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CHOATE PUBLIC HEALTH

VOLUME 3 | ISSUE 5

THE FINAL LETTER

Dear readers,

With this issue (Volume 3, Issue 5), we would like to formally bid farewell to our readers. Inspired to synergize our love for writing and health, we founded Choate Public Health as two ambitious and passionate sophomores. With the unconditional support and contribution of our five board members and Dr. Lopez, we published our very first issue with hopes of educating our community about relevant health-related topics in an engaging manner. Three years later, we've printed a grand total of 15 issues delving into controversial topics such as mental health, eating disorders, drugs, sexual health, and gun violence.

We would like to thank all writers, alumni, faculty, all current, previous, and future members of the Choate Public Health Board, and Dr. Lopez for the endless hard work they have put in to make this club what it is today. We hope that Choate Public Health's impact in keeping the community informed will be maintained and furthered, and we look forward to all the progress CPH will make under all future leadership.

With love,
Ariel Hyunseo Kim & Khushi Tyagi
Founders & Editors-in-Chief
Choate Public Health

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SERVING THE COMMUNITY: Q&A WITH JAMIE FOSTER

By Lara Selçuker'21

Jaime Foster, PhD, RD, is the Senior Director of Community Partnerships and Programs at the Connecticut Food Bank. As Senior Director, she works on strengthening the Connecticut Food Bank's ties with various community organizations and developing programs to increase the distribution and impact of healthy foods to people struggling with hunger.

CPH: Why do you work at the Food Bank?
Jaime Foster: I was most recently a Postdoctoral Fellow at the University of Connecticut's Rudd Center for Food Policy and Obesity. There, I found that although I had the opportunity to do a lot of conclusive research about hunger, food, and security, I wasn't actually able to implement changes to make sure that people weren't going to bed less hungry at the end of the day. Hence, I transitioned to the non-profit sector to actually see the concrete effects of my work — every day, at least one person is better off because of something I did.

CPH: What's your favorite part of working at the Food Bank?
Jaime Foster: I like that I work with a diverse team of people with all kinds of different experiences in life and in professional environments. These diverse groups of people can bring different skill sets together to benefit the community.

CPH: How many volunteers does the Food Bank get each year? As a non-profit, does the organization get a lot of support from the Connecticut community?
Jaime Foster: The Connecticut Food Bank gets over 6,000 volunteers a year, and our volunteers vary from working on sorting to working in food drives. We have both volunteers who help us enter donations with data and folks that are skill-based (people who volunteer to do nutrition education). So, we have an extensive range of different volunteer skills that help us have a relatively small staff of 55 people — and we get a lot of work done with that small team.

CPH: Why is fighting hunger important to you?
Jaime Foster: Well, kids who don't have enough food to eat are less likely to pay attention, behave, and get good grades in school, which means that they are less prepared for what comes after school. That creates

Photo by Elaine Zhang '21

the cycle of poverty — usually, those who don't have enough access to healthy food have a harder time managing their health. They are more likely to be overweight and to suffer from diseases such as diabetes. The diseases also become harder to manage, as they have to choose between food and medication; there are times when people have to choose between essential necessities such as heat and food, and those are choices that no one should have to make. So our work at the Food Bank is aimed at alleviating at least one of those challenges that folks face.

CPH: What is the Connecticut-specific GROW program and what are its goals?

Jaime Foster: Grocery on Wheels (GROW) is a Connecticut Food Bank program. We are actually working on revamping it — right now, it meets every other week for six months, but we are transitioning to a form of program that will meet once a week for eight weeks. So it will only be a two-month program, but we are hoping it will be more effective. We're moving towards a model that will have evidence-based nutrition education for parents and children or seniors who rely on the program. So much of healthy eating is something that people know a lot about — there are very few people that don't understand that, for example, fruit and vegetables are healthy or that dairy is an important part of a balanced diet. These are things that a lot of people know, but ways to eat healthy on a budget, ways to change things that you enjoy eating to make meals healthier, or ways to encourage young children to try new foods that might be healthier — those are the things that we can help with. So that's what the program does: it focuses on where we know that people want more support and education from us.

CPH: Which aspect of your role do you find to be the most challenging?

Jaime Foster: I am the Chief Programs Officer, so I am responsible for the direct service programs. For me, the hardest part of my job is transportation, which is getting more and more expensive. Transportation is a barrier that prevents people from having access to food, but it is also a huge cost for the Food Bank, and there's really not much we can do to control that. So we really want to help people in the community, but transportation costs are very high; that's something we need to fundraise more for. So the biggest challenge we face as an organization as a whole is how we should continue to provide healthy food to people in need and get that food to places where people are despite the costly transportation.

Photo by Elaine Zhang '21

PORTUGAL'S CONTROVERSIAL POLICY THAT SOLVED IT'S OPIOID CRISIS

By Clarence Liu '22

In 1999, 1% of Portugal's population (a figure of approximately 100,000) reported an addiction to hard drugs.[1] During this time, Portugal had the highest drug misery and number of drug related deaths of any country in Europe. According to Dr. Joao Goulao, a public health official in Portugal, hundreds died each year, leading to the widespread belief that the country would not be able to turn the situation around.

But Dr. Goulao achieved what many thought to be impossible through the controversial idea of eliminating all criminal penalties for drug use. This decriminalization was also combined with an intense focus on harm reduction, treatment, and rehabilitation in the form of soft judgment, accessible outreach programs, access to methadone (a heroin substitute), and more.

One aspect of Portugal's solution was instituting a policy of soft judgment and a network of "dissuasion commissions." Addicts caught with a "personal" amount of drugs — defined as up to 10 days' worth of a substance — are generally ordered to appear before a health department official. Nuno Capaz, the sociologist who runs the commission in Lisbon, is one such official.[1] In an interview with *CBC News* he said, "When I wake up in the morning, I'm not thinking, 'How many fines am I going to apply?' So it's easy to focus on the health issues and the help we can provide."[1] The commission's function is not to prosecute but rather to identify potential drug addicts early on and provide them with information about treatment or quickly grant them access to healthcare. This ensures that, rather than being imprisoned, addicts get the help they need to treat their addiction. An alumnus of the dissuasion commission said that "if it were not for the commission, we would be obliged to go to the court, and court expenses are far more expensive."[1] Under the new policy, his only penalty was to meet with Capaz and another health worker with whom he discussed information about addiction services. In the end, he got the help he needed and avoided a detrimental prison stay.

In order to make outreach programs even more accessible, Portugal also set up a central agency that coordinates rehabilitation programs nationwide. This agency provides each health district in the country with outreach teams that visit addicts every day. Workers hand-deliver supplies such as sterile needles and pipes and

get to know their addicts' stories and needs. The importance of their work is widely recognized. In 2012, the European Monitoring Centre for Drugs and Drug Addiction estimated that roughly half of Portugal's high-risk opioid users were involved in treatment programs.[1] Essentially, Portugal had cut its number of high-risk addicts in half.

Another important tool Portugal employed in its battle against opioid addiction was methadone, a heroin substitute that satisfies the cravings of drug addicts without producing the addictive high. To employ this tool, Portugal set up "mobile methadone" programs. In Lisbon, methadone was delivered to thousands of users in their homes and workplaces via mobile vans. Regardless of social or financial status, addicts were provided a five-milligram dose of methadone each day to aid in their recovery and daily function. Manuel, a forty-year-old father of two, said that the mobile van program allowed him to "have a job," "have health," and "have life."[1]

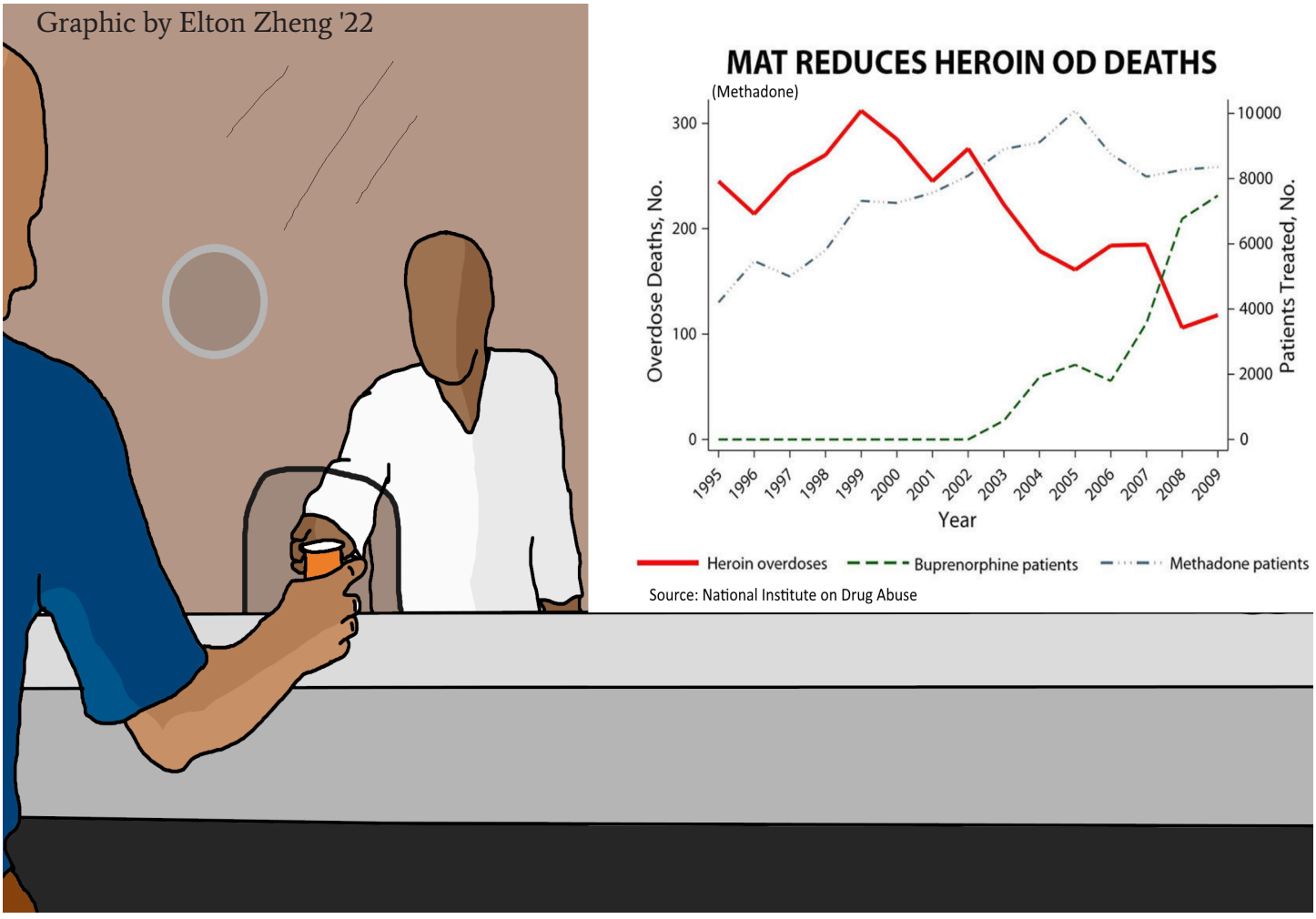
Hugo Faria, a psychologist who helps manage the mobile methadone program, highlighted the fact that some addicts have been utilizing the program for over a decade. Faria said that "without these programs, these people wouldn't go anywhere to be treated."[1]

All in all, Portugal's response to the drug epidemic has worked wonders — a decade later, the number of addicts was halved and overdose deaths dropped to just thirty a year. Europe's drug-monitoring agency states that Portugal's mortality rate from drugs is currently four times lower than the European average.[1] Now, Portugal serves as a success story for countries affected by the drug epidemic worldwide.

