### **Basics Of Good Medical Writing**

Sentence Control; Writing Flow And Cohesiveness; Computer Skills



Module 10 Topic 2

### Medical Writing

- An ideal medical document/presentation is prepared with the audience in mind. The audience might be:
  - A clinical/scientific team
  - A government agency (FDA, EMA, PMDA)
  - An objective 3rd party reviewer/expert in the field
  - A product consumer/public





A well-written document will accurately present the information and successfully communicate the outcome in the most concise manner possible

### Medical Writing (contd)

Questions medical writers ask about the documents they are writing:

- What is its purpose?
- Who is the target audience?
- What type of publication is it?
- Does a template exist?





### Medical Writing (contd)

- Are there previous similar documents that can be used as a guide?
- What are the proposed start and finish dates?
- Is there a specific style guideline/format that should be followed?
- Who will sign off on the document and at what stages?



### Before writing....

- Ethics
- Confidentiality
- Conduct
- Integrity
- Honesty





### Behave ethically

- Research ethics declaration of Helsinki, ICH
- Publication ethics
  - avoid misconduct
  - protect patients' identities
  - report clearly:
    - » informed consent
    - » any deviation from usual practice
    - » full burden imposed on participants
    - » total risks posed to participants or others
    - » benefits to participants, patients, society
- It's not always enough to state that the study was approved by an ethics committee or IRB



#### Protect patients' confidentiality

Beware of personal identifiers:

- age,
- sex,
- location,
- clinical details,
- test results
- unusual personal story or
- context
- photo
   (even if of a body part or clinical image)





#### Misconduct

**Fabrication:** making up data or results and recording or reporting them

**Falsification:** manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record

**Plagiarism:** the appropriation of another person's ideas, processes, results, or words without giving appropriate credit



### Dishonest reporting of drug trial

- Not transparent (sponsors' roles, competing interests)
- Compares intervention with one known to be inferior
  - with ineffective dose of competitor intervention
  - with so much of competitor intervention that ADRs likely
- Uses multiple endpoints and reports selectively
- Reports results only from favourable centres
- Reports only favourable subgroup analyses
- Presents only most impressive results eg reduction in relative rather than absolute risk



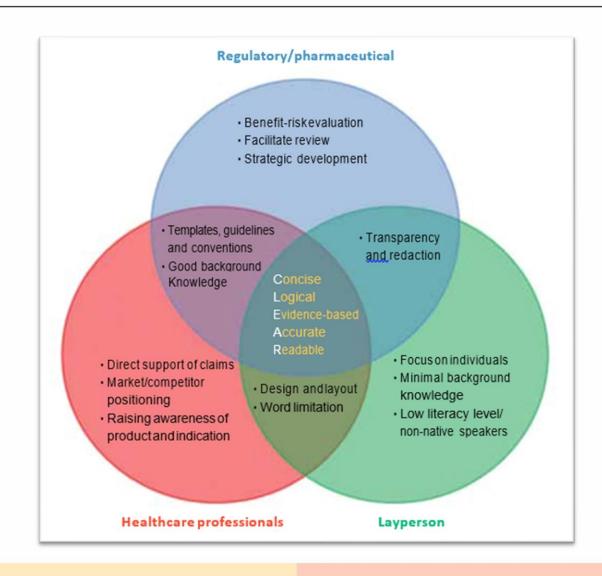
### Assessing the audience

- Regulators
- Markets
- Conferences
- Journals

Clinicians



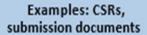
## Writing considerations for different audiences





#### Style Consistency of terminology and style

Regulatory/pharmaceutical



- Formalstyle
- · Comprehensive, objective data presentation
- Use of scientific terminology and standard regulatory terms



#### **Examples: information** sheets, marketing tools

- · Variable style
- Distillinginformation to key points and messages
- · Use of scientific terminology



