McMaster University | Family Medicine
David Braley Primary Care Research Collaborative

Choosing the appropriate statistical test

This handout provides a bit of information about each plug-in mentioned in the presentation. It also includes information about one plug-in (i.e., OpenEpi) that was not covered in the presentation but is a free online tool useful to conduct some basic statistical tests.

The plug-ins

Basic and Advance Research Designs for Primary Care Research (Ric Angeles) Video | Slides

This research knowledge and skills builder introduces basic information about observational (i.e., cross-sectional, case-control, cohort) and intervention/experimental (i.e., pre-post interventional, quasi-experimental, and true experimental randomized controlled trial) research designs. There is also basic information about more advanced types of quasi-experimental (i.e., double pre-test, regression discontinuity) and true experimental randomized controlled trial (i.e., cluster randomized, factorial, cross-over, delayed intervention, and stepped wedge) designs.

Just the Basics: Learning about the essential steps to do some simple things in SPSS (Larkin Lamarche & Melissa Pirrie) Video | Slides

This research knowledge and skills builder introduces some basic screening tests to detect entry errors or abnormalities and how to correct these errors. It also has basic information about the split file function, recoding variables and calculating scores, running descriptive statistics and understanding the output for descriptive statistics, t-test, ANOVA and linear regression. The presentation is about SPSS, but the concepts can be transferred to any statistical program.

Online stat book

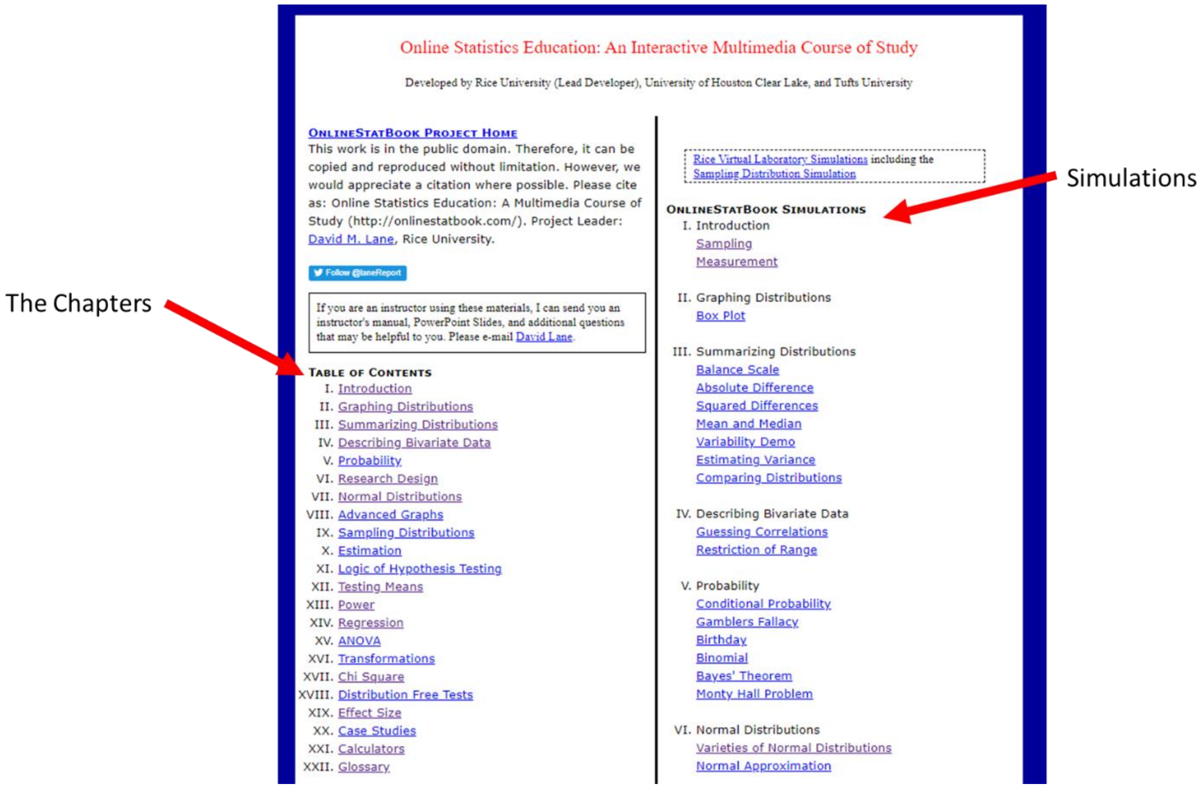
This is a free, all-in-one stats book with a gamut of topics, complete with a comprehensive glossary and even some statistical calculators (e.g., power). There are 22 chapters, with each chapter made up of multiple content sections. Most topics also have short videos that accompany the written information. It is not “fancy” in its presentation, but it’s packed with great information.