Source

1. Brown C. How Europe's Heroin Capital Solved Its Overdose Crisis. *Canadian Broadcasting Corporation News.*

Graphic by Elton Zheng '22



TRANSPHOBIA IN THE HEALTHCARE INDUSTRY

By Renee Jiang '22

While going to the doctors or heading to an annual physical exam may seem ordinary and easily accessible, that is not the case for many people around the world. One particular example is transgender or gender non-conforming people, who often fail to find health-care because of social stigmas that create social and economic barriers. This lack of access is particularly harmful for transgender people, who, in addition to the same standard healthcare needs that cisgender people have, also need regular check-ups during and after transitioning and various sex-specific preventive services.

In addition to their challenges with access to healthcare, transgender and gender non-conforming people often struggle in the workplace. Social stigmas and discrimination against people who are transgender or gender non-conforming make it harder for them to find jobs. The unemployment rate for transgender people is a staggering three times higher than the national average — 15% versus 5%.[1] This financial discrimination results in a lack of income that makes it difficult for transgender people to even afford insurance, let alone the expensive medical bills that are for treatments and check-ups not covered by insurance. As a result, many of those who are desperate may then resort to illegal and dangerous self-administration. More than 50% of persons identified as transgender have used injected hormones that were obtained illegally or were used outside of a conventional medical setting.[2] These unconventional methods make them vulnerable to infection and other unnecessary dangers that cisgender people rarely have to face.

A lack of impartiality, knowledge, and sensitivity from medical professionals creates a huge barrier for transgender and gender non-conforming people to seek and receive care.

According to a 2010 report by Lambda Legal, 70% of transgender respondents had experienced serious discrimination in health care.[3] "Your trans status is on display and on parade for people to make fun of you," transgender woman Ruby Cordaro said. She said that

doctors have even gone as far as to ask her "What *are* you?"[4] Most transgender or gender non-conforming people already have to overcome the process of telling family and friends their new identity; the fact that they have to go through that again with doctors who are supposed to act professionally is simply unacceptable.

Even worse, not only are transgender and gender non-conforming people discriminated against, the doctors who do act sensitive and respective often lack the knowledge to effectively treat their patients. Transgender treatment is not conventionally taught at medical school or in the traditional medical curriculum since it is a fairly modern practice. This makes it exceedingly tough to learn the practice in the first place, nevermind master it. Most medical professionals, even when they do have some prior knowledge of transgender treatment, are reluctant and uncomfortable at the thought of treating someone with a practice they are not completely familiar with.

Transgender and gender non-conforming people suffer numerous health disparities in comparison to cisgender people. The lack of awareness and knowledge among medical professionals forces many to turn to dangerous self-medication, consequently worsening their health and well-being. Furthermore, those who have successfully transitioned are often discriminated against and face social stigmas that may leave them at risk of unemployment. Without a steady income, transgender and gender non-conforming people cannot receive aftercare such as hormonal treatments and therapoes that are not included in basic medical insurance. This leaves them susceptible to health issues such as STDs or cancer. It is crucial to provide basic healthcare for transgender and gender non-conforming people. We must break social, cultural, and economic barriers to reform our healthcare system for everyone — not just cisgendered people.

Graphic by Sesame Gaetsaloe '21

Sources

1. Ellin A. Transgender Patients Face Challenges at the Hospital. *The New York Times.* Published February 16, 2016.

2. Health Care for Transgender Individuals. The American College of Obstetricians and Gynecologists. Published December 2011.

3. Safer JD, Coleman E, Feldman J. Barriers to Healthcare for Transgender Individuals. National Institutes of Health. Published April 1, 2017.

4. Ulaby N. Health Care System Fails Many Transgender Americans. National Public Radio. Published November 21, 2017.

THE ARTIFICIAL LIM

By Brooke E

First originating in ancient Egypt, prosthetic limbs have improved living conditions for many people across the world.[1] These artificial pieces provide both cosmetic and functional abilities that would have otherwise been unavailable to the user. Over the past few years, these prostheses have been modernized: the innovations provide benefits in functionality, cost, and efficiency.[2] Prosthetics help the lives of many, and they also represent the modernization of medical technology.

Ancient prosthetics

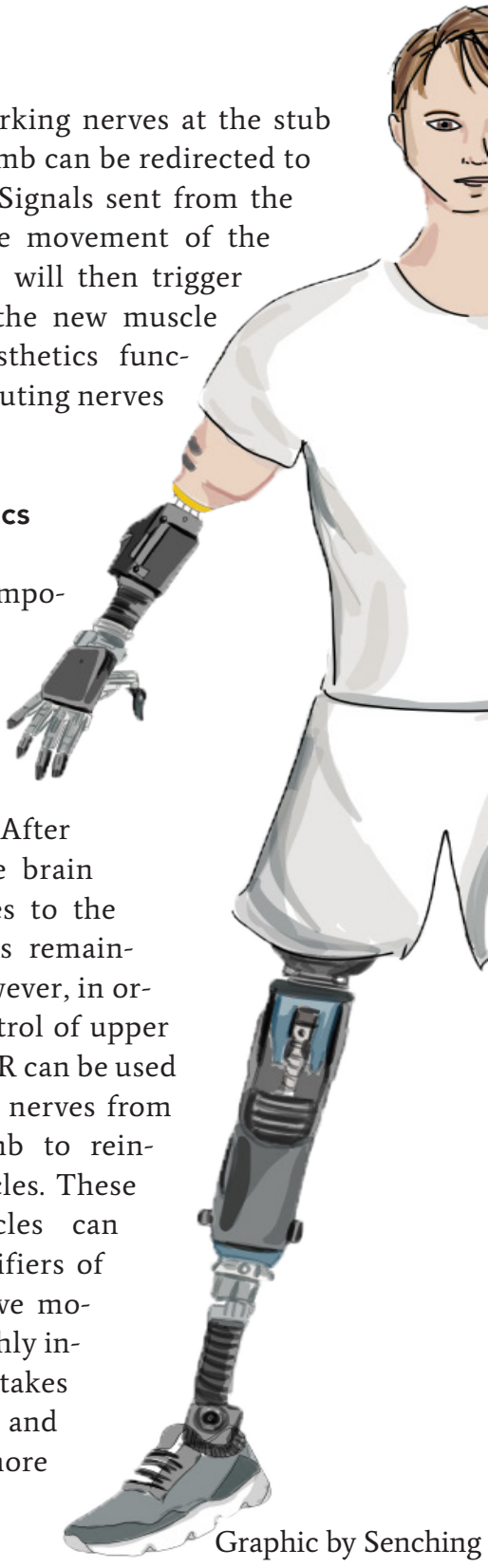
Prosthetics originated in ancient Egypt between 950 and 710 B.C. The world's first known prosthetic belonged to a mummified woman and was composed of wood and leather. Prosthetics were then carried into the civil war by James Edward Hanger, the first amputee. His patented leg was composed of a barrel and metal.[1]

The Basics

Prosthetics are officially defined as artificial substitutes made for limbs lost through a birth defect, accident, illness, or wartime injury. Prosthetics range from strictly cosmetic to functional (that may be concealed). With the modern technology of today, almost every body part can be reinstated as a prosthesis. The components of a prosthetic piece are the limb, the socket, the attachment mechanism, and the control system. Each part works to serve the overall goal of functionality by replicating muscle motion.[3] According to Harvard Medicine, "The idea behind a bionic limb is that the working nerves at the stub of the amputated limb can be redirected to a working muscle. Signals sent from the brain regarding the movement of the amputated muscles will then trigger the movement of the new muscle group." Thus, prosthetics function primarily by routing nerves to false limbs.[1]

Modern Prosthetics

The most contemporary procedure for prosthetics is a process known as targeted muscle reinnervation (TMR). After an amputation, the brain still sends messages to the muscles and nerves remaining in the area. However, in order to improve control of upper limp protheses, TMR can be used to transfer residual nerves from the amputated limb to reinnervate other muscles. These reinnervated muscles can then serve as amplifiers of the amputated nerve motor signals. This highly innovative procedure takes thought commands and translates it into more



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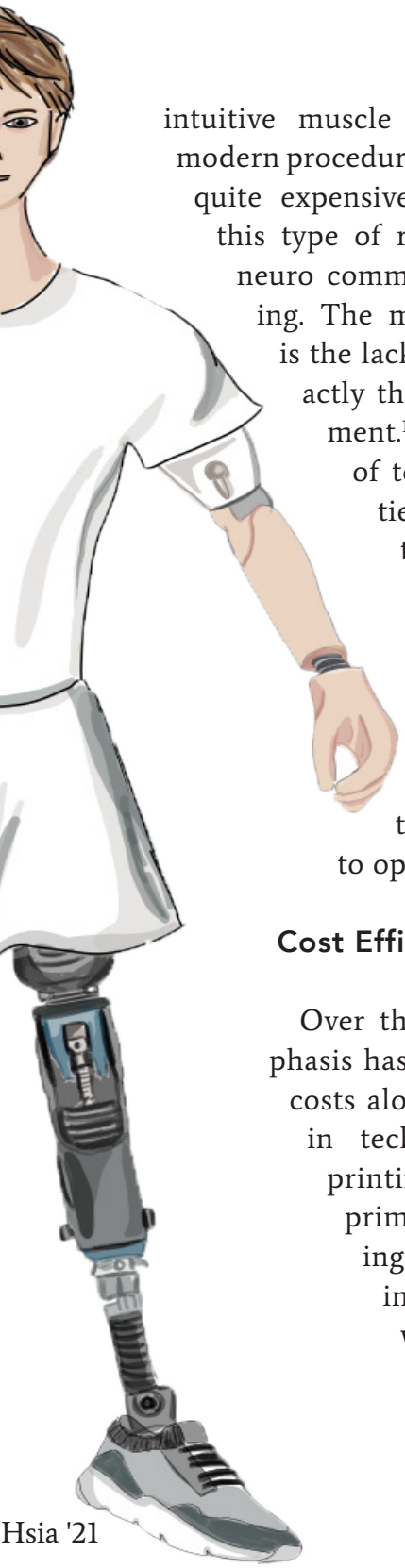
IBS OF THE FUTURE

