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Nakhon Pathom Rajabhat University

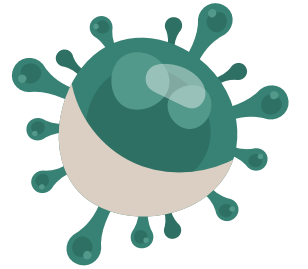
มหาวิทยาลัยราชภัฏนครปฐม
Nakhon Pathom Rajabhat University



CHAPTER 2

**Natural of Diseases
and Distribution**

(ธรรมชาติการเกิดโรคและการกระจายของโรค)



Episode 3

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THE CONTENTS OF THIS CHAPTER

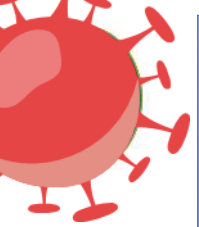
1

The occurrence of communicable diseases OR **Infectious diseases**

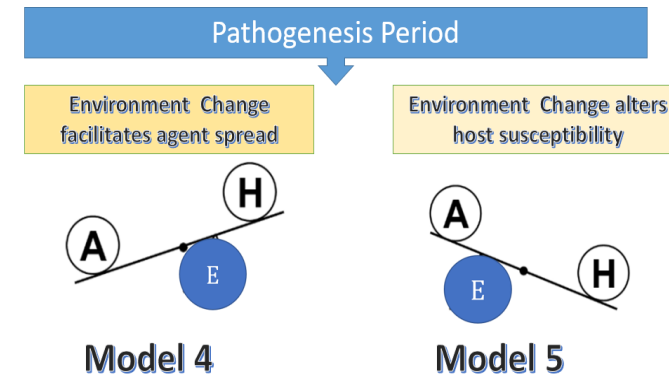
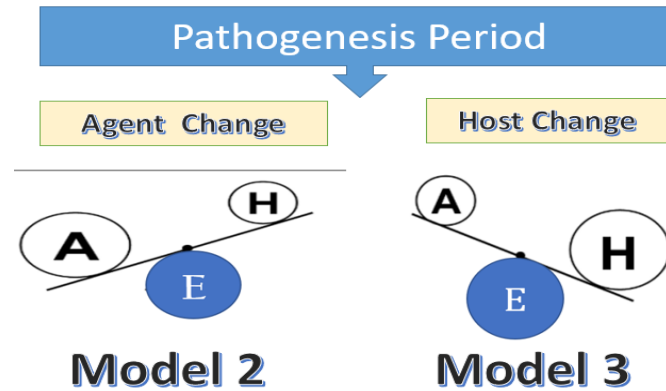
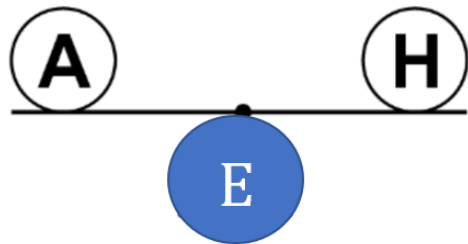


2

The occurrence of **emerging diseases** and re-emerging diseases



Epidemiologic triad (ปัจจัยสามทางวิทยาการระบาด)





The occurrence of communicable diseases



OR **Infectious diseases**



Communicable disease/Infectious diseases



Definition of communicable disease



for example

- **AIDS**
- **Dengue fever,**
- **Hepatitis,**
- **Influenza,**
- **Malaria,**
- **Measles,**
- **Tuberculosis**
- **Cholera/Severe acute diarrhea**
- **etc**



DEFINITION

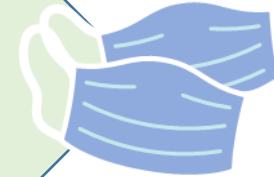
- **Infectivity** refers to the proportion of exposed persons who become infected. (ความสามารถในการติดเชื้อ หมายถึง สัดส่วนของผู้สัมผัสเชื้อแล้วเกิดการติดเชื่อนั้นๆ)
- **Pathogenicity** refers to the proportion of infected individuals who develop clinically apparent disease. (การเกิดโรค หมายถึง สัดส่วนของผู้ติดเชื้อที่เป็นโรคที่แสดงอาการให้เห็นได้ชัดเจน)
- **Virulence** refers to the proportion of clinically apparent cases that are severe or fatal. (ความรุนแรง หมายถึง สัดส่วนของผู้ป่วยที่มีป่วยรุนแรงหรือถึงแก่ชีวิต)

DEFINITION



Carriers
(พาหะ)

Persons who are infectious but have subclinical disease.



