Boston University School of Public Health

BS800: Accelerated Statistical Training

Fall 2017
2 Credits
August 14 - 31, 10:00 AM – 5:00 PM (3:00 PM on Fridays)

Instructor information

Paola Sebastiani
sebas@bu.edu
Office Hours: Monday 12 to 1pm

Co-Instructors

This team of instructors will co-teach morning classes and some of the practice sessions and computer labs. We will also engage PhD students in biostatistics to co-teach practice sessions and computer lab sessions.

Dr. Howard Cabral;
Dr. Gheorghe Doros;
Dr. Josee Dupuis;
Dr. Helen Jenkins;
Dr. Tim Heeren;
Dr. Mike LaValley;
Dr. Ching-Ti Liu;
Dr. Jaqueline Milton
Dr. Gina Peloso;
Dr. Ludovic Trinquart;
Dr. Yorghos Tripodis;
Dr. Laura White

Course description

This course is designed for the newly developed MS in Applied Biostatistics program and it is intended to teach concepts of descriptive statistics and exploratory data analysis, measures of association in epidemiological studies, probability, statistical inference and computing in R and SAS. This course is intended to equip students enrolling to the MS in Applied Biostatistics with sufficient probability, statistics and computing background to enter 800 levels courses and finish the MS program within a year.

The course will be offered during the 3 weeks preceding the Fall session, and will involve 15 day-long modules. Each module will generally run from 10am to 5pm, with the exception of Wednesdays and/or Friday in which the class will end at 3pm. Each module will combine a traditional lecture (10am to 12pm), a practice session in which students will practice the notions learned in class through exercises (1pm to 2:30pm), and a computer lab (3pm to 5pm) in which the students will learn basic computing in R and SAS and also apply the notions learned in class to real data.

Course learning objectives

Upon completion of this course, students will be able to:

1. Run exploratory data analyses, and be able to correctly interpret computer outputs and graphs;

2. Use common epidemiological study designs, measures of associations and concept of confounding;
3. Use basic probability theory including concepts of independence; marginal and conditional probability and Bayes' theorem; discrete and continuous random variables; simulations from random variables using R packages and SAS; the central limit theorem; the multivariate normal distribution.
4. Use these concepts of statistical inference: summary statistics, the likelihood function and be able to write the likelihood function for univariate samples that follow Bernoulli, Poisson, and Normal distributions; derive maximum likelihood estimates and their distributions, conduct hypothesis testing, compute interval estimates.
5. Estimate and interpret simple linear regression models including one-way ANOVA.
6. Use R and SAS to conduct exploratory data analysis, graphical display, simulating random variables, conduct basic statistical analysis and fit regression models.
7. Interpret and report summary statistics with associated level of uncertainty in the form of a confidence level or a significance level.

Learning resources

Required textbooks, software, materials: The course will be based on the first 9 chapters of the book:

Introductory Biostatistics
Chap T Le and Lynn E. Eberly
2nd Edition, Wiley
ISBN: 978-0-470-90540-1

Blackboard: In addition, specific class handouts and required readings will be distributed through blackboard to complement material in the text-book.

Online modules/resources: These online tutorials will be used for preliminary reading and/or support materials for some of the modules:

- Summarizing Data (http://sphweb.bumc.bu.edu/otlt/MPH-Modules/BS/BS704_SummarizingData/)
- Overview of Analytic Epidemiology (http://sphweb.bumc.bu.edu/otlt/MPH-Modules/EP/EP713_AnalyticOverview/)
- Measures of Association (http://sphweb.bumc.bu.edu/otlt/MPH-Modules/EP/EP713_Association/)
- Basic Statistical Analysis Using the R Package (http://sphweb.bumc.bu.edu/otlt/MPH-Modules/BS/R/R-Manual/)
- Statistical Programming with SAS (http://sphweb.bumc.bu.edu/otlt/MPH-Modules/BS/SAS/SAS-Intro/)

Assessments

Paper (50%): There will be a final take-home exam that will be handed out at the beginning of week 3 and will be submitted at the end of module 15. The exam will cover all topics and require an analysis of a real data set.

