Communicating Your Research is an Essential Skill

- The ability to communicate clearly and precisely through the written word is an essential skill for medical researchers.

- Delayed publications and denial of funding because of poorly written manuscripts and grants continues to plague researchers.

- The career of a researcher depends heavily on this skill.
The Avoidable Downfall

Your research
- Carefully planned
- Novel
- Flawlessly designed and executed

Your paper or grant
- Not as carefully planned, designed, or poorly executed (written), leading to rejection or delays
- The loss or delay of disseminating important critical information to the science community is avoidable

Manuscript Flaws

57 articles evaluated to *Emergency Medicine*—28 accepted, 29 rejected
Of these 29:

- Ambiguous methods 77%
- Ambiguous results 70%
- Conclusions not warranted by data 72%
- Poor referencing 56%
- Inadequate study design description 51%
- Unclear tables 49%
- Overly long discussion 49%
- Inadequate definition of terms 49%

“Deficiencies in manuscript preparation are more frequent than mistakes in study design and execution. Specific training...in manuscript preparation is recommended.”

Journal Editor:  
What Constitutes A Good Manuscript?

**Title** descriptive and specific  
**Abstract** descriptive, specific, and of correct length  
**Introduction** and background short and strong  
**Research question** clearly stated  
**Literature** cited is comprehensive and relevant  
**Methods** descriptive enough to be replicated; appropriate statistical analyses  
**Figures and Tables** stand on their own, support conclusions, well constructed  
**Citations** relevant to topic  
**Discussion** within boundaries of findings; demonstrate how findings have helped resolve stated problem; implications and future work addressed  
**Writing** clear, terse, logical  
**Manuscript** follows journal guidelines

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The Order of Writing

- Figures, Tables
- Outline (in following order)
  - Results
  - Methods
  - Discussion
  - Introduction
- Abstract and Title
- Fill in Outline
The Outline

- Outline each segment of the paper using traditional structure: I, II, III, A, B, 1, 2, a
- Forces logical thought and order
- Eliminates unorganized thinking and writing
  - Concentrate on structure, not wordsmithing
- Uncovers flaws in arguments
- Reduces wordiness
- Makes writing easier
- Include your draft figures, tables
- Outline even your abstract with headers

Tables & Figures

*Stand-Alone & Unambiguous*
Tables and Figures

- The first thing you should tackle—put in your outline
- Critical to a paper—Editors and readers look at these before reading the paper
- Editors judge your paper on how well these are constructed
- Stand alone and tell a complete story
- Unambiguous—immediately clear

Results or Data?

**Results**

Mean translational movements in the X (left to right), Y (back to front) and Z (bottom to top) head directions were 0.10 ± 0.11 mm, 0.16 ± 0.03 mm, and 0.65 ± 0.58 mm, respectively. Mean rotational movements about the three axes were 0.44 ± 0.42 degrees, 0.24 ± 0.26 degrees, and 0.18 ± 0.17 degrees, respectively. Movement was not significantly correlated with age for translation in the X (r = -0.09; p = 0.69), Y (r = 0.21; p = 0.35) or Z (r = -1.02; p = 0.64) directions. Movement was not significantly correlated with age for rotation in the X (r = 0.15; p = 0.51), Y (r = -0.20; p = 0.35) or Z (r = 0.02; p = 0.94) directions.
Results!

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>CONTROL</th>
<th>ASD</th>
<th>t(22)</th>
<th>P*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographics</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Age, Y</td>
<td>13.1 ± 2.6, range 0-17</td>
<td>14.4 ± 3.3, range 10-18</td>
<td>-1.532</td>
<td>0.34</td>
</tr>
<tr>
<td>N</td>
<td>10</td>
<td>7 HFA, 7 AD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSIO</td>
<td>116 ± 10.5</td>
<td>112 ± 15.9</td>
<td>-1.42</td>
<td>0.123</td>
</tr>
<tr>
<td>VIQ</td>
<td>114 ± 14.2</td>
<td>104 ± 20.3</td>
<td>-1.50</td>
<td>0.112</td>
</tr>
<tr>
<td>PIQ</td>
<td>114 ± 6.3</td>
<td>118 ± 13.6</td>
<td>-1.23</td>
<td>0.112</td>
</tr>
</tbody>
</table>

