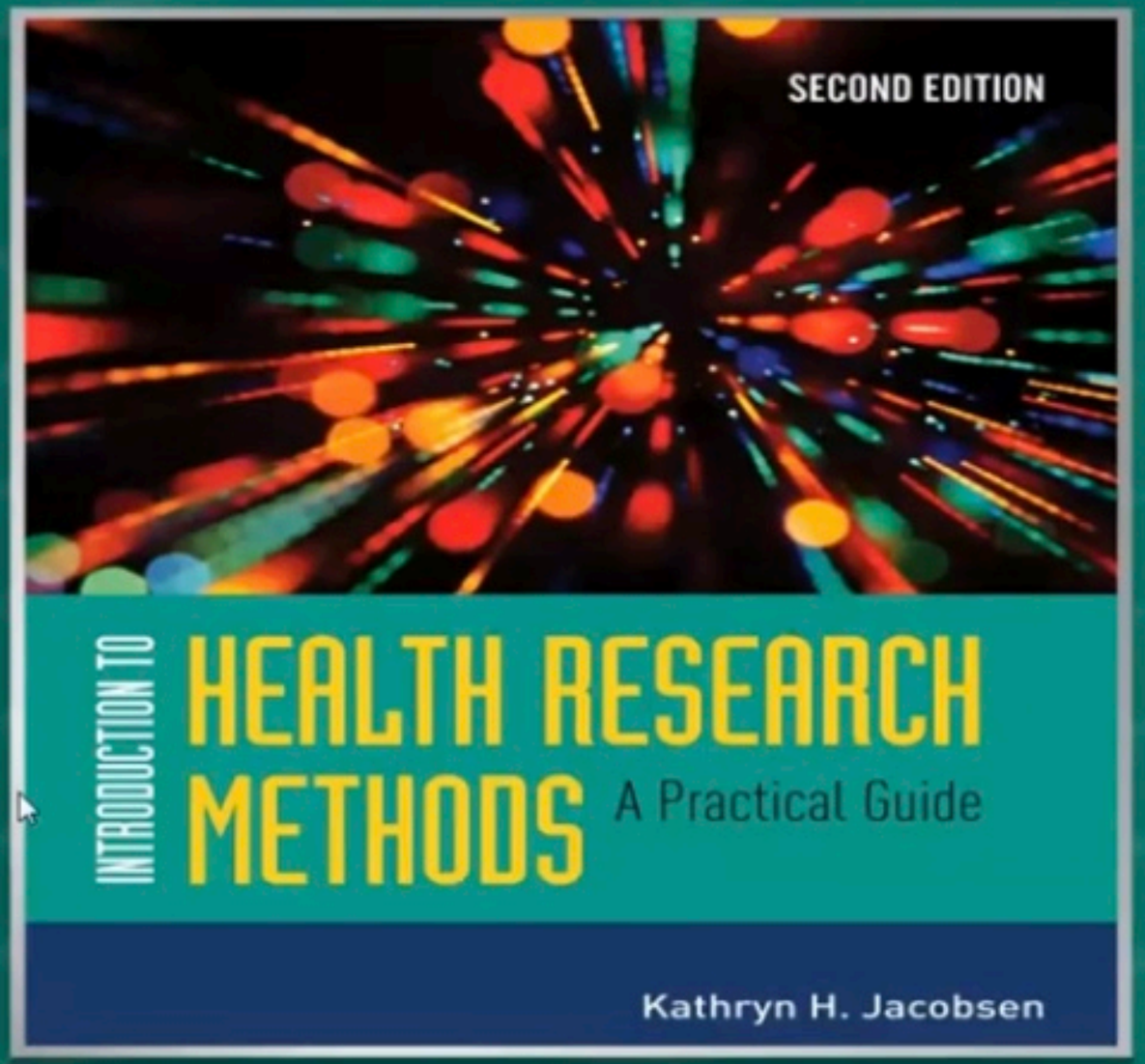
SCIENTIFIC MEDICAL RESEARCH

Week 11

Article Structure

Chapter 32



32.1 Writing Checklists

- Established writing checklists can guide the content to include in reports.
- Outlining to the paragraph level before writing can help ensure that no critical information is inadvertently omitted.

