



## CME

### Art and Science of Scientific Writing: Some Rules

**Samir Dasgupta\***

[This write-up is primarily intended to give some tips to the post-graduate students and junior researchers for their manuscript or thesis preparation]

#### A. Twelve rules for reporting numbers in scientific publications (With some examples in parenthesis)

1. Only Arabic numerals should be used, not Roman.
2. Avoid using numbers at the beginning of a title or sub-title or a sentence.
3. For number less than 10, write in words. [ in seven cases....] But if in same sentence, there are less than 10 and 10 or more values, write both in numbers. [ out of 26 seropositives 7 were males .....]
4. Numbers that represent a statistical or mathematical function should be expressed as numbers, not in words. [ Sample size was multiplied by 2 to take care of design effect]
5. Do not use 'zero' before decimal point if the value above 1 is not possible. [P value was less than .05]
6. Use a 'zero' before decimal point if value above 1 possible. [ Serum creatinine 0.97 mg/dl.]
7. Report percentage to only one decimal place if the sample size is more than 100. [ Out of 300 study subjects, 40(13.3%) were diabetic]
8. If sample size is less than 100, there is no need to report percentages with

---

**\*Professor & Head  
Dept. of Community Medicine  
North Bengal Medical College,**

mal place. [ In the sample of 87 infants, 24(27%) were LBW]

9. Do not use percentage if the sample is less than 20. [ In the sample of 15 children, 4 suffered from..... ]
10. Do not give space between number and percent sign. [15%]
11. Give single space between number and unit. [1900 cal., Hb 12 gm%]
12. For ranges, use 'to' or a 'comma' but not '--'

#### **B. Some rules for Reference citation:**

- 'Reference' is a standard way of acknowledging the source of information and ideas that have been used in a research work and publication. This allows sources to be identified and verification at any later stage thus ensures authenticity of the research publication.

Some rules of Vancouver style (commonest used style):

- Only Arabic numbers used
  - Superscript OR in round brackets in relevant place of the text
  - Numbered consecutively in order of appearance in the text
  - Same reference if used later, same number used
  - Multiple references
    - Citing more than one source at a time, cite each reference with a comma. (1,4,5)
    - If consecutive, then a 'dash' may be used. (3-7), (2-5,9,15,21)
  - The placement of citation within text
    - Inside comma and semicolon, but outside full stop
- Example:
- There have been efforts to replace mouse inoculation testing with in vitro tests like ELISA (57,60) or PCR (20-22); but these remain experimental.
  - The oral polio vaccine ..... is capable of causing AFP from the

vaccine virus known as circulating vaccine derived polio virus (cVDPV).(29)

- Be extremely careful about punctuations and space recommendations for a particular style
- There are specific recommendations for citing different sources, like, book, edited book, chapter from a book, article from a journal, web sources, Govt/other guidelines, e-book, conference reports, international/other agency reports etc.
- Consult [www.icmje.org](http://www.icmje.org) or [www.nlm.nih.gov/bsd/uniform\\_requirements.html](http://www.nlm.nih.gov/bsd/uniform_requirements.html) for updates.

**Web-based Literature search:**

In present days we are too much dependent on Web-based literature search. One major hindrance is problem of plenty. Put a few ‘key words’ in google search, in seconds few millions materials will prop up! How to screen what is ‘necessary’ and what to be discarded?

General Search Engines vs. Electronic Databases

General Search Engines (like Google)	Electronic databases (PUBMED, MEDLARS, The Cochrane library etc.)
<ul style="list-style-type: none"> <li>• Problem of plenty</li> <li>• Authenticity and validity uncertain</li> <li>• Anybody can upload anything there!! (Wikipedia)</li> </ul>	<ul style="list-style-type: none"> <li>• Source authenticity checked beforehand</li> <li>• Data validation done in databases</li> <li>• Search can be focused by scientifically formed search query</li> </ul>

- Form a well-constructed search query: In elderly patients with congestive heart failure, is digoxin effective in reducing the need of hospitalization?
- Construct Search Commands with following ‘LIMITS’ to restrict search in the desired area:

Problem under study	Congestive heart failure
Study subjects	Elderly
Intervention under study	Digoxin
Outcome measure	Hospitalization

Type of study	RCT
Comparison	None or Placebo
Language;	Language
Time limit of query	Published in last three years
Abstract or full text	Full text

- Rational use of Boolean operators: AND, OR, NOT - saves time and effort by eliminating inappropriate articles

