# Biostatistics workshop series: How to review an abstract

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# Preamble

- Reviewing an abtract is very similar to reviewing a scietintic paper. We are looking for the exact same 'ingredients'
- As a formal (invited) reviewer, you will be expected to play two important roles:
  1. To determine if the submitted abstract is of sufficient scientific quality to be 'accepted'
  2. To provide constructive critisim to the author(s) regarding improvement of their work
- Even if you are only informally reviewing an abstract (for your own purposes), the first principle still holds
- However, if informal, there is a third purpose:
  4. How can we learn from the strengths and weaknesses (and mistakes) of others, to generate 'strong' research ourselves?

# What we will cover....

# Conventions

The conventions I will use:

**Note:.....**

Things to note will occur in a green box

**Pitfalls:.....**

Common mistakes and things to watch out for will occur in a red box

# Importance of a good abstract

- A majority of scientic papers do not get read in their entirity
- Many researchers will skim a paper briefly to see if it is relevant to their work
- It is the abstract that they will quickly read
- For this reason, a well structured and presented abstract is absolutely essential in getting your work out there (cited)
- This is the only oppurtunity for the author to **SELL** their hard work.

# Different types of abstracts

There are three main types of abstracts that you are likely to encounter:

1. Thesis abstract: Usually about 2-3 full pages of text. Will generally provide much more detail (especially in the background) then other types of abstracts
2. Conference abstracts: Often smaller (half to a full page) and front heavy (Intro and methods) as the main findings may not be completed yet (Many conferences require abstracts to be submitted 6-9 months before the conference)
3. Scientific (journal) paper abstract (main focus today): Again about a half to full page of text. Many will have subheadings and it is expected that the abstract will represent a **efficient** synopsis of the main paper

# Role of the Intro/background

- Like any research article, there has to be a justification for doing the research
- Reviewers are busy people, and an author needs to mydgpull them in with their problem statement
- The introductory statements are the first thing the reviewers sees. If we can't capture their interest here, we have lost them
- An author needed to impress on the reviewer the **WOW** factor

# Role of the Introduction

There are three main ingedients in an introduction:

1. Background statement
2. Knowledge gap
3. Research objective

In a full manuscript, the author gets the luxury of a page or two of text to provide sufficient background to the problem, before identifying the knowledge gap. If the author does a good job on these first two, then the research objective naturally flows from the knowledge gap:

> *.....while the efficacy of dietry interventions on reducing diabetes complications has been studied thoroughly in western and other developed countries, very little is known about their efficacy in Thailand....*

# Introductions in abstracts

For many journals, the abstract introduction is only allowed to be two or three sentences so we have to be very efficient in constructing this section. Often we need to incorprate 2 of the three ingredients (above) into a single sentence. E.g.

*Type 2 Diabetes Mellitus complications results in huge costs to both society and the individual, but few studies have been done in developing countries like Thailand to gauge the efficiacy of interventions in reducing the incidence and severity of these complications. The aim of this study is to examine the efficacy of the XYZ dietary intervention in reducing diabetic complications among Thai Type 2 diabetics.*

# Reviewing an abstract introductory statement

With this in mind, it is quite a simple matter to review the Introduction for an abstract:

1. It should have all three 'ingedients'**
2. It should be short and succinct

**The detail in the background statement can be shorter if article (and journal) is pitched at a specialized audience

# Study strengths and limitations

Before I go into the structuring of methods section, we should note:

ALL STUDIES HAVE LIMITATIONS

BUT the question is:

**Could the researchers have designed out or analyzed out these limitations?????**

# The "It's wasn't my fault" approach to scientific writing

- A good researcher (and scientific writer) is one who can convince the reviewer that any limitations in the study are an artifact of the system under study, not the study design
- For (a simple) example: For an epidemiological study of the effect of smoking on CVD, it should be clear that there is no (ethical) way that the study could have been experimental (This is so clear that it goes without saying)
- But for the author of a study, limitations should not be hidden (the reviewer will often spot them and ask awkward questions), they should be stated and justifcations made that "IT WASN'T MY FAULT"

# The lament of the biostatistician

- One of the major problems with being a biostatistician is trying to fix the problems researchers didn't 'think of' when they designed the study
- The art is to try to convert 'oversights' into 'it wasn't my fault' design limitations. BUT this is the second best option....
- Good analytical planning is the key to good research
- You can guarantee that if a biostatistican can spot a weakness at the beginning of a project, a reviewer will spot it when it comes to submission

**Good research = good study design**

ALWAYS consult experienced researchers, peers, epidemiologists and/or biostatisticians when designing a study. You will save much pain and effort later down the track

# Role of the methods section (in a paper)

Goods research is about scientific replicability. We should be able to see all the details in the methods section needed to (almost exactly) repeat the study. Typically a methods section will be split up into different parts (with or without sub headings):

1. Target (or Study) Population
2. Participants and study design (including sampling approach)
3. Measurement procedures and/or variables collected (including outcome, study effect and covariates variables considered)
4. (if prospective) Sample size calculations
5. Statistical analysis

If we can't replicate the study exactly from the methods section, it is not acceptable. If the study is experimental we should be able to extract the PICO/PICOT from this section alone

# Methods sections in abstracts

- Clearly (given the word count constraints) a methods section in an abstract can be no where near as detailed as we would like.
- However, a reviewer (and reader) must be convinced that the right approach was taken.
- Main things that need to be included are:
  1. The sample (somehow conveying that they are representative of the target population)
  2. The main study outcome(s) and study effect(s); and
  3. Tha main statistical approach used (bivariate/multivariable) and measures of association (e.g. Hazard ratios, incidence ratios, odds ratio, mean difference, percentage difference etc) (This last item can also be worked into the results too)

# A trick to shorten your abstract's methods section

In some cases, we can use our results section to convey the statistical approach we used. For example:

**Methods**: This study involved 60000 patients from a Thai study of Diabetes and Hypertension involving the 600 hospitals from across the nation. The study outcome was acheivement (y/n) of the ABC (HbA1C, Blood pressure and Serum Cholesterol levels) quality of diabetes care indicators, and the study effect was the presence of a hypertention comorbitdity among Type 2 diabetics. Other risk factors and confounders were also considered.