Edwards'22



Hsia '21

intuitive muscle movement. While these modern procedures are helpful, they are also quite expensive. According to Harvard, this type of research revolving around neuro commands is the most promising. The main adversities, however, is the lack of knowledge of how exactly thought correlates to movement.[1] In addition to the help of technological research, patients now also receive prosthetists. As getting used to a brand new part of the body is a physical and psychological challenge, prosthetists work with patients to help them adjust and learn how to operate a new limb.[3]

Cost Efficiency

Over the past few years, an emphasis has been placed on lowering costs along with the advancement in technology. Currently, 3-D printing is being used as the primary technique for making prosthetics. For example, in 2013 a five-year-old boy without fingers on one hand was given a $150 3-D prosthetic. This mechanism allows for affordable, customizable, and quickly-made prosthetics. By using a program known as CAD (computer-aided design), 3-D printing layers material onto a piece as directed by a computer. While it may be an affordable solution, 3-D printing faces minor setbacks in wide scale manufacturing. In the future, scientists are hoping to implement at-home printers for those who need prosthetics.[2]

Overview

The past few years have held major strides for prosthetics, whether regarding cost, access, or functionality. Although price remains an issue for electrodes, these highly advanced procedures are being researched more and will hopefully result in a sensory-driven prosthetic. Looking ahead, as amputation becomes more common, the widespread technology of prosthetics will hopefully help those in conflict zones and third world countries.[3]

Sources

1. Chen J. Advancements in Limb Prosthetics. *Science in the News.* Harvard University, The Graduate School of Arts and Sciences. Published February 18, 2013.

2. 3-D Printing to Lower Prosthetic Costs. Alliance of Advanced BioMedical Engineering.

3. Woodford C. Prosthetics: A Simple Introduction to Artificial Limbs. Explain that Stuff! Updated February 25, 2019.

4. Nathan S. Future prosthetic: towards the bionic human. *The Engineer*. Published January 4, 2018.

THE NAPPING PARADOX

By Grace Liu '23

Balancing the rigorous academic workload of an elite prep school with athletic and extracurricular commitments is an incredibly demanding endeavor for students at Choate. Setting aside time for relaxation is necessary in order to maintain good mental and physical health. For many Choate students, taking a nap may seem like the best way to get a boost of energy. However, even though napping may seem to help in the short term, could it hurt you in the long run?

This question is not as straightforward as it may seem. First, you must ask yourself why you are taking a nap and for how long you need to sleep. If you feel a sudden need to take naps daily, it could be a sign of a disruption in your nighttime sleep, which may be caused by sleep apnea or insomnia.[1] In this case, you should consult a medical professional.

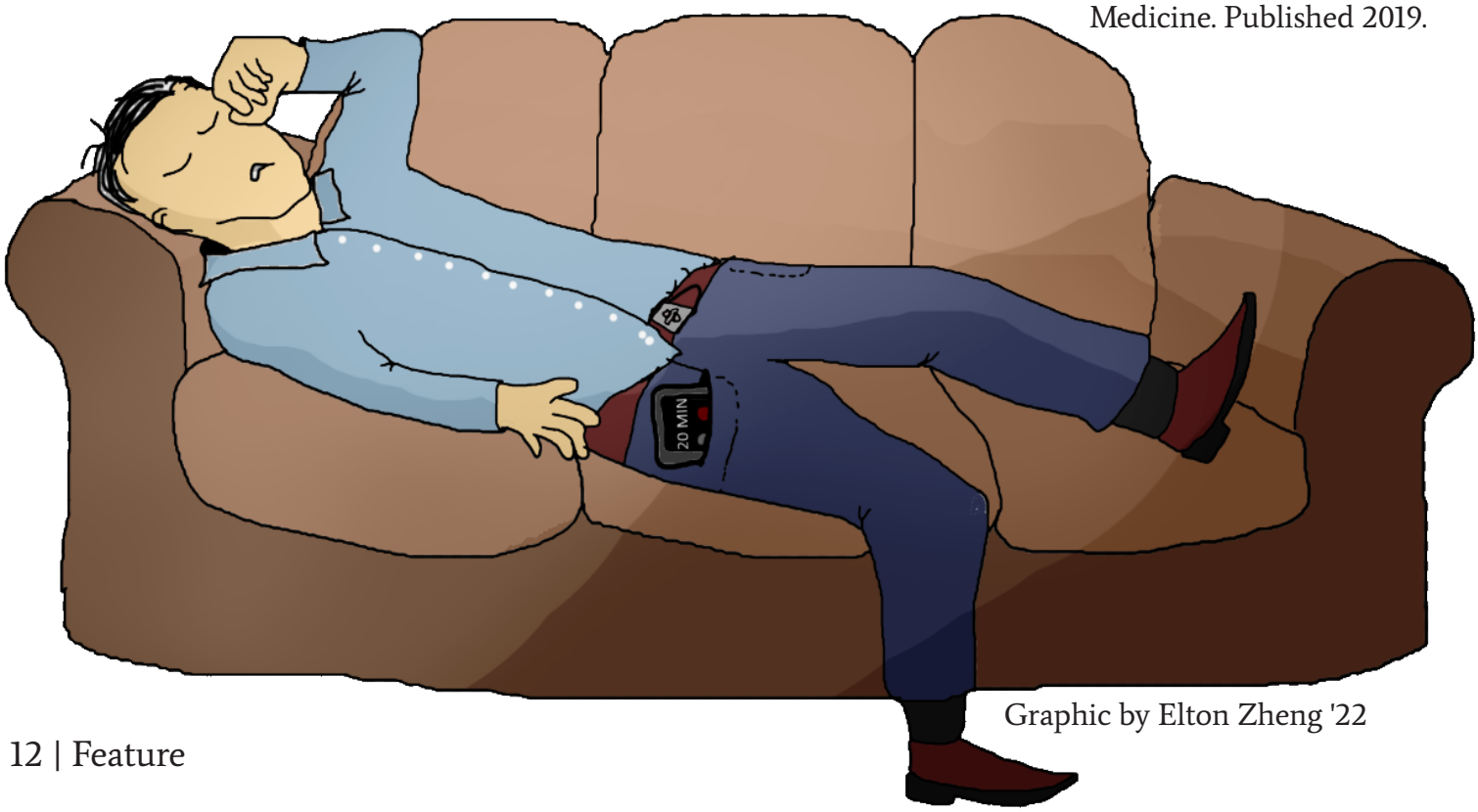
Most importantly, people should moderate the lengths of their naps. Studies from the Journal of the American Geriatrics Society show that while naps that lasted from 30 to 90 minutes in length improved cognition and memory, participants taking naps over 90 minutes long were too groggy to think clearly.[2] The optimum nap should last between 20 to 40 minutes and be in a quiet, dark, and comfortable place to avoid grogginess and trouble falling asleep at night.[2]

Overall, Choate students can continue their napping habits as long as are limiting it to the suggested length of time. But, always, naps during the day do not replace sleep at night.

Sources

1. Mayo Clinic Staff. Napping: Do's and don'ts for healthy adults. Mayo Clinic. Published November 20, 2018.

2. Can A Nap Boost Brain Health? Johns Hopkins Medicine. Published 2019.



Graphic by Elton Zheng '22

SAGE DINING: NUTRITION FOR BUSY STUDENTS

By Allison Kleinstein '21

Photos by Jayden Khuu '21

Most Choate students eat three meals a day, seven days a week at the dining hall, courtesy of SAGE. This is a huge responsibility that SAGE does not take lightly, and they ensure the quality and nutrition of each meal by selecting and preparing the food meticulously. As growing young adults, Choate students require a range of vitamins and food groups in each meal, which is additionally complicated by various dietary restrictions that SAGE must account for when planning their menus.

Each meal's menu at SAGE must meet a variety of requirements, constructed to give students the nourishment they need. According to Mr. Paul Kikosicki, Food Service Director at Choate, the menus are reviewed by nutritionists to fulfill an exhaustive list of requirements; these stipulations differ for each station in the dining hall. For instance, the "Main Ingredient" station must include one complete protein, one complete vegetarian protein meal, two vegetable dishes, and a starch. According to the National Health Service, each person should consume some fruits and vegetables, starchy carbohydrates, dairy products and alternatives, and protein foods each day.[1] Amazingly, just the Main Ingredient station can guarantee that Choate students will be able to fulfill three of these four nutritional requirements. The fourth food group, dairy products and alternatives, is also met by the many milk and dairy alternative options such as soy and coconut milk that SAGE provides at each meal.

In addition, not only does SAGE ensure students can find all the necessary food groups at each meal, but they home cook many of these options to guarantee healthy preparation techniques. All the deli meat options are house roasted without added preservatives, and all pork, beef, and chicken options throughout the dining hall are free of all preservatives and additives.

Most Choate students disregard the nutritional value of their meals and how much time and energy is put into each meal. Behind every burger day or Veg-out Monday are days of planning and preparing, each meal carefully thought out to fulfill nutritional requirements and, as such, presents Choate students with the nutrients they need to maintain their health as growing young adults.

Sources

1. The Eatwell Guide. NHS Choices. Published January 28, 2019.

FROM SMART PHONE

By Claire

This year, the Food and Drug Administration (FDA) approved the world's first smart inhaler: Teva's ProAir Digihaler. It is currently in the process of being introduced to the U.S. market and has the potential to become a game changer in the world of digital medicine. Built on the RespiClick inhaler formulation, the ProAir Digihaler has a sensor that tracks when the inhaler is used in real-time and then syncs this data to a mobile app. this process is simple: a patient can just use the app to scan a QR code at the top of the inhaler to connect the inhaler to the app.[1]

Designed as an aid for patients who use inhalers, smart inhalers have sensors that can remind patients when it is time to use the inhaler. These reminders can be triggered by the patient entering polluted or high-pollen areas or may simply be scheduled "check-ins." This helps patients keep track of how many times they have used their inhaler without needing physical records and help them adhere to their medication schedules.[2] The ProAir Digihaler can also determine how well the patient is using it and give them a rating based on their inhalation and breath actuation.[1]

It is expected that these smart inhalers will reach store shelves this year. They will not only help patients regulate their own usage but also help physicians evaluate how their patients are doing and whether they are using their inhaler properly.[1] For example, the two primary types of inhalers — dry-powder devices and aerosols — require different inhalation techniques. In dry-powder devices, the medicine is attached to lactose molecules, so a short, sharp intake of breath by the patient is needed to detach the medicine from the molecules and move it into the bloodstream and lungs. On the other hand, aerosol devices such as pressurised metered-dose inhalers and soft mist inhalers require patients to breathe slowly and deeply over approximately four seconds so that the medicine does not get stuck in the back of the patient's throat but instead reaches the patient's lungs.[3]

Although, currently, smart inhalers can only record actuation — a date and time stamp of when and how the inhaler was used — this information can still help physicians identify poor inhaler use on the patient's part.[3] The physician can then help teach their patient better inhaler-usage techniques, thus improving asthma care. This means that the patient will suffer fewer asthma attacks, which can

E TO SMART INHALER

Yuan '21

range from minor wheezing to life-threatening attacks.

