



# Scientific Writing

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# References



# References

## Scientific Writing

### Scientific Writing

Easy When You Know How

Jennifer Peat

BMJ Books

## STROBE

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### Strengthening the Reporting of Observational Studies in Epidemiology (STROBE): Explanation and Elaboration

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**Funding:** The initial STROBE workshop was funded by the European Science Foundation (ESF). Additional funding was received from the Medical Research Council Health Services Research Collaboration and the National Health Service Research Development Methodology Programme. The authors had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

**Competing interests:** The authors have declared that no competing interests exist.

**Citation:** Vandenberghe JP, von Elm E, Altman DG, Pocock SJ, Gøtzsche PC, Mulrow CD, et al. (2007) Strengthening the Reporting of Observational Studies in Epidemiology (STROBE): Explanation and Elaboration. *BMC Med* 5: 41. doi:10.1186/1745-7189-5-41

**Received:** July 20, 2007  
**Accepted:** August 30, 2007  
**Published:** October 16, 2007

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**Abbreviations:** CI, confidence interval; IRIS, Retrospective IRIS from Observatory IRIS relative RIR; STROBE, Strengthening the Reporting of Observational Studies in Epidemiology.

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**ABSTRACT**

Much medical research is observational. The reporting of observational studies is often of insufficient quality. Poor reporting hampers the assessment of the strengths and weaknesses of a study and the generalizability of its results. Taking into account empirical evidence and theoretical considerations, a group of methodologists, researchers, and editors developed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) recommendations to improve the quality of reporting of observational studies. The STROBE Statement consists of a checklist of 22 items, which relate to the title, abstract, introduction, methods, results and discussion sections of articles. Eighteen items are common to cohort studies, case-control studies and cross-sectional studies and four are specific to each of the three study designs. The STROBE Statement provides guidance to authors about how to improve the reporting of observational studies and facilitates critical appraisal and interpretation of studies by reviewers, journal editors and readers. This explanatory and elaboration document is intended to enhance the use, understanding, and dissemination of the STROBE Statement. The meaning and rationale for each checklist item are presented. For each item, one or several published examples and, where possible, references to relevant empirical studies and methodological literature are provided. Examples of useful flow diagrams are also included. The STROBE Statement, this document, and the associated Web site (<http://www.strobe-statement.org>) should be helpful resources to improve reporting of observational research.

## CONSORT

### CONSORT 2010 Statement

#### CONSORT 2010 Statement: updated guidelines for reporting parallel group randomised trials

David Altman, Douglas Altman, David Moher, for the CONSORT Group

**Introduction**  
Randomised controlled trials, when properly conducted, conducted, and reported, represent the gold standard in evaluating healthcare interventions. However, as demonstrated by our published results of a randomised trial, many randomised controlled trials do not accurately represent the results of a published report and, consequently, clear and transparent information on the methodology and findings of randomised controlled trials is often missing. This is a problem because, if not reported, the results of randomised controlled trials are often incomplete and, therefore, of limited value. The CONSORT Statement provides a checklist of 25 items, which relate to the title, abstract, introduction, methods, results and discussion sections of articles. Eighteen items are common to cohort studies, case-control studies and cross-sectional studies and four are specific to each of the three study designs. The CONSORT Statement provides guidance to authors about how to improve the reporting of observational studies and facilitates critical appraisal and interpretation of studies by reviewers, journal editors and readers. This explanatory and elaboration document is intended to enhance the use, understanding, and dissemination of the STROBE Statement. The meaning and rationale for each checklist item are presented. For each item, one or several published examples and, where possible, references to relevant empirical studies and methodological literature are provided. Examples of useful flow diagrams are also included. The STROBE Statement, this document, and the associated Web site (<http://www.strobe-statement.org>) should be helpful resources to improve reporting of observational research.

report, should not be able to pass through the publication process without recognition of their trial's inadequacies. That emerging reality should provide impetus to improved trial design and conduct in the future, a secondary indirect goal of our work. Moreover, CONSORT can help researchers in designing their trial.

**Background**  
CONSORT efforts to improve the reporting of randomised controlled trials accelerated in the mid-1990s, spurred partly by methodological research. Researchers had shown for many years that authors reports with both clarity and explicit details of design to a certain extent, some poorly conducted or poorly reported aspects of it. As we set out in our 2001 paper, the initial focus was on developing reporting guidelines submitted to one of our (DAG) Guideline Working Groups organising the first CONSORT statement in 1996. Further methodological research on randomised controlled trials, and the development of the CONSORT 2010 Statement, followed the publication of CONSORT 2001. More than 200 studies, covering the CONSORT guideline (found on the CONSORT website), which provides the empirical evidence to underpin the CONSORT initiative.

**Intent of CONSORT 2010**  
The CONSORT 2010 Statement is this paper including the 25-item checklist in the table and flow diagram figures. It provides guidance for reporting all randomised controlled trials, but focuses on the most common design type—individually randomised, also using parallel trials. Other trial designs, such as cluster randomised trials and non-inferiority trials, require varying amounts of additional information. CONSORT extensions for these designs<sup>1,2</sup> and other CONSORT products can be found through the CONSORT website. Along with the CONSORT 2010 Statement, we have updated the explanation and elaboration article, which explains the intention of each checklist item, provides methodological background, and gives published examples of incomplete reporting.

Trials will improve by authors, to the checklist items, facilitates clarity, completeness, and transparency of reporting. Explicit descriptions and justifications of one-on-one, head-to-head, or head-to-all trials. Note that the CONSORT 2010 Statement does not include recommendations for diagnostic, conducting, and assessing trials. It only addresses the reporting of what was done and what was found.

Secondarily, CONSORT does indirectly affect diagnosis and conduct. Inexpensive reporting reveals collaboration in research if they exist. Thus, investigators who conduct a complete trial, but who were “non-compliant”

Figure 1. How figures of effect sizes are used in the process of a parallel randomised trial. (Copyright © 2007 by CONSORT. Published online March 24, 2010. Webpage number 1)

# An Important Recommendation

❖ What is written without effort is in general read without pleasure.

**Samuel Johnson (1709–1784)**

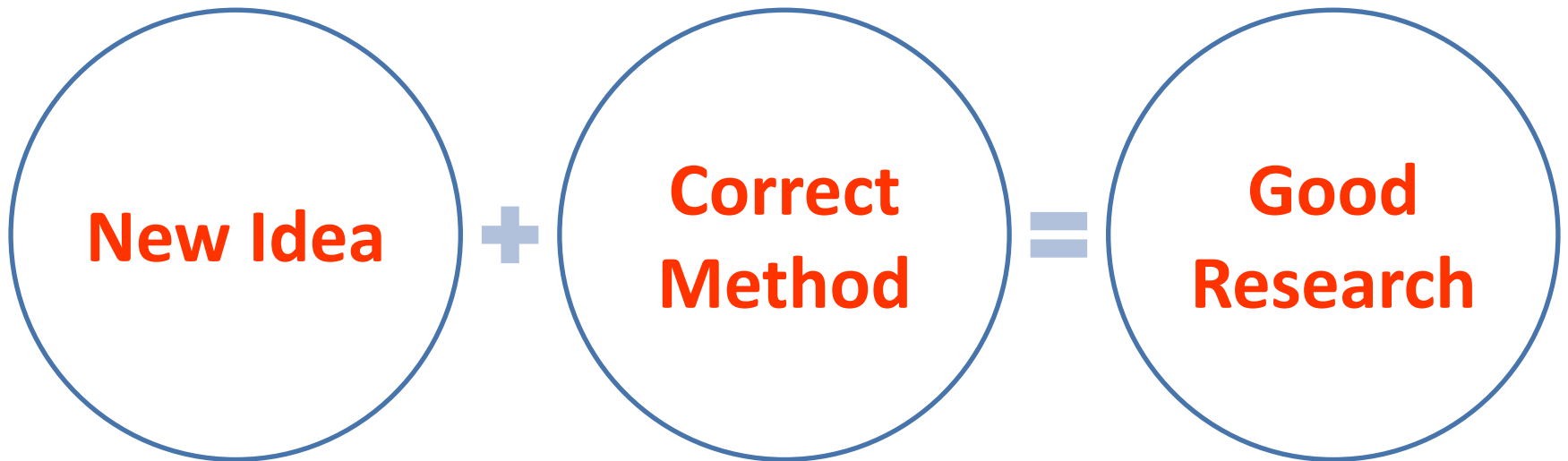
❖ Think of yourself as a reader for a moment.

❖ What kind of papers do you like to read?

❖ Short, meaty, and clear most likely.

❖ Well, then, write short, meaty, and clear papers yourself.

# Characteristics of a Good Research



# Main Topics

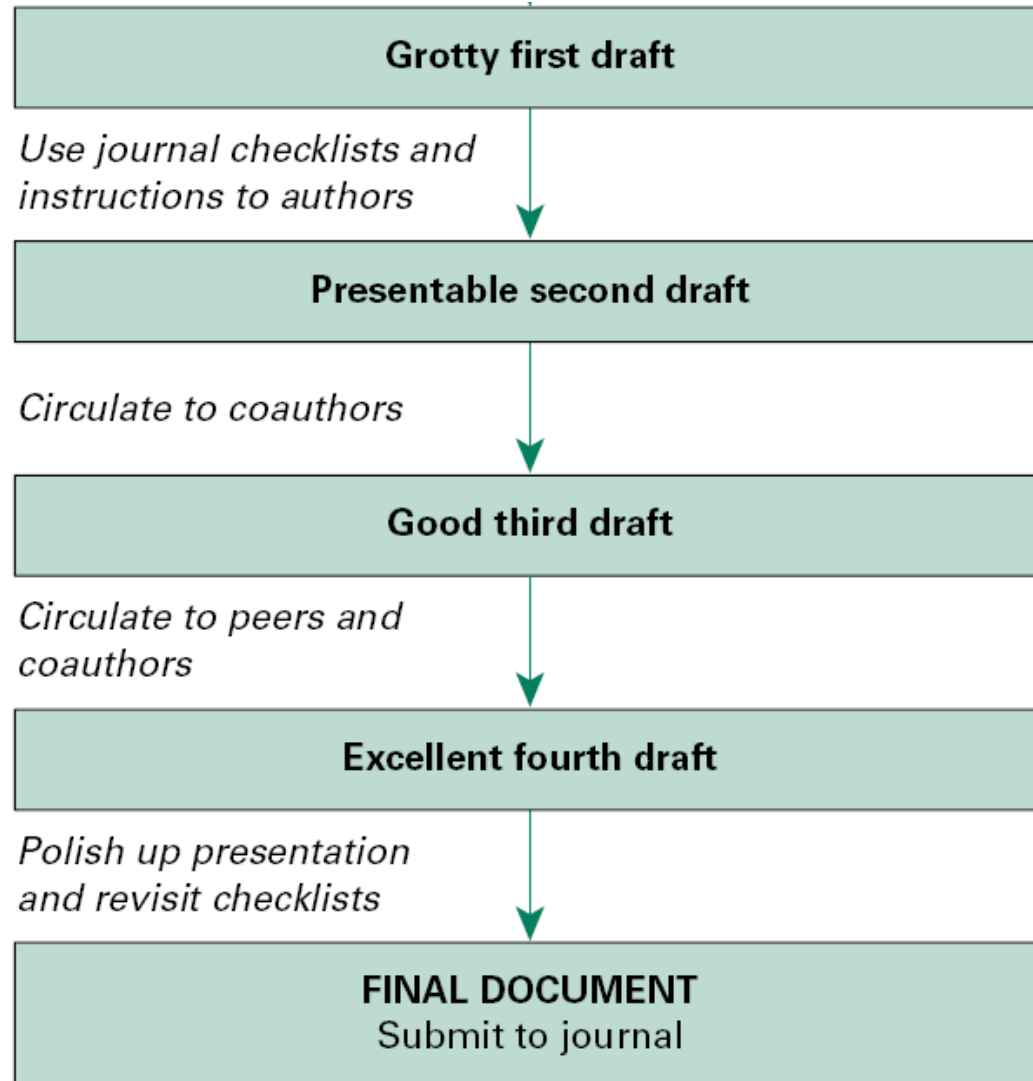
**General considerations 7-26**

**Paper writing 27-136**

**More information 137-168**

# General Considerations

# Forming a Plan





# Planning the Draft Paper

---

Section	Length*
Title	Short and accurate
Abstract	250 words
Introduction	1 page
Methods	2-3 pages
Results	2-3 pages
Tables and/or Figures	3-6 tables and/or figures
Discussion & Conclusion	2-3 pages
References	20-35 references
Total document	12-20 pages

---

\* with A4 paper, font size 12 and 1.5 line spacing

# Choosing a Journal

- ❖ Match your paper with the scope of the journal
- ❖ Consider the impact factor of the journal
- ❖ Weigh up the journal prestige, the likelihood of acceptance and the likely time until publication
- ❖ Have realistic expectations
- ❖ Be robust and, if rejected, select another journal

# Uniform Requirements

- ❖ Maintain the sequence
  - Title page
  - Title
  - Abstract
  - Keywords
  - Introduction
  - Methods
  - Results
  - Discussion
  - Conclusions
  - Acknowledgements
  - Source of funding
  - Conflict of interest statement
  - References
  - Tables
  - Figures title

# Uniform Requirements

Maximum	OA	RA	BR	LE
Length (word) <sup>a</sup>	3000	5000	2000	600
Abstract (word)	250	350	150	No
References	30	70	20	8
Tables/Figures	5	5	3	1

- ❖ OA: Original Articles
- ❖ RA: Review Articles
- ❖ BR: Brief Report
- ❖ LE: Letter to the Editor
- Not including abstract, tables, figures, and references

# Uniform Requirements

- ❖ Use 1.5 line spacing throughout
- ❖ Pages should have margins at least 25 mm
- ❖ Single column
- ❖ Number the pages
- ❖ Write short sentences
- ❖ Write short paragraphs
- ❖ Use new paragraphs for new topics
- ❖ Justify or left-justify the text
- ❖ Avoid hyphenating words between lines

# Uniform Requirements

- ❖ Use subheadings to divide sections
- ❖ Put tables/figures after references
- ❖ Each table/figure should be on a new page
- ❖ Send figures in separate files
- ❖ Include permission
  - to reproduce previously published material
  - to use illustrations that may identify participants

# Instructions to Authors

- ❖ Many journals require papers to be submitted according to the uniform requirements.
- ❖ Each journal also has its own instructions to authors.
- ❖ Instructions are published
  - on the journal website
  - in the printed copy of the journal

# Instructions to Authors

- ❖ If you follow the journal guideline:
  - Being received favorably by the editor
  - Being processed expeditiously
- ❖ If you do not follow the journal guidelines
  - Your manuscript may be returned to you
  - Causing unnecessary delay



# Standardized Reporting Guidelines

## ❖ **Observational studies**

- STROBE Statement (2007)
- **S**trengthening the **R**eporting of **O**bservational studies in **E**pidemiology

## ❖ **Randomized clinical trials**

- CONSORT Statement ((2010
- **C**onsolidated **S**tandards **o**f **R**eporting **T**rials

## ❖ **Systematic reviews and meta-analysis**

- PRISMA Statement (2009)
- **P**referred **R**eporting **I**tems for **S**ystematic Reviews and **M**eta-**A**nalyses.

## Defining the Role of Authors and Contributors

### PAGE CONTENTS

1. Why Authorship Matters
2. Who Is an Author?
3. Non-Author Contributors

### 1. Why Authorship Matters

### 2. Who Is an Author?

The ICMJE recommends that authorship be based on the following 4 criteria:

- Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND
- Drafting the work or revising it critically for important intellectual content; AND
- Final approval of the version to be published; AND
- Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

In addition to being accountable for the parts of the work he or she has done, an author should be able to identify which

# Who Is an Author?

<http://www.icmje.org/about-icmje>

## International Committee of Medical Journal Editors

- ❖ The ICMJE recommends that authorship be based on the following 4 criteria:
  - Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work, **AND**
  - Drafting the work or revising it critically for important intellectual content, **AND**
  - Final approval of the version to be published, **AND**
  - Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

# Authorship

❖ Sorting out the politics before you begin writing.

