Basics Of Good Medical Writing

Sentence Control ; Writing Flow And Cohesiveness; Computer Skills

Module 11 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

Medical Writing (contd)

- 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

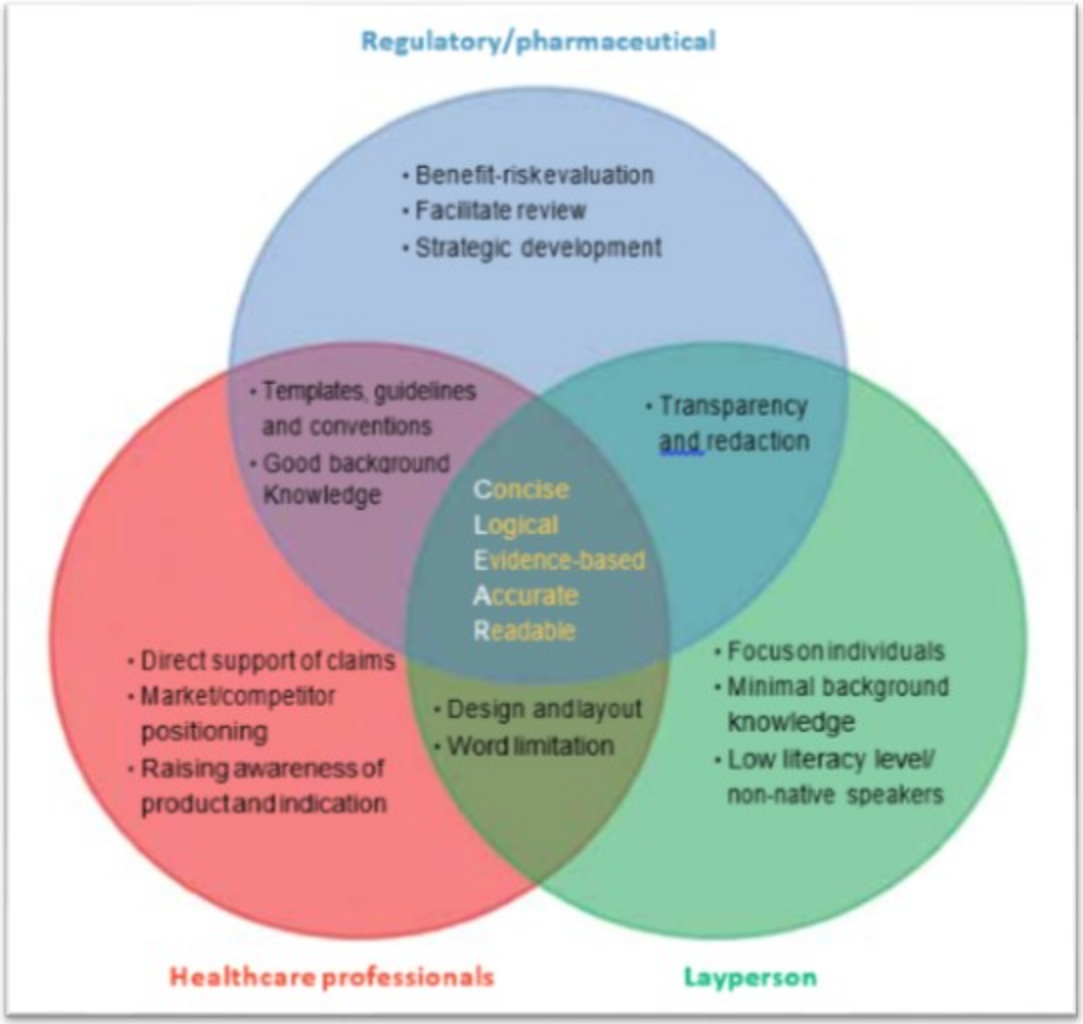
Writing process begins by analyzing constraints