Class Participation (15%): Student performance will be assessed based on participation in lectures, practice sessions and computer labs. Attendance will be part of the class participation and will be recorded. Instructors involved in the various module components will note participation of students in terms of questions asked and participation to class discussion, performance and engagement during practice sessions and hands-on session in computer labs. A common rubric will be used to ensure uniform recording among the various instructors. Notes will be recorded on blackboard.

Homeworks (35%): Homeworks will be assigned every day and a random selection of 3 questions will be graded at the end of week 1 and 2. Solution to all homework questions will be made available on Blackboard.

Grading policy

Students will be assigned the following final letter grades, based on course assessments. All SPH candidates must have a minimum 3.0 GPA at SPH to graduate. Please review the full Boston University School of Public Health grading policy.

Course Average	Final Grade
94-100	**A**
90-93	**A-**
87-89	**B+**
83-86	**B**
80-82	**B-**
77-79	**C+**
73-76	**C**
70-72	**C-**
60-69	**D**
<60	**F**

A minimum grade of B- will be required to proceed to the complete program.

Course policies and student expectations

Late-work policy: Late homeworks will not be accepted. Late final papers will be accepted in very unusual circumstances and only of the student notifies the instructor with at least 24hrs notice

Attendance and/or participation policy: Attendance will be recorded daily and will be included in the final evaluation.

Course preparation: A list pf pre-reading material will be circulated 4 weeks before the beginning of class.

Boston University School of Public Health: Standards of Academic Honesty

Students in the School of Public Health are expected to adhere to the highest standards of academic honesty. Academic honesty is essential for students to attain the competencies the School expects of its graduates and to enable the faculty to adequately assess student performance. Any action by a student that subverts these goals seriously undermines the integrity of the educational programs of the School.

Academic misconduct is any intentional act or omission by a student which misrepresents his or her academic achievements, or any attempt to misrepresent his or her academic achievements. The following acts constitute academic misconduct. This is not an exhaustive list.

- *Cheating on examinations:* The use or attempted use of any unauthorized books, notes or other materials in order to enhance the student's performance in the examination, copying or attempting to copy from another student's examination, permitting another student to copy from an examination or otherwise assisting another student during an examination, or any other violation of the examination's stated or commonly understood ground rules.
- *Plagiarism:* Any representation of the work of another as one's own constitutes plagiarism. This includes copying or substantially restating the work of another person without the use of quotation marks or other indication that the words of another have been copied, the use of any written or oral work from which the student has obtained ideas or data without citing the source, or collaborating with another person in an academic endeavor without acknowledging that person's contribution.
- *Submitting the same work in more than one course without the consent of all the instructors*
- *Misrepresentation or falsification of data*
- *Allowing another student to represent your work as his or her own*
- *Violating the rules of an examination or assignment*

A student who is found guilty of academic misconduct may be subject to disciplinary action, up to and including dismissal from the School. For more details, please review the full policy.

Be sure to complete the plagiarism tutorial and review tips for avoiding academic dishonesty.

Course Schedule

Module 1 (Mo 8-14-17)	Lecture 10AM-12PM: Descriptive statistics/ Exploratory data analysis (Categorical/continuous Data) Practice Session 1PM-2:30PM: Exercise on computation of measures of association/summary statistics Computer Lab 3PM-5PM: Introduction to R
Module 2 (Tu 8-15-10)	Lecture 10AM-12PM: Introduction to probability, and concepts of independence, marginal and conditional probability, Bayes Theorem Practice Session 1PM-2:30PM: Exercise on probability rules Computer Lab 3PM-5PM: Exploratory Data Analysis in R.
Module 3 (We 8-16-17)	Lecture 10AM-12PM: Introduction to random variables, moments. Normal distribution Practice Session 1PM-2:30PM: Exercise on normal distribution
Module 4 (Th 8-17-17)	Lecture 10AM-12PM: Discrete random variables. Binomial and Poisson Distr. Central limit theorem Practice Session 1PM-2:30PM: Exercise on Binomial/Poisson distributions Computer Lab 3PM-5PM: Simulations from discrete/continuous distributions in R.

