

16

Formal Reports



LEARNING OBJECTIVES FOR THIS CHAPTER

- Differentiate between informal and formal reports
- Determine the audience and purpose of a formal report
- Identify the characteristics of the three analytical approaches: comparative, causal, and feasibility
- Write a formal report that incorporates all the vital elements
- Include all the essential parts in a formal report (front matter, text elements, end matter)

CHAPTER OUTLINE

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LET'S GET STARTED

Formal Reports

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Formal reports are more complex and longer than informal reports (discussed in Chapter 15). Whether written for the workplace or for a class, formal reports are usually the culmination of many weeks or months of research, planning, drafting, and revising.

Think about a situation where you will need to write a formal report (for work, for this class, or for another class). Draft an initial plan by writing a one- to two-page memo to your instructor. In your plan, consider the intended audience, purpose of the report, intended use of the report, main question(s) the report is intended to answer, research and sources of information you will need to look at, and so on. Also create a rough outline for your report.

Questions to ask about the formal report as you review the material in this chapter may include the following:

- ▶ Who is my audience?
- ▶ Are there any secondary audiences (other readers)?
- ▶ What is the purpose of the report? To inform? To persuade?
- ▶ What would be the right length for this report?
- ▶ Should I use visuals? What kind?
- ▶ What types of research will I need to undertake?

At the end of this chapter, review your Let's Get Started report planning memo with your instructor or with a group of students and determine how much you might change or modify your plan based on what you have learned in this chapter.

Much like the shorter analytical reports (feasibility and recommendation reports) discussed in Chapter 15, long, formal reports are analytical reports that often lead to recommendations. The formal report format replaces the informal memo format when the topic requires lengthy discussion. Formal reports generally include a title page, a table of contents, a system of headings, a list of references or works cited, and other front-matter and end-matter supplements. An

Formal versus
informal reports

essential component of workplace problem solving, formal reports are designed to answer these questions:

- Based on the information gathered about this issue, what do we know?
- What conclusions can we draw?
- What should we do or not do?

Scenario for a formal report

For instance, imagine you work on a team of alternative energy experts (engineers, policy analysts, technical writers, lawyers), and the state department of energy has asked your organization for a report on the feasibility of producing biodiesel fuel in your state. First you will have to learn everything you can about the nature of the energy situation in your state at this time. Then you will need to compare the advantages and disadvantages of various options based on the *criteria* you are using to assess feasibility, such as cost-effectiveness, time required versus time available to begin biodiesel production, potential risk to the public and the environment, and so on. As you consider all the factors, you might find that the cheapest biodiesel option might also pose the greatest environmental risk; on the other hand, the most environmentally friendly option might be too expensive.

The importance of research in formal reports

This type of situation requires critical thinking and research. Aside from the technical knowledge about biodiesel production that your team already has, you may need additional research about the state or about the relationship of biodiesel to other sectors of the agricultural economy. Sources for this research may be available using secondary research (online or through the library), or you may need to answer these questions through primary research (surveys and interviews). For more information on how to conduct research, review Chapter 2.

AUDIENCE AND PURPOSE OF FORMAL REPORTS

Audience considerations

Because of their major impact on the decision-making process, formal reports are almost always written for an audience of decision makers: for example, government officials, corporate managers. You need to know whether the report will be read primarily by an individual, a team, or a series of individuals with differing roles in the company.

Purpose considerations

To determine the purpose of the report, consider what question or questions it will ultimately answer. Also, consider why this particular topic is timely and useful to the intended audience. Use the Audience and Purpose Profile Sheet on page 46 to begin mapping out your audience and purpose for the report.

Next, determine which of the following three analytical categories best fits your purpose: the comparative analysis (“Which is better, X or Y?”), the causal analysis (“Why does X occur?”), or the feasibility analysis (“Is X a good idea?”). Note that not all formal reports fall neatly into one of these categories. Some

reports blend two or all three. For instance, some reports will present a feasibility analysis but will also offer a great deal of comparative information.

Comparative Analysis

Comparative analysis rates similar items on the basis of specific criteria. For example, you may need to answer a question such as “Which type of security procedure—firewall or encryption—should we install in our company’s computer system?”

For a comparative analysis, base the comparison on clear and definite criteria: costs, uses, benefits/drawbacks, appearance, results. Identify your specific criteria and then rank these in order of importance. Give each item balanced treatment. Support and clarify the comparison or contrast through credible examples. Use research, if necessary, for examples that readers can visualize.

In a report titled “A Comparison of Different Methods for Uploading Digital Photographs,” the abstract of which is shown in Figure 16.1, Christina Romano compares three different upload methods. Romano, a freelance photographer, was asked to write this report for a local photography club. Notice how the abstract makes clear the comparative approach of the report.

