WRITING THE BIOMEDICAL MANUSCRIPT

©CHRISTOPHER DANT

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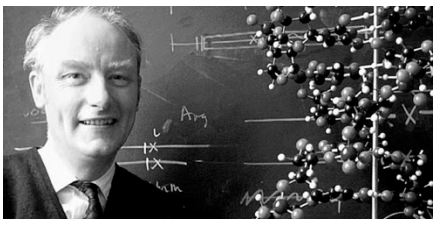
The Recognized Problem

"There is no form of prose more difficult to understand and more tedious to read than the average scientific paper!"



-Dr. Francis Crick, 1994
The Astonishing Hypothesis

Manuscript Writing

- Communicating science clearly
- What makes a good paper—the journal editor's perspective
- Parts of a manuscript and manuscript writing strategies
- Advice from Journal Editors

My Mantra

- Many papers deserve to be better written than they are
- If your research is worth writing, it's worth writing up well

The Fatal Flaw of Writing

No amount of clever writing can cover for a poorly designed or executed study…

but there are *many* ways to disguise a good one!

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

Awareness of Flaws

"An awareness of the most common fatal flaws in writing is necessary if authors are to improve the quality of their manuscripts."

nature REVIEWS NEUROLOGY

John W Griffin, MD Editor-in-Chief

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."

Taylor and Brown, Emergency Medicine 13(4):444-50, 2001

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

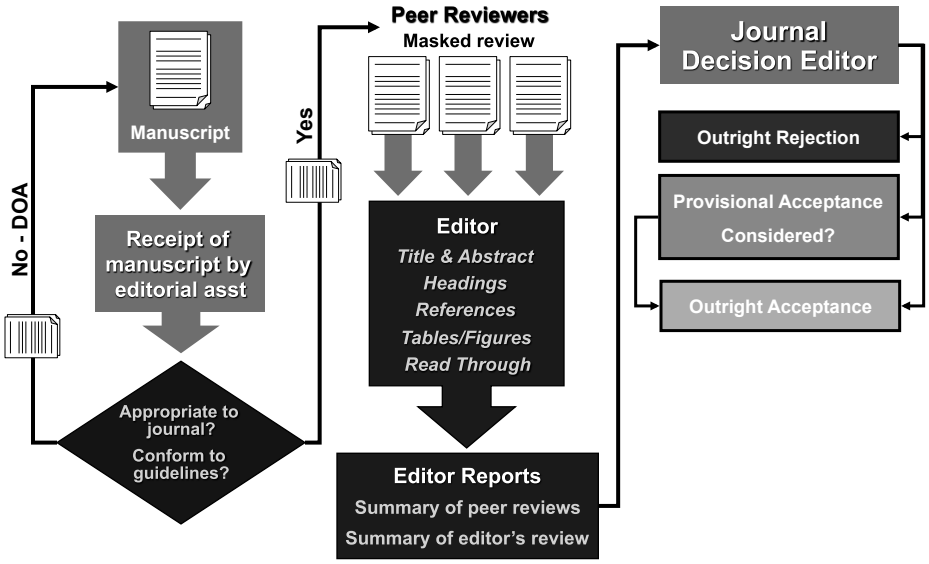
Citations relevant to topic

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

Manuscript Reviews



Illustrate with Example

JAMA®

The Journal of the American Medical Association

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Vol. 274 No. 6, August 9, 1995

ARTICLE

The effect of zinc supplementation on pregnancy outcome

R. L. Goldenberg, T. Tamura, Y. Neggers, R. L. Copper, K. E. Johnston, M. B. DuBard and J. C. Hauth
Department of Obstetrics and Gynecology, University of Alabama at Birmingham 35233-7333, USA.

The Order of Presentation

Title

Abstract

Introduction

Materials and Methods

Results

Discussion

The Order of Writing

Figures, Tables

⇩

Outline (in following order)

⇩

Results

⇩

Methods

⇩

Discussion

⇩

Introduction

⇩

Fill in Outline

⇩

Write Abstract, Finish Title

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?

