BIOS 571) 2011  
Regression Methods for Independent Data (BIOS 570) 2010

**Teaching Assistant, Department of Statistics, Duke University**  
Introduction to Statistical Inference (STAT 101) 2005-2006

## Honors and Awards

<b>Top Performer, Prostate Cancer DREAM Challenge</b>	2015
Led team of students and postdocs in development of ensemble learning algorithms for predicting survival of patients with metastatic castration-resistant prostate cancer	
<b>Honorable Mention, Poster Award</b>	2015
Patrick C. Walsh Prostate Research Day	
<b>Travel Award</b>	2014
Women in Statistics Conference	
<b>Junior Researcher Travel Award</b>	2013
Objective Bayes Workshop	
<b>Faculty Selection for Best Student Poster</b>	2013
Department of Biostatistics, University of Washington	
<b>Winner, Oral Presentation, Student Paper Competition</b>	2013
Western North American Region of the International Biometrics Society (WNAR) Conference	
<b>Runner-up, Written Paper, Student Paper Competition</b>	2013
WNAR Conference	
<b>National Institutes of Health Trainee</b>	2008 - 2012
Oral Health and Epidemiology Training Grant	
<b>Dean's List, Duke University</b>	2003, 2005

## Grant Support

As co-investigator: **Patient-Centered Outcomes Research Institute (PCORI)** methods development grant, "Bayesian Hierarchical Models for the Design and Analysis of Studies to Individualize Healthcare" (6/15-12/17). PI: Zeger.

As co-investigator: **Johns Hopkins's Center for Educational Resources** grant for Narrative and Data Visualization, "Data Analysis and Visualization Practicum for Individualized Health" (8/15-5/16). PI: Zeger.

Postdoctoral Research Fellow: **Patrick C. Walsh Prostate Research Fund** grant for "Stochastic Models of Prostate Cancer Screening and Detection at Johns Hopkins" (8/14-8/16). PI: Zeger, Carter.

## Publications

\* indicates first author was a student supervised by Dr. Coley

1. **Coley RY**, Zeger SL, Mamawala M, Fisher AJ, Pienta KJ, Carter HB. (2016) "Prediction of the pathological Gleason Score (PGS) to inform a personalized management program for prostate cancer". *European Urology* (To appear.)
2. **Coley RY**, Fisher AJ, Mamawala M, Carter HB, Pienta KJ, Zeger SL. (2016) "A Bayesian Hierarchical Model for Prediction of Latent Health States from Multiple Data Sources with Application to Active Surveillance of Prostate Cancer". arxiv: 1508.07511. *Biometrics* (To appear.)

3. **Coley RY**, Brown ER. (2016) “Estimating effectiveness in HIV prevention trials with a Bayesian hierarchical compound Poisson frailty model”. *Statistics in Medicine*. 35: 2609-2634 doi: 10.1002/sim.6884.
4. \*Fisher AJ, **Coley RY**, Zeger SL. (2015) “Fast Out-of-Sample Predictions from Bayesian Hierarchical Models of Latent Health States”. arxiv: 1510.08802.
5. Murnane PM, **Coley RY**, Baeten JM. (2015) “Response to: Every good randomization deserves observation”. *American Journal of Epidemiology*. 182: 861-862. doi: 10.1093/aje/kwv201.
6. Murnane PM, Brown ER, Donnell D, **Coley RY**, Mugo N, Mujugira A, Celum C, Baeten JM. (2015) “Estimating efficacy in a randomized trial with product non-adherence: application of multiple methods to a trial of pre-exposure prophylaxis for HIV prevention”. *American Journal of Epidemiology*. 182: 848-856. doi:10.1093/aje/kwv202.
7. Farjo N, Turpin D, **Coley RY**, Feng J. (2015) “Characteristics and fate of orthodontic articles submitted for publication: An exploratory study of the American Journal of Orthodontics and Dentofacial Orthopedics”. *American Journal of Orthodontics and Dentofacial Orthopedics*. 147: 680-690. doi: 10.1016/j.ajodo.2015.01.020.
8. Delaney S, **Coley RY**, Brown Z. (2015) “1,5- Anhydroglucitol: A new predictor of neonatal birth weight in diabetic pregnancies”. *European Journal of Obstetrics & Gynecology and Reproductive Biology*. 189: 55-58. doi: 10.1016/j.ejogrb.2015.03.021.

## In Preparation

1. **Coley RY**, Brown ER. “Latent class approach to survival analysis with a compound Poisson frailty mixture model”.
2. **Coley RY**, Deng D, Du Y, Zhicheng J, Rao K, Wu Z, Zhu Y. “Predicting prostate cancer survival: A multiple imputation-assisted super learning approach”.