Module 5 (Fr 8-18-17)	Lecture 10AM-12PM: Review of probability distributions. Multivariate Normal Distribution Computer Lab 1PM-3PM: Importing/Exporting data in R. For loops and logical functions
Module 6 (Mo 8-21-17)	Lecture 10AM-12PM: Random samples, data reduction, summary statistics Practice Session 1PM-2:30PM: Exercise on distribution of summary statistics Computer Lab 3PM-5PM: Introduction to SAS.
Module 7 (Tu 8-22-17)	Lecture 10AM-12PM: Introduction to point estimation. Maximum Likelihood estimation Practice Session 1PM-3PM: Exercise on estimates Computer Lab 3PM-5PM: Importing data in SAS. Univariate statistics in SAS and R
Module 8 (Wed 8-23-17)	Lecture 10AM-12PM: Interval estimation Practice Session 1PM-2:30PM: Exercise on interval estimation
Module 9 (Th 8-24-17)	Lecture 10AM-12PM: Hypothesis testing Practice Session 1PM-2:30PM: Exercise on hypothesis testing Computer Lab 3PM-5PM: Univariate statistics in SAS and R.
Module 10 Fr (8-25-17)	Lecture 10AM-12PM: Analysis of categorical data and MH methods Practice Session 1PM-2:30PM: Exercise on analysis of categorical data Computer Lab 3PM-5PM: Proc Freq in SAS, and R functions
Module 11 (Mo) 8-28-17	Lecture 10AM-12PM: Comparison of population means Practice Session 1PM-2:30PM: Exercise on analysis of categorical data Computer Lab 3PM-5PM: Proc means in SAS, and R functions.
Module 12 (Tu) 8-29-17	Lecture 10AM-12PM: Linear Regression (ANOVA) Practice Session 1PM-3PM: Exercise on ANOVA Computer Lab 3PM-5PM: Analysis in SAS and R
Module 13 (Wed) 8-30-17	Lecture 10AM-12PM: Linear Regression Practice Session 1PM-2:30PM: Exercise on linear regression
Module 14 (Th) 8-31-17	Lecture 10AM-12PM: Topics in linear regression Computer Lab 1PM-3PM. Regression in R and SAS
Module 15 (Fr) 8-25-17	Computer Lab 10AM -1PM: Regression in R and SAS

Session outline

Module 1: Descriptive statistics/ Exploratory data analysis (Categorical Data)

Module content: This module will review graphical displays and descriptive statistics for categorical and continuous data, including proportions, rates, ratios, and odds ratio, measures of location and spread, percentiles, histograms and boxplots. Students will also be introduced to the statistical package R, and will learn to make simple calculations in R, and compute rates, proportions and odds from real data, and use appropriate graphical displays.

Active learning strategies**:** The module will include a 2 hour class, followed by a 1 ½ hour practice session in which students will practice the theoretical concepts through exercises, and a 2 hour computer lab.

Instructional objectives and competencies**:** By the end of this module, students will be able to:

1. Compute proportions, rates and odds ratios and understand the appropriate data context in which each of these summaries is appropriate.
2. Compute summary statistics of univariate data sets, including mean, medians, quartiles and percentiles.
3. Visualize and summarize data using various graphical displays including histograms and boxplots.
4. Use the statistical package R for simple numerical manipulations and graphical display.

Reading Assignments**:** Chapter 1 and 2 of the textbook (pages 1-28, 55-86). Note that students are expected to read these two chapters before the beginning of this course

Homework: Selection of exercises from Chapter 1 and 2 of the textbook.