1

- Decide authorship

2

- Agree on authors' roles and responsibility

3

- Agree on acknowledgement

4

- Agree on up to three journals

# Authorship

❖ Credit point system for deciding authorship

Phase	Work	Points
Initiation	Idea + Literature review + Hypotheses	3
Pilot	Development of instruments + Pilot	2
Execution	Management + Key workers	1
Analysis	Analysis + Draft write-up + Final write-up + Revisions	4

# Authorship

## ❖ Points required for name on a paper

<b>Number of authors</b>	<b>Order</b>	<b>Points</b>
Solo author	1st	10
Two authors	1st	6
	2nd	4
Three authors	1st	5
	2nd	3
	3rd	2
Four authors	1st	5
	2nd	2, etc.

# Authorship

❖ Suggested maximum number of authors

Type of publication	Number of authors
Journal article	8-9
Letters	4-5
Reviews	3-4

# Authorship

## ❖ Gift authorship

- Occurs when someone who has not made an intellectual contribution to a paper accepts an authorship.
  - Both the authors and the “gift” author benefit from the relationship.
  - Senior “gift” author may gain prestige.
  - The authors may gain approval for their work.
- ❖ However, this practice can lead to scandal when the results of a journal article cannot be substantiated.



# Authorship

## ❖ Ghost authorship

❖ The practice of omitting authors who have made a major contribution to a paper.

❖ Such practices do not conform in any way to the Vancouver guidelines.

❖ Practices of “**gift**” and “**ghost**” authorship are to be avoided at all costs.

# Contributorship

- ❖ Contributors other than the authors of a paper should be acknowledged.
- ❖ In the case of large multicenter trials, a move to naming “contributors” rather than “authors” was suggested.
- ❖ When the number of authors exceeds a pre-specified threshold, journals list the contributions of researchers in alphabetical order.

# Paper Writing

# Proposal versus Article

---

## PROPOSAL

---

- ❖ Title
- ❖ State of problem
- ❖ Literature review
- ❖ Objectives
- ❖ Methods
- ❖ References
- ❖ Budget

## ARTICLE

---

- ❖ Title
  - ❖ Abstract
  - ❖ Keywords
  - ❖ Introduction (last paragraph)
  - ❖ Methods
  - ❖ Results
  - ❖ Discussion
  - ❖ Conclusions
  - ❖ Acknowledgement
  - ❖ Fund and conflict of interest
  - ❖ References
  - ❖ Tables
  - ❖ Figure titles
  - ❖ Figures
-

# Article Components

1. Cover letter
2. Title page
3. Title
4. Abstract
5. Keywords
6. Introduction
7. Methods
8. Results
9. Discussion
10. Conclusions
11. Acknowledgements
12. Source of funding
13. Conflict of interest
14. References
15. Tables
16. Figure titles
17. Figures

# 1

## Cover Letter

**Dear Editor-in-Chief**

**Subject:** submission of a manuscript entitled “.....”

Please find enclosed our manuscript submitted for publication in your journal. The data included in this manuscript have not been published previously, either in whole or in part, and are not under review or in press elsewhere. All authors contributed sufficiently to the study and read this final manuscript and gave their approval for the manuscript to be submitted in its present form.

Yours sincerely,

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## Long-term protection provided by hepatitis B vaccine and need for booster dose: A meta-analysis

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### Running title

Long-term protection provided by hepatitis B vaccine

### Word count:

Abstract: 236

Text excluding abstract and references: 2315

## Long-term protection provided by hepatitis B vaccine and need for booster dose: A meta-analysis

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### Running title

Long-term protection provided by hepatitis B vaccine

### Word count:

Abstract: 236

Text excluding abstract and references: 2315



- ❖ **Identify the main issue of your paper**
  - Accurate
  - Unambiguous
  - Specific
  - Complete
- ❖ Attract readers
- ❖ Do not contain abbreviations
- ❖ Indicate the study's design whenever possible

# Title

## ❖ Example

❖ Different ways of writing titles

❖ Give **independent** & **dependent** variables, and **population**:

➤ Effect of asthma on linear growth in children

➤ Asthma and linear growth in children

❖ Pose a **question**:

➤ Does asthma reduce linear growth?

❖ Give the **answer** to the question:

➤ Linear growth deficit in asthmatic children

## ❖ Informative and balanced

❖ Provide in the abstract an informative and balanced summary of

➤ What was done

➤ What was found

❖ Do not quote in the abstract.

## ❖ Structured

➤ Background (Objectives)

➤ Methods

➤ Results

➤ Conclusion

# Abstract

**Background:** The duration of protection provided by hepatitis B vaccine is still unknown but can be estimated through long-term follow-up studies.

**Method:** Electronic databases and conference databases to December 2008 were searched. Reference lists of articles were screened and the studies authors and manufacturers were contacted for additional unpublished references. Randomized clinical trials and prospective cohort studies addressing the long-term protective effect of hepatitis B vaccine were included in this meta-analysis.

**Results:** We assessed 42 separate cohorts involving overall 11,090 subjects; 34 cohorts involving 9356 subjects were included in the final meta-analysis. Results indicate that the overall cumulative incidence of HBV breakthrough infection 5–20 years post-primary vaccination was 0.007 [95% CI: 0.005 to 0.010] with a variation among studies from 0 to 0.094. Available data do not allow us to exclude an increased risk for infection with time since vaccination.

**Conclusion:** We conclude that the protection provided by three or four doses of monovalent HB vaccine persists for at least two decades in the great majority of immunocompetent individuals. Additional studies are needed for assessing vaccine efficacy for longer periods of time and the need of booster doses in different subgroups of population.

[Vaccine. 2010;28\(3\),623-631](#)

# Abstract

**Objectives:** To determine whether specialist nurse intervention improves outcome in patients with chronic heart failure.

**Design:** Randomized controlled trial.

**Setting:** Acute medical admissions unit in a teaching hospital.

**Participants:** One hundred and sixty-five patients admitted with heart failure due to left ventricular systolic dysfunction. The intervention started before discharge and continued thereafter with home visits for up to one year.

**Main outcome measures:** Time to first event analysis of death from all causes or readmission to hospital with worsening heart failure.

**Results:** Thirty-one patients (37%) in the intervention group died or were readmitted with heart failure compared with 45 (53%) in the usual care group (hazard ratio: 0·61, 95% CI: 0·33 to 0·96). Compared with usual care, patients in the intervention group had fewer readmissions for any reason (86 versus 114,  $P=0\cdot018$ ), fewer admissions for any reason (86 versus 114), fewer admissions for heart failure (19 v 45,  $P<0\cdot001$ ) and spent fewer days in hospital for heart failure (mean 3·43 versus 7·46 days,  $P=0\cdot005$ ).

**Conclusions** Specially trained nurses can improve the outcome of patients admitted to hospital with heart failure.

# 5

## Keywords

- ❖ A list of 3-5 keywords
- ❖ Separate keywords with “;”
- ❖ Keywords may be listed alphabetically
- ❖ Use MeSH terms

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# MeSH

MeSH (Medical Subject Headings) is the NLM controlled vocabulary thesaurus used for indexing articles for PubMed.

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MeSH

MeSH

Tumor

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**Neoplasms**

1. New abnormal growth of tissue. Malignant **neoplasms** show a greater degree of anaplasia and have the properties of invasion and metastasis, compared to benign **neoplasms**.  
Year introduced: /diagnosis was NEOPLASM DIAGNOSIS 1964-1965

**Tumor Markers, Biological**

2. Molecular products metabolized and secreted by neoplastic tissue and characterized biochemically in cells or body fluids. They are indicators of **tumor** stage and grade as well as useful for monitoring responses to treatment and predicting recurrence. Many chemical groups are represented including hormones, antigens, amino and nucleic acids, enzymes, polyamines, and specific cell membrane proteins and lipids.  
Year introduced: 1988

**Tumor Burden**

3. The total amount (cell number, weight, size or volume) of **tumor** cells or tissue in the body.  
Year introduced: 2005

**Lymphocytes, Tumor-Infiltrating**

4. Lymphocytes that show specificity for autologous **tumor** cells. Ex vivo isolation and culturing of TIL with interleukin-2, followed by reinfusion into the patient, is one form of adoptive immunotherapy of cancer.  
Year introduced: 1991

**Genes, Wilms Tumor**

5. Genes at loci that are involved in the development of WILMS **TUMOR**. Included are human WT1 at 11p13 and human WT2 (MTACR1) at 11p15.  
Year introduced: 1991

**Wilms Tumor**

6. A malignant kidney **tumor**, caused by the uncontrolled multiplication of renal stem (blastemal), stromal (STROMAL CELLS), and epithelial (EPITHELIAL CELLS) elements. However, not all three are present in every

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tumor[All Fields] OR tumour [All Fields]  
OR "neoplasms"[MeSH Terms]

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MeSH

Cigarette (13)

MeSH

MeSH    [Save search](#) [Limits](#) [Advanced](#) [Help](#)

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- Neoplasms**  
 1. New abnormal growth of tissue. Malignant **neoplasms** show a greater degree of anaplasia and have the properties of invasion and metastasis, compared to benign **neoplasms**.  
 Year introduced: /diagnosis was NEOPLASM DIAGNOSIS 1964-1965
  
- Hematologic Neoplasms**  
 2. **Neoplasms** located in the blood and blood-forming tissue (the bone marrow and lymphatic tissue). The commonest forms are the various types of LEUKEMIA, of LYMPHOMA, and of the progressive, life-threatening forms of the MYELODYSPLASTIC SYNDROMES.  
 Year introduced: 1997
  
- malignancy-associated nucleolar antigen, human** [Supplementary Concept]  
 3. identifies tumor cell populations selectively; can be useful for immunodiagnosis of malignant disease; MW 68,000; isoelectric point of 6.3  
 Date introduced: March 27, 1984
  
- Neoplasms, Post-Traumatic**  
 4. Tumors, cancer or other **neoplasms** caused by or resulting from trauma or other non-radiation injuries.  
 Year introduced: 1993
  
- Neoplasms, Second Primary**  
 5. Abnormal growths of tissue that follow a previous neoplasm but are not metastases of the latter. The second neoplasm may have the same or different histological type and can occur in the same or different organs as the previous neoplasm but in all cases arises from an independent oncogenic event. The development of the second neoplasm may or may not be related to the treatment for the previous neoplasm since genetic risk or predisposing factors may actually be the cause.  
 Year introduced: 1992
  
- DRLM protein, human** [Supplementary Concept]

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"neoplasms"[MeSH Terms] OR Malignancy[Text Word]

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<< First < Prev Page 1 of 16 Next > Last >>

- Neoplasms**  
 1. New abnormal growth of tissue. Malignant **neoplasms** show a greater degree of anaplasia and have the properties of invasion and metastasis, compared to benign **neoplasms**.  
 Year introduced: /diagnosis was NEOPLASM DIAGNOSIS 1964-1965
  
- Early Detection of Cancer**  
 2. Methods to identify and characterize **cancer** in the early stages of disease and predict tumor behavior.  
 Year introduced: 2009
  
- Cancer Care Facilities**  
 3. Institutions specializing in the care of **cancer** patients.  
 Year introduced: 1991(Aug 1977)
  
- American Cancer Society**  
 4. A voluntary organization concerned with the prevention and treatment of **cancer** through education and research.  
 Year introduced: 1991(1975)
  
- Chemotherapy, Cancer, Regional Perfusion**  
 5. Neoplasm drug therapy involving an extracorporeal circuit with temporary exclusion of the tumor-bearing area from the general circulation during which high concentrations of the drug are perfused to the isolated part.  
 Year introduced: 2006 (1963)
  
- National Cancer Institute (U.S.)**  
 6. Component of the NATIONAL INSTITUTES OF HEALTH. Through basic and clinical biomedical research and training, it conducts and supports research with the objective of **cancer** prevention, early stage identification and elimination. This Institute was established in 1937.  
 Year introduced: 2008

PubMed search builder

Find related data

Database:

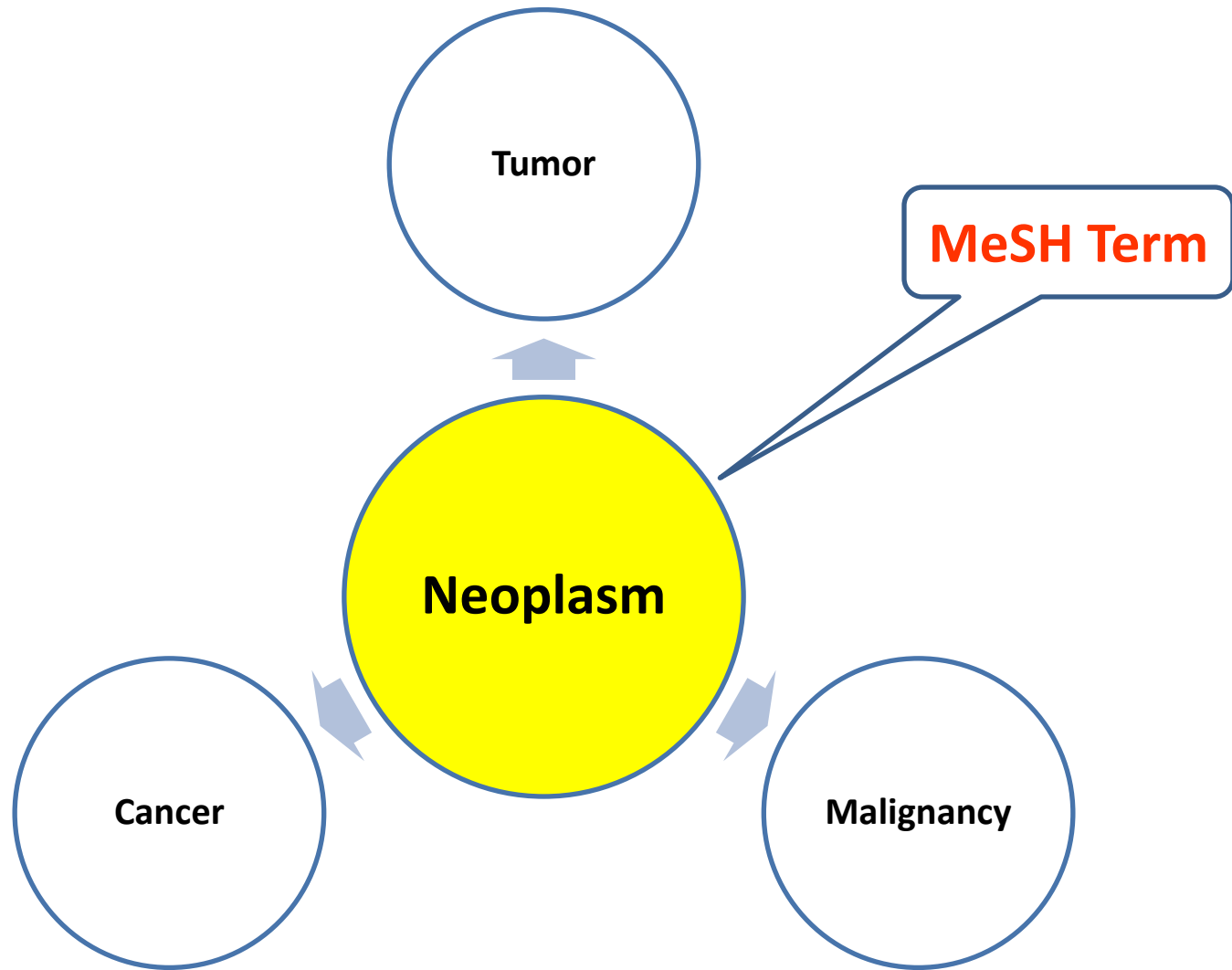
Search details

"neoplasms" [MeSH Terms] OR Cancer [Text Word]