Reservoir
(รังโรค)



Habitat = ที่อยู่อาศัย



❖ Human reservoirs

❖ Animal reservoirs

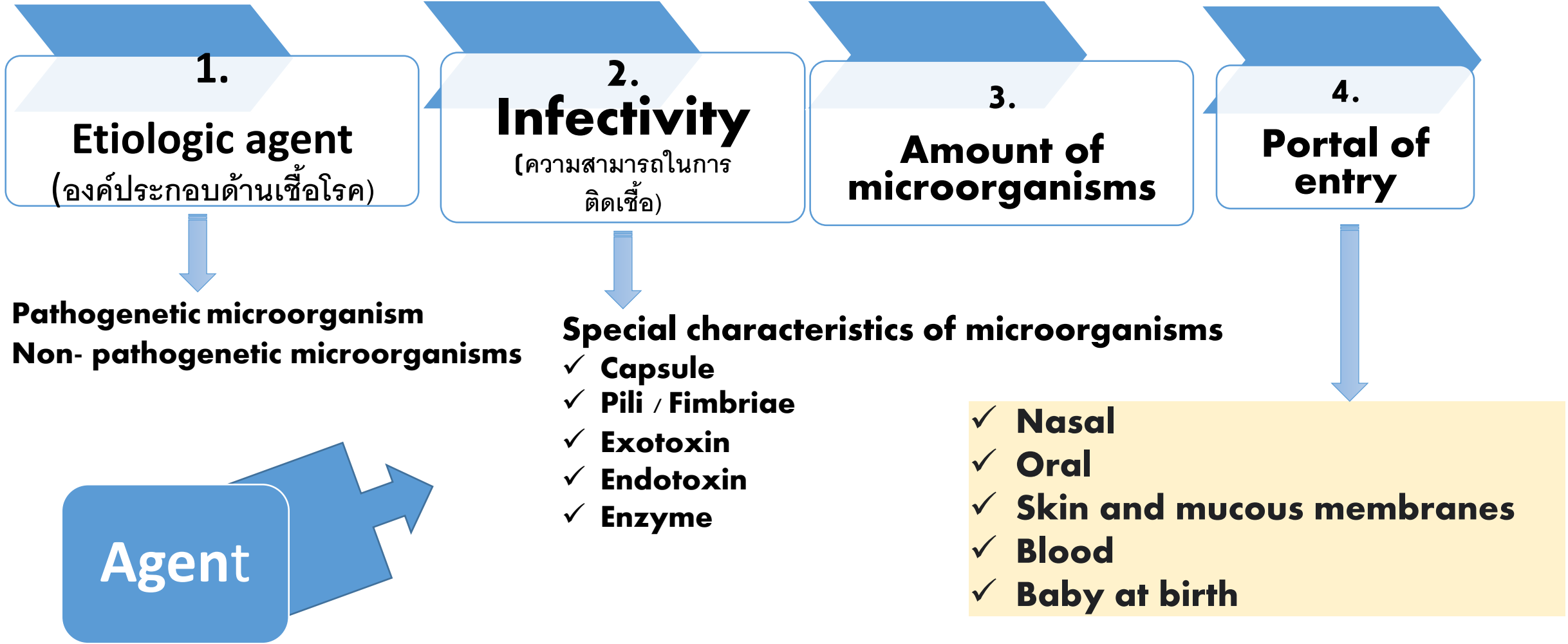


❖ Environmental reservoirs