Neuropsychological Results

<table>
<thead>
<tr>
<th></th>
<th>CONTROL</th>
<th>ASD</th>
<th>t(22)</th>
<th>P*</th>
</tr>
</thead>
<tbody>
<tr>
<td>EM Accuracy, %</td>
<td>80 ± 11</td>
<td>78 ± 25</td>
<td>-1.525</td>
<td>0.118</td>
</tr>
<tr>
<td>EL Accuracy, %</td>
<td>85 ± 12</td>
<td>89 ± 27</td>
<td>-1.788</td>
<td>0.095</td>
</tr>
<tr>
<td>EM Response Time, s</td>
<td>2047 ± 272</td>
<td>2531 ± 393</td>
<td>3.33</td>
<td>0.003</td>
</tr>
<tr>
<td>EL Response Time, s</td>
<td>1869 ± 300</td>
<td>2141 ± 363</td>
<td>0.623</td>
<td>0.539</td>
</tr>
</tbody>
</table>

Region of Interest Analysis—Activation

<table>
<thead>
<tr>
<th>Region</th>
<th>N</th>
<th>t(22)</th>
<th>P*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amygdala, Vox</td>
<td>13032</td>
<td>3.44</td>
<td>0.006</td>
</tr>
<tr>
<td>Fusiform Gyrus, Vox</td>
<td>7288</td>
<td>3.58</td>
<td>0.002</td>
</tr>
<tr>
<td>Prefrontal Cortex, Vox</td>
<td>9098</td>
<td>3.65</td>
<td>0.003</td>
</tr>
</tbody>
</table>

*p<0.05 was considered significant

Simple Graphs

Figure 2. Mean Patient Blood Pressure at Baseline and During Treatment

- Make it simple and self-contained
- No more than 3-4 groups
- Keep all lines solid, clear symbols, with key in plot
- Put in SD and P values if relevant
Results

What Did You Find?

Results: The Heart

- Write after figures and tables are constructed
  - Consider your data critically
  - Construct tables, figures and include them in outline
  - Write the results
  - Use subheadings within Results

- Results determine
  - Whether you’ve answered your original question(s)
  - Your direction for future studies
  - Both of which belong in the discussion
Results

- **Short** and to the point—Main or most important findings first
- **Focus**—Present only data directly relevant to the study
- **Don’t repeat methods** (but may remind the reader briefly how you measured something if needed)
- Tell a story, but **don’t make it a narrative**
- In Tables and Figures, be **descriptive, specific**. Do not repeat the obvious:
  - **NO**: Figure 1 shows an illustration of fMRI analysis in control adults during the study showing that...
  - **YES**: In controls, fMRI analysis showed increased blood flow to the basolateral nucleus of the amygdala during visual stimulation (Fig. 1).

Results

- State **ALL** the findings
  - Whether significant or not
  - **Without bias or interpretation**
  - Do not include weaknesses, strengths of study, ie don’t discuss results

- List experiments **in order listed in methods**

- **Use logical** headers and group your findings
  - Characteristics of study subjects
  - Findings in order listed in methods
  - General to specific
Zn levels were assessed in maternal plasma before randomization (week 19) and at 26, 32, and 37 weeks gestational age (Fig 1).

Beginning as early as 26 weeks and at each timepoint, significant differences in plasma zinc levels between placebo and zinc supplement groups were observed.

Common Mistakes in Results

- Tables and figures poorly constructed
- Failure to provide all the data critical to answering the research question
- Presentation of data
  - Data in tables, figures, and text must match
  - Tables, Figures should have explanation of data in footnotes (don’t refer the reader back to the methods)
- Repetition
  - Repeating methods, table/figure titles
- Commenting on results
  - “Six of the 20 patients required intubation, illustrating the seriousness of this problem”
  - “Over 40% of treated rats exhibited a decreased inflammatory response, an unexpected finding”
Methods

*How You Did It*

- Study design, type of analysis, period of study
- Condition or disease (model) studied
- Human subjects approval
- Details of sample (number, recruiting methods of study subjects, patients, how organized)
- Interventions, outcome measures
- Statistical analyses
Methods

- Editors judge the study on whether your methods are adequate to answer your specific aims or hypothesis
  - Rationale for choosing model/procedures/measurements
  - The pivotal point to judge whether the validity of results

- Methods usually the weakest section
  - Often deficient in detail, not providing enough information to replicate the study
  - Balance between brevity and completeness
  - Reference commonly used methods/models/etc
  - Statistical methods closely reviewed

Methods

- Use figures and tables (eg, design, CONSORT flow diagram)

- Naming things—be consistent
  - Acronyms—spell out first time, use consistently throughout
  - Specialized tests, terms—use identical name in text, figs, tables

- Present in logical order and your subsequent results should follow that same order

- Give enough information to replicate the study; don’t assume only the specialist in your field will read it
Introduction

Background and Significance

You can’t write a strong, focused background and significance until you finally determine how you did the study, what you found, and what it means.