Features of a comparative analysis

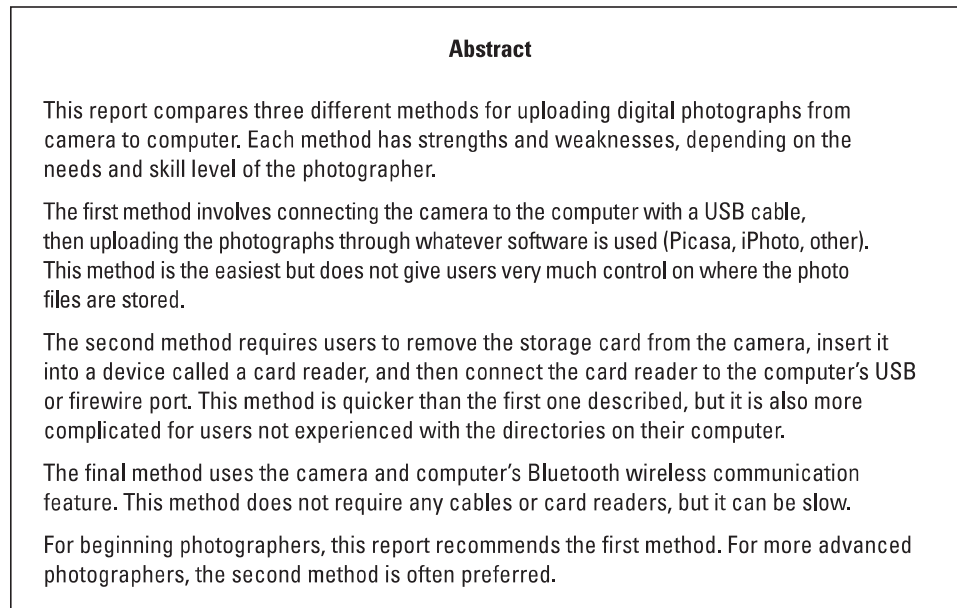


FIGURE 16.1
Abstract for a formal report that takes a primarily comparative approach

Causal Analysis

Causal analysis explains the causes or the effects of an event, a problem, or a decision. For example, medical researchers may need to explain why so many apparently healthy people have sudden heart attacks. Or you might need to anticipate the possible effects of a proposed corporate merger on employee morale.

Features of a causal analysis

For a causal analysis, be sure the cause fits the effect. Faulty causal reasoning is extremely common, especially when people ignore other possible causes or when they confuse mere coincidence with causation. Make the links between effect and cause clear. Identify the immediate cause (the one most closely related to the effect) as well as the distant cause(s) (the ones that precede the immediate cause). For example, the immediate cause of an airplane crash might be a fuel-tank explosion, caused by a short circuit in frayed wiring. This wiring defect, it turns out, was caused by faulty design or poor quality control by the manufacturer. Discussing only the immediate cause merely scratches the surface of the problem.

The sample formal report by Crystal Cunningham, “Effects of Periodontal Disease on Preterm Low Birth Weight Babies,” provided later in this chapter (see pages 314–323), takes a primarily causal approach. The writer examines the research literature on the question of whether periodontal disease in mothers might cause low birth weight in babies.

Feasibility Analysis

Features of a feasibility analysis

Feasibility analysis assesses the practicality of an idea or plan. For example, if your company needs to know whether increased business will justify the cost of maintaining a corporate blog for customers, you would do some research and describe your findings in a formal feasibility report. In some cases, you (the writer) can’t actually determine the feasibility; all you can do is provide enough information so that the readers of your report can make the final decision.

For a feasibility analysis, consider the strength of supporting reasons. Choose the best reasons for supporting the action or decision being considered—based on your collected evidence. Also consider the strength of opposing reasons. Remember that people usually see only what they want to see. Avoid the temptation to overlook or downplay opposing reasons, especially for an action or decision you have been advocating. Consider alternate points of view and examine and evaluate all the evidence. After weighing the pros and cons, recommend a realistic and well-reasoned course of action.

In their report “A Study on the Feasibility of Biodiesel Production in Georgia” (the conclusion section is shown in Figure 16.2), Professor George A. Shumaker and his coauthors provide decision makers with the information needed to decide on a vital component of one state’s energy policy. Their conclusion is a good example of how a feasibility study can take into account criteria that would have to be met (in this case cost-effectiveness) for a proposed plan to be feasible.

ELEMENTS OF EFFECTIVE FORMAL REPORTS

Readers expect a report that is based on thorough research, critical analysis of the evidence, and clear presentation of the material.

Conclusion

There exist a variety of potential feedstocks both in Georgia and nearby states that could be utilized to produce biodiesel. These feedstocks vary significantly in price depending on supply and demand conditions, as well as market structural conditions. Feedstock costs represent between 50 and 75 percent of the cost of producing biodiesel, and thus a reliable source of low priced feedstocks is critical to success. A 15 million gallon biodiesel plant would require about 27% of the vegetable and animal fats currently available within the State of Georgia. This facility would produce 750 million gallons of 2% blend for approximately twice the state demand. A 20% blend will create 75 million gallons of B20 or roughly 20% of the Georgia diesel market.

The processing technology for producing biodiesel is well established and presents little technological risk. The production of biodiesel is a very efficient process, returning about 3.2 units of energy for each unit used in production. Biodiesel is thus an excellent renewable fuel source. Biodiesel can be very easily integrated into the existing petroleum distribution system from the handling, chemical, physical, and performance perspectives.

Lacking government mandates or subsidies, a feedstock cost of about 10 cents per pound or less, given current diesel fuel prices, is needed for biodiesel to be cost effective.

Source: From “A Study on the Feasibility of Biodiesel Production in Georgia” by Professor George A. Shumaker et al. Copyright © 2003 by The University of Georgia’s Center on Agribusiness & Economic Development. Reprinted with permission.