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Recent activity

- [Turn Off](#) [Clear](#)
- Cancer (319) MeSH
  - Malignancy (9) MeSH



# 6

# Introduction

❖ **6-1 Background**

❖ **6-2 Objectives**



# Introduction

## ❖ 6-1 Background

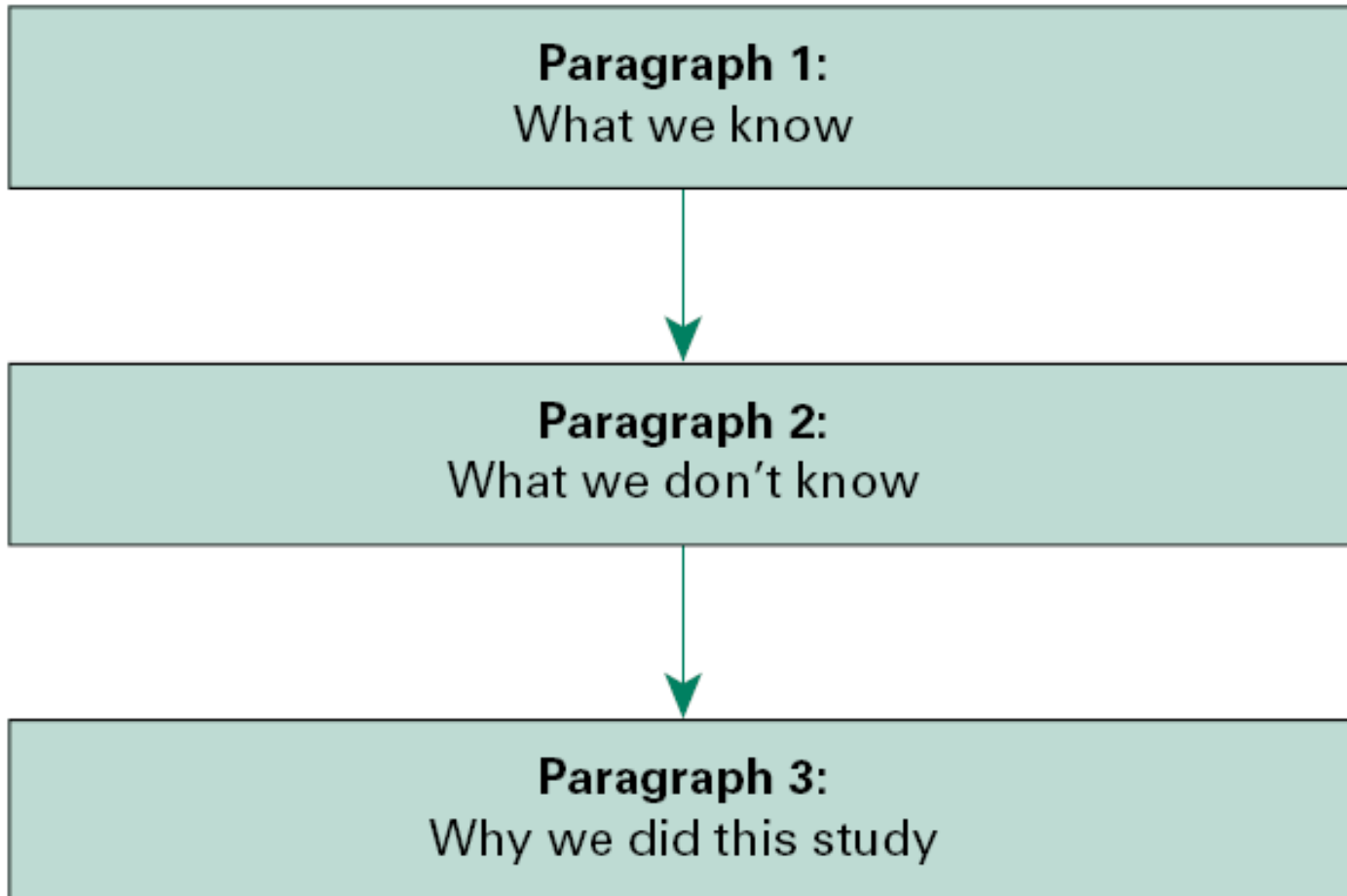
- ❖ Explain the scientific background and rationale for the investigation being reported.

## ❖ Example

- An overview of what is known on the topic
- An explanation of what is unknown
- A description of what will be addressed by the study
  - gap in current knowledge

# Introduction

## Template for the introduction



# Introduction

## ❖ 6-2 Objectives

❖ State objectives or hypotheses

## ❖ Example

- We aimed to estimate ...
- Our objective was to determine ...
- Our purpose was to specify ...



# Example of Introduction

## Introduction

People who are overweight or obese are at increased risk of developing many illnesses including hypertension, cardiovascular disease, and non-insulin dependent diabetes. However, many adults continue to be overweight. In 1995, results from the National Nutrition Survey in Australia suggested that 63% of men and 47% of women were either overweight or obese.

Despite the impact of excess body weight on health, self-perception of body mass in the general population has not been properly investigated. The only information comes from small, unrepresentative samples of women, particularly younger women, or from national studies in which self-reported weights may be unreliable. Until reliable information of self-perceptions of body mass is collected, it is difficult to design effective weight loss intervention strategies.

In 1998, we conducted a large cross-sectional survey of adults in which we accurately measured height and weight. In this paper, we report information about adults' perceptions of their own body mass. (188 words)

# Example of Introduction

## Introduction

Hepatitis B (HB) immunization is now the most effective and cost-saving means to prevent hepatitis B virus (HBV) infection [1,2]. Antibody to hepatitis B surface antigen (anti-HBs) concentration equal to or greater than 10 mIU/ml is considered protective [1,2], however, anti-HBs titer decreases over time and may fall to below protective level [3,4]. Long-term immunogenicity induced by a 3-dose vaccination is well established [5–7], nonetheless, HBV breakthrough infection and chronic carriage are reported in some vaccinees [5,6,8]. Moreover, the risk of HBV infection increases by sexual and occupational exposures during adulthood [9]. Therefore, there is no worldwide consensus on the need for booster dose of HB vaccine [10].

A practical means to determine the long-term protection provided by HB vaccine against HBV infection is to estimate the cumulative incidence of chronic carrier state as well as breakthrough infection at different periods among previously vaccinated individuals.

To date, none of the international guidelines recommended booster doses for regular bases [1,11–13]. However, the duration of protection provided by HB vaccine is an important issue for future booster dose policies. In this meta-analysis, we aim to estimate long-term immunity induced by HB vaccine and the possible need for booster dose. (398 words)

Long-term protection provided by hepatitis B vaccine and need for booster dose: A meta-analysis. *Vaccine*. 2010; 28: 623–631



# Methods

- ❖ **7-1 Ethical approval**
- ❖ **7-2 Study design**
- ❖ **7-3 Setting**
- ❖ **7-4 Participants**
- ❖ **7-5 Sample size**
- ❖ **7-6 Questionnaire**
- ❖ **7-7 Variables**
- ❖ **7-8 Grouping choices**
- ❖ **7-9 Measurement**
- ❖ **7-10 Matched studies**
- ❖ **7-11 Statistical methods**

# Methods

## ❖ 7-1 Ethical approval

❖ Investigators should always document both:

- The approval from the Ethics Committee
- Whether informed consent was obtained from the participants

## ❖ Example

- Written informed consent was received from all parents. The Ethics Committee of the university approved the consent procedure, as well as the whole trial. The protocol was registered with the Iranian Registry of Clinical Trials on April 23, 2013 (IRCT201303209014N16).

[JAMA Otolaryngology - Head & Neck Surgery. 2014:E1-E6.](#)

# Declaration of Helsinki 2013

## #32

- ❖ For medical research using identifiable human
  - Material
  - Data
- ❖ Seek consent for
  - Collection
  - Analysis
  - Storage
  - Reuse
- ❖ If impossible or impractical
  - Research may be done only after consideration and approval of a research ethics committee

# Methods

## ❖ 7-2 Study design

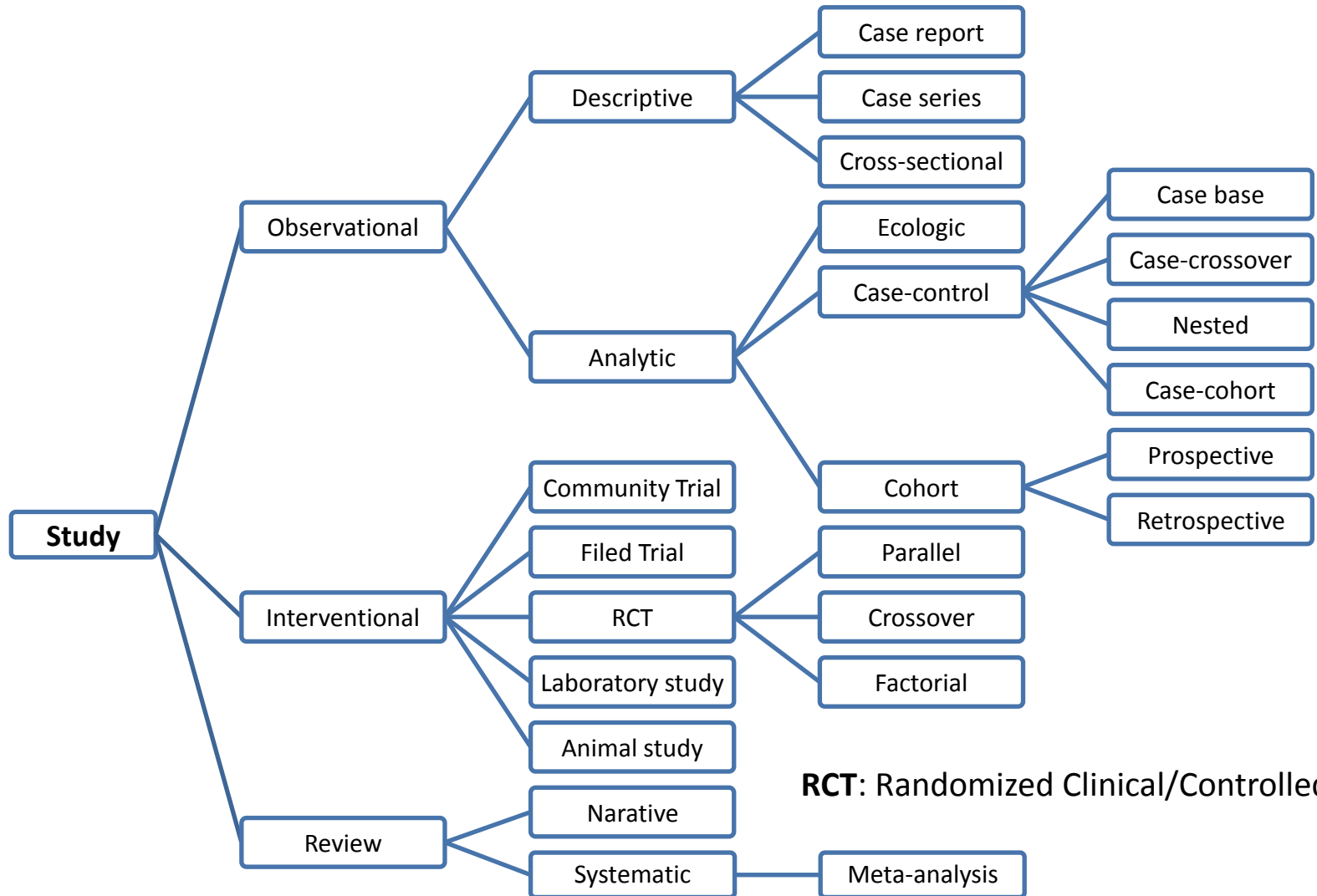
- ❖ Present key elements of study design early in the paper.
  - Either early in the methods section
  - Or at the end of the introduction

## ❖ Example

- This triple blind randomized clinical trial was conducted at Beasat Hospital, affiliated with Hamadan University of Medical Sciences, in the west of Iran, from April to November 2013.

[Plos one. 2014;9\(8\):e104477](https://doi.org/10.1371/journal.pone.0104477)

# Classification of Epidemiologic Studies



# Epidemiologic Studies

Study type	Characteristics	Method/s
Systematic or Cochrane review	<ul style="list-style-type: none"><li>• Review of the literature to answer a specific question about a therapy, intervention or exposure</li><li>• Requires systematic, explicit search criteria to identify all published studies</li><li>• Results from several studies may be combined statistically using a meta-analysis</li></ul>	Literature review Retrospective
Randomised controlled trial (RCT)	<ul style="list-style-type: none"><li>• Used to compare the effect of a new treatment with an existing or placebo treatment</li><li>• Participants are allocated to study groups using a formal randomisation process</li><li>• Randomisation minimises the effects of bias and confounding on the results</li></ul>	Experimental Prospective
Quasi- or non-randomised clinical trial	<ul style="list-style-type: none"><li>• Similar to an RCT but quasi- or non-random methods are used to allocate participants to groups</li><li>• Quasi-randomisation methods include use of birth date, medical record number, etc.</li><li>• Uncontrolled bias and confounding may influence the results</li></ul>	Experimental Prospective
Cohort study	<ul style="list-style-type: none"><li>• Data are collected from participants regularly over a long period of time</li><li>• The development of disease in participants with different exposures is compared</li><li>• Prognosis and/or causation can be inferred when an exposure is measured before an outcome</li><li>• Most cohort studies are prospective, that is the cohort is enrolled and followed into the future</li></ul>	Observational Prospective or retrospective



# Epidemiologic Studies

Study type	Characteristics	Method/s
Case-control study	<ul style="list-style-type: none"><li>• Cases with a disease of interest and controls who do not have the disease are enrolled</li><li>• Differences in exposures or treatments between the cases and controls can be compared</li><li>• Provides a fast, inexpensive way to measure risk factors</li><li>• Bias and confounding are difficult to control and causation cannot be inferred</li></ul>	Observational
Cross-sectional studies	<ul style="list-style-type: none"><li>• A large, random selection of a defined population is enrolled</li><li>• Participants have their health status, exposures etc., measured at a single point in time</li><li>• Can be used to measure risk factors but causation cannot be inferred</li><li>• Also called population or prevalence studies</li></ul>	Observational
Methodology studies	<ul style="list-style-type: none"><li>• Used to measure whether a test is accurate or can be used interchangeably with another test</li><li>• Important for assessing the validity of research methods</li></ul>	Observational
Ecological studies	<ul style="list-style-type: none"><li>• Used to compare summary data such as prevalence rates, pollen counts etc., between populations</li><li>• Bias and confounding cannot be controlled</li><li>• Hypothesis generating only</li></ul>	Observational
Case reports	<ul style="list-style-type: none"><li>• Used to describe or summarise the records of interesting medical cases</li><li>• Provide new information for clinicians and/or hypothesis generating</li></ul>	Observational

# Methods

## ❖ 7-3 Setting

❖ Describe the locations, and relevant dates, including periods of recruitment, follow-up, and data collection.

## ❖ Example

➤ This matched case-control study was conducted in Hamadan Province, the west of Iran, in 2012 enrolling all neonates born in this province between 2005 and 2011 covered by screening program for congenital hypothyroidism.

[Journal of Research in Health Sciences. 2013;13\(2\):151-6](#)

# Methods

## ❖ 7-4 Participants

❖ Give the eligibility criteria, and the sources and methods of selection of participants.

## ❖ Example

➤ Patients with migraine headache who were seropositive for H. pylori infection were enrolled in this trial. The patients with the following criteria were excluded from the study: (a) already received H. pylori intervention treatment; (b) hypertension; (c) fever due to any causes; (d) received acute medical treatment of migraine.

# Methods

## ❖ 7-5 Sample size

❖ Explain how the study size was arrived at.

## ❖ Example

- Previous studies reported the prevalence of cigarette smoking among adolescents 14.3%<sup>9</sup>. Assuming  $P$  to be 0.143, we arrived at a sample of 576 with 0.05 significance level and error level of 0.2. Because of cluster random sampling, we doubled the sample size and raised it to 1161.

[Journal of Research in Health Sceinces. 2012;12\(1\):31-7](#)

# Methods

## ❖ 7-6 Questionnaire

❖ Give precise details of the questionnaires you used and how they were developed, validated, and tested for reliability.

## ❖ Example

➤ Data collection tool was a self-administered multiple choice questionnaire included the following four sections: (a) demographic characteristics (3 questions), (b) knowledge of cervical cancer and Pap test (12 questions), (c) beliefs including perceived susceptibility, severity, benefits and barriers (6 questions for each), and (d) practice (4 questions). Reliability of the questionnaire was checked through a pilot study using Cronbach's alpha coefficient. The scores of alpha for the questions related to knowledge and perceived susceptibility, severity, benefits and barriers were 66%, 69%, 88% 79% and 94%, respectively. [Journal of Research in Health Sciences. 2011;11\(1\):20-5.](#)

# Cronbach's Alpha

❖ Many quantities of interest in medicine are impossible to measure explicitly.