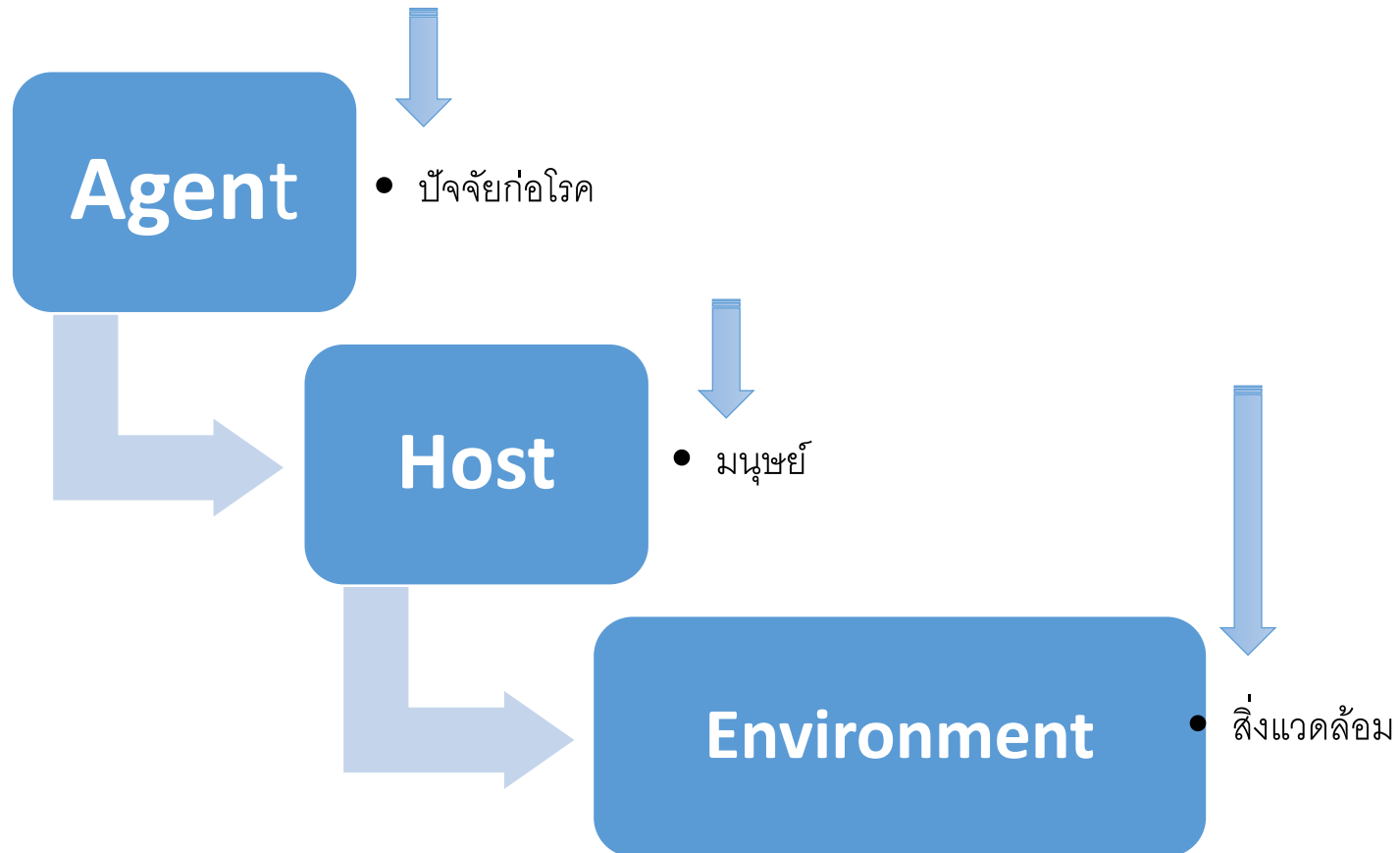


The reservoir of an infectious agent is the habitat in which the agent normally lives, grows and multiplies.

