**Laryngoscope Case Study**

**Statistical Analysis Report Guide**

**Length**: ~5 single-spaced pages

A *statistical analysis report* is a detailed description of the data analyses you have carried out to address the scientific questions posed by a client. It is important that this report be written in language that is accessible to the intended reader. Sometimes, this will be statistical experts. But very often, the intended reader is a client or a non-statistician scientist. For purposes of this assignment, assume that the reader is not a statistician. **If you cannot explain your findings in a straightforward manner, then the analysis is of little value to anyone**.

As a general rule, the non-statistician reader is not interested in the technical aspects of the analyses that were conducted. Aim, instead, to report your major impressions (the results of your primary hypothesis tests) and any variations in these findings that emerged from additional analyses that took into account any adjustment variables (confounders, modifiers, etc.). These should be written at a level that a non-statistician can understand.

The report should then include the following sections:

1. *Header*: Address the client directly in your report. Since this is only an assignment, you may address the instructor. A suggested format is as follows:

To: Client Name or Instructor’s Name

From: Analyst Name

Date: [Date]

1. *The scientific background*: The client obviously should already know this information. However, it is not uncommon that the client has not yet organized the information as comprehensively as we might need. In any case, this is the opportunity for you to write briefly but clearly what you understand about the scientific problem, and it allows the client to check to see whether you understand the issues. Hence, this should include:

* [Creative Commons License](http://creativecommons.org/licenses/by-nc-sa/4.0/)The overall goal of the research (e.g., cancer chemoprevention)
* [Creative Commons License](http://creativecommons.org/licenses/by-nc-sa/4.0/)Background regarding the current state of scientific knowledge (e.g., what is known about the cancer, hypotheses about mechanisms of chemoprevention, and prior studies of the particular agent under study)
* The specific aims of the study currently under discussion (e.g., pharmacokinetics of the agent under study)

1. *Statistical/Scientific questions to be addressed*:This should include:

* The specific questions that your client posed,
* The questions that you answered (this might be stated in terms of summary measures and variable adjustment),

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* Any discrepancies between the two categories of questions (e.g., confounding in the sample may have rendered the client’s original question scientifically meaningless).

1. *The research methods*: Again, this may already be known to the client, in which case you are documenting your understanding of the study design from a statistical perspective. Almost always, the client has not organized the study design so completely. This should include:

* General study design (e.g., cross-sectional study, longitudinal cohort study, case-control study, randomized interventional experiment)
* Description of subjects (source, sampling scheme, inclusion/exclusion criteria)
* Description of any intervention(s) (both experimental and control)
* Data collected (source, timing, variables measured categorized by their scientific relevance and statistical role, methods of measurement, mechanisms of missing data)

1. *The statistical methods*: In a typical scientific report, this is a subsection under Research Methods. However, given the focus of statistical consultation, it is usually the case that an expanded description of the statistical methods is warranted.

* Give a low-level technical description of the statistical methods for the client to use in the manuscript. Include references for non-standard techniques. You may want to describe any software used, and you certainly want to describe the methods used for assessing the appropriateness of your models. Explain how you handled common problems like missing data, multiple comparisons, etc.
* Explain the basic philosophy behind the statistical techniques in layman's terms. Motivate any transformations. Describe the use of *p*-values and confidence intervals if they play an important role in your analysis. Explain why you did not use more common techniques, or, if applicable, why you did not use the techniques the client first asked about.

1. *Results and Discussion*:This should include:

* Statistical analyses of the data (including tables and figures). Provide interpretations for all parameter estimates.
* Interpretation of results, including explicitly answering the original research question.
* Comments about any limitations of your results. Identify any unresolved issues. Here you might also make recommendations for future analyses and studies.

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