FIGURE 16.2
Conclusion of a formal report that takes a feasibility approach

Accurate, Appropriate, and Clearly Interpreted Data

Make sure your information is accurate and, to the best of your ability, unbiased. Use reputable information sources (particularly for statistical data), such as government documents, peer-reviewed sources, and sound reporting from nationally respected newspapers and similar sources. Make sure you interpret information fairly and provide valid conclusions based on your best research. Assume, for example, that you are writing a report to recommend the best brand of chain saw for a logging company. If, in reviewing test reports on various chain saw brands, you learn that one brand, Bomarc, is the easiest to operate but also has the fewest safety features, include both pieces of information in your report—even if you personally prefer this brand.

Choose and interpret the source material critically

Clearly Identified Purpose Statement

Begin by defining the primary question the report will need to answer, and then identify any secondary questions. The biodiesel report discussed earlier may have begun with a question from a state legislator: “Will producing biodiesel benefit the state of Georgia?” Answering this question is the report’s primary purpose (feasibility analysis); however, this question leads to others, such as “What are the advantages and drawbacks of biodiesel use versus other types of fuels?” (comparative analysis) or “How does biodiesel fuel affect the environment?” (causal analysis). Create a purpose statement that addresses both primary and secondary purpose,

Address both primary and secondary purposes in the purpose statement

such as “The purpose of this report is to examine the feasibility of biodiesel production in the state of Georgia by comparing biodiesel fuels to other alternatives and assessing their environmental effects.”

Understandable Structure

Use outlining, chunking, sequencing, paragraphing, and heading strategies

Structure your report for ease of navigation. Begin by outlining your report and adjusting that outline as you go. Then chunk the text so that large passages of dense information don’t overwhelm your readers. Next, sequence all your data in a logical order (spatial, chronological, problem-solution, cause and effect). After that, order information within your paragraphs for maximum readability. Finally, use clarifying headings and subheadings to announce what each section contains. For example, the heading “Data Analysis” does not really say much, whereas the heading “Physiological Effects and Health Risks” offers a clear, informative preview.

Readable Style

Write clearly, concisely, fluently, and personably

Readers don’t want to be bogged down with cumbersome prose. Make your writing clear by avoiding ambiguous pronoun references and modifiers, using active voice, avoiding nominalizations, unstacking modifying nouns, and avoiding unnecessary jargon. Make your writing concise by avoiding wordiness and eliminating repetition and redundancy. Make your writing fluent by combining related ideas, varying sentence construction and length, and using parallel structure. Write personably by choosing the appropriate tone and avoiding sexist and biased language. Ask a colleague or editor to copyedit your report before it is printed. Proofread the final version carefully.

Audience-centered Visuals

Use graphs, tables, charts, illustrations, diagrams, and photographs as appropriate

Provide as much visual information as appropriate to make complex statistics and numeric data easy to understand. Graphs are especially useful for analyzing rising or falling trends, levels, and long-term forecasts. Tables and charts are helpful for comparing data. Illustrations, diagrams, and photographs are an excellent way to show a component or special feature. Place each visual near the accompanying text and be careful not to overuse visuals. The biodiesel feasibility study mentioned earlier uses visuals effectively. For instance, on page 18 of the report (see Figure 16.3), the writers quantify the reduction in emissions when biodiesel fuel is used. In that example, a table provides an excellent way to compare information without the requirement of reading a lot of dense prose.

User-friendly Design

Design for consistency, cohesiveness, navigation, and emphasis

Remember that a well-designed document demonstrates consistency and cohesiveness via grid patterns, margins, paragraphs, justification, line spacing, font style, and font size. A good design also aids navigation and adds emphasis via headings, color, shading, bold, italic, underlining, color, bulleted and numbered lists, and running heads and feet (see Chapter 8).

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Gelling of biodiesel varies depending upon the chemical composition of the feedstock used in its production. The higher the saturated fat of the feedstock, such as in animal fats, the higher the temperature at which gelling occurs. The converse is also true. Canola oil, with low levels of saturated fats, derived biodiesel provides the lowest gelling temperature biodiesel. Pure biodiesel should be stored and transported at temperatures above 50 F and blending temperatures should be above 40 F.

Environmental Impacts of Biodiesel Use

Studies completed by the Environmental Protection Agency (NREL/TP 2001) state that a 20% blend is "basically a trade off between cost, emissions, cold weather, material compatibility and solvency issues." Researchers believe the 20% blend to be the best blend for general use without encountering major issues. Higher blends often cause problems in winter and with nitrogen oxide emissions.

Table 10. Emission Changes with Biodiesel Fuels.

Emission	100% Biodiesel*	20% Biodiesel Blend*
Carbon Monoxide	-43.2%	-12.6%
Hydrocarbons	-56.3%	-11%
Particulates	-55.4%	-18%
Nitrogen Oxides	+5.8%	+1.2%
Air Toxics	-60% to -90%	-20%
Mutagenicity	-80% to -90%	-20%
Carbon Dioxide**	-78.3%	-15.7%

* Average of data from 14 EPA FTP Heavy duty test cycle tests, variety of stock engines
 ** Life Cycle Emission

It would appear that the use of biodiesel can be an effective means for reducing exhaust emissions. The relevant question becomes, how does the cost of reducing emission using biodiesel compare to other means of obtaining the same level of emission reduction? The answer to that question is beyond the scope of this inquiry.