- Disability
- Dementia
- Satisfaction
- Depression
- Anxiety
- Knowledge
- Attitude

# Measure of Disability in Daily Activity

using mini-HAQ scale in 249 severely impaired subjects

Item	Mean score	SD of score $S_i$
Stand	2.96	1.04
Get out of bed	2.57	1.11
Cut meat	2.91	1.12
Hold cup	2.41	1.06
Walk	2.64	1.04
Climb stairs	3.06	1.04
Wash	3.25	1.01
Use toilet	2.59	1.09
Open a jar	2.86	1.02
Enter/leave car	2.80	1.03
<b>Mini-HAQ</b>	<b>28.06</b>	<b><math>S_T=8.80</math></b>

# Measure of Disability in Daily Activity

using mini-HAQ scale in 249 severely impaired subjects

$$\alpha = \frac{k}{k-1} \left( 1 - \frac{\sum S_i^2}{S_T^2} \right) = \frac{10}{9} \times \left( 1 - \frac{11.16}{77.44} \right) = \mathbf{0.95}$$

❖ For comparing groups

➤  $\alpha$  values of 0.7 to 0.8 are regarded as satisfactory.

❖ For clinical applications

➤ much higher values of  $\alpha$  are needed. The minimum is 0.90.



# Methods

## ❖ 7-7 Variables

### ❖ Clearly define all

- Interventions (in interventional studies)
  - Randomization
  - Concealment
  - Blinding
- Exposures (in observational studies)
- Primary outcomes
- Secondary outcomes
- Grouping and measurements methods

# Methods

## ❖ 7-7 Variables (continue)

### ❖ Example

- A case of HIV was defined as an individual by two sequential enzyme-linked immunosorbent assay tests positive for HIV antibody followed and confirmed by a Western blot test <sup>13</sup>.
- A case of AIDS was defined as a presumptive or definitive diagnosis of stage 3 or stage 4 condition and/or CD4 count <350 per mm<sup>3</sup> of blood in an HIV-infected subject <sup>12</sup>.

[International Journal of STD & AIDS. 2013;24\(11\):859-66](#)

# Methods

## ❖ 7-8 Grouping choices

❖ If applicable, describe which groupings were chosen, and why.

## ❖ Example

➤ Body mass index (BMI) was classified according to the recommendation of the WHO <sup>15</sup> as follows: a BMI less than 18.5 was underweight, a BMI greater than or equal to 18.5 was normal weight, a BMI greater than or equal to 25 was overweight, and a BMI greater than or equal to 30 was obese. [Epidemiol Health. 2014 Oct 30. doi: 10.4178/epih/e2014024](https://doi.org/10.4178/epih/e2014024)

# Methods

## ❖ 7-9 Measurement

❖ For each variable of interest give details of methods of measurement

## ❖ Example

➤ Fasting blood sugar (FBS) and total cholesterol (TC) were measured by taking a venous blood sample after 12 hours overnight fasting. FBS was examined by the glucose oxidase/oxidase-4-aminophenazone-phenol (GOD-PAP) method, and total cholesterol was examined by the cholesterol oxidase/paminophenazone (CHOD-PAP) method.

[Journal of Public Health. 2012;41\(3\):71-81](#)

# Methods

## ❖ 7-10 Matched studies

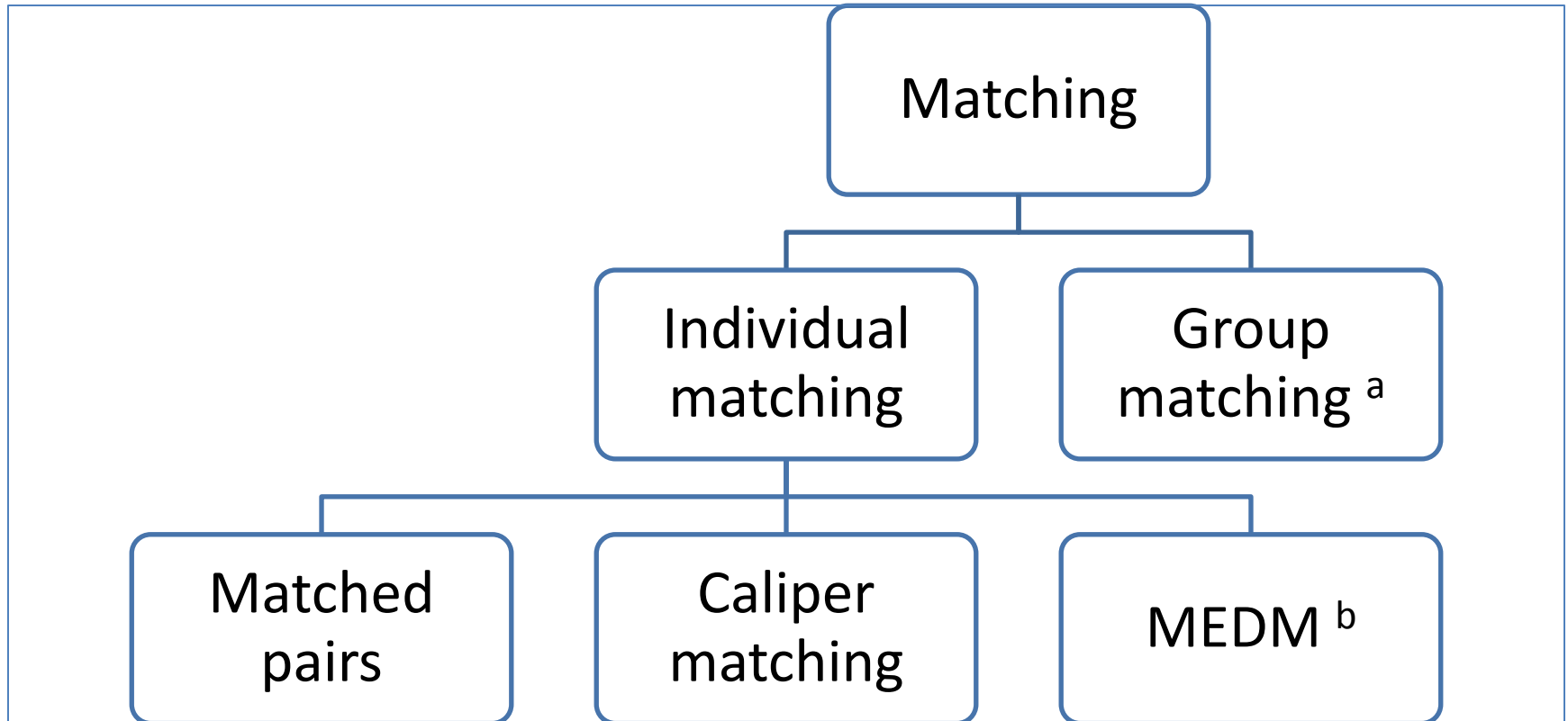
- Give matching criteria and the number of controls per case.

## ❖ Example

- Since the number of cases was small, four controls were selected for every case from the same study population.
- Controls were individually matched to cases by death date and the area of residence.

[Epidemiology and Health. 2014:e2014031](#)

# Types of Matching















<sup>a</sup> Frequency matching

<sup>b</sup> Minimum Euclidean Distance Measure


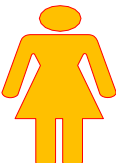










# Individual Matching

by: age, sex and race

Cases	Controls
 40	 40
 45	 45
 50	 50
 55	 55
 60	 60
 65	 65

# Group Matching

by: age, sex and race

Cases		Controls	
 45	 40	 40	 45
 55	 50	 50	 55
 65	 60	 60	 65



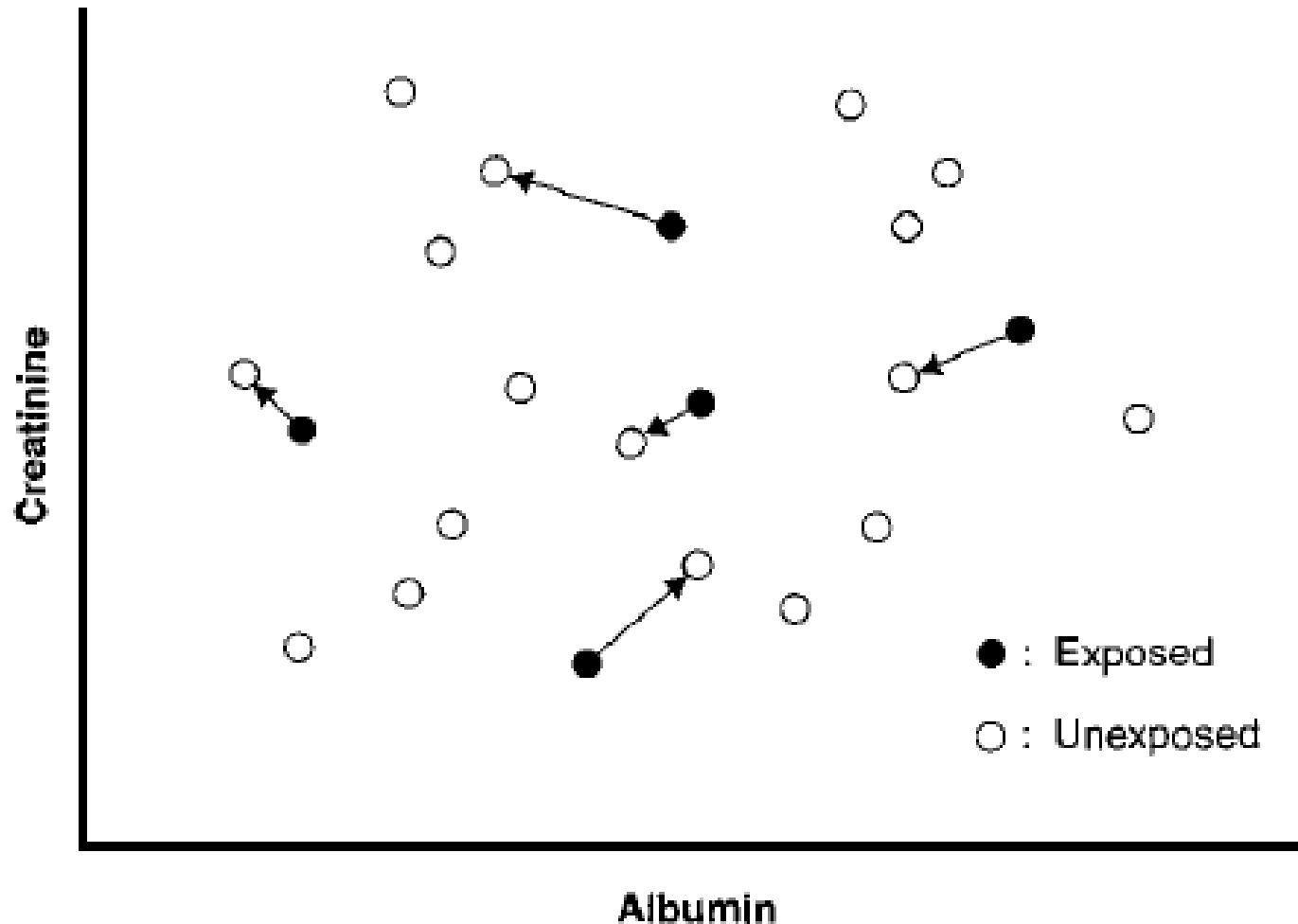
# Caliper Matching

- ❖ Conducted for continuous variables
- ❖ The matched control's age should be equal to the case's age plus or minus a defined value of years.
- ❖ Example:
  - Case 45 yr      Control  $45 \pm 5$  yr
  - Case 53 yr      Control  $53 \pm 5$  yr
  - Case 19 yr      Control  $19 \pm 5$  yr

# Minimum Euclidean Distance Measure (MEDM)

- ❖ MEDM is a useful alternative method for matching several continuous variables
- ❖ Example
  - Survival after transplantation in multiple myeloma
  - Individuals are matched according to two prognostic factors
    - Serum albumin level
    - Serum creatinine level

# Matching According to MEDM Method



# Methods

## ❖ 7-11 Statistical methods

- The statistical test
- The statistical computer packages
- $P$  value (e.g.,  $P < 0.05$ ,  $P < 0.01$ , etc.)

## ❖ Example

- The quantitative variables were compared using t-test and ANOVA test and categorical variables were compared using chi-square test after testing for normal distribution.
- All statistical analyses were performed at the 95% significance level using the statistical software Stata version 11.2 (StataCorp, College Station, TX).

[J Res Health Sci. 2014;14\(1\):57-63](#)

# Statistical Methods of Analysis

Variable	Statistics	Comparison	Test
Nominal	Proportion (P)	2 groups	Fisher's exact test, Chi <sup>2</sup> test
	Proportion (P)	2 groups (paired)	McNemar's test
	Proportion (P)	>2 groups	Chi-squared test
Ordinal	Proportion (P)	2 groups	Mann-Whitney <i>U</i>
	Proportion (P)	>2 groups	Kruskal-Wallis test
	Proportion (P)	2 groups (paired)	Rank Wilcoxon
	Proportion (P)	2 groups (paired)	Friedman test
Numerical	Mean ( $\mu$ )	2 groups	<i>t</i> -test
	Mean ( $\mu$ )	2 groups (paired)	Paired <i>t</i> -test
	Mean ( $\mu$ )	>2 groups	<i>f</i> -test (ANOVA/ANCOVA)

# 8

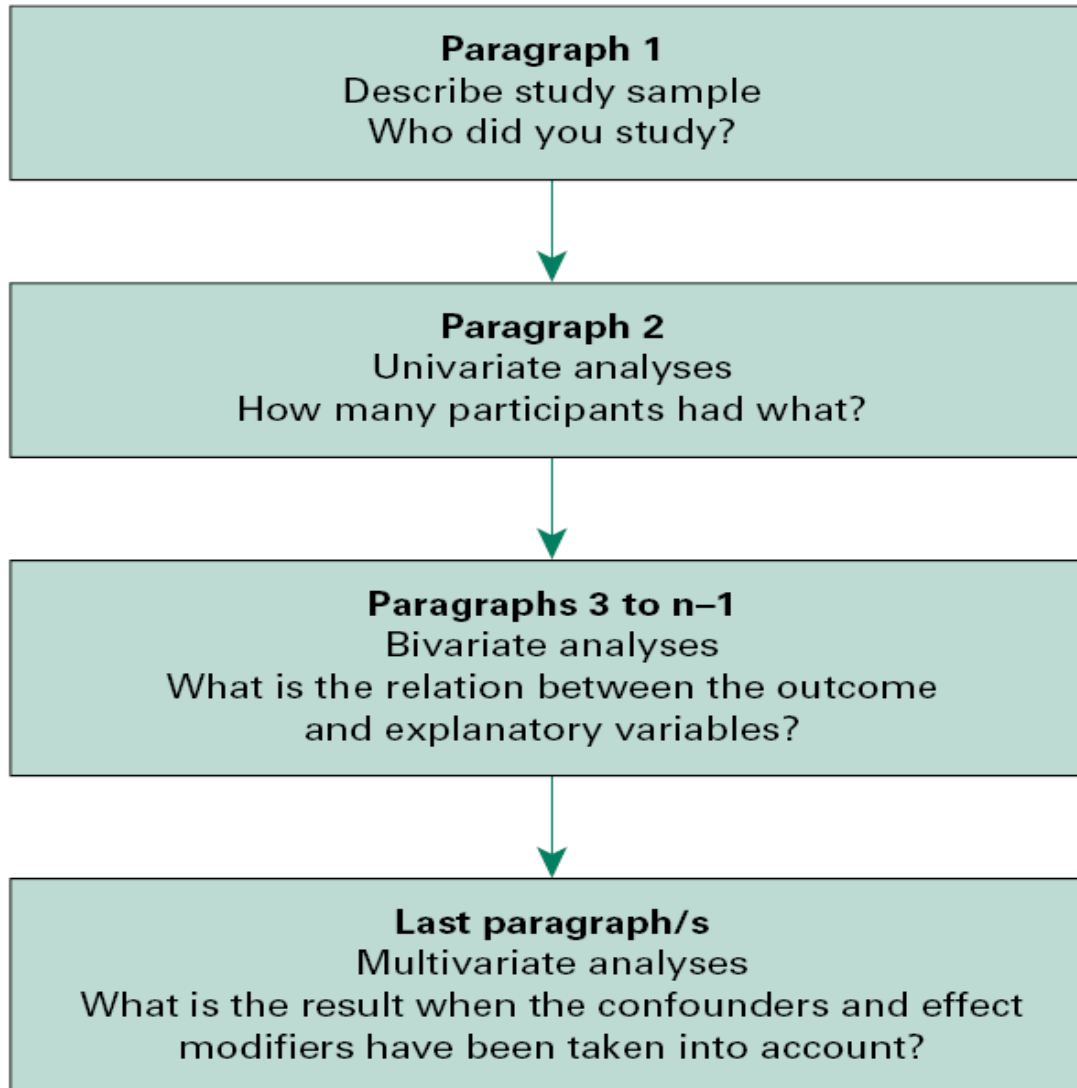
# Results

- ❖ **8-1 Describe study sample**
- ❖ **8-2 Flow diagram**
- ❖ **8-3 Univariate data analyses**
- ❖ **8-4 Bivariate data analyses**
- ❖ **8-5 Multivariate data analyses**
- ❖ **8-6 Other analyses**
- ❖ **8-7 Tables**
- ❖ **8-8 Figures and graphics**
- ❖ **8-9 Statistics**

