【学び方】
その 1： 同じ文章が　タイプ A：英文のみ、　タイプ B：英文、日本文併記、タイプ C：日本文で
　　　　執筆されています。地球全体の問題でありますので、英文でも取り組めるよう工夫していた
　　　　だいていますので、ぜひ英文に挑戦してください。
その 2： 本文中の URL をクリックして、公式 HP にアクセスし、公式情報を得てください。
その 3： 読後に　https://pro.form-mailer.jp/fms/97aaca99194854　にアクセスして是非、
　　　　回答してください。
その 4　連休中でもありますので、ご家族にもご一読いただいてください。ご家族の方にもアンケー
　　　　トにご回答いただけると幸いです。

Coronavirus Disease 2019 (COVID-19)

1.Collect information about current situation (Feature of virus, Domestically and Globally)

The coronavirus disease 2019 (COVID-19) is an infectious diseases caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It was initially identified in Wuhan city, Hubei province, China on December 1, 2019. The World Health Organization (WHO) declared COVID-19 a Public Health Emergency of International Concern (PHEIC) on January 30, 2020. Subsequently, COVID-19 was declared a pandemic by the WHO on March 11, 2020 based on its worldwide spread and its seriousness.

COVID-19 is mostly transmitted through droplets or contact with contaminated objects. Droplets containing the virus become airborne through the coughing, sneezing, or conversation of infected persons. These virus-containing droplets then disperse, possibly exposing noninfected individuals. If these noninfected individuals are exposed to a sufficient number of the contaminated droplets, they might become infected. Additionally, contact infection, another source of infection, consists of direct contact such as hand shake and indirect contact through objects such as door knobs or hand rails.

The incubation period varies from 1 to 14 days, with 6 days being the most commonly reported. Subsequently, patients display common cold symptoms such as fever, respiratory symptoms, and general malaise. Symptoms generally continue for about 1 week. In some infected individuals who difficulty in breathing, X-ray or CT are

indicated chest pneumonia. Most infected individuals have mild symptoms; however, elderly persons and those with underlying diseases are more likely to have serious consequences. As a result, careful monitoring is necessary.
https://www.niid.go.jp/niid/ja/diseases/ka/corona-virus/2019-ncov/2487-idsc/idwr-topic/9567-idwrc-2014.html

SARS-CoV-2 is a type of coronavirus that can infect humans. In total, there are seven known types of coronaviruses that can infect humans, including those which cause severe acute respiratory syndrome and Middle East respiratory syndrome. However, the other four types of coronaviruses cause mild common cold. The virus is an single-stranded RNA virus. It has a double film made up of lipids, called "an envelope." The virus cannot proliferate itself. It can replicate when it invades cells such as mucous. However, it cannot invade the skin; it simply attaches to the skin surface.
If it is attached to the surface of an object, it gradually loses its activity. It has some level of activity for 24 to 72 hours on the surface of some types of objects.
https://www.mhlw.go.jp/stf/seisakunitsuite/bunya/kenkou_iryou/dengue_fever_qa_00001.html#Q2-1

Importance of collecting information about the current situation
To avoid dissemination of fake news through a social network system, we have collected information about the current COVID-19 status. When one states an opinion and considers a counter measure against COVID-19, one must use information from a credible source.

Domestic situation
Currently, the Japanese Ministry of Labour, Health and Welfare releases data on the number of patients reported from each prefecture
(https://www.mhlw.go.jp/stf/seisakunitsuite/bunya/0000164708_00001.html#kokunaihassei). The format of release is subject to change. For the table in HP (1) is tested positive, (2) is divided by whether there are symptoms or not.
It should be noted that patients include those with asymptomatic cases and positive test cases. The latter refers to patients who test-positive. It is not reported but it if they show symptoms.

About Epidemiology
Epidemiology is a branch of science as to examine the spread of disease by quantifying

frequencies, distributions, and factors affecting the spread of disease among a group of humans.

