Cancer *IS*

an Infectious Disease

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A New Model for Measuring, Preventing, and Reversing Cancer Risks

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Introduction

The prevailing myth is that cancer is somehow different when compared to the other common chronic diseases of modern society. That myth perpetuates the notion that one must wait for a tumor to be detected at which point, your options are limited to those that destroy the tumor. Hopefully, you will survive both cancer and the treatment but the statistics of either occurring are usually not very favorable.

New advances in the earlier detection of tumors and other forms of cancer appear to provide better survival outcomes. However, since cancer remission is defined as 5-year survival, detecting cancer earlier simply starts the clock on the 5-year time frame sooner. What looks like better outcomes is not necessarily so.

New labs are now available for circulating tumor and cancer cells. These are important tests for early detection but they do not change the treatment paradigm. Instead, it just hastens the harmful slash, burn, and poison treatment approach. Improvement in outcomes almost always realized with earlier detection. However, when the treatment is harmful, then this is not always the case as the treatment for cancer is frequently worse than the disease.

The real answer to cancer outcomes is to evaluate and correct the root causes of the disease and this is no different compared to any other debilitating and deadly chronic condition. This approach was best forwarded by Louis Pasteur and Claude Bernard, both medical giants of the 19th Century. Pasteur is famous for many discoveries and is noted as an author of the germ theory of disease (infection). Claude Bernard, less well known, but arguably more important compared to Pasteur, coined the term "milieu Intérieur" also known as homeostasis or internal terrain.

It is believed that Pasteur, on his deathbed said, "Bernard is right, the seed is nothing, the soil is everything." What is the soil? It is your immune system; innate, adaptive, barrier, and all other aspects of immunity. Shown clearly in this book is that cancer risk and status can be measured using a broad range of blood-based biomarkers. Importantly, cancer, like every other chronic disease, smolders before erupting in fire (tumor or blood cancer). The biomarkers that help clarify this process are all modifiable. That is, in the hands of a skilled practitioner, you can lower the biomarkers and improve your odds against the disease.

You can take control over cancer, your cancer risk, and your cancer prognosis. It is a matter of performing the right tests, and interpreting the results from a chronic, not an acute

perspective. With that knowledge in hand, many who are suffering and dying from cancer may be able to avoid these disastrous consequences.

Do not listen to the pundits be proactive. You cannot wait for a diagnosis of cancer. You must act now to measure your risks. The standard of care will not help you. You must seek medical providers who understand the chronic disease process and can provide you with a path to improve your overall health and likely reduce your risk of cancer while improving your prognosis if afflicted with the disease.

Chapter 1: Cancer is an Infectious Disease

Cancer is an infectious disease. The information supporting this statement is quite compelling. Why is this of interest to you? Because it provides hope for prevention and treatment.

The purpose of this book is 2-fold:

1. To explain that cancer is not some special disease. In fact, it is like all the other major chronic diseases including, cardiovascular diseases, metabolic conditions, brain conditions like Alzheimer's, and so-called autoimmune diseases. When you push back the curtains you will often find infectious causation. And when the blinders about cancer being some unexplainable conditions are removed, hope is afforded.
2. To explain how you can determine where you lie on the cancer risk continuum. There are many new tests for biomarkers for circulating cancer cells. We all have circulating cancer cells in our bodies. It is just a question of how much and how resilient our internal terrain is to control their growth or eliminate them. Therefore, the preferred tests to perform are not those associated with tumor cells. Instead, the right tests measure cancer vulnerability and susceptibility.

It is critically important everyone understand that health is a continuum. Somewhere on earth is the healthiest person. Somewhere else, a person is about to die, and due to all circumstances could be considered the unhealthiest. The rest of the population is somewhere in between. In essence, we all lie on a health-disease continuum, Figure 1. And there are many "sub-continuums" that place us on the overall continuum. Cancer risk and status is one of those sub-continuums.