Module 2: Introduction to probability

Module content: This module will introduce basic concepts of probability, including concepts of independence, marginal and conditional probability, and Bayes's theorem with application to sensitivity and specificity of diagnostic tests.

Active learning strategies**:** The module will include a 2 hour practice session in which students will practice the theoretical concepts through classes exercises.

Instructional objectives and competencies**:** By the end of this module, students will be able to:

1. Describe uncertain events in probabilistic terms.
2. Compute the probability of events.
3. Distinguish conditional and marginal probabilities.
4. Use Bayes theorem to show the equivalence between disease odds and exposure odds.

Reading Assignments: Chapter 3 of the textbook (pages 103-114).

Homework**:** Selection of exercises from Chapter 3 of the textbook.

Module 3. Introduction to random variables, moments. The Normal distribution.

Module content**:** This module will introduce the normal distribution and define the density and cumulative distribution functions and show the relation between the area under the density function and probability of events. R functions to manipulate normal distributions will be used to generate samples from a normal distribution in a variety of situations, and to compute approximate probability values. The examples will be

used to introduce the general concept of continuous random variables, density functions and cumulative distribution functions.

Active learning strategies**:** The module will include a 2 hour class, followed by a 1 ½ hour practice session in which students will practice the theoretical concepts through exercises.

Instructional objectives and competencies**:** By the end of this module, students will be able to:

1. Use the normal distribution to compute probability of events;
2. Standardize variables.

Reading Assignments**:** Chapter 3 of textbook (pages 114-125).

Homework: Selection of exercises from Chapter 3 of the textbook.

Module 4. Discrete random variables. Binomial and Poisson Distr. Central limit theorem

Module content: This module will introduce the binomial distribution, the Poisson distribution as limit of the binomial distribution, and the convergence to the Normal distribution via the Central Limit Theorem. R functions to manipulate binomial and Poisson distributions will be shown.

Active learning strategies**:** The module will include a 2 hour class, followed by a 1 ½ hour practice session in which students will practice the theoretical concepts through exercises.

Instructional objectives and competencies**:** By the end of this module, students will be able to:

1. Use the Binomial distribution to compute probability of events based on Bernoulli trials.
2. Use R functions to calculate probability of specific events using Binomial and Poisson distributions and Normal distributions.
3. Use the Central Limit Theorem to approximate the distributions of sum of random variables.

Reading Assignments**:** Chapter 3 of textbook (pages 126-134).

Homework: Selection of exercises from Chapter 3 of the textbook.

Module 5. Review of probability distributions. Multivariate Normal Distribution

Module content**:** This module will review the probability distributions introduced in modules 3 and 4, and make more examples of less common distributions. The multivariate normal distribution will be introduced, using linear algebra notation. Concepts of marginal and conditional means will be illustrated through examples. The variance covariance matrix will also be introduced, and Gaussian graphical models will be used to illustrate complex covariance structures. Students will also learn to read data in R from external files and manipulate multivariate datasets. For-loops and logical functions will be introduced.

Active learning strategies**:** The module will include a 2 hour class, followed by a 2 hour computer lab

Instructional objectives and competencies**:** By the end of this module, students will be able to:

1. Work with density functions and probability mass functions of common probability distributions
2. Derive marginal and conditional means from multivariate normal distributions
3. Infer marginal and conditional independence of normally distributed random variables from the variance covariance matrix of their joint distribution.
4. Use R to read external files, and manipulate multivariate datasets.
5. Run iterative procedures in R.

Reading Assignments**:** Section 2.6, pages 47-51 from J Whittaker, (1990), Graphical models in applied multivariate analysis. This section will be distributed from Blackboard.

Homework: Selection of exercises from Chapter 3 of the textbook.