During the encoding task, significant activation clusters were detected in the left middle frontal gyrus (MFG) extending into the inferior frontal gyrus (IFG) (BA 9/45/47; Talaraich coordinates: −40, 14, 28), left MFG (BA 8; −40, 22, 50), left superior frontal gyrus (BA 6; −24, −8, 64), right IFG (BA 47; 28, 28, −2), left LTL (BA 22; −62, −22, 2), right cerebellum (30, −70, −16) together with right fusiform/lingual gyrus (BA 18; 18, −88, −14), left cerebellum/vermis (−6, −60, −16) (Fig. 1, top row) as well as the left (−30, −12, −18) and right hippocampus (34, −12, −16) (Fig. 2, left panel). During the retrieval task, when performance was not considered, significant activation clusters were detected in the left IFG (BA 47; −28, 24, −4), left MFG/IFG extending into the anterior cingulate cortex (BA 9/44/24; −36, 12, 28), right IFG (BA 44; 56, 16, 24 and BA 47; 36, 20, −10), left supramarginal gyrus (BA 40; −34, −46, 42), right putamen and caudate (16, 10, 2), right cerebellum (36, −74, −18) together with right fusiform/lingual gyrus (BA 18; 28, −90, −6) and vermis (−2, −62, −40) (Fig. 1, middle row) as well as the right hippocampus (26, −4, 22) (Fig. 2, right panel). During retrieval, brain activation related to accurate memory performance was observed in the left LTL (Fig. 1, bottom row), with peak activation in the middle temporal gyrus (BA 21 and 22; −50, −38, −4) extending into the superior and inferior temporal gyri. No activation clusters were detected in the prefrontal cortex, hippocampus, or other MTL structures. No brain regions showed negative correlations with behavioral performance.

Results!

VARIABLE	CONTROL	ASD	t(22)	P*
Demographics				
Age, Y	13.1 ± 2.5, range 9-17	14.4 ± 3.3, range 10-18	-1.532	0.34
N	10	7 HFA, 7 AD		
FSIQ	116 ± 10.5	112 ± 15.9	-1.42	0.123
VIQ	114 ± 14.2	104 ± 20.3	-1.53	0.112
PIQ	114 ± 6.3	118 ±13.6	-1.23	0.112
Neuropsychological Results				
EM Accuracy, %	90 ± 11	76 ± 25	-1.625	0.118
EL Accuracy, %	85 ± 12	69 ± 27	-1.768	0.095
EM Response Time, s	2047 ± 272	2531 ±393	3.33	**0.003**
EL Response Time, s	1960 ± 300	2141 ± 363	0.623	0.539
Region of Interest Analysis—Activation				
Amygdala, Vox	9342	2342	3.44	**0.006**
Fusiform Gyrus, Vox	7898	1239	3.58	**0.002**
Prefrontal Cortex, Vox	9098	1122	3.65	**0.003**

*p<0.05 was considered significant

Table!

In survivors, medical resources use after VAP diagnosis was significantly higher in high and very-high-risk patients when compared to mild-risk patients, evaluated using ICU length of stay (22.5 ± 10.3 days vs 18.7 ± 12.9 days; median, 21.0 vs 16.0 days; Mann-Whitney *U test Z statistic = −3.413; p < 0.001) and duration of mechanical ventilation (18.9 ± 9.9 days vs 15.1 ± 11.5 days; median, 17.0 vs 12.0 days; Mann-Whitney U test Z statistic = −3.454; p < 0.001) after VAP diagnosis*.

No Table

As compared with patients in the placebo group, the proportion of patients in the anti-CD20 treatment group with relapses was reduced at week 24 (14.5% vs. 34.3%, p= 0.02) and week 48 (20.3% vs. 40.0%, p=0.04).

Tables & Result

Table 2.—Selected Pregnancy Outcomes and Neonatal Measurements in the Zinc Supplement and Placebo Subgroups by Body Mass Index (BMI) Categories

	BMI ≥26			BMI <26		
	Zinc Supplement (n=155)	Placebo (n=145)	*P*	Zinc Supplement (n=134)	Placebo (n=134)	*P*
Maternal Characteristics						
Age, y	24.8	24.2	.32	22.9	21.2	.01
BMI, kg/m²	33.4	33.0	.64	22.3	22.2	.57
Current smoker, %	7.7	5.5	.44	3.0	3.0	.98
Pregnancy Outcome						
Birth weight, g	3240	3241	.99	3190	2942	.005
Gestational age, wk	39.0	38.7	.47	38.6	37.9	.08
Preterm birth <32 wk, %	3.2	5.5	.33	3.0	6.8	.15
Birth weight <1500 g, %	3.9	3.5	.84	2.3	6.0	.12
Anthropometric Measurements						
Crown-heel length, cm	50.2	49.8	.41	50.3	49.7	.20
Head circumference, cm	34.3	34.0	.50	34.1	33.4	.005
Abdominal circumference, cm	33.3	33.1	.64	32.8	32.6	.58
Arm length, cm	9.9	9.7	.27	9.9	9.6	.03
Subscapular skinfold, mm	4.2	3.9	.05	3.9	3.6	.06
Neonatal Outcome						
Neonatal hospital stay, d	3.9	4.5	.47	3.1	4.9	.10
Neonatal sepsis, %	0.7	1.4	.52	0	2.2	.08