# Results

- ❖ The Results section should give a factual explanation of what was found.
- ❖ It should be free of interpretations and the authors' views and opinions.
- ❖ No more than 5 tables or figures
- ❖ Put most important findings in a figure

# Results





# Results

## ❖ 8-1 Describe study sample

### ❖ Numbers of individuals at each stage

- Potentially eligible
- Examined for eligibility
- Confirmed eligible
- Included in the study
- Completing follow-up
- Analyzed

# Results

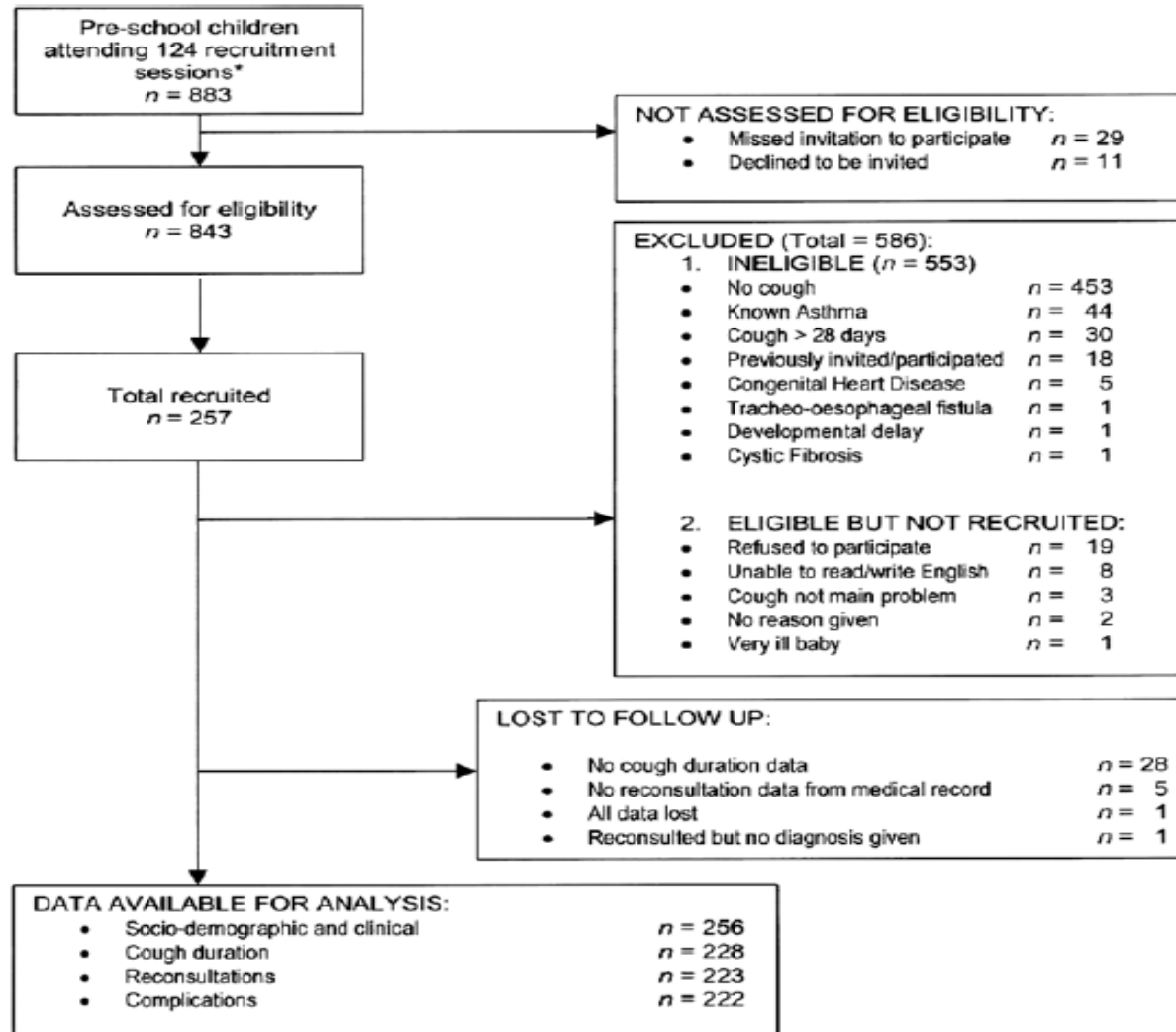
## ❖ Example

We identified **578** patients, 20 patients died and 35 were discharged before an interview could be arranged; 78 were too sick to be interviewed, 14 had language difficulties, and 26 refused the interview.

Also excluded from the analysis were 8 nonwhite patients, 4 residents of countries other than US, 8 patients older than 79 years, and 16 patients whose interview information was judged by the interviewer to be of questionable reliability. The analysis is based on data from the remaining **369** patients.

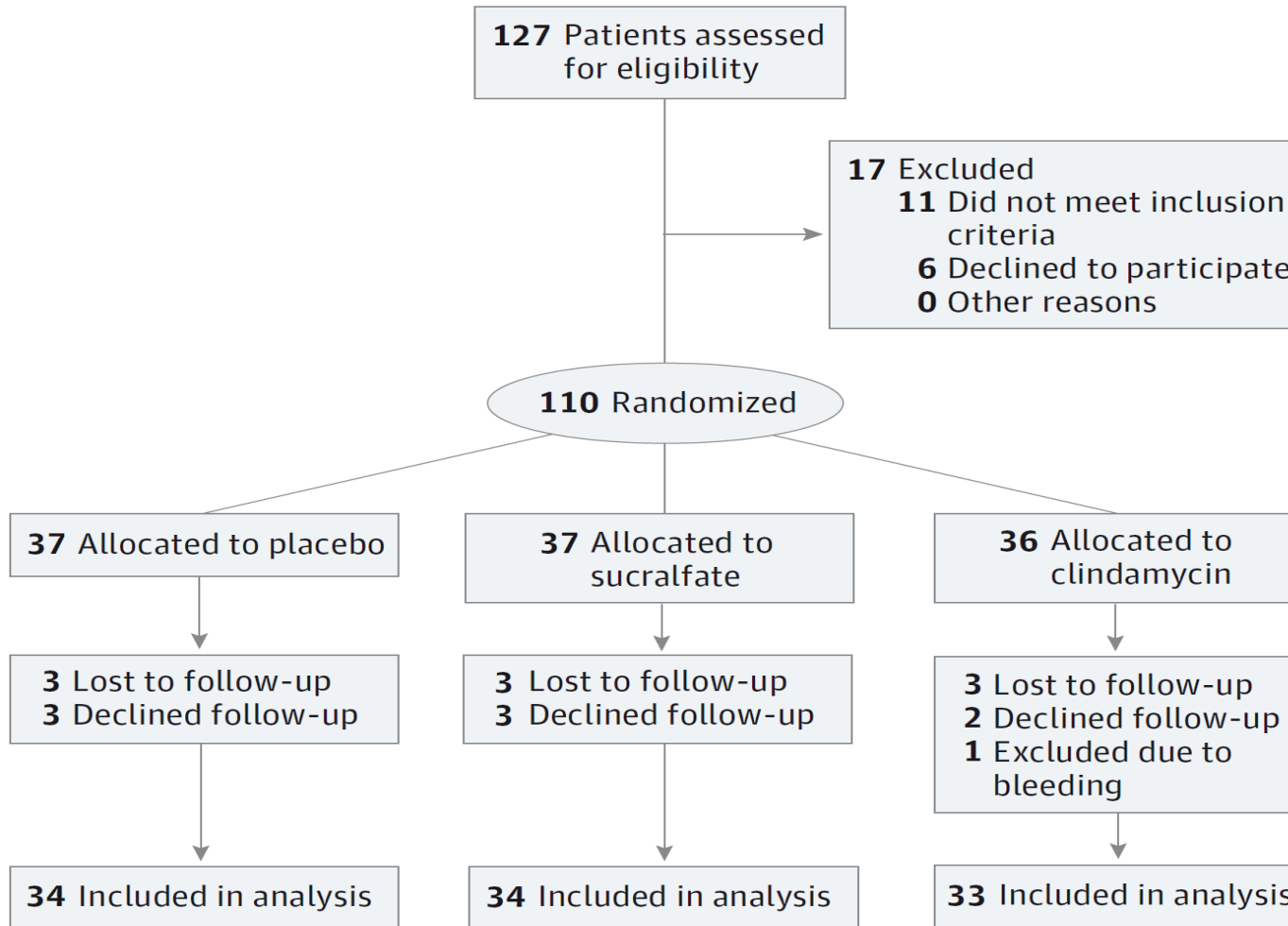
# Results

## ❖ 8-2 Flow diagram for cohort studies



# Results

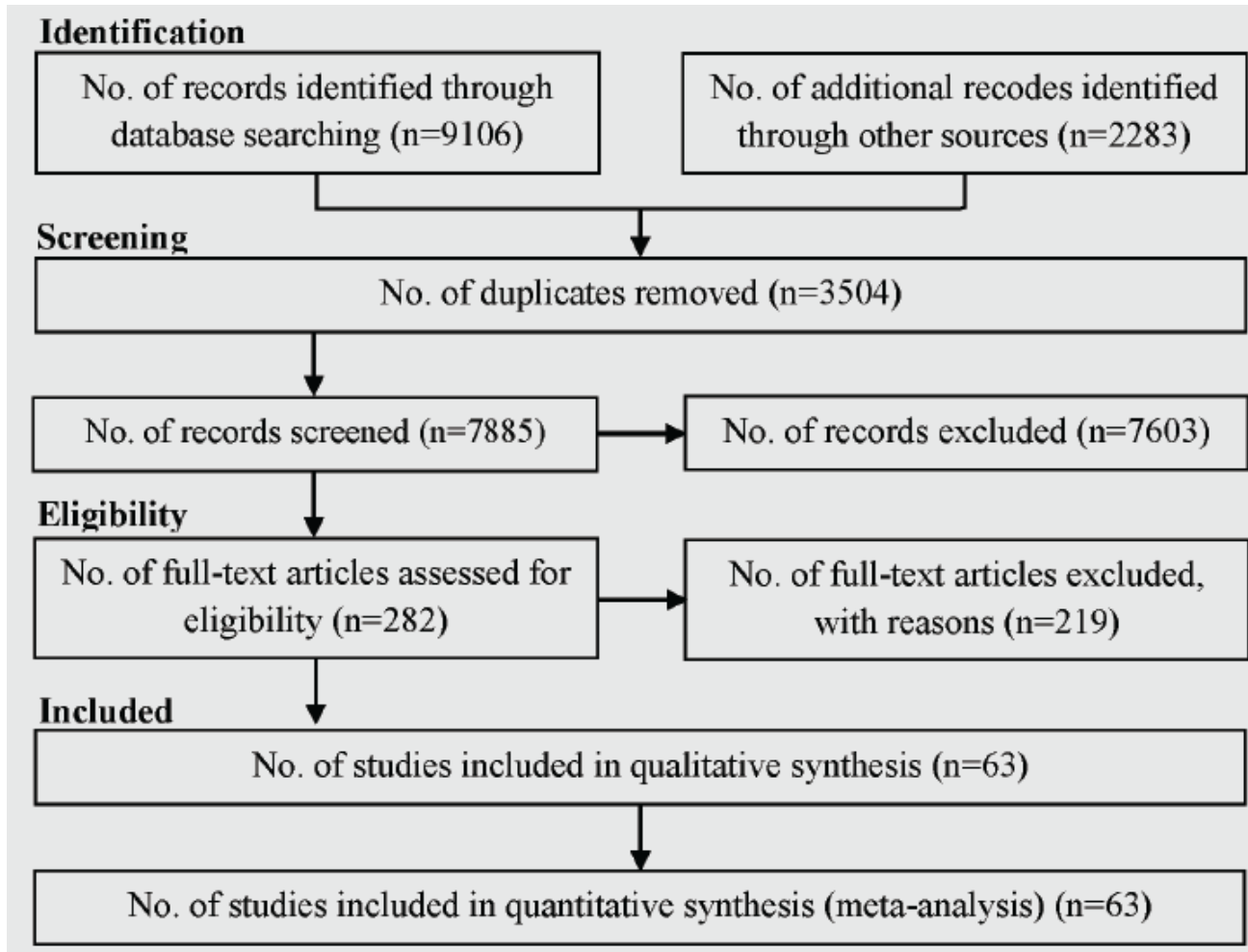
## ❖ 8-2 Flow diagram for RCTs



JAMA Otolaryngology–Head & Neck Surgery 2014;140(8):698-703

# Results

## ❖ 8-2 Flow diagram for meta-analysis



PloS One. 2015;10(5):e0126870

# Results

## ❖ 8-3 Univariate data analyses

❖ Use Table 1 for sample characteristics (no P values)

❖ Give characteristics of study participants

➤ Demographic (age, sex, education, occupation)

➤ Clinical (BMI, blood pressure)

➤ Prevalence

➤ Incidence

❖ Information on

➤ Exposures

➤ Potential confounders

# Results

## ❖ Example of univariate data analyses

Variables	HCV-Negative n=1458	HCV-Positive n=511	Unknown n=513
<b>Sex (%)</b>			
Male	936 (64%)	296 (58%)	197 (39%)
Female	522 (36%)	215 (42%)	306 (61%)
<b>Mean age at enrolment (SD)</b>	45.7 (10.0)	52.0 (11.7)	52.5 (12.8)
<b>Daily alcohol intake</b>			
None	250 (17%)	129 (25%)	119 (24%)
Moderate <sup>a</sup>	853 (59%)	272 (53%)	293 (58%)
Excessive <sup>b</sup>	355 (24%)	110 (22%)	91 (18%)

HCV, Hepatitis C virus.

<sup>a</sup> Male < 60 g ethanol/day, females < 30 g ethanol/day.

<sup>b</sup> Male ≥ 60 g ethanol/day, females ≥ 30 g ethanol/day.

# Results

## ❖ 8-4 Bivariate data analyses

### ❖ Give unadjusted estimates

- Odds ratio
- Relative risk
- Attributable risk
- Attributable risk fraction
- Their precision (e.g., 95% CI)



# Results

## ❖ 8-5 Multivariate data analyses

- ❖ If applicable, give confounder adjusted estimates and their precision (e.g., 95% CI)
- ❖ Make clear which confounders were adjusted for and why they were included.