Module 6. Random samples, data reduction, summary statistics

Module content**:** The first part of this module will introduce the concepts of random sample, statistic, and sampling distribution of a statistics. The examples will focus on the sample mean, the sample variance, standard error, and the sample proportion. Using R, samples will be generated and the concept of sampling variability will be illustrated. The second part of the module will introduce SAS, SAS editor, output/results screen, importing data from excel and other formats. The proc IML will be introduced for generation of random samples, and simple data manipulations.

Active learning strategies: The module will include a 2 hour class, followed by a 1 ½ hour practice session and a 2 hour computer lab.

Instructional objectives and competencies**:** By the end of this module, students will be able to:

1. Calculate summary statistics of random samples, including mean, standard deviation and use the sampling distribution for inference.
2. Use R and SAS to generate random samples and mimic the process of selection of a random sample.
3. Use SAS for simple manipulations. Use the PROC IML for executing iterative procedures.

Reading Assignments:

Chapter 4 from the textbook (pages 141-157)

SAS documentation on simulating data:
https://support.sas.com/resources/papers/proceedings15/SAS1387-2015.pdf

Homework: Selection of exercises from Chapter 4 of the textbook.

Module 7. Introduction to point estimation. Maximum Likelihood estimation

Module content**:** This module will provide a theoretical framework to the material covered in Module 6. The likelihood function will be introduced and maximum likelihood estimation will be shown in the context of normally distributed data and binary data. Theoretical properties of the maximum likelihood estimates will be shown.

Active learning strategies**:** This module will include a 2 hour practice session in which students will learn how to write the likelihood function and derive maximum likelihood estimates in a variety of context (univariate samples only).

Instructional objectives and competencies**:** By the end of this module, students will be able to:

1. Write the likelihood function for normally distributed data, and derive the maximum likelihood estimate of the population mean and variance.
2. Write the likelihood function for categorical data (Bernoulli and Poisson distributions), and derive the maximum likelihood estimate of the population parameters.
3. Derive the MLE of the odds ratio as application of maximum likelihood estimation.

Reading Assignments:

Chapter 4 of the textbook (pages 157-165)

Sections 6.5 and 6.6 (pages: 338-354) from M H DeGroot (1989), Probability and Statistics. that will be distributed from Blackboard

Homework**:** Selection of exercises from Chapter 4 of the textbook.

Module 8. Interval estimation

Module content**:** This module will focus on interval estimation and illustrate how to derive confidence intervals in a variety of standard statistical analyses. Both R functions and SAS PROC for interval estimation will be shown using real data. A real data set from the Framingham Heart Study will be used in the lab session, that will include also some training on data manipulation in SAS, creating new variables, and handling dates. The PROC UNIVARIATE will be used for generating summary statistics.

Active learning strategies**:** The module will include a 2 hour class, followed by a 1 ½ hour practice session in which students will practice the theoretical concepts through exercises.

Instructional objectives and competencies**:** By the end of this module, students will be able to:

1. Compute confidence intervals for means and for proportions.
2. Use computer output from SAS and R for inferring confidence intervals.
3. Generate confidence intervals for varying levels of significance.
4. Interpret confidence intervals and describe the results.

Reading Assignments**:** Chapter 4 of the textbook (pages 145-165)

Homework: Selection of exercises from Chapter 4 of the textbook

Module 9. Hypothesis testing

Module content: This module will introduce hypothesis testing, and describe types of hypotheses, Type I and II errors, statistical power, the concepts of rejection and acceptance regions and relation to confidence intervals. Significance testing based on p-values will also be shown. Examples of hypothesis testing on proportion and means will be used, and computer output from SAS and R will be shown. Correct interpretation of results will be emphasized and students will be encouraged to read the statement about p-values produced by the American Statistical Association.

Active learning strategies**:** This module will include a 2 hour practice session in which students will practice the concepts learned in class, followed by a lab session.

