IMRAD: What goes into each section
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
For investigations done in the emergency laboratory costs are higher\textsuperscript{1} and quality more difficult to ensure.\textsuperscript{2} These investigations are also more frequently misused.\textsuperscript{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.

Methods (What did you do?)

(Materials and Methods; Patients and Methods)


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 + 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