#### Examples: informed consent, lay summaries

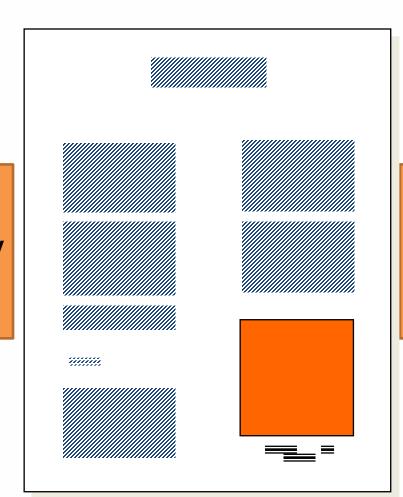
- · Informal style
- Distillinginformationtokey points and messages
  • Careful/limiteduse of
- scientificterms
- · Simple language and sentence structure



## Key components of good writing – Format and Mechanics

#### format

typography Structure layout template



#### mechanics

grammar usage punctuation spelling



#### Mechanics



Writing Styles & Grammar Nuances of Good writing

# Medical Writing Style: The Importance of Being Clear and Concise

- Use Short, Single Topic Sentences
  - Let your reader breathe. If you need to take a breath while reading your sentence, it should probably be split into two or three sentences



# Medical Writing Style: The Importance of Being Clear and Concise (contd)

#### Avoid Repetition

- It is often advisable to change the word order in a sentence in order to avoid repetition
- Example: Group A had a mean systolic blood pressure of 13.3mm Hg on Day 1 and Group B had a mean systolic blood pressure of 15.6mm Hg on Day 1
- Improved version: The mean systolic blood pressure on
   Day 1 was 13.3mm Hg in Group A and 15.6mm Hg in Group
   B
- I only advise using 'respectively' for studies with three or more groups. It requires a little more mental gymnastics to understand



# Medical Writing Style: The Importance of Being Clear and Concise (contd)

- Put the Most Important Information at the Beginning of the Sentence
  - Example: During the 13-week treatment period, 3.6% of subjects in the Drug A group and 2.3% of subjects in the placebo group reported headaches
- The sentence is about headaches, so it needs to be mentioned first. That way, anyone who is not interested in headaches does not have to read it.



#### Ten common Errors Made by Writers

- Use of a, an, the
- Punctuation
- Correct use of noun and verbs
- Word choice
- Tense
- Sentence structure
- Spelling
- Word economy
- Sentence clarity
- Over emphasis



# The ten commandments of good writing

- Each pronoun should agree with their antecedent
- Just between you and I, case is important
- A preposition is a poor word to end a sentence with
- Verbs has to agree with their subject
- Don't use no double negatives
- Avoid cliches like the plague
- Join clauses good, like a conjunction should
- Do not use hyperbole; not one writer in a million can use it effectively



#### Misuse of words

- Watch for vial alternative: young juveniles or 7 a.m. in the morning
- Amount: use this word when you refer to a mass or aggregate. Use number when units are involved. (V An amount of cash, X An amount of coins)
- And/or is a visual and mental monstrosity that should be avoided in any kinds of writing
- Case: the most common word in the language of jargon. "in this case" means "here", "in most case" means "usually", "in all cases" means "always"
- Each/every



#### Misuse of words

- It: watch for unclear antecedent
- Like: often used incorrectly as a conjunction
- Only: must positioned correctly "I hit him in the eye yesterday"
- Quite: is quite unnecessary
- Varying: mass changing not a defined word
- Which: is properly used in a "nonrestricted" sense, instead of "that" as an essential clause
- While: when a time relationship exists, "while" is correct; otherwise, "whereas" would be a better choice



#### **Avoid Passive Constructions**

- It may change verb into noun
- Swelling the sentence
- Less direct
- Poorly understood
- The active voice is usually more precise and less wordy that is the passive voice. Example: "It was found that" to "I found"
- Do not be afraid to name the agent of the action is a sentence, even when it is "I" or "We"



#### **Words Economy**

- Do not use more words where fewer will do
- A sentence is better not exceed 20 words or 2 printed lines
- Do not use long words where short ones will do
- Do not use jargon where regular words will do
- Do not use special words to make your writing seem more technical, scientific, or academic when the message is more clearly presented in another manner



