Project Phoenix learn R Session 7 UNAM

Presenting Statistics for Publication

Dr. David Gillespie

14th June 2017

Outline

- Background
- Two key guiding principles
- Expansion and examples
- Discussion and questions
- Summary

N.B. I am a medical statistician by background, but concerns are likely to be apparent in other fields and principles should also hold true…

Background

Dozens of articles published demonstrating statistical errors:

- Application
- Analysis
- Interpretation
- Reporting

Why might this be a problem?

- Decision making (and consequences of)?
- Reproducibility?
- Discredited professionals (or)?

Source material

(For reference)

Lang T, Altman D. **Basic statistical reporting for articles published in clinical medical journals: the SAMPL guidelines.** In: Smart P, Maisonneuve H, Polderman A (eds). , European Association of Science Editors, 2013.

Guiding principles

1. Sufficiently detailed statistical methods:

2. Sufficiently detailed results:

Reporting statistical methods

- Describe target sample size and underlying assumptions
- Describe of each piece of analysis
- Describe variables used
- Describe methods used to analyse data
- Describe software used to analyse data

Pre-specification is important for transparency

- Protocol with description of aims, objectives, and planned analyses in place **prior to starting any analysis**

- Descriptions of any deviations from any pre-specified plans

Reporting statistical results

An over-reliance on values…

- A function of sample size
- Often reported in isolation (i.e. without context)
- Do not convey effect size
- Too much focus on reporting findings based on an arbitrary threshold (e.g. 5% or < 0.05)

Some suggested improvements

- State sample size (and reflect against original target)
- Report effect sizes (absolute and relative?)
- Convey uncertainty (e.g. confidence intervals, data visualisation)
- Interpret in terms of (e.g. clinical importance)

If reporting values:

- State hypothesis/es of interest
- Report calculated value rather than threshold (i.e. = 0.032 rather than < 0.05)

Some examples of poor practice

Reporting guidelines in the medical research field

- Enhancing the QUAlity and Transparency Of health Research
- Guidelines for various study designs, topics, and clinical areas
- Catchy acronyms!

Group discussion

Consider statistical methods and results as reported throughout publications in your own field...

1. What are the positive aspects of reporting in your field?
2. How could reporting be improved?

Summary

Any questions?

with special thanks to
Thomas Lang and Douglas Altman

Lang T, Altman D. **Basic statistical reporting for articles published in clinical medical journals: the SAMPL guidelines.** In: Smart P, Maisonneuve H, Polderman A (eds). , European Association of Science Editors, 2013.

Dr. David Gillespie (Ph.D)

Research Fellow in Statistics, Centre for Trials Research, Cardiff University

GillespieD1@Cardiff.ac.uk

@DaveGUK87

Slide with R Output

```
summary(cars)
```

```
##      speed           dist       
##  Min.   : 4.0   Min.   :  2.00  
##  1st Qu.:12.0   1st Qu.: 26.00  
##  Median :15.0   Median : 36.00  
##  Mean   :15.4   Mean   : 42.98  
##  3rd Qu.:19.0   3rd Qu.: 56.00  
##  Max.   :25.0   Max.   :120.00
```

Slide with Plot