

# Nursing Research Series

## Essentials of Science: Methods, Appraisal and Utilization



### Nursing Research Series

*Essentials of Science:  
Methods, Appraisal and Utilization*



1 **What is Science and Its Essentials?**  
gretchen.j.summer@kp.org ©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---

---

---



### Nursing Research Series

Part 1 of 20

### What is Science and what are its Essentials?



2 **What is Science and Its Essentials?**  
gretchen.j.summer@kp.org ©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---

---

---



### Introduction

- You may be asking yourself, why should I be interested in science?
- How is nursing research relevant to my clinical practice?
  - There are three answers to these questions:
    - First, it is not necessary to conduct studies to be able to appreciate and use research findings in practice.
    - Second, it will help you become an intelligent consumer of research. To be intelligent consumers, nurses must understand the research process and develop the critical evaluation skills needed to judge the merit and relevance of findings before applying them in practice.
    - Third, when patients are confident their healthcare providers are using evidence-based care, optimal outcomes can be achieved (Burns & Grove, 2007).

3 **What is Science and Its Essentials?**  
gretchen.j.summer@kp.org ©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---

---

---

# Nursing Research Series

## Essentials of Science: Methods, Appraisal and Utilization



### Objectives

- The purpose of Part 1 is to introduce you to the essentials of science and nursing research.
- By the completion of this presentation the participant will be able to:
  1. Define science.
  2. Understand the scientific method.
  3. Understand the study of skilled nursing practices are essential to advance the discipline of nursing and nursing science.
  4. Know the difference between nursing research and evidence-based practice (EBP).
  5. Understand why science alone does not provide a sufficient foundation for nursing research. Nursing research must include: ethical principles, the study of expert nurse's observations and practices, and the integration of individual patients' values and beliefs.

4 What is Science and Its Essentials?  ©2010 Kaiser Permanente Southern & Northern California Nursing Research  
gretchen.j.summer@kp.org

---

---

---

---

---

---

---

---



### Science

- Science is empirical, meaning it is based on *careful, systematic observation*.
- In its broadest sense, science is any systematic knowledge base or prescriptive practice capable of resulting in a prediction or predictable type of outcome (Merriam-Webster, 2009).
- In science, objectivity is important to answer a research question.
- To be objective, values, feelings, and personal perceptions cannot enter into the measurement of reality (Burns et al., 2007, p. 18).



5 What is Science and Its Essentials?  ©2010 Kaiser Permanente Southern & Northern California Nursing Research  
gretchen.j.summer@kp.org

---

---

---

---

---

---

---

---



### Scientific Integrity

- Scientific integrity is concerned with the principles of good science, which aim to promote the generation of knowledge that is both *scientifically sound* and *ethically defensible*.
- These principles are developed and operate within the frameworks of the scientific community norms and ethical principles.
- Scientific integrity is concerned with data management and access, publication practices, collaboration, mentorship and conflict of interest.
- These areas collectively address researchers duties and obligations toward science and society, fellow researchers and their students (Fitzpatrick, 1998, p. 522).

6 What is Science and Its Essentials?  ©2010 Kaiser Permanente Southern & Northern California Nursing Research  
gretchen.j.summer@kp.org

---

---

---

---

---

---

---

---

# Nursing Research Series

## Essentials of Science: Methods, Appraisal and Utilization



### Scientific Method

- The scientific method was originally defined by the British philosopher, Sir Francis Bacon (1561-1626).
- Understanding the scientific method is important to develop the 'know how', or methodologic skills, needed for generating and evaluating nursing evidence for nursing practice.
- The scientific method involves several steps in a research process including observation, hypothesis testing and predicting, analysis and interpretation of data, and dissemination of findings.



7 What is Science and Its Essentials?  
gretchen.j.summer@kp.org ©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---



### The Whole is Greater than the Sum of its Parts. --Aristotle

- Science is often conducted in groups.
- Group work is valuable because individuals working together can accomplish more than individuals working alone.
- *Groupthink* is a term used to define a type of thought exhibited by group members who try to minimize conflict and reach consensus without critically testing, analyzing and evaluating ideas (Wikipedia, 2010).
- In other words, group cohesiveness is promoted over independent thinking.
- To protect against groupthink, there must be a commitment: 1) to support the expression of different points of view, and 2) to avoid bringing closure until all possibilities have been fully addressed.
- While a new point of view can challenge group cohesiveness, it is also necessary for healthy growth and change (Chinn, 2004, p. 59).