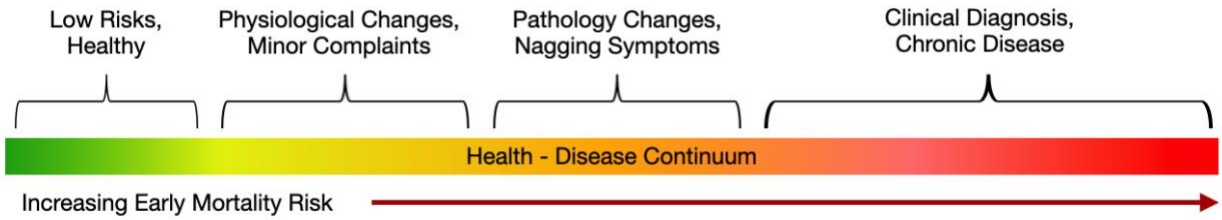


Figure 1. The Health-Disease Continuum. A disease diagnosis is human-made and reflects a position somewhere on this continuum. The definition of disease is often so loose that the disease location on this continuum varies from person to person within the same disease. Not very scientific to say the least.

Biomarkers provide precision to a human-defined diagnosis. Multiple biomarkers improve precision and accuracy (not of a diagnosis per se) by truly characterizing a person's health and future risks. In cancer and in many chronic diseases and conditions for that matter, the neutrophil to lymphocyte ratio (NLR) is the place everyone should start in the quest to be resilient against cancer and improve your odds of survival.

The NLR explained:

The Ideal NLR value: 1.2 - 1.5. The value is obtained by taking your absolute neutrophil value divided by your absolute lymphocyte value. Note, the standard of care does not have a reference range for this biomarker and I doubt any traditional doctor calculates and discusses it. It is not often discussed even among functional and integrative doctors. Also, in medical research, high NLR values have been studied in association with disease, but low NLR values are also indicative of infectious disease as well. However, few studies have considered low NLR values.

As you read through this section, you will see that the NLR biomarker connects cancer to other major chronic diseases. It is simple and obvious; NLR elevates in these diseases and people with optimal NLR values are much less likely to have one of these diseases. The NLR, as a single biomarker, may be the best marker to determine where you lie on the cancer risk continuum and what you can do about it. However, a single marker always lacks precision and accuracy.

The NLR is obtained from a complete blood count with a differential test that is one of the least expensive tests available through many labs. Note, this test also provides neutrophil and lymphocyte percentages. These values do NOT yield the NLR. In all cases, the NLR must be calculated. It is simple math (division) and prolific data on this marker is published in peer-reviewed journals. So why the reticence to discuss this marker. My belief is an infection is an unpopular diagnosis, particularly chronic infection which is hard to measure and treat. It is much easier to prescribe a statin or run a heavy metal toxicity test.

Most doctors do quickly glance at the total white blood cell counts and almost always conclude "they are fine." But, of course, they do not understand that the standard of care reference range is too broad to afford a viable diagnosis. Thus, in the actuality of most cases the WBC values are not fine. Instead, the value is an indication of the smoldering risk being ignored. Additionally, the NLR itself does not have a reference range. Without a reference range, a traditional doctor is ill-equipped to draw conclusions about the association of its value to risk.

They could, of course, read the literature, and understand what values infer risk. But this does not happen.

The medical research community is well apprised of the prognostic value of the NLR. Web searches using the term “neutrophil to lymphocyte ratio” returns 9,000,000 articles. A more targeted search, within the National Library of Medicine, using the same phase, yields 35,000 articles. The NLR value is titrated to many of the most important human-made disease terms as follows:

- NLR and Cancer: 28,000 articles
- NLR and Heart: 16,000 articles
- NLR and Cardiovascular: 21,000 articles
- NLR and Stroke: 6,500 articles
- NLR and Diabetes: 15,000 articles
- NLR and Infection: 21,000 articles
- NLR and Mortality: 24,000 articles

This type of search does not necessarily demonstrate causation, but it does illustrate a strong association between these disease syndromes and the NLR value. In this way, the NLR bridges causation across all these diseases.

Importantly, the NLR provides an excellent representation of the innate immunity response. In terms of a biomarker explaining health, what is more important than that?

