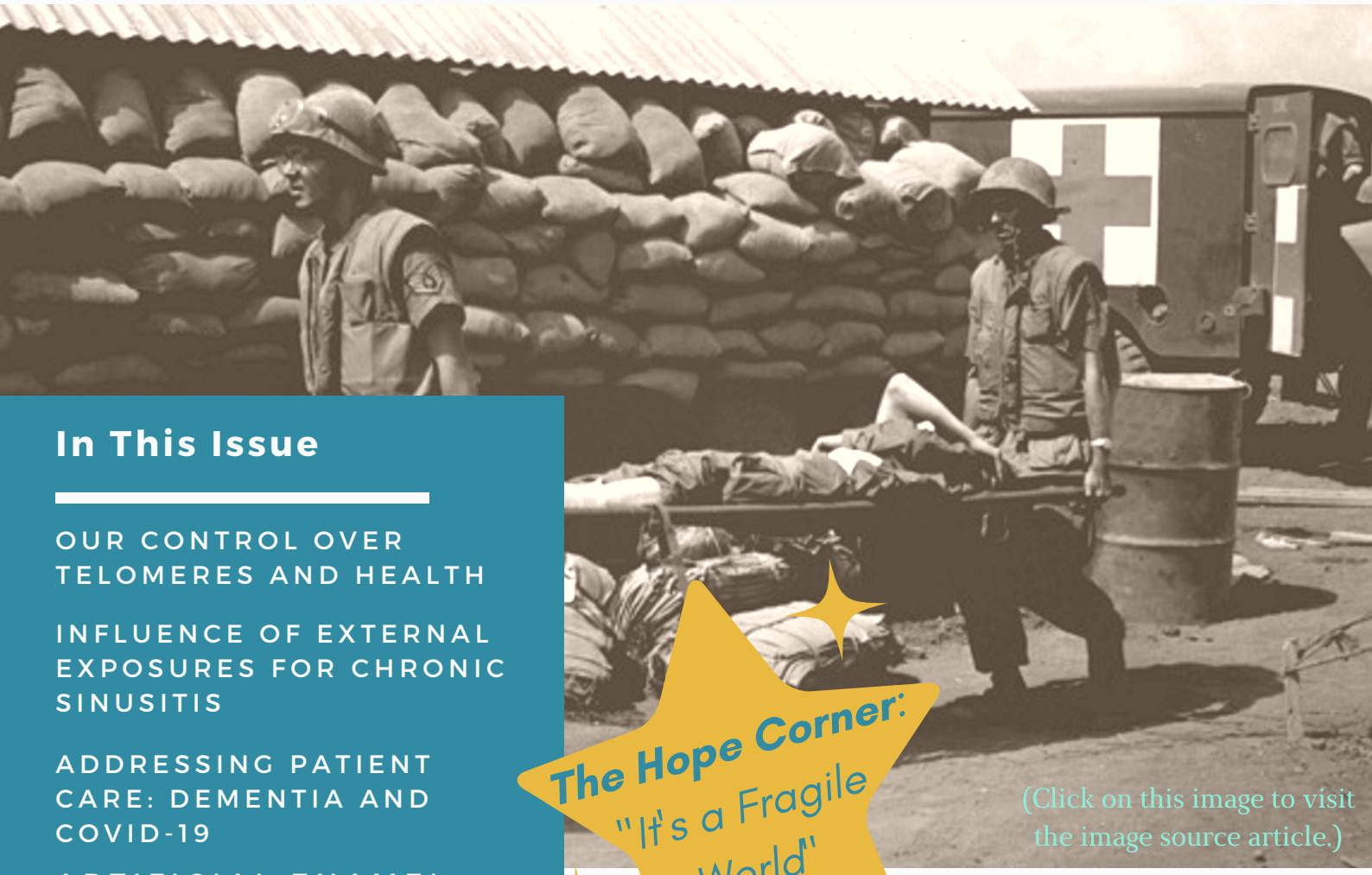
FEBRUARY 2022

THE PREMED SCENE'S MONTHLY MEDICAL NEWSLETTER

# CROSSROADS

THE OFFICIAL NEWSLETTER OF THE PREMED SCENE



## In This Issue



**The Hope Corner: "It's a Fragile World"**

(Click on this image to visit the image source article.)

## A WORD FROM OUR NEWSLETTER DIRECTOR

BY RYEN BELLE HARRAN

Dear medical newsletter readers,

On behalf of The Premed Scene, I would like to thank you all for taking some time during your busy day to read this month's news in the field of science.

Everyone is talking about it. War. Death. Peace. Yet, in the end, scientific discovery continues and emerges stronger out of these historical difficulties. The members of the scientific community are still sources of hope. This month's Hope Corner will be devoted to this topic.

