

Health Services Research Academy

Course Descriptions

LS1: What is Health Services Research?

Health Services Research (HSR) is a broad term that encompasses a variety of research topics, methods, and approaches. In this course, you will learn about the origin and key features of HSR, including how it compares with other types of research. Also, hear from experts about what HSR means to them and how they have used these methods with their own research.

Key concepts: health services research, AHRQ

Learning Objectives:

- Learn the origins, concepts, and definition of health services research
- Articulate examples of different types of health services research

LS2: Coding Systems for Healthcare Claims

Codes available in healthcare claims can be a goldmine of valuable information about patients' clinical characteristics, quality of care, and health outcomes.

Learning Objectives:

- Learn about common coding systems in health care administrative data
- Understand how coding systems might be useful to your research

LS3: Overview of Available Datasets

There are amazing, national databases containing health service and outcomes information. These databases are well organized and clean, making them great examples of how to manage your own data. *This section spans the following four courses:*

Key concepts: large, administrative databases, national surveys

LS3.1: AHRQ Databases

The Agency for Healthcare Research and Quality's (AHRQ) mission is to produce evidence to make health care safer, higher quality, more accessible, equitable, and affordable, and to work within the U.S. Department of Health and Human Services and with other partners to make sure that the evidence is understood and used. To that end, AHRQ has several clean and valuable healthcare databases available for analysis.

Learning Objectives

- Describe various databases and content available through AHRQ
- Efficiently query AHRQ databases through the HCUPnet online query system
- Highlight research examples that utilized AHRQ databases

LS3.2: Pediatric Health Information System

The Pediatric Health Information System (PHIS) is a rich hospital-based administrative and billing database of children's hospitals. It is widely used in pediatric health services research, and may just be the database that is right to answer your research question.

Learning Objectives

- Learn about the data sources and content of PHIS
- Share examples of PHIS use in pediatric health services research
- Learn how to access PHIS

LS3.3: Using Surveys for Health Services Research

A survey is a list of questions aimed at collecting information from a particular group or sample of people. A survey consists of a predetermined set of questions that are given to a sample. Surveys may be conducted by phone, mail, online, or in-person. Healthcare survey research is often used to assess thoughts, opinions, and feelings about health, healthcare, and quality of life from patients and their families.

Learning Objectives

- Become familiar with the background of healthcare surveys, including their data sources
- Review examples of national healthcare surveys publicly available for research
- Learn to access national healthcare survey data

LS3.4: Healthcare Claims Databases

Claims-based databases are a rich source of data for analyzing the continuum of care for health services research.

Learning Objectives

- Learn about common data elements and structure/organization
- Understand the strengths and limitations of using claims data for research
- Highlight research examples that utilize claims databases

LS4: How to Read a Medical Research Article

Hundreds of thousands of medical research articles are published annually. Knowing how to read and interpret medical research articles is an essential skill for all healthcare professionals.

Learning Objectives:

- Describe the key components of a medical research article
- Learn how to effectively select a medical research article
- Apply reading principals to interpret a research article and its findings

LS5: Getting Started with a Research Project

Choosing a research topic and starting a project on it can be overwhelming, especially if you've never done those things before. Don't go blindly in the process. Be methodical and thoughtful about it. Work with your mentor team to choose a topic and project that will keep you excited about the work and also ensure that the findings will help patients and families.

Learning Objectives:

- Understand the importance of selecting a research topic that is right for you
- Identify key components of a successful research project team to help you conduct your work

LS6: Literature Review and Bibliography Management

An essential aspect of performing high-quality research is to articulate how it fits within and builds upon existing work in the field of study and clinical knowledge. Articulating this requires a firm grasp of prior literature in order to contextualize your work. That grasp is a critical component of justifying your work. This course focuses on different ways of searching and organizing existing literature for use with your current and future research projects.

Key concepts: MESH terms, PubMed search, bibliography management, EndNote, Zotero

Learning Objectives:

- Perform, organize, and save literature searches with PubMed
- Efficiently organize and embed literature references with bibliography software

LS7: Study Design and Sample Size

Study design and sample size are two critical attributes that drive the validity of a research study. Be thoughtful about those attributes and how to best match them with your research study's specific aim and hypotheses.