On a wider scale, the data collected by the inhalers can also be used for research purposes regarding both asthma and other respiratory disorders. Konstantinos Votis, a computer engineer and informatics researcher at the Centre for Research and Technology Hellas in Thessaloniki, Greece, coordinates a project called myAirCoach that is dedicated to helping users improve their health with various user-friendly tools like smart inhalers. He said that digital sensors not only can give patients individualized warnings about impending asthma attacks but "can also be helpful for doctors to see what is happening" and "help researchers understand more about the disease."[3,4] This can include modeling for environmental factors that exacerbate patients' asthma and finding ways to lessen those effects.

Of course, there is still debate over who should have access to the information collected by these smart-inhalers. There are matters of patient privacy involved as well as fears that private pharmaceutical companies with access to the data will not share it with researchers without a monetary incentive. This, in turn, might make it difficult for patients to switch between different smart inhalers, especially if producers keep their production methods secret and do not communicate with one another or medical officials. Joseph Clift, a senior policy officer at charity Asthma UK, said, "We know that people with asthma need to change medicines and inhalers at times, so there's an interoperability angle that needs to be addressed so smart inhalers don't place barriers on patients easily switching."[3]

Despite these concerns, smart inhalers present incredibly exciting possibilities for safer and more reliable asthma care. As technology evolves rapidly, devices like smart inhalers are opening up countless doors for physicians, companies, and patients alike that will revolutionize the healthcare industry. All it takes are some careful steps to ensure that this change is for the better.

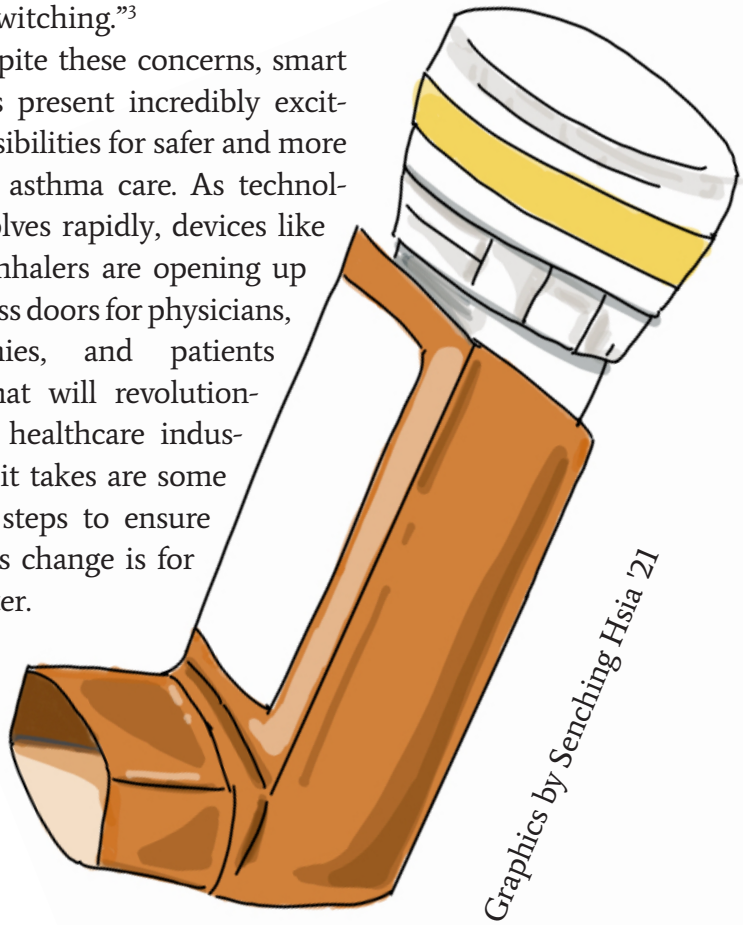
Sources

1. Aungst T. World's First Smart Inhaler is Arriving. Pharmacy Times. Published January 22, 2019.

2. Smart Inhalers. Asthma UK.

3. Mohammadi D. Smart inhalers: will they help to improve asthma care? *The Pharmaceutical Journal.* Published April 7, 2017.

4. What is the myAirCoach project? myAirCoach.



Graphics by Senching Hsia '21

RETURN OF THE
...OR

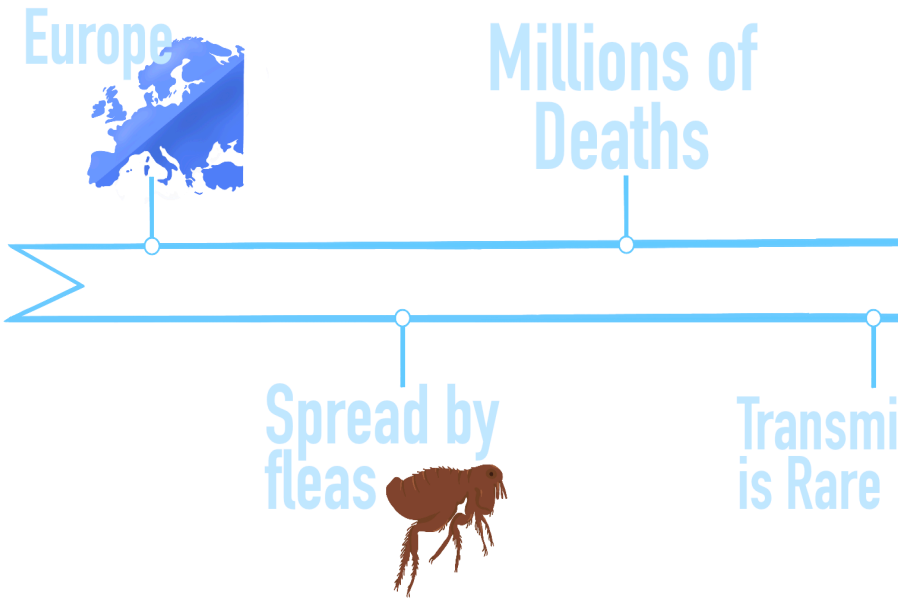
By Joy B

In 14th century Europe, a Plague known as the Black Death wiped out millions. Recently, it has resurfaced. Last month, Chinese officials reported three cases of the Plague contracted in the Inner Mongolian region of Northern China. The most recent case concerns a 55-year-old male who contracted the Bubonic Plague after hunting and eating a wild rabbit. The twenty eight people who came into contact with him are currently in quarantine. The two other cases concern patients diagnosed with the Pneumonic Plague, who are also being treated in Beijing.[1]

The Bubonic Plague — one of the three types of the Plague that triggered the deaths of millions throughout human history— refers to a serious infection in the lymphatic system, which is responsible for the body's immune system. Bacteria known as Yersinia pestis (Y. pestis) causes the infection and is usually spread by infected fleas that reside on small animals. Symptoms include fever, vomiting, bleeding, organ failure, and open sores. Patients often present with a painful symptom called buboes in which the lymph nodes of the armpit, neck, and groin swell up uncontrollably.[2] If the Bubonic Plague is left untreated, bacteria enters the bloodstream, bringing about the successive Septicemic Plague. From the bloodstream, the bacteria may then infect the lungs, causing what's known as the Pneumonic Plague. The fatality rate of an untreated Plague can be up to 60%, according to the World Health Organization (WHO).[3]

Despite the deadly threat posed by the Bubonic Plague, healthcare professionals collectively argue that the detection of the Plague in China should not be worrisome. Transmission of the disease is extremely rare, as the Bubonic and Septicemic Plagues cannot be contracted from person to person. In fact, the United States only has about seven cases of the Plague annually. Although the Pneumonic Plague is an airborne disease transmitted through coughing by droplets in the air, Y. pestis is extremely vulnerable to sunlight. "Y. pestis is easily killed by sunlight. If the bacteria is released into the air it can survive for up to one hour depending on the environmental conditions," says Dr. Robert Glatter, an emergency physician at Lenox Hill Hospital.[4]

Graphic by Sesame Gaetsaloe '21



BUBONIC PLAGUE NOT?

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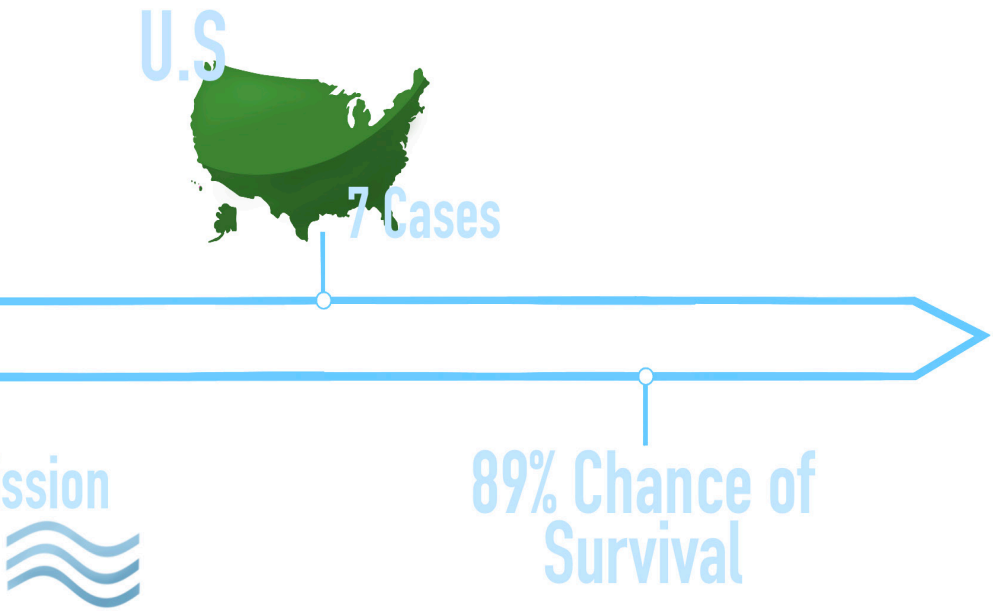
Unlike in the 1300s, medical practitioners now are aware of the transmission pathways of the disease and how to effectively prevent it. Even if the bacteria does infect someone, the advancement in the field of medicine today ensures a survival rate of 89% when promptly treated, according to the Centers for Disease Control and Prevention (CDC). Patients receive antibiotics, which work best if injected within the first 24 hours of the first symptoms. In more severe cases, patients are given oxygen, intravenous fluids, and breathing support. Furthermore, individuals who have been in contact with infected patients or animals carrying infected fleas can receive preventive antibiotics to ensure their safety from the Plague.[4]

From 2010 to 2015, the Plague killed 584 people out of the 3,248 people diagnosed with the disease worldwide. Although no single death should be overlooked, the harm caused by the Plague is significantly lower than those of other conditions. For instance, the global estimation of the number of deaths caused by rabies is 59,000 per year. Additionally, over 150 people die from influenza and pneumonia each day in the U.S. alone.[2]

Given the statistics, it is safe to conclude that although the Plague has not died out completely, it has done relatively little harm to humankind since the 14th century. Transmission of the disease is difficult, and transmission pathways can be effectively prevented beforehand as antibiotics lower the fatality rate of the disease to a mere 11%. The rarity of the Plague and the advanced medical treatments today nullify the general public's concerns about the reappearance of the pandemic in China.



