



**SELAMAT PAGI
MALAYSIA**

IF YOU WOULD BE NOT
FORGOTTEN AS SOON
AS YOU ARE DEAD,
EITHER WRITE THINGS
WORTH READING OR
DO THINGS WORTH
WRITING

HOW TO WRITE GOOD SCIENTIFIC PAPER



JUST FOR YOUR KNOWLEDGE

- Many papers are badly written and hard to understand 
- This is a pity, because their good ideas may go unappreciated 
- Following simple guidelines can dramatically improve the quality of your papers 
- Your work will be used more, and the feedback you get from others will in turn improve your research 

BASIC STUFF

Keep to the length restrictions

- ***Do not narrow the margins

- ***Do not use 6pt font

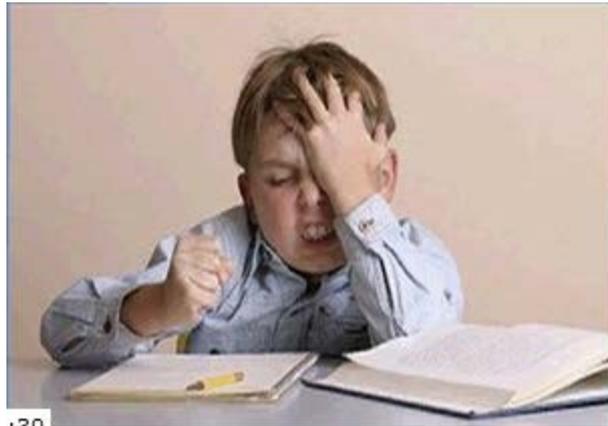
- ***On occasion, supply supporting evidence (e.g. experimental data, or a written-out proof) in an appendix

Always use a spell checker

Submit by the deadline (revision and proof)

KEYS TO ACADEMIC SUCCESS

- PUBLISH ... PUBLISH ... PUBLISH
- PUBLISH IN EXCELLENT JOURNALS
- QUALITY IS MORE IMPORTANT THAN QUANTITY
- IMPACT FACTOR, “H” INDEX, CITATION



WHY BOTHER?

FALLACY !!

WE WRITE PAPERS AND
GIVE TALKS MAINLY TO
IMPRESS OTHERS, GAIN
RECOGNITION, AND GET
PROMOTED

YOUR GOAL OF WRITING PAPERS

To infect the mind of your reader
with **your idea**, like a virus

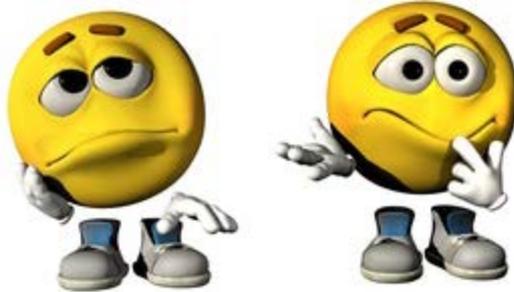
- Papers are far more durable than
programs

ALWAYS REMEMBER: The greatest ideas are
(literally) worthless if you keep them to yourself

THE PURPOSE OF YOUR PAPER IS

TO CONVEY YOUR IDEA

... FROM YOUR HEAD TO YOUR READER'S
HEAD...



Everything serves this single goal



HOW TO CONVEY YOUR IDEA ... FROM YOUR HEAD TO YOUR READER'S HEAD



- Explain it as if you were speaking to someone using a whiteboard
- Convey the idea is primary, not secondary
- Once your reader has the idea, he/she can follow the details (but not vice versa)
- Even if the reader skips the details, he/she still takes away something valuable



OUTLINES

- Research leading to a manuscript
- The manuscript itself
- The editorial process and publication:
 - Reviewer chooses
 - role of editors
 - statistical input

RESEARCH LEADING TO A MANUSCRIPT

- Picking a research question
- Ask big question
- Work in or collaborate with a research group in which a “big” question can be answered.
- Don’t be enamored by the latest technology for its own sake.
- Know when to get into a research area, but also know when to get out of it.