In women with BMI <26 kg/m^2, zinc supplementation was associated with a significant increase in birth weight of 248 g (*P=0.005), an increase in head circumference of 0.7 cm (P=0.005), and increase in arm length of 0.3 cm (P=0.03). The other outcome measures all favored the zinc supplement group but the differences were not statistically significant (Table 2).*

Tables and Footnotes

Table 3. (Continued.)

End Point	Placebo (N=35)	Rituximab (N=69)	P Value
Clinical			
Relapses between wk 0 and wk 48 — no. of patients (%)			
0 relapses	21 (60.0)	55 (79.7)	
1 relapse	11 (31.4)	8 (11.6)	
2 relapses	1 (2.9)	5 (7.2)	
≥3 relapses	2 (5.7)	1 (1.4)	
Mean no. of relapses (range)	0.54±0.82 (0–3)	0.30±0.67 (0–3)	
Annualized rate of relapse from wk 0 to wk 24			
Total no. of relapses	13	11	
Total subject-years of follow-up	15.9	31.3	
Unadjusted rate	0.8	0.4	
Adjusted rate (90% CI)**	0.8 (0.53–1.31)	0.4 (0.23–0.60)	0.04††
Mean‡‡	0.8±1.20	0.3±0.86	
Median	0	0	
Annualized rate of relapse from wk 0 to wk 48			0.08††
Total no. of relapses	19	21	
Total subject-years of follow-up	27.2	59.7	
Unadjusted rate	0.7	0.4	
Adjusted rate (90% CI)**	0.7 (0.46–1.12)	0.4 (0.24–0.57)	
Mean‡‡	0.7±1.05	0.4±0.81	
Median	0	0	

* Plus–minus values are means ±SD. Numbers of gadolinium-enhancing lesions were not whole numbers because of the inclusion of imputed data. Data on MRI findings were available for 66 patients in the rituximab group.
† The P value is based on van Elteren's test stratified according to the baseline Expanded Disability Status Scale (EDSS) score (range of scores, 0 to 10.0, with higher scores indicating more severe disease), status with respect to previous treatment, and baseline gadolinium-enhancing lesions in 100 patients.
‡ The P value is based on Friedman's analysis of covariance (ranked data), adjusted for the baseline total volume of lesions detected on T_2-weighted MRI and stratified according to the baseline EDSS score (≤2.5 or >2.5) and status with respect to previous treatment with interferon beta or glatiramer acetate; all tests were two-sided.
§ The patients who discontinued treatment before weeks 24 and 48 were considered to be relapse-free if they did not have any relapse during the study period.
¶ The P value is based on the Cochran–Mantel–Haenszel chi-square test stratified according to the baseline EDSS score (≤2.5 or >2.5) and status with respect to previous treatment with interferon beta or glatiramer acetate.
‖ The logit-estimate of the relative risk of relapse was adjusted according to the baseline EDSS score (≤2.5 or >2.5) and status with respect to previous treatment with interferon beta or glatiramer acetate.
** 90% CIs are based on the logit-adjusted method.
†† The P value is based on Poisson regression adjusted for the baseline EDSS score (≤2.5 or >2.5) and status with respect to previous treatment with interferon beta or glatiramer acetate.
‡‡ The mean annualized relapse rate per patient is the number of relapses for each patient divided by the total number of years of follow-up.