Impact Analysis

Impact analysis is a key component of any feasibility study. An impact analysis indicates the effect of a new venture on the economy. Building a new biodiesel facility in Georgia will impact the economy on two levels. The new plant will generate output as it begins selling biodiesel and its by-products. These sales will, in turn, generate additional sales as the plant purchases inputs. The suppliers to the plant will increase the purchase of their inputs, thus

FIGURE 16.3
Effective use of a visual in a formal report

← The table enables readers to compare data easily

Source: From "A Study on the Feasibility of Biodiesel Production in Georgia" by Professor George A. Shumaker et al. Copyright © 2003 by The University of Georgia's Center on Agribusiness & Economic Development. Reprinted with permission.

PARTS OF FORMAL REPORTS

Most formal reports consist of the front matter, the text of the report, and the end matter. (Some parts of the front and end matter may be optional.) The following sections describe these various parts.

Letter of Transmittal

Many formal reports include a letter of transmittal, addressed to a specific reader or readers, which precedes the report. This letter might acknowledge individuals or organizations that helped with the report, refer readers to sections of special interest, discuss any limitations of the study or any problems in gathering data, offer personal (or off-the-record) observations, or urge readers to take immediate action. See page 314 (Figure 16.4) for a sample letter of transmittal.

Front Matter

Preceding the text of the report is the front matter: the title page, table of contents, list of tables and figures if appropriate, and abstract or executive summary.

Title Page. The title page provides the report title, the names of all authors and their affiliations (and/or the name of the organization that commissioned the report), and the date the report was distributed to readers. The title announces the report's purpose and subject by using descriptive words such as *analysis*, *proposal*, *feasibility*, or *recommendation*. Be sure the title fully describes your report, but avoid an overly long and involved title. Design the page so that the title is the most prominent item, highest on the page, followed by the name of the recipient(s), the author(s), and the date of submission. See page 315 (Figure 16.4) for a sample title page.

Table of Contents. A table of contents is essential for any long report, helping readers find what they seek by providing the page number for each major section, including any front matter that falls after the table of contents. (Do not include the letter of transmittal, title page, or table of contents itself, but do include the list of tables and figures, along with the abstract or executive summary.)

Indicate page numbers for front matter in lowercase Roman numerals (i, ii, iii). Note that the title page, though not numbered itself or listed on the table of contents, is counted as page i. Number the report text pages using Arabic numerals (1, 2, 3), starting with the first page of the report. Number end matter using Arabic numerals continuing from the end of the report's text.

Make sure headings and subheadings in the table of contents match exactly the headings and subheadings in the report. Indicate headings of different levels (a-level, b-level, c-level) using different type styles or indentations. Use *leader lines* (.....) to connect headings with their page numbers. For a sample table of contents, see page 316 (Figure 16.4).

List of Tables and Figures. On a separate page following the table of contents (or at the end of the table of contents, if it fits), list the tables and figures in the report. If the report contains only one or two tables and figures, you may skip this list. Because Figure 16.4 contains no illustrations, it includes no such list in the front matter.

Abstract or Executive Summary. Instead of reading an entire formal report, readers interested only in the big picture may consult the abstract or executive summary that commonly precedes the report proper (see Chapter 14). The purpose of this summary is to explain the issue, describe how you researched it, and state your conclusions (and, in the case of an executive summary, indicate what action the conclusions suggest). Busy readers can then flip through the document to locate sections important to them.

Make the abstract or executive summary as brief as you can. Summarize the report without adding new information or leaving out critical information.

Write for a general audience and follow a sequence that moves from the reason the report was written, to the report's major findings, to conclusions and recommendations. For an example of an abstract, see page 317 (Figure 16.4).

Text of the Report

The text of the report consists of the introduction, the body, and the conclusion.

Introduction. The introduction engages and orients the audience and provides background as briefly as possible. Readers don't generally need a long history lesson. In your introduction, identify the topic's origin and significance, define or describe the problem or issue, and explain the report's purpose. Briefly identify your research methods (interviews, literature searches, and so on). List working definitions, but if you have more than five, place definitions in a glossary. Finally, if you have not done so in the abstract or executive summary, state your conclusion. Don't make readers wade through the entire report to find out what you are recommending or advising. For a sample introduction to a formal report, see page 318 (Figure 16.4).

Body. The body describes and explains your findings. Present a clear and detailed picture of the evidence, interpretations, and reasoning on which you will base your conclusion. Divide topics into subtopics, and use informative headings as aids to navigation, as described earlier in this chapter. The body of your report will vary greatly, depending on the audience, topic, purpose, and situation. The body of Figure 16.4 begins after the introduction on page 1 of the report and ends with the recommendation on page 4 of the report (pages 318–321 in this book).

Conclusion. The conclusion is vital because it answers the questions that originally sparked the analysis. In the conclusion, you summarize, interpret, and recommend. Although you have interpreted evidence at each stage of your analysis, your conclusion presents a broad interpretation and suggests a course of action (where appropriate). Your conclusion should provide a clear and consistent perspective on the whole document. Don't introduce new ideas, facts, or statistics. See page 321 (Figure 16.4) for a sample conclusion.

End Matter

Following the text of the report (as needed) is the end matter, which may include a list of references cited in your report, a glossary, and/or appendices. Readers can refer to any of these supplements or skip them altogether, according to their needs.