Why did you carry out this research? State the specific purpose or rationale for the study.

What is the existing state of knowledge of this topic?
  - What is known?
  - What is unknown?
  - What are the gaps in knowledge this study will fill?

What are you going to do and what do you expect to find?
  - State your hypothesis or research question clearly (Objectives, Aims)

Provide only strictly pertinent references.
Introduction

- This is a vital part of your paper—it convinces (or not) the reader (editor) whether your study:
  - Has merit and asks important research questions
  - Is focused and supported by relevant recent citations
  - Is ultimately important to human health and human disease

- Reviewers and editors will determine whether the work is novel by the introduction

- Focus your introduction AFTER you construct your findings (results) and consider them (discussion)

- Your research question is the most important part of introduction—in your discussion, you will address whether the question or hypothesis was answered based on your results (analogous to specific aims)

Example Outline of Introduction

I. Introduction
   A. Zinc plays a critical role in cell function
      1. Mitochondrial function decreased in vitro stem cells without Zn (Billings)
      2. Cell motility of endothelial cells decreased (Jones, Smith)
   B. Zn concentrations decreased by physiological changes during pregnancy in gibbons (Michaels)
   C. Zn deficiency increases spontaneous abortions and pregnancy complications
      1. Rhesus monkeys (Putter) 50% increase in spontaneous abortions.
      2. White rats (Michaels, Reiss) 39% abortions with teratogenic anomalies
   D. In humans, the role of Zn deficiency in pregnancy outcome is unclear (Brown, Smith-Evans, Reiss)
   E. Objective: To whether Zn supplementation during pregnancy is associated with changes in birth outcomes
Discussion

What Does It Mean?

Don’t Deviate From Your Findings

- Few studies make discoveries changing the course of scientific direction, and authors:
  - Overly state or the importance of their findings
  - Come to erroneous or unsupported conclusions
  - Uncritically accept statistical results

- Distracts from work’s importance and signals to the reviewer problems with the research

- Results in discussion excessive length
Construction of the Discussion

- How did your findings relate to those of others?
  - The reduction in inflammatory lesions occurred at the earliest time point—4 weeks after the first dose—an effect also observed in a Phase I trial with 26 patients\(^{10}\).

- Clinical relevance?
  - The degree of response here suggests that B cell depletion with anti-CD20 agents may be a novel new therapeutic option for the relapsing-remitting form of the disease...

Construction of the Discussion

- Limitations?
  - This small 48-week trial was not powered to assess long-term safety or detect uncommon events...larger and long-term studies will be needed...

- Future direction?
  - A larger 72-week controlled trial is planned to assess patients with both the relapsing-remitting and primary-progressive form of the disease to assess...
In conclusion, the significant degree of response seen in this study suggests that B-cell depletion may be a therapeutic option for the relapsing form of this disease, provided that the observed efficacy and safety profile are sustained in longer-term controlled trials.

Conclusion ≠ Summary

In the last paragraph, do not summarize the study (abstract), rather, state your position, opinion or judgment about what your findings might mean to the field overall.
Title

- First reviewed by Journal Editors even before abstract
- Short (~80 characters)
- Specific, Relevant, Descriptive
- Finish last—your findings and conclusions may alter your title

Unnecessary Title Phrases

- A Study of.../A Study to Determine.../Results of...
- An Innovative Method...
- Contributions to (of)...
- Investigations on (concerning, about)...
- Observations on...
- A Trial Comparing...
Title—Specific & Descriptive

- Down Syndrome—Where we are today: A Review

- Nerve Growth Factors and Sodium Channels in Pancreatic Cells
  Nerve Growth Factor Increases Sodium Channel Expression in Pancreatic (Beta) Cells