Articles this month include Ilana Saidov's article, *Our Control Over Telomeres and Health*, Ashlyn Southerland's article, *Influence of external exposures for chronic sinusitis*, Oriana Tolentino's article, *Addressing patient care: dementia and COVID-19*, and Aprile Bertomo's article, *Artificial Enamel: A Promising Alternative*.

The Premed Scene hopes that you enjoy the content that our writers have collected from the scientific community.

CROSSROADS

We also hope that the minutes that you spend reading this newsletter, can bring you a few minutes of hope, peace, and newfound strength, during these troubling times.

Enjoy reading Crossroads, The Premed Scene's February 2022 medical newsletter.

Yours truly,

Ryen Belle Harran

Ryen Belle Harran

# THE HOPE CORNER

## IT'S A FRAGILE WORLD

BY RYEN BELLE HARRAN

All it takes is one person... one person to lend a helping hand - one person to say the right words... to induce change.

Sometimes, however, it also takes one limitation, whether it be in the form of a word, an opinion, or a person, to engrain itself in our minds, and limit our actions, our thoughts, and our emotions. Ultimately, these limitations undermine our self-concept as well as our individual effect on our community. Thus, internalizing these limitations prevents us from making a positive difference in our society.

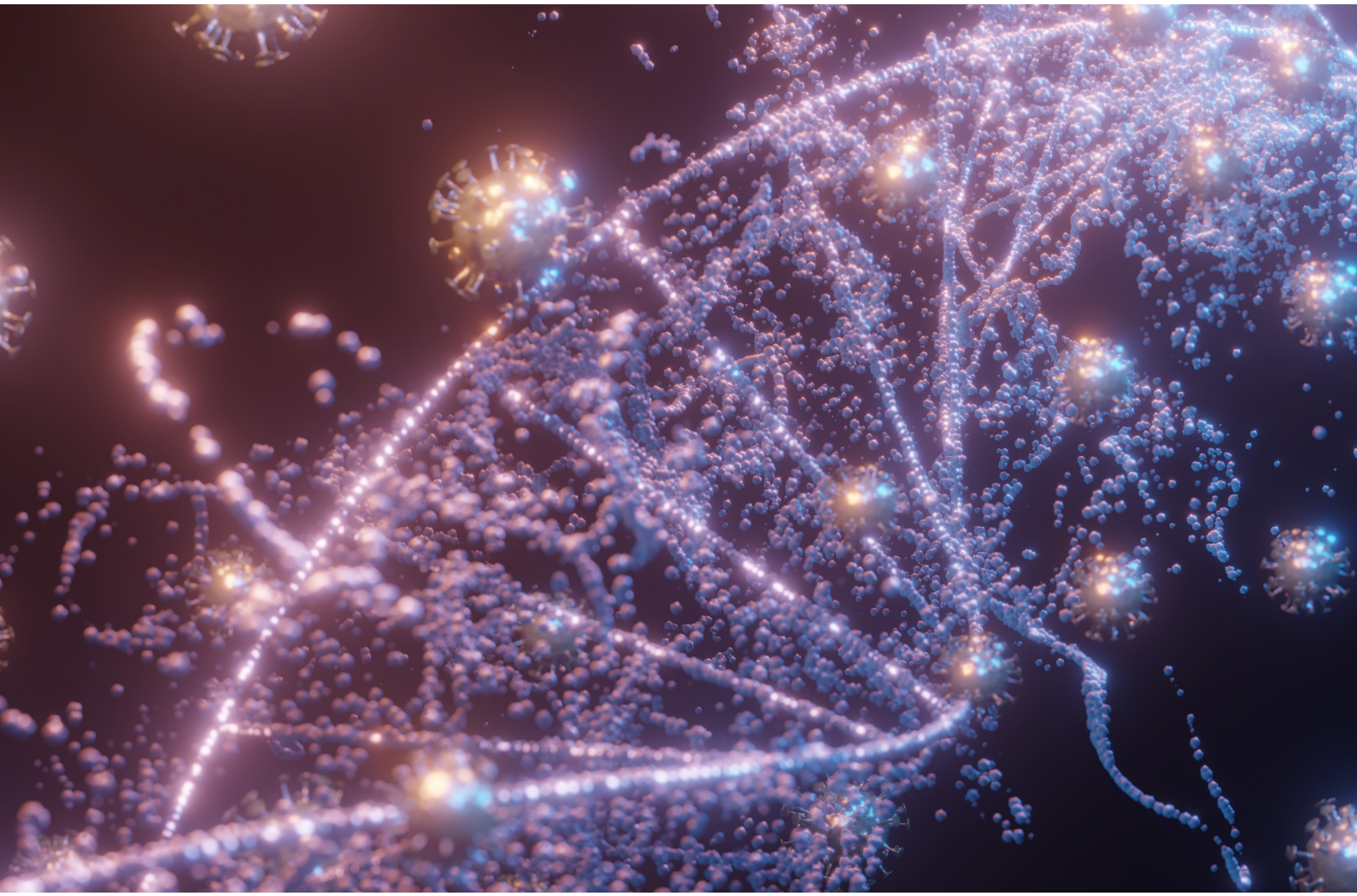
> *"What is the point of adversity if we don't learn and adapt from it?*

How can the scientific community break the chains of these limitations? By correcting our perception and understanding of the real world, scientific discovery thus increases our tangibility of hope in humanity.