Link: https://onlinestatbook.com/2/index.html

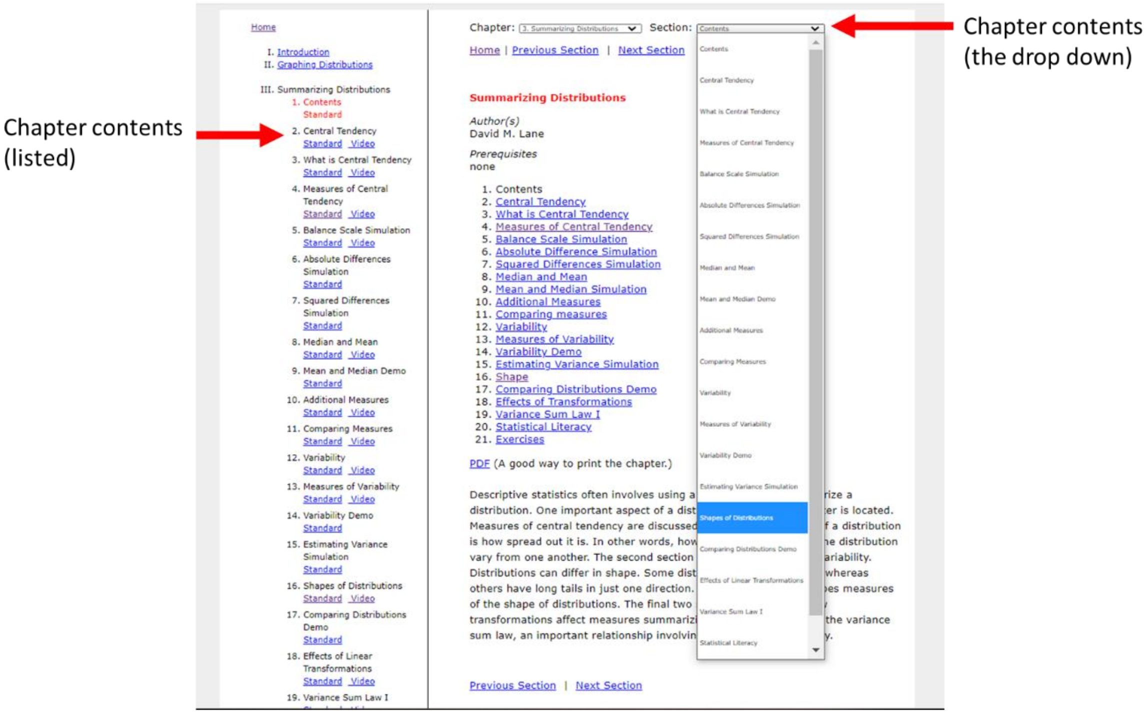
Reference: Online Statistics Education: A Multimedia Course of Study (http://onlinestatbook.com/). Project Leader: David M. Lane, Rice University.

Quick orientation

The homepage has two big sections to the book, the book chapters (Table of Contents) on the left, and simulations along the right.

