



# Reading a Research Article

## Part I: Types of Variables

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Oncology nurses constantly are confronted with statistical data. Although most nurses receive some instruction on statistical process in basic preparation, and those who pursue graduate degrees receive even more, statistics and their interpretation remain a source of confusion and consternation for many. Nurses who choose to implement findings from a research paper need to have knowledge of statistical analysis to comprehend the ramifications of the findings and explain the data to patients in understandable terms. This article is the first in a series that will examine specific issues and considerations in applied statistics to assist nurses as they read and implement the findings of research into clinical practice. This part specifically will address identification of and issues related to the assessment of different types of variables. Future articles will describe statistical tests and issues including parametric statistics, nonparametric statistics, common statistical errors, and meta-analyses. An additional focus of this series is to acquaint readers with statistical terminology.

### Definitions

Statistical analysis is a process by which data collected from or for a research project are organized to form meaningful conclusions. Statistics also provide a standardized means of summarizing conclusions across (or between) similar types of studies conducted at various sites.

### Primary Analysis

Statistics are used in the primary analysis of research data. For example, in the oncology nursing setting, studies frequently focus

on symptom management, psychosocial adjustment, quality of life, and continuous quality improvement issues. Statistical tests can be used to describe research findings during all aspects of oncology care. This includes research related to prevention, early detection, diagnostic modalities, treatment choices, management of the side effects of disease and treatment, and a myriad of issues related to psychosocial adjustment throughout the cancer trajectory.

### Secondary Analysis

Once conclusions are formed, suggestions for treatment or nursing interventions are inferred from statistical summaries. Often, these summaries and data sets are not limited to a single interpretation of the primary analysis objective. A secondary analysis of data also can be performed. In this case, the data are reanalyzed or combined with another data set to answer and assess additional questions and issues. Also, a meta-analysis may be undertaken. This type of retrospective study compares the results of a researcher's previously published study with other published studies that have evaluated the efficacy of the same new treatment and are similar in design.

### Statistical Errors

Like any tool, statistics can be misused. Oncology nurses should consider and be aware of some of the more common scenarios in which this occurs. The most common situations are underpowered studies (i.e., the sample size is too small to draw reliable conclusions), selection of the wrong statistical test, and misinterpretation of the significance of the p

value. One of the best ways to eliminate these problems is to consult a statistician before data collection begins, midway during data collection, and at the end of data collection to ensure that the analysis is appropriate.

### Basic Considerations When Reading, Designing, or Evaluating a Research Study

Rules and assumptions are used to determine which of the many statistical tests would be most appropriate to use when providing a summary for a researcher's primary objective. These can be thought of as a series of questions that break an analysis into steps. The questions focus on assessment of the type of data, sample size, distribution of the data, and data variability.

### What Is the Data Type?

The first issue to consider is the type of data being analyzed. Four groups or types of data exist: nominal, ordinal, interval, and ratio.

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