

# WHAT IS RESEARCH ?

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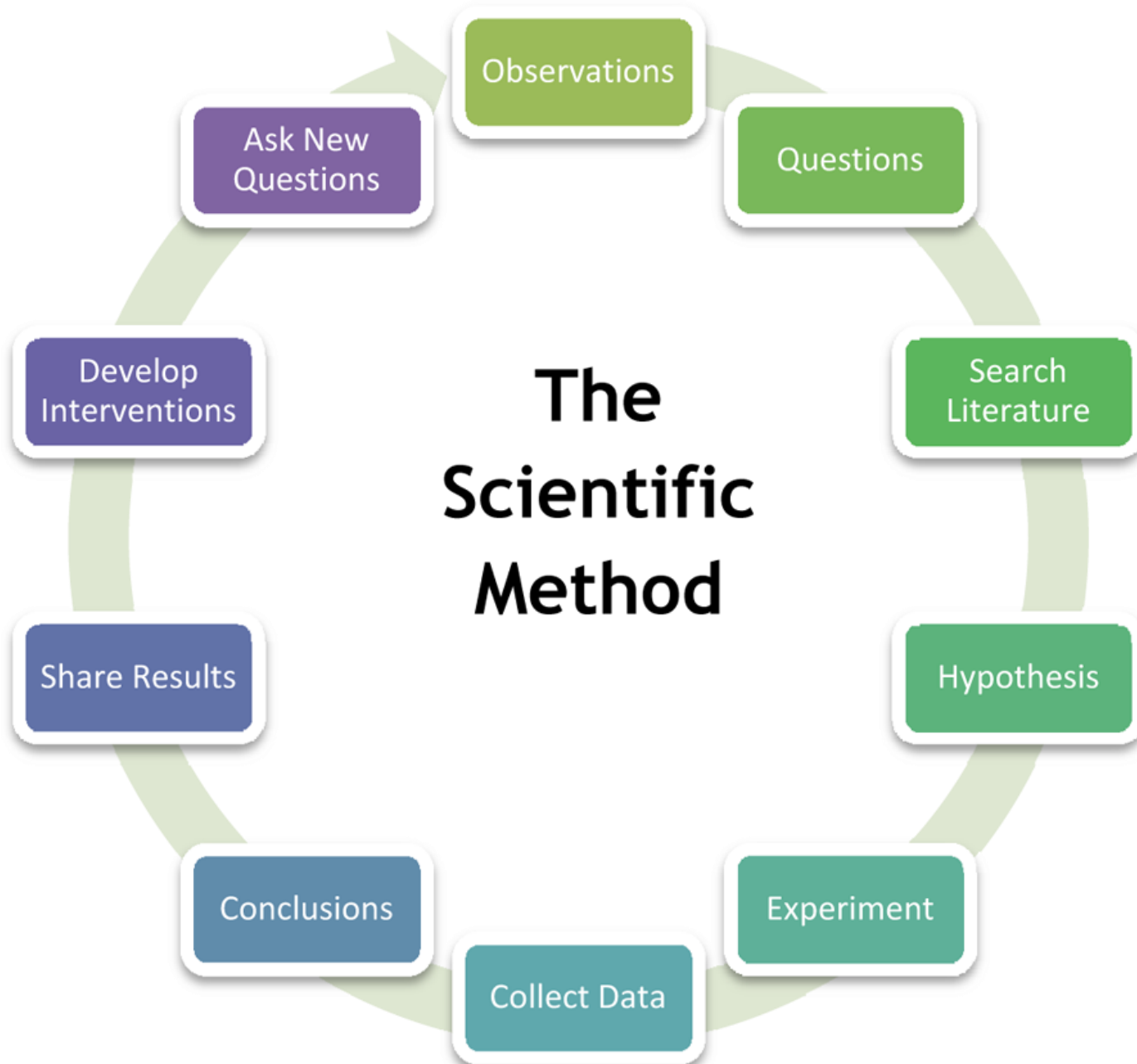
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# Research is a process to discover **NEW KNOWLEDGE**

“A systematic investigation (i.e., the gathering and analysis of information) designed to develop or contribute to generalizable knowledge.”

*[Code of Federal Regulations 45 CFR 46.102(d)]*



# Why research?

- Curiosity
- Problem finding and solving
- Correct judgment/decision
- Improvement/excellence
- Saving human life/suffering

# What is health research?

The generation of new knowledge using the scientific method to identify and deal with health problems

Health research-essential link to equity in development. Report of the Commission on Health Research for Development. New York: Oxford University Press; 1990.

# Types of research

## Basic Research (Research for “light”)

- To generate new knowledge that contributes to better understanding of the diseases.
- Examples
  - polynucleotide structures/ functions
  - immunoglobulin types/functions
  - pathogenesis of diseases

# Types of research cont.

## **Applied Research (Research for “fruit”)**

- To establish new knowledge and the results which can be applied to practical settings (patient care and improvement of pop. health)
- Examples:
  - clinical trials/field trials
  - therapeutic efficacy of antimalarials
  - development of methods/models
  - community based surveys

# Types of research cont.

## Public Health Research

- To identify extent, distribution, causes and solutions of health problems at population level
- Examples
  - Epidemiological studies (from population perspective)
  - Health system research (from health system perspective)



Figure 1: The WHO health system framework



# Defining research to improve health systems

Research domain	Primary characteristics		
	Focus of the research	Focus of the research outputs	Utility of the research output
Operational research	Operational issues of specific health programs	Health-care providers, program managers	local
Implementation Research	Implementation strategies for specific products/services	Program managers, Research & Development Managers	Local/broad
Health Systems Research	Issues affecting some or all of the health system building blocks	Health system managers, policy makers	Broad

