BIOSTATISTICS FAQ

FOURTH EDITION

INTUITIVE
BIOSTATISTICS
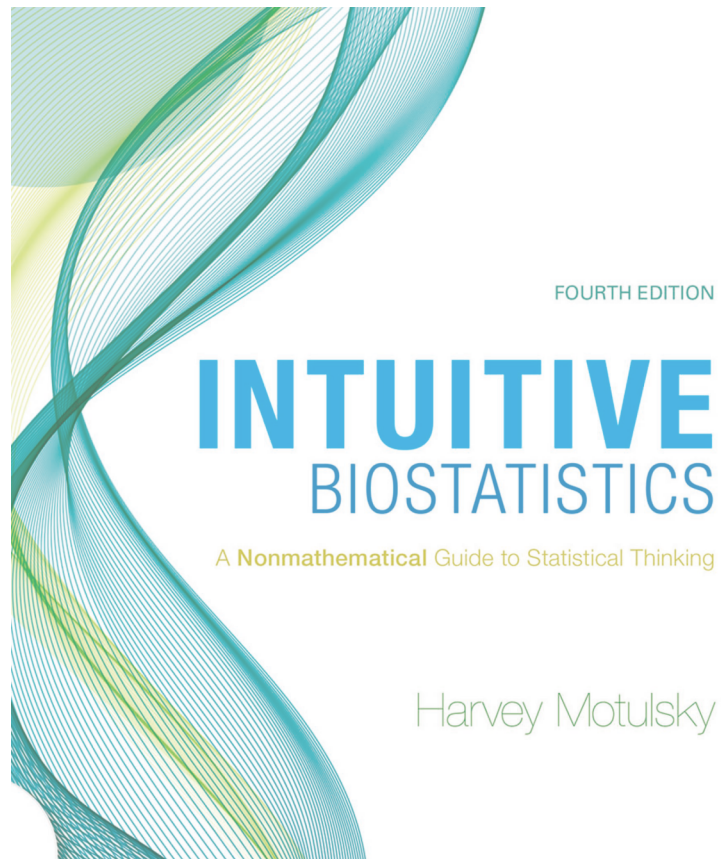
A **Nonmathematical** Guide to Statistical Thinking

Harvey Motulsky

find answers to those questions you dare not ask

biostatistics : find answers to those questions you dare not ask

This FAQ can help you find concrete tips in the excellent book "Intuitive biostatistics".
You can borrow it from the secretariat or the CMU library.

Can I run statistics on technical replicates?
Statistics must be computed at the level of biological replicates. *Read pages 83 & 84*

How do I know how many samples I need?
The appropriate tool is power analysis. *Read chapters 20 & 26*

Why should I care about independence?
Lack of independence can bias your results. Mice of the same litter or cells of different wells in a plate are not independent. *Read page 51*

How should I deal with outliers?
Removing an outlier is not cheating if based on precise rules and methods. *Read chapter 25*

Should I test for normality ?
Normality tests are not as useful as they appear. *Read chapter 24*

Should I transform my data?
Transformations can have a huge impact on your conclusions. Be careful. *Read page 71-72*

When should I not use a t-test?
Each test depends on assumptions. What to do if some are violated? *Read chapter 30*

High p-value = no effect ?
A p-value > 0.05 means your data are not surprising, but not necessarily that there is no effect. *Read chapters 16, 18 & 19*

How to avoid p-hacking?
All statistical analyses should be planned, and all planned analyses should be conducted and reported. *Read chapters 22 & 23*

No time?
Have a look at least at Chapters 16, 18, 19, 44 & 45

Why not multiple t-tests, but ANOVA?
Such multiple comparisons increase your chances of false positives. *Read chapter 39*

Which post-hoc test after an ANOVA?
The choice depends on the goals of your study. *Read chapter 40*

How do I know an effect is important?
The appropriate tool is effect size. *Read chapter 26 & page 468*

What should represent my error bars?
SD, SE, SEM or CI? It depends on your aim. *Read chapter 14*

ADDITIONAL RESOURCES
To perform a power analysis, you can use R or some specific free softwares, e.g. G*Power or www.powerandsamplesize.com
Want some more tips? Browse the collection "What is wrong with this picture?" from BMC Biology.