FIGURE 32-1 Key Content for Articles Reporting on Analysis of Individual-Level Data

Section	Content
Abstract/ summary	• Summarize the article using key words.
Introduction/ background	• Provide essential background information. • State the objectives of the study (or, for experimental studies, the hypotheses tested). • Identify the study design (including, for experimental studies, the randomization method). • Describe the source population (including selection methods and eligibility criteria and, if applicable, recruiting methods), the setting, and the dates of the study.
Methods	• Define key exposures, key outcomes, and other variables. • Explain how data were collected. • Describe how the required study size was estimated. • Discuss ethical considerations (such as which research ethics committees approved the project, whether an inducement was offered, and how informed consent was documented). • Describe the statistical methods used for analysis.
Results	• Describe the study population, including the sample size (using a flow diagram to show the number of individual participants at each stage of the study if that will be helpful). • Report relevant results (using tables and figures when possible). • Summarize key findings and how they relate to the study objectives (or hypotheses). • Discuss the limitations of the study.
Discussion	• Summarize (briefly) the key findings and state how they achieved the goals of the study. • Describe the key implications of the study for changes in practice, policy, and/or future research.
Endmatter	• Provide the information requested by the target journal, such as a description of each author's contributions, acknowledgments of the contributions of those who did not meet the authorship criteria, funding sources, and possible conflicts of interest. • References.

FIGURE 32-3 Sample Outline for an 18-Paragraph Paper

	Section	Paragraph
1	Abstract	Summary
2	Introduction	Set the stage
3		Justify the importance of the study
4		Main study question and 3 specific aims
5	Methods	Sampling and recruiting
6		Survey instrument
7		Ethics
8		Statistical methods
9	Results	Description of participants (Table 1)
10		Key finding #1 (Table/Figure 2)
11		Key finding #2 (Table/Figure 3)
12		Key finding #3 (Table/Figure 4)
13	Discussion	Answer to the main study question
14		Commentary on key finding #1
15		Commentary on key finding #2
16		Commentary on key finding #3
17		Study strengths and limitations
18		Implications and conclusions
	Endmatter	References
		Table/Figures

FIGURE 32-2 Common Reporting Guidelines

Study Approach	Checklist	
Case series	CARE	*Case Report*
	STARD	*Sta*ndards of *R*eporting of *D*iagnostic Accuracy
	TRIPOD	*T*ransparent *R*eporting of a multivariable prediction model for *I*ndividual *P*rognosis *o*r *D*iagnosis
Cross-sectional survey Case-control study Cohort study	STROBE	*S*trengthening *t*he *R*eporting of *Ob*servational Studies in *E*pidemiology
Experimental study	CONSORT	*Con*solidated *S*tandards *o*f *R*eporting *T*rials (for randomized controlled trials)
	SPIRIT	*S*tandard *P*rotocol *I*tems: *R*ecommendations for *I*ntervention *T*rials
	SQUIRE	*S*tandards for *Qu*ality *I*mprovement *R*eporting *E*xcellence
	CHEERS	*C*onsolidated *H*ealth *E*conomic *E*valuation *R*eporting *S*tandards
	TREND	*T*ransparent *R*eporting of *E*valuations with *N*onrandomized *D*esigns
Qualitative studies	COREQ	*Co*nsolidated *C*riteria for *Re*porting *Q*ualitative Research
Systematic review Meta-analysis	PRISMA	*P*referred *R*eporting *I*tems for *S*ystematic Reviews and *M*eta-*A*nalyses (for evaluations of interventions)
	MOOSE	*M*eta-analysis *o*f *O*bservational *S*tudies in *E*pidemiology

32.2 Abstract

- The ***abstract*** is a paragraph-length summary of the article that serves as a type of "advertisement" for the manuscript.
- A *structured abstract* uses subheadings like Objective, Methods, Results, and Conclusion to highlight content.
- An *unstructured abstract* usually follows the same outline but does not list the section titles.
- Use synonyms; be careful about length.

32.3 Introduction

- The *introduction section* (or *background section*) typically provides information about key definitions and foundational theories as well as the overall goal & specific aims of the paper.

