

令和 7 年 度

医 学 科

外 国 語(英語)

注意事項

1. 問題は 1 頁から 15 頁に掲載されています。
2. 解答に用いる言語(日本語あるいは英語)は各設問の指示にしたがって選びなさい。ただし、記号で答えるように求められている場合は記号で答えなさい。
3. 解答は解答用紙に記入しなさい。

次の英文を読んで、設問に日本語あるいは記号で答えなさい。

For as long as humans have been domesticating animals, there have been *zoonoses, also known as *infectious diseases that jump from animals to humans. Recent *public health stories about COVID-19, *avian flu and *swine flu have thrust zoonoses back into the spotlight, ⁽¹⁾sparking conversations about how animals like pets, rodents, birds or livestock might make humans sick.

But people should also pay attention to disease transmission in the opposite direction, said Benjamin Anderson, Ph.D., an assistant professor in the University of Florida's College of Public Health and Health Professions and member of the *Emerging Pathogens Institute. In June 2023, he and his colleagues published a comprehensive review of studies documenting instances of *reverse zoonosis, or human-to-animal disease transmission. The paper warned that pets, which share beds, kisses, snuggles and dining areas with humans, are at risk of catching diseases from their owners.

"We're starting to see a lot of examples of reverse zoonosis. Pets are more *susceptible than, maybe, we previously thought," Anderson said.

Differences in the biology of animals and humans usually make it difficult for infectious diseases to spread between species. Viruses, for example, must bind to specific cell *receptors in the host to reproduce and continue their life cycle.

"Typically, the viruses that I will have as a human are not going to fit into the receptors that a dog or cat has," Anderson explained.

Because of the genetic diversity that a viral population might have, there will be different *strains with varying levels of success at fighting off the host's *immune system and entering the host's cells. Those varieties that can reproduce more will become more common over time.

There is also the possibility of a virus developing a *mutation that, by chance, allows it to fit in a new receptor and cross the species barrier. The risk of this happening increases every time the virus is transmitted and *replicates in the presence of both humans and animals, leaving homes with pets especially ²vulnerable. Minimizing transmission is important, Anderson said, because every individual infection increases the odds that a mutation occurs, and a new *viral strain emerges.

Still, reverse zoonosis gets little attention from researchers and popular media. This is partially because it is much easier to instead track instances where pets get their owners sick.

“When you see a human in the clinic, you can ask questions like whether they were around any animals, or if any of their pets were sick. But when you get an animal that’s sick, you may not always be able to get that kind of information to link it back to a human case,” Anderson said.

His paper described several diseases that have been transmitted from humans to their pets, including the swine flu, human norovirus, *dengue, COVID-19 and *tuberculosis, as well as several lesser-known infections. While the vast majority of cases involved dogs and cats, there were also a few transmissions documented among horses, ferrets and parrots.

Not all pets face the same risk of reverse zoonosis. Mammals are more likely than birds or reptiles to get sick from their owners because they share more *genetic similarities with humans. This means viruses will not have to mutate as much to cross the species barrier. The receptors in an animal’s cells are sometimes *dictated by whether the animal is from a mammal, reptile or avian species. For example, the ACE 2 receptor, which the virus that causes COVID-19 binds to, exists with minor variations in all mammals.

In addition to being a health risk for cherished pets, reverse zoonosis can also later impact humans by contributing to the spread of a disease. Most seasonal flu viruses bind to a cell receptor that is found in humans and pigs and

also exists in a slightly different *configuration in birds. This unique circumstance of biology allows pigs to be infected by both human and avian influenza viruses at the same time. When that happens, pigs can sometimes serve as a mixing *reservoir and produce new viruses that can cause pandemics.

Domestic animals like pigs can also sustain a pathogen population and become reservoirs. In 2016, Anderson co-authored a paper studying the spread of influenza viruses among people who worked in the swine industry. During the 2009 to 2010 and 2010 to 2011 flu seasons, when the 2009 pandemic influenza virus was circulating, cases peaked earlier in counties with more pig production. Researchers believe that the flu virus was circulating within pigs, creating an opening for *outbreaks in the human population.

Tracking *zoonotic transmission can be difficult because pathogens don't always cause *symptoms upon infection, and *diagnostic testing even among symptomatic cases is often limited. This means movement of a disease between species can occur without anyone realizing. But regardless of whether an animal is sick, as long as it carries a pathogen, it increases the disease's overall movement in an environment — putting the health of other living beings at risk.