Components of Infection



Components of Infection



The distribution of the disease in population

➤ **Portal of exit** (ช่องทางออก) **is the path by which a pathogen leaves its host, usually corresponding to the site where the pathogen is localized.**

➤ **Modes of transmission** (รูปแบบของการติดต่อ), **an infectious agent may be transmitted from its natural reservoir to a susceptible host in different ways.**

Direct skin-to-skin kissing
- Direct contact sexual intercourse

spray with relatively large, short-range aerosols produced by sneezing, coughing, or even talking

- Droplet spread

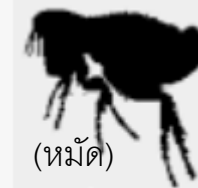
Indirect carried by dust or droplet nuclei suspended in air

- Airborne
- Vehicle borne
- Vector-borne (mechanical or biologic)

food, water, biological products (blood), and inanimate objects



Mosquitoes (ยุง)



(หมัด)

Fleas



Ticks

(เห็บ)

The distribution of the disease in human

Portal of entry (ช่องทางเข้า)

- The portal of entry refers to the manner in which a pathogen enters a susceptible host.
- The portal of entry must provide access to tissues in which the pathogen can multiply or a toxin can act.
- Often, infectious agents use the same portal to enter a new host that they used to exit the source host.

The distribution of the disease in human

Susceptibility of a Host (มนุษย์)



Nonspecific factors that defend against infection include the skin, mucous membranes, gastric acidity, cilia in the respiratory tract, the cough reflex, and nonspecific immune response.



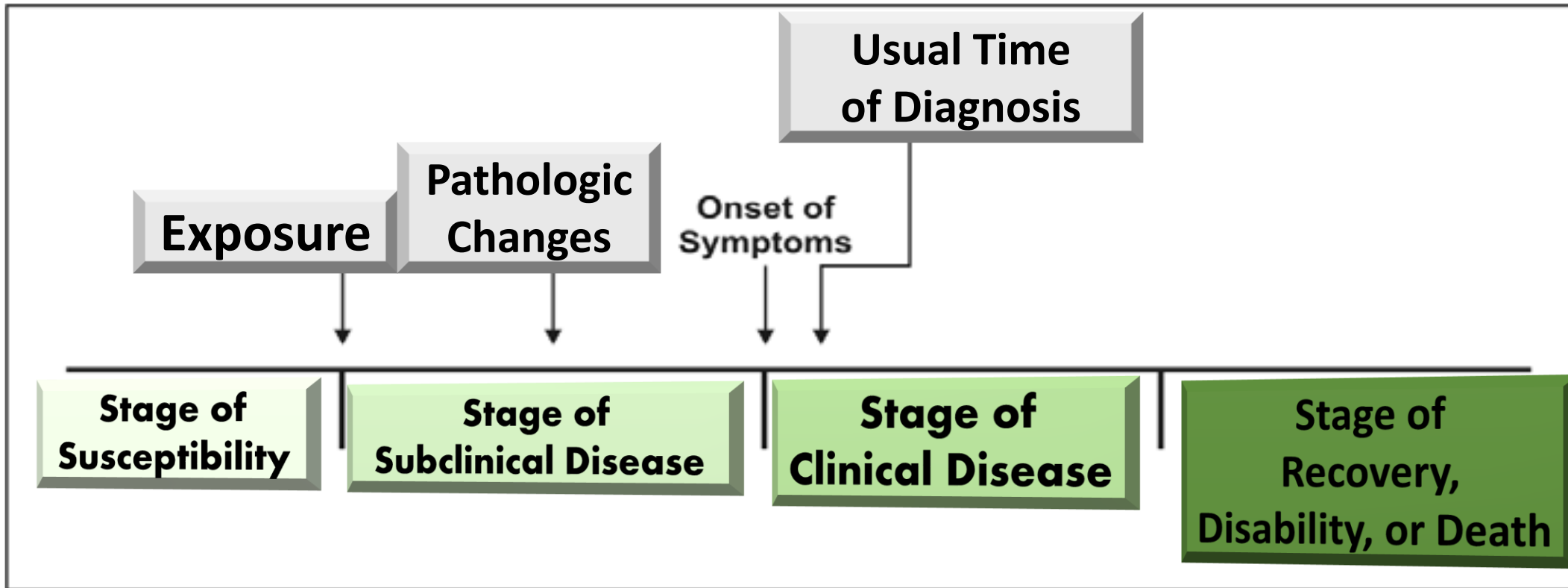
Specific immunity refers to protective antibodies that are directed against a specific agent.