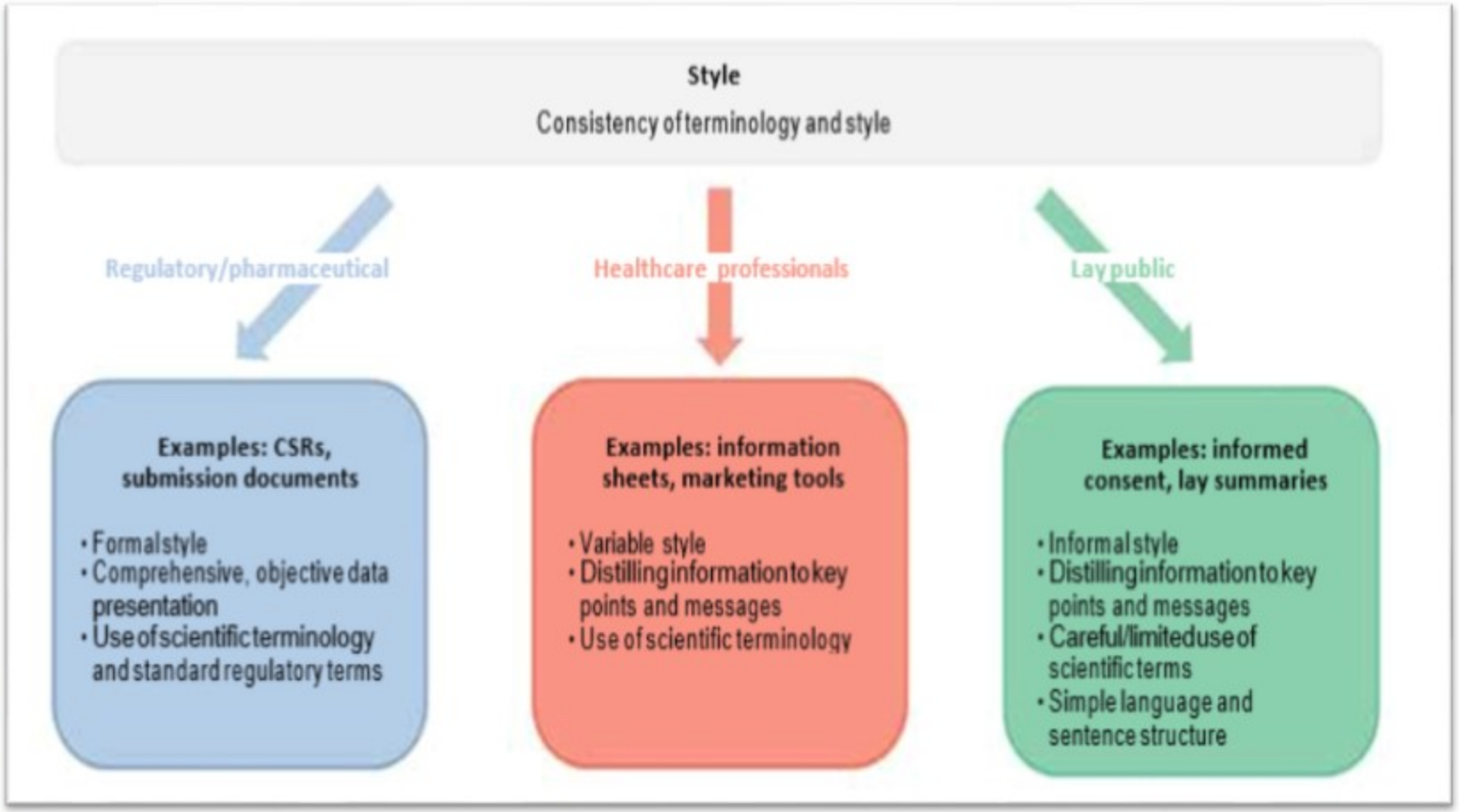
Audience	Who they are What they know Why they will read How they will read
Occasion	Format Formality Politics and ethics Process and deadline
Purpose	To inform To persuade For approval For compliance

