



Hôpital St-Boniface Hospital

# Clinical Trial Research News

From the Office of Clinical Research

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*This newsletter is published on a quarterly basis and is an information source for anyone interested in Clinical Research. Please contact Terry (237-2226) if you would like to be added to / deleted from our mailing list.*

## Statistics and Medical Research

### Effect Size in Medical Research

Effect size is a descriptive statistic that measures the strength of relationship between two variables or the magnitude of difference between two or more groups on dependent or outcome variables. The greater the relationship or difference the greater the effect size.

Effect sizes are an important source of empirical information in medical studies and have many practical and clinical applications. They convey information that may be more meaningful than just the reporting of p-values, and in this sense they complement the calculation of p-values in hypothesis testing and inferential statistics. Most importantly they enable a researcher to determine whether an observed relationship or difference in a study is of clinical importance and significance.

In clinical studies effect size conveys a sense of the magnitude of a treatment intervention and may be more meaningful than just the probability value which determines if the result is due to chance. Effect size and probability may be independent and do not necessarily predict one another. For instance, if a sample size is very large then a small, clinically meaningless relationship may be statistically significant even though the effect is small or negligible.

Effect size estimation is also an important component of statistical power analysis which determines the required sample size in a study for a given level of power. Finally, effect size measures play a significant role in meta-analysis. In meta-analysis similar studies in a specific area of research are combined into a single overall analysis. Effect size is often the measure of choice to compare and pool individual study results in order to produce a comprehensive view of the findings.

It is important to note that meta-analysis is susceptible to the problem of publication bias, whereby studies with robust effect sizes and/or significant p-values are more likely to be reported than studies with negative findings. This phenomena tends to over-estimate the magnitude of the effect size in the population.

### Levels of Effect Size

Some researchers such as Jacob Cohen have suggested categorizing effect size into three levels: small, medium and large. As a general rule, small and medium effect sizes are more likely to be found in new areas of research or fields where the variables are difficult to measure and are hard to control or quantify. Large effect sizes are more likely in fields where variables are well- defined and under rigorous experimental control. However, Cohen offers a caveat when using this classification scheme:

“The terms ‘small,’ ‘medium’ and ‘large’ are relative, not only to each other, but to the area of science and the research method being employed in any given investigation.” (1)

### Pearson Correlation

The Pearson correlation  $r$  is one of the most widely used measures in statistical analysis and denotes the relationship between two variables. It is also a measure of effect size. The  $r$  coefficient varies between  $-1$  to  $+1$ , with  $-1$  indicating a perfect negative linear relationship,  $+1$  a perfect positive linear relationship, and  $0$  indicating no linear relationship between the two variables. The larger the absolute magnitude of the correlation coefficient the stronger the relationship between the two variables and the larger the effect size. Cohen suggests the following effect size categories: small ( $r = 0.1$  to  $0.23$ ), medium ( $r = .24$  to  $.36$ ) and large ( $r > .36$ ).

A related measure of effect size is the “coefficient of determination” which is calculated by squaring  $r$ . It yields a measure of the proportion of variance shared by the two variables. For example, if  $r = .7$  then  $r^2 = .49$ , indicating that the two variables have about 50% of the measurement score variability in common.

### Odds Ratios

Another common and useful measure of effect size in medical research is the odds ratio (OR). The OR is appropriate when the data is binary (e.g. yes, no) and is defined as the odds of a positive (or negative) outcome in one group relative to the odds of a positive (or negative) outcome in another group. It is frequently used in studies comparing the odds of an adverse event between a treatment group and a control group.

### Standardized Mean Difference

The standardized mean difference is a measure of effect size appropriate for continuous variables. For research studies based on population data, where the population means and standard deviation are known, the effect size  $\theta$  is calculated by dividing the difference between the respective population means by the standard deviation of either or both populations.

In many cases population values for a specific variable are not known with any precision and must be estimated from sample statistics. One index of effect size used with sample data is Cohen’s  $d$ . Cohen’s  $d$  is calculated as the difference between two sample means divided by the pooled standard deviation of the sample data. Cohen suggests that a  $d$  value around  $0.2$  should be considered small,  $0.5$  medium and  $0.8$  large.

### Confidence Intervals

Confidence intervals (CI) are another measure of effect size. By presenting a range of values based on sample data (for example 95% CI), CIs allow the researcher to measure the precision of the sample estimate of the population effect. CIs can be calculated for the difference between means, between proportions, for regression slopes, and for odds ratios and relative risk.

### Other Measures of Effect Size

Effect size measures also exist with other statistical tests, including proportion, Chi-square, t-test, sign test, linear and multiple regression and analysis of variance (ANOVA). As a general rule, the calculation of effect size becomes more complicated as the type of statistical analysis and research design increase in complexity.

### References

- (1) Jacob Cohen *Statistical Power Analysis for the Behavioral Science* (2<sup>nd</sup> ed.) Hillsdale, New Jersey: Erlbaum, 1988.
- (2) Jacob Cohen “A power primer” *Psychological Bulletin*, 1992, 112, 155-9.
- (3) Joachim Hartung, Guido Knapp & Bimal Sinha *Statistical Meta- Analysis with Applications*. Hoboken, New Jersey: Wiley, 2008.

Articles are authored by OCR statistical consultant Doug Staley. Doug teaches statistics at the School of Medical Rehabilitation, University of Manitoba and has conducted medical research at SBGH for more than 25 years. Readers are welcome to submit questions or suggest topics of interest. Doug can be contacted through the OCR or by email: [dstaley@mts.net](mailto:dstaley@mts.net)

## PHIA Update

A review of *The Personal Health Information Act* (PHIA) was conducted in 2004. Recommendations from this review led to the development of *The Personal Health Information Amendment Act*. The Personal Health Information Amendment Act was proclaimed on May 1, 2010.