Instructional objectives and competencies**:** By the end of this module students will be able to:

1. Use the correct statistical test for hypotheses on population means and proportions.
2. Use the p-value to conduct a test of hypotheses and interpret the results correctly.
3. Use R functions and SAS proc for testing hypothesis on population means and proportions.
4. Interpret and report the results of a hypothesis testing procedure.

Reading Assignments**:**

Chapter 5 of text book (pages 179-194).

R. L. Wasserstein and N. L. Lazar (2016), The ASA statement on p-values: Context, process and purpose. The American Statistician. (Available online from http://amstat.tandfonline.com/doi/pdf/10.1080/00031305.2016.1154108)

Homework: Selected exercises from Chapter 5 of the textbook.

Module 10. Analysis of categorical data and MH methods

Module content**:** This module will describe statistical methods for analysis of categorical data from different study designs including case controls, matched pairs, cross sectional, and cohort studies. Mantel Haenszel methods for stratified 2x2 tables will be described. The standard Chi-square test and Fisher exact test will also be described. During the lab-session, the PROC FREQ will be used for analysis of categorical data.

Active learning strategies**:** The module will include a 2 hour class, followed by a 1 ½ hour practice session in which students will practice the theoretical concepts through exercises, and a 2 hour computer lab.

Instructional objectives and competencies**:** By the end of this module students will be able to:

1. Specify the correct methods of analysis of categorical variables different study designs.
2. Estimate measures of associations and test their significance.
3. Estimate association between a binary outcome and a binary risk factor adjusting for confounding using Mantel Haenszel method for stratified analysis.
4. Interpret the output SAS PROC Freq, and specific R functions for analysis of categorical data.
5. Report the results of the analysis.

Reading Assignments**:** Chapter 6 of textbook (pages 197-218).

Homework**:** Selected exercises from Chapter 6 of the textbook.

Module 11. Comparison of population means

Module content**:** This module will introduce statistical methods for inference on the means of two populations, using paired or unpaired data for normally distributed data or large samples. Non parametric tests for small samples will also be introduced. During the lab session, students will use SAS PROC ttest, and analogue R functions for comparisons of populations means. Part of the computer lab session will also be dedicated to managing data sets, concatening data, and writing macros.

Active learning strategies**:** The module will include a 2 hour class, followed by a 1 ½ hour practice session in which students will practice the theoretical concepts through exercises, and a 2 hour computer lab.

Instructional objectives and competencies**:** At the end of this module, students will be able to:

1. Conduct statistical inference on means of two populations using the t-test.
2. Use appropriate SAS PROC and R functions for these statistical analyses.
3. Use the non-parametric rank tests for the statistical comparisons of population means from small samples.
4. Interpret and report the results from computer output.

Reading Assignments**:** Chapter 7 of the textbook (pages 235-252).

Homework: Selected exercises from chapter 7.

Module 12. Linear Regression (ANOVA)

Module content**:** This module will extend the topic of modules 12 to comparison of means from multiple populations using ANOVA. The one-way ANOVA model, decomposition of total sum of squares into the "within" and "between" sum of squares, and the ANOVA table will be shown in details using theoretical derivations. The theoretical assumptions (normality of the data and homoschedasticity) will be emphasized. The computer lab will show the PROC GLM in SAS and the aov() function in R for analysis

Active learning strategies**:** The module will include a 2 hour class, a ½ hour practice session, followed by a 2 hour computer lab.

Instructional objectives and competencies**:** At the end of this module, students will be able to:

1. Use the ANOVA method to compare the means of several populations.
2. Identify the situations in which the ANOVA method is not appropriate.
3. Use R and SAS procedures for ANOVA and interpret the computer output.
4. Interpret the results from the R and SAS computer output and present the results of an ANOVA.

Reading Assignments:

- Chapter 7 of the textbook (pages 252-260).
- M Larson (2008), Analysis of Variance, Circulation. 2008; 117:115-121

Homework: Selected exercises from chapter 7

Module 13. Linear Regression

Module content**:** This module will introduce simple linear regression. The methods of Least Squares to estimate the parameters of the regression model will be described, and the equivalence to Maximum Likelihood will be shown. Interval estimates of the regression coefficients and statistics to test hypotheses on the regression coefficients will be described. Several examples will be shown and during the extended computer lab the students will learn to use the proc GLM and the lm() function in R to fit regression models.