Neutrophils are important effector cells in the innate arm of the immune system. They constantly patrol the host for signs of microbial infections, and when found, these cells quickly respond to trap and kill the invading pathogens. The key term is “microbial infections” and neutrophils usually respond (elevated) to bacterial infections.

Lymphocytes are cells that circulate in mammalian blood and are part of the innate immune system. There are two main types of lymphocytes: T cells and B cells. B cells produce antibody molecules that can latch on and destroy invading viruses or bacteria. T cells are part of the immune system and develop from stem cells in the bone marrow. They help protect the body from mainly viral infections and might help fight cancer as many cancers are induced by viruses.

The NLR is not always a perfect marker for infection because in some instances, neutrophils might go down and lymphocytes might go up when the body is being attacked by an array of

infectious species. However, the NLR marker always comes with a complete white blood count with differential that includes 18 individual biomarkers, and a doctor skilled at interpreting labs can use the other white blood cell counts from which to draw conclusions or make a diagnosis. These biomarkers include neutrophil percent, lymphocyte percent, total white blood cell counts, red blood cell distribution width, monocyte, eosinophil, and basophil counts.

The importance of the NLR marker is its sensitivity when compared to single white blood cell values. The ratio of the NLR amplifies both values. With a slightly elevated neutrophil count and slightly lowered lymphocyte count, even when both are considered normal, the NLR value may be elevated or out of the optimal range. In this case, "Elevated" is based on our research into levels of NLR that are associated with higher mortality risk.[1]

Harvard Medical School, at Dana Faber Cancer Research, understands the value of the NLR as a prognostic indicator of solid tumor cancer risk and outcomes. Aly-Khan Lalani, MD is an Assistant Professor at McMaster University and a Medical Oncologist at the Juravinski Cancer Centre. After completing Internal Medicine and Medical Oncology training, he was awarded the TD Insurance Meloche Monnex & Alberta Medical Association Scholarship. Thereafter, he pursued a Fellowship in Genitourinary Oncology at Dana-Farber Cancer Institute in Boston, mentored by Dr. Toni Choueiri. He has also completed the Program in Clinical Effectiveness at the Harvard T.H. Chan School of Public Health. He remains a Visiting Scientist at Dana-Farber and is a member of the Escarpment Cancer Research Institute, with academic interests in clinical trial design and translational work. In two separate interviews, Dr. Lalani stated:

Interview 1: https://youtu.be/vKqTsA04_Hw

> "We were examining the ratio of the neutrophils to lymphocytes in metastatic Renal Cell Carcinoma (RCC) patients treated with immunotherapy. For a bit of background, we know that neutrophils reflect the inflammatory cascade in patients with cancer and we know that lymphocytes are an important anti-tumor agent, really a suppressor of tumor growth pathways. When we have this ratio of neutrophil to lymphocytes, we are trying to get a sense of both the inflammation cascade and the immunotherapy response. The NLR, as we call it, has been studied in a variety of solid tumors and shown that it is associated with poorer outcomes in patients with higher NLR. What has not been studied is looking at metastatic RCC patients specifically in this expanding era of immune checkpoint blockade (biologic drugs) as we know there is approval of nivolumab as the second line agent and the

> clinical trials ongoing with immunotherapy are expanding in RCC coding. This is the perfect time to examine this kind of blood biomarker that is readily available, affordable, and modifiable in these solid tumor patients."

The key point made in this video is that NLR has been studied in a variety of solid tumor cancers and outcomes in all cases worsen as the NLR value goes up. Dr. Lalani, as part of Harvard, and supported by the drug industry, did not explain what the NLR is very accurately. He put a spin on the definition of NLR which would lead you away from the proper conclusion that this biomarker accurately measures your infectious burden.

Interview 2: https://youtu.be/rKHSWBK6kKA

> "In our study, what I find interesting and the major take-home point is, at the 6-week mark (of therapy), higher NLR was associated with worse objective response rate as well as poorer or shorter PFS (progression-free survival) and OS (overall survival) compared to those with lower NLR. I think that is very informative for physicians and patients. We also found that in those patients – when comparing baseline to the six-week level – patients that had decrease in their NLR by 25% or more actually portended a more favorable outcome in terms of progression free and overall survival compared to patients who had an increase in their NLR by 25% or more."