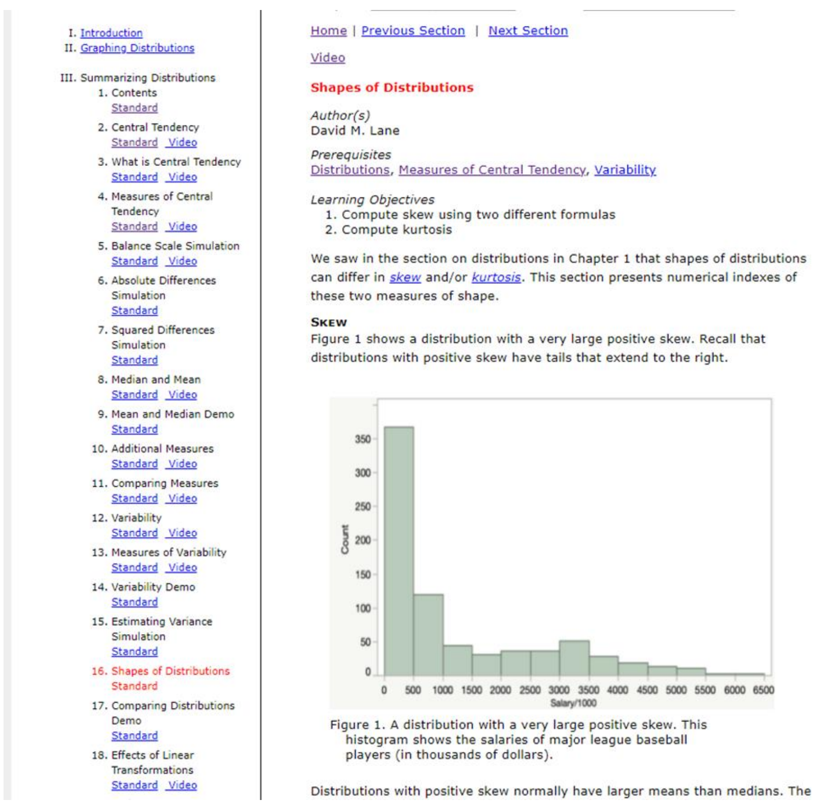


Select a chapter (e.g., Chapter III, Summarizing Distributions) takes you to the chapter page, which contains section contents of the chapter (in the drop-down menu on the right, or is listed along the left [“Standard” is the text for the chapter section, “Video” is the video for the chapter section]).



Selecting the chapter contents (e.g., Shapes of Distributions) takes you to the text. Each section of the chapter has a short video. At the bottom of each section of the chapter usually has a quiz question.

Here is the Shapes of Distributions chapter contents page



StatXFinder

This is an open-source online decision support tool for appropriate statistical test selection. StatXFinder. The tool takes you through a series of yes/no questions which will ultimately result in a recommended statistical test – kind of like a guide to a statistical decision tree. The questions can be about the number of variables or groups you have, the type of research question you are trying to answer, and how your distribution looks (e.g., normally distributed). Note this tool is for univariate statistical tests; multivariate statistical tests coming soon! Also on the website is a great glossary.

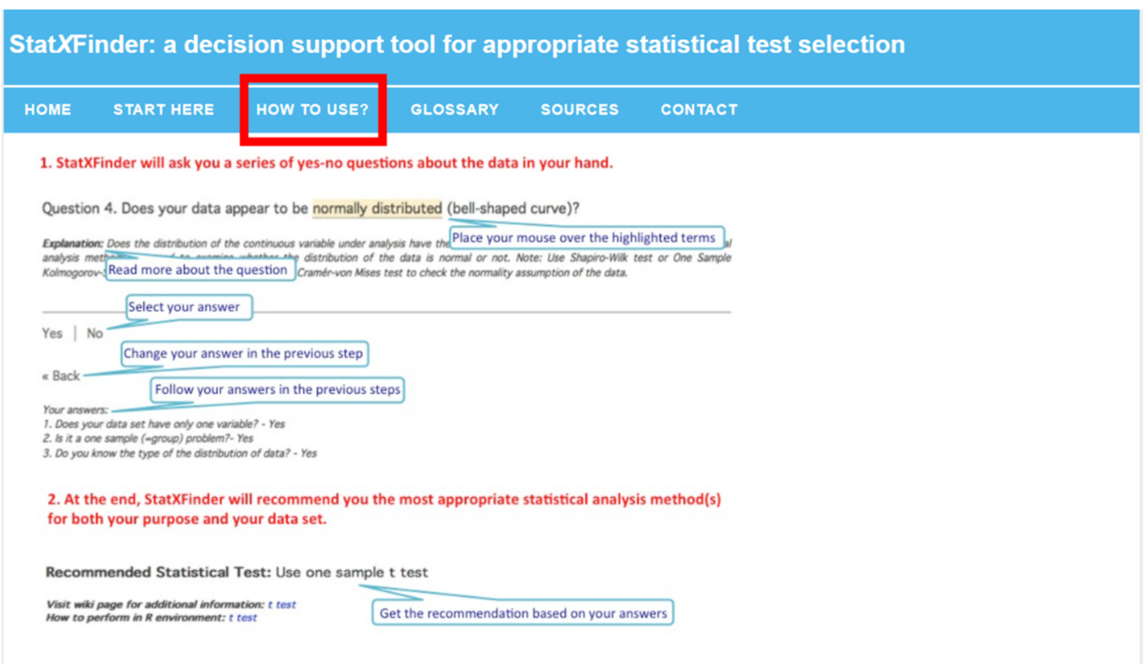
Link to tool: https://medinfo.deu.edu.tr/statxfinder/