Factors that may increase susceptibility to infection by disrupting host defenses include **malnutrition**, **alcoholism**, and disease or therapy that impairs the **nonspecific immune response**.



Natural of disease timeline



Source: Centers for Disease Control and Prevention. Principles of epidemiology, 3rd ed. Atlanta: U.S. Department of Health and Human Services; 2012, p71.

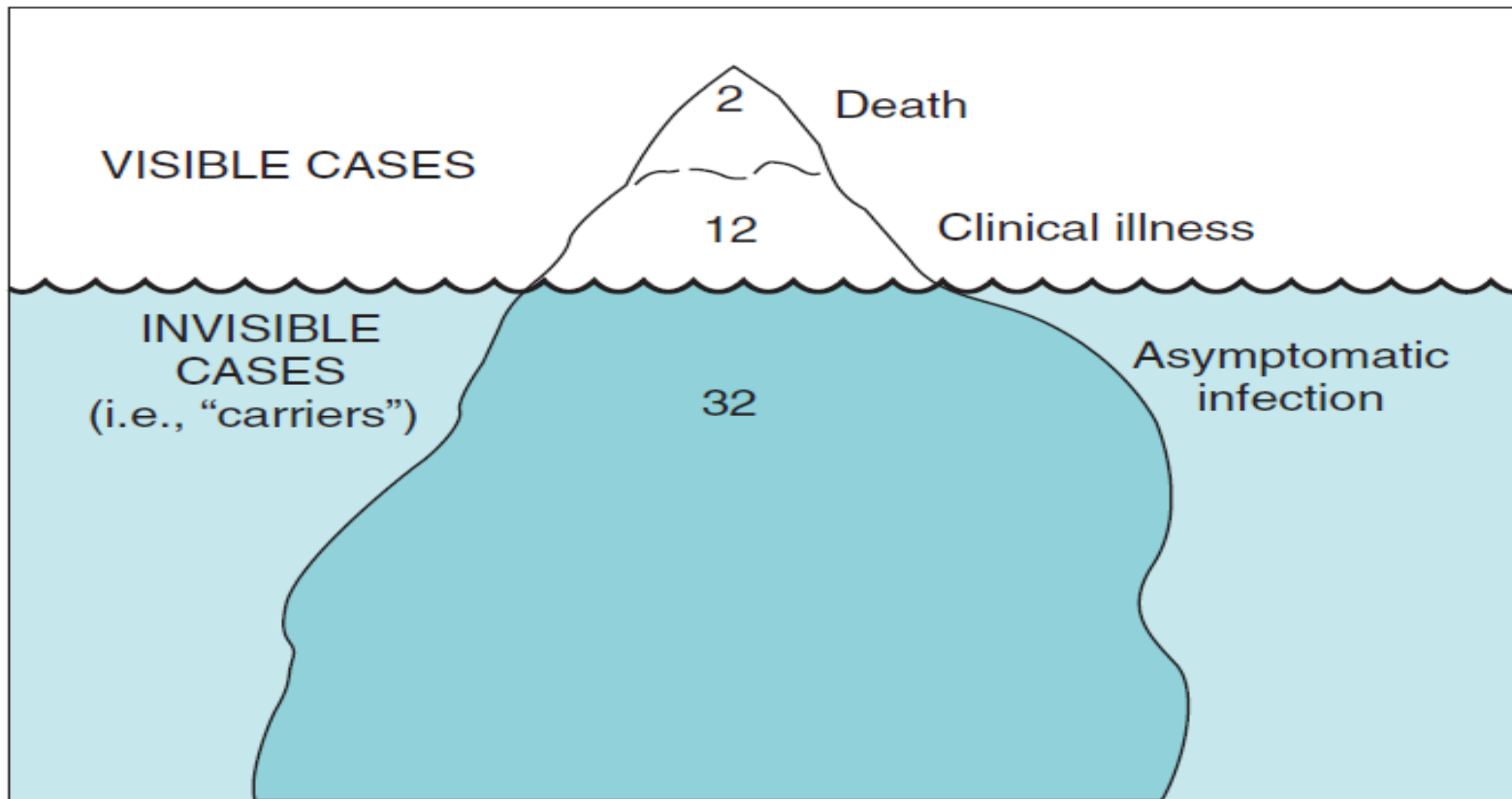


Figure 1-3 Iceberg phenomenon, as illustrated by a diphtheria epidemic in Alabama. In epidemics, the number of people with severe forms of the disease (part of iceberg above water) may be much smaller than the number of people with mild or asymptomatic clinical disease (part of iceberg below water). (Data from Jekel JF et al: *Public Health Rep* 85:310, 1970.)

From: Joann Elmore, Dorothea Wild, Heidi Nelson, David Katz. (2020). *Jekel's Epidemiology, Biostatistics, Preventive Medicine, and Public Health*. 5th Edition.

Philadelphia: Saunders, p13.



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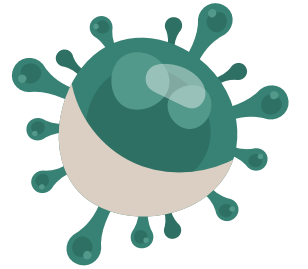