Active learning strategies**:** The module will include a 2 hour class, followed by a 1 ½ practice session.

Instructional objectives and competencies: At the end of this module students will be able to:

1. Use Least Squares and Maximum Likelihood to estimate the regression coefficients of linear regression;
2. Interpret the fitted model, compute interval estimates of the regression coefficients, and test hypotheses on the slope of the linear regression model
3. Interpret the results from R and SAS computer output and present the results of the analysis.

Reading Assignments**:** Chapter 9 of the textbook (pages 297-310).

Homework: Selected exercises from chapter 9.

Module 14. Topics in Linear Regression

Module content**:** This module will review linear regression and describe analysis of residuals to assess goodness of fit. The matrix-algebra formulation of linear regression will be shown, and during the computer lab students will implement the method of Least Squares in R.

Active learning strategies**:** The module will include a 2-hour computer lab.

Instructional objectives and competencies: At the end of this module, the students will be able to:

1. Analyze residuals from the fitting of a simple linear regression model and identify problems with model fit.
2. Use SAS and R to implement the method of least squares for estimation of the regression coefficient of a linear regression model.

Reading Assignments**:** Chapter 8 of textbook (pages 287-291).

Homework: No homework.

Module 15. Linear Regression in R and SAS

Module content: This module will be a final 2-hour computer lab in which students will work on analysis of a real data set.

Active learning strategies: The module will include a 2-hour computer lab.

Instructional objectives and competencies: At the end of this module, the students will be able to:

1. Use SAS and R to analyze a data set using regression.

Homework: No homework.

BUSPH Academic Support Resources

There are many support resources available to BUSPH students, including communication resources, a writing guide, academic support and a core course tutoring program. For more information, contact Mahogany Price at sphtutor@bu.edu.

Public Health Writing Program

The Public Health Writing Program is available to SPH degree candidates who would like to discuss planning a paper, organizing a paper, writing clearly, or other aspects of the writing process. The program is not an editing service and does not guarantee that the assistant will be knowledgeable about content of the paper.

For more information or to schedule an appointment, please visit the program's website: bu.edu/sph/writing. If you have any questions, please contact the Program Manager, Mahogany Price at sphwrite@bu.edu.

Presentation Skills Appointments

Presentation skill appointments are available to SPH degree candidates looking to practice presentations and receive feedback from a peer coach on slides, poster presentations, speech outlines, and/or oral communication skills!

For more information or to schedule an appointment, please visit the program's website: bu.edu/sph/present. If you have any questions, please contact the Program Manager, Mahogany Price at sphwrite@bu.edu.

BUSPH Writing Guide

BUSPH Writing Guide (bu.edu/sph/writing-guide). The Guide includes components like writing strategies, communicating data, word choice, writing as a team, resources for non-native English speakers, and finding and using resources. In addition, there are explanations of several specific types of public health writing, including literature reviews, policy memos, reflections, and critiques. This Guide is designed to be a starting point for students and save you from having to answer basic questions about style and formatting.

BUSPH Library Tutorials

Librarians from the BU Alumni Medical Library created BUSPH library tutorials, for students in the School of Public Health. The first is a brief overview of library resources followed by guidance on advanced searches using including PubMed, Web of Science, POPLINE, Google, etc. One this site you will also find tutorials on Mendelay and Zotero, which are free citation management programs, as well as on properly citing sources and avoiding plagiarism.

If you would like to make an appointment to meet with a librarian in person to get personalized assistance with a search you can contact them directly by email (refquest@bu.edu), phone (617 638-4228), or stopping by the reference desk on the 12th floor of the med school (Building L).