Assessing the audience

- Regulators
- Markets
- Conferences
- Journals
- Clinicians

Writing considerations for different audiences




Style
Consistency of terminology and style
Regulatory/pharmaceutical
Healthcare professionals
Lay public
Examples: CSRs, submission documents
• Formal style
• Comprehensive, objective data presentation
• Use of scientific terminology and standard regulatory terms
Examples: information sheets, marketing tools
• Variable style
• Distilling information to key points and messages
• Use of scientific terminology
Examples: informed consent, lay summaries
• Informal style
• Distilling information to key points and messages
• Careful/limited use of scientific terms
• Simple language and sentence structure

What makes a good research question?

FINER criteria

- **F**easible (answerable with a robust method)
- **I**nteresting
- **N**ovel
- **E**thical
- **R**elevant

What makes a poor research question?

- A question you don't care about, nor does anyone else
- Looking at routine clinical data and trying to think of a question
  - the records will be biased and confounded
  - they may lack the information you need to answer your question reliably, because they were collected for another reason
- A fishing expedition/data dredging – gathering lots of information and hoping a question will emerge
  - statistical analysis of many outcomes post-hoc may yield false positives (type I errors) or false negatives owing to lack of power (type II errors)

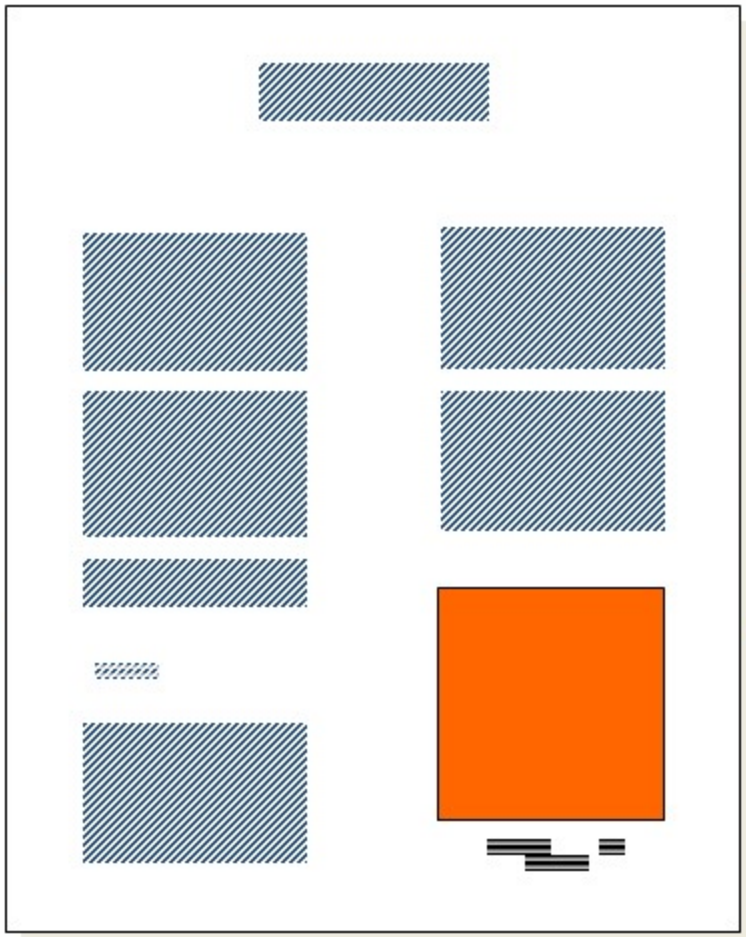
Dishonest reporting of drug trial

- 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

Key components of good writing – Format and Mechanics

format

typography
Structure
layout
template



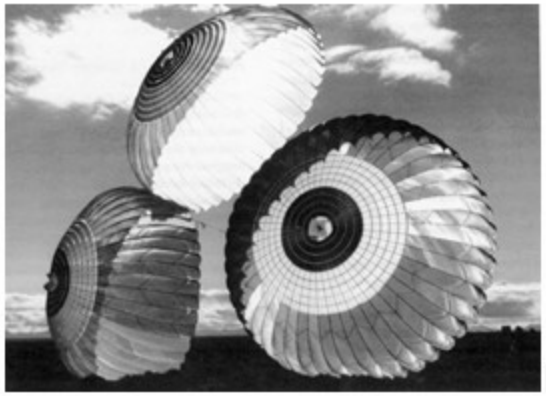
mechanics

grammar
usage
punctuation
spelling

Mechanics

Writing Styles & Grammar
Nuances of Good writing

Style is the way you communicate the content to the audience



[Peterson, 1987]

Illustration

words
wordswords
wordswordswords
Wordswordswordswords
wordswordswords
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wordswordswords

Language

Structure

style

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
- Remember to never split an infinitive
- 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
- About sentence fragments

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 quite 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 fro 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

Document Structure and Formatting (contd)

- 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

Document Structure and Formatting (contd)

- 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 cross-references (References tab)
- Use 'cross-reference' (References tab) for all references to chapters, tables, and figures. Check that the hyperlinks function correctly