Article reference for StatXFinder: Suner, A., Karakülah, G., Koşaner, Ö., & Dicle, O. (2015). StatXFinder: a web-based self-directed tool that provides appropriate statistical test selection for biomedical researchers in their scientific studies. *SpringerPlus*, *4*(1), 1-13.

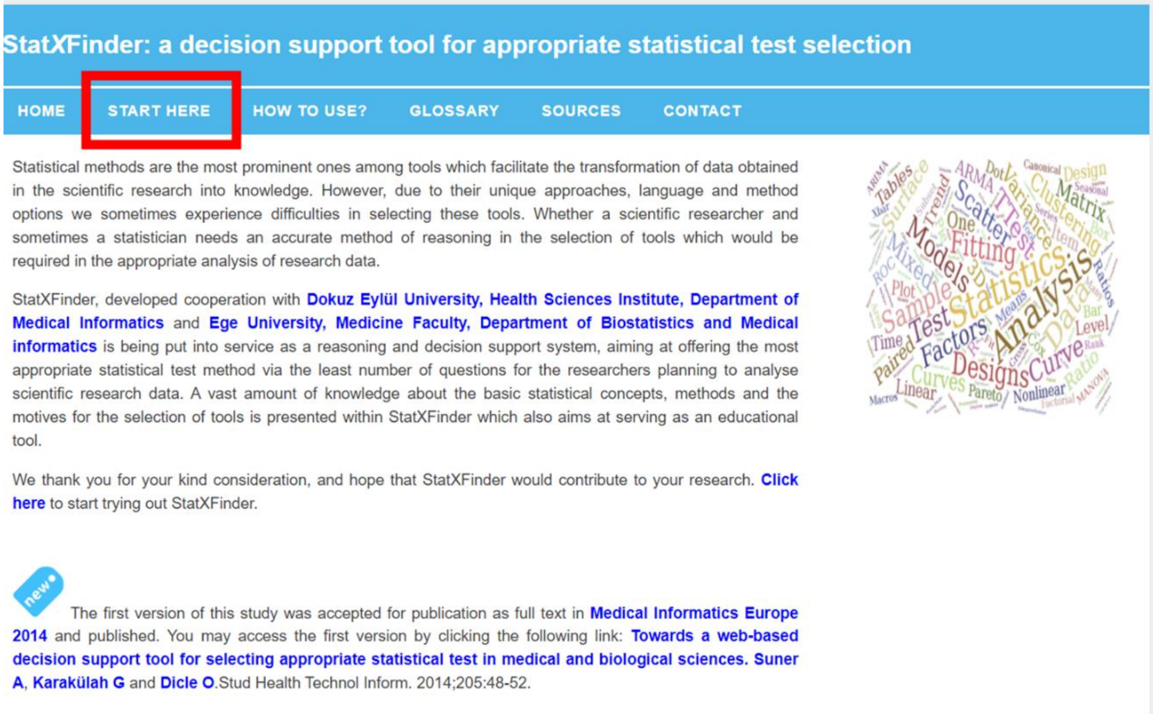
Link to a basic decision tree

Quick orientation

On the website for the tool there is a “How to use?” option which gives you an orientation to the tool (screenshot below).