8 What is Science and Its Essentials?  
gretchen.j.summer@kp.org ©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---



### Science & The Research Process

- As in other fields of science, there is the conviction that the research process be objective to reduce biased interpretations of the results.
- Another basic expectation is to document, archive and share all data and methodology so they are available for careful scrutiny by others.
- In fact, publications of scientific research are expected to provide other researchers with all the information necessary to verify the results.
- Other researchers verify results by attempting to reproduce or *replicate* them.
- This practice, called *full disclosure*, also allows statistical measurement of the reliability of scientific research data.

9 What is Science and Its Essentials?  
gretchen.j.summer@kp.org ©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---

# Nursing Research Series

## Essentials of Science: Methods, Appraisal and Utilization

### Nursing Science

- To have a foundation for examining science as it applies to the discipline of nursing, it is important to ask ourselves what is nursing science? How is nursing science linked to the practice of nursing?
- Since 1858, when Florence Nightingale wrote the goal of nursing was "putting the patient in the best condition for nature to act upon him (Herbert, 1981 as cited in Burns et al, 2007, p.9)", nursing leaders have described nursing as an art and a science.



*Florence Nightingale*  
(From the "Portrait Gallery of Eminent Men and Women")

10 What is Science and Its Essentials?  
gretchen.j.summer@kp.org ©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---

### Nursing = Art & Science

- What is the 'art' of nursing and is it good science?
- In 1984, Patricia Benner described nursing science as the culmination of evidence and practical experience from research, which over time becomes the "know-how" of clinical experience (Benner, 1984).
- The study of knowledge embedded in nursing practice (Benner, 1984) is often referred to as the art of nursing.
- Therefore, examining the acquisition of skilled nursing practices, the art of nursing, is indeed good science.



11 What is Science and Its Essentials?  
gretchen.j.summer@kp.org ©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---

### Why is Nursing Science Important?

- Nurses are in a unique position to ask clinically relevant research questions
- Unfortunately, the knowledge accrued by nursing experience has been largely undocumented and understudied.
- Systematic observations of what nurse clinicians learn from their clinical practice are critically needed.



12 What is Science and Its Essentials?  
gretchen.j.summer@kp.org ©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---

# Nursing Research Series

## Essentials of Science: Methods, Appraisal and Utilization



### Nursing Science: We Have Evolved

- In the past, nursing science was acquired by traditions, authority, borrowing, trial and error, personal experience, role modeling, intuition, and reasoning (Burns et al., 2007, p. 13-17)
- Using research findings to serve as a basis for nursing practice represents an important departure from more common approaches, such as tradition and institutional preference (i.e., we've always done it this way)



13 **What is Science and Its Essentials?**  
gretchen.j.summer@kp.org ©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---



### Nursing Science: Evidence versus Tradition

- In many areas of nursing, research has demonstrated that "tried and true" methods taught in basic nursing education are not always best practices.
- For example, although many nurses were taught to place infants in the prone sleeping position to prevent aspiration, it is well established that the supine (back) sleeping position decreases the risk of sudden infant death syndrome (SIDS).



14 **What is Science and Its Essentials?**  
gretchen.j.summer@kp.org ©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---



### Nursing Research

- Nursing research studies can be highly quantitative or qualitatively based—that is, based on interpretive observations, not statistical analysis.
- Quantitative research is a formal, objective, systematic process using numerical data to obtain information about the world.
- Qualitative research is a systematic, subjective approach used to describe life experiences and give them meaning.
- Both quantitative and qualitative studies are based on observation (i.e., empirical).
- Both are important to nursing science and the practice of nursing.



15 **What is Science and Its Essentials?**  
gretchen.j.summer@kp.org ©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---

# Nursing Research Series

## Essentials of Science: Methods, Appraisal and Utilization



### What is a Phenomena?



- Topics for research study are called *phenomena* (i.e., a single topic) or *phenomenon* (i.e., more than one) .
- In scientific usage, a phenomenon is any event that is observable, however commonplace it might be, even if it requires the use of instrumentation to observe it.
- In philosophic terms, the word phenomenon refers to perceived events. That is, phenomena may be perceived through a person's senses or with their mind.
- Phenomenology* is both a philosophy and a research method (Burns et al, 2007b, p. 63)

16 What is Science and Its Essentials?  
gretchen.j.summer@kp.org
©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---