# Results

## ❖ Example Bivariate & Multivariate data analyses

Treatment	No. of Relapses	Person-Years	Crude relative Rate (95% CI)	Adjusted Relative Rate (95% CI)	Fully adjusted Relative Rate (95% CI)
Perphenasine	53	187	0.41 (0.29, 0.59)	0.45 (0.32, 0.65)	0.32 (0.22, 0.49)
Olanzapine	329	822	0.59 (0.45, 0.75)	0.55 (0.43, 0.72)	0.54 (0.41, 0.71)
Clozapine	336	804	0.61 (0.47, 0.79)	0.53 (0.41, 0.69)	0.64 (0.48, 0.85)
Thioridazine	115	201	0.84 (0.63, 1.12)	0.82 (0.61, 1.10)	0.70 (0.51, 0.96)

Adjusted for sex, calendar year, and age at onset of follow-up (adjusted column) and duration of hospitalization and length of follow-up (fully adjusted column)

# Results

## ❖ 8-6 Other analyses

❖ Report other analyses done

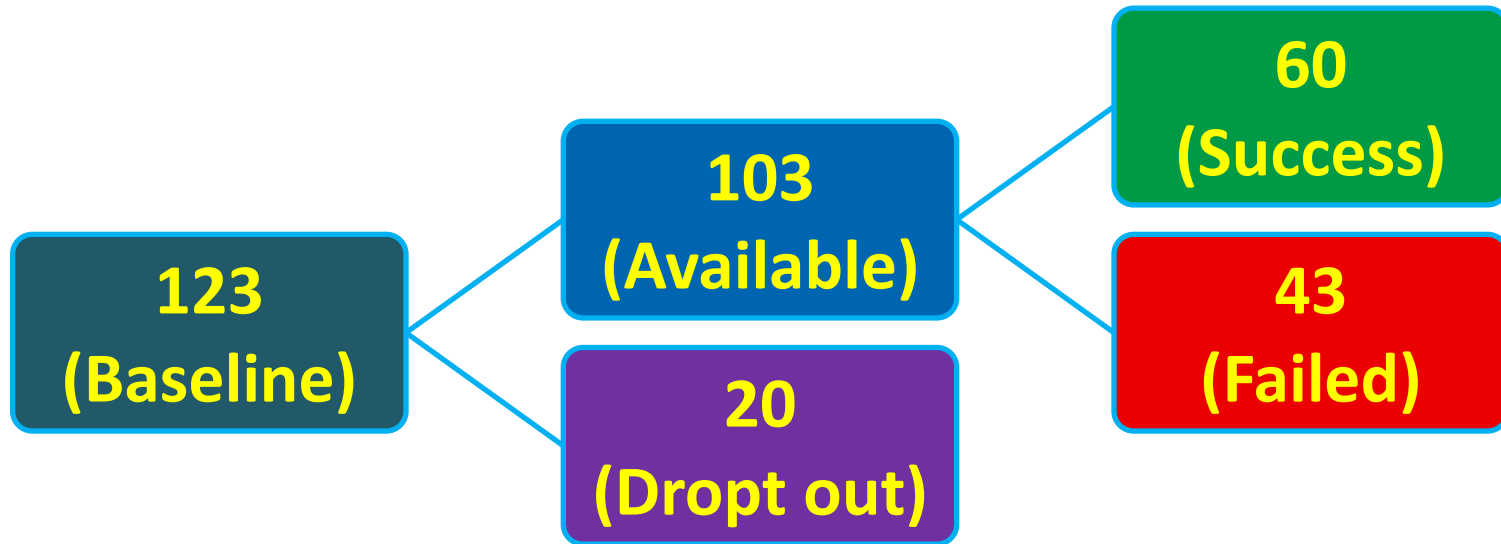
➤ e.g., sensitivity analyses

## ❖ Example of sensitivity analysis

➤ Gastro-gastrostomy of obese patients to reduce excess weight, 19-47 months after surgery

# Sensitivity Analysis

Gastro-gastrostomy of obese patients to reduce excess weight,  
19-47 months after surgery



## ❖ Sensitivity analysis:

- Available case approach =  $60/103 = 58\%$
- Best case scenario =  $(60+20)/123 = 65\%$
- Worst case scenario =  $60/123 = 49\%$

# Results

## ❖ 8-7 Tables

- ❖ If many rows or columns are being presented, it is a good idea to consider dividing the table into two.
- ❖ Row and column headings should be brief but sufficiently explanatory.
- ❖ Standard abbreviations of units of measurements should be added in parentheses.

# Results

## ❖ 8-7 Tables (continue)

- ❖ Do not use multiple borders and grids.
- ❖ Use few horizontal rules and no vertical rules.
- ❖ Consider sufficient white space to separate the rows and columns.
- ❖ Do not include sample or group sizes at the base of a table.

# Results

## ❖ 8-7 Tables (continue)

- ❖ It is best to just give the results once,
- ❖ Do not present the same data in both a figure and a table
- ❖ Never repeat data from figures or tables in the text.
- ❖ Readers may get confused if a percentage of 54.7% in the table is repeated as 55% in the text.

# Results

## ❖ 8-7 Tables (continue)

- ❖ It is much better to have an inclusive title and detailed row and column descriptors than to put the essential information into footnotes, which should be avoided as far as possible.
- ❖ Do not incorporate tables into the text.
- ❖ Tables should be submitted on separate pages.



# Results

## ❖ Example of scientific table

Multivariate logistic regression for incident self-reported symptoms of anxiety or depression at year 9. Values are numbers (percentages) unless otherwise stated<sup>24</sup>

	Incident symptoms of anxiety or depression at year 9 (n = 116)	Total (n = 1746)	Adjusted odds ratio (95% CI)	P value
Victimised at baseline				
not bullied in year 8	28 (24.1)	680 (38.9)	1.00	
bullied at one time in year 8	42 (36.2)	575 (32.9)	1.49 (0.88 to 2.54)	0.130
bullied at both times in year 8	46 (39.7)	491 (28.1)	2.03 (1.14 to 3.64)	0.019
Availability of attachments at baseline				
available at both times in year 8	96 (82.8)	1501 (86.0)	1.00	
available at one time in year 8	17 (14.1)	217 (12.4)	1.25 (0.53 to 2.96)	0.594
no available attachments in year 8	3 (2.6)	25 (1.4)	1.97 (0.43 to 9.05)	0.366
Arguments with others at baseline				
none at baseline	31 (26.7)	837 (47.9)	1.00	
with one other at either time	67 (57.8)	798 (45.7)	1.86 (1.05 to 3.30)	0.036
with two or more others at either time	18 (15.5)	104 (6.0)	4.25 (1.82 to 9.94)	0.002
Sex				
male	40 (34.5)	868 (49.7)	1.00	
female	76 (65.5)	878 (50.3)	1.86 (1.02 to 3.40)	0.044
Family structure				
intact family	86 (74.1)	1422 (81.4)	1.00	
separated, divorced, other	30 (25.9)	324 (18.6)	1.47 (0.9 to 2.4)	0.116

# Results

## ❖ 8-8 Figures and graphics

- ❖ Show your most important findings as a figure, but only as long as the figure does not take up much more space than reporting the data would.
- ❖ For this reason, some journals prefer tables to bar charts.

# Results

- ❖ **8-8 Figures and graphics** (continue)
- ❖ The figure should be totally self-explanatory and have a bold, stand-alone quality.
- ❖ A good figure tells the story in a single grab and stays in a reader's mind.
- ❖ The figure legend, symbols, abbreviations, hatching, line types, and bars must all be very clear and fully understood.

# Results

- ❖ **8-8 Figures and graphics** (continue)
- ❖ Never use three-dimensional box histograms.
- ❖ Photographs should always maintain the anonymity of the patient (i.e. masking the eyes).
- ❖ If a photograph is used, written consent must be obtained from the patient or their parent or guardian.

# Results

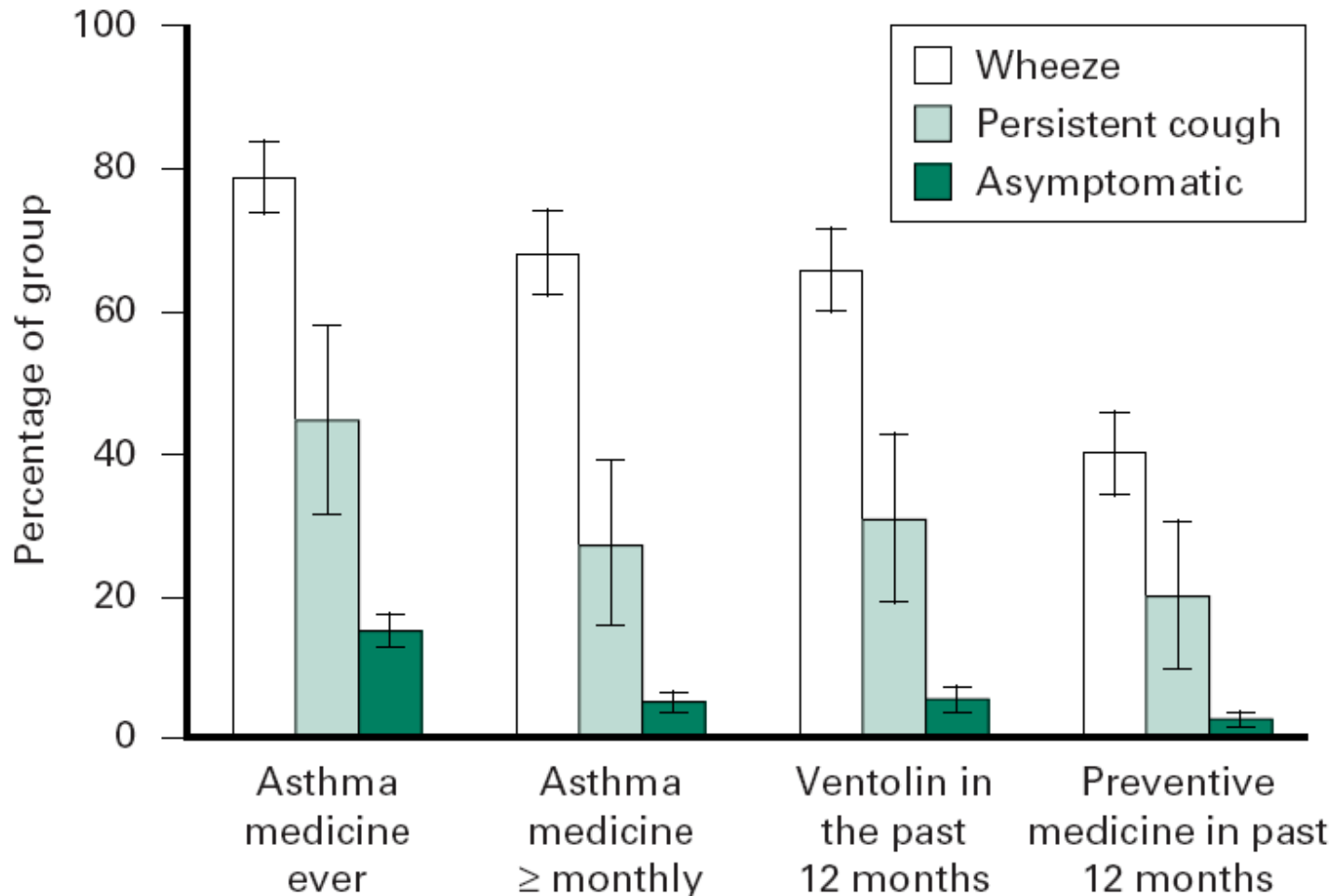
- ❖ **8-8 Figures and graphics** (continue)
- ❖ For most graphics, a scale calibration is needed to interpret the magnitude of the picture and for the comparison of different images.
- ❖ Graphics should be professionally produced so that any subtle color are not lost in the translation to black and white publishing.

# Results

- ❖ **8-8 Figures and graphics** (continue)
- ❖ Figures should be printed on separate pages.
- ❖ The figure titles are usually listed on a separate page under the heading “*figures title*”.

# Results

## ❖ Example of scientific figure



# Results

## ❖ 8-9 Statistics

- ❖ Use the abbreviation SD, SE, or CI to define which statistic you are presenting and to avoid using an ambiguous  $\pm$  or  $+/-$  sign.
- ❖ The SE has no intuitive meaning in making comparisons between groups whereas 95% CI is an ideal statistic for this purpose.
- ❖ In tables use:
  - $P=0.043$  not  $P<0.05$
  - $P=0.130$  not NS
  - $P<0.001$  not  $P <000$



# Golden Rules for Reporting Numbers

<b>Rule</b>	<b>Correct expression</b>
Numbers less than 10 are words.	In the study group, eight participants underwent the intervention.
Numbers 10 or more are numbers.	There were 120 participants in the study.
Words not numbers begin a sentence.	Twenty per cent of participants had diabetes.
Be consistent in lists of numbers.	In the sample, 15 boys and 4 girls had diabetes.
Numbers less than 1 begin with a zero.	The <i>P</i> value was 0·013.
Do not use a space between a number and its per cent sign.	In total, 35% of participants had diabetes.
Use one space between a number and its unit.	The mean height of the group was 170 cm.
Report percentages to only one decimal place if the sample size is larger than 100.	In our sample of 212 children, 10·4% had diabetes.
Do not use decimal places if the sample size is less than 100.	In our sample of 44 children, 10% had diabetes.

# Golden Rules for Reporting Numbers

## Rule

## Correct expression

---

Do not use percentages if the sample size is less than 20.

In our sample of 18 children, two had diabetes.

Do not imply greater precision than your measurement instrument.

Only use one decimal place more than the basic unit of measurement when reporting statistics (means, medians, standard deviations, 95% confidence interval, interquartile ranges, etc.)

For ranges use “to” or a comma but not “–” to avoid confusion with a minus sign and use the same number of decimal places as the summary statistic.

The mean height was 162 cm (95% CI 156 to 168).

The mean height was 162 cm (95% CI 156, 168).

The median value was 0.5 mm (interquartile range –0.08 to 0.7).

The range of heights was 145 to 170 cm.

Rules for data numbers do not apply to citations to the literature.

The page range was 145–70.

---



# Discussion

- ❖ **9-1 Key results**
- ❖ **9-2 Interpretation**
- ❖ **9-3 Comparison**
- ❖ **9-4 Limitations**
- ❖ **9-5 Generalizability**
- ❖ **9-6 Implications**

# Discussion

## ❖ 9-1 Key results

❖ A short summary of the main findings of the study related to the objective.

### ❖ Example 1

➤ The results of this meta-analysis indicated that transient HBsAg seroconversion may occur sparsely among the previously vaccinated individuals but chronic carrier state may not occur.

[Vaccine. 2010;28\(3\),623-631](#)

# Discussion

## ❖ 9-1 Key results

### ❖ Example 2

- According to our findings, H. pylori infection and smoking were the first and second most powerful risk factors for stomach cancer, respectively, whereas fruit and vegetable consumption were the first and second most powerful protective factors against stomach cancer, respectively.

[Epidemiol. Infect. 2020;148:e2020004](#)

# Discussion

## ❖ 9-2 Interpretation

❖ Give a reasonable and scientific interpretation of the main findings.

## ❖ Example

- Association between malaria infection and male gender
- High rate of influenza infection in pregnant women
- H. pylori infection and stomach cancer
  - H. pylori > inflammation > protein modulation > mutations
  - > gastric carcinogenesis

# Discussion

## ❖ 9-3 Comparison

❖ Comparing the results with relevant findings from similar studies.

## ❖ Example

➤ Our findings are confirmed by other reviews. A review article revealed that development of HBsAg positive is a rare and transient event in vaccinated individuals even if anti-HBs titer decreases to very low or undetectable level.

[Vaccine. 2010;28\(3\),623-631](#)

# Discussion

## ❖ 9-4 Limitations

- Discuss limitations of the study
- Taking into account sources of potential bias or imprecision.

## ❖ Example

- Rejection rate
- Self reporting
- Sensitivity and specificity
- Sample size
- Incomplete data
- Left censoring (HIV)
- Unavailable full text (systematic review)



# Discussion

## ❖ 9-5 Generalizability

❖ Discuss the generalizability (external validity) of the study results.

## ❖ Example

- Special groups (students, hospital, employee)
- Sub region (rural, urban)

# Discussion

## ❖ 9-6 Implications

❖ A brief section that summarizes the implications of the work for practice and research.