Document Structure and Formatting (contd)

- '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)

Document Structure and Formatting (contd)

- 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

Performance of the Solar One Receiver

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

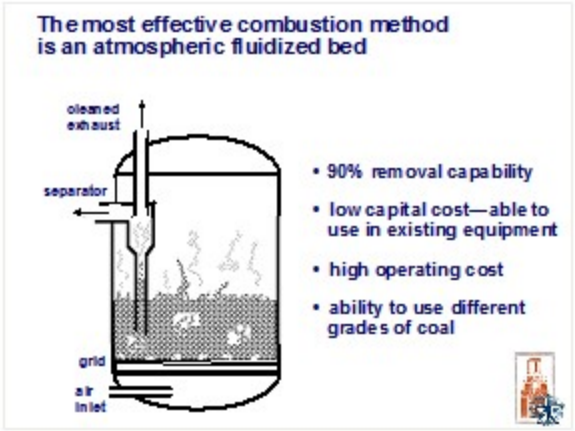
Glossary

- **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, sentence-by sentence modification of a paper.

In Medical writing, formats vary considerably to serve different situations

Formal Reports

Journal Articles



Presentation Slides

KLINTEC Academy

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

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ABSTRACT

High freestream turbulence along a gas turbine airfoil and strong secondary flows along the endwall have both been reported to significantly increase convective heat transfer. This study superimposes high freestream turbulence on the naturally occurring secondary flow vortices to determine the effects on the flowfield and the endwall convective heat transfer. Measured flowfield and heat transfer data were compared between low freestream turbulence levels (0.5%) 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 temperatures on a constant heat flux plate placed on the endwall surface. Laser Doppler velocimeter (LDV) measurements were performed of all three components of the mean and fluctuating velocities of the leading edge horseshoe vortex. The results indicate that the mean flowfields for the leading edge horseshoe vortex were similar between the low and high freestream turbulence cases. High turbulence levels in the leading edge-endwall juncture were attributed to a vortex unsteadiness for both the low and high freestream turbulence cases. While, in general, the high freestream turbulence increased the endwall heat transfer, low augmentations were found to coincide with the regions having the most intense vortex motions.

INTRODUCTION

Along a turbine airfoil surface, elevated convective heat transfer coefficients occur as a result of high turbulence levels emitting a combustor in a gas turbine engine. The platform of an airfoil (endwall), a critical surface where durability can be an issue, also has high convective heat transfer levels with a complex footprint. The complexity occurs from the secondary flows that develop in the form of vortices that sweep the platform surface. Both of these effects, high freestream turbulence effects on airfoil heat transfer and secondary flow effects on endwall heat transfer, have been discussed in the literature. What is missing from the literature is the combined effects of combustor-level freestream turbulence and secondary flows on endwall heat transfer.