Table, Figure Captions

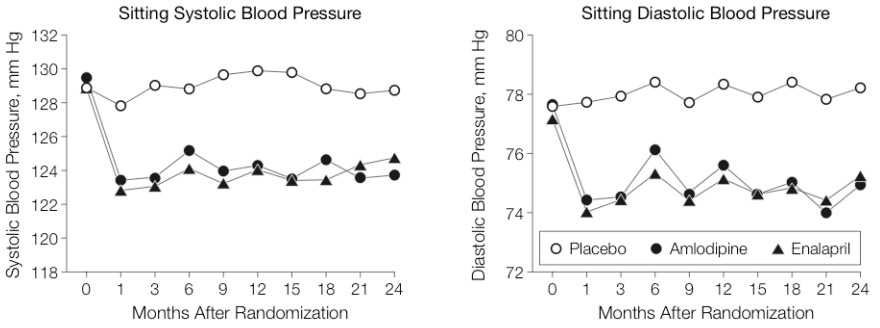
Table 3 Association of rs7025486[A] with venous thromboembolism and pulmonary embolism

			rs7025486[A]				
Sample set	n_c[a]	n_a[a]	f_c[b]	f_a[b]	OR (95% CI)	P	P_{het}[c]
Venous thromboembolism							
Iceland[d]	5,863	1,019	0.298	0.321	1.14 (1.03–1.25)	0.011	
Canada 1	226	187	0.257	0.246	0.95 (0.68–1.30)	0.73	
Canada 2	78	27	0.263	0.278	1.08 (0.54–2.16)	0.83	
Spain	888	675	0.177	0.196	1.13 (0.94–1.36)	0.18	
Combined	7,055	1,908			1.12 (1.07–1.22)	0.0079	0.71
Pulmonary embolism							
Iceland[e]	5,863	479	0.298	0.336	1.21 (1.07–1.37)	0.0026	
Canada							
ACE	226	72	0.257	0.271	1.08 (0.70–1.65)	0.74	
PEDS	78	26	0.263	0.288	1.14 (0.56–2.29)	0.72	
Spain	888	234	0.176	0.218	1.30 (1.01–1.67)	0.045	
Combined	7,055	811			1.20 (1.09–1.32)	0.00030	0.97

Association of rs7025486[A] with VTE and pulmonary embolism in several sample sets of European descent. [a]The number of controls n_c and affected individuals n_a. [b]Frequency in controls f_c and in affected individuals f_a. [c]P value for the test of heterogeneity in the effect estimates. [d,e]We included 1,626 ungenotyped Icelanders with VTE and 901 ungenotyped Icelanders with pulmonary embolism in the analysis, with $n_{a,eff}$ = 1,554 and 775, respectively, and adjusted the P values for relatedness of the Icelandic individuals by dividing the χ^2 statistic by the corresponding genomic-control factors λ_g = 1.319 and 1.207.

Simple Graphs

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



- Use graphing software to create but keep it uncluttered
- No more than 3-4 groups
- Keep all lines solid, few symbols
- Put in SD and P values if relevant

Results

What Did I Find?
The Heart!

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
  - Order is dictated by your story, not the order of your experiments
- 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)
- Allow the data to speak for itself—use tables/figures —construct them first and use as a basis for writing
- Figures and tables will guide the outline
- In Tables and Figures, be descriptive, specific. Do not repeat the obvious:
  - NO: Results of the kidney lead analysis are shown in Table 1…
  - YES: Kidney lead concentrations increased in group 1 over the first 10 study weeks (Table 1).
  - NO: Figure 1 is an illustration of fMRI analysis in control adults during the study showing that…
  - YES: fMRI analysis of control adults revealed an increase in blood flow to the amygdala during visual stimulus (Fig. 1).

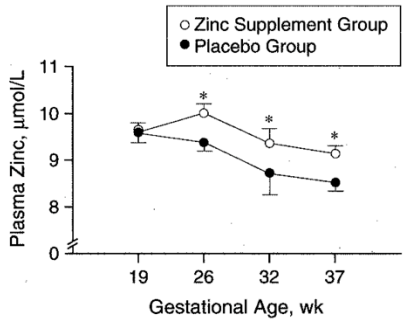
Results

- 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

Don't Regurgitate Results in Tables, Figures

- As shown in Table 1, the mean age of participants was 20.4 ± 2 years, and 80% of patients were Caucasian. Treatment group contained 40 patients, whereas control group contained 45 patients. Table 2 shows the demographics of women in these groups. There were 24 women in the control group, and 33 women in the treatment group...
- There were no significant differences in treatment and control patient intake demographics (Table 1), although a significantly greater number of patients in the treatment group dropped from the study for a variety of reasons, mostly relating to adverse reactions. However, analysis of patients in this group later revealed that those dropped patients had significant disease at intake (Table 2). In comparing the two treatment groups (Fig. 1), we found that...