FOR THE EXPERIMENTALISTS

Just because you can perform an experiment doesn't mean that you should

ELEMENTS OF A VALID EXPERIMENT

- # Experimental question must be worth asking.
- # Experiment must have a good chance of setting an open question.
- # True experimental uncertainty exists a priori.
- # Experimental design must be adequate and the experiment feasible
- # All outcomes are considered equally likely
- # Carefully designed endpoints, controls, and statistical approaches are essential

A poorly designed experiment is worse than none at all

THE MANUSCRIPT



First, have some thing to say; second, say it; third, stop when you have say it; and fourth give it an appropriate title

Every sentence is a stately torchlight procession from subject to predicate

HIGH QUALITY WRITING

Write concisely (in brief)

- Avoid repetition.**
- Omit nonessential words.**
- Avoid long paragraphs.**
- Avoid neologisms (the new worlds).**

Minimize use of passive voice.

Use simple, direct language “Clarity in writing implies clarity of thought”

Avoid hyperbole (don't make things bigger than the reality)

Minimize use of passive voice

The passive voice is “respectable” but it **DEADENS** your paper. Avoid it at all costs.

use the active voice whenever possible. It is less wordy and clear

NO



It can be seen that ... →

34 tests were run ... →

These properties were thought desirable ... →

It might be thought that this would be a type error ... →

YES



We can see that

We ran 34 tests ... →

We wanted to retain these properties

You might think this would be a type error

“WE”=YOU AND THE READER

“WE”=THE AUTHORS

“YOU”= THE READER

Use simple, direct language

“Clarity in writing implies clarity of thought”



NO

YES

The object under study was displaced horizontally



The ball moved sideways

On an annual basis



Yearly

It could be considered that the speed of storage reclamation left something to be desired



The garbage collector was really slow

Avoid hyperbole (don't make things bigger than the reality)

AVOID CLAIMS OF PRIORITY

- “This is the first demonstration of”
 - Avoid subjective claims of importance.
 - “...very interesting...”
 - “...major advance...”
 - “...transformative findings...”
- Avoid exaggerated claims.

WHY AVOID HYPERBOLE

- *Loss of public credibility
- *To avoid the doubt in scientific process
- *This is Science not a Business

VISUAL STRUCTURE of the manuscript

Give strong visual structure to your paper using:

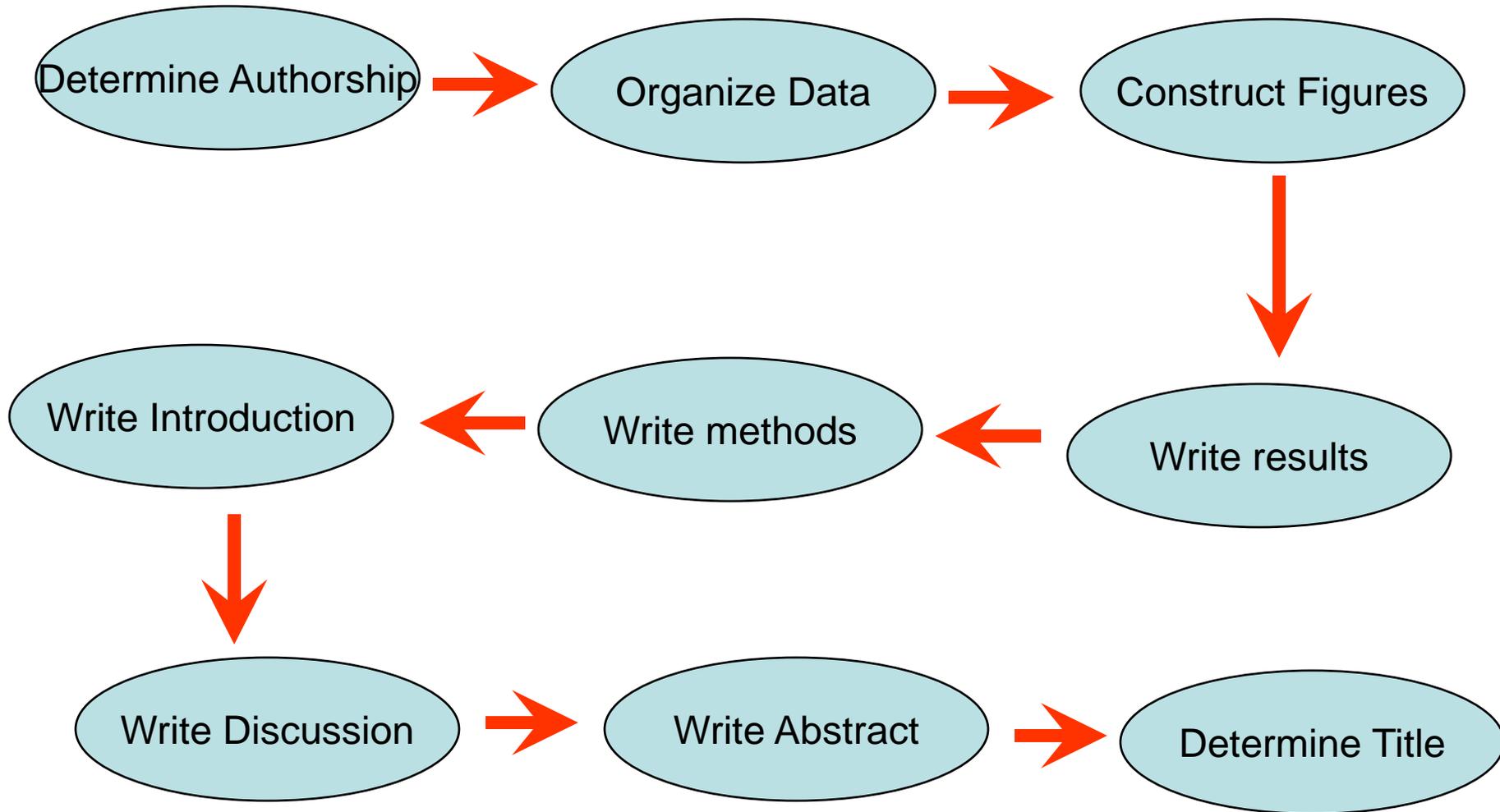
- ***Sections and sub-sections
- ***Bullets (For example, This info table contains:
 - > Executable code for the ...
 - > Layout information for ...
- ***Italics (for new definition, Greek, Latin ..)
- ***Follow the standard structure of each journal

