

# Essential Field Epidemiology: Outbreak Investigations

*Core Infectious Disease Emergency Readiness (CIDER)  
Summer Intensive Program 2006, Berkeley, CA*

## Schedule At-A-Glance

Day	Date	Time	Lecture or laboratory component titles	Location
Mon	8/7	9:00a–12:00p	Epidemiologic concepts for controlling microbial threats	212 Wheeler
		1:30p–4:30p	Introduction to R for epidemiologic computing	212 Wheeler
Tue	8/8	9:00a–12:00p	The epidemiologic approach: Steps to public health action	212 Wheeler
		1:30p–4:30p	Basic epidemiological computing and graphics	212 Wheeler
Wed	8/9	9:00a–12:00p	Conducting an outbreak investigation in 7 steps (or less)	212 Wheeler
			Relational database management system basics	
		1:30p–4:30p	Introduction to EpiData for data entry & data documentation	212 Wheeler
Thu	8/10	9:00a–12:00p	Step 1: Case investigation	212 Wheeler
		1:30p–4:30p	Descriptive epidemiology module	212 Wheeler
Fri	8/11	9:00a–12:00p	Step 4: Conducting analytic study	212 Wheeler
		1:30p–4:30p	Analytic epidemiology module	212 Wheeler
Mon	8/14	9:00a–12:00p	Workshop: Earthquake public health preparedness/response	101 Morgan
		1:30p–4:30p	Workshop: Public health issues in disasters	150 Univ Hall
Tue	8/15	9:00a–12:00p	Field Epi Computer Lab or Workshop (Disaster sheltering)	212W/101M
		1:30p–4:30p	Workshop: Lessons learned from Hurricanes Katrina & Rita	150 Univ Hall
Wed	8/16	9:00a–12:00p	Field Epi Computer Lab or Workshop (Medical volunteers)	212W/101M
		1:30p–4:30p	Tabletop Exercise	212 Wheeler
Thu	8/17	9:00a–12:00p	Public Health Disease Functional Exercise: Orientation	101 Morgan
		1:30p–4:30p	Public Health Disease Functional Exercise: Shift 1	212 Wheeler
Fri	8/18	9:00a–12:00p	Public Health Disease Functional Exercise: Shift 2	212 Wheeler
		1:30p–4:30p	Public Health Disease Functional Exercise: Debriefing	150 Univ Hall

## Instructors

Tomás Aragón, MD, DrPH  
Director & Medical Epidemiologist  
Center for Infectious Disease Preparedness  
UC Berkeley School of Public Health  
Tel: 510-643-4935; Mobile: 510-847-9139  
Email: aragon@berkeley.edu

Jennifer Lachance, Graduate Student Researcher  
UC Berkeley School of Public Health  
Email: lachance@berkeley.edu

## **Guest lecturers**

TBA

## **Course description**

This 2-week course will cover the essential knowledge, skills, and abilities necessary to conduct an epidemiologic field investigation, including: essential concepts for the prevention and control of microbial threats; the epidemiologic approach and steps to public health action, steps to conducting an outbreak investigation, approach for designing and conducting a field survey, and operational aspects of conducting a field investigation; and analysis of outbreak modules using a computer laboratory. The computer lab component will emphasize basic analysis and interpretation.

## **Target audience**

This course is targeted to public health staff who want to learn how to lead or participate in an epidemiologic field investigation, and who want to learn to analyze and interpret epidemiologic data. Target audiences include public health practitioners such as communicable disease investigators, environmental health specialists, epidemiologists, health educators, health officers, laboratorians, medical epidemiologists, and public health nurses.

## **Course prerequisites**

1. Basic familiarity with computers and an interest in conducting epidemiologic data analyses using computer software; and
2. Basic mathematic skills, including ability to utilize fractions, ratios, and percentages.

## **Course objectives**

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

1. Describe the core epidemiologic concepts for the prevention and control of microbial threats, including the design and evaluation of prevention control measures.
2. Describe the epidemiologic approach to public health action, including surveillance, descriptive and analytic epidemiology, measures of occurrence and association, study design, threats to validity, epidemiologic and causal inference, and types of evidence-based interventions.
3. Describe the seven conceptual steps to conducting an outbreak investigation.
4. Conduct basic epidemiologic analyses, including both data and graphical analyses, using freely available numerical tools.
5. Describe the operational aspects of conducting field investigations, including principles of the incident command system (ICS) applied to an epidemiologic investigative emergency response.
6. Demonstrate the above core knowledge, skills, and abilities in a real-time public health infectious disease emergency ICS-based functional exercise.