Sources

1. Westcott B. Hunter in China Catches Bubonic Plague After Eating a Wild Rabbit. CNN. Published November 18, 2019.

2. Newman T. Bubonic plague: Third Case Reported in China. *MedicalNewsToday*. Published November 19, 2019.

3. Plague. World Health Organization (WHO).

4. Ries J. Yes the Bubonic Plague Is Still Around, Why You Don't Need to Worry. Healthline. Published November 19, 2019.

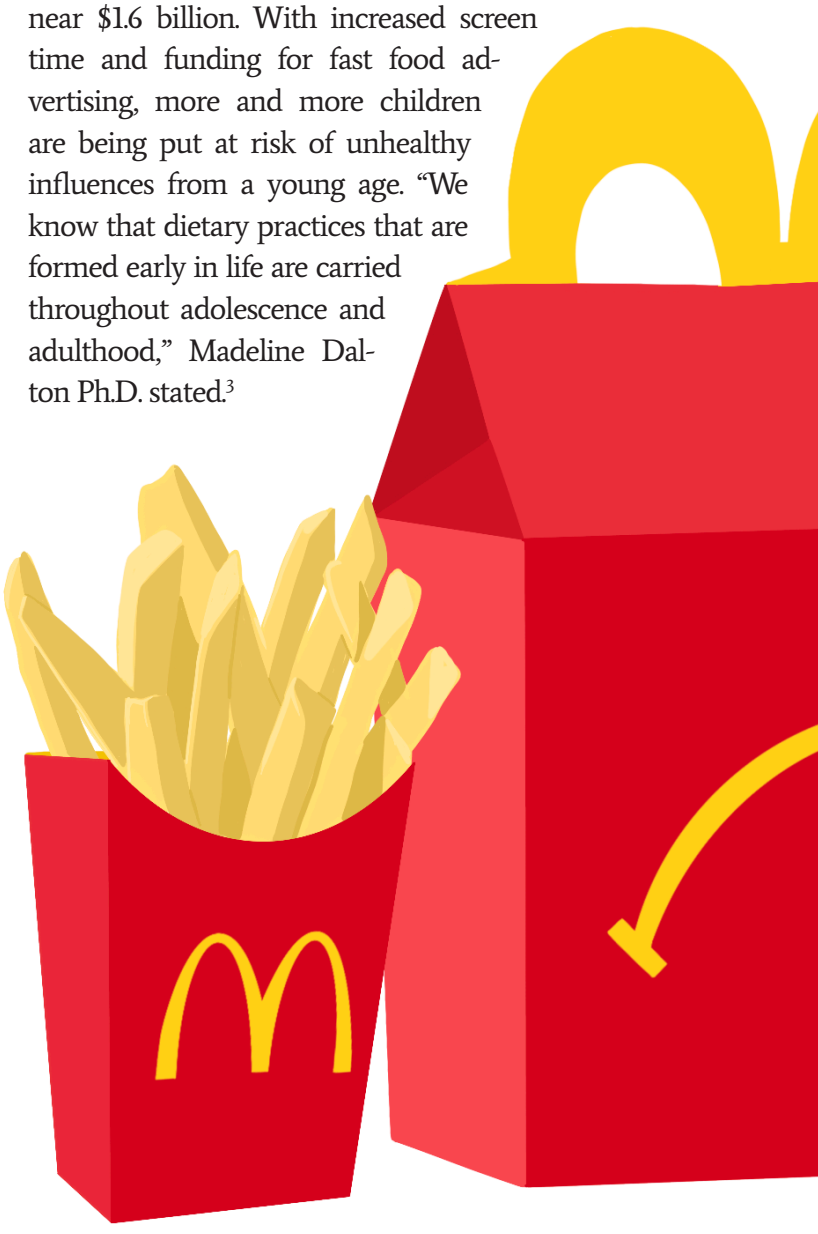
FAST FOOD ADVERTISEMENTS: ARE WE REALLY LOVIN' IT?

By Henrik Torres '22

With the obesity rate in preschool-age children rising at an unprecedented pace, 20% of youth now suffer from being overweight. There are several factors of this childhood obesity epidemic that may account for the near tripling of children's weights in the past quarter-century, but one of the most controversial is the effects of fast food commercials on their targeted audience: children.[1]

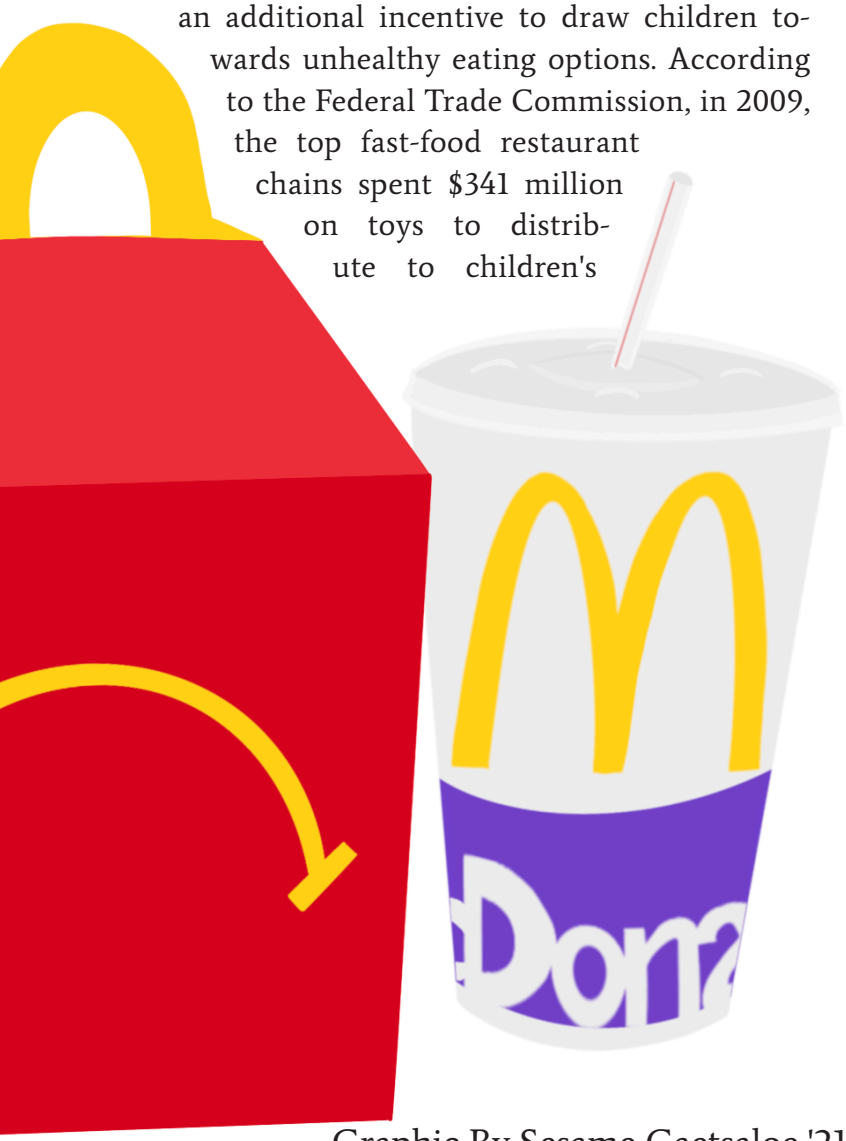
Fast food advertising has been around for centuries, but with the advent of television and increased child viewership, ads have become targeted for all ages. According to Ashley Gearhardt, an associate professor who runs The Food and Addiction Science Treatment (FAST) lab at the University of Michigan, "[Fast food ads are] primed for you to be motivated to seek out ultra-processed foods. So you'll start scrounging around in your kitchen and you might not even make the link between what you've seen on TV and why you suddenly have a hankering for food."[2] Children and teens, who are more impressionable by nature, suffer from the effects of fast food commercials more than their adult counterparts. To make matters worse, most children under six years old cannot distinguish between scheduled TV programming and advertisements, and children under eight years old do not understand the intent of persuasive advertisements, believing everything that the advertisements promote. According to the American Psychological Association, all it takes is one advertisement to establish a fast-food preference early in life and for fast food corporations to gain a lifelong customer.[1]

Fast food companies and corporations consciously pool money into targeting child audiences. Estimates of the money spent on food advertising aimed at children near $1.6 billion. With increased screen time and funding for fast food advertising, more and more children are being put at risk of unhealthy influences from a young age. "We know that dietary practices that are formed early in life are carried throughout adolescence and adulthood," Madeline Dalton Ph.D. stated.[3]



According to a study led by Dalton, researchers surveyed 548 families with preschool children over a period of nine months. As part of the data collection, families were asked the number of hours their children spend watching television, the types of channels their children watch, and the food intake of their children. The findings showed that McDonald's "accounted for almost three-quarters of TV advertising exposure."[3] The study additionally proved that children who had moderate to high levels of exposure to McDonald's ads were 38% more likely to eat McDonald's than children who were not exposed. As a major advertiser on childrens' networks, McDonald's was also found to account for 79% of participating children's fast-food consumption.

Not only do major fast-food chains such as McDonald's invest heavily in advertising aimed at youth, but also their use of toys in meals serve as an additional incentive to draw children towards unhealthy eating options. According to the Federal Trade Commission, in 2009, the top fast-food restaurant chains spent $341 million on toys to distribute to children's meals. In that same year, restaurants sold more than one billion meals with toys to children and raised their youth customer base to 18%.[4] Additionally, fast food commercials exhibited a growing trend of focusing on collectible toys more than the food itself, leading children to want to consistently eat at the same chain in order to get as many toys as possible. More than 70% of fast-food ads targeted towards children featured included toys in meals.[4]



Graphic By Sesame Gaetsaloe '21

The backlash against fast-food chains and their child-targeted marketing has not gone unnoticed, however. In July 2011, McDonald's announced that it would reduce its portion size of fries and increase the amount of fruit given in all Happy Meals as well as stop advertising sodas to children in-store or listing them on childrens' menus. In June 2011, Jack in the Box announced it would no longer include or market toys with childrens' happy meals. Likewise, Taco Bell announced in July 2013 that it would no longer promote childrens' meals and toys in its menu.[4]

Fast-food advertisement is partly to blame for the growing trend of obesity among the youth. Fast-food corporations deliberately create advertisements geared towards the young and impressionable, boost their business, and, as a result, create bad eating habits in children that will follow them for the remainder of their lives. The child obesity epidemic will only continue to grow if fast-food marketing stays child-centered.