The key point made in this video is that lowering the NLR lowers "PFS" (progression free survival) and "OS" (overall survival) whereas when this marker goes up, PFS and OS worsen.

Note, that Dr. Lalani is classified as a "scientist," not a doctor. Thus, he is doing research and not applying his knowledge clinically. How is Harvard Medical School at their oncology arm, Dana Faber Cancer Institute, applying this knowledge clinically? If you are a cancer patient, has a doctor told you your NLR and what you can do about it? The answer probably 100% of the time is that you have not been told about this marker. To show you how little new knowledge is translated from the research side of medicine to the clinical application side, here is a real-life example.

Jim is a very dear friend. He has been suffering metastatic cancer of the lungs for several years and is a patient at Dana Faber. I happened to be in Boston and gave Jim a call. He indicated he, too, was in Boston, for a checkup with his Oncologist at Dana Faber. I went to Dana Faber and met him in the waiting room prior to his checkup. I asked if I could be invited into the consult and, through some miracle, I was invited to listen – and that I did, quietly for 30 minutes.

At the end of the consult, I decided to ask one simple question, "what is Jim's vitamin D level?" The oncologist quickly replied that they take vitamin D levels routinely. So, I asked the question again – what is his (pointing to Jim) level of vitamin D? The doctor claimed he did not have it in the chart with him. The next day Jim called me and said that after I left, they pulled blood on him and his vitamin D level was 9 ng/ml, whereas 55 – 100 ng/mL is an optimal level for health and cancer prevention.

The Dana Faber Oncologist blatantly lied about obtaining vitamin D levels on Jim, who has been a patient for several years. Clearly, there is a disconnect between medical research at Harvard and clinical delivery. Dana Faber's research group has published prolifically on the benefit of high doses of vitamin D and cancer yet it is not an intervention used by their oncologists.[2] Thus, you can guess that the NLR marker receives even less consideration compared to vitamin D in clinical oncology.

NLR and Early Mortality

The understanding that elevated NLR values are linked to early mortality is not new. Peer-reviewed papers on this go back to the 1980s, but the studies were on animals. It took another 20 years for this marker to be reported on humans. The first paper titled, "Which White Blood Cell Subtypes Predict Increased Cardiovascular Risk?"[3] reports on various white blood cells and indicates that NLR is most predictive. According to this research, "Total WBC count is confirmed to be an independent predictor of death and heart attacks in patients with or at high risk for coronary artery disease (CAD), but the greater predictive ability is provided by high neutrophils or low lymphocyte counts. The greatest risk prediction is given by the N/L ratio (NLR). The NLR explored post hoc, proved to be the most powerful single WBC count predictor, with a value of 5 or more elevating risk by 300% compared to ratios <2."

More current research illustrates the predictive power of the NLR value in early mortality. In a paper titled, "The neutrophil-to-lymphocyte ratio is associated with mortality in the general population: The Rotterdam Study," an NLR value of approximately 1.5 or less is shown to be optimal.[4] The Rotterdam Study, a long-standing, population-based, prospective cohort study of an aging population is well respected and was started in 2002. Figure 2 shows mortality trends with different NLR values, over time.