References or Works Cited List. If you have used outside sources in your report (and typically you should), you must provide a list of References (per APA style) or of Works Cited (per MLA style) just after the text of the report or on a

separate page. For detailed advice on documenting sources using APA or MLA style, see Appendix A of this book. The long report in Figure 16.4 uses APA style and includes a References list (page 322).

Glossary. Use a glossary if your report contains more than five technical terms that may not be understood by all intended readers. If five or fewer terms need defining, place them in the report's introduction as working definitions or use footnote definitions. If you do include a separate glossary, announce its location when you introduce technical terms defined there ("see the glossary at the end of this report"). Figure 16.4 includes working definitions in the appendix (page 323).

Appendices. If you have large blocks of material or other documents that are relevant but will bog readers down, place these in an appendix. For example, if your report on the cost of electricity at your company refers to another report issued by the local utility company, you may wish to include this second report as an appendix. Other items that belong in an appendix might include complex formulas, interview questions and responses, maps, photographs, questionnaires and tabulated responses, texts of laws and regulations, and the like.

Do not stuff appendices with needless information or use them to bury bad or embarrassing news that belongs in the report itself. Title each appendix clearly: "Appendix A: Projected Costs." Mention the appendices early in the introduction, and refer readers to them at appropriate points in the report: "(see Appendix A)". The sample report in Figure 16.4 includes an appendix on page 323.



STRATEGIES for Formal Reports

- ▶ **Determine your audience.** Be sure that you understand what your audience needs to know or do as a result of reading your report.
- ▶ **Determine your analytical approach.** Decide whether the primary purpose of the report is to compare items, look for a cause, or determine feasibility. Because formal reports are complex, also consider if the report will have a secondary purpose or purposes.
- ▶ **Do your research and document your sources.** For a long, formal report, research is paramount. Strive for accurate, appropriate, and clearly interpreted data. Always think critically about the sources you consult during the research process. Document all your sources within the report (using parenthetical citation—see pages 413, 425) and at the end of the report (in a References or Works Cited list—see pages 322, 414, 426).



STRATEGIES *continued*

- ▶ **Work from a clear purpose statement.** You may need to revise your purpose statement during the research process as you uncover new information, but make sure the statement is finalized before you start writing your final draft of the report.
- ▶ **Use an understandable structure.** Follow the strategies in Chapter 5 for outlining, chunking, sequencing, paragraphing, and using headings.
- ▶ **Write with a readable style.** Follow the strategies in Chapter 6 to write with a clear, concise, fluent, and personable style.
- ▶ **Include audience-centered visuals.** Follow the strategies in Chapter 7 for using graphs, tables, charts, illustrations, diagrams, and photographs as appropriate to enhance, not decorate, the report.
- ▶ **Create a user-friendly design.** Follow the strategies in Chapter 8 for consistency, cohesiveness, navigation, and emphasis.
- ▶ **Include all appropriate front matter.** If appropriate, include a letter of transmittal. Always include a title page as well as a table of contents and an abstract or executive summary. If your report contains plentiful visuals, include a list of tables and figures.
- ▶ **Provide an introduction, body, and conclusion.** In the text of the report, include an introduction to orient readers and provide background; a body with a clear and detailed presentation of findings; and a conclusion that answers the question or questions posed by the report, possibly with recommendations.
- ▶ **Include the appropriate end matter.** Always include a list of References (APA style) or of Works Cited (MLA style) on a separate page at the report's end. If your report includes more than five technical terms to be defined, place them in a glossary after the Works Cited or References page; otherwise, define the terms in your introduction or via footnotes in the report. Relevant secondary information that will not fit within the report (surveys, complex formulas, interviews, maps, and so on) belongs in an appendix at the very end.
- ▶ **Proofread.** If possible, get someone else to read and edit your report.

A SAMPLE FORMAL REPORT

Figure 16.4 is a formal report. Its author, Crystal Cunningham, was a student in the B.S. program in dental hygiene at the University of Minnesota. For a final project in her technical writing class, she chose a real-life research situation that fit nicely with her major. Crystal chose to examine the relationship between periodontal disease in mothers and low birth weights in their babies. Her research is

FIGURE 16.4
A sample formal report

Letter of transmittal targets and thanks specific reader and provides additional context

15 Timber Drive
St. Paul, MN 55666

28 August, 20XX

Professor Janet Belding
University of Minnesota
School of Dentistry
Minneapolis, MN 55444

Dear Dr. Belding:

Thank you for providing me with this opportunity to research the potential impacts of periodontal disease on birth weights. Enclosed in this envelope is my final report, "Effects of Periodontal Disease on Preterm Low Birth Weight Babies." In the Appendix to this report, I recommend that we develop a proposal to explore this potential causal connection.

If I can provide any other information as you review this report, please don't hesitate to contact me. I look forward to meeting with you at a later date to hear your thoughts. I hope this report is useful in your research program.

Yours truly,

Crystal Cunningham

Crystal Cunningham, B.S., Dental Hygiene

FIGURE 16.4
(Continued)

**Effects of Periodontal Disease
on Preterm Low Birth Weight Babies**

for
Professor Janet Belding
University of Minnesota
School of Dentistry

by
Crystal Cunningham
University of Minnesota
Division of Dental Hygiene

March 15, 20XX

← Title is clear and encompasses entire focus of the report

← Name and affiliation of intended recipient are given

← Author provides name and affiliation

← Date of distribution of the report appears on the title page

FIGURE 16.4
(Continued)

Table of contents
helps readers
find information
and visualize the
structure of the
report



Effects of Periodontal Disease ii

Table of Contents

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Effects of Periodontal Disease iii

Abstract

The purpose of this report is to assess ten recent studies concerning periodontal disease and its association with preterm and low birth weight infants and to recommend, based on the inconclusiveness of these studies, that a new study be undertaken at the University. A number of these studies have found a correlation between periodontal disease and premature birth/low birth weight. However, a number of them have been limited in their scope and the results have been contradictory, indicating the need for further research.