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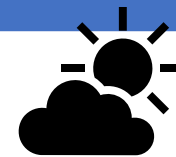
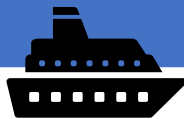
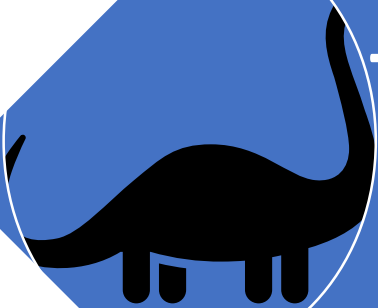
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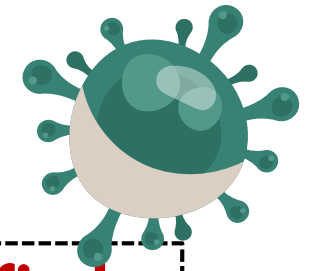


The occurrence of **emerging diseases** and **re-emerging diseases**



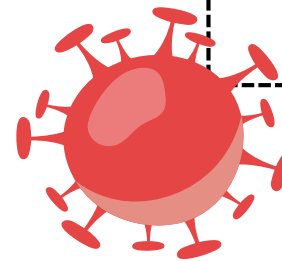
The occurrence of emerging diseases and re-emerging diseases

An emerging infectious disease is one that has appeared and affected a population for the first time, or has existed previously but is rapidly increasing, either in terms of the number of new cases within a population, or its spread to new geographical areas.



- ✓ **New infectious diseases,**
- ✓ **Re-emerging infectious diseases,**
- ✓ **New geographical areas,**
- ✓ **Mutated diseases**

➤ **COVID-19 is classified as an “emerging infectious disease”**



The occurrence of emerging diseases and re-emerging diseases

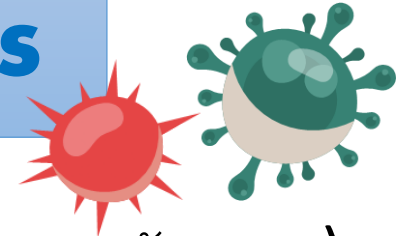
Re-emerging diseases are diseases that reappear after they have been on a significant decline.