	Example	Function
AND	Toxaemia of pregnancy AND low birth weight	Retrieves articles where both Toxaemia of pregnancy and low birth weight mentioned, obligatorily related
OR	Toxaemia of pregnancy OR low birth weight	Retrieves articles on Toxaemia of pregnancy and/or low birth weight, not necessarily both topics in the same article
NOT	Toxaemia of pregnancy OR low birth weight NOT stillbirths	Retrieves articles on Toxaemia of pregnancy and/or low birth weight excluding articles about stillbirths ('NOT' is always processed first)

- Using parenthesis ( ) =

(smoking OR tobacco) AND cancer

- Retrieves articles containing: smoking and cancer; tobacco and cancer; but NOT smoking or tobacco when cancer is not mentioned

### Language matters - Golden Rules

- The 'art' of presentation substantially determines acceptability for publication. Valuable content may 'loose' if poorly presented. The message must be effectively communicated.
- Use simple English as far as practicable, avoid complex sentences
- Incorrect English may lead to rejection of paper
- Scientific manuscripts demand precise writing. Never expand unnecessarily, better to keep on the lower side. Reader will always be happy with lesser number of pages. Moreover, all journals have space restrictions.
- Write accurately: avoid confusing statements.

- The erythrocytes, which are in blood, contain haemoglobin.

[Is there Erythrocytes elsewhere with no haemoglobin!!]

- Brevity is a virtue of scientific writing. Write short words: Some examples of common expressions that may be replaced as follows:

- Brown in color = Brown, In a considerable number of cases = Often,  
Due to the fact that = Because, Take into consideration = Consider, It  
is possible that = It may

- A sentence of more than 25 words or more than two commas within a single sentence should be reconstructed as two sentences

- Active or Passive voice?

Expression in passive voice is common practice prevailing in our publications.

- We usually write "It was found that . . ." instead of "We found that . . ."

But most of the eminent international journals are promoting active or direct presentation.

Some examples:

- "We followed up children once a day for diarrhoea and a month for anthropometry. ." [The Lancet ;2004;363:112–18]

- "We enrolled 518 patient with polycythemia vera,..." [New England Journal of Medicine. 2004;350:114–24]

- "I searched the Cochrane Library, Medline, and ..... to identify studies of common pathological findings in .." [British Medical Journal;2001;323:382–86]

- Utmost care for correct use of syntax. Faulty placement of syntax may drastically change the meaning!

The physician thought, the patient looked gravely ill.

- The physician, thought the patient, looked gravely ill.

- Never be over-dependant on Spell-check software. It may not capture all mistakes!  
- "When we consider the animal as a hole ....."

#### **Value of 'Title':**

- Web-based databases store and retrieve articles by 'key words'
- How intelligently 'key words' are put in Title / Abstract will determine how frequently it will be retrieved and cited by other researchers

Attempt should be made to indicate the following information in the 'Title':

- What? – Problem under study
- In whom? – Study subjects
- Why? – (Major) Objective
- Where? – Study setting(s)
- How? – Study design

‘Title’ should not be too short or too long, but try to incorporate the above as far as practicable.

Example:

“A case-control study to assess risk factors of rheumatic cardiac disease among primary school children in Burdwan municipal area”

- Problem under study = Rheumatic cardiac disease
- Study subjects = Primary school children
- Objective = Assessment of risk factors
- Study setting = Schools of Burdwan municipal area
- Study design = Case-control

**End note:**

Only a few aspects of scientific writing have been discussed here. Attempt has been made to present in a bullet-point manner so that this may be used as a ready-reckoner by the prospective authors. There are many other areas of scientific writing that may need more elaborate discussion

**Acknowledgement:**

Many of the concepts, information and examples used in this write-up are from following sources:

1. ICMJE Recommendations for conduct, reporting, editing and publication of scholarly work in medical journals. ICMJE; Updated December 2014. [ [www.icmje.org](http://www.icmje.org) Accessed 23 May 2015]
2. Albert T. The A-Z of medical writing. BMJ books. 2000.

3. Taylor RB. *The Clinician's Guide to Medical Writing*. Springer. 2006
4. Vancouver citation styles. Vancouver community college library.2009
5. Winkler AC, Metherell JR. *Writing the research paper: A handbook*. 8th Ed. Wadsworth. 2012.
6. Parikh MN, Hazra A, Mukherjee J, Gogtay N. *Research methodology simplified: Every clinician a researcher*. Jaypee brothers. 2010.