FIGURE 16.4
(Continued)

← Abstract fully summarizes the content of the report

FIGURE 16.4
(Continued)

Introduction sets up the problem and clearly indicates the report's causal analytical approach

Background section provides helpful but not overly detailed context

Clear purpose statement leads into the body of the report

Subheads within the Methodologies section make the section easy to follow

Effects of Periodontal Disease 1

Introduction

In the last ten to fifteen years, interesting findings in dental and obstetric research have linked periodontal disease in mothers to preterm low birth weight conditions in their babies. Many studies have found a correlation, while adequately controlling for confounding variables; the variables include age, smoking, diabetes, and other factors already contributing to preterm low birth weight babies. However a definitive link has yet to be found. This report examines the existing studies, charting their methodologies and results, and concludes with a recommendation for future research.

Background

The world has seen a rise in preterm low birth weight births in the last few decades. This fact has alarmed many physicians and obstetricians because there have been so many advancements in the medical field aiming to promote the health and longevity of life. Many reasons have been proposed to explain the reasons for preterm low birth weight births, but no conclusive answers have yet emerged. In the last ten years, some researchers have suggested that gingivitis and periodontal disease may be to blame for this occurrence. One possible cause could be the increase in harmful bacteria entering the bloodstream.

Preterm birth is considered to be any birth that occurs before 37 weeks of gestation; low birth weight is recognized as a weight of fewer than 2,500 grams. Many studies since the mid-1990s have attempted to find a correlation between periodontal disease and preterm low birth weight babies. However, research related to the possibility that periodontal disease increases the risk for preterm low birth weight babies has varied immensely over the years.

This report is an assessment of ten peer-reviewed journal articles that seek to examine whether periodontal disease has any correlation with preterm low birth weight babies. The goal of this report is to find a correlation between gingivitis/periodontal disease and preterm low birth weight infants in previous studies and offer a brief recommendation to conduct a new study (see Appendix).

Methodologies of the Studies

Following is a summary of the methodologies used in the various studies:

Time

Studies by Farrell, Ide, and Wilson (2006) and Dortbudak, Eberhardt, Ulm, and Persson (2005) examined women during pregnancy. In the Farrell et al. study, pregnant women were recruited at 12 weeks of gestation (p. 116). Subjects were excluded if gestational age was below 10 weeks or above 15 weeks. The Dortbudak et al. study maintained that it was crucial to examine patients during weeks 15–20 of gestational age because a sample of amniotic fluid is needed to assess for particular bacteria (p. 46). However, most studies waited to collect fluid samples until immediately after the birth.

Effects of Periodontal Disease 2

Setting

Most of these studies were conducted in hospital settings. The remaining studies were conducted after the subjects returned home from the hospital and were either instructed to return to their dental office or wait for an examiner to visit their home within 48 hours after birth. Some studies had a lengthier time frame to collect data following the birth, such as 72 hours, or five days as in a UK study (Buduneli et al., 2005, p. 176; Moore, Randhawa, & Ide, 2005, p. 3).

Examiners

Examiners in these studies were calibrated and blind, and often a single examiner was used (Alves & Ribeiro, 2006, p. 322; Bassani, Olinto, & Kreiger, 2007, p. 37; Gazolla et al., 2007, p. 844; Jarjoura et al., 2005, p. 516; Moliterno, Monteiro, Figueredo, & Fischer, 2005, p. 887; Moore et al., 2005, p. 2). The study by Farrell et al. (2006) involved three examiners, which allowed more subjects to be evaluated (p. 117).

Exclusion Criteria

A questionnaire/interview was given to patients (Bassani et al., 2007, p. 32; Bosnjak, Relja, Vucicevic-Boras, Plasaj, & Plancak, 2006, p. 712; Farrell et al., 2006, p. 117; Jarjoura et al., 2005, p. 516; Moliterno et al., 2005, p. 888; Moore et al., 2005, p. 3). These questions pertained to socioeconomic status, race, education, occupation, marital status, smoking, drinking, medications, pregnancies, preterm deliveries, and prenatal care (Gazolla et al., 2007, p. 843).

The information gathered from questions and patients' medical records excluded many subjects from the study. Exclusion criteria included diabetes, anemia, cardiovascular disorders, hepatic deficiency, high blood pressure, TB, cancer, seizure disorders, psychopathology, asthma, STD, HIV, fetal or uterine anomalies, cervical incompetence, labor induction, and multiple birth pregnancies (Buduneli et al., 2005, p. 177; Gazolla et al., 2007, p. 844; Jarjoura et al., p. 516; Moliterno et al., p. 887; Moore et al., p. 4). Another common exclusion involved subjects who required prophylactic antibiotics prior to dental treatment (Farrell et al., p. 117; Jarjoura et al., p. 513; Moore et al., p. 3).