## ❖ Example

- Policymakers
- Clinicians
- Guidelines

- ❖ The conclusions must answer the aims set out in the introduction.
- ❖ The conclusions must be justified and logical?
- ❖ **Example**
  - We conclude that the protection provided by three or four doses of monovalent HB vaccine persists for at least two decades in the great majority of immunocompetent individuals. Additional studies are needed for assessing vaccine efficacy for longer periods of time and the need of booster doses in different subgroups of population.

# Verb Tense Throughout the Paper

Section	Verb tense	Examples
Introduction	Present or past tense for describing the evidence that exists Past tense for describing your aims or hypotheses	It is known that ... There is no evidence that ... Therefore, we investigated whether ...
Methods	Past tense throughout	Participants were recruited from ...
Results	Past tense for results Present tense to refer to tables, etc.	We found that ... Figure 1 shows that ...
Discussion	Present tense for answers to questions Present tense to discuss the literature Past tense to discuss the results	Our findings suggest that ... Evidence from cohort studies shows that ... We found that ...

# 11

# Acknowledgement

- ❖ Contributions to a paper that warrant acknowledgement
  - Financial support (Vice-chancellor of Research and Technology, Research Center)
  - General support (employee, patients)
  - Technical help (consultant, translation)

❖ Give the source of funding and the role of the funders for the study.

## ❖ Example

➤ This study was approved by Vice-Chancellor of Education and funded by the Vice-Chancellor of Research and Technology, Hamadan University of Medical Sciences (No. 186534).

# 13 Conflicts of Interest

❖ Explain clearly conflicts of interest that may influence study results.

- Pharmaceutical company
- Chewing gum
- Diagnostic tests
- LDL cutoff point for treatment
- Presenting a book in a workshop

## ❖ Example

- The authors declare that they have no conflicts of interest.

- ❖ All citations must be accurate
- ❖ Include only literatures with following criteria
  - Most recent
  - Most reliable
  - Most important
- ❖ Quote only published articles or books
- ❖ Never quote “second hand”
- ❖ Cite only 20-35 references



# Referencing Styles

- ❖ Various styles for referencing to literature
  - 492 different styles
- ❖ Depending on the journal
  - Instructions for authors
- ❖ More commonly used styles
  - Vancouver (with different variant)
  - Harvard

# EndNote X8



# Journal Article

- ❖ **Author A, Author B, Author C, Author D, Author E, Author F, et al. Title. Journal. Year; Volume (Issue): Page-Page.**
- **Poorolajal J, Mahmoodi M, Majdzadeh R, Haghdoost AA, Nasserri-Moghaddam S, Fotouhi A, et al. Seroprotection of hepatitis B vaccine and need for booster dose: a meta-analysis. Hepat Mon. 2009;9(4):293-304.**

Reference Type: Journal Article

**Rating****Author**

Poorolajal, Jalal  
Jalal Poorolajal  
Mahmoodi, Mahmood  
Majdzadeh, Reza  
Haghdoost, Ali Akbar  
Nasseri-Moghaddam, Siavosh  
Fotouhi, Akbar  
Ghalichee, Leila

**Year**

2009

**Title**

Seroprotection of hepatitis B vaccine and need for booster dose: a meta-analysis

**Journal**

Hepat Mon

**Volume**

9

**Issue**

4

**Pages**

293-304

Added to Library: 12/09/2012 Last Updated: 13/11/2013

Layout ▾



# Book

- ❖ Author A, Author B, Author C, Author D, Author E, Author F, et al. Title of book. Edition. City: Publisher; Year.
- Gordis L. Epidemiology. 4th ed. Philadelphia: Saunders; 2008.

Reference Attached PDFs

Plain Font Plain Size B I U P A<sup>1</sup> A<sub>1</sub> Σ . Aa

Reference Type: **Book**

**Rating**  
.....

**Author**  
Gordis, L

**Year**  
2008

**Title**  
Epidemiology

**Place Published**  
Philadelphia

**Publisher**  
Saunders

**Volume**

**Number of Pages**

**Pages**  
120

**Editor**

**Edition**  
4th

Added to Library: 11/09/2012 Last Updated: 13/11/2013

Layout

# Book Section

- ❖ **Author A, Author B, Author C, Author D, Author E, Author F, et al. Chapter Title. In: Editor A, Editor B, Editor C, Editor D, Editor E, Editor F, et al, editors. Book Title. Edition. City: Publisher; Year. p. Page-Page.**
- **Greenland S. Introduction to regression modeling. In: Rothman KJ, Greenland S, Lash TL, editors. Modern Epidemiology. 3rd ed. Philadelphia: Lippincott Williams & Wilkins; 2008. p. 418-55.**

Reference Attached PDFs

Plain Font Plain Size **B** *I* U **P** A<sup>1</sup> A<sub>1</sub> Σ . Aa

Reference Type: **Book Section**

**Rating**  
.....

**Author**  
Greenland, S

**Year**  
2008

**Title**  
Introduction to regression modeling

**Editor**  
Rothman, K J  
Greenland, S  
Lash, T L

**Book Title**  
Modern Epidemiology

**Place Published**  
Philadelphia

**Publisher**  
Lippincott Williams & Wilkins

**Pages**  
418-455

**Edition**  
3rd





# Thesis

- ❖ **Author A. Title [PhD thesis]. City: University; Year.**
- **Poorolajal J. Assessing the duration of protection provided by hepatitis B vaccine and the need for booster dose: a meta-analysis [PhD thesis]. Tehran: Tehran University of Medical Sciences; 2009.**

Reference Attached PDFs

Plain Font Plain Size **B** *I* U **P** A<sup>1</sup> A<sub>1</sub> Σ . Aa

Reference Type: Thesis

**Rating**  
.....

**Author**  
Poorolajal, J

**Year**  
2009

**Title**  
Assessing the duration of protection provided by hepatitis B vaccine and the need for booster dose: a meta-analysis

**Place Published**  
Tehran

**University**  
Tehran University of Medical Sciences

**Degree**

**Advisor**

**Thesis Type**  
PhD thesis

**Short Title**

**ISBN**

# Abstract

- ❖ Author A, Author B, Author C, Author D, Author E, Author F, et al. Title [abstract]. Journal. Year; Volume(suppl):Spage.
- Joffe M, Santanna J, Feldman H. Partially marginal structural models for causal inference [abstract]. Am J Epidemiol. 2001;153(suppl):S261.

Reference Attached PDFs

Plain Font Plain Size **B** *I* U **P** A<sup>1</sup> A<sub>1</sub> Σ . Aa

Reference Type: Journal Article

**Rating**  
.....

**Author**  
Joffe, M  
Santanna, J  
Feldman, H

**Year**  
2001

**Title**  
Partially marginal structural models for causal inference [abstract]

**Journal**  
Am J Epidemiol

**Volume**  
153

**Issue**  
suppl

**Pages**  
S261

**Start Page**

**Epub Date**



# Conference

- ❖ **Author A, Author B, Author C, Author D, Author E, Author F, et al, editors. Title. Conference Name. Year of Conference Date. Conference Location.**
- **Poorolajal J, Mahmoodi M, Haghdoost A, Majdzadeh R, Nasser-Moghaddam S, Fotouhi A, editors. Long-term protection provided by hepatitis B vaccine and need for booster dose: A meta-analysis. EPS Global-Shanghai 1st International Biomedicine Forum; 2010 September 10 - September 11; Shanghai.**

Reference Type: Conference Paper

**Rating****Author**

Poorolajal, J  
Mahmoodi, M  
Haghdoust, A  
Majdzadeh, R  
Nasseri-Moghaddam, S  
Fotouhi, A  
Ghalichee, Leila

**Year**

2010

**Title**

Long-term protection provided by hepatitis B vaccine and need for booster dose: a meta-analysis

**Editor****Conference Name**

EPS Global-Shanghai 1st International Biomedicine Forum

**Conference Location**

Shanghai

**Date**

September 10 - September 11

**Type**

Added to Library: 11/09/2012 Last Updated: 12/09/2012

Layout



# Web Page

- ❖ Author A, Author B, Author C, Author D, Author E, Author F, et al. Title. **Wes Site**; Year [updated Day Month, Year **cited** Day Month, Year]; **Available from: URL.**
- Chan M. Progress in public health during the previous decade and major challenges ahead. WHO **Web Site**; 2010 [updated 18 January, 2010; **cited** 16 April, 2011]; **Available from:** [http://www.who.int/dg/speeches/2010/executive\\_board\\_126\\_20100118/en/index.html](http://www.who.int/dg/speeches/2010/executive_board_126_20100118/en/index.html).

Reference Attached PDFs

Plain Font Plain Size B I U P A<sup>1</sup> A<sub>1</sub> Σ . Aa

Reference Type: Web Page

**Rating**  
.....

**Author**  
Chan, Margaret

**Year**  
2010

**Title**  
Progress in public health during the previous decade and major challenges ahead

**Series Editor**  
.

**Place Published**  
.

**Publisher**  
WHO

**Access Year**  
16 April, 2011

**Access Date**

**Last Update Date**  
18 January, 2010

**URL**  
[http://www.who.int/dg/speeches/2010/executive\\_board\\_126\\_20100118/en/index.html](http://www.who.int/dg/speeches/2010/executive_board_126_20100118/en/index.html)



# More Information

# Plagiarism



<http://plagiarism.org>

# Plagiarism

## ❖ Definition

- Many people think of plagiarism as copying another's work, or borrowing someone else's original ideas.
- But terms like "copying" and "borrowing" can disguise the seriousness of the offense.

## ❖ Merriam-Webster Online Dictionary

- To steal and pass off (the ideas or words of another) as one's own.

# Plagiarism

## ❖ Instances

- Turning in someone else's work as your own
- Copying words or ideas from someone else without giving credit
- Changing words but copying the sentence structure of a source without giving credit
- Failing to put a quotation in quotation marks
- Copying so many words or ideas from a source that it makes up the majority of your work, whether you give credit or not
- Giving incorrect information about the source of a quotation

# Plagiarism

## ❖ What are the punishments for plagiarism?

- When plagiarism takes place in an academic setting
  - It is most often handled by the academic institution
- When plagiarism involves money, prizes, or job placement
  - It constitutes a crime punishable in court

# Self-plagiarism

- ❖ Also known as “recycling fraud”
- ❖ The reuse of significant and identical portions of one’s own work
  - without acknowledging that one is doing so, or
  - without citing the original work
- ❖ Referred to as duplicate or multiple publication

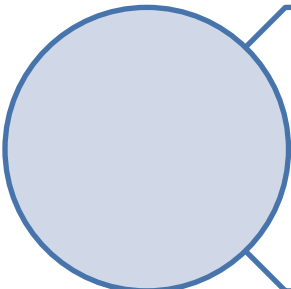
# Examples of Plagiarism



German Defense Minister was stripped of his doctorate on Wednesday 24 February 2011 by the German university that awarded the title, after he admitted to flaws in a thesis that is the focus of a plagiarism row.



Two Iranian government ministers have co-authored peer-reviewed papers that duplicate substantial amounts of text from previously published articles, according to an investigation by *Nature*.



Who is the next one?

# Impact Factor (IF)

- ❖ A proxy for the relative importance of a journal within its field.



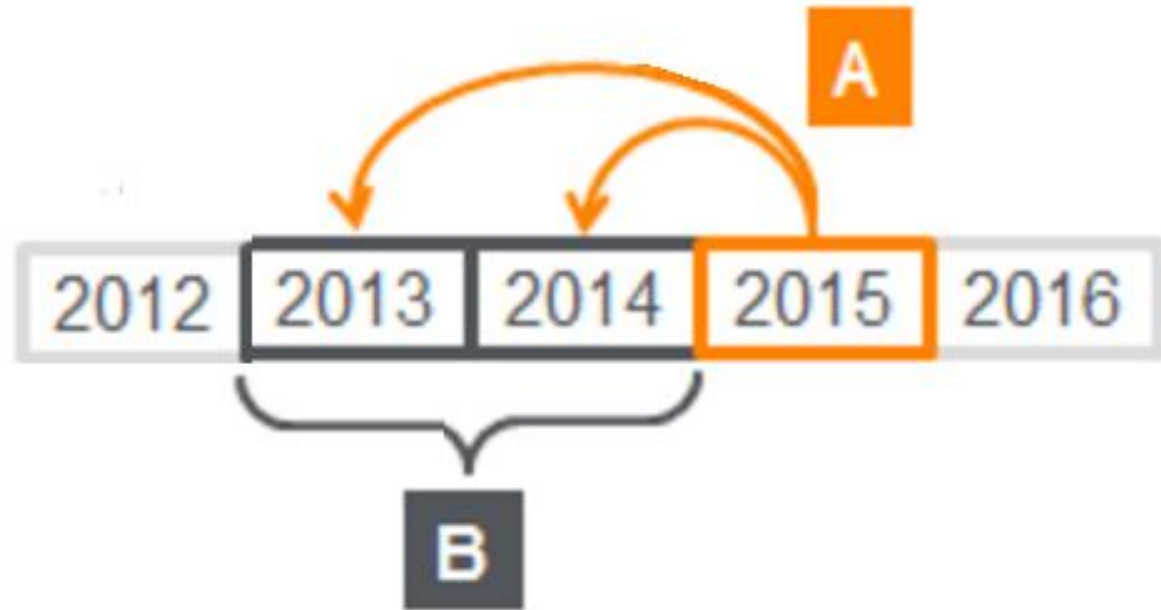
# Impact Factor (IF)

- ❖ The 2016 impact factor of a journal would be calculated as follows:
  - **A** = The number of times articles published in 2013 and 2014 were cited by indexed journals during 2015
  - **B** = The total number of '*citable items*' published by that journal in 2013 and 2014.

$$2015 \text{ IF} = A/B$$

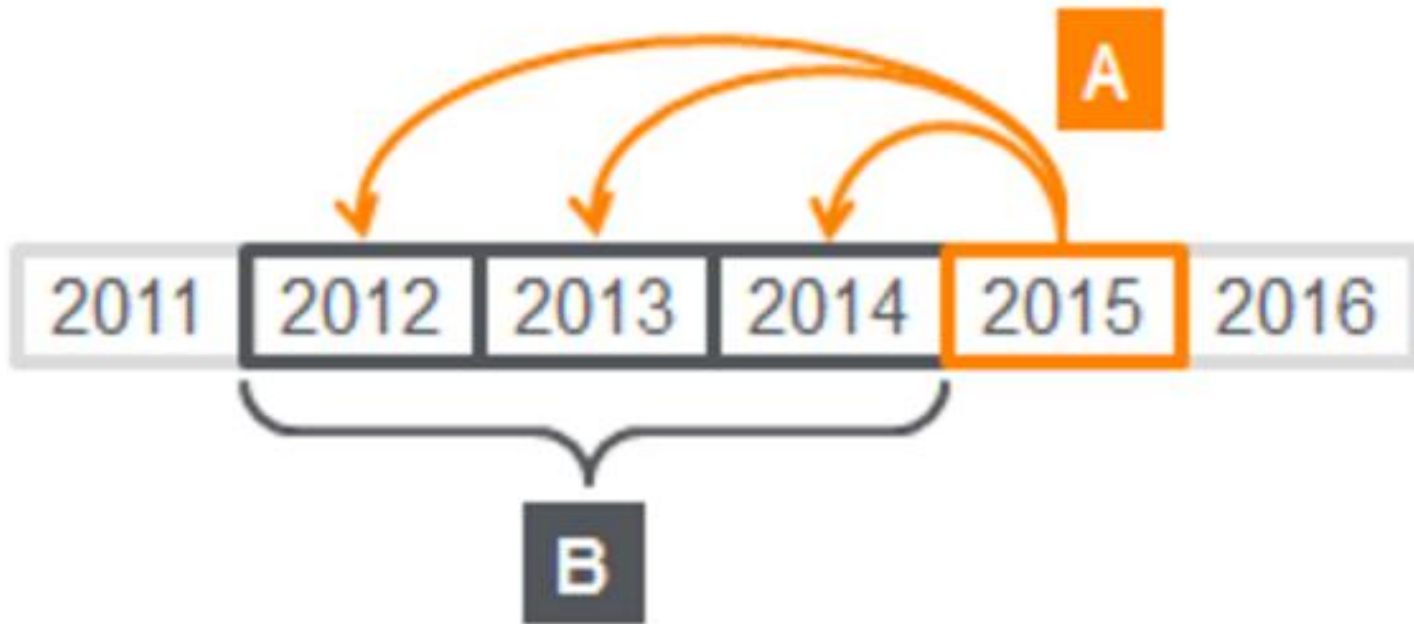
- 'Citable items' are usually articles, reviews, proceedings, or notes; but not "editorials" or "Letters to the Editor"
- ❖ Note that 2015 impact factors are actually published in 2016.

