IMRAD: What goes into each section

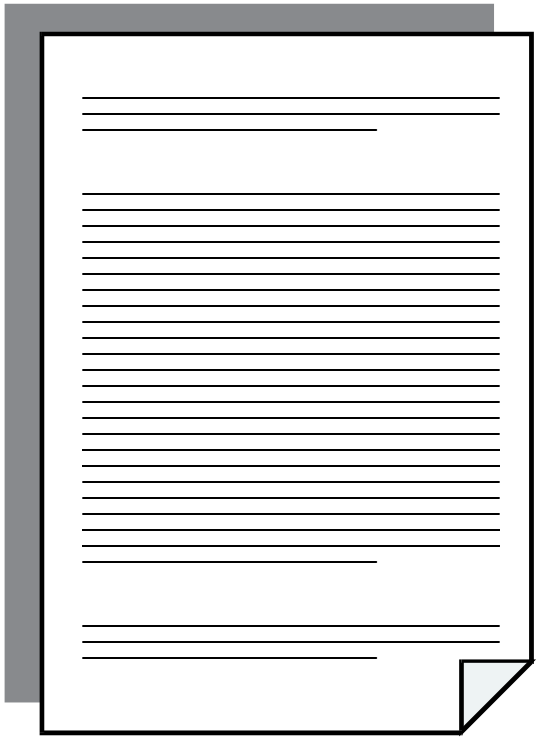
Source: http://www.jpgmonline.com/documents/author/24/2_Aggarwal_10.pdf (Journal of Postgraduate Medicine - Online)

Parts of an Essay

Beginning

Main Body

End



Parts of a Paper: IMRAD

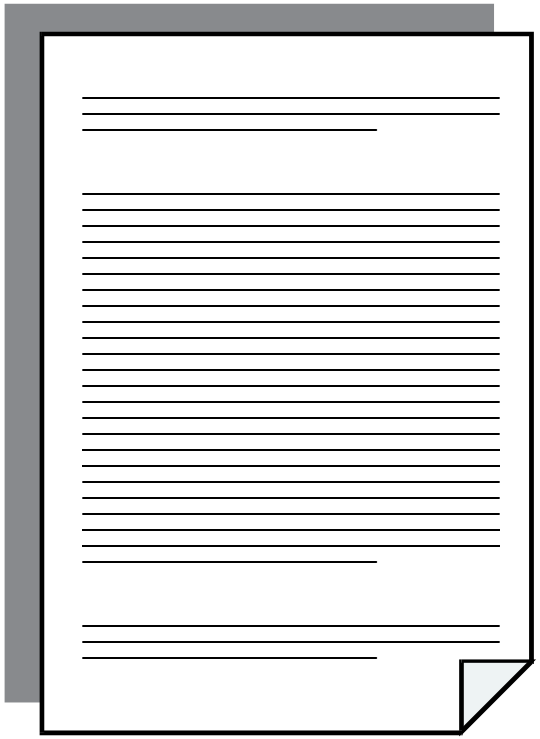
I Introduction

M Methods

R Results

a and

D Discussion



Bradford Hill's Questions

Introduction	Why did you start?
Methods	What did you do?
Results	What did you find?
and	
Discussion	What does it all mean?

Introduction (Why did you start?)

- Rationale of the study

- Supply sufficient background information to allow a reader to understand and evaluate the results of present study without referring to previous publications on the topic

Introduction

- Review pertinent literature to orient the reader
- Define lacunae and shortcomings in current state of knowledge
- Provide rationale for the current study
  - What gap in knowledge did you try to fill?
  - What controversy did you try to resolve?
- State aim of the study

Introduction

- Brief, clear, to the point
- Written mostly in present tense
- May state the study group, study design and methods used

  (How and why are these better than those of previous studies)
- May state the principal result/conclusion

Introduction

- Key references supporting background information provided in this section
- Refer to your previous preliminary work
- Refer to your own closely related papers appearing elsewhere
- Define any specialized terms, definitions or abbreviations you intend to use

Introduction: Common problems

- Historical details
- Too long
- Too general and vague
- Imitative
- Contains ‘discussion’ material

Introduction: Example

For investigations done in the emergency laboratory costs are higher[1] and quality more difficult to ensure.[2] These investigations are also more frequently misused.[3] We therefore decided to study which investigations really contributed to clinical decision making in acute care medicine.

Introduction

We wish to suggest a structure for the salt of deoxyribose nucleic acid (D.N.A.). This structure has novel features which are of considerable biological importance.

Watson JD, Crick FHC. A structure for deoxyribose nucleic acid. Nature 1953; 171: 737-8.

Methods (What did you do?)

(Materials and Methods; Patients and Methods)

Who? What? When? Where? How? Why?

Study design
Study material (what did you work with?)
What was done to the study material (intervention)?
How was the effect assessed (outcome measures)?
Analysis and statistical methods
Ethical considerations

(Sections and subsections help)

Methods

Study design

Case-control, cohort, cross-sectional

Prospective, retrospective

Controlled, uncontrolled

Randomized, non-randomized

Open, Blinded (single or double)

Methods

What did you work with?

- Humans, animals, *in vitro* preparation
- Volunteers/patients
- Controls

How selected?

- Eligibility, definitions, inclusion/exclusion criteria
- Population-based, hospital-based
- Particular age group, gender, SE status
- Consecutive or not
- Urban, rural, suburban

Methods

Randomization/blinding: any violations

Intervention

- Drugs, chemicals (amount, route, frequency, source)
- Techniques and procedures, modifications
- Equipment used (model, settings)
- Compliance

Measurements

- By whom? Was it objective and accurate?
- How often? Repetitions --> how averaged?

Who administered the questionnaire? Where?

Methods (What did you actually do?)

Endpoints and outcome: how assessed

- Response, partial response, failure, relapse
- Mild, moderate, severe
- Side-effects
- Withdrawals and dropouts

Sample size calculation

Statistical analysis

- Hypothesis testing: How? Are assumptions OK?
- Multiple testing. Software used
- Intention-to-treat *versus* per protocol

Results (What did you find?)

Results of all experiments
- in natural order
- in subsections similar to methods

Text, tables and figures
- do not duplicate

Statistical analysis (RR, 95% CI)

Results

Data collection and recruitment (Response rate)

Study group

- Number, baseline characteristics
- Drop-outs, withdrawals
- Absent data on some subjects

Key findings

- Primary outcome measures

Secondary findings

- Secondary outcome measures
- Subgroup analyses

Results

What does 56.78 $\pm$ 12.34 mean?

What does 16.7% mean?

What is the denominator?

What is
- normal, abnormal?
- raised, high, low?

Cite all tables/figures in text

Results

Should not include
- Any methods
- Data for which methods are not included
- Interpretation of data (--> discussion)
- References

Careful with use of words like
- significant, random, correlation

Discussion (What does it mean?)

Recapitulation of major findings

Discussion of findings cf. available data

- Why the difference, why more reliable, etc

Discussion of important minor findings

Alternative explanations

Strength and pitfalls

Implications of the findings

Unanswered questions and future research

Final summary / conclusion

Discussion

Should not include

- History
- Repetition of results
- Discussion of points other than those generated by the study's data
- Unreasonable extrapolation of results
- Superlatives

Discussion: Common pitfalls

- First study in the world/India/Parel …. …
- Megalomania
- Emphasizing strengths, not weaknesses
- Reiterating selected results
- Inflating the importance and generalizability of findings
- Going beyond the evidence and drawing unjustified conclusions