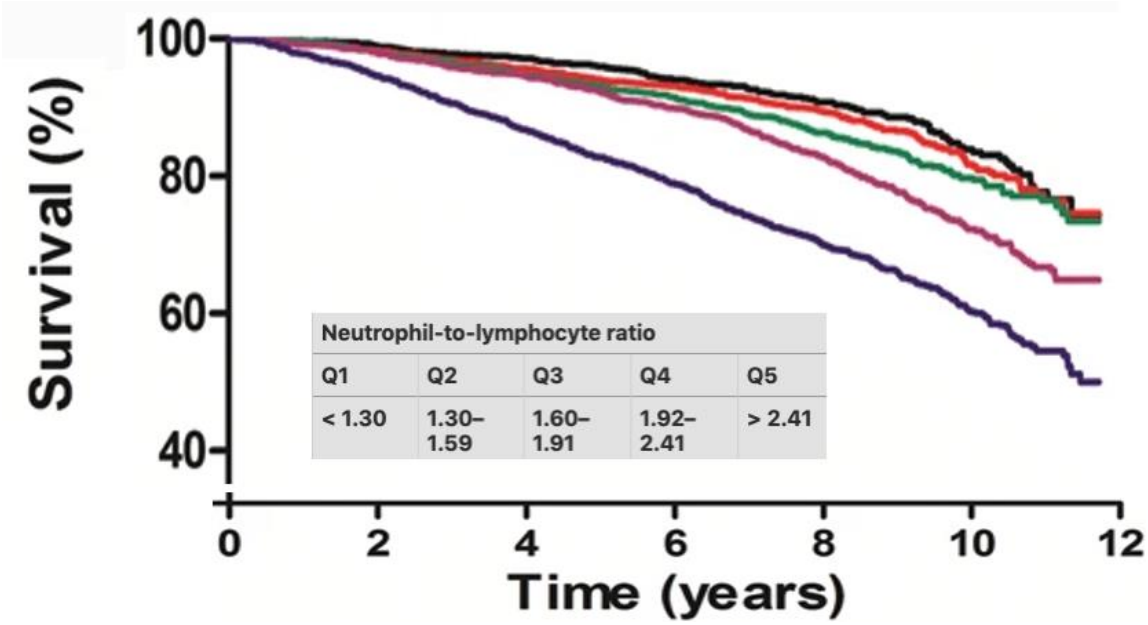


Figure 2: Kaplan–Meier (statistical) curves for all-cause mortality for each quintile of the NLR (P-value < 0.001). The upper black line is for Q1 and the lower line is for Q5. Q2 – Q4 reflect progressively lower survival rates.

NLR and Cancer

Nature magazine is considered in the top 3 of all medical and scientific publications. Here is the introduction to an article published in 2020 regarding the neutrophil-to-lymphocyte ratio and cancer.[5]

> "In 2018, 32,825 new breast cancer cases were diagnosed in Spain, representing 12% of all cancer cases, and 29% of all cancers in women. It was responsible for 6,421 deaths (6% of all cancer deaths). Breast cancer is the most frequent cancer in Spain and ranks fourth in cancer-related mortality. There has been a 30% increase in breast cancer incidence between 2012 and 2018."
>
> "High concentration of blood neutrophils is seen in patients with advanced cancer and are associated with poor survival. Similarly, there is abundant evidence for an adverse prognostic value of neutrophil to lymphocyte ratio (NLR) on breast cancer. Multiple studies have shown that higher NLR was associated with poorer survival and a recent meta-analysis found that higher NLR was associated with both worse disease-free survival and overall survival. Several previous studies have found that higher NLR was also associated with more advanced or aggressive breast cancer."

For this reason, the ratios between neutrophils in blood and other leukocytes (white blood cells), such as the NLR, have been suggested as a prognostic value in cancer. NLR is higher in patients with more advanced cancers and correlates with poor survival in many cancers. Thus, NLR, a simple and inexpensive biomarker, has been introduced as a significant prognostic factor in many tumor types. However, it has not been accepted in many clinical settings. The evidence for a detrimental effect of circulating neutrophils and the NLR on cancer prognosis and survival altogether, is very consistent."

To our knowledge, only three small studies, conducted in Asian women, assessed the association between NLR and the risk of breast cancer. Two of the three studies compared breast cancer cases with benign breast disease (BBD) controls, and the third one used healthy controls as a reference group. In one of the studies, the NLR was significantly higher in breast cancer patients compared with the BBD group, and patients with NLR > 1.67 were related to an increased risk of breast cancer. This finding was consistent with the other two studies suggesting that NLR could be an independent risk factor for breast cancer."