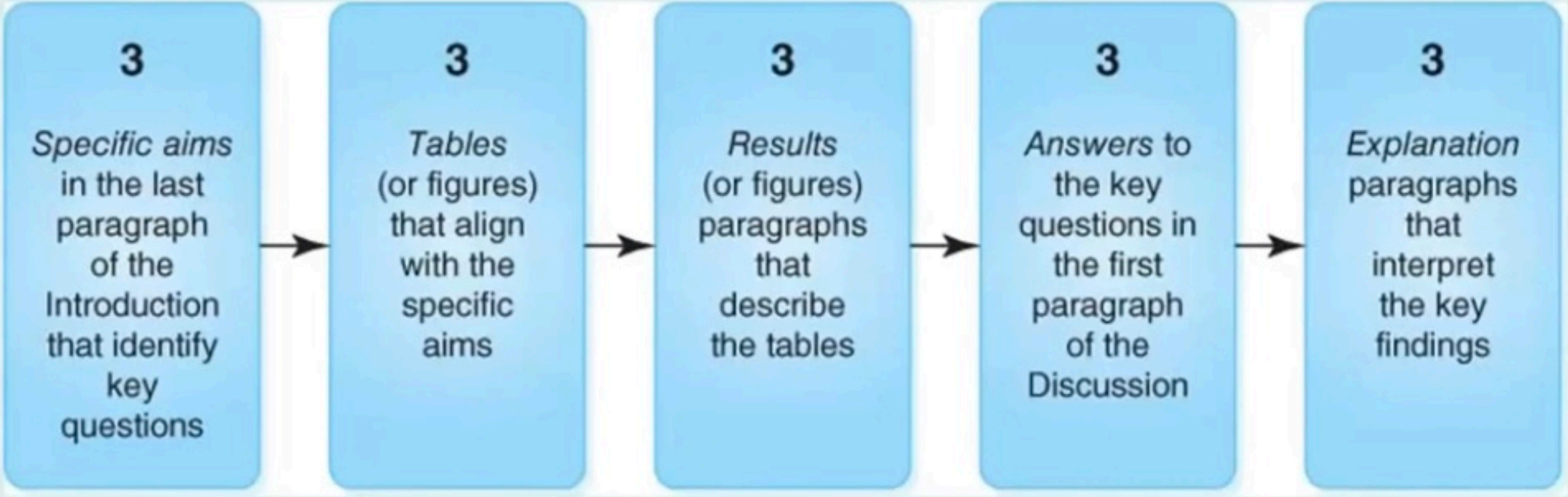
32.4 Methods

- The *methods section* typically describes the study design; the data collection & analysis methods; and ethical considerations.

32.5 Results

- The *results section* describes the study population and the key quantitative and/or qualitative results, using tables/figures when possible.

Figure 32-4: A "Follow the 3s" Approach to Storytelling in a Scientific Paper



32.6 Discussion

- The *discussion section* usually begins with a brief summary of the key findings of the new study, then puts them in context by comparing them to previous studies.
- At least one paragraph typically describes the strengths & limitations of the study.
- The final paragraph usually presents conclusions & implications.

32.7 Endmatter

- Some journals list author contributions, acknowledgments, disclosures, and other information after the main text.

32.8 Tables & Figures

- "A picture is worth a thousand words."

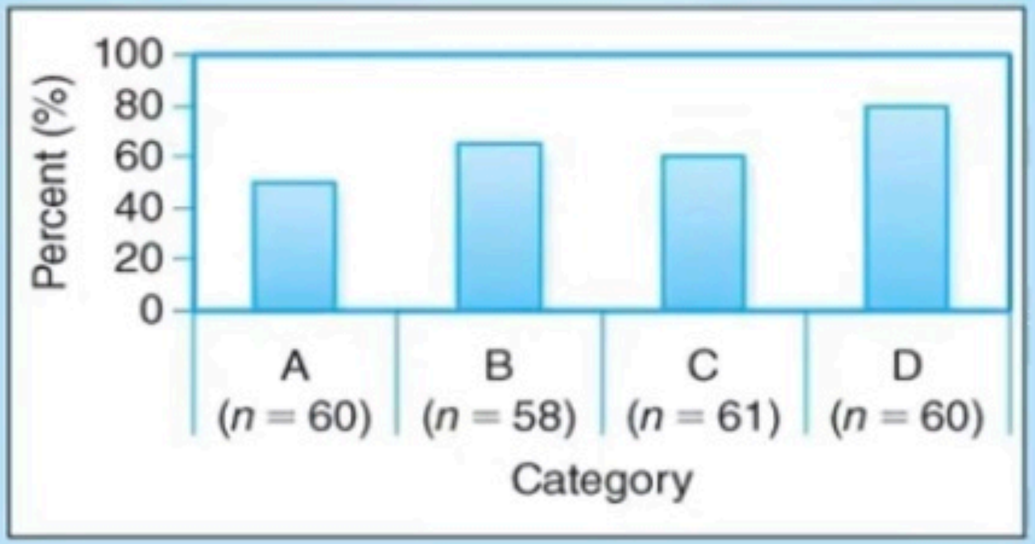
FIGURE 32-5 Sample Table Describing the Participants in a Case-control Study and Showing that the Case and Control Populations Are Similar