#### The common touch

- As a general principle, the greater the percentage of common words an article contains, the easier it is to comprehend
- Euphemistic words and phrases normally should not be used in the scientific writing. (Animals are not "sacrificed" but "killed", Some peoples "suffered mortal sequences from" the lead in the flour. Replace it with "Some peoples died of ...."
- Singulars and plurals: 10 g was added or 10 g were added



#### Pay Attention to tenses

- What you, or others, did in the past should be stated in the past tense
- Events or objected that continue to happen or exist can be described in the present tense
- Events that will take place in the future can be in the future tense
- Whatever tense you choose, be consistent
- Whenever you write or discuss previously published work, you should use the present tense; you are quoting established knowledge



#### **Tense**

- Your own present work must be referred to in the past tense
- Most of the abstracts should be un the past tense, because you are referring to your own present results
- M&M and the results sections should be in the past tense, as you describe what you did and what you found
- Much of the introduction and discussion sections should be in the present tense
- Exceptions: in the area of attribution and presentation, a general statement or known truth; the results of calculations and statistical analyses should be in the present tense



### Might, May, and Would

They do not make a confident statement.

- Will
- Would
- Should
- May
- Might
- Could



### **Linking Sentences**

- Paragraphs contain a collection of sentences that explain in a more complicated idea instead of a single statement or simple idea.
- Sentences are linked using transitional words and phrases
- Transitions indicate relations, whether from sentence to sentence, or from paragraph to paragraph
- Smooth transitions provide coherence



#### Correctly Structure Paragraph

- A paragraph should begin with a topic sentence that clearly sets the stage for what will follow – make topic sentences short and direct
- Build the paragraph from the ideas introduced in your topic sentence
- Make the flow of individual sentences follow a logical sequence
- Try to finish each paragraph with a sentence that forms a bridge to the next paragraph



# Format Structure And Formatting



Computer skills in Medical writing

#### **Document Structure and Formatting**

- A well-structured and well-formatted document should be pleasing to the eye and should help the reader navigate through its numerous chapters
- The simplest way to get your formatting right in Word is to attach a template with pre-set styles.
   Many companies also have customised tool bars to facilitate the use of styles and standardise certain repetitive tasks such as inserting references and tables
- Never copy and paste formatting from another document unless it has identical Word styles. If in doubt, always use 'paste special' or the 'keep text only' paste option to avoid copying formatting



- Page headers and footers are important as they define the identity of the document, e.g. date, version number, study number etc.
- Do not forget to update these for each draft and in all sections of the document
- Chapter numbers should never be typed manually.
   Create automatic chapter numbers using Word styles (Heading 1, Heading 2 etc.) and insert an automatic table of contents (References tab)
- Check consistency of the use of capitals in chapter headings



- Use the 'navigation pane' (View tab) to view the document chapter headings. If any additional text appears, you probably need to correct the styles
- Always insert table and figure titles using 'insert caption' (References tab). This allows you to produce a table of contents and to insert crossreferences (References tab)
- Use 'cross-reference' (References tab) for all references to chapters, tables, and figures. Check that the hyperlinks function correctly



- 'Refresh' your document regularly (CTRL+A then F9)
  to ensure that all automatic numbers are correct.
  Avoid use of page breaks or adding carriage returns
  to position text on a new page. It is better to use
  'keep with next' (Layout tab, paragraphs, line and
  page breaks) to ensure that chapter headings stay
  with text, and that tables stay with their captions
  and footers
- Make sure that bulleted lists are consistent throughout with respect to symbols, indentation, and choice of punctuation at the end of each line (.,; or blank)



 Use non-breaking hyphens (CTRL+Alt+Hyphen) to avoid hyphenated words splitting across lines and non-breaking spaces (CTRL+Alt+Space) between numbers and their units to avoid ending a line with a number