Sources

1. Ellin A. Transgender Patients Face Challenges at the Hospital. *The New York Times.* Published February 16, 2016.

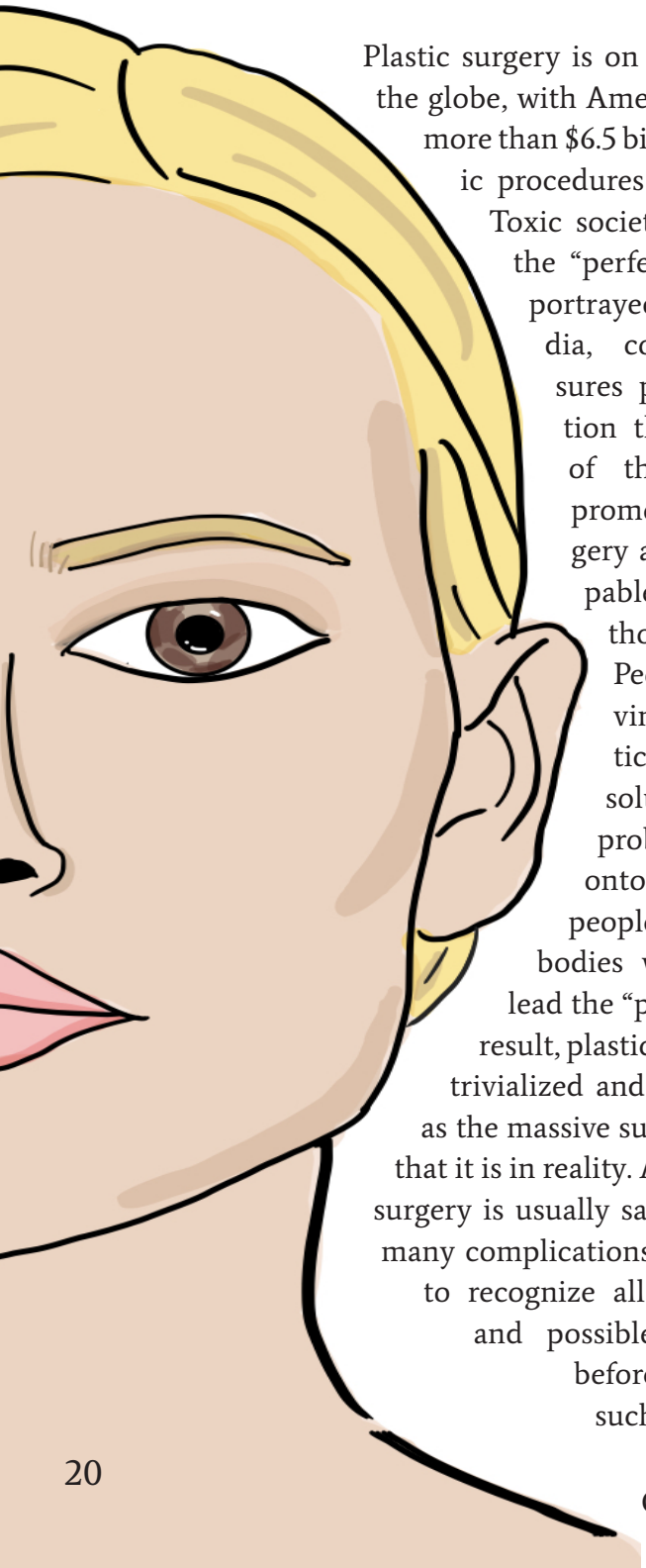
2. Health Care for Transgender Individuals. The American College of Obstetricians and Gynecologists. Published December 2011.

3. Safer JD, Coleman E, Feldman J. Barriers to Healthcare for Transgender Individuals. National Institutes of Health. Published April 1, 2017.

4. Ulaby N. Health Care System Fails Many Transgender Americans. National Public Radio. Published November 21, 2017.

THE TWO FACES O

By Bella Ca



Plastic surgery is on the rise around the globe, with Americans spending more than $6.5 billion on cosmetic procedures in 2017 alone.[1] Toxic societal standards of the "perfect" body, often portrayed through media, constantly pressures people to question the minor flaws of their body and promotes plastic surgery as a solution capable of eliminating those insecurities. People are convinced that plastic surgery is the solution to all their problems, clinging onto the idea that people with "perfect" bodies will be able to lead the "perfect" life. As a result, plastic surgery is often trivialized and not thought of as the massive surgical operation that it is in reality. Although plastic surgery is usually safe, there can be many complications, so it is crucial to recognize all of its dangers and possible repercussions before embarking on such a journey.

Plastic surgery is surgery. There are many complications that can arise throughout the process, some of which may be life-threatening. A hematoma, which is an abnormal pocket of blood outside the blood vessel that manifests itself as a large, painful bruise, occurs in 1% of breast augmentation and facelift patients. Treatment depends on severity, and some hematomas can be simply treated with blood drainage, while others may require another operation. Another complication that may occur is seroma, a condition where the buildup of fluid under the surface of the skin can swell and potentially induce extreme pain.

A substantial 15-30% of tummy tuck patients experience seromas, which need to be drained with a needle for treatment.[1]

Regular smokers considering plastic surgery are also at risk of necrosis, also known as skin death, which can develop due to hematomas or infections. Moreover, plastic sur-

Graphics by Senching Hsia '21

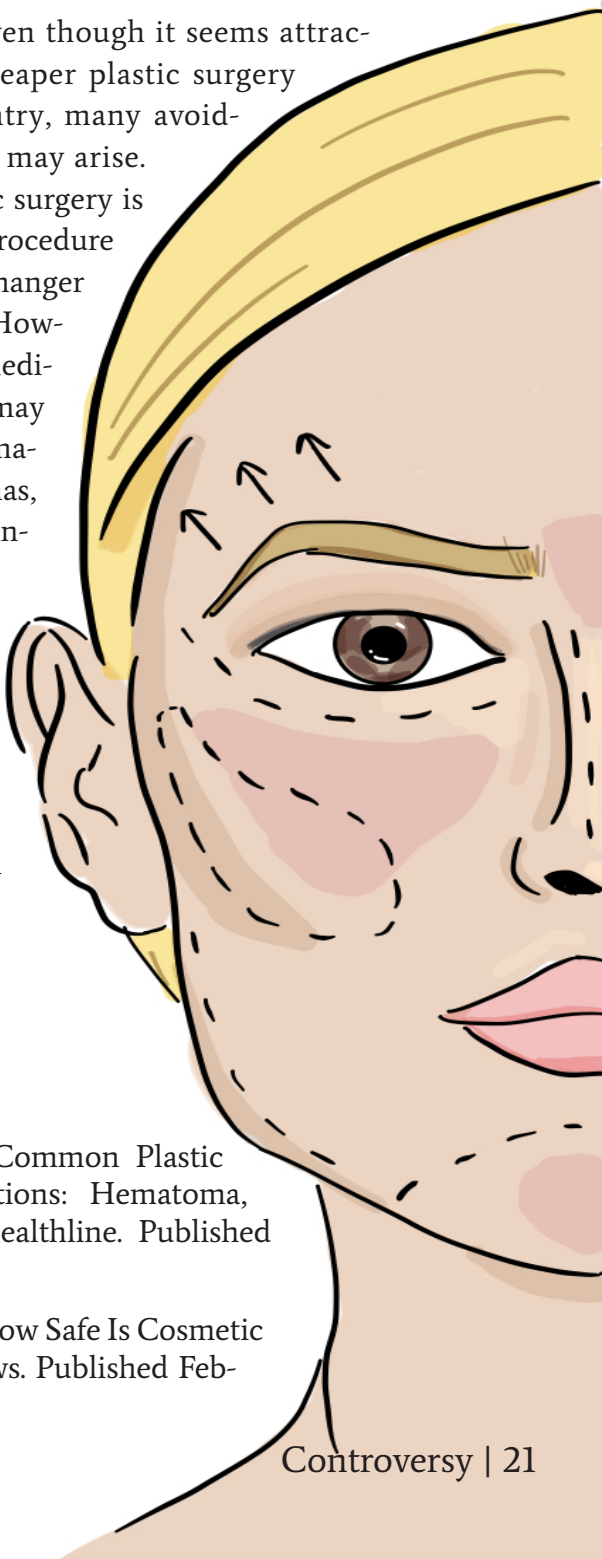
F PLASTIC SURGERY

apuano '21

gery does not always produce the intended results; issues of asymmetry and general appearance dissatisfaction go hand in hand with this risky process. Other potential complications include blood loss, organ and nerve damage, and scarring.

Before making a final decision, it is vital to self-reflect and consult with both an adult and a professional, especially since plastic surgery has many risks and unpredictable outcomes. Questions such as "What are my motivations for this surgery?" or "Do the benefits outweigh the risks?" must be considered and discussed with a guardian. It is equally important to ask the surgeon various questions to make sure they are qualified to perform the surgery. The BBC states, "to be safe, sites should be carrying out more than 20 operations a year—in order to give them enough experience."[1] When looking for a plastic surgeon, beware of "have a go" surgeons who fail to assess and care for patients properly. These people are often unqualified to perform plastic surgery, so it is important to ask if they are registered with the General Medical Council in the UK and for their years of education with medical school, residency, and fellowship. If the surgeon does not check one or any of these boxes, it is an automatic red flag and indicates that one should search for a new plastic surgeon. In addition, the BBC stresses the importance of not having surgery abroad, as it may be difficult to find the credentials of the doctor and the location, whether it is a hospital or outpatient surgical center.[2] Even though it seems attractive to undergo cheaper plastic surgery in a different country, many avoidable complications may arise.

All in all, plastic surgery is a relatively safe procedure and can be a life-changer for many people. However, plenty of medical complications may arise, such as hematomas and seromas, as well as issues involving unqualified surgeons and locations. Clearly, it is essential to slow down, ask questions, and know all the facts before deciding on plastic surgery.