# Impact factor - ISI



$$\text{Impact Factor 2015 value} = \frac{\text{A}}{\text{B}}$$

# CiteScore - Scopus



$$\text{CiteScore 2015 value} = \frac{\text{A}}{\text{B}}$$

## Journal Summary List

[Journal Title Changes](#)

Journals from: All Journals

Sorted by:  SORT AGAIN

Journals 1 - 20 (of 8281)

Page 1 of 415


*Ranking is based on your journal and sort selections.*

Mark	Rank	Abbreviated Journal Title (linked to journal information)	ISSN	JCR Data <sup>i</sup>						Eigenfactor <sup>®</sup> Metrics <sup>i</sup>	
				Total Cites	Impact Factor	5-Year Impact Factor	Immediacy Index	Articles	Cited Half-life	Eigenfactor <sup>®</sup> Score	Article Influence <sup>®</sup> Score
<input type="checkbox"/>	1	<a href="#">CA-CANCER J CLIN</a>	0007-9235	10976	101.780	67.410	21.263	19	3.8	0.04502	24.502
<input type="checkbox"/>	2	<a href="#">NEW ENGL J MED</a>	0028-4793	232068	53.298	50.075	11.484	349	7.8	0.66466	21.293
<input type="checkbox"/>	3	<a href="#">ANNU REV IMMUNOL</a>	0732-0582	15990	52.761	42.901	9.174	23	8.2	0.05204	23.410
<input type="checkbox"/>	4	<a href="#">REV MOD PHYS</a>	0034-6861	31368	43.933	44.436	10.026	38	9.8	0.11667	28.864
<input type="checkbox"/>	5	<a href="#">CHEM REV</a>	0009-2665	103702	40.197	42.054	7.158	196	7.9	0.21464	13.305
<input type="checkbox"/>	6	<a href="#">NAT REV MOL CELL BIO</a>	1471-0072	29222	39.123	42.508	6.500	66	5.1	0.17432	23.838
<input type="checkbox"/>	7	<a href="#">LANCET</a>	0140-6736	158906	38.278	33.797	10.576	276	8.9	0.36138	13.602
<input type="checkbox"/>	8	<a href="#">NAT REV GENET</a>	1471-0056	20384	38.075	31.359	7.014	71	4.7	0.12140	16.942
<input type="checkbox"/>	9	<a href="#">NAT REV CANCER</a>	1474-175X	28602	37.545	38.460	4.838	68	5.8	0.12608	17.917
<input type="checkbox"/>	10	<a href="#">ADV PHYS</a>	0001-8732	4400	37.000	25.289	3.778	9	>10.0	0.01485	17.966
<input type="checkbox"/>	11	<a href="#">NATURE</a>	0028-0836	526505	36.280	36.235	9.690	841	9.4	1.65658	20.353
<input type="checkbox"/>	12	<a href="#">NAT GENET</a>	1061-4036	76456	35.532	33.096	6.357	196	6.8	0.33022	17.569
<input type="checkbox"/>	13	<a href="#">ANNU REV BIOCHEM</a>	0066-4154	18684	34.317	35.013	2.951	41	>10.0	0.05695	19.743
<input type="checkbox"/>	14	<a href="#">NAT REV IMMUNOL</a>	1474-1733	22613	33.287	34.302	5.116	69	5.0	0.11980	16.806
<input type="checkbox"/>	15	<a href="#">NAT MATER</a>	1476-1122	39242	32.841	36.732	6.246	134	4.7	0.22089	17.891
<input type="checkbox"/>	16	<a href="#">CELL</a>	0092-8674	171297	32.403	34.774	6.382	338	8.6	0.66143	20.536
<input type="checkbox"/>	17	<a href="#">ENERGY EDUC SCI TECH</a>	1301-8361	2992	31.677		5.460	174	1.5	0.00117	
<input type="checkbox"/>	18	<a href="#">SCIENCE</a>	0036-8075	480836	31.201	32.452	6.075	871	9.4	1.41282	17.508
<input type="checkbox"/>	19	<a href="#">NAT REV NEUROSCI</a>	1471-003X	24316	30.445	34.187	5.085	47	5.9	0.10635	16.124
<input type="checkbox"/>	20	<a href="#">JAMA-J AM MED ASSOC</a>	0098-7484	117668	30.026	29.684	6.927	220	8.8	0.28624	13.114

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# CA A Cancer Journal for Clinicians



## CA: A Cancer Journal for Clinicians



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Edited By: Otis Webb Brawley, MD, and Ted Gansler, MD, MBA, MPH

Impact Factor: 153.459

ISI Journal Citation Reports © Ranking: 2012: 1/197 (Oncology)

Online ISSN: 1542-4863

Associated Title(s): Cancer, Cancer Cytopathology

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[July/August 2013](#)

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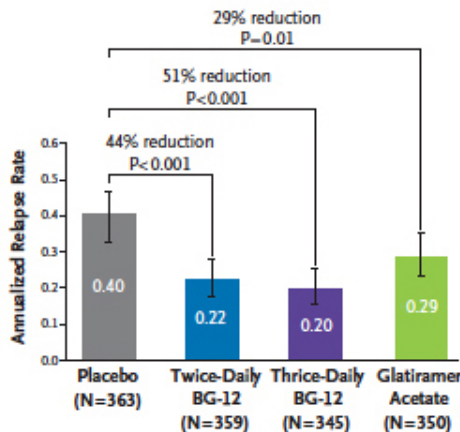
IP: 51.658



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ORIGINAL ARTICLES

## Oral BG-12 or Glatiramer in Multiple Sclerosis

September 20, 2012 | R.J. Fox and Others

In this trial involving patients with relapsing–remitting multiple sclerosis, BG-12 (dimethyl fumarate) reduced the annualized relapse rate and number of MRI lesions but not disability progression. BG-12 was associated with flushing, diarrhea, and decreased lymphocyte counts.

[CME](#) | [Comments](#)

## Oral BG-12 for Relapsing Multiple Sclerosis

September 20, 2012 | R. Gold and Others

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NEW: Includes NEJM iPad Edition



IMAGE CHALLENGE



What is the diagnosis?

[Submit Answer](#)

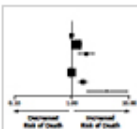
[More Image Challenges >](#)

IMAGE OF THE WEEK



### Battle's Sign

A 46-year-old man presented with hearing loss and a sensation of fullness in the left ear.



ORIGINAL ARTICLE

## Intensive or Conventional Glucose Control

September 20, 2012 | The NICE-SUGAR

PERSPECTIVE **ONLINE FIRST**

## Liver Transplantation — A Vision Realized

September 19, 2012 | J.L. Dienstag and A.B. Cosimi  
(DOI: 10.1056/NEJMp1210159)

# H-index

Hirsch JE. An index to quantify an individual's scientific research output. PNAS. 2005;102(46):16569-72.

- ❖ So called “Hirsch index”
- ❖ A scientist has index  $h$  if  $h$  of his or her papers have at least  $h$  citations each and the other papers have  $<h$  citations each.
  - Scientific productivity
  - Scientific impact

# H-index Calculation

Sort the citations descending

H-index=5

Article	Citation
1 <sup>st</sup>	10
2 <sup>nd</sup>	10
3 <sup>rd</sup>	9
4 <sup>th</sup>	7
5 <sup>th</sup>	6
6 <sup>th</sup>	4
7 <sup>th</sup>	3
8 <sup>th</sup>	2
9 <sup>th</sup>	1
10 <sup>th</sup>	0



# H-index Calculation

Sort the citations descending

H-index=3

Article	Citation
1 <sup>st</sup>	28
2 <sup>nd</sup>	23
3 <sup>rd</sup>	6
4 <sup>th</sup>	3
5 <sup>th</sup>	3
6 <sup>th</sup>	2
7 <sup>th</sup>	2
8 <sup>th</sup>	2
9 <sup>th</sup>	1
10 <sup>th</sup>	1

# H-index Calculation

Sort the citations descending

H-index=1

Article	Citation
1 <sup>st</sup>	90
2 <sup>nd</sup>	1
3 <sup>rd</sup>	1
4 <sup>th</sup>	1
5 <sup>th</sup>	1
6 <sup>th</sup>	0
7 <sup>th</sup>	0
8 <sup>th</sup>	0
9 <sup>th</sup>	0
10 <sup>th</sup>	0

# H-index

- ❖  $h^2$  gives a lower bound on the total number of citations
- ❖ Total citations  $> h^2$ , because:
  - $h^2$  underestimates the citations of larger than  $h$
  - $h^2$  ignores the papers less than  $h$
- ❖ Total citations =  $ah^2$ 
  - $a$  ranges between 3 to 5

# H-index

## ❖ Successful scientist

- An h index of 20 after 20 years of scientific activity, characterizes a successful scientist.

## ❖ Outstanding scientist

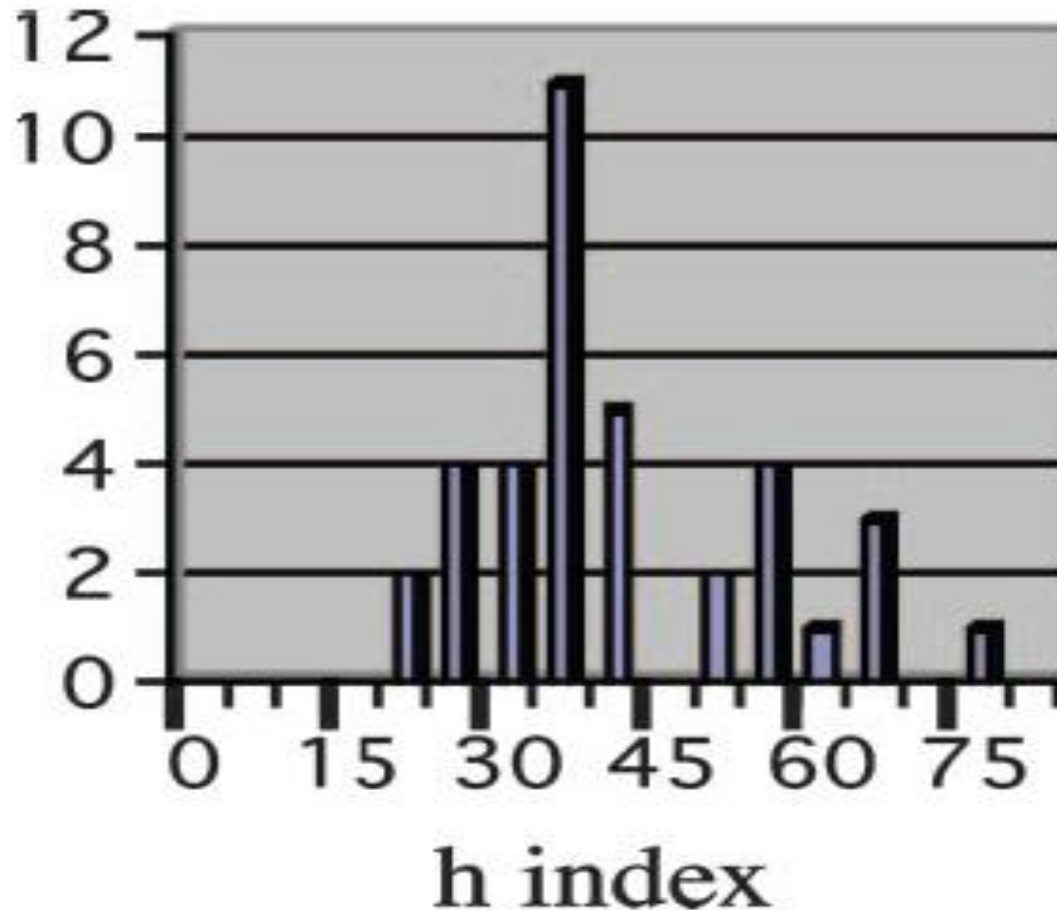
- An h index of 40 after 20 years of scientific activity, characterizes outstanding scientists
- Likely to be found only at the top universities or major research laboratories.

## ❖ Unique individual

- An h index of 60 after 20 years, or 90 after 30 years, characterizes truly unique individuals.

# H-index

The number of Nobel prize recipients in physics in the last 20 years versus their h index.



# G-index

Leo Egghe. Theory and practise of the g-index. *Scientometrics*,  
Vol. 69, No. 1 (2006) 131–152

- ❖ Given a set of articles ranked in decreasing order of the number of citations that they received
- ❖ The g-index is the (unique) largest number such that the top g articles received (together) at least  $g^2$  citations.
- ❖  $g \geq h$

# H-index versus G-index

TC	$r$	$\Sigma TC$	$r^2$
47	1	47	1
42	2	89	4
37	3	126	9
36	4	162	16
21	5	183	25
18	6	201	36
17	7	218	49
16	8	234	64
16	9	250	81
16	10	266	100
15	11	281	121
13	12	294	144
<b>13</b>	<b>13</b>	307	169
13	14	320	196
13	15	333	225
12	16	345	256
12	17	357	289
12	18	369	324
12	<b>19</b>	<b>381</b>	<b>361</b>
11	20	392	400

h-index=13

g-index=19

# H-index versus G-index

TC	r	$\Sigma TC$	$r^2$
10	1	10	1
10	2	20	4
9	3	29	9
7	4	36	16
6	5	42	25
4	6	46	36
3	7	49	49
2	8	51	64
1	9	52	81
0	10	52	100



# H-index versus G-index

	TC	r	$\Sigma TC$	$r^2$	
	10	1	10	1	
	10	2	20	4	
	9	3	29	9	
	7	4	36	16	
h-index=5	6	5	42	25	
	4	6	46	36	
	3	7	49	49	g-index=7
	2	8	51	64	
	1	9	52	81	
	0	10	52	100	

# H-index versus G-index

TC	r	$\Sigma TC$	$r^2$
28	1	28	1
23	2	51	4
6	3	57	9
3	4	60	16
3	5	63	25
2	6	65	36
2	7	67	49
2	8	69	64
1	9	70	81
1	10	71	100

# H-index versus G-index

	TC	r	$\Sigma TC$	$r^2$	
	28	1	28	1	
	23	2	51	4	
h-index=3	6	3	57	9	
	3	4	60	16	
	3	5	63	25	
	2	6	65	36	
	2	7	67	49	
	2	8	69	64	g-index=8
	1	9	70	81	
	1	10	71	100	

# H-index versus G-index

TC	r	$\Sigma TC$	$r^2$
90	1	90	1
1	2	91	4
1	3	92	9
1	4	93	16
1	5	94	25
0	6	94	36
0	7	94	49
0	8	94	64
0	9	94	81
0	10	94	100

# H-index versus G-index

h-index=1

TC	r	$\Sigma TC$	$r^2$
90	1	90	1
1	2	91	4
1	3	92	9
1	4	93	16
1	5	94	25
0	6	94	36
0	7	94	49
0	8	94	64
0	9	94	81
0	10	94	100

g-index=9

# How to find one's H-index?



Web of Science



Scopus



Google Scholar

# Iran's rank related to health indicators

Indicators	Year	Esimate	Rank
Scientific productions <sup>4</sup>	2015	39,727	16
Citation per document <sup>4</sup>	1996-2015	5.86	201
Human development index <sup>6</sup>	2015	0.774	69
Gender development index <sup>7</sup>	2015	0.862	69
Total DALY rate ( $\times 100,000$ ) <sup>a8</sup>	2014	30911	81
Life expectancy at birth <sup>9</sup>	2015	75.5	60
Maternal mortality rate ( $\times 100,000$ ) <sup>a10</sup>	2015	25	61
Under-5 mortality rate ( $\times 1000$ ) <sup>a11</sup>	2015	16	86

<sup>a</sup> Ranked from the lowest rate to the highest

J Res Health Sci. 2017; 17(2): e00376

**THANK YOU**