#### Harmonisation

- It is essential to decide what terms to use, and then to stick to them throughout the whole document
- Readers do not like to have to keep switching between words that look different but are really saying the same thing. So define your terms from the beginning and then be consistent
- It is also important to reach an agreement with the statistician to ensure harmonisation between the statistical tables and your text



- Below are some of the most important concepts and terms that should be consistent
  - British versus American Spelling
  - 'Subjects' versus 'Patients'
  - Investigational Product Names
  - Treatment Group Names
  - Visit Names
  - Study Names



# Section headings should be descriptive and parallel

Non-Parallel Non-Descriptive

Introduction
Background
Marx Generators
Line Pulse
Beam Generation
Transporting Beam
Pellets
Results
Conclusions

### **Parallel Descriptive**

Introduction

Past Designs for Particle Beam Fusion

New Design for Particle Beam Fusion
Charging Marx Generators
Forming Line Pulse
Generating Particle Beam
Transporting Particle Beam
Irradiating Deuterium-Tritium Pellets

Results of New Design

**Conclusions and Recommendations** 



# Organization is hidden when headings occur in a long list without secondary headings

Performance of the Solar One Receiver

Introduction
Steady State Efficiency

Average Efficiency

Start-Up Time

**Operation Time** 

Operation During Cloud Transients

**Panel Mechanical Supports** 

Tube Leaks

Conclusion



Introduction

Receiver's Efficiency

**Steady State Efficiency** 

**Average Efficiency** 

Receiver's Operation Cycle

Start-Up Time

**Operation Time** 

**Operation During Cloud** 

**Transients** 

Receiver's Mechanical Wear

Panel Mechanical

**Supports** 

**Tube Leaks** 

Conclusion



# Use appendices to supply background for secondary audiences

### Appendix A Concern About the Greenhouse Effect

For almost a hundred years, experts have been concerned with the increasing concentrations of gases such as carbon dioxide, methane, and nitrogen oxides in the earth's lower atmosphere. These gases are natural by-products of combustion. Figure A-1 illustrates the correlation between global temperature and carbon dioxide concentrations...



### For secondary readers, use a glossary to define unfamiliar terms

### **Glossary**

- IMRAD: An acronym that represents the organizational structure most often used in research reports: Introduction, Methods, Results, and Discussion.
- Meta-analysis: A method of combining the results of several studies into a summary conclusion, using quantitative strategies that will allow consideration of data in diverse research reports
- Redaction: The process of word-by-word, sentenceby sentence modification of a paper.



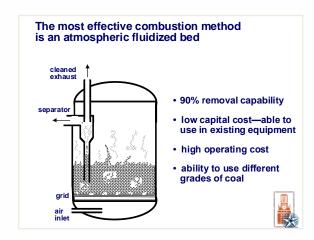
# In Medical writing, formats vary considerably to serve different situations







**Journal Articles** 



**Presentation Slides** 



### Not all rules of format are constant

Reports Sandia Laboratories	Textbooks Prentice-Hall	Journals ASME
Figure 1	Fig. 1	fig. 1
Table	Table 1	Table 1
equation	equation (1)	Eq. 1



## Format is the arrangement of type on the page

### typography

Proceedings of ASME TURBOEXPO 2000 May 8-11, 2000, Munich, Germany

2000-GT-0201

### HIGH FREESTREAM TURBULENCE EFFECTS ON ENDWALL HEAT TRANSFER FOR A GAS TURBINE STATOR VANE

### R.W. Radomsky' and K. A. Thole

Mechanical Engineering Department Virginia Polytechnic Institute and State University Blacksburg, Virginia 24060

