



Hôpital St-Boniface Hospital

# Clinical Trial Research News

From the Office of Clinical Research

Volume 12, Issue 4

October 2010

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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

### The t-test

The t-test compares the means of two groups or samples and is one of the most widely used statistical tests in medical research. The t-test is particularly useful in experimental and quasi-experimental designs in which a treatment and a control group are compared.

The test is often called the student's t-test and there is an interesting story behind the name. The developer of the test was William Gosset, a chemist working for the Guinness brewery in Dublin, Ireland at the beginning of the 20th century. Gosset was hired to apply statistics to Guinness's industrial processes and monitor the quality of stout. He published the t-test in *Biometrika* in 1908 but was forced by his employer to use a pseudonym "student" to prevent competitors from discovering that the company was using statistical methods to improve their product.

The t-test is a precise method of comparing two groups based on the theoretical distribution pattern of sample means randomly drawn from a normally distributed population. The t-statistic is very similar to the z-statistic. However, it uses an estimate of the population parameters based on sample data, and thereby is substituted for the z-statistic when the population parameters are unknown.

### Types of t-tests

There are three basic applications of the t-test:

- One sample t-test comparing a sample mean with a population mean. This test tells a researcher the statistical likelihood that a sample mean for a given variable is representative of a population mean.
- Independent groups t-test comparing the means of two independent groups, i.e. the two samples are composed of different subjects
- Paired group or repeated measures t-test which compares the means of two related or matched groups. This test is typically used when the same or matched subjects are measured under two conditions such as a pre-post design. A typical example would be where subjects are tested prior to treatment for high blood pressure, and the same subjects are tested again after treatment with an anti-hypertensive medication.

### Statistical significance of the t-test

The t-test is evaluated for statistical significance (p-value) based on critical values of the t-distribution in standard published tables. The size of the mean difference between the two groups, the variability of scores in the samples

and the sample size all affect the statistical significance of the computed t-statistic. The level of significance is also a function of whether a one-tailed or two-tailed test is applied to the data. A one-tailed test is directional, specifying that one sample mean will be greater than the other sample mean. A two-tailed test is non-directional in that one sample mean is hypothesized to be either greater or smaller than the other sample mean.

#### Assumptions of the t-test

There are a number of statistical assumptions underlying the t-test:

- The t-test requires interval or ratio level data for the dependent measure.
- The test assumes that the subjects are sampled independently, i.e. each subject contributes only one score to the sample data.
- The scores on the dependent measure are normally distributed. The distribution of scores does not have to be exactly bell-shaped as the validity of the t-test is quite robust to violations of normality. But if scores are significantly skewed then analyzing the data by the t-test is inappropriate.
- The variability of the scores in the two groups should be similar (homogeneity of variance). This is related to the assumption implied by the null hypothesis that the groups are from a single population. However, if the sample sizes in the two groups being compared are roughly equal, the t-test is robust to the presence of unequal variances.

#### Common Errors Using the t-test

When using the t-test it is important to avoid a number of common statistical errors:

- Researchers often confuse the independent groups t-test and the paired groups t-test, treating independent subjects as related or matched and vice versa. The result of this error is an incorrect t-statistic and corresponding incorrect p-value.
- The presence of outliers or extreme scores in a sample can have an inordinate effect on the calculation of the t-value. Because the t-test is calculated by squaring the difference between each score and the mean, one extreme score can greatly influence the test statistic. In the case of extreme scores non-parametric tests are more appropriate than the t-test. For the comparison of the means of two independent groups the non-parametric equivalent of the t-test is the Mann-Whitney U test. In the case of paired or related groups the non-parametric equivalent of the repeated measures t-test is the Wilcoxon signed rank test.
- In studies with numerous dependent measures which are often correlated, comparing the means of these variables between the two groups by multiple t-tests can lead to an increase in Type I statistical errors (false positives). It is necessary to apply Bonferroni corrections to the p-values to compensate for the inflation of Type I errors through multiple testing. An alternative is to analyze the data by multivariate analysis of variance (MANOVA). This is possible because a t-test between two groups yields an identical result as a one-way ANOVA F-statistic, since the two tests are mathematically related:  $\sqrt{F} = t$ . The MANOVA takes into account the inter-relationship between the dependent variables, producing p-values that control the level of Type I errors.

This article is 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) or extension 2690.

### **May 20, 2010 - Clinical Trials Day on "SBRC.TV"**

For anyone who missed clinical trials and is interested in seeing some of the presentations log onto the website **SBRC.TV** (no "www" required) to view a couple of the presentations.

Clinical Trials Day 01 - Scientific Research and Creative Discovery presented by Doug Staley

Clinical Trials Day 02 - Quality Assurance in Human Research (QAHR) Development at the University of Manitoba Presented by Monica Woods

## Free On-Line Research Ethics Training

### Course in Human Research Protection Program (CHRPP) - Now available online

Anyone working or studying at the University of Manitoba now has access to a new online research ethics tutorial. The Office of the Vice-President (Research) recently purchased the license to the Course in Human Research Protection Program (CHRPP).

