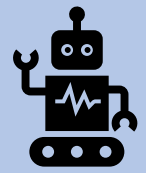
มหาวิทยาลัยราชภัฏนครปฐม
Nakhon Pathom Rajabhat University

CHAPTER 4

Vital statistics
(สถิติชีพ)



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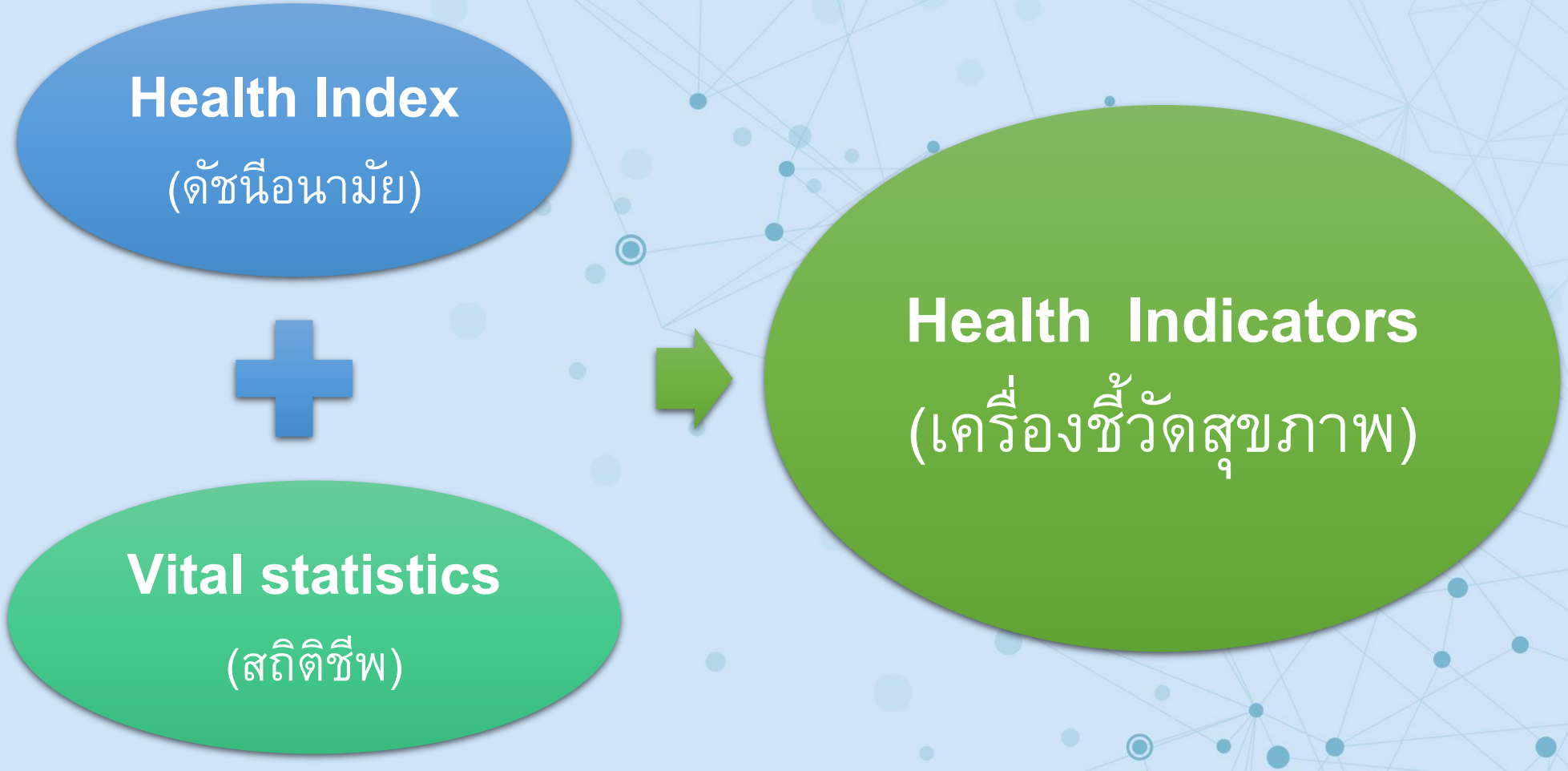
CHAPTER CONTENTS

CONCEPTS



Health index and vital statistics are health indicators that show information about the health situation of the community, sub-district, province, and country.