### ABSTRACT

High freezinem turbulence along a gas turbine sirfoil and strong secondary flows along the endwall have both been reported to significarely increase convective hast transfer. This study superimposes high from trems turbulence on the naturally occurring secondary flow vertices to determine the effects on the flowfield and the endwall convective hast transfer. Measured flowfield and heat transfer data were compared between low fraustream turbulence levels (0.0%) and combustor simulated turbulence levels (19.5%) that were generated using an active grid. These experiments were conducted using a scaled-up, first stage stator vane geometry. Infrared thermography was used to measure surface temperaturns on a constant heat flux plate placed on the endwall surface. Laser Doppler velocimeter (LDV) measurements were performed of all those components of the russs and fluctuating velocities of the leading edge horseshoe vortex. The results indicate that the mean showfields for the loading edge herseshoe vertex were sixeder between the low and high theoriesms terbulence cases. High terbulence levels is the leading ofge-end wall juncture were statibated to a vertex unsteadment for both the low and high frantress tabulance cases. While, in general, the high frontress turba-Jance increased the ondwall host transfer, low appropriations were found to coincide with the regions having the most intense vertex ractions.

### INTRODUCTION

Along stathine naried numbers, obvisted convective best transfer coefditions origins. The platform of one at full (and/odl), a critical station where startings are the statement of the attention of the statement of the starting consistency of the statement of the statement of the statement of the complete frequents. The completely occurs from the accordary flowers that does dop in the from of vertices that around the platform surface. Both of these effects, high from common technique of factors in a first his attention and accordary flow of floctors and only like transfer, but who are discussed in the literature. What is missing from the form the combined of factor of combintation of the statement of the statement of the combined of the contraction of flowers and statement of the combined of factors of combined statements.

\*Procent address in

United Technologies Research Center 411 Silver Lane East Harford, CT 05108 Turbelines resussements takes at the out of a vasity of gas tember conductors have shown that the furth on range between PNs and 40% (Goldenin, et al., 1905; Kintenson and McChark, 1905; and Golden, et al., 1993) with some industries therefore its angust limited to close occlus with the duranter of the dilution bolden in the conductor (Moss, 1992). At these high levels progress through the downtown nothing votes passages; levels at the exit of the passage (Pauleusky and Thele, 1998). The effect that these high retrieval conductors of the dollar has on the action that the son to the single limit first in a significant wheels in the conductor of the dollar has one that exit that the so high retrieval conductors are of the son of the passage (Pauleusky and Thele, 1998). The effect that these high retrievals conductors on the son of the passage (Pauleusky and Thele, 1998). The effect that these high retrievals conductors of the son of the passage (Pauleusky and Thele, 1998). The effect of the son of the passage of the son of the passage of the son of the son of the son of the passage of the son of

The secondary flows proviously mentioned take the form of a leading edge horseduce vortex. This vortex splits into one lag that wrops around the suction surface and snother leg that wraps around the pressure surface with the latter ultimately forming a passage vertex. As the flow progressus downstream, the flow is dominated by the passage vortex. Guagler and Russell (1984) identified, through flow visualization and surface hest transfer, that high convective hest transfer coefficients. coincided with the most intense vortex action. Kung and Thole (1999) showed through flow field and heat transfer measurements that the reak host transfer coincided with the downward legs of both the horseshoe vortex and passage vortex. The downward log of these vortices brings high speed from tream fluid towards the endwall and thins the boundary layer to ultimated vincrouse the local heat transfer coefficients. As seen in several past and wall hest transfer studies (Courisms, et al., 1980; and Boyla and Russall, 1990; Kang, et al., 1999) the peak heat transfer on the passage endwall eweeps from the pressure side of the nickel to the suction side of the adjacent sirfoil as the passage vertex racese in that direction.

Although there have been a number of stating documenting high theoreticum unbulence affects on sinful host transfer and those have been a number of endwall flowfield and heat transfer endies, there are no studies documenting endwall heat transfer at combaste level theoreticum tradition. The work presented in this poper investigates the affect that high turbulence has on endwall heat transfer. In particular, one of the regions having the highest heat transfer is the tasking adjacentual successor. These-discussional flow field mea-

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layout

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# Each typestyle has its own personality and power

Serif

**Sans Serif** 

Times New Roman abcdefghijklmnopqr stuvwxyz1234567890 Arial abcdefghijklmnopqr stuwxyz1234567890

Garamond abcdefghijklmnopqr stuvwxyz1234567890 Arial Narrow abcdefghijklmnopqr stuwxyz1234567890



Courier abcdefghijklmnopqr stuvwxyz1234567890

Comic Sans abcdefghijklmnopqr stuwxyz1234567890

### Avoid large blocks of capital letters

### TYPE IS TO READ

Type is to read

WORDS SET IN ALL CAPS USE MORE SPACE THAN TEXT SET IN LOWERCASE.