We run a comprehensive panel of biomarkers to help our clients determine where they lie on the cancer and health continuums. "Doctor" in Latin means "teacher." Thus, our reports do not just give you a biomarker number but also provide a detailed explanation of the marker along with providing optimal levels and show you where you reside on the individual biomarker "continuum." Additionally, we provide references to medical literature, some of which were used in determining your risk. The following is an example of the NLR biomarker as is represented on our cancer risk and general health reports.

Neutrophil-to-Lymphocyte Ratio (NLR):

The NLR is the number of neutrophils divided by the number of lymphocytes. In general, neutrophils, a type of white blood cell, elevated in the presence of bacterial infection. Lymphocytes, also a type of white blood cell, decrease in the presence of a viral infection. Thus, the NLR is a measure of your infectious burden. Importantly, the NLR value is amplified or magnified compared to other individual markers, providing better measurement or prediction of very early diseases like cancer. Source: Journal of the National Cancer Institute

Category: Immune Health, Infectious Burden

Traditional Reference (normal) Range: None

Cancer Risk Optimal Range: 1.2 - 1.5

Selected Publications:

Title: Neutrophil to lymphocyte ratio (NLR) for prediction of distant metastasis-free survival (DMFS) in early breast cancer: a propensity score-matched analysis

Finding: Distant metastasis-free survival is enhanced by up to 300% in the low NLR group compared to the high NLR group.

Conclusion: This study shows a significant correlation between high NLR and worse prognosis in Caucasian patients with early breast cancer by means of propensity score-matched analysis.

Title: Prognostic Role of Neutrophil-to-Lymphocyte Ratio in Solid Tumors: A Systematic Review and Meta-Analysis

Finding: One hundred studies comprising 40559 patients were included in the analysis. An NLR of <4 was used to determine risks. Overall, NLR > 4 was associated with: Overall Survival decline by 181%, an effect observed in all disease subgroups, sites, and stages. Risks for NLR > 4 for cancer-specific survival, progression-free survival, and disease-free survival were 161%, 163% and 227%, respectively.

Conclusion: A high NLR is associated with an adverse overall survival (OS = high mortality) in many solid tumors. The NLR is a readily available and inexpensive biomarker, and is a valuable addition to the establishment of prognostic scores for clinical decision-making across a broad array of cancers.

Two Different Breast Cancer Studies

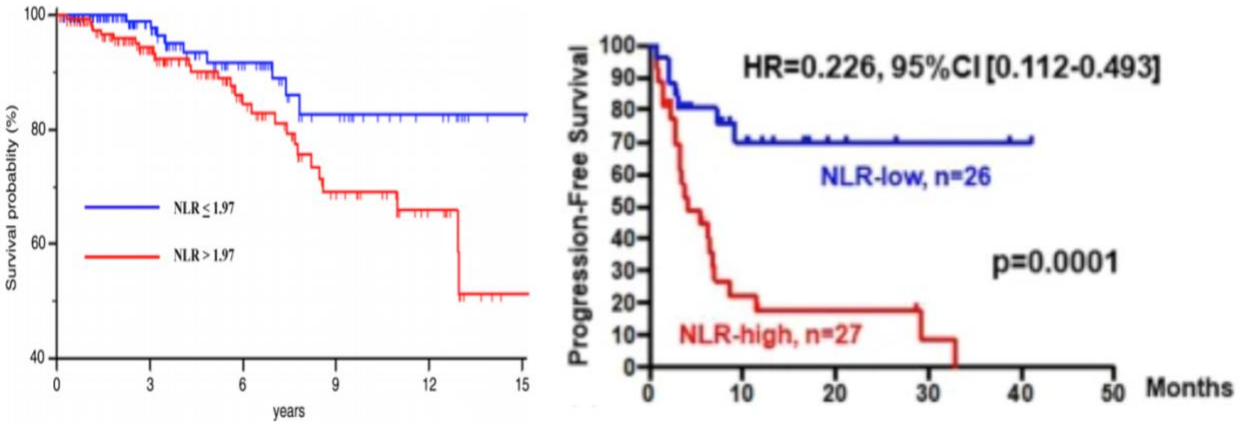


Figure 3. NLR values and associated cancer survival statistics. The "n" values in the right-hand image are for the number of people in the study, not the NLR value.