- A study of MI in older Americans 1994-1999
  Epidemiological survey of MI in Community-Dwelling American Males Over 65 years

- Lazarus arise! Life and Death Issues in Intensive Care
  End-of-Life Care Issues for Critically Ill Patients in Intensive Care Hospitals

Good Titles—Sentences

- Programmed death 1 ligand signaling regulates the generation of adaptive Foxp3+CD4+ regulatory T cells

- Increased 17β-estradiol suppresses PTHrP gene expression in breast cancer cell lines

- Spinal cord stimulation attenuates visceromotor reflexes in a rat model of post-inflammatory colonic hypersensitivity

- Rhinovirus challenge decreases antioxidant enzymes in respiratory epithelial cells
Not Sentences But Good Titles

- Regulation of the expression of multiple class II genes in murine B cells by B cell stimulatory factor-1
- Reduced amygdala volume in children with 47,XXY and 47,XXX karyotypes: a high-resolution MRI analysis
- Increased brain gyrification in Williams syndrome: new evidence using 3D MRI methods
- Annual Revaccination Against Influenza and Mortality Risk in Community-Dwelling Elderly Persons

Abstract

*Specific, Descriptive, LAST*
Abstract

- With title, 1st Impression to journal editor, reader
- Sometimes the only thing read
- Sets the tone for the paper
- Follow Journal Guidelines
  - Often too long: \( \leq 250 \) words: Cannot upload paper!
- Structure it with headers as required
- Write last

“The abstract is the single most important part of a manuscript, yet the most often poorly written”

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Abstract

- **Introduction/purpose**: 1 short sentence
- **Methods, Results**: 2-4 sentences
- **Conclusion**: 1-2 sentences
- Put **objective** as imperative style:
  - Objective: To evaluate whether zinc supplementation during pregnancy affects infant birth measures.
- Include important **implications or significance**
- **Emphasize** methods, main results, and conclusion
JAMA Structured Abstract

**Context**—Summarize the study rationale and provide clinical (or other) reason for the study question.

**Objective**—State the purpose or question asked. If more than one objective, state primary objective and key secondary objectives.

**Design**—Describe basic design, including relevant details.

**Setting**—General community, primary care, hospital, etc.

**Patients**—Demographics, disorders, inclusion/exclusion criteria, etc.

**Interventions**—Name, dose, dosage

**Main outcome measure(s)**

**Results**

**Conclusions**

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**The Effect of Zinc Supplementation on Pregnancy Outcome**

**Objective**—To evaluate whether zinc supplementation during pregnancy affects infant birth measures.

**Design**—Randomized, double-blind, placebo-controlled trial.

**Setting**—Outpatient clinic at University of Alabama at Birmingham.

**Patients**—580 healthy African-American pregnant women with plasma zinc levels below normal levels, randomized at 19 weeks’ gestational age and divided by median body mass of 26 kg/m² into placebo and zinc supplement groups.

**Intervention**—Women receiving a non-zinc-containing prenatal vitamin tablet were randomized to 25 mg/day zinc or placebo.

**Outcome Measures**—Birth weight, gestational age at birth, head circumference at birth.

**Results**—Infants from zinc supplement group had greater birth weight (p<0.01) and head circumference (p=0.02) than those in placebo group. Women with body mass ≤ 26 kg/m² had infants with significantly higher birth weights (median 245 g, p<0.001) and larger head circumference (median 0.7 cm, p=0.003).

**Conclusions**—Daily zinc supplementation in women with low plasma zinc concentrations in early pregnancy is associated with greater birth weights and head circumferences, with the effect occurring in women with body mass index ≤26 kg/m². The specific effects of zinc on the fetus are unknown, and future work is focusing on zinc effects on embryonic cells in vitro.

=192 words
Traditional Abstract

Background
There is increasing evidence that B lymphocytes are involved in the pathogenesis of multiple sclerosis, and they may be a therapeutic target. Rituximab, a monoclonal antibody, selectively targets and depletes CD20+ B lymphocytes.

Methods
In a phase 2, double-blind, 48-week trial involving 104 patients with relapsing-remitting multiple sclerosis, we assigned 69 patients to receive 1000 mg of intravenous rituximab and 35 patients to receive placebo on days 1 and 15. The primary end point was the total count of gadolinium-enhancing lesions detected on magnetic resonance imaging scans of the brain at weeks 12, 16, 20, and 24. Clinical outcomes included safety, the proportion of patients who had relapses, and the annualized rate of relapse.

