# Research Questions: คำถามการวิจัย

➢ A research question is a question that a study or research project aims to answer.

➢ Research question aims to explore an existing uncertainty in an area of concern and points to a need for deliberate investigation.

➢ Formulation of the research question (RQ) is essential before starting any research.

(Ratan, Anand & Ratan, 2019)

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# Three Types of Research Questions

- They can be further categorized into three types: descriptive, comparative, and relationship.

➤ Descriptive research questions aim to **measure** the responses of a study's population to one or more variables or **describe** variables that the research will measure.

**"what"**

➤ Comparative research questions aim to **discover the differences** between two or more groups for an outcome variable.

**"compare X and Y "**

➤ Relationship research questions seek to **explore and define trends and interactions** between two or more variables.

**"association" or "trends"**

(McCombes, 2023)

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# **Research Questions**

- A good research question should be specific and focused, and its answer should be discovered through data collection and analysis.

Example no. 1

Bad: How does social media affect people's behavior?
Good: What effect does the daily use of YouTube have on the attention span of nursing students?

Example no. 2

**Bad:** Has there been an increase in uncontrolled hypertensive patients in Thailand in the past 10 years?
**Good:** How have nurse-led intervention programs affected blood pressure levels among older persons?

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# Variable and its types

➤ **Independent variable**

✓ The first variable is called the **independent variable**.

✓ This part of the research can be changed and tested.

✓ The independent variable happens first and can be considered the cause of any changes in the outcome.

➤ **Dependent variable/** the outcome

✓ The outcome is called the **dependent variable**.

✓ The independent variable can be changed by an independent variable that can be tested.

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# Hypothesis: สมมุติฐาน

- **A tentative statement about a population parameter that might be true or wrong.**

- The purpose of hypothesis testing is to determine whether there is enough statistical evidence in favor of a certain belief about a parameter.

- A hypothesis is a specific, testable prediction.

- It describes in concrete terms what you expect will happen in a certain circumstance.

(Illowski & Dean, 2023; Academy, 2023)

# Hypothesis: สมมุติฐาน

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**Null Hypothesis**

✓      A null hypothesis is a type of statistical hypothesis that proposes that no statistical significance exists in a set of given observations.

✓ In statistics, the null hypothesis is usually denoted by the letter H with subscript '0' (zero), such that $H_0$.   (H-null or H-zero or H-nought)

✓ The null statement must always contain some form of equality  (=)

> Note
> $H_0$ always has a symbol with an equal in it.

(Illowski & Dean, 2023; Academy, 2023)

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# Hypothesis: สมมุติฐาน

- **The null hypothesis, symbolized by Ho,** is a statistical hypothesis that states that there is no difference between a parameter and a specific value, or that there is no difference between two parameters.

**Example**     (Illowski & Dean, 2023; Academy, 2023)

➢ There is a relationship between gender and quality of life.

➢ A null hypothesis may state: There is **no** difference between male or female and quality of life.

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# Hypothesis: สมมุติฐาน

- **The alternative hypothesis, symbolized by $H_1$ or $H_a$,** is a statistical hypothesis that states the existence of a difference between a parameter and a specific value or states that there is a difference between two parameters.

Note $\qquad$ $(\neq, >, \text{ or } <)$

Ha, $H_1$ never has a symbol with an equal in it.

A medical trial is conducted to test whether or not a new medicine reduces cholesterol by 25%. State the null and alternative hypotheses.

(Illowski & Dean, 2023; Academy, 2023)

$H_0$ : The drug reduces cholesterol by 25%. $p = 0.25$

$H_a$ : The drug does not reduce cholesterol by 25%. $p \neq 0.25$

**From:** https://courses.lumenlearning.com/introstats1/chapter/null-and-alternative-hypotheses/

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# Hypothesis: สมมุติฐาน

**Statistical Hypothesis**

➢These are statements about a statistical population.  These are derived from a sample. These are quantitative in nature in that they are numerically measurable

➢Always write the alternative hypothesis, typically denoted with  Ha  or  $H_1$, using less than, greater than, or not equals symbols, i.e.,  ($\neq$, >, or <)

**Example**

Group A is a higher score in health literacy than B or  $\mu_A > \mu_B$

$\mu_a \neq \mu_b,$     $\mu_A > \mu_B,$    $\mu_A < \mu_B$

(Upadhyay, 2017)

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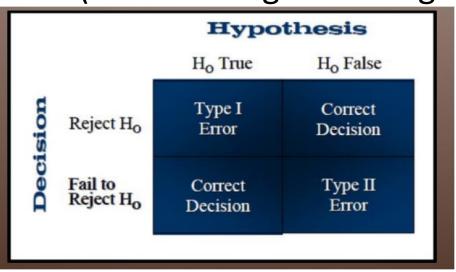มหาวิทยาลัยราชภัฏนครปฐม
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**Type 1 Error:**   We may reject the null hypothesis when it is, in fact, true. This occurs when we think there is a difference between our groups, but there really isn't. We can minimize this possibility by selecting an appropriate alpha level.

**Type 2 Error:**   Type 2 error occurs when we fail to reject a null hypothesis when it is, in fact, false (i.e. believing that the groups do not differ, when in fact they do).

(Upadhyay, 2017)

| | **Hypothesis** | |
|---|---|---|
| **Decision** | $H_O$ True | $H_O$ False |
| Reject $H_O$ | Type I Error | Correct Decision |
| Fail to Reject $H_O$ | Correct Decision | Type II Error |

# Thank you

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