## Presentations

### Invited Talks

**Individualized Medicine and Informative Missingness: A Bayesian Approach to Personalized Prostate Cancer Care**

International Society of Bayesian Analysis Meeting

June 17, 2016

**Prediction of the Cancer State to Inform a Personalized Management Program for Prostate Cancer**

American Urological Association Annual Conference

May 6, 2016

**Individualized Decision Support for Low-Risk Prostate Cancer**

Hopkins inHealth Design and Analysis Core

March 30, 2016

Johns Hopkins Bloomberg School of Public Health

**Precision Medicine, Learning Health Systems, and Improving Surveillance of Low Risk Prostate Cancer**

Division of Biostatistics, Department of Healthcare Policy and Research

January 20, 2016

Cornell Weill School of Medicine  
Department of Biostatistics January 29, 2016  
Johns Hopkins Bloomberg School of Public Health

Biostatistics Research Branch February 4, 2016  
National Institute of Allergy and Infectious Diseases

Statistics Group February 8, 2016  
RAND Corporation

Department of Biomedical Data Science February 11, 2016  
Stanford University School of Medicine

Center for Cancer Statistics February 19, 2016  
Mayo Clinic

Group Health Research Institute February 24, 2016

**Optimizing Surveillance of Low-Risk Prostate Cancer**  
High-Value Research Symposium February 1, 2016  
Johns Hopkins School of Medicine

**Active Surveillance Modeling and Decision-Making at Johns Hopkins**  
Cancer Intervention and Surveillance Monitoring Network (CISNET) November 19, 2015  
National Cancer Institute

**Optimizing Surveillance of Low Risk Prostate Cancer: An Application of Precision  
Medicine and Learning Health Systems at Johns Hopkins**  
Data Science Interest Group November 18, 2015  
Johns Hopkins Medicine

**Optimizing Surveillance of Low Risk Prostate Cancer**  
Pacific Northwest Specialized Program of Research Excellence (SPORE)  
Program in Prostate Cancer Research October 22, 2015  
Fred Hutchinson Cancer Research Center

**Precision Medicine, Learning Health Systems, and Improving Surveillance of Low  
Risk Prostate Cancer**  
Data Science Affinity Group October 19, 2015  
Fred Hutchinson Cancer Research Center

**Statistical Methods for Individualized Health: Improving Surveillance of Low Risk  
Prostate Cancer**  
Grand Rounds, Department of Biostatistics September 14, 2015  
Johns Hopkins Bloomberg School of Public Health

**Electronic Medical Records Data for Individualized Health: Application to Low Risk  
Prostate Cancer**  
Joint Statistical Meetings August 13, 2015

**Precision Medicine, Learning Health Systems, and Low Risk Prostate Cancer Care**  
Guest lecture for Clinical and Translational Research Methods Class June 20, 2015  
Johns Hopkins Summer Institute of Epidemiology and Biostatistics

- Optimizing Surveillance of Low Risk Prostate Cancer**  
ENAR Conference March 17, 2015
- Stochastic Models of Prostate Cancer Screening and Detection at Johns Hopkins**  
Patrick C. Walsh Prostate Cancer Research Day February 26, 2015
- Latent class approach to modeling frailty in HIV prevention trials**  
WNAR Conference June 16, 2014
- Estimating effectiveness in HIV prevention trials with a Bayesian hierarchical compound Poisson frailty model**  
Department of Biostatistics March 28, 2014  
Johns Hopkins Bloomberg School of Public Health
- Parallel processing**  
Guest lecture for Computing and Research (BIOS 563) June 20, 2013  
University of Washington
- Heterogeneity in risk: Effects on randomized clinical trial data analysis**  
Oral Health Sciences Seminar May 21, 2012  
University of Washington

### Contributed Talks

- Optimizing Surveillance of Low Risk Prostate Cancer**  
International Conference of Health Policy Statistics October 8, 2015
- Latent class approach to survival analysis with a compound Poisson frailty model with an application to HIV prevention**  
Joint Statistical Meetings August 4, 2014
- Review of “Marginal Structural Models and Causal Inference in Epidemiology”, Robins et al. (2000)**  
January 31, 2014  
Causal Inference Working Group, Department of Biostatistics, University of Washington
- Estimating effectiveness in HIV prevention trials with a compound Poisson frailty model**  
WNAR Conference June 17, 2013
- Botulinum toxin: Effects on muscle strength and structure**  
Biology Project, Department of Biostatistics, University of Washington March 14, 2012
- Geo-additive models and MESA Air**  
Non-parametric Regression Course (BIOS 527), University of Washington June 1, 2011
- An examination of ‘Empirical Bayes and the Two-Group Model’, Bradley Effron (2008)**  
Student Seminar, Department of Biostatistics, University of Washington November 18, 2010  
Advanced Regression Methods Course (BIOS 572), University of Washington April 28, 2010

### Posters

- Individualized medicine and informative missingness: a model for predicting latent prostate cancer state**  
Atlantic Causal Inference Conference May 20, 2015

**Dynamic model of prostate disease: predicting reclassification in Johns Hopkins active surveillance cohort**

Patrick C. Walsh Prostate Cancer Research Day

February 21, 2015

**Latent class approach to survival analysis with a compound Poisson mixture frailty model with application to HIV prevention trials**

Women in Statistics Conference

May 16, 2014

**Estimating effectiveness with a compound Poisson frailty model**

Objective Bayes Workshop

December 15, 2013

**Estimating effectiveness in HIV prevention trials with a compound Poisson frailty model**

Annual Retreat, Department of Biostatistics, University of Washington

September 17, 2013

**Developing a tool for conducting assessments of the built environment**

American Public Health Association Conference

November 5, 2007

## Service and Affiliations

**Graduate Student Representative**, Educational Policy and Teaching Evaluation/  
Curriculum Committee

2013-2014

Department of Biostatistics, University of Washington

**Consultant**, Lawry Research Associates International  
Puralytics Water Purification Project

2013

**Referee:** *Journal of the American Statistical Association, Statistics in Medicine, BJU International, Nature: Scientific Reports, Envirometrics*

**Reviewer:** *Proceedings of the Fourth Seattle Symposium in Biostatistics: Clinical Trials*

**Member:** American Statistical Association, International Society of Bayesian Analysis, WNAR