Results
As compared with patients who received placebo, patients who received rituximab had reduced counts of total gadolinium-enhancing lesions at weeks 12, 16, 20, and 24 (P<0.001) and of total new gadolinium-enhancing lesions over the same period (P=0.001); these results were sustained for 48 weeks (P=0.001). As compared with patients in the placebo group, the proportion of patients in the rituximab group with relapses was significantly reduced at week 24 (14.5% vs. 34.3%, P = 0.02) and week 48 (20.3% vs. 40.0%, P = 0.04). More patients in the rituximab group than in the placebo group had adverse events within 24 hours after the first infusion, most of which were mild-to-moderate events; after the second infusion, the numbers of events were similar in the two groups.

Conclusions
A single course of rituximab reduced inflammatory brain lesions and clinical relapses for 48 weeks. This trial was not designed to assess long-term safety or to detect uncommon adverse events. The data provide evidence of B-cell involvement in the pathophysiology of relapsing-remitting multiple sclerosis.

Be Specific & Descriptive

The principles of reconstruction of the traumatic losses of the external ear are presented, with emphasis on effective treatment of the acutely injured ear. The steps necessary for obtaining satisfactory reconstruction are discussed, including two new techniques.

In the past decade, advances in soft tissue surgical techniques have allowed surgeons to successfully reconstruct detached ears. We present two new surgical reconstruction techniques of the acutely injured detached ear. These include the use of local and distant tissues to obtain soft-tissue coverage, and the recent use of silastic cartilage for structural support...

- Don’t be vague—be substantive but brief
  - NOT “The implications are summarized”
  - INSTEAD Summarize the implications!
The Paper as a Whole

The Paper Is Cohesive

- The objective, specific aim, hypothesis is posed in Introduction
- Methods tell how you propose to answer these aims
- Results presented answer (or not) related to your objective/aim/hypothesis
- Discussion should be within the bounds of the results
- Conclusions directly answer the original questions in the Introduction
- Each section should refer back to one another
Reviewers “Hear” Key Words and Ideas

What reviewers hear

- “The significance of this research…”
- “In this study, our objective was”
- “In summary…”
- “We will test the hypothesis that….”
- “Alternative approaches…. potential pitfalls”
- Taken together, these findings...
- “In conclusion”

Advice From A Journal Editor-In-Chief

Stephen Hauser, M.D.  Editor-In-Chief
Advice to Authors

- **Read the instructions** and format your paper **exactly** to standards.

- **Don’t be careless**  Large numbers of grammatical mistakes, misspellings, and garbled references make the reviewers wonder whether a similar lack of care is exercised in taking histories, examining patients, collecting data, or keeping laboratory notebooks.

Advice to Authors

- **Good English works**  There is no bias against non-English-speaking authors...but lack of clarity is another matter and a major determinant of priority scores. If yours is the greatest work of the year (and we understand it), we can rewrite, punctuate, and put it into the journal style. If it is just near-great and in competition with other near-greats, it may fail.

- **Brevity is beautiful**  Brevity usually delivers the message more clearly, gives the journal more pages for other authors, impresses reviewers, and warms the hearts of editors (who are fond of three-word sentences).
Prepare Your Manuscript Carefully

- Incorrect style irritates reviewers and editors, and the wrong style suggests that another journal previously rejected the paper
- Edit carefully
  - Eliminate spelling, punctuation, and grammar errors
  - Good writing requires rewriting
- Check accuracy of references with original sources
  - Incorrect citations inconvenience the publisher and are a disservice to the reader
- Double-check numerical data!
  - Numbers in abstract, text, tables, figures, legends, and text must be consistent and correct
  - For example, a table may state a result as p=0.0029 and abstract states the same result as p=0.003

Journal Review

- Full review and decision takes 1-3 months
- Editors make decision based on arguments; they don’t count votes from Peer Reviewers
- Most papers undergo 2 rounds before publication
- For borderline decisions, a goal is to avoid multiple rounds of review
- Pressure to publish quickly may lead to rejection if further experiments are needed
Journal Review

- Editors emphasize the ultimate importance of following the journal’s instructions to authors
  - If the manuscript is rejected by 1 journal, assure the previous reviewers’ comments are addressed before sending it to the next journal
  - Assure it is in the correct new style of the journal!