Find out how to draw pictures, and use them

Structure of the manuscript

- *Title (strong, short, express the work)
- * Authorship
- *Abstract (4 sentences)
- *Introduction (1 page)
- *The problem (1 page)
- *My idea (2 pages)
- *The details (5 pages)
- *Related work (1-2 pages)
- *Conclusions and further work (half page)

Constructing the manuscript



AUTHORSHIP

- Discuss authorship as early as possible – ideally as you plan a project and decide the collaborators and advisers.
- Discuss order of authorship; come to agreement about who will be first author and senior author.

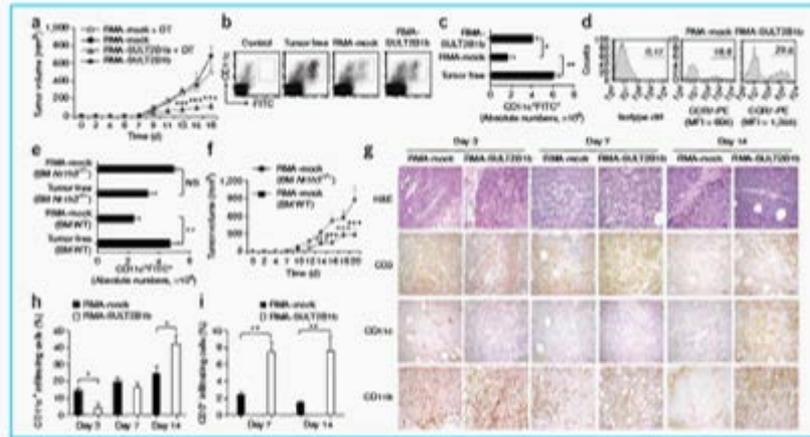
ORDER OF AUTHORSHIP

- Authors decide on order of authorship
- First author generally has made the largest contribution.
- Authors are typically listed in descending order of contribution.
- The most senior author or the authors who supervised the work is sometimes listed last.

DATA AND FIGURES

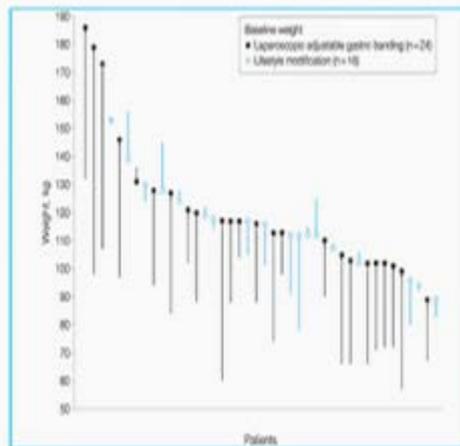
- Do not necessarily include every experiment.
- Do not include different types of experiments that are internally consistent and mutually supportive (essential for some journals).
- Emphasis on clarity and legibility of Figures—often difficult in even the best of journals.
- Make the Figures express your work—Make the Figures speak instead of you