In a March 2020 survey, researchers found that Americans experienced heightened nervousness, anxiety, depression and even physical reactions, due to the rapid spread of COVID-19. Yet, simultaneously, nearly 75% of respondents indicated hope for the future.

The reason behind this trend is science. Scientific discovery is not simply meant to debunk age-old-myths, but to shed light on reality. Answering the how and the why of the way the world works when facing some of the darkest of times of humanity is sometimes our only source of hope, most especially when all other sources of hope fail.

War inevitably changes us. Whether we like to admit it or not, it affects us in all possible ways. Historically, it has affected the field of medicine, and it will continue to do so throughout the entirety of human history. Because: what is the point of adversity if we don't learn and adapt from it?



# OUR CONTROL OVER TELOMERES AND HEALTH

### BY ILANA SAIDOV

What if I told you that you can control the way you age, the diseases you are diagnosed with, as well as your overall "health span". Sounds out of this world - right? Wrong! You can control all of these factors in your life as well as more just by keeping your telomeres healthy.

Telomeres are the segments of noncoding DNA at the ends of chromosomes. Eukaryotic chromosomes consists of repeated sequences of telomeres. For a DNA strand to lengthen, telomerase binds to the telomere repeat sequence and synthesizes a 6-nucleotide repeat.

In simpler terms, as we age, our telomeres shorten. When this telomere becomes too short, a signal is sent to the cell that the DNA is not being protected. This causes the telomere to fall off and die completely.

“Telomere attrition” is the loss of the protective caps on our chromosome which causes a limit to the amount of times a cell can continuously divide. Thus, the cells in our vital organs we need eventually die.

In order to replenish our telomeres, we need the enzyme telomerase. Although telomerase decreases the risk of many diseases by lengthening telomeres, it also increases cancer risks when there is an overproduction of the enzyme.

Specifically, when a cell is cancerous, it divides uncontrollably, affecting the healthy cells around it. The longer the telomere is on a cancerous cell, the greater amount of time it will take for that cell to die. Thus, if telomerase is continuously lengthening a cancerous telomere, uncontrollable cell division of the cancerous cells will continue for a longer period of time. This confirms the observation which states that in 90% of human cancers, telomerase has been found to be present at high levels.

Thus, it is important for us to focus on expanding health span instead of life span or immortality. Health span is defined as the amount of years an individual is healthy and free of any diseases. The opposite is the number of years we spend feeling sick.

Elizabeth Blackburn, the nobel prize winner on her discovery of telomeres and telomerase, found that humans can control their telomere length without causing detrimental effects on their health. .

Blackburn discovered that chronic stress is an important factor which affects the length of telomeres as well as presence of telomerase.
She concluded that the more stressful an individual is, the shorter the telomere length and the lower the presence of telomerase.

Stress negatively affects the length of our telomeres. Chronically stressed individuals are more likely to become ill in their lives and pass away at an earlier age.

From this understanding, it can be concluded that telomeres are not just solely affected by an individual’s age, but by also how that person lives their life.

However, not only can we affect our telomeres, but we can also impact the telomeres of the individuals around us since we are all socially interconnected.

All in all, in order to maintain a longer health span, it is imperative to understand the impact of our psychological well being on our biological health as well as the health of the individuals around us.

Sources:

*"The science of cells that never get old"*. (n.d.). TED.

Rossiello, F., Jurk, D., Passos, J. F., & d'Adda di Fagagna, F. (2022, February 14). Telomere dysfunction in ageing and age-related diseases. Nature News. Retrieved February 15, 2022, from https://www.nature.com/articles/s41556-022-00842-x

# INFLUENCE OF EXTERNAL EXPOSURES FOR CHRONIC SINUSITIS

BY ASHLYN SOUTHERLAND

If you have ever had a sinus infection before, you probably know all of the symptoms too well. You may recall the facial pain, headaches, runny nose, and nasal congestion. You may have even had difficulty breathing because of it, counting down the minutes and seconds until you can finally breathe normally again.