To help control zoonotic and reverse zoonotic transmission, Anderson⁽³⁾ recommended that people who are sick be more cautious around their pets, particularly if they know they have COVID or the flu. This does not have to mean a total *quarantine, since being separated from their companion animals is not always possible or preferred.

Strong human-animal bonds also come with a score of benefits for emotional and mental well-being that should not be⁽⁴⁾discounted. Anderson said that owners can still make a meaningful difference by limiting petting and keeping *bodily fluids away from pets while sick. On a day-to-day level, people can also limit the spread of disease by feeding pets a healthy diet, providing fresh drinking water, keeping a clean living area and following a recommended vaccination schedule.

On the *systemic level, more *integrated research can also reduce the impact of reverse zoonoses. This means not just focusing on human health data to understand a disease, but also incorporating animal data as well.

“I think it’s important to know not just about the human health issues, but also have a more complete picture as to what’s actually happening out in the environment,” Anderson said.

Source (with changes) :

Liang, J. (2024, January 11). Yes, humans can get their pets sick: Reverse zoonoses more common than once thought. Emerging Pathogens Institute, University of Florida.

<https://epi.ufl.edu/2024/01/11/yes-humans-can-get-their-pets-sick-reverse-zoonoses-more-common-than-once-thought>

Notes :

(reverse) zoonosis/zoonoses; zoonotic : (逆) 人獣共通感染症 (の)

infectious diseases : 感染症

public health : 公衆衛生

avian flu : 鳥インフルエンザ

swine flu : 豚インフルエンザ

Emerging Pathogens Institute : 新興病原体研究所

susceptible : 病気にかかりやすい

receptors : レセプター, 受容体

(viral) strain : (ウイルス) 株

immune system : 免疫システム

mutation : 突然変異

replicates : 複製する

dengue : デング熱

tuberculosis : 結核

genetic similarities : 遺伝的類似性

dictate : 決める

configuration : 構造

reservoir : 保有宿主

outbreaks : 大流行

symptoms : 症状

diagnostic testing : 診断検査

quarantine : 隔離

bodily fluids : 体液

systemic : 組織的な, 全体的な

integrated : 統合的な

設問 1 次の語は、本文の文脈ではそれぞれどのような意味で使われているか、最も近いものを選んで解答用紙の記号を○で囲みなさい。

(1) sparking

(a) inspiring

(b) continuing

(c) dominating

(d) interrupting

(2) vulnerable

(a) in vain

(b) in need

(c) in effect

(d) in danger

(3) recommended

(a) advised

(b) ordered

(c) discussed

(d) mentioned

(4) discounted

(a) ignored

(b) reduced

(c) included

(d) considered

設問 2 豚がパンデミックを起こすような新しいウイルスを生み出すことがあるのはなぜか、本文の内容にしたがって説明しなさい。

設問 3 逆人獣共通感染症からペットを守るにはどうしたらよいか、本文の内容にしたがって説明しなさい。

設問 4 本文の内容と合致するものを3つ選んで解答用紙の記号を○で囲みなさい。4つ以上選んだ場合は0点とする。

- (a) Viruses can reproduce without binding to cell receptors.
- (b) Virus varieties which can make more copies of themselves will be more widespread.
- (c) Reverse zoonosis attracts considerable attention from researchers.
- (d) The virus that causes COVID-19 can spread from humans to their pets.
- (e) During the 2009 influenza pandemic, cases reached a highest point later in countries where pigs are produced more.
- (f) It can be difficult to track zoonotic transmission because cases are not always symptomatic.
- (g) A total quarantine is required to control reverse zoonotic transmission.

Read the following passage and answer the questions that follow.

Americans are overworked. According to the Organization for Economic Co-operation and Development, U.S. employees work an average of 1,791 hours per year versus an OECD country average of 1,716—the sixth highest in the world.

To give workers in their state an extra day off to recharge, Maryland *lawmakers are introducing a new *bill “promoting, *incentivizing and supporting the experimentation and study” of a four-day workweek for private companies and government agencies.

Let’s take a look at how employees and employers could thrive with a four-day workweek and whether such a schedule could become the new norm.