Drowning in Data

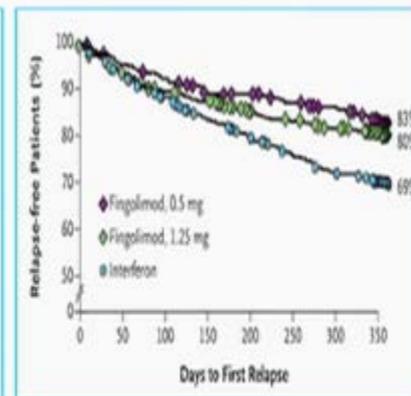


—Nature Medicine 2010; 16: 101

Misrepresentation of Data

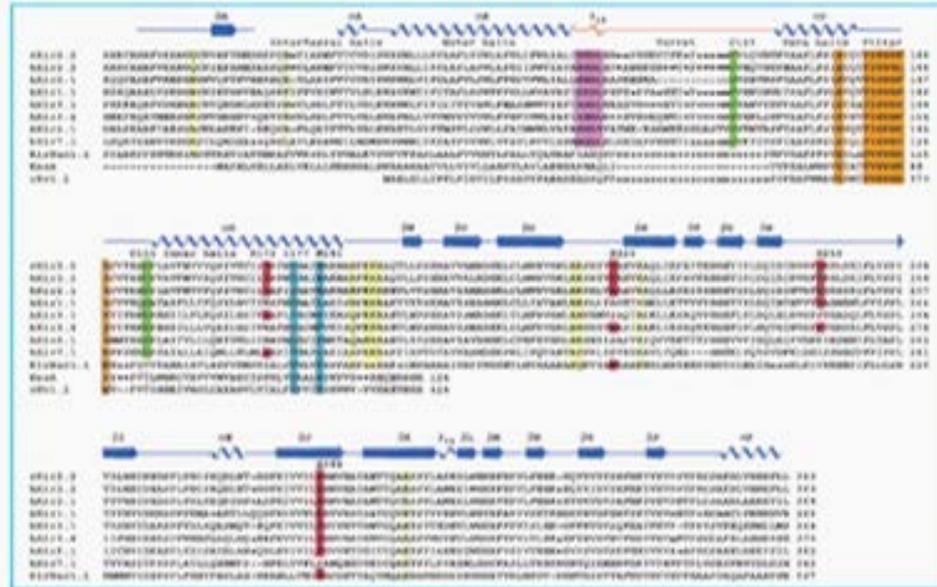


—JAMA 2010; 303:523



—NEJM 2010; 362:410

Limited Legibility



--Science 2009;326:1669

RESULTS SECTION

- Concise presentation (brief)
- Present results in logical order (which may not be – in fact, rarely is – the order in which the experiments were performed).
- Just observed facts, no interpretation can give objective justification for an experiment
- Use of supplementary section

INTERPRETATION OF RESULTS

- Over-interpretation vs. understatement
- Seeing what you believe vs. believing what you see
- Experimental composure—a step forward to enlightenment the knowledge

METHODS SECTION

- Be concise, but provide sufficient detail so that experiment can be repeated by others.
- Do not give details for methodologies that have been published, unless used with modification.
- Use of supplementary section
- Always be explicit about statistical methods used.

“If your experiment needs statistics, you ought to have done a better experiment.”



--E. Rutherford

THE INTRODUCTION

- Describe the problem
- State your contributions

...THAT IS ALL





- Give relevant background concisely (briefly).
- Do not avoid citing relevant prior publications that may render your work incremental, nor bury them in the discussion.
- Not meant to be a tutorial on the mechanism of topic under consideration

Describe the problem

concentrate on;

- *Describes the problem, and why it is interesting**
- *Describes your idea**
- *Defends your idea, showing how it solves the problem, and filling out the details**

On the way, cite relevant work in passing, but defer discussion to the end

State your contributions

Don't leave the reader to guess what your contributions are !!