- Malaria,
- Tuberculosis,
- Cholera,
- Pertussis,
- Influenza,
- Pneumococcal disease,
- Gonorrhea,
- Chikungunya fever



Re-emerging diseases

Factors contributing to the emerging and re-emerging infectious diseases

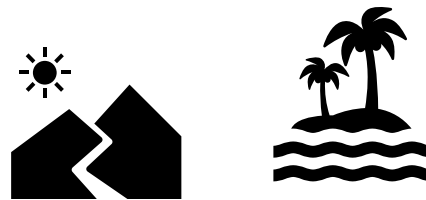


- Various of agent
- Agent genetic change (การเปลี่ยนแปลงทางพันธุกรรม)
- Adaptation or evolution of pathogens (Agent) (การปรับตัวหรือวิวัฒนาการ)

❖ Demographic and social changes

❖ Globalization

➤ Climate change



- ✓ Changes in the management of the health care system
- ✓ Advances in technology and advances in medicine





The levels of spread of disease.

- ✓ A pandemic is an infectious disease that has spread over multiple countries or continents at the same time affecting a large number of people. (การระบาดใหญ่)
- ✓ An epidemic is a disease that spreads rapidly, affecting a large number of people within a community, population, or region. (การระบาดในวงกว้าง)
- ✓ Sporadic refers to a disease that occurs infrequently and irregularly. (โรคที่เกิดขึ้นไม่บ่อยและไม่สม่ำเสมอ)





The levels of spread of disease.

✓ Endemic refers to the constant presence and/or usual prevalence of a disease or infectious agent in a population within a geographic area. (โรคประจำถิ่น)

✓ A disease outbreak is a rise in disease cases over what is normally expected in a defined area, generally over a short period of time, affecting a specific population group.

(เหตุการณ์ที่มีผู้ป่วยเพิ่มขึ้นผิดปกติ ทั้งในกรณีโรคประจำถิ่น แต่มีจำนวนผู้ป่วยมากกว่าที่คาดการณ์ หรือในกรณีโรคอุบัติใหม่ ถึงแม้จะมีผู้ป่วยเพียงรายเดียว)



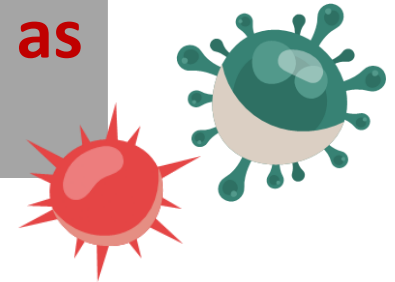


1. Emerging infectious diseases or re-occurring **in Thailand** such as avian influenza, H1N1 influenza (2009), MERS and Chica virus infections, etc.



2. Emerging infectious diseases that may **spread from abroad, virus infection diseases that can be transmitted to animals** and **diseases used as biological weapons** such as Nipah virus infection, Ebola, COVID-19 such as monkeypox

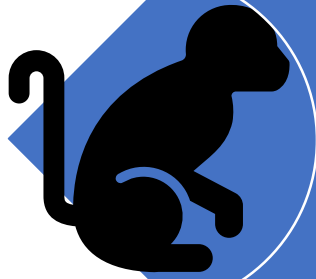
such as anthrax, smallpox (ไข้ทรพิษ), and the plague (กาฬโรค).



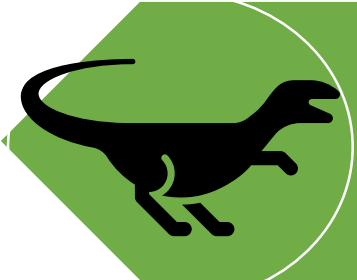
3. Emerging infectious diseases that may occur in the future.

such as diseases caused by the mutation of the new flu strain, mutation of avian influenza, and diseases caused by new drug-resistant pathogens, etc.

SUMMARY



The occurrence of communicable diseases OR **Infectious diseases**



The occurrence of **emerging diseases** and re-emerging diseases



Thank You for Your Attention



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