Turbulence measurements taken at the exit of a variety of gas turbine combustors have shown that the levels can range between 9% and 40% (Goldstein, et al., 1985; Kestoras and McGuirk, 1988; and Goebel, et al., 1991) with some indication that the integral length scale scales with the diameter of the dilution holes in the combustor (Moss, 1992). As these high levels progress through the downstream turbine vane passage, there is a production of turbulence resulting in high turbulent kinetic energy levels at the exit of the passage (Radomsky and Thole, 1999). The effect that these high turbulence levels has on the airfoil itself is to significantly increase the heat transfer along the leading edge and pressure side surfaces as well as move the transition location forward on the suction side surface.

The secondary flows previously mentioned take the form of a leading edge horseshoe vortex. This vortex splits into one leg that wraps around the suction surface and another leg that wraps around the pressure surface with the latter ultimately forming a passage vortex. As the flow progresses downstream, the flow is dominated by the passage vortex. Graziani and Russell (1984) identified, through flow visualization and surface heat transfer, that high convective heat transfer coefficients coincided with the most intense vortex action. Kang and Thole (1999) showed through flowfield and heat transfer measurements that the peak heat transfer coincided with the downward legs of both the horseshoe vortex and passage vortex. The downward leg of these vortices brings high speed freestream fluid towards the endwall and thins the boundary layer to ultimately increase the local heat transfer coefficients. As seen in several past endwall heat transfer studies (Graziani, et al., 1980; and Blair and Russell, 1980; Kang, et al., 1999) the peak heat transfer in the passage endwall swaps from the pressure side of the airfoil to the suction side of the adjacent airfoil as the passage vortex moves in that direction.

Although there have been a number of studies documenting high freestream turbulence effects on airfoil heat transfer and there have been a number of endwall flowfield and heat transfer studies, there are no studies documenting endwall heat transfer at combustor-level freestream turbulence. The work presented in this paper investigates the effect that high turbulence has on endwall heat transfer. In particular, one of the regions having the highest heat transfer is the leading edge-endwall junction. Three-dimensional flowfield mea-

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411 Silver Lane
East Hartford, CT 06108

