Writing for the Reader

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Scientific Writing and Publication

• **Authors**: explain your work to others in a public forum

• **Reviewers**: critically evaluate your work

• **Editors**: decide whether to publish your work

• **Readers**: read and cite your work
An Account of a very odd Monstrous Calf.

By the same Noble person was lately communicated to the Royal Society an Account of a very Odd Monstrous Birth, produced at Limmington in Hampshire, where a Butcher, having caused a Cow (which cast her Calf the year before) to be covered, that she might the sooner be fatted, killed her when fat, and opening the Womb, which he found heavy to admiration, saw in it a Calf, which had begun to have hair, whose hinder Leggs had no Joynts, and whose Tongue was, *Cerberus-like*, triple, to each side of his Mouth one, and one in the midst: Between the Fore-leggs and the Hinder-leggs was a great Stone, on which the Calf rid: The *Sternum*, or that part of the Breast, where the Ribs lie, was also perfect Stone; and the Stone, on which it rid, weighed twenty pounds and a half; the outside of the Stone was of Grenish colour, but some small parts being broken off, it appeared a perfect Free-stone. The Stone, according to the Letter of Mr. David Thomas, who sent this Account to Mr. Boyle, is with Doctor Haughteyn of Salisbury, to whom he also referreth for further Information.
“The man of science appears to be the only man to have something to say just now, and the only man who does not know how to say it.”

Sir James Barrie
An Introduction to the History of Medicine, 1929
Why Do We Write Scientific Papers?

- To demonstrate research productivity
- To protect intellectual property
- To get credit (publish first)
- To advance our career
- To secure funding

*We write to publish...and to avoid perishing!*
Why Do We Write Scientific Papers?

- To disseminate and advance knowledge
- To promote thought and debate
- To stimulate further research
- To change practice
- To educate

*We write to communicate — or do we?*
I used to hate writing assignments, but now I enjoy them.

I realized that the purpose of writing is to inflate weak ideas, obscure poor reasoning, and inhibit clarity.

With a little practice, writing can be an intimidating and impenetrable fog. Want to see my book report?

“The dynamics of interbeing and monological imperatives in Dick and Jane: A study in psychic transrelational gender modes.”

Academia, here I come!
Publication
Publication

Communication

The Writer

The Reader
Readability of the Scientific Literature

- The Gunning Fog Index
- A measure of the readability of text
  - Easy reading is 6-10
  - The average person reads at level 9
  - Anything >level 17 is difficult for university students

- How readable is the medical literature?
  - Children's books 6-10
  - Newspapers 12-14
  - Medical journals 14-16
  - Law journals 16-18
  - Insurance policies 18-20

Readability of the Scientific Literature

The LEX score is based on word frequency and usage

- Nature +35
- Time magazine +2
- US/UK newspapers 0
- TV (prime time) -36
- Farmer talking to cows -56

Knight J. Nature 2003;423:376
Oh this is far too important to be readable

Medical Journal

Tim Alberts, *Short Words*
Attributes of Good Scientific Writing

- simple
- explicit

→

- clear
- understandable

Write for the uninformed reader
“... it is only in attempts to explain his work to somebody who has not done it that he can acquire the discipline of clear and reasoned communication, which too is part of the scientific method.”

Karl R. Popper
We Regret to Inform You...

- Poor writing is a top reason for rejection
- Main editor and reviewer criticisms
  - Poor organization
  - Too long and verbose
  - Failure to communicate clearly
  - Poor grammar, syntax, or spelling
  - Excessively self-promotional
  - Poorly written abstract

Pierson DJ. *Respiratory Care*. 2004;49(1):1246-1252
The Case for Good Writing
Writing for the Reader: Main Points

• Think about your audience
• Organize your main ideas
• Write, then edit
Writing for the Reader: Main Points

• Think about your audience
• Organize your main ideas
• Write, then edit
  ▫ *It’s okay to write garbage, as long as you edit...*
Think About Your Audience
Think About Your Audience

The Editor: I have 2,000 other manuscripts to choose from.

The Peer Reviewer: Don’t waste my time.

The Graduate Student: Tweet me.