---

---

---

---



### Nursing Science Phenomena

- The ANA defines the following phenomena as the focus for nursing science:
  - Self-care processes
  - Physiologic and pathophysiologic processes such as rest, sleep, respiration, circulation, reproduction, activity, nutrition, elimination, skin, sexuality and communication
  - Comfort, pain and discomfort
  - Emotions related to health and illness
- Meanings ascribed to health and illnesses
- Decision making and ability to make choices
- Perceptual orientations such as self image and control over one's body and environments
- Transitions across the lifespan, such as birth, growth, development and death
- Affiliative relationships, including freedom from oppression and abuse
- Environmental systems (Smeltzer, Bare, Hinkle & Cheever, 2009, p. 5)

17 What is Science and Its Essentials?  
gretchen.j.summer@kp.org
©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---

---

---

---

---



### Nursing Research versus Evidence-Based Practice

- When discussing nursing science, it is important to understand the difference between nursing research and evidence-based practice (EBP).
- Nursing research refers is a scientific process that validates and refines existing knowledge and generates new knowledge that directly and indirectly influences nursing practice.
- EBP is the conscientious integration of best research evidence with clinical expertise and patients values and needs in the delivery of high quality, cost-effective health care system (Burns et al, 2007a, p. 4-5)



18 What is Science and Its Essentials?  
gretchen.j.summer@kp.org
©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---

---

---

---

---

# Nursing Research Series

## Essentials of Science: Methods, Appraisal and Utilization

**Evidence-Based Practice Model**

Adapted from Rycroft-Malone, et al.  
© 2008 Susan Shapiro

19 What is Science and Its Essentials?  
gretchen.j.summer@kp.org ©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---

---

---

**Evidence-Based Practice**

- Most evidence-based literature in medicine and nursing focus on clinical questions about the effectiveness of interventions, whether discussing treatment for an actual problem or measures for prevention
- They use what is called a PICO format for asking such questions (Melnik & Fineout-Overholt, 2004; Sackett, 2000):
  - P = Patient population
  - I = Intervention (new EBP)
  - C = Comparison Intervention
  - O = Outcome
- EBP question using PICO:
  - In \_\_\_\_\_ (Population) what is the effect of \_\_\_\_\_ (Intervention) Compared with \_\_\_\_\_ standard practice on \_\_\_\_\_ (Outcome)
  - The following is an EBP question: In the PICU, what is the effect of standardizing IV drip concentrations on medication errors related to IV drip concentrations compared with usual care?

20 What is Science and Its Essentials?  
gretchen.j.summer@kp.org ©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---

---

---

**For More Information about EBP**

For an excellent overview of EBP, see the presentation by Cecelia Crawford, RN MSN entitled "Mining the Evidence to Improve Nursing Practice" at <http://nursingpathways.kp.org/scal/research/innovation/ebp1/index.html> on SCAL's Nursing Research/EBP Web Site.

  
**Nursing.Research@kp.org**  
<http://nursingpathways.kp.org/scal/research/index.html>

21 What is Science and Its Essentials?  
gretchen.j.summer@kp.org ©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---

---

---

# Nursing Research Series

## Essentials of Science: Methods, Appraisal and Utilization

### Types of Research



**Applied (Clinical) Research**      **Basic (Animal) Research**

22      What is Science and Its Essentials?  
gretchen.j.summer@kp.org      ©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---

---

---

### Applied versus Basic

<p><b>APPLIED RESEARCH</b></p> <ul style="list-style-type: none"><li>• Designed to solve immediate problems</li><li>• Focused on the systematic planning of induced change (e.g., in nursing practice) to improve a problematic situation</li></ul>	<p><b>BASIC RESEARCH</b></p> <ul style="list-style-type: none"><li>• Not designed to solve immediate problems</li><li>• Focused on accumulating knowledge to formulate or refine a theory</li><li>• Extends the base of knowledge for the sake of knowledge and understanding</li></ul>
---	---

23      What is Science and Its Essentials?  
gretchen.j.summer@kp.org      ©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---

---

---

### Translational Research

- The findings from applied research almost immediately pose questions for basic research.
- The results of basic research often suggest clinical applications to a practical problem.
- The term *translational research* refers to implementing findings from applied or basic research to clinical practice



24      What is Science and Its Essentials?  
gretchen.j.summer@kp.org      ©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---

---

---

# Nursing Research Series

## Essentials of Science: Methods, Appraisal and Utilization



### Settings Supporting Careers in Nursing Science

- Historically confined to teaching and research in an academic setting
- With recent changes in health care delivery systems: More opportunities!
  - Industry
  - Clinical centers
  - Outpatient care facilities
    - Practice improvements
    - Care quality
    - Health outcomes