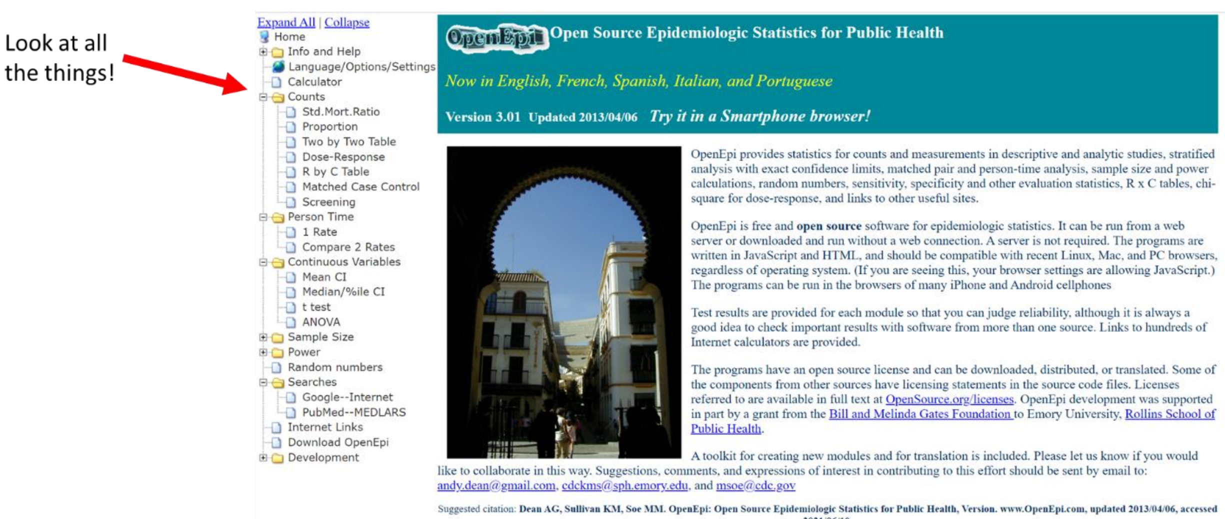


The “Start Here” selection is to start with the first question of the tool.