Sources

1. Schaefer A. 10 Common Plastic Surgery Complications: Hematoma, Infection, More: Healthline. Published 26 Apr, 2019.

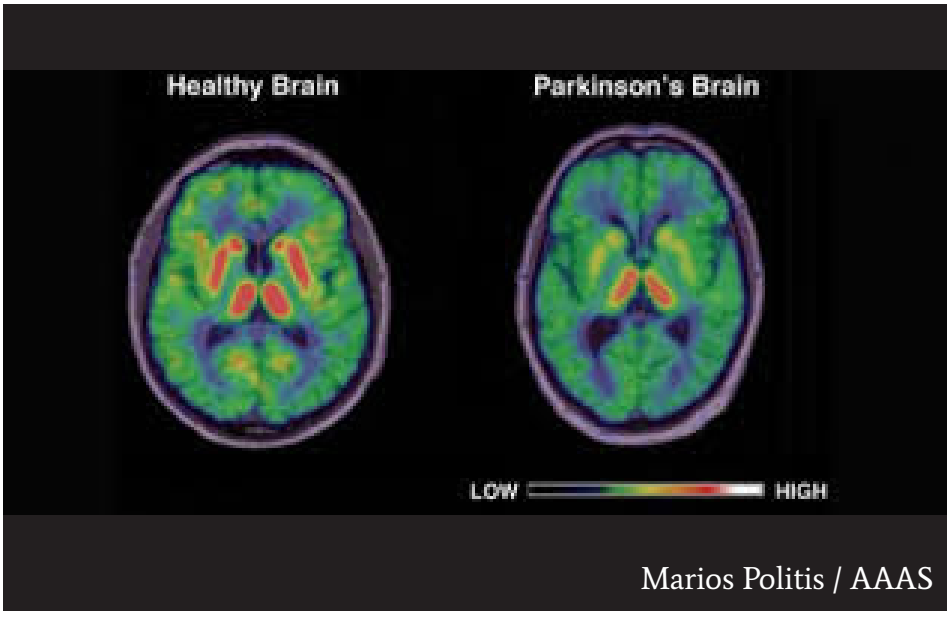
2. McGilchrist S. "How Safe Is Cosmetic Surgery?" BBC News. Published February 10, 2011.

PARKINSON'S: THE DEBILITATING DISEASE

By Anika Midha '22

Parkinson's, a progressive neurodegenerative disease, affects approximately 935,000 people aged 45 or older in the United States alone.[1] Despite the increasing prevalence of Parkinson's, medical professionals have yet to understand the specific causes of Parkinson's and how it became the fastest-growing neurological condition in the world.[2] The primary symptoms of Parkinson's affect motor function and present as tremors, limb rigidity, slurred speech, and the loss of automatic movements such as blinking or swinging arms while walking. These symptoms can severely affect a patient's quality of life; however, there are sustainable treatment options that can lessen or suppress the symptoms.

Although researchers have not conclusively pinpointed the cause of Parkinson's, the root cause of the disease is largely assumed to be the death of dopaminergic neurons, brain cells that synthesize dopamine. Researcher Sang Ryong Jeon from the Korea Institute of Science and Technology stated, "So far, it had been firmly believed that idiopathic [Parkinson's disease] is caused by the death of dopaminergic neurons in [the] substantia nigra," a structure of the brain that plays a role in motor control.[1] A decrease in dopamine levels in the substantia nigra causes abnormal brain activity which leads to symptoms of Parkinson's.[2] Researchers have also identified two primary factors that play a role in Parkinson's: genes and environmental triggers.[2] There are specific genetic mutations that can cause Parkinson's and variations that can increase the risk of Parkinson's disease. Additionally, exposure to certain environmental toxins can increase the risk of Parkinson's disease later in life; however, this risk is less significant than the genetic factors. Other risk factors for Parkinson's include age and sex—the risk of Parkinson's increases with age. Men are more likely to develop Parkinson's than women.[2] Newly published research also indicates that there has been a significant increase in the frequency of



Marios Politis / AAAS

Parkinson's cases. From 1990 to 2015, the number of people living with Parkinson's more than doubled to around 6.2 million and is predicted to reach 12 million by 2040.[3]

The process for diagnosing Parkinson's begins with identifying early onset symptoms, then conducting diagnostic tests.[5] Diagnostic tests that can detect Parkinson's include blood tests as an indication of thyroid performance and liver damage, an MRI or CT scan to check for strokes or brain damage, and a Positron Emission Tomography (PET) scan that can reveal dopamine levels in the brain.[5] As Parkinson's develops, it is easier to diagnose but harder to treat, which is why it is vital to catch it early. After the initial medical assessment, doctors will utilize what is known as the United Parkinson's Disease Rating Scale (UPDRS) to determine the stage of Parkinson's Disease a patient is experiencing.[5]

The treatments for Parkinson's are primarily medications and surgical procedures. Prescribed medications can lessen the difficulty of movement and tremors and can act as a substitute for dopamine.[3] Over time, the effects of medication become less reliable.[3] One surgical option to treat Parkinson's is Deep Brain Stimulation (DBS). In DBS, an electrode is implanted into the brain and connected to a generator implanted in the patient's chest. The electrodes send electrical pulses to the brain, which reduce the symptoms of Parkinson's.[3] However, DBS presents major risks including infections, stroke, or even brain hemorrhage.[3] Additionally, while DBS is a treatment option that suppresses the symptoms of Parkinson's, it does not prevent the disease from progressing.[3] Researchers are constantly looking for new methods of treatment to manage and possibly cure Parkinson's. Recently, scientists have discovered a drug containing medicinal cannabis that could act as a possible alternative to current Parkinson's medication.[4] The drug, known as HU-308, has been proven to provide the benefits of cannabis without the "high." The research, conducted by the Centre for Neuroscience and Regenerative Medicine, indicates that HU-308 can reduce inflammation in the brain and enable immune cells to support normal neural function again.[4] Although current treatment options for Parkinson's Disease are lacking, there is hope for future treatments and perhaps, a cure.

Sources

1. Cohut M. New study could 'drastically' change how we understand Parkinson's. *Medical News Today.* Published January 13, 2020.

2. Newman T. Are we facing a Parkinson's pandemic? *Medical News Today.* Published February 3, 2019.

3. Parkinson's Disease. Mayo Clinic.

4. University of Technology Sydney. Scientists discover medicinal cannabis substitute for treating Parkinson's disease: The drug, HU-308, lessens involuntary movements called dyskinesias, a side effect from years of treatment for Parkinson's disease. ScienceDaily. Published December 19, 2019.

5. Carteron N. Diagnosing Parkinson's Disease. *Medical News Today.* Published October 22, 2018.

LYME TICKS: LURKERS OF WINT

By Sofia Munoz '23

The dreaded Lyme disease is often associated with summer, when people can pick up the bacteria-carrying ticks while hiking, camping, or spending time in their yards. Contrary to popular belief, lyme ticks are actually present year-round, meaning that people are susceptible to Lyme disease even in the winter months.

Lyme Disease is caused by a bacterium known as borrelia burgdorferi, which is transmitted by a tick bite to a human; most humans are infected by immature ticks called nymphs. The species that is especially prevalent on the east coast is the Blacklegged tick, which attaches itself to a tiny area on the body, making them difficult to locate until the disease has already been transmitted.[1] In the United States, ticks are most commonly found in areas with an abundance of trees and forests. In fact, Lyme disease was first discovered in 1975 in Connecticut, and is still widespread throughout the state.

Blacklegged ticks do not necessarily die under cold conditions. As long as the temperature does not dip below freezing for a long period of time and the ground slowly thaws, they will most likely be able to survive. Although a majority of Lyme cases are reported in the summer months, thousands of people still contract it in the winter, especially if the weather is warmer that year. Between 2002 and 2018, the Centers for Disease Control and Prevention (CDC) reported a total of 18,682 cases of Lyme disease during November, December, January, and February. While the numbers were significantly lower than the 138,826 cases from June, July, and August, they still show that Lyme should be a significant concern in the winter.[2]

Between 2002 and 2018, the Centers for Disease Control and Prevention (CDC), reported a total of 18,682 cases of Lyme disease during November, December, January, and February.

Cases year-round have fluctuated, but the recent increase in Lyme disease cases may be attributed to warmer seasons, which is an effect of climate change. According to Matthias Leu, an ecologist and assistant professor at the College of William and Mary, the Lyme disease bacteria is more rampant after unusually warm winters and springs, in addition to mast years. Mast years are years in which there is a large amount of masts, which refer to fruits, nuts, berries, and acorns produced by trees.[3] During "mast years," the population of white-footed mice increases substantially, as acorns are a direct food source for them. These white-footed mice are the root cause of Lyme disease because they spread it to the black-legged ticks, which pass it on to humans,

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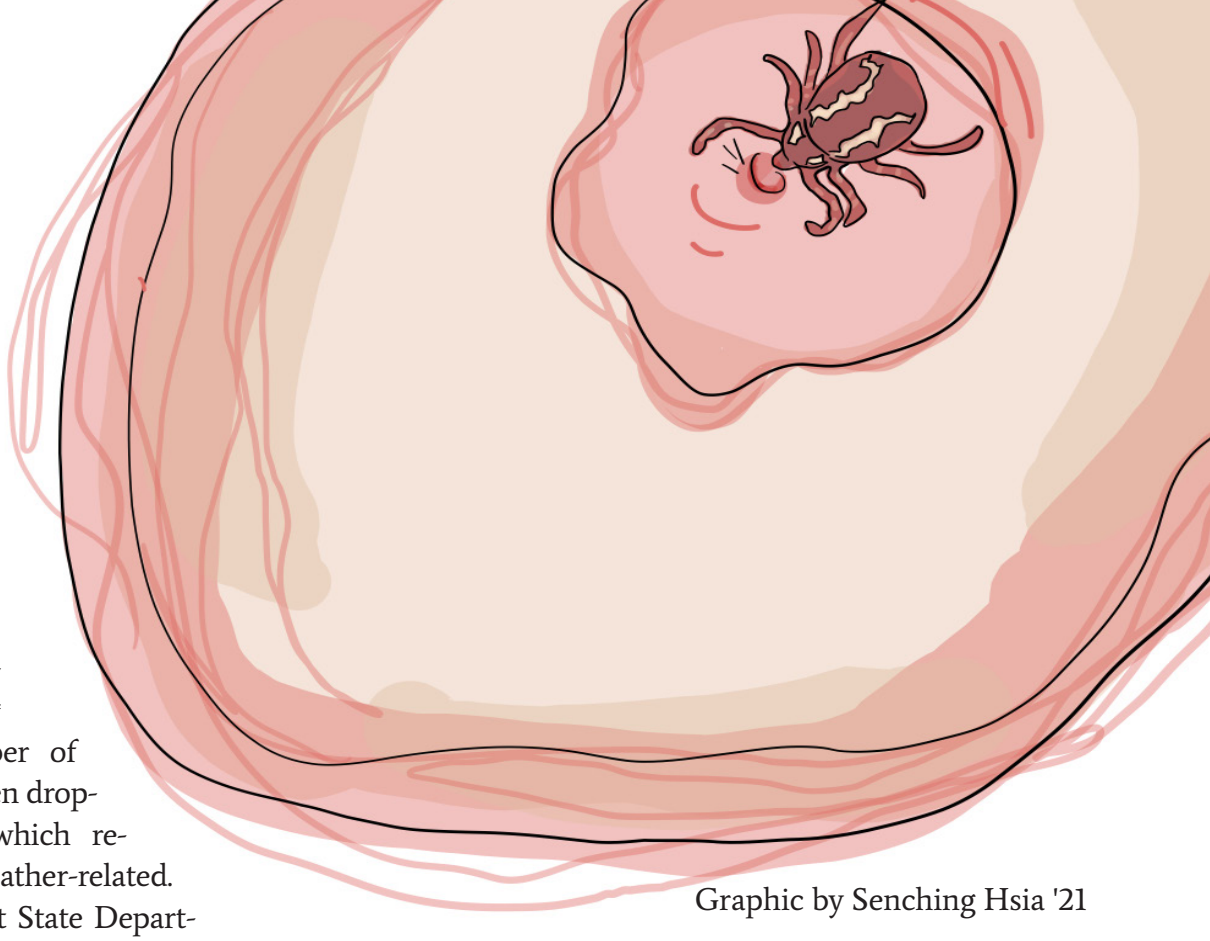