Data Collection

The most common measurements in each trial were pocket depths, clinical attachment levels, and bleeding on probing. A periodontal probe of varying markings was used to assess the extent of periodontal involvement. A few studies included a plaque index along with the previously mentioned tests (Farrell et al., 2006, p. 117; Jarjoura et al., 2005, p. 515; Moore et al., 2005, p. 3). One study, by Alves and Ribeiro, also included calculus detection (2006, p. 319). DMFT scores were taken into account in two other studies (Bosnjak et al., 2006, p. 712; Buduneli et al., 2005, p. 176).

Most of the studies gathered periodontal measurements from six different sites on one tooth throughout the entire dentition (Alves & Ribeiro, 2006, p. 319; Bassani et al., 2007, p. 36; Buduneli et al., 2005, p. 176; Gazolla et al., 2007, p. 845;

FIGURE 16.4
(Continued)

← Sentence variety and clear prose give the report a readable style

← Writer uses accurate and clearly interpreted data

← No year needed for work that follows closely after the initial reference

← All information from outside sources is documented in text

← Writer not only describes but critiques the previous studies examined

FIGURE 16.4
(Continued)

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Moliterno et al., 2005, p. 887). However other studies assessed fewer sites, for example mesial, distal, buccal, and lingual surfaces (Bosnjak et al., 2006, p. 711; Dortbudak et al., 2005, p. 47). Columbia University collected data from three sites: mesiobuccal, midbuccal, and distobuccal in two randomly selected quadrants (Jarjoura et al., 2005, p. 514). The fewest measurements were taken from one tooth at only two sites, in a UK study. These sites were midbuccal and mesiobuccal in the maxillary and midlingual and mesiolingual in the mandibular (Moore et al., 2005, p. 3).

Three studies included a subgingival plaque sample from the mesial and distal aspect of certain teeth. The sample was obtained by placing a paperpoint into the sulcus and analyzing the type of bacteria collected (Buduneli et al., 2005, p. 177; Dortbudak et al., 46; Jarjoura et al., 518).

An interesting study was conducted by Dortbudak et al. A periodontal exam was completed as in other studies; however, this study included collection of amniotic fluid at 15–20 weeks. These women were already scheduled to have amniocentesis tests for medical purposes. Two milliliters of additional fluid were collected and analyzed for particular bacteria. The results concluded that an increased number of certain bacteria from the fluid placed these women at a higher risk for premature birth. An obvious limitation to this study, however, was that women undergoing an amniocentesis are already at an increased risk for problems during their pregnancy, or they would not be having the test in the first place (p. 51).

Results of the Studies

The research analyzed for this report demonstrates varying degrees of correlation between periodontal disease and birth weight of preterm low weight babies (PTLWB). See Table 1 for summary.

Table 1. Results of major studies

Correlation	Correlation percentages	Comments
High correlation:		
Alves and Ribeiro 2006, p. 323	84.21%	High correlation found.
Bosnjak et al. 2006, p. 716	73.26%	Similar correlation found between PTLWB and tobacco use (p. 716).
Dortbudak et al. 2005, p. 52	83%	No bacteria found in amniotic fluid: authors still believe maternal periodontitis could be causal.
Jarjoura et al. 2005, p. 522; Moliterno et al. 2005, p. 890	No percentages given.	Both found statistically significant casual connections.
Low correlations:		
Bassani et al. 2007, p. 39	No significant correlation.	While 59% of subjects had periodontal disease, causality was not established.
Buduneli et al. 2005, p. 181; Farrell et al. 2006, p. 120	No significant correlation.	No differences established.
Gazolla et al. 2007, p. 879	No significant correlation.	Note that the group not treated with scaling/ root planning had 79% PTLWB.

Writer provides
bottom-line results
of previous studies

Effects of Periodontal Disease 4

As summarized in Table 1 (previous page), recent studies offer conflicting results about the relationship between periodontal disease and the birth of preterm low weight babies. The two studies to establish high, statistically significant correlations are Alves and Ribeiro (2006) and Dortbudak et al. (2005), but as noted, Dortbudak et al. did not actually find bacteria in the amniotic fluid, thus requiring the authors to make something of a casual leap. As noted in the next section, there were also other limitations to all these studies.

Limitations of the Studies

All these studies involved limitations, the most obvious being the sample size. Two studies had a sample of less than 100 subjects (Alves & Ribeiro, 2006, p. 318; Dortbudak et al., 2005, p. 45). Another limitation was the location of the studies. Many well-known studies were conducted outside the United States, in countries such as Croatia, United Kingdom, Turkey, and two in Brazil.

Almost all of these studies were conducted in lower socioeconomic areas, in developing countries, with more uniform ethnic and racial groups. Pregnant Croatian women were studied because they tend to develop more pronounced periodontal disease (Bosnjak et al., 2006, p. 710).

Limitations in only a couple cases were the ages of the subjects. It is well known that having a child above or beneath a certain age poses potential problems for the mother and child, not to mention the strong correlation between age and increased periodontal disease. Only two studies imposed a restriction on age. One study only allowed an age range of 18 to 35 years (Buduneli et al., 2005, p. 174); another only allowed an age range of 18 to 30 years (Gazolla et al., 2007, p. 842).

Conclusion

In conclusion, several studies found a correlation between periodontal disease and preterm low birth weight babies, even when accounting for possible confounding variables. On the other hand, many found no correlation between periodontal disease and preterm low birth weight babies. These researchers make the argument that their counterparts who did find a correlation did not account for all confounding variables.