The tutorial “was created to offer researchers a deeper understanding of the principles and standards that govern human research in Canada,” according to the website for the Queen’s University-based course. The content is based on the national standard of human research ethics, the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans. It may include “audio, video or text-based news reports about how issues in research have affected real people.”

CHRPP is made up of seven modules that can be completed at one’s own pace. A certificate of completion is made available for printing after completion of all modules.

To access the tutorial, go to <http://www.chrpp.ca/homepage/MAN/>. Enter your university or your institutional e-mail address as your user ID and create a password.

The following affiliate institutions have access through the use of an institutional-specific email address (as the user ID):

- Winnipeg Regional Health Authority [userID@wrha.mb.ca](mailto:userID@wrha.mb.ca)
- Health Sciences Centre [userID@exchange.hsc.mb.ca](mailto:userID@exchange.hsc.mb.ca)
- St. Boniface Hospital and Research Centre [userID@sbgh.mb.ca](mailto:userID@sbgh.mb.ca) or [userID@sbrca.ca](mailto:userID@sbrca.ca)
- Manitoba Institute for Child Health [userID@mich.ca](mailto:userID@mich.ca)
- Cancer Care Manitoba [userID@cancercare.mb.ca](mailto:userID@cancercare.mb.ca)

Should you require additional information about the tutorial, please contact Monica Woods, Research Quality Assurance Manager, University of Manitoba, at [woodsm@cc.umanitoba.ca](mailto:woodsm@cc.umanitoba.ca).

## Research Review Committee at St. Boniface General Hospital

### Deadlines for RRC Submission

September 29, 2010  
October 27, 2010  
November 24, 2010

### Meeting Date

October 6, 2010  
November 3, 2010  
December 1, 2010

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

Contact **Krista Vandewaeter** 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.sbrca.ca/content/blogcategory/87/132/>

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

### Deadline for REB Submissions

October 8 (Friday)  
November 8, 2010  
November 29, 2010

### Meeting date

October 25, 2010  
November 22, 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).

### **Health Canada Clinical Trial Inspections – The Local Experience - October 27, 2010**

You are invited to attend a Clinical Research Educational Event on October 27, 2010. This is a free event but registration is required. Be prepared to spend an engaging afternoon learning about Local Clinical Research Team Experiences with the Health Canada Inspection Process!

Local presenters are representatives of:

- Cancer Care Manitoba (CCMB)
- Manitoba Institute of Child Health (MICH) • Health Sciences Centre • University of Manitoba

After participating in the event, the attendee will:

- Have reviewed the clinical trial inspection process, specific to the expectations of local Health Canada and the perspectives of local clinical research team members
- Have reviewed procedures related to Good Clinical Practice (GCP) and the conduct of clinical trials.
- Have a greater understanding of the preparation required before, during, and after a Health Canada clinical trial inspection.

Video links available with U of M Fort Garry Campus (Richardson Centre for Functional Foods and Nutraceuticals) and the St. Boniface General Hospital (NG002)

Contact Monica Woods if you would like further information:  
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053H Apotex Centre - 750 McDermot Avenue  
Winnipeg MB Canada R3E 0T5  
Ph: 204-272-3121 Fax: 204-272-3122 Cell (204) 803-1193  
[Monica\\_Woods@umanitoba.ca](mailto:Monica_Woods@umanitoba.ca)  
[www.umanitoba.ca/research](http://www.umanitoba.ca/research)

REGISTRATION CLOSING on Friday, October 22, 2010 - Registration Link:

[http://www.lsam.ca/calendar\\_details.cfm?id=381](http://www.lsam.ca/calendar_details.cfm?id=381)

### **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/>

### **UHN is hosting the 3<sup>rd</sup> Toronto Research Management Symposium (TRMS) – November 4, 2010**

This is a forum for discussing research management issues, visioning and sharing best practices. This year's theme of systems accountability brings together researchers, systems experts and operations experts to address:

- The Impact of Hospital Regionalization on Research Performance
- Leading practices in
  - Handling Misconduct in Research Professional Practice
  - Conduct of Clinical Trials
  - Bio and Lab Safety Legislative Compliance
  - Grant Financial Audit Lessons Learned
  - CFI Administration

VP's, Directors, Managers and senior professional staff are welcome to attend. Please feel free to distribute to your colleagues!

\*You will notice that there is no fee set as of yet... this symposium on a cost recovery basis only, so the more registrants they have, the lower the individual cost. They expect it will be in the neighborhood of \$250. The registration fee will be invoiced after the event.

Please [register online](#) by **Monday, October 18, 2010**.

General inquiries or comments should be directed to [TRMS@uhnresearch.ca](mailto:TRMS@uhnresearch.ca)

For more information and to register please visit <http://www.uhn-trms.ca/>

### **Health Canada - Good Clinical Practices (GCP) Information Sessions – November 2010**

Message from Health Canada:

September 20, 2010

Dear Stakeholder,

Health Canada is pleased to invite you to a Good Clinical Practices (GCP) information session. The goal of this session is to provide information and education to our stakeholders in an effort to improve understanding of regulatory requirements pertaining to clinical trials, as well as to facilitate compliance to these requirements. The questions raised and feedback received will be valuable in shaping future guidance and compliance promotion initiatives.