What can be done for elevated NLR? Many of us know what to do to reverse insulin resistance with diet and exercise. Functional or integrative doctors or a health coach can help improve your metabolic status without drugs. But the NLR is less well understood because it is elevated or lowered by subtle chronic infections. The COVID-19 pandemic provided substantial enlightenment on infectious causes of disease. A major condition in COVID-19 is lymphocytopenia or low absolute lymphocytes. Those people with a pre-existing bacterial burden fared worse when their lymphocytes were low. That is why some doctors treated with azithromycin. What happens to the NLR with lymphocytopenia and a bacterial burden? It goes sky-high. NLR is an excellent biomarker to predict outcomes in COVID-19. My team wrote a peer-reviewed paper on this at the beginning of COVID. The title of the article and link to its content are provided here:

The Cytokine Storm and Pre-Cytokine Storm Status in COVID-19 - A Model for Managing Population Risk for Pandemics and Chronic Diseases

https://grfpublishers.com/assets/article_in_press/1589740364.pdf

Sadly, the relentless focus on vaccination has ruined a great opportunity for all of us to understand how to lower our NLR values by improving innate immunity and lowering stealth infectious burdens.

Acute infections and their consequences are well appreciated. People get sick and often experience elevated temperature, at which point antibiotics are often prescribed. If a cold strikes, there are no pharmaceutical treatments and many people take vitamin C and zinc while waiting for their adaptive immune system to conquer the virus.

Chronic infections, those that cause cancer, present a completely different paradigm. Firstly, 99.9+ percent of doctors do not recognize chronic infections or consider them a cause of disease. Instead, the doctor may assign a diagnosis, and the CPT code associated with the diagnosis determines a boiler-plate treatment path for your symptoms. According to the standard of care, cancer, with an elevated NLR, is not related to infection. In the interview with Dana Faber cited above, there is no mention of infection.

Cardiovascular disease, strokes, high blood pressure, or a heart attack has no relationship to infection in the standard of care. Patients are given statin drugs to lower LDL, blood pressure

medication to lower blood pressure, and may get a stent to circumvent an arterial blockage. Each of these treatments is for symptoms. However, what is the NLR in these diseases? Is your doctor determining the value and doing something about it? Based on research, it is most likely elevated and presents a strong indicator of an underlying chronic infection.

Many types of organisms, called pathogens in this context, cause either disease or “dis-ease" which is a term I use to describe real symptoms but without an official diagnosis. The severity of the disease depends upon your immune health and the virulence of the pathogen(s). Treatment of chronic infections is different compared to acute infectious diseases. Chronic infection, as the name "chronic" implies, requires long-term treatment to eradicate what are called obligate intracellular pathogens. These pathogens are different compared to those that cause acute infectious diseases like the flu in that they can hide from treatment over long periods of time and thus requiring longer treatment schedules.

In all cases of diseases, the best approach is to improve immune health. The starting point is to evaluate and improve diet and digestion. Supplements are part of the immune health equation when quality whole foods are not available or routinely consumed. Anti-pathogenic nutrients include vitamin A, D, and a variety of herbs as limited examples. Finally, everyone can measure their progress in the fight against cancer, chronic infections and disease by obtaining the neutrophil to lymphocyte ratio through a complete blood count with differential.

Chapter 2: Doctors Who Know the Cause of Cancer

"The tumor is not the disease"

Dr. Woeppel – Hufeland Klinik

Connie Strasheim wrote a book titled, "Defeat Cancer: 15 Doctors of Integrative & Naturopathic Medicine Tell You How." I suggest everyone get and read this book. Many of the 15 doctors understand that infection is involved in the genesis of cancer. Some use the term "inflammation" only and do not mention infection. But we must understand that inflammation is an immune response and is often a treasure of nature protecting our health. When an immune response is noted by changes in white blood cell counts and inflammation is detected, the inflammation is essentially always caused by an infection, either chronic or acute.

Here is a brief summary of some of the doctors highlighted in Ms. Strasheim's book, with emphasis on those who make reference to infectious causes of cancer.