The research conducted pertaining to the correlation between preterm low birth weight babies and periodontal disease, then, continues to result in conflicting conclusions. More research is needed in order to arrive at definitive conclusions.

Recommendation

See Appendix for a brief discussion about a proposed new study.

FIGURE 16.4
(Continued)

← The writer is careful to list the limitations of previous studies

← Conclusion provides a summary of the report

← Because the report takes the causal approach, writer is careful to show that correlation does not always equal causation

FIGURE 16.4
(Continued)

Reference page immediately follows the report and lists all sources consulted in APA style

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FIGURE 16.4
(Continued)

Appendix

Recommendation for Future Research

Overview

Based on the existing studies described in this report, I recommend we propose a new study to explore a possible correlation between periodontal disease and preterm low birth weight babies. This study would measure six surfaces on every tooth; most importantly, it would gather a baseline periodontal reading within eight weeks after conception. Using this approach, we can measure to see if there has been any significant difference in periodontal disease during pregnancy or if the subject has always had the same level of disease. This more exacting approach should increase the accuracy and reliability of the findings.

In a forthcoming proposal, I will describe this study in detail. For the purposes of this Appendix, I have outlined several key areas.

Research Design

The research design of this study involves no manipulation of subjects; patients are only observed for changes in their periodontal status. Therefore, the design of this study is quantitative, nonexperimental, and correlational.

Sample

The sample will include 500 women from the Twin Cities Area. Women cannot be more than eight weeks pregnant to be included in the study. Exclusion criteria include women with diabetes and other systemic illnesses, previous birth complications, and previous abuse of alcohol or other illegal substances.

Credentials of Project Personnel

Crystal Cunningham is a recent graduate from the school of dentistry at the University of Minnesota, Division of Dental Hygiene. She is well prepared to perform a study in this particular area due to the extensive background research she has completed in this area. As the project director, who will also be working in collaboration with highly educated professionals from the University of Minnesota, the author anticipates that this research will be successfully carried out.

← Content that is not central to the report goes into an appendix

aimed at other dental hygiene experts; in particular, she wants to send her report to a professor in her department who might wish to continue this research.

With this audience in mind, Crystal makes appropriate choices about technical language, statistical analysis, and reference to scientific articles. While these approaches would not be suitable for a nonexpert audience, they are just right for an audience of other scientists. She understands that her primary purpose is to see if the literature can show a causal relationship. Another purpose is to convince her readers to take her work seriously so that her work might be continued and possibly published in a scientific journal.



CHECKLIST for Formal Reports

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- ☐ Have I determined the audience for this report?
- ☐ Have I decided on the purpose, and have I chosen the right analytical approach (comparative, causal, feasibility) to fit this purpose?
- ☐ Did I evaluate all sources consulted while researching?
- ☐ Are my data accurate, appropriate, and clearly interpreted?
- ☐ Does my report have a clearly defined purpose statement early in the report?
- ☐ Is the structure of the report logical and appropriate for this setting?
- ☐ Is the writing style clear and professional?
- ☐ If there are visuals in my report, are the visuals supportive of what is in the text?
- ☐ Are the pages well designed and easy to follow?
- ☐ Is there a distinct introduction, body, and conclusion?
- ☐ Does the introduction provide enough of an orientation to the issue or problem without being too long?
- ☐ Does the body of the report offer a clear picture of the issue or problem?
- ☐ Does the conclusion answer the question that originally sparked the analysis?
- ☐ Have I included all the required and appropriate front and end matter?
- ☐ Have I documented all my sources both in the text and in a References or Works Cited list?



APPLICATIONS

GENERAL APPLICATIONS

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1. Choose a specific audience and purpose, based on a real-life situation at school or at work, and write out some ideas for how you would determine whether this situation is an appropriate one for a formal report. List all possible readers (audience members) and all possible purposes. List the kinds of questions your report will need to answer, and then list the kinds of research you will need to do in order to write the report. Bring this document to class for a discussion.
2. Prepare a formal report using causal, comparative, or feasibility analysis (or some combination). As you prepare your report, refer to the Strategies for Formal Reports on pages 312–313, the Checklist, and other materials in this chapter.

TEAM APPLICATION

In the workplace, it is common for reports to be written not by one individual but in teams. Thinking of an idea you might have for a report for this class, ask yourself whether this report might be a team project. How would you divide the tasks and ensure that the work was being done fairly? What are the advantages and disadvantages of a team approach to a report? In groups of two to three, discuss these issues. If your instructor indicates that your report is to be team-based, write a memo (as a team) to your instructor indicating the role of each team member and the timeline.

GLOBAL APPLICATION

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Go online and look for reports written in English by government agencies of different countries. See if you can use the material from this chapter to determine if the reports fall into causal, comparative, or feasibility categories. Look for similarities to the reports you are familiar with within the United States (or the one you are preparing for class), as well as differences in features such as structure and organization, word choice, formatting, use of visuals, levels of politeness, and so on.

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Many reports, particularly government reports, are turned into PDF documents and are available on the Web (often via a link on a Twitter or Facebook posting). When you have a draft of your report, experiment with turning it into a PDF document. Check to be sure the PDF conversion maintained your original formatting. Then write a brief tweet or Facebook posting about the report that would entice readers to click on the link to learn more.

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