Key concepts: observational, experimental, sample size, power

Learning Objectives:

- Learn about common study designs used in health services research
- Understand sample size and statistical power considerations

LS8: Developing a Health Services Research Analytical Plan

Before launching your health services research project, you must develop an analytical plan. This process is similar to cooking. If you don't have a good plan (recipe) to follow, it can be challenging to complete your project.

Key concepts: specific aims, statistical methods, templates for tables and figures

Learning Objectives:

- Identify the essential components of an analytic plan
- Learn how to develop and implement an analytical plan

LS9: Statistics in Health Services Research: Understanding the Basics

Before diving into the details of statistical analysis in health services research, it's important to understand why statistics are needed in the first place. In health services research, statistics - even the most advanced ones - are primarily designed to do one thing: understand something about a population of patients.

Key concepts: parameter, population, statistic, sample, statistical tests, bias, confounding

Learning Objectives:

- Become familiar with basic statistics terminology
- Articulate how statistics are used to draw conclusions about a population
- Recognize bias in research and determine how it can be minimized

LS10: Exploring Your Data

Before starting an analysis, you must first understand the nature of your health care data - what it looks like, if there are errors or inconsistencies that need to be addressed, or if there are outliers that may dramatically alter your results. In this course, you will be introduced to graphical representations of your data, different ways to summarize key features of your data, and identification and handling of outliers.

Key concepts: mean, median, standard deviation, interquartile range, boxplot, histogram, outliers

Learning Objectives:

- Graphically display your data in an appropriate format
- Understand how to look for outliers in your data and approaches to address them
- Summarize your data appropriately so that you can understand it better

LS11: Exploring Simple Relationships Between Two Variables

Health services research often involves understanding the relationship between two characteristics of a population.

Examples of those relationships include:

- the main risk factor of interest and the main outcome measure
- a confounding patient characteristic and the main outcome measure
- the difference in a characteristic between the exposure and control groups

In these two modules, we will provide a framework for examining such relationships, including how to select the most appropriate statistical test to assess whether a relationship is truly significant (i.e. "real") and not the result of random chance.

Key concepts: bivariate analysis, hypothesis testing, p-values, chi-square, Pearson correlation, Spearman correlation, graphical displays, Wilcoxon Rank sum test, Kruskal-Wallis test

Learning Objectives:

- Understand the importance of exploring simple relationships in your data
- Describe different tests for assessing relationships between variables
- Learn about p-values and understand how they are used to interpret the results of statistical tests

This section spans the following two courses:

LS11.1: Exploring Simple Relationships Between Two Variables | Part I Categorical Variables

Comparing two categorical variables is common in the Table 1 for many manuscripts to understand differences in population characteristics. In this module, we will focus on understanding the relationship between two categorical variables using statistical tests.

Key concepts: bivariate analysis, hypothesis testing, p-values, chi-square, Wilcoxon Rank sum test, Kruskal-Wallis test

LS11.2: Exploring Simple Relationships Between Two Variables | Part II Continuous Variables

Comparing two study groups on a continuous variable may not be as common as comparing two study groups on a categorical variable, but it is still done frequently. In this module, we will focus on understanding the relationship between two variables when at least one of them is continuous.

Key concepts: bivariate analysis, hypothesis testing, p-values, chi-square, Pearson correlation, Spearman correlation

LS12: Complex Relationships Between Multiple Variables - Part I

Most healthcare events and outcomes are influenced by several factors occurring at the same time. For example, the probability of a medication effectively treating a disease can be influenced by the severity of the disease, the patient's past medical history, and the patient's age, sex, and race/ethnicity. Accounting for the complex relationships among those factors is extremely important when investigating healthcare events and outcomes. This course will teach the basic principles of statistical modeling to assess those relationships.

Key concepts: interpretation of results from simple linear, multiple linear and logistic regression models

Learning Objectives:

- Understand the importance of using multivariable statistical models
- Compare and contrast different types of multivariable models

- Interpret the results of multivariable models

This section spans the following two courses:

LS12.1: Complex Relationships Between Multiple Variables Part IA

This module focuses on the basic concepts of statistical models and on understanding simple linear models (i.e., models with one independent variable). While simple linear models are not commonly used in practice, they do provide a nice building block for understanding statistical models before we move on to more complex models.