Characteristic		Cases $n = 102$	Controls $n = 237$	X^2 p-value
Sex	Female	54 (53%)	138 (58%)	0.37
	Male	48 (47%)	99 (42%)	
Home district	North	33 (32%)	62 (26%)	0.47
	Central	33 (32%)	89 (38%)	
	South	36 (35%)	86 (36%)	
Current smoker	Yes	18 (18%)	31 (13%)	0.28
	No	84 (82%)	206 (87%)	

Figure 32-6

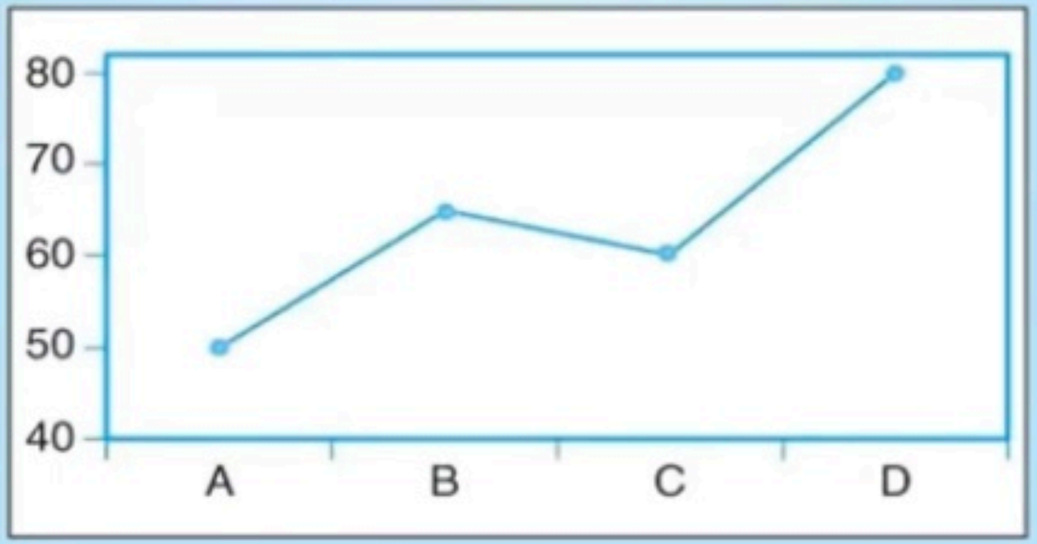
Correct:

- Bar graph used to display categorical data
- *y*-axis extends from 0% to 100%
- Both axes are labeled
- Provides information about sample sizes