- Before sending to the journal, have a colleague examine the work

- Always thank the reviewers for their reviews

What Helps or Hinders?

**What Helps?**

- New data — to a point
- Referee or Editor made factual errors
- Careful, succinct, and accurate response to reviewer comments, questions
- Telling the editor that reviews were helpful in improving the paper

**What Doesn’t?**

- Referees were “unfair” and the criticisms were largely “not valid”
- Specific evidence of bias by referee (difficult to prove)
- Endorsements or statements about your standing and reputation
Suggestions

- Put the manuscript away for a couple of days
- Read troublesome areas aloud
- Don’t try to edit a mangled paragraph—delete and rewrite it
- Your colleagues reviews of writing and table/figures are valuable—don’t be defensive about edits
- Let go of “academic” writing habits and don’t imitate others’ writing. Develop your own clear, direct style

Overview of Writing
Writing Clarifies Thought

- Unclear writing means unclear thinking
- Simply writing ideas down for critical appraisal helps clarify the thought
- Clear writing, then, will clarify the:
  - Purpose
  - Conclusions
  - Significance
- Speaking it aloud clarifies the thought
  - The better you can speak the idea, the better you can write it

An Author’s Warning

Stilted, flowery, or complicated writing impairs the reader’s ability to grasp the nuances of complex messages

“Some authors apparently (mistakenly) believe that they must impress the reader (and the editor) with mastery of multisyllabic words for their work to be given the appreciation it deserves.”

Say what you mean, mean what you say, and don’t use big words

-David Pearson. J Resp Care 49 (10) 2004
Writing Deficiencies

*Most commonly cited by journal editors*

- Wordiness and redundancies
- Poor flow of ideas
- Poor syntax and grammar
- Excessive abstraction
- Unnecessary complexity
- Excessive compression
- Unnecessary qualification
- Cut, condense, combine
- Outline to catch logic problems
- Consult an editor
- Be specific and descriptive
- Keep it simple and direct
- Do not overly compress writing
- Qualify statements as necessary

Omit Needless Words, Phrases

- There is no such thing as good writing. There is only good rewriting.

- To present ideas clearly, we need to clear out the clutter—needless words and phrases as well as repetitive sentences and ideas.

- We need to make sure the writing’s architecture reveals itself as clearly as the foundation of a well-designed building.
Needless Modifiers

- Starts out
- Cools off
- Surrounded on all sizes
- Consensus of opinion
- Entirely complete
- Add together
- Absolutely essential
- Skin rash
- Soft in consistency
- Still continues
- Estimated at about

- Audible to the ear
- Tetrahedral in shape
- Small in size
- Red in color
- In close proximity
- Final outcome
- Important essentials
- Adequate enough
- Advance planning
- Fewer in number
- Add together
- Equally as well as

Needless Phrases

- It is interesting to note...
- It should be pointed out...
- It is obvious that...
- Of course... or it is clear that...
- Needless to say...
- Call your attention to the fact...
- This is a subject that...
- In the event that...
- In the nature of...
- The point I am trying to make...
- It may be argued that...
- In a very real sense
- For the most part
- In the case of
- In regards to...
Avoid Repetition

- Do not disclose results in Introduction
- Do not repeat background or significance in Discussion
- In text
  - Do not repeat figure legends, table titles, or contents of the tables themselves
- Use tables sparingly
  - Presenting a few facts in text takes less space than a table
  - Do not use tables for presenting simple lists
  - Do not reiterate information obvious in a figure or table
- Abbreviations, definitions, symbols in figures and tables must be explained in legends and footnotes
  - Never refer a reader back to text for such information

Delete on Sight

- Arguably                  Confusing
- Needless to say          Just say it
- It is interesting to note Just note it
- Recent                   Undefined: last week, last year?
- Significant              Meaningless unless statistical

- It...that constructions

- It is a fact that
- It is apparent that
- It is of interest to note
- It is often the case
- It is recognized that
- It is shown that
Stacked Modifiers: Overly Compressing Language

- A series of fixed duration sequential constant rate infusions...
  (which adjective is qualifying which noun?)
  - Fixed-duration, sequential, constant-rate infusions
  - Sequential infusions of constant rate and fixed duration

- ...mouse marrow-derived macrophage colony-stimulating factor (M-CSF) dependent monocytes
  - Monocytes, derived from mouse marrow, whose growth was dependent on macrophage-stimulating factor (M-CSF)

- Another aspect of spinal fluid biochemical profile complexity
  - Another aspect of the biochemical complexity of spinal fluid

Vague, Inaccurate Adjectives and Adverbs

- Very, exceedingly, clearly, large, small

  The magnitude of change was very large
  The change was 10-fold larger than...
  Figure 1 clearly shows...
  Figure 1 shows...