Education regarding the **Amendment Act** took place during May and June of 2010. This education was for staff who have already completed their PHIA training and have signed a PHIA pledge. St. Boniface Staff were not required to sign another PHIA pledge but rather a training session attendance sheet once they had viewed the DVD. The attendance sheets will be kept on file in Health Records.

The DVD is available from the audio visual department and on the SBH Intranet for staff to view. Questions from staff that Managers are not comfortable answering can be forwarded to Shirley Guinn, Manager Health Records / Privacy, E-Mail: [sguinn@sbgh.mb.ca](mailto:sguinn@sbgh.mb.ca) or Phone: (204) 237-2909.

## Health Records Retrieval Fees for Research

The WRHA has entered into a new contract with Iron Mountain which has significantly higher rates for off-site retrieval fees.

Health Records previously charged \$2.85 to retrieve off-site records but has increased the rate to \$5.15 effective June 1, 2010. Health Records will continue to charge the old rate for studies previously approved that they are still pulling charts for. (Please note that \$5.15 is in addition to the regular \$3 per chart pull for unfunded studies and \$5 per chart pull for funded studies.)

Updated forms with the new fees are available on the RRC website at [www.sbrc.ca/content/blogcategory/87/132/](http://www.sbrc.ca/content/blogcategory/87/132/)

If you have any further questions do not hesitate to contact:

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## Reporting of Financial Conflicts of Interest

A CIHR-funded team led by Dr. Paula Rochon, of the Women's College Research Institute, has developed the Financial Conflicts of Interest Checklist that aims to minimize financial conflicts in clinical research. Before the development of this checklist, investigators were often required to submit many different conflict of interest reports to stakeholders at different stages of their research. Researchers can now create a single checklist so that stakeholders are able to receive common information. The user-friendly PDF document is designed for clinical research studies, but it may be adapted for other types of studies as well.

The full article and checklist can be viewed at:

<http://www.openmedicine.ca/article/view/356/316>

## Research Review Committee at St. Boniface General Hospital

### Deadlines for RRC Submission

### Meeting Date

#### **NO MEETING IN JULY**

July 28, 2010	August 4, 2010
August 25, 2010	September 1, 2010
September 29, 2010	October 6, 2010
October 27, 2010	November 3, 2010
November 24, 2010	December 1, 2010

**Submissions to the RRC must be received in N1004 by 11:00 AM on the deadline date.**

Contact the **RRC at 235-3623** with any questions you may have regarding your RRC submission. Please always refer to the Office of Clinical Research and RRC web site for the most recent submission forms and updates.  
<http://www.sbrc.ca/content/blogcategory/87/132/>

## The Biomedical (BREB) / Health Research Ethics Board (HREB) Submissions

### Deadline for REB Submissions

### Meeting date

#### **NO MEETING IN JULY**

August 9, 2010

August 23, 2010

September 13, 2010

September 27, 2010

October 8 (Friday)

October 25, 2010

November 8, 2010

November 22, 2010

November 29, 2010

December 13, 2010

Contact **Ethics** at **789-3255** with any questions you may have regarding your REB submission. Please always refer to the Research Ethics Board web site for the most recent submission forms and updates.  
<http://www.umanitoba.ca/faculties/medicine/research/ethics/index.html>

## Education and Training Events

### **Fall 2010 – Clinical Research 3 Part Lecture Series at St. Boniface General Hospital**

Interested in getting involved in Clinical Research? Clinical research refers to all research conducted with human subjects. These comprehensive introductory courses are specially designed for individuals with little to no previous research experience or those wanting a “refresher” on the latest information. The courses will present an overview of the language of clinical research, project design, roles and responsibilities of the Investigator and the research staff, and the regulatory and ethical environment for the conduct of clinical research.

<b>Lecture Title</b>	<b>Date and Time</b>	<b>Location</b>
Introduction to Clinical Research And Research Ethics	Wednesday, November 10, 2010 1:30 PM to 3:30 PM	St. Boniface General Hospital – N1012
Good Clinical Practice (GCP) and Clinical Research Regulations	Wednesday, November 24, 2010 1:30 PM to 3:30 PM	St. Boniface General Hospital – N1012
Clinical Research Project and Document Management	Wednesday, December 1, 2010 1:30 PM to 3:30 PM	St. Boniface General Hospital – N1012

There is no charge to attend the lecture series but registration is required. For more information or to register contact Terry Sawicz-Hanesiak at (204) 237-2226 or [tsawicz@sbgh.mb.ca](mailto:tsawicz@sbgh.mb.ca) .

## **Life Science Association of Manitoba (LSAM) – Training Events**

Through an industry led steering committee, LSAM offers a variety of courses and training resources so that companies can effectively train their employees to meet their current needs. LSAM has offered 1141 courses and trained more than 11,700 individuals since 1994. To view a list of scheduled training events please visit their training website:

[www.lsam.ca/calendar.cfm](http://www.lsam.ca/calendar.cfm)

## **MAGI's Clinical Research Conference 2010 West – San Francisco, CA – October 24 -27, 2010**

If you are a clinical research novice or veteran; with a study sponsor, research site, or CRO; in a corporate, academic or other organization; you will find a coherent and comprehensive program that focuses on your current needs for applicable information. MAGI sessions and workshops emphasize practical tips based on real-life examples, with lots of interaction.

More information available at:

<http://www.magiworld.org/events/2010W/>

## ***Don't Forget to Save the Date!***

### ***"Health Canada Clinical Trial Inspections – The Local Experience"***

Thursday, October 14, 2010 – Afternoon

Frederic Gaspard - Theatre A  
University of Manitoba - Bannatyne Campus

More details to come later this summer!