layout

Each typestyle has its own personality and power

Serif

Times New Roman
abcdefghijklmnopqr
stuvwxyz1234567890

Garamond
abcdefghijklmnopqr
stuvwxyz1234567890

Courier
abcdefghijklmnopqr
stuvwxyz1234567890

Sans Serif

Arial
abcdefghijklmnopqr
stuwxyz1234567890

Arial Narrow
abcdefghijklmnopqr
stuwxyz1234567890

Comic Sans
abcdefghijklmnopqr
stuwxyz1234567890

Avoid large blocks of capital letters

~~TYPE IS TO READ~~

Type is to read

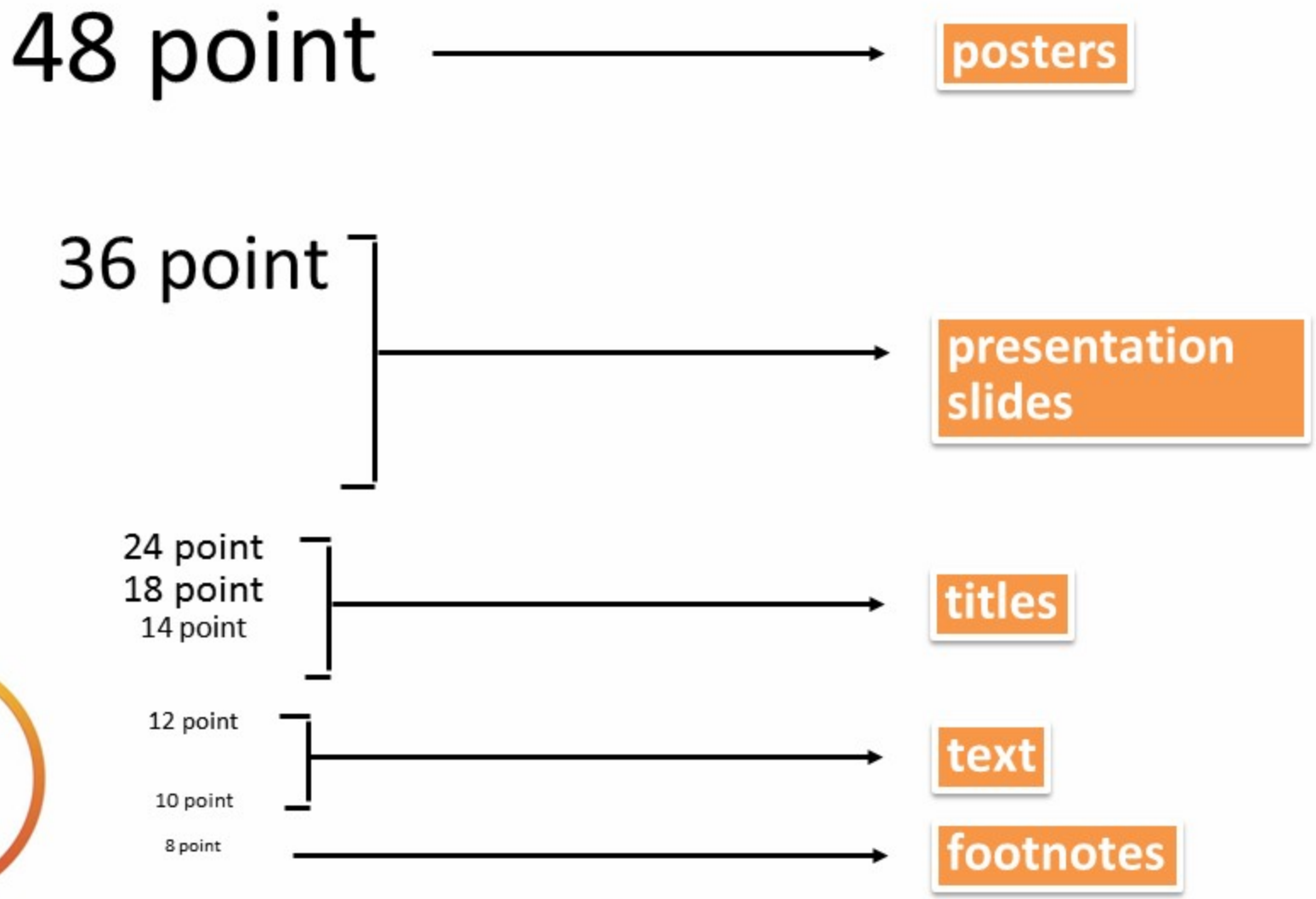
~~WORDS SET IN ALL CAPS USE MORE SPACE THAN TEXT SET IN LOWERCASE.~~

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

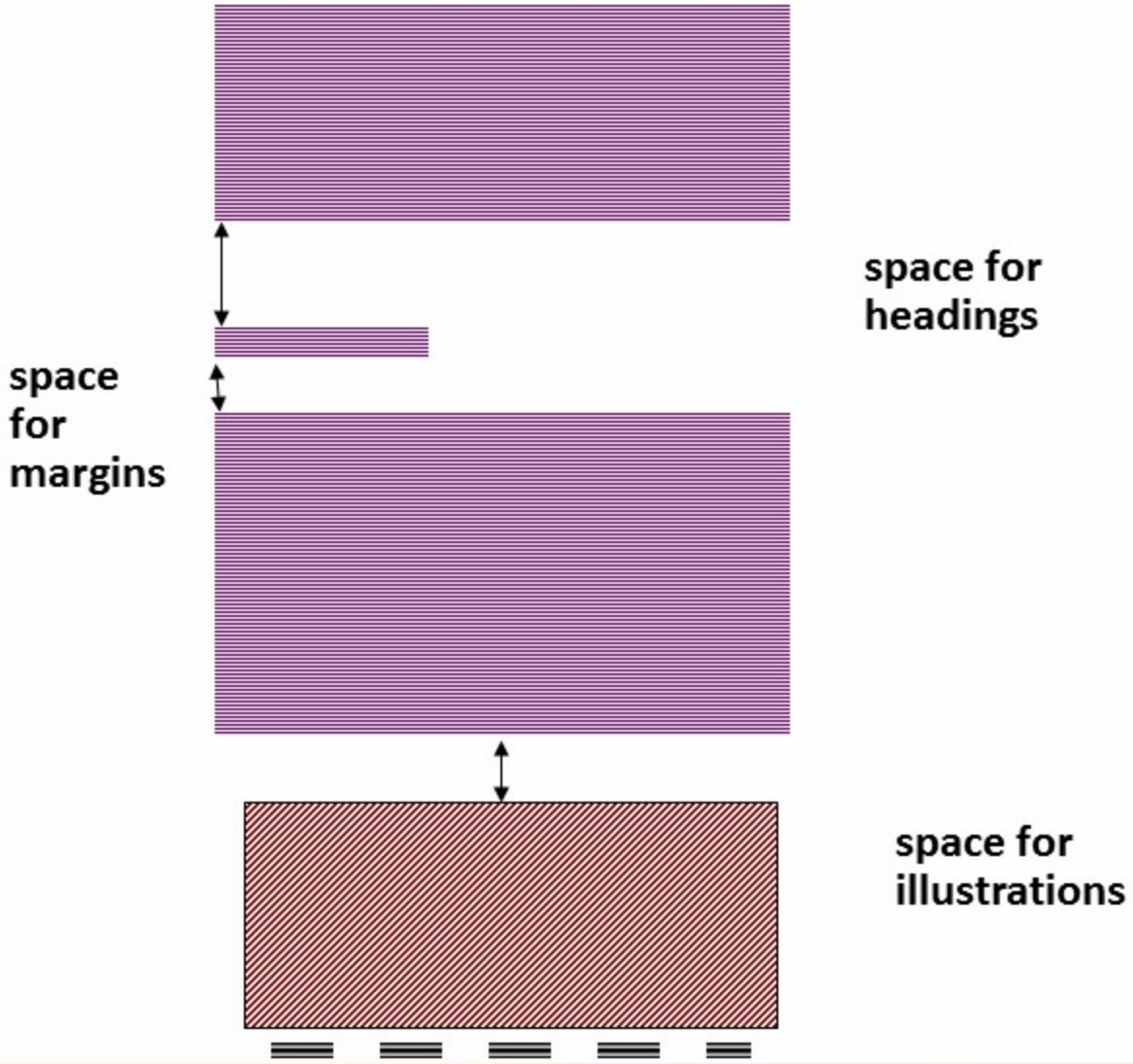
Example: Morton-Thiokol's presentation to NASA suffered because of all capital letters on the slides

- PRIMARY CONCERNS-
- FIELD JOINT - HIGHEST CONCERN
- EROSION PENETRATION OF PRIMARY SEAL REQUIRES RELIABLE SECONDARY SEAL FOR PRESSURE INTEGRITY
- IGNITION TRANSIENT - (0-600 MS)
- (0-170 MS) HIGH PROBABILITY OF RELIABLE SECONDARY SEAL
- (170-330 MS) REDUCED PROBABILITY OF RELIABLE SECONDARY SEAL
- (330-600 MS) HIGH PROBABILITY OF NO SECONDARY SEAL CAPABILITY
- STEADY STATE - (600 MS - 2 MINUTES)
- IF EROSION PENETRATES PRIMARY 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



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



- 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.