Source: Remme et.al. (2010) Defining Research To Improve Health Systems. PLoS Med. 7 (11)

# Research framework

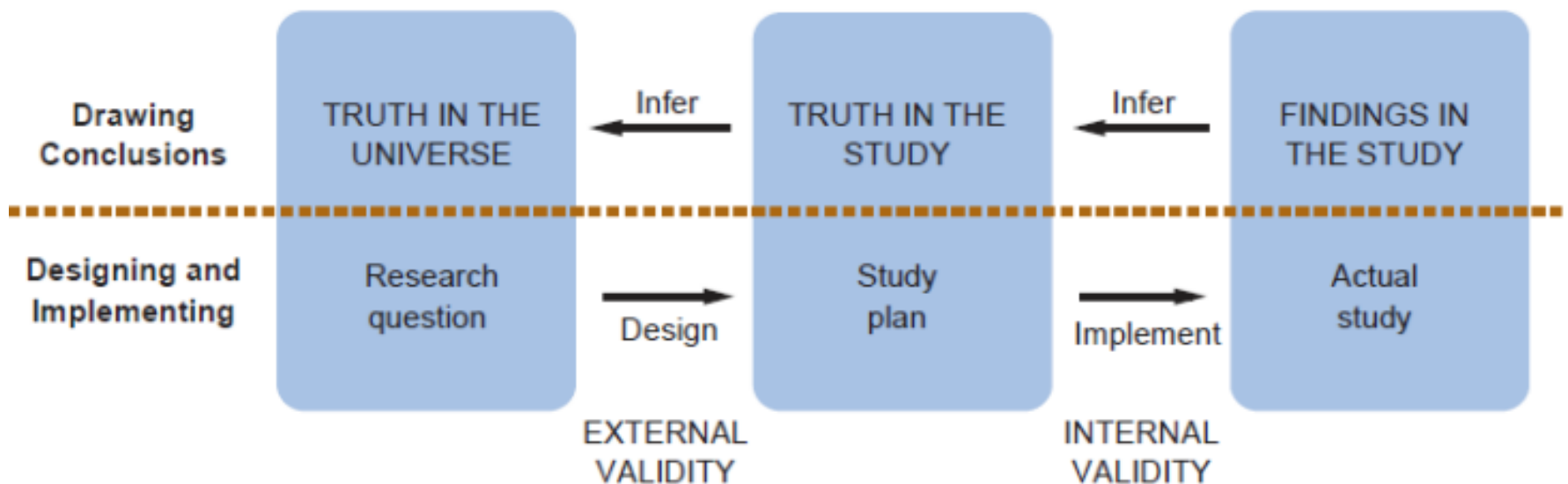
- Anatomy (structure) of research: what it is made of
- Physiology (function) of research: how it works

# Anatomy (structure) of research: what it is made of

- Research problem
- Objectives & hypothesis
- Study design
- Study subjects (sampling and sample size)
- Variables
  - (what information will be collected from study subjects)
- Data collection
  - Types of data (Exposure, Outcome & Confounders)
  - Data collection methods
- Implementation
- Data management (quality control)
- Data Analysis
- Research Ethics

# Physiology (function) of research: how it works

- Using measurements in a sample to draw inferences about phenomena in a population



# Roles and responsibilities of principal investigator (PI)

# Responsible researcher



***Honesty*** in all aspects of research

***Accountability*** in the conduct of research

***Professional courtesy and fairness*** in working with others

***Good stewardship*** of research on behalf of others

**DOING THE RIGHT THING**

First RCS\_HA, DMR (POLB)-Feb 2020

# Roles and responsibilities of a PI

- Generates high quality, and reproducible research results
- Ensure management and integrity of the design, conduct, and reporting of the research project
- Giving direction and oversight of compliance, financial, personnel, and other related aspects of the research project
- Coordination with school, department, and central administration personnel to assure research is conducted in accordance with departmental, university and sponsoring agency policies and procedures
- Reports to a designated official such as a dean, department head, or division chief.



# Attributes of a good researcher

- Honest
- Observant
- Imaginative
- Patient
- Dedicated/Persistent/Industrious
- Wise
- Ethical

# Criteria for a good research

- Purpose clearly defined
- Research process detailed
- Research design thoroughly planned
- High ethical standards applied
- Limitations frankly revealed
- Adequate analysis for decision maker's need
- Findings presented clearly
- Conclusions justified
- researcher's experience reflected

# Authorship

# Authorship: ICMJE Criteria

1. Substantial contributions to conception and design, or acquisition of data or analysis or interpretation of data
2. Drafting the article or critically reviewing
3. Give approval for final version to be published
4. Agree to be accountable for the work

Must meet all 4 conditions

# Think these things through:

- Study team needs to assign roles at outset
- Designate the lead – usually PI
- All persons with “substantial” contributions to be included; **Be Inclusive!**
- Order is important
- May collect large dataset that may be used to answer several questions
- Share “authorship” for several papers
- **At the beginning and not at the end!**



# “Gift, Ghost and Guest Authors”



**"Gift"** authorship: someone who has **not made an intellectual contribution** to a paper accepts an authorship

- Gift authors should definitely not be included "because everyone does it."



**"Ghost"** authorship: the practice of omitting authors who have made a major contribution to a paper.

A surreal landscape featuring a sunset over a vast ocean. In the sky, there is a large, textured planet and a smaller celestial body. A vibrant green and blue aurora-like glow emanates from the horizon. In the foreground, a small figure stands on a sandy beach, with a thought bubble above their head.

# Thank You

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