First, patients are classified according to the severity of symptoms. Classifications of patients include the following: those who do not display any symptoms (asymptomatic cases), mild cases, severe cases, and mortal cases. In the case of COVID-19, mild cases displayed symptoms similar to a common cold. Severe cases showed pneumonia and difficulty breathing.

The pertinent information regarding the outbreak included: the epidemic curve, incidence, prevalence, mortality rate, and case-fatality rate.

The epidemic curve indicates the number of newly diagnosed patients by their onset date. Sometimes, the onset date of some patients was unreported. However, we can estimate their onset date from the distribution of onset to among patients with known onset dates. Similarly, some patients had a delay in reporting the onset date. Even in this case, we can adjust such a delay from the distribution of duration from onset to report.

We must note that media generally indicates the number of newly diagnosed patients by the reported date. This is not an epidemic curve and the difference is sometimes misleading.

An epidemic curve indicates the number of newly diagnosed patients by their onset date. However, the onset date is often not reported.

What is the epidemic curve in Shimane Prefecture? The following describes its development.

Incidence is the number of patients at one day per population. Prevalence was defined as the rate of change of the total number of patients per day, per population. Mortality rate is defined as the rate of the total number of deaths due to diseases per population. Case-fatality rate is defined as the rate of the total number of deaths due to diseases per patient. Case-fatality rate may be an important index of the severity of the disease.

The Symptoms include the following: fever (79%), cough (76%), pneumonia (63%),

general malaise (47%), pain in the throat (29%), nasal (25%), headache (24%), diarrhea (19%), joint or muscle pain (14%), vomiting (6%), acute respiratory distress syndrome (ARDS) (4%), and conjunctival injection (2%).

Taste or olfactory abnormalities have occasionally been reported.

What is the age distribution? You can access information regarding age distribution at https://www.niid.go.jp/niid/ja/covid-19/9533-covid19-14-200323.html
Why is the prevalence of the disease in children, especially younger than ten years old, very low?

Current situation in the world
The WHO has published "Coronavirus disease (COVID-2019) situation reports."
"Coronavirus disease 2019 (COVID-19) Situation Report – 94(Data as received by WHO from national authorities by 10:00 CEST, 23 April 2020)"
https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports/
reported as

April 23	Number of the confirmed patients with COVID-19	Mortality
New case	73,657	6,689
Total	2,544,792	175,694

Update the above table.

Month/Day	Number of the confirmed patients with COVID-19	Mortality
New case		
Total		

Counter measures by government and individuals
Movement before the emergence state declaration

February 25, Head office for counter measures against COVID-19 spread initialed.

February 26, Cancellation voluntarily events

February 27, Schools closed

February 28, State of emergency declared in Hokkaido

March 24, Postponement of Olympic and Paralympic games until 2021

In March 25, The Governor of Tokyo initialed a significant phase to explosively expand outbreak restrictions; the Ministry of Foreign Affairs recommends to cancel voluntary travel abroad.

March 26, The Governor of Tokyo recommended strict, but voluntary, quarantine

March 27, The Governor of Tokyo recommend not leaving home on weekends and at nighttime

April 7. The Prime Minister of Japan declared a state of emergency based on a special law for the influenza pandemic; other cites followed with states of emergencies varying from April 8 to May 6 in Saitama. Chiba, Tokyo, Kanagawa, Osaka, Hyogo, and Fukuoka prefectures.

April 16, The Prime Minister of Japan expanded the state of emergency to the entire country

2. *How will the outbreak cease?   How do you predict the outbreak hereafter?*

Transmission of some infectious diseases, especially human-to-human infectious diseases such as influenza and measles, has been explained by relatively simple partial differential equation systems. One such system is the well-known Susceptible-Infection-Recovery (SIR) model.

If the pathogen were newly emerging and none in the human population had immunity at all, all persons would susceptible. When this pathogen invades this community, the initial patient causes an outbreak.