- Write the list of contributions first
- The list of contributions drives the entire paper; the paper support the claims you have made
- Reader thinks “gosh, if they can really deliver this, that’s be exciting; I’d better read on”

EVIDENCE

- Your introduction makes claims
- The body of the paper provides evidence to support each claim
- Check each claim in the introduction, identify the evidence
- Evidence can be; analysis and comparison, theorems, measurements, case studies

*Related work (1-2 pages)

- FALLACY

“To make my work look good, I have to make other people’s work look bad”

The truth: credit is not like money

Giving credit to others does not diminish the credit you get from your paper

- Warmly acknowledge the people who have helped you
- Be generous to the competition. “In his inspiring paper [???? et al.2009] they shows ... We develop his foundation in the following way...”
- Acknowledge weaknesses in your approach

credit is not like money

Failing to give credit to others can kill your paper

If you imply that an idea is yours, and the referee knows it is not, then either

*** you don't know that it's an old idea (bad)



*** you do know, but are pretending it's yours (very bad)



Making sure related work is accurate

- A good plan: when you think you are done, send the draft to the competition saying “could you help me ensure that I describe your work fairly?”
- Often they will respond with helpful critique
- They are likely to be your referees anyway, so getting their comments up front is jolly good.

THE DISCUSSION

- Summarize and interpret observations.
- Do so in historical context, reviewing consistencies and inconsistencies with prior published work.
- Explain inconsistencies.

ABSTRACT

I USUALLY WRITE THE ABSTRACT LAST

- Give it much thought
- What the reviewers and editors first see and on which they focus
- Include quantitative results in abstract
- **FOUR SENTENCES 1,2,3,4**
 - 1. State the problem**
 - 2. Say why it's an interesting problem**
 - 3. Say what your solution achieves**
 - 4. Say what follows from your solution**

TITLE

- I usually write the title last

Should be concise

Should capture the essence of the study

Should not exaggerate results



The process

- Start early... Very early...
 - *Quickly-written papers get rejected
 - *Papers are like fruit: they need time to mature

Collaborate with your colleagues

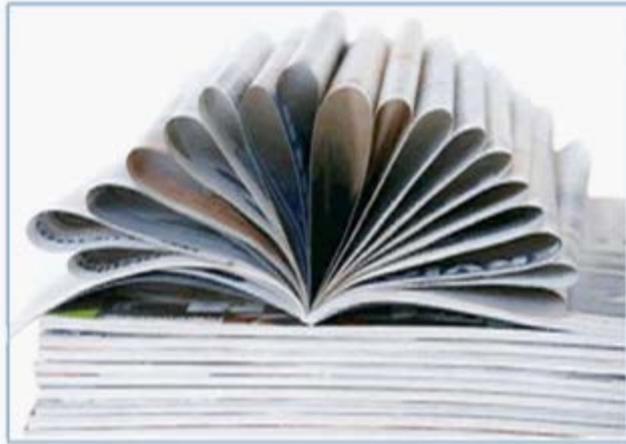
Getting help

- Get your paper read by as many friendly collaborators as possible
- Experts are good
- Non-experts are also very good
- Each reader can only read your paper for the first time once! So use them carefully
- Explain carefully what you want (“I got lost here” is much more important than “wibble is mis-spelt”)

KEY QUALITIES OF ACCEPTED PAPERS

- Topic of sufficiently broad interest
- Well designed and executed study
- Statistically sound
- Data not over-interpreted
- Well written
- May have a lasting impact on the field

The Editorial Process



RESPONSES TO REVIEWERS

LISTENING TO YOUR REVIEWERS

- Read every criticism as a positive suggestion for something you could explain more clearly
- Always be cool DO NOT response with passion
- Thank them warmly. They have given up their time for you.

LISTENING TO YOUR REVIEWERS

Every review is gold dust

Be (truly) grateful for criticism as well as
praise

This is really..really...really Hard

But it's really really really really really
really really Important

HANDLING REVISIONS

- Be responsive to all of the reviewers comments, which may, on occasion, require performing additional experiments or analyses.
- If not, give a logical (rather than impassioned) rationale for not doing so.

COMMON REASONS FOR REJECTION IN THE ABSENCE OF FATAL FLAWS

- Lack of novelty
- Incremental
- Too narrow in scope (subspecialty deflection)
- Modest effect size implies modest importance
- Purely observational, no mechanism
- Priority decision

HANDLING REJECTIONS

- Move on to another journal.
- Rebut, but recognize that the acceptance rate of rebuttals is very low (5% or 0.5% overall).

Reviewers recommend Editors decide



**If the journal accept your paper
within 3–4 weeks you will get the
Proof of your accepted paper**

A Quick Test of Your Proof Reading Accuracy

- **There are no tricks in this test**
- **Let's Begin**

**Finished files are the
result of years of
scientific study
combined with the
experience of years**

**How many F's in that
sentence**

YOUR
PUBLICATIONS
ARE YOUR
SCIENTIFIC
LEGACY