**Results**: Multivariable binary logistic regression analysis revealed that patients with diabetes alone had XX times the odds of achieving all three ABC clinical outcomes, relative to diabetics with the hypertension comorbidity (OR=XX, 95%*CI*: XX-XX, p<XX)...

# Results sections in full papers

## DOs

- Start off with a brief presentation of sample statistics that can be for the group as a whole, and/or between the main groups (e.g. Treatment or exposure group):
  - For RCTs this is about showing confounders are balanced
  - For observational studies, show statistics for group as a whole, and then split according to study effect (to show 'other' potential independant risk factors and confounders)
- Section for figures and tables and a very succint interpretation of the results from these 'statistical outputs'

# Results sections in full papers

## DON'Ts

- Avoid linking the results from different analyses
- Never mention result implications (especially in terms of findings of others)
- Never introduce methods here (not mentioned in the methods section)

# Results in abstracts

- As I mentioned before. If you have no room in your methods, you can work in some of your statistical methods here: E.g. "..the Adjusted Hazard Ratio from Cox regression showed that the new drug was effective in increasing survival rates (HR=0.7, 95% CI: 0.64, 0.79)..."
- You have very limited room in an abstract, so you may only be able to mention one or two key findings (focus of study effect, or if an exploratory analysis, the main risk factors identified)
- Generally don't mention descriptive statistics unless it really adds to the story

# Discussions/implications/conclusions in abstracts

- In a full paper, the discussion is where you:
  1. Reiterate your main findings
  2. Tie these findings in with the literature (agree/disagree)
  3. Talk about the strengths and limtations of your study
  4. (If relevant) talk about how your findings may feed into (Policy, clinical practice, or future research)
  5. Again, reiterate you main findings
- Again, in abstracts we have too little room and many journals just expect a 'conclusions' or 'recommendations' section of one or two sentences. This coincides with the last item in the above section (state your main findings/conclusions).

# KISS: Keep it simple, stupid

- One of the hallmarks of a inexperienced researcher is their tendency to 'tech it up'
- Inexperienced researchers will also use unnecessary and flowery langauge. Avoid words like: 'Moreover', 'heretofore' and 'aforementioned' instead use the simple corresponding words: 'Also / In addition', 'up to the present time' and 'as mentioned above'
- Remember as a reviewer, YOU are the audience. The chances are, if you can't understand it, then the problem lies with the author (not you)

# KISS and the discipline

- As a biostatistican, I have reviewed articles (and abstracts) from a diverse range of disciplines
- One of the areas I HATE reviewing articles is from the 'pre-clinical' sciences (particularly 'biomedicine')
- Biomedical (and also psychology) articles are typically jargon-rich and for some reason, this seems to be accepted in these disciplines

**Pitfalls in writing:**

In your own writing, avoid jargon (at least, where possible) and flowery langauge. Simply written is ALWAYS best.

# Reviewing an abstract: Mark it!!!

One of the simplest ways of reviewing an abstract is to mark it:

1. Intro/background (marks/10)
2. Methods (marks/10)
3. Results (marks/10)
4. Discussion (marks/10)

...and then finally

1. Cohesion (how it fits together) and communication (marks/10): Does it flow naturally, have they kept the writing as simple as possible (Can you understand it)?

# Reviewing an abstract

Everything said and done there are two main aspects we need to consider in reviewing an abstract (or manuscript):

1. **Scientific importance**: Is the (research) question worth answering?
2. **Scientific quality**: Did the author(s) do a good job in answering the research question? Was it in their power to improve the quality (strength of evidence) or 'Wasn't it their fault'?

If you keep this in mind when reviewing anything, you are half way there.

# Concluding remarks

REMEMBER:

- ...every word costs \$1 (30 baht) $\rightarrow$ short and sweet
- ...what role each section is supposed to play
- ...the audience (do they have background knowledge so author doesn't have to spell out so much background)
- ...is the subject area relevant and does the work make a significant contribution (fill an important knowledge gap)

# Exercise 1: Your turn

1. From each row, someone should be willing to present their abstract (even if it s a work-in-progress)
2. Each (other) person in that row is expected to ask a question or make a comment that may improve the quality of the abstract (REVIEW)

To crique (and be criticized) are VERY important skills if you are to become a strong researcher. PLEASE PARTICIPATE!!!! 0.25cm]
It is not only good for improving your own research skills, but is a way YOU can contribute to the community.

# THANK-YOU!!

# Questions??

## YOUR TURN

# Exercize 2: Homework

Three articles:

1. Pagani *et al.* (2013) Prospective associations between early long-term household tobacco smoke exposure and antisocial behaviour in later childhood
2. Rautiainen *et al.* (2012) Total Antioxidant Capacity from Diet and Risk of Myocardial Infarction: A Prospective Cohort of Women NOW:

- Using their abstracts **alone** comment on their quality
- Think about what you might have done differently