Words set in all caps use more space than words set in lowercase.

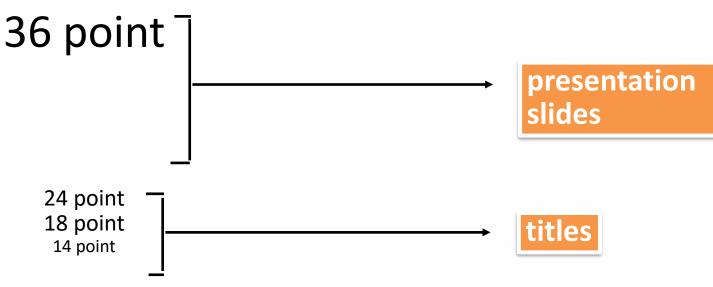
# Example: Morton-Thiokol's presentation to NASA suffered because of all capital letters on the slides

- PRIMARY CONCERNS-
- FIELD JOINT HIGHEST CONCERN
- EROSION PENETRATION OF PRIMARY SEAL REQUIRES RELIABLE SECONDARY SEAL FOR PRESSURE INTEGRITY
- IGNITION TRANSFINT (0-600 MS)
- (0-170 MS) HIGH PROBABILITY OF RELIABLE SECONDARY SEAL
- (170-330 MS) REDUCED PROBABILITY OF BELIABLE SECONDARY SEAL
- (330-600 MS) HIGH PROBABILITY OF NO SECONDARY SEAL CAPABILITY
- STEADY STATE (600 MS 2 MINUTES)
- IF EROSION PENETRATES PRIMIARY O-RING SEAL HIGH PROBABILITY OF NO SECONDARY SEAL CAPABILITY
- BENCH TESTING SHOWED O-RING NOT CAPABLE OF MAINTAINING CONTACT
- WITH METAL PARTS GAP OPERATING TO MEOP
- BENCH TESTING SHOWED CAPABILITY TO MAINTAIN O-RING CONTACT DURING INITIAL PHASE (0 170 MS) OF TRANSIENT



### Choose a type size that is easy to read

48 point — posters



footnotes

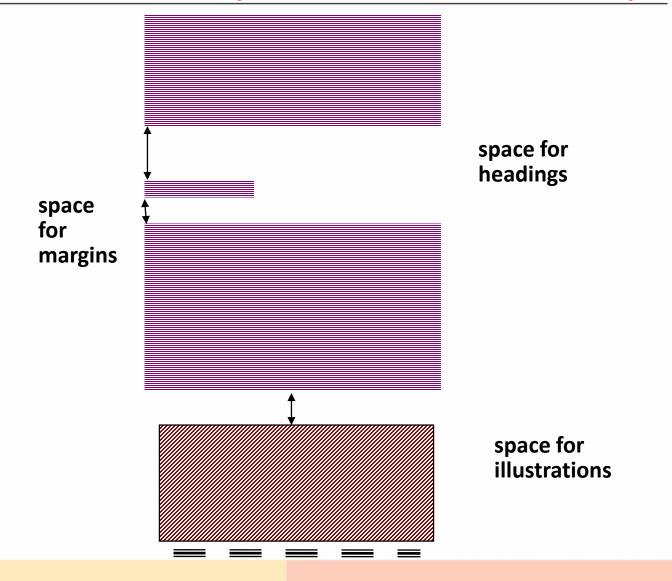


12 point

10 point

8 point

# In your layouts, use white space for association, emphasis, and hierarchy



Academ

- A good medical writer ensures that the document finalized is as per audience requirement and of utmost quality (Language as well as appearance).
- Good medical writing skills need to be developed both by experience and by skillset.
- Continual learning is key to success.