BASIC CONCEPTS OF THE HEALTH INDEX

Health Index

- Indicator of community health condition in various aspects

Health Indicators

- Crude death rate
- Life expectancy
- Infant mortality rate
- Maternal mortality rate

BASIC CONCEPTS OF THE HEALTH INDEX

Health Index

(ดัชนีอนามัย)

- indicators of the health condition of a particular community should cover both the direct measurement of the sanitary condition and the determinants or various elements that influence the state of health

Vital statistics

(สถิติชีพ)

- Vital statistics mean numerical data relating to events that are important to people's lives and health conditions at a particular time, death, illness and is an indicator of people's health status.

The significant indicators to measure the health condition of the people are as follows:

Group 1 Indicators of community characteristics

1.1 Characteristics of the structure of the people in the community
1.2 Characteristics of economic, society, and culture

Group 2 Indicators of quality of life of the population

2.1 Quality of the environment
2.2 The quality of the population

Group 3 Health indicators

3.1 Indicators of positive health conditions
3.2 Indicators of negative health conditions

Statistics of calculation of vital statistics and health index

1. Rate (อัตรา)

- Rate = $\frac{a}{a+b}$
- Rate = $\frac{a}{a+b} \times k$
- (k is a constant, it can be 100, 1000, 10,000, 100,000,…)

2. Ratio (อัตราส่วน)

- Ratio = $\frac{a}{b}$
- or $a : b$
- Ratio = $\frac{a}{b} \times k$

3. Index (ดัชนี)

- Index = $\frac{a}{a+b} \times k$
- (k is a constant, it can be 100, 1000, 10,000, 100,000,…) where a + b is a derivative or estimate.

4. Proportion (สัดส่วน)

- Proportion = $\frac{a}{a+b+c+d}$
- = $\frac{a}{a+b+c+d} \times k$
- (where k is a constant, usually 100)

Vital statistics

1. Measure of morbidity (การวัดการป่วย)

2. Measure of mortality (การวัดการตาย)

3. Dependency ratio (อัตราส่วนพึ่งพิง)

1. Measure of morbidity (เครื่องชี้วัดปริมาณการเจ็บป่วย)

1. Prevalence rate

2. Incidence rate

1. Measure of morbidity: 1.1 Prevalence rate

Example 1

A daily activity record form of a public health hospital in November 2021 summarizes the results of dengue fever control as follows:

1. Patients in responsibility are quoted as 25 people.
2. Patients registered as new patients are 30 cases
3. The population in that sub-district in 2021 has a total of 32,000 people.

Therefore, the prevalence rate of dengue fever in November 2021

$$\text{Prevalence rate} = \frac{(25+30)}{32{,}000} \times 10{,}000$$

$$= 17.18 \text{ per } 10{,}000 \text{ populations}$$

1. Measure of morbidity: 1.2 Incidence rate

Example 2

A daily activity record form of a public health hospital in November 2021 summarizes the results of dengue fever control as follows:

1. Patients in responsibility are quoted as 25 people.
2. Patients registered as new patients are 30 cases
3. The population in that sub-district in 2021 has a total of 32,000 people.

Therefore, the incidence rate of dengue fever in November 2021

$$\text{Incidence rate} = \frac{30}{32{,}000} \times 10{,}000$$

$$= 9.37 \text{ per } 10{,}000 \text{ populations}$$

Measure of morbidity: 3 Attack Rate (อัตราโจมจับ)

Source:
https://www.cdc.gov/csels/dsepd/ss1978/lesson3/section2.html

Primary Attack Rate

$$= \frac{\text{Number of new cases of disease or injury during specified period}}{\text{Size of population at start of period}} \times 100$$

Secondary Attack Rate

$$= \frac{\text{Number of cases among contacts of primary cases}^{*}}{\text{Total number of contacts}^{**}} \times 100$$

** กลุ่ม ผู้ป่วยที่อาจได้รับเชื้อจากกลุ่มผู้ป่วยปฐมภูมิ*
*** ไม่นับผู้ป่วยรายแรก (หรือชุดแรก) และรายที่มีภูมิต้านทาน*

EXAMPLE 3-4: Calculating Attack Rate

Ex.3 …. Consider an outbreak of chickenpox in which 15 students in 15 different classrooms all became ill. If the population of the school was 1,000, then

Primary attack rate = (15 / 1,000) × 100
= 1.5%

Ex.4 …. One incubation period later, 20 persons in the same classrooms as these “primary” cases developed chickenpox. If the 15 classrooms included 1,000 students, calculate the secondary attack rate.