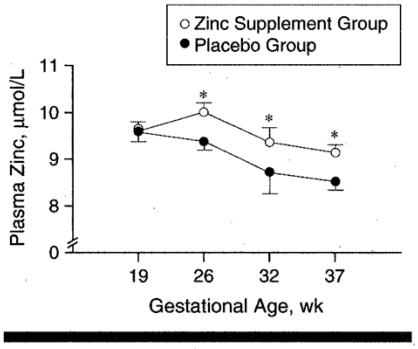
Don't State the Obvious



Changes in plasma zinc concentrations. Asterisk indicates significant difference between the values of the zinc supplement and placebo groups ($P \leq .05$). Vertical bars indicate SEMs.

Figure 1 is a line graph illustrating the plasma zinc levels (µmoL/L) over the 37 weeks versus gestational age in both the zinc supplement group and placebo group. The placebo and the zinc group both decreased over the 37 weeks of the study, but the differences were significant for the zinc group.

State What's Important To Reader



Changes in plasma zinc concentrations. Asterisk indicates significant difference between the values of the zinc supplement and placebo groups ($P \leq .05$). Vertical bars indicate SEMs.

We measured mothers' plasma zinc levels before randomization (week 19) and at 26, 32, and 37 weeks' gestational age (Fig 1).

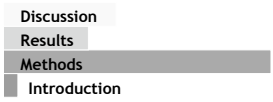
Beginning as early as 26 weeks and at each timepoint, differences in plasma zinc levels between placebo and zinc supplement groups were statistically significant after randomization.

Methods

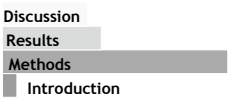
Could Others Replicate Your Study?

Methods are Critical: Editors' Responses

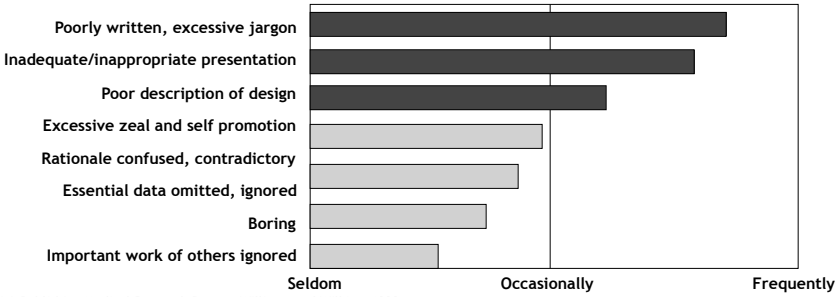
What section contains the most flaws?



What section responsible for outright rejection?



How frequently do Editors encounter manuscript problems?



Byrne DW, Publishing Medical Research Papers, Williams and Wilkins, 1998

Methods

- Editors judge the study on whether your methods are adequate to answer your specific aim or hypothesis
  - Rationale for choosing procedures/tests
  - The pivotal point to judge whether the validity of results
- Don't suggest a method you have no expertise with
  - Peer reviewers may uncover this
  - Use consultants for methods you have no experience with, stating this in paper
- Methods usually the weakest section
  - Often deficient in detail, not providing enough information to replicate the study
  - Statistical shortcomings closely reviewed
- Many problems with study design and execution will kill your chances of acceptance

Methods

- Balance between brevity and completeness
  - Reference an commonly used method
- Use figures and tables (eg, design, flow diagram)
- Naming things—be consistent
  - Acronyms—spell out first time, use consistently throughout
  - Specialized tests, terms—use identical name in text, figs, tables
- Develop list of frequently used terms
- 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