Sinusitis, an infection that inflames the nasal passages and cavities of the nose, cheeks, and forehead, can either be acute or chronic. For individuals who have acute sinusitis, their infection is short-term and typically coincides with a cold. However, many suffer from chronic sinusitis, in which these symptoms could last for twelve or more weeks. What factors come into play to cause this latter option?

In a recent systematic review-based study conducted by Alkholaiwi et al., the presence of different types of environmental exposures were shown to have a significant correlate to (and increased prevalence of) chronic rhinosinusitis (CRS). Although association of second-hand smoke and CRS was inconclusive, smoking was considered to have the highest positive correlation, with this factor increasing one's development of CRS by 44%. Fungicides, insecticides, pesticides, and Asian sand dust (ASD) were also identified with high CRS prevalence rates in numerous communities.

Occupational exposures also appeared to have indicators connected to CRS. The vapor of gases, as well as fumes, dust, mists, and airborne fibers within an indoor occupational setting appear to impact one's incidence of CRS. These findings were found to be most prevalent for plant operators, machine assemblers, elementary operations, firefighters, and craftworkers.

# ARTIFICIAL ENAMEL: A PROMISING ALTERNATIVE

BY ORIANA TOLENTINO

As the hardest tissue of the human body, enamel is truly a crucial component because it acts as the teeth's protection from potential damages caused by constant chewing and grinding of food. Unfortunately, enamel is always subjected to wear and tear as well as has the inability to regenerate because the cells involved are lost when the teeth break through the gums. Therefore, a group of researchers strived to solve this problem through successfully designing a tougher and more durable alternative to naturally-occurring enamel.

Instead of utilizing peptides in imitating the complex structure of natural enamel, wires of hydroxyapatite with a malleable zirconium oxide covering were created. This would recreate the elasticity essential in reducing the likelihood of the wires breaking. When the researchers employed certain procedures in testing the durability and elasticity of the finished product, it was discovered that this exceeded multiple aspects of the actual enamel.

However, it is vital to note that this version would be challenging to be made available in typical dentists' offices because of the difficult processes and expensive tools required to produce the artificial enamel.


# ADDRESSING PATIENT CARE: DEMENTIA AND COVID-19

BY APRILE BERTOMO

The COVID-19 pandemic has proven to be challenging in a variety of ways, having global negative impact in various sectors of life, from influences on human health to wide-scale industrial issues. However, recent studies have shown that COVID-19 may be particularly difficult for those with dementia or at risk of developing the condition.

The National Institute of Health defines dementia as a type of condition involving a loss of abilities such as remembering, reasoning, and thinking. Such abilities characterize cognitive function. For those with dementia, the loss of such abilities often has the capacity to greatly interfere with one's typical day-to-day life and corresponding activities. Dementia has not been characterized normal to the overall process of aging; however, the condition is common among those older than 85 years old, with approximately one-third of all individuals within that age range exhibiting signs of dementia. Regardless, some individuals older than approximately 90 years old can age without any indicators of dementia. (1)

With regard to the impact of COVID-19 on the development of dementia in individuals, a recent study published later this month by Bianchetti et al., 2022 emphasized the importance of switching from typical forms of treating patients with dementia to more innovative forms. Such more advanced forms of dementia treatment involve improvements to out-home assistance and better long-term care. Those with dementia were noted to have a greater risk of developing the coronavirus. When adjusting for factors such as age and presence of comorbidities, it was found that mortality resulting from infection with COVID-19 was about two to five times higher than those in the general population. (2)

In order to mitigate the damaging neurological effects of COVID-19 in those with dementia specifically, it was recommended that patients be encouraged to engage in physical activity more frequently and to perform activities that were more cognitively-stimulating. In addition, it was noted that sleeping for approximately seven to eight hours and establishing a balance diet involving minerals and other essential vitamins could make all the difference in limiting negative health issues. (3)

Although it is not fully clear whether the coronavirus could be a major risk factor for those with dementia, it is essential to recognize the most probable psychiatric and neurological issues associated with COVID-19 and how this could likely present issues for those with dementia and other health conditions as well. (3)

Works Cited:
1) “What Is Dementia? Symptoms, Types, and Diagnosis.” National Institute on Aging, U.S. Department of Health and Human Services, https://www.nia.nih.gov/health/what-is-dementia.
2) Bianchetti, A., Rozzini, R., Bianchetti, L. et al. Dementia Clinical Care in Relation to COVID-19. Curr Treat Options Neurol (2022). https://doi-org.proxy.library.cornell.edu/10.1007/s11940-022-00706-7
3) “Could Covid-19 Increase the Risk of Dementia?” Medical News Today, MediLexicon International, https://www.medicalnewstoday.com/articles/dementia-and-covid-19-why-are-scientists-concerned#No-clear-answer.

# CONNECT WITH US