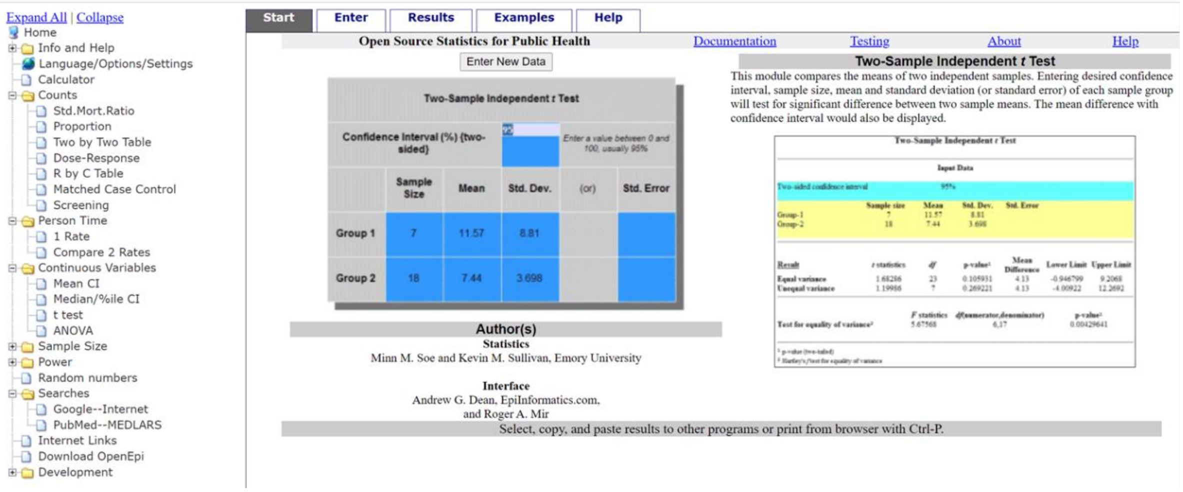


OpenEpi

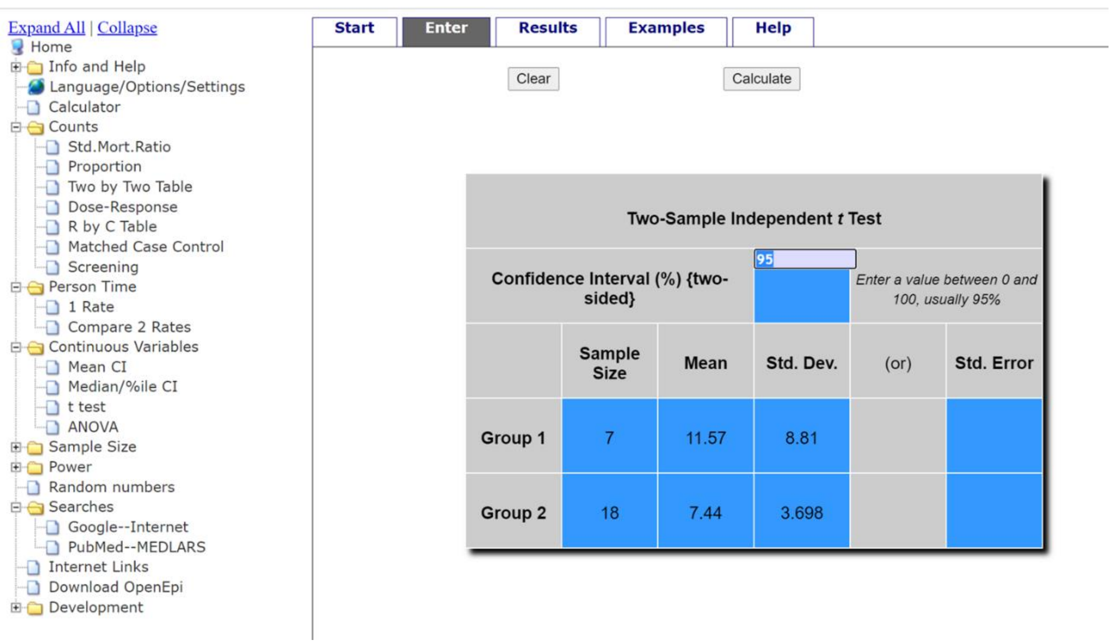
OpenEpi is free and open-source software for epidemiologic statistics. This can help once you have chosen the appropriate statistical test to do. The panel on the left provides the range of things OpenEpi can do (not every statistical test, but some).



Selecting an option along the left (e.g., t test) takes you to a page that typically has a few selection (i.e., Start, Enter, Results, Examples, Help). The “Examples” selection is a great way to get familiar with the tool. The right side of the page (Documentation, Testing, About, and Help) provides information about the test within the tool for demonstration data.



If you have your data and are ready to do the test, enter your data ("Enter New Data" on the 'Start' selection or enter it on the "Enter" selection). Note if you've made mistakes, hit "Clear."



Hit "Calculate" to get your results, which takes you to the output table.

Expand All | Collapse

- Home
- Info and Help
- Language/Options/Settings
- Calculator
- Counts
  - Std.Mort.Ratio
  - Proportion
  - Two by Two Table
  - Dose-Response
  - R by C Table
  - Matched Case Control
  - Screening
- Person Time
  - 1 Rate
  - Compare 2 Rates
- Continuous Variables
  - Mean CI
  - Median/%ile CI
  - t test
  - ANOVA
- Sample Size
- Power
- Random numbers
- Searches
  - Google--Internet
  - PubMed--MEDLARS
- Internet Links
- Download OpenEpi
- Development

Start | Enter | **Results** | Examples | Help

Two-Sample Independent *t* Test

Input Data

Two-sided confidence interval 95%

	Sample size	Mean	Std. Dev.	Std. Error
Group-1	7	11.57	8.81	
Group-2	18	7.44	3.698	

Result	*t* statistics	*df*	p-value[1]	Mean Difference	Lower Limit	Upper Limit
Equal variance	1.68286	23	0.1059	4.13	-0.946799	9.2068
Unequal variance	1.19986	7	0.2692	4.13	-4.00922	12.2692

	F statistics	*df*(numerator,denominator)	p-value[1]
Test for equality of variance[2]	5.67568	6,17	0.004296

[1] p-value (two-tailed)
[2] Hartley's *f* test for equality of variance

Results from OpenEpi, Version 3, open source calculator--t_testMean
Print from the browser with ctrl-P
or select text to copy and paste to other programs.