Method—Design

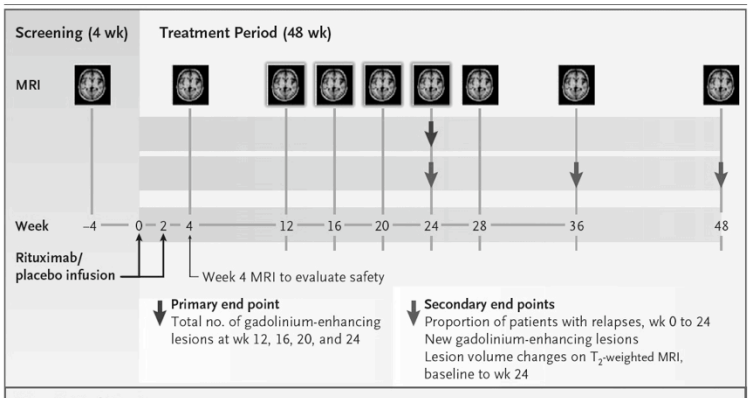
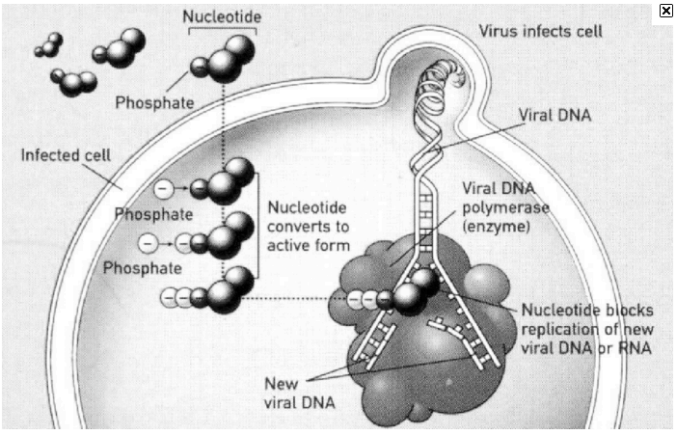


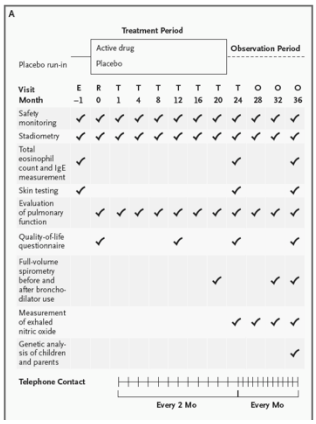
Figure 1. **Study Design.**

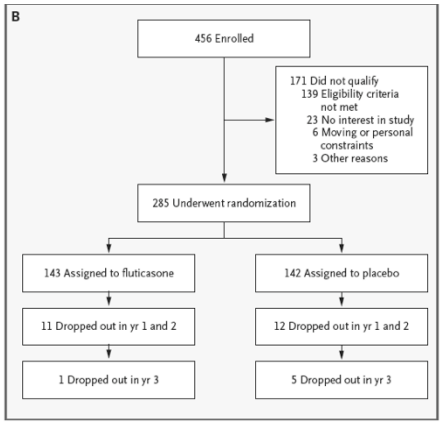
Patients were randomly assigned in a 2:1 ratio to receive rituximab or placebo. They were hierarchically stratified according to study site, status with respect to previous treatment with interferon beta or glatiramer acetate (either no treatment or discontinuation of medication >6 months previously vs. treatment within the previous 6 months), and baseline disease severity according to the Expanded Disability Status Scale (EDSS) score (≤2.5 vs. >2.5). The EDSS is an ordinal scale ranging from 0 (normal neurologic examination) to 10.0 (death) in 0.5-step intervals.

Method—MOA



Method—Procedures





Method diagrams communicate schedule of procedures, enrollment, study design, mechanisms of action, guidelines, algorithms to reduce text and increase comprehension

Introduction

Background and Significance

Introduction

- After the editor reads and scrutinizes your title comes they read first paragraph of your paper in the introduction
- You must grab the reader's attention by telling them the central story of your research and why this deserves to be told—think of background and especially significance
- SHORT! 1-2 pages double spaced

Introduction

- 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
- What is the existing state of knowledge of this topic? Trace the problem development and summarize its current state…ie, the background. You ask (with citations):
  - What's known?
  - What's 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)

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

F. Significance and Importance: Nutritional guidelines for pregnancy

Discussion

What Does It Mean?

Structure

1. Overarching statement of findings and what you think it means
2. Cast your data and interpretation in context of others' work (how it extends what is known)
3. Limitations to interpretation or what new questions are raised
4. Future work
5. Conclusion-the punch!

Don't Deviate From Discussing 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
- Authors should let the data 'speak' for themselves

Conclusion

- A conclusion is not a summary of findings
- A good conclusion gives perspective to sights that haven't yet been seen at introduction
- A conclusion is about the implications of what the reader has learned
- Fatal flaw = conclusions not supported by findings
  - A statistician should verify your conclusions

Title

Specific, Descriptive

Title

- Why should anyone care to read past the title of my paper?