The Doctor: I don’t have much time to read journals.
What is your main message?
• The single most important thing you want to convey to readers
• A single sentence with a verb
• Use it to focus your writing and connect the parts of your manuscript
Function and Molecular Mechanism of Acetylation in Autophagy Regulation

Cong Yi, Meisheng Ma, Leili Ran, Jingxiang Zheng, Jingjing Tong, Jing Zhu, Chengying Ma, Yufen Sun, Shaoqin Zhang, Wenzhi Feng, Liyuan Zhu, Yan Le, Xingqi Gong, Xianghua Yan, Bing Hong, Fen-Jun Jiang, Zhiping Xie, Di Miao, Haiteng Deng, and Li Yu


The acetyltransferase TIP60 functions specifically to promote autophagy in cells deprived of growth factors.

Abstract » Full Text » Full Text (PDF) » Supplementary Materials

CSK3–TIP60–ULK1 Signaling Pathway Links Growth Factor Deprivation to Autophagy

Shu-Yong Lin, Tertyty Yang Li, Qing Liu, Cixiong Zhang, Xiaotong Li, Yan Chen, Shi-Meng Zhang, Guili Lian, Qi Liu, Ka Ruan, Zhen Wang, Chen-Song Zhang, Kun-Yi Chien, Jiawei Wu, Qinxi Li, Jiahuai Han, and Sheng-Cai Lin

Science 27 April 2012: 477-481.

A signaling pathway is involved in cellular responses to serum starvation but not glucose starvation.

Abstract » Full Text » Full Text (PDF) » Supplementary Materials

GBP5 Promotes NLRP3 Inflammasome Assembly and Immunity In Mammals

Avinash R. Shenoy, David A. Wellington, Pradeep Kumar, Hilina Kassa, Carmen J. Booth, Peter Cresswell, and John D. MacMicking


Published online 29 March 2012 [DOI:10.1126/science.1217141]

A human protein activates the assembly of a cellular complex that detects signs of infection.

Abstract » Full Text » Full Text (PDF) » Supplementary Materials

The Inhibitory Receptor PD–1 Regulates IgA Selection and Bacterial Composition in the Gut

Shimpei Kawamoto, Thinh H. Tran, Mikako Maruya, Keiichiro Suzuki, Yasuko Doi, Yumi Tsutsui, Lucia M. Kato, and Sidonia Fagarasan


An inhibitory receptor is important for gut microflora containment by immunoglobulin A.

Abstract » Full Text » Full Text (PDF) » Supplementary Materials

Microbial Exposure During Early Life Has Persistent Effects on Natural Killer T Cell Function

Torsten Olszak, Dingding An, Sebastian Zeissig, Miguel Pinilla Vera, Julia Richter, Andre Franke, Jonathan N. Glickman, Reiner Siebert, Rebecca M. Baron, Dennis L. Kasper, and Richard S. Blumberg


Published online 22 March 2012 [DOI:10.1126/science.1219328]

Early exposure of germ-free mice to microbes keeps later inflammation in check by modulating immune cells.

Abstract » Full Text » Full Text (PDF) » Supplementary Materials » Podcast Interview
Organize Your Main Ideas

**Introduction**

What did I want to do?

**Methods**

How did I do it?

**Results**

What did I find?

**Discussion**

What might it mean?
Why Is Structure So Important?

- **For writers:** a framework helps organize ideas and information
- **For readers:** predictable patterns and relationships aid comprehension
  - Helps readers find information
  - Helps readers draw conclusions
Make sure the readers know where they are, where they are going, and why
Structure of a Manuscript

Introduction

Methods

Results and

Discussion
Structure of a Manuscript

Introduction

• First paragraph: Why did you start the study?
• Last paragraph: What was the aim of your study?
The Introduction

Go from the general, broad context of your work, to tell the reader what is already known, to what is not yet known, to what the problems are and to what you have decided to do.
Structure of a Manuscript

**Discussion**

- First paragraph: What were the most important findings?
- Last paragraph: What is the main conclusion and its implications?
The Discussion

After summarizing your results, identify limitations and biases, compare and contrast them with previous findings and discuss theoretical and practical implications of your own; give suggestions for future research; show what is new and how your results fit into the broad field described at the beginning of the Introduction.
Cohesion Between the Parts

**Introduction**

Diabetes is an increasingly important cause of morbidity and mortality...

**Methods**

...these findings have strong potential to facilitate early detection of diabetes.

