

## Re: Medical stats

**Source:** <http://sci.tech-archive.net/Archive/sci.stat.edu/2004-08/0072.html>

---

**From:** Richard Ulrich (*Rich.Ulrich\_at\_comcast.net*)

**Date:** 08/21/04

Date: Sat, 21 Aug 2004 11:47:53 -0400

On 15 Aug 2004 03:57:50 -0700, aymanhafez@yahoo.com (AMH) wrote:

- > *Dear everybody*
- > *Thanks for your concern; I think the question was misunderstood. It is*
- > *not that I will take an advice and go apply it to patients, that is*
- > *IMPPossible to do, even if I wanted, it was a personal curiosity to*
- > *know what the statistician do in these situations. Remember every body*
- > *I am a surgeon, we do not give radiation that is another specialty.*
- > *Thank for your concern.*

Okay, I can add a bit more. Here is the original post –

- > *I am a surgeon, that means minimal knowledge in statistics. The problem I am*
- > *analyzing involves different doses of radiation to a tumor, I would like (if*
- > *possible) to be able to calculate the cut off dose for good clinical*
- > *response and the dose above which the probability of complications*
- > *significantly increase. The data comes as numbers for the doses and as*
- > *Yes/No (0/1) for complications. The clinical response can be a 2 items or 4*
- > *items field which ever feasible to use.*
- > *We have SPSS v9 and excel 2002.*
- > *Help much appreciated.*

Given, "some problem like this." You might find specific guidance by looking in the literature for a particular treatment.

The best overviews are sometimes given in review articles, which point out shortcomings in the published studies, and which may argue for a specific choice of treatment.

Here is something posted a couple of years ago.

===== copied after googling groups

From: Simon, Steve, PhD (ssimon@cmh.edu)

Subject: Re: Reading medical statistics

View: Complete Thread (11 articles)

Newsgroups: sci.stat.edu

Date: 2002-10-10 05:15:55 PST

Also,

Evidence-based Medicine: How to Practice and Teach EBM, David Sackett

Interpreting the Medical Literature Third Edition. Gehlbach SH

Studying a Study and Testing a Test: How to Read the Health Science Literature Third Edition. Riegelman RK and Hirsch RP

Where's the Evidence? Debates in Modern Medicine. Silverman WA

There is a lot of good stuff for free at the British Medical Journal web site: [www.bmj.com](http://www.bmj.com).

A nice list of web resources can be found at

[http://pedscdm.wustl.edu/EBJ/EB\\_Resources.html](http://pedscdm.wustl.edu/EBJ/EB_Resources.html)

Steve Simon, [ssimon@cmh.edu](mailto:ssimon@cmh.edu), Standard Disclaimer.

The STATS web page has moved to

<http://www.childrens-mercy.org/stats>.

===== end of citations. Steve's web page is still there.

As to the problem –

Presumably, at one extreme, the dose is too low for either a clinical response or side effects — It takes an assumption or "control data" to know that both responses, good and bad, are non-existent, unless you are only considering effects that are extreme. That is more likely for tumors, I suppose, than for many other clinical applications.

At the other extreme, high dose kills the tumor and kills the patient, too. That is clearly not okay. Somewhere in the middle is supposed to be a dose that is cures but does not afflict too much damage. Here are logical complications:

- There is no useful definition of "significantly increase" for medical complications, except by referring to details and balancing benefit against cost, gain against loss.
- The degree of cure, or its measurement, is apt to be influenced by or confounded with the disease characteristics, such as size and stage of the tumor.
- The impact of side effects is apt to be affected by personal characteristics, such as age and general health status. (How much nausea is there; how well does the person tolerate it?)

The simplest model for an analysis arises when the subjects all have the same disease at the same stage; and when they can be regarded as a homogeneous subject population; and when they have been \*randomized\* to specific treatment groups; and when everyone completes the treatment protocol.

A good article should make it clear (at least, to the reader who knows the field and the jargon) \*that\* they have dealt with these issues. For the reader to understand \*how\* ... , he might also need some relevant statistical background.

With perfect knowledge of outcome, the balance between cure and side-effect is a matter of some personal preferences, not of statistical demonstration. (Is incontinence an acceptable side-effect for a cure of a slow-growing prostate cancer?) More choice and preference arise in real life, where the outcomes are predicted with approximated probabilities.

Excel is not a statistical package, even though folks have provided some routines. It might be useful for crude collection of the numbers, but a package like SPSS is far better for the later steps – and for documenting the later steps – of screening variables, checking assumptions, computing composite scores, and carrying out the eventual analyses by (for instance) logistic regression.

Hope this helps.

--

Rich Ulrich, wpilib@pitt.edu  
<http://www.pitt.edu/~wpilib/index.html>