## Readings:

1. Materials are provided in your Course Binders.
2. Additional handouts will be distributed in class (store in your Course Binder)
3. Optional readings are available at  
<<http://www.idready.org/elib/Outbreak-Readings.html>> (password protected)

## Assignments and evaluation

1. Students are expected to attend and actively participate in the following:
2. Daily lectures and computer labs
3. ICS-based tabletop and functional exercise (on last 3 days)
4. Computer-based, computational exercises will be provided to be worked on in the computer lab.
5. Students are expected to read and understand preparation materials for the ICS exercise on August 17–18 .

## Computer laboratory

Lectures and computer lab will take place at 112 Wheeler Hall. Students should bring the Course Binder and floppy computer disk (or USB memory drive) to each class.

The goals of the computer laboratory are to:

- Reinforce concepts learned in lecture;
- Reinforce your epidemiologic intuition through numerical examples;
- Practice constructing basic graphical display of epidemiologic data; and
- Practice conducting basic contingency table analyses for testing investigative hypotheses.

## Computers and Software

We will be using the Dell Windows Computers in 212 Wheeler Hall. We will be using freely available software for the analytic component of the course.

1. **R** is a freely available (open source) program for statistical computing and graphics. It is maintained and tested by statistical programmers around the world. We will be using R as a calculator and spreadsheet, and for basic epidemiologic analysis and graphics. R also comes with a large set of analytic tools for basic and advanced statistics. R is available to all platforms (Windows, Mac OS, Linux, etc.). See the Appendix for more information on R.
2. **EpiTools** is an R package developed and maintained by Tomás Aragón for basic epidemiologic analysis.
3. **Notepad** is the default Windows text editor. We will be using Notepad to write our commands and save our work.
4. **EpiData** is used for simple or programmed data entry and data documentation. You will be introduced to this program only. More information available at <http://www.epidata.dk/>.

# Appendix A. R for epidemiologic computing

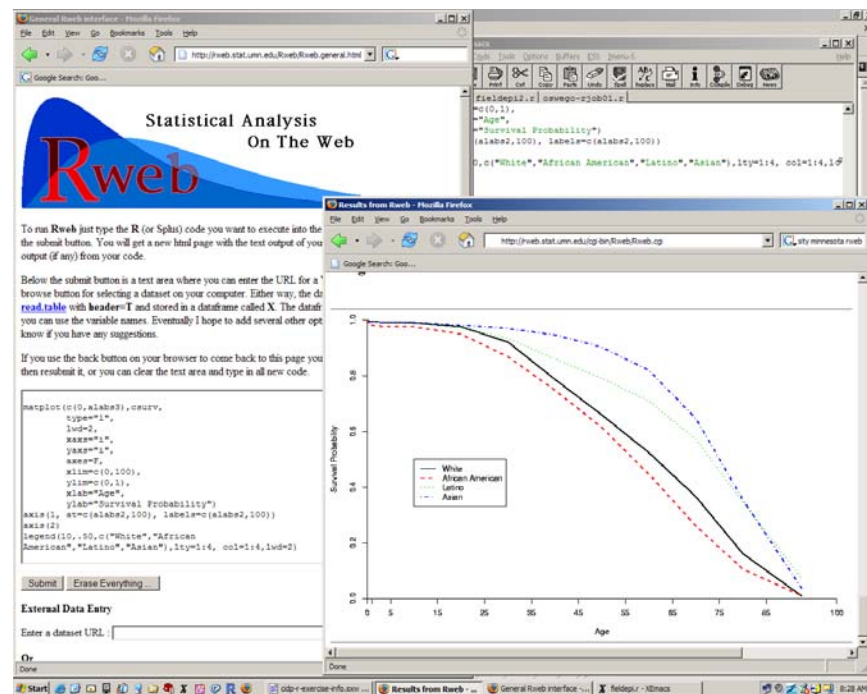
## Where do I get R?

- R project home page at <http://www.r-project.org>
- Download from UC Berkeley at <http://cran.cnr.berkeley.edu/>
- R manuals available at <http://cran.r-project.org/manuals.html>
- R tutorials available at <http://cran.r-project.org/other-docs.html>

## How can I get help with R?

- Visit <http://www.epitools.net> (site developed and maintained by Tomás Aragón)
- Join the EpiTools Yahoo Group at <http://www.epitools.net>
- Join an R mailing list at <http://www.r-project.org/mail.html>

## How can I access R on-the-road?



- From any Internet-connected computer you can access Rweb via the Montana State University website at <http://www.math.montana.edu/Rweb/>

## Other resources

The EpiTools website (<http://www.epitools.net>) maintains links to key sites that list resources for epidemiologic computing.