**Results and Discussion**
The aims of this study were to measure blood glucose concentration in... 

The results of this study indicated that blood glucose concentration was...
Structure of a Manuscript

**Methods**

**Results**

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Total</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students²</td>
<td>40(41)</td>
<td>17(37)</td>
<td>23(63)</td>
</tr>
<tr>
<td>Postgraduates³</td>
<td>20(23)</td>
<td>10(48)</td>
<td>10(52)</td>
</tr>
<tr>
<td>Specialists⁵</td>
<td>40(38)</td>
<td>20(73)</td>
<td>10(27)</td>
</tr>
<tr>
<td>Total</td>
<td>112(100)</td>
<td>56(50)</td>
<td>56(50)</td>
</tr>
</tbody>
</table>

Parallel construction
The Title

- The most visible, read, and searched part of an article
  - Accurate
  - Informative
  - Succinct
- From the reader’s perspective: (why) should I read this paper?
A simple mechanism for complex social behavior

*PLoS Biology* 2011
Diagnostic value of single complete compression ultrasonography in pregnant and postpartum women with suspected deep vein thrombosis

*British Med J* 2012
A single continuous title:
Randomized controlled trial of maintenance treatment of depression in old age

A title with subordinate terms following a colon:
Maintenance treatment of major depression in old age: randomized controlled trial

A title and a subtitle:
Preventing major depression in old age. Randomized controlled trial of maintenance therapy with paroxetine or psychotherapy
The Abstract

• The most accessible, read, and functional part of an article
• Must accurately convey the main elements and the most important findings
• Structured abstracts
  ▫ Help writers
    • Remember what to include
    • Organize information
  ▫ Help readers search & understand by:
    • Chunking information
    • Following a pattern
Identifying a well-tolerated dose of pralatrexate for T-cell lymphoma

Systemic treatment for cutaneous T-cell lymphoma (CTCL) involves the use of less aggressive, well-tolerated therapies. Pralatrexate is a novel antifolate with high affinity for reduced folate carrier-1. A dose de-escalation strategy identified recommended pralatrexate dosing for patients with CTCL that demonstrated high activity, good rates of disease control, and an acceptable toxicity profile for continuous long-term dosing. Eligibility included mycosis fungoides, Sézary syndrome, or primary cutaneous anaplastic large cell lymphoma, with disease progression after ≥ 1 prior systemic therapy. The starting dose was 30 mg/m²/wk intravenously for 3 of 4 weeks. Subsequent starting doses were 20, 15, and 10 mg/m²/wk for 3/4 weeks. Response was evaluated by the modified severity-weighted adjustment tool. Fifty-four patients were treated. The recommended regimen was identified as 15 mg/m²/wk for 3/4 weeks and was explored in the expansion cohort. In 29 patients treated with the recommended dosing regimen, the median number of prior systemic therapies was 4. Pralatrexate was administered for a median of 4 cycles; response rate was 45%. The most common grade 3 adverse event was mucositis (17%). Pralatrexate 15 mg/m²/wk for 3/4 weeks shows high activity with acceptable toxicity in patients with relapsed/refractory CTCL.

BACKGROUND: Systemic treatment for cutaneous T-cell lymphoma (CTCL) involves the use of less aggressive, well-tolerated therapies. Pralatrexate is a novel antifolate with high affinity for reduced folate carrier-1.

STUDY DESIGN: A dose de-escalation strategy identified recommended pralatrexate dosing for patients with CTCL that demonstrated high activity, good rates of disease control, and an acceptable toxicity profile for continuous long-term dosing.

METHODS: Eligibility included mycosis fungoides, Sézary syndrome, or primary cutaneous anaplastic large cell lymphoma, with disease progression after ≥ 1 prior systemic therapy. The starting dose was 30 mg/m²/wk intravenously for 3 of 4 weeks. Subsequent starting doses were 20, 15, and 10 mg/m²/wk for 3/4 or 2 of 3 (2/3) weeks. Response was evaluated by the modified severity-weighted adjustment tool. Fifty-four patients were treated. The recommended regimen was identified as 15 mg/m²/wk for 3/4 weeks and was explored in the expansion cohort. In 29 patients treated with the recommended dosing regimen, the median number of prior systemic therapies was 4. Pralatrexate was administered for a median of 4 cycles; response rate was 45%. The most common grade 3 adverse event was mucositis (17%).