During the session, stakeholders will be provided with a general overview of Good Clinical Practices, regulatory requirements, and information and updates on Health Canada's Good Clinical Practices Compliance Program, including the Inspection Program. The GCP Compliance Unit of Health Canada and its regional inspectors will also

present more information on various topics related to GCP and on Health Canada's activities pertaining to clinical trials of drugs using human subjects in Canada. Furthermore, there will be presentations from the Therapeutic Products Directorate (TPD) and the Biologics and Genetic Therapies Directorate (BGTD). We would like to take this opportunity to answer any questions you may have regarding our program, and hear from you on how we can best interact and share information with our stakeholders.

During the month of November, Health Canada will be delivering one-day information sessions in the following six Canadian cities: Halifax, Montreal, Toronto (two sessions), Winnipeg, Calgary, and Vancouver. In Halifax, sessions will be made available via the telehealth network/video teleconferencing in Moncton, Fredericton and St.John's. Please refer to the table below regarding the dates of the sessions.

You are invited to register for one of our no-fee GCP information sessions. If you are interested in attending, please submit the attached registration form, via e-mail, by **October 5, 2010**. Please refer to the table below for information on where to send your registration. You are encouraged to register as early as possible, as space at this event is limited. **(NOTE: Contact Terry Sawicz-Hanesiak at [tsawicz@sbgh.mb.ca](mailto:tsawicz@sbgh.mb.ca) for a registration form)**

Please note that, due to venue size restrictions, we are limiting the number of representatives per organization (for example, clinical research unit /clinical trial site, corporation, research ethics board, etc.) to one. After initial registration, organizations/representatives will be contacted if additional spaces are available. Invitations to additional representatives will be prioritized based on the date the Registration Form is received. Once you have registered for a session, more information will be provided via e-mail regarding the venue and the final agenda.

Thank you for your continued cooperation. We look forward to meeting with you soon.

Yours truly,  
 Diana Dowthwaite  
 Director General  
 Health Products and Food Branch Inspectorate

### **Good Clinical Practices (GCP) Information Sessions**

City	Session Date	E-mail	Registration deadline
Winnipeg	November 4, 2010	<a href="mailto:gcp-roadshow-bcp-tournee-de-presentation-win@hc-sc.gc.ca">gcp-roadshow-bcp-tournee-de-presentation-win@hc-sc.gc.ca</a>	October 5, 2010
Montreal	November 9, 2010	<a href="mailto:gcp-roadshow-bcp-tournee-de-presentation-mon@hc-sc.gc.ca">gcp-roadshow-bcp-tournee-de-presentation-mon@hc-sc.gc.ca</a>	October 5, 2010
Vancouver	November 16, 2010	<a href="mailto:gcp-roadshow-bcp-tournee-de-presentation-van@hc-sc.gc.ca">gcp-roadshow-bcp-tournee-de-presentation-van@hc-sc.gc.ca</a>	October 5, 2010
Calgary	November 18, 2010	<a href="mailto:gcp-roadshow-bcp-tournee-de-presentation-cal@hc-sc.gc.ca">gcp-roadshow-bcp-tournee-de-presentation-cal@hc-sc.gc.ca</a>	October 5, 2010
Toronto	November 23, 2010	<a href="mailto:gcp-roadshow-bcp-tournee-de-presentation-tor@hc-sc.gc.ca">gcp-roadshow-bcp-tournee-de-presentation-tor@hc-sc.gc.ca</a>	October 5, 2010
Toronto	November 24, 2010	<a href="mailto:gcp-roadshow-bcp-tournee-de-presentation-tor@hc-sc.gc.ca">gcp-roadshow-bcp-tournee-de-presentation-tor@hc-sc.gc.ca</a>	October 5, 2010
Halifax	November 29, 2010	<a href="mailto:gcp-roadshow-bcp-tournee-de-presentation-hal@hc-sc.gc.ca">gcp-roadshow-bcp-tournee-de-presentation-hal@hc-sc.gc.ca</a>	October 5, 2010
Fredericton <i>Via video-teleconference</i>	November 29, 2010	<a href="mailto:gcp-roadshow-bcp-tournee-de-presentation-hal@hc-sc.gc.ca">gcp-roadshow-bcp-tournee-de-presentation-hal@hc-sc.gc.ca</a>	October 5, 2010
Moncton <i>Via video-teleconference</i>	November 29, 2010	<a href="mailto:gcp-roadshow-bcp-tournee-de-presentation-hal@hc-sc.gc.ca">gcp-roadshow-bcp-tournee-de-presentation-hal@hc-sc.gc.ca</a>	October 5, 2010
St.John's <i>Via video-teleconference</i>	November 29, 2010	<a href="mailto:gcp-roadshow-bcp-tournee-de-presentation-hal@hc-sc.gc.ca">gcp-roadshow-bcp-tournee-de-presentation-hal@hc-sc.gc.ca</a>	October 5, 2010

### **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)