Secondary attack rate = (20 / (1,000 − 15)) × 100
= (20 / 985) × 100
= 2.03%

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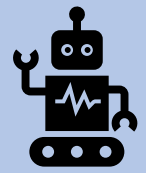

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2. Measure of mortality: 2.1 Crude death rate

2.1 **Crude death rate** refers to the rate representing the number of all-cause deaths per total population /mid-year population over a period of time. (usually for a period of 1 year)

$$= \frac{\textbf{all-cause deaths in period of time}}{\textbf{total population /mid-year population over a period of time}} \times k$$

The value of k (constant) can be 100, 1,000, 10,000

EXAMPLE 5: In a sub-district, 28 people died in 2021, and the mid-year population of a sub-district was 32,000.

$$\text{Crude death rate} = \frac{28}{32{,}000} \times 10{,}000$$

$$= \quad 8.75 \text{ per } 10{,}000 \text{ populations}$$

2. Measure of mortality: 2.2 Specific Death Rate (SDR)

2.2.1 Age-specific death rate (ASDR)/Age-specific mortality rate

$$\text{ASDR} = \frac{\#\text{ of death in a specific age group}}{\text{number of persons in that age group in the population}} \times k$$

EXAMPLE 6: Number of deaths in the age group 0-5 in 2021 = 150

Estimated 2021 mid-year population in the age group 0-5 = 20,000

The age-specific death rate for the age group 0-5 in 2021 is calculated using formula above as:

$$\text{ASDR} = \frac{150}{20{,}000} \times 1{,}000$$

$$= 7.5 \text{ per } 1{,}000 \text{ populations}$$

2. Measure of mortality

Measure	Numerator	Denominator	K
• **1.Crude death rate**	• **Total number of deaths during a given time interval**	• **Mid-interval population**	• 1,000 or • 100,000
▪ 2. Cause-specific death rate	▪ Number of deaths assigned to a specific cause during a given time interval	▪ Mid-interval population	▪ 100,000

Frequently Used Measures of Mortality

Measure	Numerator	Denominator	K
• **3. Maternal mortality rate**	• **Number of deaths assigned to pregnancy-related causes during a given time interval** (42 days or 6 weeks after delivery)	• **Number of live births during the same time interval**	• 100,000
4. Death-to-case ratio อัตราส่วนการเสียชีวิตของโรค	▪ Number of deaths assigned to a specific cause during a given time interval	▪ Number of new cases of same disease reported during the same time interval	▪ 100

Frequently Used Measures of Mortality

Measure	Numerator	Denominator	K
• **5. Fetal mortality rate** อัตราเด็กเกิดไร้ชีพ	• **Number of resident fetal deaths in a specified geographic area (country, state, county, etc.)**	• **Number of resident live births plus fetal deaths for the same geographic area**	• 1,000

$$\frac{\text{Number of Resident Fetal Deaths}}{\text{Number of Resident Live Births + Number of Resident Fetal Deaths}} \times 1{,}000$$

6. Neonatal mortality rate (อัตราการตายของทารกแรกเกิด)	▪ Number of deaths among children ▪ < 28 days of age during a given time interval	▪ Number of live births during the same time interval	▪ 1,000

Frequently Used Measures of Mortality

Measure	Numerator	Denominator	K
• 7 . Infant mortality rate • (อัตราการตายของทารก)	• Number of deaths among children < 1 year of age during a given time interval	• Number of resident live births during the same time interval	• 1,000

3. Dependency ratio (อัตราส่วนพึ่งพิง)

The formula for the dependency ratio is – (the number of people aged between 0 and 15 + the number of people aged 60 and above) divide by the total population between 16 and 59, times by 100.

$$\frac{(\#\text{people aged between } 0 - 15) + (\#\text{people aged 60 and above})}{\text{total population age } 16 - 59 \text{ in a period of time}} \text{ X } 100$$

Summary

Vital statistics and important health indices

1. Measure of morbidity

Prevalence Rate | Incidence Rate | Attack Rate

2. Measure of mortality [The Division of Vital Statistics (DVS)]

Mortality Rates

- ❑ Infant mortality rate
- ❑ Neonatal mortality rate
- ❑ Fetal mortality rate
- ❑ Maternal mortality rate

Death Rates

- ➢ Crude death rate
- ➢ Age-Specific death rate
- ➢ Cause-Specific death rate

Source: https://www-doh.state.nj.us/doh-shad/view/sharedstatic/FetalMortalityRate.pdf

3. Dependency ratio (อัตราส่วนพึ่งพิง)

Thank you

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