CONCLUSION: Pralatrexate 15 mg/m²/wk for 3/4 weeks shows high activity with acceptable toxicity in patients with relapsed/refractory CTCL.

Horwitz et al. Blood Mar 6 2012
Write...

- The first draft
- Get it all out
- Write quickly
- Write the whole thing
Pause
Think
Reflect
...then Edit

- Is the meaning clear?
- Is the writing vigorous?
- Is it simple and concise?
- Does it say what I mean?
- Is the grammar correct?
Attributes of Good Scientific Writing

Write for the uninformed reader

simple, explicit, clear, understandable
What Is the Main Message?

• From time immemorial, it has been known that regular ingestion of the fruit of any tree of the genus *Malus* (eg, *Malus sylvestris*), said fruit being usually round in shape and red, yellow, or greenish in color, on a diurnal basis is associated with a significant reduction in the frequency of domiciliary visits from a primary member of the health care establishment.
An apple a day keeps the doctor away
“A good scientist should be able to explain any laboratory result to a bartender.”

Francis Crick
Is the meaning clear?

Short topical paragraphs
Short sentences
Smooth transitions
Avoid noun clusters
Avoid stacked modifiers
Avoid excessive caution
Use parallel construction
Use Topical Paragraphs

- One major idea
- State the most important thing first: define the topic
- Follow with supporting sentences
- End with a concluding or transitional sentence
The topic or main point:
Enterovirus infections in the neonatal period are common and are associated with significant morbidity and mortality.
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Enterovirus infections in the neonatal period are common and are associated with significant morbidity and mortality.

A supporting sentence:
According to two recent studies, enterovirus accounts for 4-6% of diarrhea cases in neonatal intensive care units in the United States.
The topic or main point:

Enterovirus infections in the neonatal period are common and are associated with significant morbidity and mortality.

A supporting sentence:

According to two recent studies, enterovirus accounts for 4-6% of diarrhea cases in neonatal intensive care units in the United States.

A concluding sentence:

Efforts to improve neonatal health and survival must include a focus on enterovirus infections.
The topic or main point:
Enterovirus infections in the neonatal period are common and are associated with significant morbidity and mortality.

A supporting sentence:
According to two recent studies, enterovirus accounts for 4-6% of diarrhea cases in neonatal intensive care units in the United States.

A transitional sentence:
Therefore, measures that reduce enterovirus transmission could improve neonatal health and survival.
Use Short Sentences

• One major thought
• Goal: 25 words or 3 lines or less
  ▫ Easier to digest
  ▫ Faster to read
  ▫ Avoids confusion (the need to read more than once)
• Arrive quickly at the verb
Relative sensitivity of five different Egyptian plant species, namely *Senecio vulgaris*, *Malva parviflora*, *Sonchus oleraceus*, *Medicago sativa* and *Melilotus indicus* to elevated levels of ozone has been studied.
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Relative sensitivity of five different Egyptian plant species, namely *Senecio vulgaris*, *Malva parviflora*, *Sonchus oleraceus*, *Medicago sativa* and *Melilotus indicus* to elevated levels of ozone has been studied.

Relative sensitivity of five Egyptian plant species to elevated levels of ozone has been studied.
Relative sensitivity of five different Egyptian plant species, namely *Senecio vulgaris*, *Malva parviflora*, *Sonchus oleraceus*, *Medicago sativa* and *Melilotus indicus* to elevated levels of ozone has been studied.

Specifically, we tested *Senecio vulgaris*, *Malva parviflora*, *Sonchus oleraceus*, *Medicago sativa* and *Melilotus indicus*. 

*Environ Poll.* 2003
Create Smooth Transitions

- Use words and phrases that shift the focus
  - However
  - Although
  - Those
  - Since then
  - Therefore
  - In addition
  - For example
Avoid Noun Clusters

Lead ionization chamber

Was the lead being ionized?
Was the chamber made of lead?
In human overhydrated cation-leak stomatocytosis...
Avoid Stacked Modifiers

The results of this randomized, double-blind, placebo-controlled trial demonstrated that this drug is effective...
Novel photo-cross-linkable polymer bearing spindle-type chromophores for second-order non-linear optical materials

J Mater Sci 2011
Avoid Excessive Caution

- There is evidence that...
- It is generally believed that..
- It may be expected that...
- It is widely held that...
- It appears that...
Use Parallel Construction

• Severe pain was reported by 58% of patients and 70% of the group indicated that it was moderate.