- Only leads the reader

  The patients receiving drug A had only a 4% incidence of bleeding
  The patients receiving drug A had a 4% incidence of bleeding compared with a 10% incidence in subjects receiving drug B
Don’t Turn Verbs Into Nouns

WEAK verb phrases (passive)
- The neutralization of reactions were...
- The measurement of fields are...

STRONG verbs (active)
- Neutralized
- Measured

The human immune system is responsible not only for the identification of foreign molecules, but also for the actions leading to their immobilization, neutralization, and destruction.

The inhibition of the reaction was carried out by...

An increase in heart rate occurred

Heart rate increased

Choose Strong Verbs

- The neutralization of the toxic proteins was carried out by the B cells
  - B cells neutralized the toxic proteins

- In these animals, the infusion of glucose was carried out in a timed course every 2 hours
  - In these animals, glucose was infused every 2 hours
Use Topic Sentences

- Use a *topic sentence* to announce the paragraph’s topic.

- *Many patients with a chronic wound have other diagnoses that require medical attention.* Frequently encountered are vascular insufficiency, metabolic disturbance… A *treatment plan* for chronic wounds is not adequate until such problems are addressed…

- *Treatment plans are generally divided by physiologic system.* Those dealing with the cardiovascular system…

Use Logical Transitions

- This question is discussed in more detail in the following paragraphs..

- Thus, many educators believe that if medical students work under difficult conditions during clinical rotations, they will be better prepared for the *unpredictable demands of practice.*

  - The unpredictable demands of emergency medicine and critical care…

- Because of this, However, Meanwhile, Next, More specifically,

- Three hypotheses have been suggested for this. First, … A second hypothesis… Third,
Tense

- Use **PRESENT** tense
  - When describing established knowledge or previously published results
    
    *Lesions of the midbrain cause...*
  - Used in Abstract, Introduction, Discussion

- Use **PAST** tense
  - When describing Methods and Results
    
    *We used... We found ... BUT*
  - Use PRESENT for presenting figures/tables in results
    
    *Table 1 illustrates... Table 5 shows ...*
  - For attribution of other’s work
    
    *Smith reported...*

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Tense

- Do **not** use the **PERFECT** tenses:
  
  *Smith has reported the presence of ...* Present perfect
  
  *Jones had described the action of drug A...* Past perfect

- Use **FUTURE** tense only for pointing out the need for further studies:
  
  *In the next series of studies, we will examine this population in series with ...*
Unclear (and Clear)

Writing

Examples


Unclear Writing

The influence of age (younger vs. older) has been reported recently\(^3\) for multiple sclerosis disease in the context of a more rapid clinical response.

Compared with older (\(\geq 56\) years) patients, younger (\(\leq 55\) years) patients with multiple sclerosis have a more rapid (<4 weeks) clinical response, as measured by a reduction in protocol-defined clinical relapses\(^3\).
Pompous, Academic Writing

Baby walkers are devices that provide preambulatory infants with postural support in addition to offering them the opportunity to experience bipedal locomotion. They are intended to simulate the infant’s independent locomotion activity and by so doing, it is argued, encourage and even accelerate the early acquisition of this skill.

Baby walkers are devices that allow babies at the crawling stage to stand up and practice walking. Such devices may encourage and even accelerate a baby’s ability to walk independently.

Summary

- **Begin as early** as your data is being analyzed
- **Outline** your paper
- **Look at your data and decide** how to organize and present your results: tables, figures, text
- **Write clearly, logically, simply**
- **Start with results**
- **Write title and abstract** last
- Put it away, **re-read**, give to your **colleagues** to read
- **Revise**, revise, and re-revise
- **Adhere by journal guidelines to the letter**
- **Critically evaluate** your paper with an editor’s eye
- **Enjoy** the process and what you CREATE!