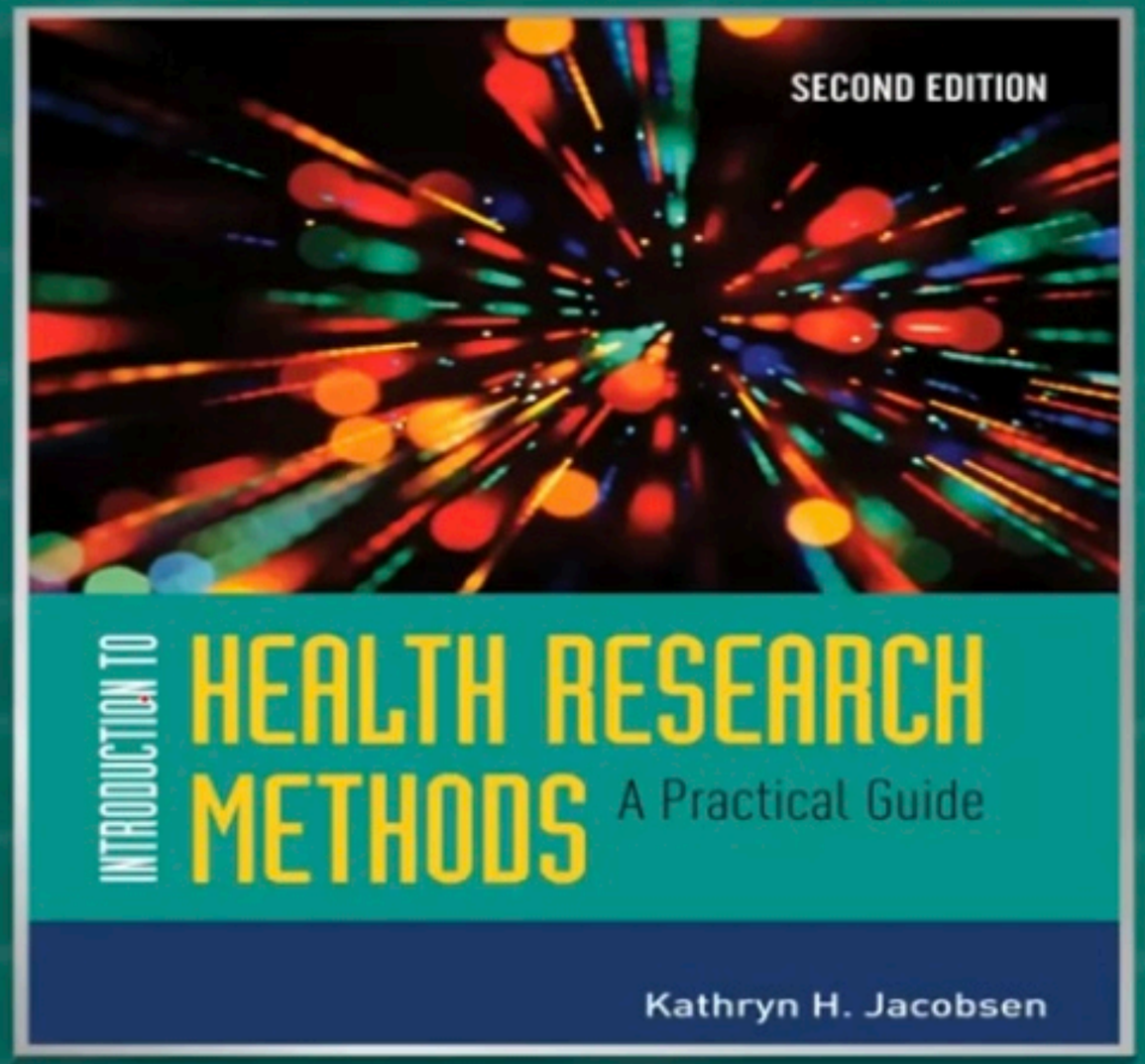
Problems:

- Interpolated line graph incorrectly used to display categorical data
- *y*-axis scale implies greater difference between categories than truly exists
- Missing label on *y*-axis makes it unclear that the value is a percent rather than a count



Citing

Chapter 33



33.1 Referring to the Scientific Literature

- A typical article in the health sciences refers to about 25 or 30 other articles published in peer-reviewed journals.
- Writers must read the full text of every article they cite; abstracts are not always accurate.
- Avoid citations of informal sources like factsheets.

FIGURE 33-1 Characteristics of Formal Scientific Reports

Formal Scientific Reports ...

- Are published in a peer-reviewed journal (or sometimes a peer-reviewed report or book), not on a website, in a newspaper, or in a popular magazine
- Describe the study design and explain why it was appropriate for the objectives of the study
- Explain how the study population was selected and demonstrate that the sample size was sufficiently large
- Explain how exposures and outcomes were defined and assessed
- Describe the analytic approaches used and present results using easily interpreted tables and graphs
- Draw conclusions that are reasonable and based on the study's data
- Discuss the limitations of the study
- Compare the new study to previous studies
- Follow a standard outline and other conventions for scientific writing

FIGURE 33-2 Citable Sources

Source	Formal or Informal?	Citable?	Remarks
Website or fact sheet	Informal	Rarely	Websites and fact sheets may be helpful starting places for informal research but should only be cited in a formal manuscript if they are from a trusted organization and no formal article or report provides the same information.
Newspaper or popular magazine	Informal	Rarely	Popular media items should be referred to only when no formal scientific article or report provides the same information.
Statistical database	Formal	Yes	Cite statistical databases and reports only when information is provided about how, when, and where the data were collected.
Official report	Formal	Yes	Reports are usually cited only when they are formal publications (with assigned publication years and/or other bibliographic information) from trusted organizations.
Book or book chapter	Formal	Yes	Although most scientific communication occurs through journals rather than books, scientific books are acceptable sources for formal manuscripts; general textbooks are rarely appropriate sources, but some highly technical textbooks are appropriate to cite.
Abstract	Formal	No	Cite only full-text articles (and be sure to read the full text before citing them).
Article	Formal	Yes	Articles from peer-reviewed journals are the preferred references for formal manuscripts.