• In this study, 58% of patients reported severe pain and 70% reported moderate pain.
Is the writing vigorous?

Use an active voice
Release the active verb
Active and Passive “Voice”

• Passive voice
  ▫ **OBJECT - VERB - SUBJECT**
  ▫ “The tubes were vortexed (by us)”
  ▫ Indirect, emphasizes the receiver of the action

• Active voice
  ▫ **SUBJECT - VERB - OBJECT**
  ▫ “We vortexed the tubes”
  ▫ Direct, emphasizes the performer of the action
Use an Active Voice

• **AMA Manual of Style**: “Authors should use the active voice, except in instances in which the actor is unknown or the interest focuses on what is acted on.”

• **British Medical Journal**: “Please write in a clear, direct, and active style...Write in the active [voice] and use the first person where necessary.”
It was concluded that the treatment was not effective.
It was concluded that the treatment was not effective.

We concluded that the treatment was not effective.
Based on the results, it was concluded that the treatment was not effective.

What was based on the results? Who concluded?
Based on the results, it was concluded that the treatment was not effective.

On the basis of the results, we concluded that the treatment was not effective.
The new nursing program had been approved by the Curriculum Committee.
The new nursing program had been approved by the Curriculum Committee.

The Curriculum Committee approved the new nursing program.
We tested AE1 and RhAG as candidate genes responsible for stomatocytosis and initiated functional characterization of the cation transport abnormality.

We concluded that unlike overhydrated cation-leak stomatocytosis, the lesion in this cohort of patients was not caused by mutations in the genes encoding AE1 and RhAG.

Shmukler et al, *Blood Cells, Molecules, and Diseases*, 2012
Use an Active Voice

- The verb “actively” moves the sentence along
- Conveys a sense of immediacy
- More direct and to the point
- Avoids the impression of hedging
- Enhances the authority of the writer
- But...balance it with the passive voice
Use the Passive Voice

• When the subject is unknown, irrelevant, or less important
  ▫ The patient was transported to the hospital by ambulance
  ▫ The solution was heated to 40°C for 30 minutes and then allowed to cool
  ▫ Bilirubin is produced by heme degradation within macrophages
"Release" the Active Verb

<table>
<thead>
<tr>
<th>Change this...</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>We came to the conclusion</td>
<td></td>
</tr>
<tr>
<td>We reached a decision</td>
<td></td>
</tr>
<tr>
<td>The doctor conducted an examination</td>
<td></td>
</tr>
<tr>
<td>The results were indicative of</td>
<td></td>
</tr>
<tr>
<td>We performed an analysis</td>
<td></td>
</tr>
</tbody>
</table>
“Release” the Active Verb

<table>
<thead>
<tr>
<th>Change this...</th>
<th>...to this</th>
</tr>
</thead>
<tbody>
<tr>
<td>We came to the conclusion</td>
<td>We concluded</td>
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<td>The results indicated</td>
</tr>
<tr>
<td>We performed an analysis</td>
<td>We analyzed</td>
</tr>
</tbody>
</table>
Is it simple and concise?

Use simple words
Delete extra words
Use Simple Words

- Enumerate
- Exhibit
- Majority
- Administer
- Terminate
- Utilize
Use Simple Words

- Enumerate (count)
- Exhibit (have)
- Majority (most)
- Administer (give)
- Terminate (end)
- Utilize (use)
Delete Extra Words

- In conjunction with
- In order to
- For the purpose of
- Was found to be
- Few in number
- Yellow in color
- Joined together
- Very rare
Delete Extra Words

- In conjunction with
- In order to
- For the purpose of
- Was found to be
- Few in number
- Yellow in color
- Joined together
- Very rare
Bias is likely to occur if the only subjects who are enrolled are those who are chosen specifically on the basis of the presence or absence of disease.
Bias is likely to occur if the only subjects who are enrolled are those who are chosen specifically on the basis of the presence or absence of disease.
Bias is likely to occur if the only subjects who are enrolled are those who are chosen specifically on the basis of the presence or absence of disease.