What is a four-day workweek? It is exactly what it sounds like: a workweek during which employees work for four days and take the other three off.

Here’s how it works: Instead of working 40 hours a week, four-day workweeks allow you to work only 32 hours while receiving the same pay and benefits. Depending on the company or the industry, you might work Mondays through Thursdays and get Fridays off. Or, you may have the freedom to choose your extra day off.

The idea of a four-day workweek has been gaining popularity in recent years, with companies like Microsoft and Amazon adopting it in some form or another. But why are businesses making the switch? What are the benefits of a four-day workweek?

Despite common *misconceptions, longer working hours don’t always translate to better productivity and quality of work. Research from Stanford University found that worker performance declines (①) once employees are asked to work more than 50 hours a week. In fact, the additional output created by those extended working hours is so minute that the extra hours are often not worth the effort.

Rather than forcing employees through hours of unproductive labor, the four-day workweek model (②) them to rest so that they can reemerge with a refreshed outlook and optimism for their jobs. Most important, when employees can work without sacrificing physical health or mental well-being, it fosters an environment of productivity and innovation as they become more engaged with their work.

Moving to a four-day workweek doesn't just benefit employees, it also offers employers a significant cost advantage. Variable overhead expenses like electricity, office supplies and cleaning services can add up quickly. By shifting to a four-day workweek, employers could save up to 20% on those costs and use the funds in other business areas.

Plus, when employees have a manageable workload and reasonable working hours, companies are more likely to (③) their top talent, which keeps employee replacement costs down.

Overall, a four-day workweek could be a win-win situation for everyone involved because employers save money on business (④) and employees are happier and more productive.

According to the *International Journal of Environmental Research and Public Health*, not having a work-life balance could increase burnout and lead to lower career satisfaction. What's worse, burnout could often be long-lasting and affect your mental and physical health.

So, it's no surprise that many people want to spend less time at work, as indicated in Joblist's survey showing that more than 94% of full-time salaried U.S. employees would prefer a four-day workweek.

Introducing a four-day workweek could be an excellent solution to help employees achieve an improved work-life balance. By permitting them to (⑤) more time to activities outside of work, employees are more likely to come back to work with increased focus and motivation.

Jack Darracott, web app developer at Marketing Signals, wrote in an email, "Not only has a four-day workweek helped with my home life, but my work has

also improved. My day off serves as a ‘reset day,’ so when I’m back in the office, I can look at work with a fresh pair of eyes. You couldn’t pay me enough to return to five-day workweeks.”

While working less may sound like a dream come true for many, there are some downsides you should consider before interviewing at a company offering a four-day workweek.

If your company expects you to complete the same number of tasks with fewer hours available each day, you must remain (⑥) or you could risk falling behind. This compressed schedule can make you feel overwhelmed and anxious as you try to stay afloat while juggling multiple projects.

Jenn Lim, global workplace expert, says, “Doing the same amount of work in less time can set unrealistic (⑦), leading to increased burnout and stress.” To make a four-day workweek successful, “organizations and their teams will have to be very diligent about setting time (and honoring that time) for deep work.”

For some positions, such as customer service, it may not be practical to limit employee hours to a shorter work week as employees may need to be available five days a week to provide customer support.

“Businesses must realize that the four-day workweek is yet another one-size-fits-all approach to workplace flexibility that will serve some employees and hurt others,” says Gabriela Mauch, vice president of the ActivTrak Productivity Lab. For example, “employees who must take customer calls and (⑧) external commitments across five days may feel *resentful or short-changed compared to their four-day-a-week co-workers.”

Adriana Herrera, founder of PayDestiny, wrote in an email, “Four-day workweeks could attract less motivated talent — people who are rather disengaged and want to do the bare minimum at work.”

In positions that require *rigorous effort to be successful, passive individuals could lower the team’s productivity and diminish output. However, Herrera says this problem is usually preventable by clearly “communicating the duties a position is measured by in the job description.”

The pandemic has shown that we can reimagine the workplace and make (⑨) changes to how we work. Lim says, “For so long, the U.S. has been a work-first culture, and we have seen the rejection of that in recent work trends after COVID-19. “A four-day workweek is just another layer of the increased demand for flexibility and less work.”