33.2 Writing in One's Own Words

- Almost no scientific articles quote directly from another source word for word.
- **Paraphrasing** does not remove the requirement to cite the original source; it just means that quotation marks do not have to be used.

FIGURE 33-3 Examples of Quoting and Paraphrasing

Quotation (almost never used in journal articles)	Paraphrase (often used)	Reference (always required for either a quotation or a paraphrase)
A case-control study examining risk factors for ovarian cancer in Canadian women found that "age at first full-term pregnancy was not associated with risk of ovarian cancer."[1]	A case-control study of Canadian women found no association between ovarian cancer and the ages of participants at the time of their first full-term pregnancies.[1]	1. Risch HA, Marrett LD, Jain M, Howe GR. Differences in risk factors for epithelial ovarian cancer by histologic type: results of a case-control study. *Am J Epidemiol* 1996; 144:363–72.
The authors acknowledged that "since we did not adjust for depth of inhalation and age at smoking onset, the RR for women, compared with that for men, due to smoking was likely to have been underestimated by our results."[2]	The authors of the study pointed out that it was possible that they might have underestimated the magnitude of the increased risk of lung cancer in female smokers compared to male smokers because they had not statistically adjusted for smoking behaviors, such as the depth of inhalation.[2]	2. Zang EA, Wynder EL. Differences in lung cancer risk between men and women: examination of the evidence. *J Natl Cancer Inst* 1996; 88:183–92.
The investigators noted that "cholera is usually considered to be a water-borne disease, but, in this outbreak, the available evidence indicates that a food item served as part of a meal was the most likely vehicle of infection."[3]	The investigators concluded that the most likely cause of the cholera outbreak was food served to passengers on the airplane.[3]	3. Sutton RG. An outbreak of cholera in Australia due to food served in flight on an international aircraft. *J Hyg (London)* 1974; 72:441–51.

33.3 Common Knowledge and Specific Knowledge

- *Specific knowledge*, such as a statistic or the result of a particular field or laboratory study, must be cited.
- *Common knowledge* (also called *general knowledge*) refers to what a typical person in the discipline knows, and it does not require a citation.
- When in doubt, err on the side of using a citation.

33.4 Avoiding Plagiarism

- ***Plagiarism*** occurs when someone's wording, thinking, image, or creative output is repeated in a new document without attribution.
- Plagiarism is a major violation of scholarly integrity, and it can have a damaging long-term impact on a professional career.
- Never cut & paste information from anywhere; "unintentional plagiarism" is still plagiarism.

33.5 Citation Styles

- Most of the citations styles used in the health sciences require two types of notations about each source of information:
  - **In-text citations** where the sources of information are briefly identified in the text
  - A **reference list** at the end of the document that provides full bibliographic information for each source
- Common styles: APA & AMA
- Be careful to use a consistent style across all entries in the reference list.

FIGURE 33-4 In-Text Citation Styles

Number of Citations for the Sentence	1 Source	2 Sources	3 Sources
First author's last name and publication year	… [Ruiz, 2014].	… [Ruiz, 2014; Yamamoto, 2001].	… [Ivanov, 2008; Ruiz, 2014; Yamamoto, 2001].
Author(s) and publication year	… (Ruiz, 2014).	… (Ruiz & Sanchez, 2014; Yamamoto et al., 2001).	… (Ivanov, 2008; Ruiz & Sanchez, 2014; Yamamoto et al., 2001).
Number in brackets (square brackets)	… [1]. … .[1]	… [1, 2]. … .[1, 2]	… [1–3]. … .[1–3]
Number in parentheses (round brackets)	… (1). … .(1)	… (1,2). … .(1,2)	… (1–3). … .(1–3)
Superscript number	… .[1]	… .[1,2]	… .[1–3]

The End
Good Luck