Bias can occur if the subjects are selected on the basis of the presence or absence of disease.
Rift Valley Fever is a seasonal vector-borne viral disease that affects animals such as antelope, buffalo, cattle, goats and sheep, causing abortion in pregnant animals and mortality.
Rift Valley Fever is a seasonal vector-borne viral disease that affects animals such as antelope, buffalo, cattle, goats and sheep, causing abortion in pregnant animals and mortality.
Rift Valley Fever is a seasonal vector-borne viral disease that affects animals such as antelope, buffalo, cattle, goats and sheep, causing abortion in pregnant animals and mortality.

Rift Valley Fever is a seasonal vector-borne viral disease that causes abortion and mortality in antelope, buffalo, cattle, goats and sheep.
The results of this study have the potential to make a significant impact on our ability to serve rural populations.
The results of this study have the potential to make a significant impact on our ability to serve rural populations.
The results of this study have the potential to make a significant impact on our ability to serve rural populations.

The results of this study could significantly improve our ability to serve rural populations.
Does it say what I mean?

Be precise
Avoid editorializing
Check the grammar
Use the proper tense
Be Precise

• Use accurate terminology
  ▫ Comprise vs compose
  ▫ Use ‘significant’ only for statistical meaning

• Avoid nonspecific words and phrases
  ▫ eg, ‘some’, ‘in general’

• Avoid jargon and slang
  ▫ Keep your audience in mind
  ▫ Don’t write the way you talk
Plasma PTH concentrations, both I-PTH and W-PTH, remained fairly stable during the study period with only a small peak, which did not seem relevant for diagnostic purposes, around one year of age.
Plasma PTH concentrations, both I-PTH and W-PTH, remained **fairly stable** during the study period with **only a small peak**, which **did not seem relevant** for diagnostic purposes, **around one year of age**.
Plasma PTH concentrations, both I-PTH and W-PTH, remained fairly stable during the study period with only a small peak, which did not seem relevant for diagnostic purposes, around one year of age.

Plasma I-PTH and W-PTH concentrations fluctuated slightly but did not change significantly from 6 to 15 months of age.
Avoid Editorializing

- Surprisingly...!
- Remarkably...!
- Interestingly...
- Regrettably...
- The patient was suffering from acute hepatic failure
It is clearly evident in Figure 1 that species diversity increased with habitat complexity.
It is clearly evident in Figure 1 that species diversity increased with habitat complexity.

Species diversity increased with habitat complexity (Figure 1).
Unfortunately, because of our survey design, we had no way of knowing if subjects wheezed more with exertion.
Unfortunately, because of our survey design, we had no way of knowing if subjects wheezed more with exertion.

Our survey design did not allow us to identify participants who experienced more wheezing on exertion.
Check the Grammar

• Make sure subject and verb agree
  ▫ Singular vs plural
  ▫ Remember: “data are…”

• Appropriate usage
  ▫ ‘That’ vs ‘which’
  ▫ ‘Compared to’ vs ‘compared with’
  ▫ ‘Increased’ vs ‘higher’
  ▫ ‘Lesser’ vs ‘fewer’
A random sample of 60 homes were selected for the collection of water samples.
A random sample of 60 homes were selected for the collection of water samples.
Fasted rats that received the drug had significantly increased alkaline phosphatase activity compared with fed rats.
Fasted rats that received the drug had significantly increased alkaline phosphatase activity compared with fed rats.

Fasted rats that received the drug had significantly higher alkaline phosphatase activity than fed rats.
This study aims to measure the prevalence of several childhood illnesses.
This study aims to measure the prevalence of several childhood illnesses.

The aim of this study was to measure the prevalence of several childhood illnesses.
This study aims to measure the prevalence of several childhood illnesses.

The aim of this study was to measure the prevalence of several childhood illnesses.

Our aim in conducting this study was to measure the prevalence of several childhood illnesses.
Use Proper Tense

• Past tense for your study (the work already has been done)
  ▫ “We found a strong correlation between...”

• Present tense for generally accepted knowledge
  ▫ “Nanoparticles are important in medicine.”
  ▫ “Our study has important implications for the prevention and treatment of asthma.”
In Summary: Edit

- Clear
- Vigorous
- Concise
- Precise
In Summary: Write for the Reader

- Write, then edit
- Think about the audience
- Organize and structure
Final Thoughts About Writing

- Focus on the science and the main message
- A well-written manuscript has a competitive advantage
- Get feedback
- Read and critically evaluate many papers
Resources


• [www.biomedicaleditor.com](http://www.biomedicaleditor.com)