25 What is Science and Its Essentials? gretchen.j.summer@kp.org ©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---



### Funding Resources: Centers for Nursing Science

- National Institute of Nursing Research (NINR), National Institutes of Health
  - Core centers for research at universities across the nation
    - University of Pittsburgh: Chronic disorders
    - University of North Carolina: Chronic illness in vulnerable people
    - University of Iowa: Gerontological nursing interventions
    - University of Pennsylvania: Advancing care in serious illness
    - University of Washington: Women's health

26 What is Science and Its Essentials? gretchen.j.summer@kp.org ©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---



### Opportunities to Advance Nursing Science

- Professional organizations:
  - American Nurses Association
  - American Nurses Foundation
  - American Organization of Nurse Executives
  - American Association of Critical Care Nurses
  - American Association for Pain Management Nursing
  - Sigma Theta Tau, the International Honor Society of Nursing—National and local chapters

27 What is Science and Its Essentials? gretchen.j.summer@kp.org ©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---

# Nursing Research Series

## Essentials of Science: Methods, Appraisal and Utilization

### Start a Journal Club

- A journal club is nurses coming together as a group to discuss and critique an article
- Many organizations that employ nurses sponsor journal clubs that review research articles that have potential relevance to practice
- The traditional approach for a journal club has in some settings been replaced with electronic online journal clubs that acknowledge time constraints and the inability of nurses from all shifts to come together at one time.



©2010 Kaiser Permanente Southern & Northern California Nursing Research

28 What is Science and Its Essentials? gretchen.j.summer@kp.org
©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---

---

---

### Read Widely and Critically

- Professionally accountable nurses keep abreast of important developments and read journals relating to their specialty, including research reports in them.
- Other sources:
  - Essential Nursing Library
  - Cochrane Collaboration
  - KP Clinical Library
  - Integrated Reviews
  - Federally funded resources

**Patient Safety and Quality: An Evidence-Based Handbook for Nurses**

Agency for Healthcare Research and Quality  
U.S. Department of Health and Human Services  
1655 L Street, NW  
Washington, DC 20036

Editor:  
Sandra G. Hingle, M.D., M.P.H., R.N.  
AHRQ Publication No. 09-004-CD  
March 2009

Disclaimer: The opinions expressed in this document are those of the authors and do not reflect the official position of AHRQ or the U.S. Department of Health and Human Services.

29 What is Science and Its Essentials? gretchen.j.summer@kp.org
©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---

---

---

### Find a Mentor

- Experienced Nurses:
  - Serve as consultants to other nurses and interdisciplinary teams
  - Mentor novice nurses
  - Continue to develop as a professional
  - Make a contribution to nursing knowledge



30 What is Science and Its Essentials? gretchen.j.summer@kp.org
©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---

---

---

# Nursing Research Series

## Essentials of Science: Methods, Appraisal and Utilization



### For More Information

Nursing Research Video Series:  
<http://nursingpathways.kp.org/scal/research/resources/researchseries/index.html>

Part 2 focuses on the *research process*  
Part 8 focuses on *qualitative research*  
Part 9 focuses on *quantitative descriptive research*  
Part 10 focuses on *quantitative experimental or interventional research*



31 What is Science and Its Essentials?  
gretchen.j.summer@kp.org ©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---



### In Conclusion

- **KEY CONCEPTS:**
- Research is defined as diligent, systematic inquiry to validate and refine existing knowledge and generate new knowledge.
- Nursing research is defined as a scientific process that validates and refines existing knowledge and generates new knowledge that directly and indirectly influences nursing practice.
- Evidence-Based practice is the conscientious integration of best research evidence with clinical expertise and patient values and needs in the delivery of high-quality, cost-effective health care.
- Nightingale was the first nurse researcher who developed empirical knowledge to improve practice in the nineteenth century.  
(From Burns et al, 2007, p. 20)

32 What is Science and Its Essentials?  
gretchen.j.summer@kp.org ©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---



### Key Concepts continued

- The conduct of clinical research continues to be a major focus in the twenty-first century, with the goal of developing a research- or evidence-based practice for nursing.
- Quantitative research is a formal, objective, systematic process using numerical data to obtain information about the world. This research method is used to describe, examine relationships and determine cause and effect.
- Qualitative research is a systematic, subjective approach used to describe life experiences and give them meaning. Knowledge generated from qualitative research will provide meaning and understanding of specific emotions, values and life experiences.
- Burns and Grove define a third research method as *outcomes research*, which focuses on examining the result of care or in determining the changes in health status for the patient.