And while it’s difficult to predict whether we’ll see an increase in the number of states recommending or incentivizing shorter workweeks this year, Lim says, “We’ll likely see more organizations test and adopt this model soon.”

While the idea of a four-day workweek could be attractive, don’t let that be the sole reason you apply to work for an employer. Remember, a four-day workweek at the wrong company could negatively (⑩) your mental health and career growth — especially if the company lacks support or opportunities for career progression.

So, before submitting your application for a position, thoroughly research the company to see if its mission and corporate culture align with your goals and values.

Source (with changes) :

Jamela, A. Adam (2023, February 23). How employees and employers can thrive with a 4-Day workweek. *US News and World Report*.

<https://money.usnews.com/careers/articles/how-employees-and-employers-can-thrive-with-a-4-day-workweek>

Notes :

lawmaker : an elected official responsible for making laws

bill : a written proposal for a new law

incentivize : to give someone a reason to do something

misconception : an idea which is wrong or untrue

resentful : feeling angry or upset over something you think is unfair

rigorous : careful, thorough and exact

設問 1 : Use the following words to best complete the text. Use each word once. Use a capital letter if necessary.

impact	expectations	retain	sharply	expenses
allows	drastic	devote	productive	fulfill

設問 2 : Answer the following questions in English in complete sentences and in your own words.

1. According to the article, what are some benefits of the four-day workweek for employees, and what are some benefits of the four-day workweek for employers?
2. According to the article, how does the four-day workweek negatively affect employees and employers?

Please read the article below and answer these two questions in English.

Questions

1. According to the article, what are some of the barriers that traditional guide dogs present? Answer in 40 words or less.
2. Please write a paragraph explaining the possible benefits that a robotic guide dog might give its owner. Answer in 75 words or less.

What features does a robotic *guide dog need? Ask the blind, say the authors of an award-winning paper led by researchers at the University of Massachusetts Amherst, a study identifying how to develop robot guide dogs with insights from guide dog users and trainers.

Guide dogs enable remarkable *autonomy and mobility for their handlers. However, only a small number of people with *visual impairments have one of these companions. The barriers include the scarcity of trained dogs, cost (which is \$40,000 for training alone), allergies and other physical limitations that *preclude caring for a dog.

Robots have the potential to step in where *canines can't and address a truly important need — if designers can get the features right.

Through analysis, the research team found the current limitations of canine guide dogs, the traits handlers are looking for in an effective guide and new ideas for future robotic guide dogs.

One of the more nuanced themes that came from these interviews was the delicate balance between robot autonomy and human control. “Originally, we thought that we were developing an autonomous driving car,” says team member Kim. They envisioned that the user would tell the robot where they want to go

and the robot would navigate autonomously to that location with the user in tow.

This is not the case.

The interviews revealed that handlers do not use their dog as a global navigation system. Instead, the handler controls the overall route while the dog is responsible for local obstacle avoidance. However, even this isn't a hard-and-fast rule. Dogs can also learn routes by habit and may eventually navigate a person to regular destinations without directional commands from the handler.

“When the handler trusts the dog and gives more autonomy to the dog, it's a bit delicate,” says Kim. “We cannot just make a robot that is fully passive, just following the handler, or just fully autonomous, because then the handler feels unsafe.”

Hochul Hwang, first author on the paper and a doctoral candidate in Kim's robotics lab, says that a two-hour battery life is an important feature for commuting, which can be an hour on its own. “About 90% of the people mentioned the battery life,” he says. “This is a critical part when designing hardware because the current *quadruped robots don't last for two hours.”

Ultimately, Kim understands that robotics can do the most good when scientists remember the human element. “My Ph.D. and postdoctoral research is all about how to make these robots work better,” Kim adds. “We tried to find an application that is practical and something meaningful for humanity.”

Source (with changes) :

University of Massachusetts Amherst. (2024, May 16). To optimize guide-dog robots, first listen to the visually impaired.

<https://www.umass.edu/news/article/optimize-guide-dog-robots-first-listen-visually-impaired>

Notes :

guide dog : assistance dogs trained to lead blind or *visually impaired people around obstacles

autonomy : the right or ability to be independent and control oneself or one's own activities.

visual impairment : vision problems that affect one's ability to perform certain everyday activities

preclude : to prevent something or make it impossible

canine : an animal of the dog family

quadruped : something which moves on four legs