Learning Objectives:

- Understand the basics of statistical models
- Interpret the results of simple linear models

LS12.2: Complex Relationships Between Multiple Variables Part IB

Now that you understand the basics of building statistical models, we will expand these concepts to develop models with more than one independent variable (i.e., multivariable models). While we will introduce some technical aspects of model building, we focus primarily on understanding the output of these models and how they are used in practice.

Learning Objectives:

- Understand the importance of using multivariable statistical models
- Compare and contrast different types of multivariable models
- Interpret the results of multivariable models

LS13: Complex Relationships Between Multiple Variables - Part II

This course complements the concepts of multivariable analysis that were presented in "Complex Relationships Between Multiple Variables - Part I," which focused mostly on linear regression with a continuous outcome. Additional types of regression, including logistic, Poisson, and exponential, are presented in this course.

Key concepts: interpretation of results from simple linear, multiple linear and logistic regression models

Learning Objectives:

- Understand when and how to use multivariable regression with dichotomous, ordinal, and rate outcomes
- Interpret the results of multivariable regression models

LS14: Propensity Methods

When assessing the impact of an exposure, observational and experimental study designs are very different. For observational studies, where the exposure occurred naturally (i.e., it was not randomized), take caution to not overstate the findings that the exposure caused an effect on the outcome.

In this course, you will learn about propensity analytic methods that attempt to optimize the strength of the relationships between an exposure and an outcome in observational studies.

Learning Objectives

- Describe the advantages of propensity methods over traditional modeling approaches
- Construct propensity scores
- Understand how to use propensity scores in different ways

LS15: Creating Tables and Figures to Display the Results of Your Work

Tables and figures are efficient ways to convey the most important findings of your work. They are also effective in attracting readers to your work. Well designed and formatted tables and figures will hold the interest of readers.

Key concepts: data presentation, tables, figures

Learning Objectives:

- Create and format tables and figures
- Appropriately label and display data in tables and figures
- Select tables and figures that best portray findings from your work

LS16: Writing a Research Manuscript

Writing a manuscript can be a daunting task, but there's no need to be overwhelmed or intimidated. In this course, we'll provide a step-by-step guide to help you get to know the components of a standard manuscript and how to approach writing a manuscript.

Key concepts: scientific writing, introduction, methods, results, discussion

Learning Objectives:

- Identify key components of each section in a manuscript
- Apply principles and style of scientific writing
- Plan an approach to writing your first paper

LS17: Responding to Peer Reviewer Comments on a Submitted Manuscript

A standard part of the peer review process is the opportunity to revise and resubmit a manuscript that addresses the comments made by reviewers and the journal editor team.

Key concepts: response to reviewer's document, manuscript revisions

Learning Objectives:

- Write a professional and effective response to reviewers document for a submitted manuscript
- Avoid pitfalls that might affect your manuscript's chances at acceptance for publication

LS18: How to Write a Research Abstract for Submission to a Conference

Writing and submitting a high-quality abstract to a research conference can be challenging. Often limited to roughly 250 words, every word in every sentence is important. Peer reviewers may only spend a minute (or less) reading and judging your abstract. The abstract must tie together in a way that grabs the reader's attention and quickly enables them to reach a conclusion that the findings of the work are important and valuable. Complete this module to understand how to write a high-quality research abstract for a research conference.

Learning Objectives

- Plan an approach to writing your first research conference abstract.
- Identify key components of each section in a research conference abstract.
- Apply formatting and writing principles to convey your research.

LS19: Research PowerPoint Presentation

Presenting your research is a critical part of its dissemination. In this course, you will learn how to optimize the quality of your research presentations using Microsoft Office PowerPoint.

Key concepts: presentation, PowerPoint

Learning Objectives:

- Learn to use clear, concise headings and bullet points to convey your work and findings
- Organize and format a PowerPoint presentation

LS20: Creating a Research Poster

The research poster is a fantastic visual to convey the background, aims, methods, results, and implications of a research study in a concise format (if done properly!). It can be a great conversation starter with colleagues if the message is clear.

In this course, you will learn how to optimize the quality and design of a research poster that you will be proud to present at your next conference.

Learning Objectives

- Identify key components of each section in a research poster.
- Plan an approach to creating your first research poster.
- Learn to use clear, concise formatting and design concepts to convey your research.