33 What is Science and Its Essentials?  
gretchen.j.summer@kp.org ©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---

# Nursing Research Series

## Essentials of Science: Methods, Appraisal and Utilization



### References

Benner, P. (1984). *From Novice to Expert: Excellence and Power in Clinical Nursing Practice*. Menlo Park, CA: Addison-Wesley.

Brown, S. J. (1999). *Knowledge for health care practice: A guide to using research evidence*. Philadelphia: Saunders.

Burns, N. & Grove, S.K (Eds.). (2007a). Discovering nursing research. *Understanding Nursing Research, Building an Evidence-Based Practice* (4<sup>th</sup> ed.). St. Louis, Missouri: Saunders.

Burns, N. & Grove, S.K (Eds.). (2007b). Introduction to the qualitative research process. *Understanding Nursing Research, Building an Evidence-Based Practice* (4<sup>th</sup> ed.). St. Louis, Missouri: Saunders.

Chinn, P. L. (2004). Value-Based Decision-Making. *Peace and Power: Creative Leadership for Building Community* (6<sup>th</sup> ed.). Sudbury, MA: Jones & Bartlett Publishers, Inc.

Fitzpatrick, J. (Ed.). (1998). Scientific Integrity. *Encyclopedia of Nursing Research*. New York, NY: Springer Publishing Co.

Institute of medicine committee on quality health care in America (2001). *Crossing the quality chasm: Shaping the future of health care in America*. Washington D.C.: National Academy Press.

Kaplan, A. (1964). *The conduct of inquiry; Methodology for behavioral science*. San Francisco: Chandler.

34
©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---

---

---



### References continued

Melnik, B. M. & Fineout-Overholt, E. (Eds.). (2004). *Evidence-based practice in nursing and healthcare: A guide to best practice*. Hagerstown, MD: Lippincott, Williams & Wilkins.

Melnik, B. M. & Fineout-Overholt, E. (Eds.) (2005). *Evidence-based practice in nursing & healthcare: A guide to best practice*. Philadelphia: Lippincott, Williams & Wilkins.

Merriam-Webster. *Online dictionary*. <http://www.m-w.com/dictionary/science>. Retrieved 2009-05-22

Michaels, C., McEwen, M. M., & McArthur, D. B. (2008). Saying "no" to professional recommendations: Client values, beliefs, and evidence-based practice. *Journal of the American Academy of Nurse Practitioners*, 20(12), 585-589.

Sackett, D. L., Strauss, S. E., Richardson, W. S., Rosenberg, W. & Haynes, R. B. (2000). *Evidence-based medicine: How to teach and practice EBM* (2<sup>nd</sup> ed.). Edinburgh, Scotland: Churchill Livingstone.

Smeltzer, S. C., Bare, B. G., Hinkle, J. L. & Cheever, K. H. (Eds.). (2009) Brunner & Suddarth's Textbook of Medical Surgical Nursing, North American Edition. Philadelphia: Lippincott, Williams and Wilkins.

Wikipedia. *Groupthink*. <http://en.wikipedia.org/wiki/Groupthink> retrieved 2010-04-14.

35
©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---

---

---



### Nursing Science Resources

- American Academy of Nursing: <http://www.aannet.org/>
- National Institute of Nursing Research: <http://www.ninr.nih.gov/>
- American Nursing Foundation: <http://www.nursingworld.org/anf/>
- Eastern Nursing Research Society: <http://www.enrs-go.org/>
- Midwest Nursing Research Society: <http://www.mnrs.org>
- Southern Nursing Research Society: <http://www.snrs.org/>
- Western Institute of Nursing: <http://www.ohsu.edu/son/win/>
- Sigma Theta Tau International: <http://www.nursingsociety.org/>

36
©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---

---

---

# Nursing Research Series

## *Essentials of Science: Methods, Appraisal and Utilization*

 Thank you!

For more information please contact:

 **Southern California Nursing Research**  
[Nursing.Research@kp.org](mailto:Nursing.Research@kp.org)  
<http://nursingpathways.kp.org/scal/research/index.html>

[gretchen.j.summer@kp.org](mailto:gretchen.j.summer@kp.org)  
<http://nursingpathways.kp.org/ncal/research/index/html>

 **Northern California Nursing Research**

37 What is Science and Its Essentials?  
gretchen.j.summer@kp.org ©2010 Kaiser Permanente Southern & Northern California Nursing Research

---

---

---

---

---

---

---

---