The key parameter for the SIR model is the reproduction number, R. R represents how many persons on average can be infected from the initial case until the initial case recovers. In particular, R in the case of all persons was susceptible is defined as the basic reproduction number R_0. If R_0 was smaller than one, the initial case could be less than one person on average and the outbreak would persist for a long time. Therefore, R_0 for COVID-19 is definitely greater than one.

A person in a susceptible state can enter the infected state. Some of the infected patients showed symptoms, while others were asymptomatic. Some of the symptomatic cases may be severe, and some severe patients may die. Except for mortality cases, the infected persons will move to the recovery state. They are immune to this pathogen and will never be infected from the same pathogen, in principal.

If R_0 is higher than one, the initial case infects R_0 persons, then these infected individuals infect other R_0 individuals on average. Therefore, the outbreak expands exponentially. In this situation, does one consider that all persons will be infected for a long time? The answer is no. When the outbreak developed, the population of susceptible individuals decreased, and conversely, the population of recovery grew. Thus, among the people surrounding the infected, the proportion of susceptible persons decreases. The infected individuals cannot infect R_0 persons. For example, half of the surrounding persons were not susceptible, and the infected individuals can infect only R_0 /2 persons. In this sense, R decreases when the outbreak is developing. When R is less than 1, the outbreak will cease.

What is the R_0 of COVID-19? During the earlier phase of the outbreak in Wuhan and Japan it was estimated to be greater than two. This means that at the peak of this outbreak, half of the population would be infected. When is peak? The interval from a person being infected to infecting another person was almost 7 days on average. Moreover, the onset date of the initial case in the community outbreak in Japan was estimated to be January 14. Then, one can calculate the course of this outbreak.

Does the model represent an outbreak in Japan or the Shimane prefecture? If not, why does it not? What factor should one take into the model to mimic the outbreak in Japan? This would be key to understand COVID-19 and counter measures against it.

3. Never repeat the history of discrimination.

The history of human and infectious diseases repeatedly shows discrimination of people affected and their families. Leprosy (Hansen's disease) and AIDS are typical examples. Whenever these diseases cause anxiety, people are driven by prejudice and have discriminated people affected in an avoidance manner. Those who became the subject of discrimination mentally suffered. Infectious diseases not only hurt us

physically but also trigger psychological damage. In fighting infectious diseases, we also need to fight against the invisible fear.

Have you ever received any insulting comments, or have any of your family been treated badly when you contracted the influenza ? In 2009 at the beginning of the epidemic of a novel type of influenza (currently known as Type-A Influenza H1N1, emerged, some discrimination were reported. An unaffected student, who went to a school where another student was infected, refused to ride a taxi because of the fear of infection. The students of the same school also met several forms of discrimination, such as dry cleaners refusing to clean their school uniforms.

When we are anxious, we tend to become discriminatory or act on prejudice. The same applies when a new infectious disease breaks out. On the other hand, no discrimination or prejudice arises against existing infections.

A term, "corona bullying," already exists. Families of coronavirus patients meet various harassments. There was also a case of a child being taunted as "corona." Why does such a thing happen? It is like treating those affected by the virus as criminals. We need to understand that the people affected by the virus are innocent. We need to respect the dignity of patients as well as their family and medical staff who look after the patients. We have to protect them from discrimination. It is our responsibility to eliminate discrimination and prejudice.

Some infections are treatable with vaccines, while there are no vaccines for other infections. It is difficult to prevent ourselves from contracting infections without the help of vaccines. Because COVID-19 is a new infection, there has been no effective vaccine or established therapy. Unless we affected it, there is no way to obtain immunity. Currently, it is known that many infected people have no symptoms, while others suffer from severe symptoms and eventually succumb to the disease. When everyone is caught up in the fear of an unknown infection, what we should do is to correctly understand official information, dismiss groundless rumors, and stay away from discrimination and prejudice.

Finally, let us remain respectful and thankful for healthcare workers who always devote themselves to the health of the patients.

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