- A succinct, informative but also tempting title is essential, and the first thing to come under editorial scrutiny

Title

- First reviewed by Journal Editors 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

- *A Study Involving Medical Imaging with Genetic Patients and Turner's Syndrome*

MRI Brain Imaging in Children With Turner's Syndrome and Other X Chromosome Abnormalities

- *Nerve Growth Factors and Sodium Channels in Pancreatic Cells*

Nerve Growth Factor Increases Sodium Channel Expression in Pancreatic (Beta) Cells: Implications for Insulin Secretion

Title—Specific & Descriptive

- *Down Syndrome—Where we are today: A Review*

Down Syndrome: Genetic, Behavior, and Functional Neuroimaging Research 2000-2006

- *Aldosterone and Heart Failure*

Aldosterone Plasma Concentrations Increase with Severity of Congestive Heart Failure

- *A study of MI in older Americans 1994-1999*

Epidemiological survey of MI in Community-Dwelling American Males Over 65 years

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*
- *Annual Revaccination Against Influenza and Mortality Risk in Community-Dwelling Elderly Persons*

Abstract

Specific, Descriptive

LAST

Abstracts Poorly Written

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

JAMA® The Journal of the American Medical Association

Dr. Catherine DeAngelis,
Editor-In-Chief

Abstract Goal

"Winning over a skeptical editor, reader, or reviewer should be the ultimate goal of your abstract"

nature International weekly journal of science

Dr. Phillip Campbell
Editor-In-Chief

Decisions Based on Abstract

"For about two thirds of submissions seen during the study, BMJ editors were able to make decisions based on reading only abstracts

…For all papers that editors thought should be rejected after reading the abstract, the final decision after full processing was still rejection."

Schroter S, Barratt H. Editorial decision making based on abstracts. *European Science Editing 2004;30: 8-9.*

Abstract Deficiencies

"Defects in abstracts, particularly inconsistencies between abstract and body and the presentation of data in abstract, but not in body, occur frequently."

Pitkin RM, Branagan MA. Can the accuracy of abstracts be improved by providing specific instructions? JAMA 1998 280:267-9.

Abstract

- Introduction (Background, Significance)/purpose
- Put objective as imperative style:
  - Objective: To evaluate whether zinc supplementation during pregnancy affects infant birth measures.
- Methods, Results
- Conclusion
- Include important implications or significance

Abstract

- Do not cut and paste from your paper—write this section new
- Use a structured outline with the headers of your paper—structured abstracts can improve changes of acceptance
- Clearly describe the problem in the first sentence—grab the reader (the EDITOR!)
- Double-check consistency of numerical data with tables, text, figures
- Do not try to edit the abstract on the fly during electronic upload

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/m^2 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/m^2 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/m^2. 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

The Paper as a Whole

Sections Re-balanced

Article 3650 words

Determine the Manuscript's Focus

- The focus must be clear and consistent in the title, abstract, and introduction
- If your paper is about the technique and value of magnetic resonance imaging in diagnosing pituitary tumors
  - Do not devote time to discussing the pathology, prognosis or clinical findings of pituitary tumors per se
- In your outline, clearly state the purpose and focus
- If you cover too much, the paper's punch will be lost and readers will retain little after reading it

Advice from Leading Journal Editors

- You are only as good as your last paper — previous success does not guarantee future acceptance
- You've got to hook the editor with the abstract
- Don't delete those files: keep every version—you never know what aspect you can use for some other piece of writing
- Writing is an amazingly long learning curve
  - Many authors say that they're still getting better as a writer after several decades

Advice from Leading Journal Editors

- The most significant work is improved by subtraction: keeping the clutter away allows a central message to be communicated with a broader impact
- Once you've written what you wanted to convey, end it there
- Even polished authors go through an average of 10–12 drafts, and sometimes as many as 30
- Start every day of writing by editing the previous day's material — it eases you into writing

Advice from Leading Journal Editors

- Writers make the mistake of assuming too much knowledge on the part of their audience
  - In reality, even at the most specialized journals, only a handful of readers will be such close colleagues that they don't need any contextual setup
- Introduction need not cite every background article gathered, the results should not archive every piece of data collected, and the discussion is not a treatise on the paper's subject
- The writer must be selective, choosing only the references, data points, and arguments that bolster the question/objective

Advice From Journal Editor-In-Chief

ANNALS OF NEUROLOGY

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

My 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

Questions?

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