Graphic by Senching Hsia '21

consequently escalating Lyme disease rates.[4]

Recently, the number of Lyme infections have been dropping in Connecticut, which researchers say may be weather-related. In 2018, the Connecticut State Department of Public Health (DPH) reported 333 cases of Lyme disease in New Haven County, with 221 cases being confirmed. This was a decrease from 2017, as 374 cases were reported that year and 264 verified.[5] Since this only occurred due to an unusually hot and dry summer, researchers believe tick numbers will climb back up in 2019 and 2020.[6]

For those who enjoy spending time outdoors in the winter but are afraid of contracting Lyme disease, multiple precautions can be taken. One solution is to wear tick repellent on clothing and to tuck shirts into pants and pant legs into socks. Many brands of repellent work to prevent ticks, such as DEET, Wondercide, Repel, Cutter Backwoods, and Natrapel. Another prevention method is to place clothes worn outside in a hot dryer for five to ten minutes before washing them so that any lingering ticks will not survive. Additionally, checking for ticks on other people after working or playing outdoors can prevent bringing ticks into other areas.[7] Ultimately, it is vital to recognize the dangers of Lyme disease—even in the winter—and to take the suggested precautions after staying outdoors.

Sources

1. Transmission: Centers for Disease Control and Prevention. Updated December 4, 2019.

2. Lyme Disease Charts and Figures: Historical Data. Centers for Disease Control and Prevention. Updated November 22, 2019.

3. Pearlman MA. "Mast Year" for Acorns. *Columbia Journalism Review.* Updated November 10, 2019.

4. Ambrose K. The Tick Population is Booming. Is Climate Change to Blame? And Will Tick-Borne Diseases Increase? *The Washington Post.* Published May 22, 2019.

5. Lyme Disease Statistics. Connecticut State Department of Public Health. Updated August 10, 2019.

6. Shay J. Summer 2019: A Season of Heat, Humidity, Record Rain. *Connecticut Post.* Published August 13, 2018.

7. Mather TN. Winter Tick Activity. Tick Encounter Resource Center, University of Rhode Island. Updated December 28, 2019.

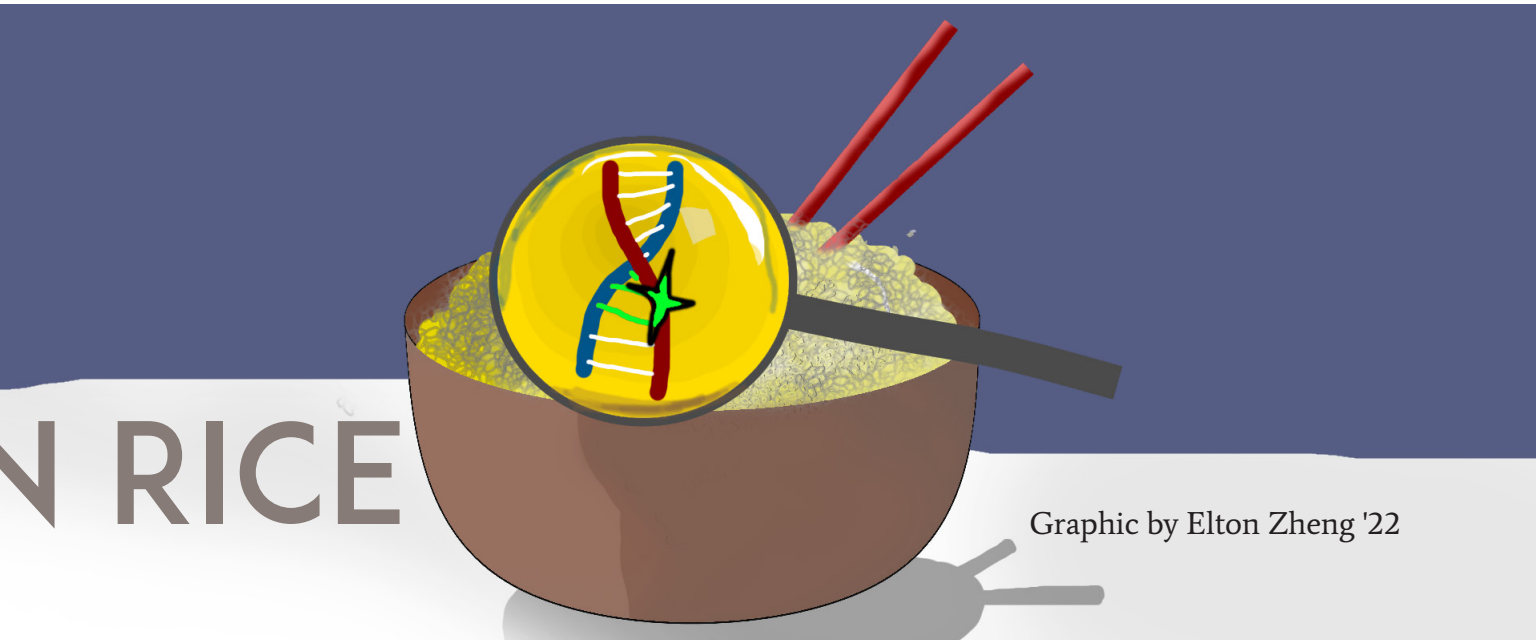
THE MAGIC OF GOLDEN

By Jayden Khuu '21

A world of darkness lies ahead for around 250,000 to 500,000 children every year. After going blind, half of these children die within twelve months.[1] Currently, an estimated 250 million preschool children risk blindness due to vitamin A deficiency (VAD).[1] Most of these children come from developing countries where they do not have the "luxury" of consuming vitamin A-rich foods such as broccoli, carrots, and squash.[2] In order to deal with this global public health crisis, professor Ingo Potrykus started the Golden Rice Project in 1999. Potrykus used his genetic engineering background to fortify rice with beta-carotene, the precursor to vitamin A.[3] In the beginning, Golden Rice's largest struggle was its practicality — its beta-carotene concentrations were too low. Since then, there have been many breakthroughs in crop variety and beta carotene concentration. However, Golden Rice still remains in the lab as no country has yet allowed it to be planted in its soil. Why is that so? What actually is Golden Rice, and how can it change the world for the better?

Vitamin A Deficiency (VAD) limits the production of rhodopsin, the eye pigment responsible for vision in low-light conditions. Rhodopsin is made of retinal, an active form of vitamin A, opsin, a protein. Without a sufficient amount of vitamin A, the body cannot produce enough retinal, and consequently, rhodopsin. As a result, VAD patients suffer from night blindness. Moreover, vitamin A deficiency is linked with xerophthalmia, a medical condition where the eye fails to produce tears. This leads to prolonged dryness of the cornea and the conjunctiva, the tissue that lines the eyelids. Xerophthalmia patients, if left untreated, will suffer from total blindness due to irreversible damage to the cornea. As VAD is associated with both rhodopsin and xerophthalmia, which affect the front and back parts of the eye respectively, supplementing vitamin A for deficiencies is vital.

Vitamin A has two forms: retinol (not to be confused with retinal) and provitamin A carotenoids. Retinol comes from animal-derived foods, and provitamin A carotenoids comes from select fruits and vegetables. Beta-carotene is one of the most efficient provitamin A carotenoids. While beta-carotene is mostly found in orange-pigmented fruits and plants like mangoes and carrots, rice plants can be genetically modified to synthesize beta-carotene. In fact, rice plants already have the machinery to make beta-carotene but only utilize it in its leaves.[4] But by adding two genes, a plant phytoene synthase and a bacterial phytoene desaturase, one could "unlock" the grain's beta-car-



Graphic by Elton Zheng '22

otene producing capability.[4] The Golden Rice project introduced beta-carotene into the favored staple of many countries through this method.

First generation Golden Rice had a beta-carotene content of only 1.6 µg/g, meaning that one would have to eat approximately 500 grams, or 2.5 cups of rice, just to meet the bare minimum. However, recent generations of Golden Rice offer much more promising results, with up to 23 times more beta-carotene than the first generation, or 37 µg/g. Despite these incredible advancements, Golden Rice still is not cultivated in public. This is a result of large pushback from advocacy groups that are hesitant on allowing genetically modified crops (GMOs) to be planted. Groups such as Greenpeace and Friends of the Earth argue that current UNICEF campaigns that employ vitamin A supplements are proven to be more effective than Golden Rice. They also question whether this is simply a scheme to raise more support for GMOs.[5] Facing this opposition, supporters of the Golden Rice project, including 110 Nobel Laureates among 5591 scientists, signed a letter against Greenpeace's destructive resistance to Golden Rice. The letter called out Greenpeace's opposition to biotechnological innovations and sincerely asked them to reexamine the benefits and risks of GMOs.[5]

It is impossible to prove the long-term effects of Golden Rice without taking it out of the controlled settings of a laboratory and testing its effects. The science suggests a promising future where hundreds of thousands of children can be spared from their vision, or life, being taken away by VAD. In fact, recent developments suggest such a possibility as Bangladesh looks to officially approve of the cultivation of Golden Rice. If all goes smoothly, farmers might have Golden Rice seeds to plant by 2021.[6] This 24-year-old project may finally have the chance to save many lives and better the world.

Sources

1. Micronutrient deficiencies. World Health Organization.

2. Meixner M. The 9 Most Important Vitamins for Eye Health. Healthline. Published July 25, 2018.

3. History of the Golden Rice Project. Golden Rice Project, Golden Rice Humanitarian Board.

4. Cazzonelli C. The Science of Golden Rice. Golden Rice Project, Golden Rice Humanitarian Board.

5. Genetically Modified Organisms: The "Golden Rice" Debate. High School Bioethics.

6. Stokstad E. Bangladesh could be the first to cultivate Golden Rice, genetically altered to fight blindness. *Science*. Published November 20, 2019.

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