Nicholas J. Gonzalez, MD, graduated from Brown University, Phi Beta Kappa, magna cum laude, with a degree in English Literature. He subsequently worked as a journalist, first at Time Inc., before pursuing premedical studies at Columbia. He then received his medical degree from Cornell University Medical College in 1983. During a postgraduate immunology fellowship under Dr. Robert A. Good, considered the father of modern immunology, he completed an intensive research study in which he evaluated an aggressive nutritional therapy involving high doses of pancreatic enzymes for the treatment of advanced cancer.

The Gonzalez approach to cancer; what it is, what causes it, and how to treat it is similar to that of the early 1900s English scientist John Beard, DSc, who developed a ground-breaking theory on cancer over 100 years ago. Conventional medicine believes that cancer develops from mature, healthy cells that go “berserk,” mutate and turn cancerous. Dr. Beard believed that cancer didn’t come from mature cells, but from residual trophoblast cells that remain in all of us and which are scattered throughout our tissues and organs.

Embryonic trophoblast cells are the earliest precursors to the placenta; the scattered trophoblast cells in the mature organism serve as stem cells, regenerating new tissues as replacements are needed. They sit quietly most of the time. At some point, the trophoblast cells start growing just like the placenta, as the result of a stimulus, such as an **infection or inflammation**. Unlike the placenta, they grow in the wrong place and at the wrong time. And

just as the placenta grows and invades the uterus, cancer cells grow fast and invade local tissues and organs.

Clifford Fetters, M.D. of Health and Wellness of Carmel, IN is a functional doctor with a targeted focus on measuring and treating cancer and a colleague of mine. He was trained in traditional medicine with a MD degree from Indiana University in 1985 and then a 3-year residency program in family medicine. It took him less than 1 year in private practice to realize that using prescription drugs to mask the symptoms of chronic diseases was not the solution. After being exposed to holistic/functional medicine, he became obsessed with finding a natural solution for all ailments with one exception - that being Cancer. His initial mission was to bring holistic health into the mainstream. He commented that it was painful to observe so many Americans living in pain from chronic illnesses when he knew a holistic health approach could provide substantial benefits.

In 2010, his practice was achieving an approximate 95% success rate at restoring optimal wellness to his patients. The only exception was in treating cancer where he usually referred the patient to a more traditional path. One of his long-time 72-year-old clients was diagnosed with breast cancer. She adamantly refused to see an oncologist and refused to travel out of state for holistic cancer care. Dr. Fetters became her only choice. He decided it was time for a new challenge and agreed to treat her condition. Through good fortune, he attended a cutting-edge cancer conference. It was the first international symposia on functional medicine confronting cancer as a chronic disease. The Institute of Functional Medicine sponsored it. Close to one thousand doctors from all over the world came together to hear about the innovative strategies in the prevention and treatment of cancer from the top doctors in the field. He was impressed by the advanced treatments being used in integrative oncology care.

He was privileged to have Dr. Dwight McKee, one of the highest regarded holistic hematologist and oncologist, become his mentor. With his guidance they helped many clients obtain long-term remission without the need of chemotherapy or surgery. Dwight became a close friend and invaluable colleague that helped Dr. Fetters with his most complicated patients.

Great strides have been made in holistic cancer treatments over the last 12 years. In March 2013 the Health and Wellness team infused one of the first Immune Support Therapy (IST) treatments in America. One particular client had recurrent tongue cancer which was deemed untreatable and terminal by her oncologist. During 2 years awaited the availability of IST, the client followed a ten-step program to achieve optimal wellness. She came for weekly clinic visits

for IV vitamin C and chelation therapy. She received custom made Supportive Oligonucleotide Technique (SOT) treatments every 6 months and got immune boosting supplements and supplements known to help fight her type of cancer.

Her cancer remained stable for 2 years. She contacted the clinic 10 hours after her first 3-hour IST infusion and stated that she ate steak for the first time in 10 years. Her chronic pain was resolved within 3 weeks. Each month Fetter's team witnessed the regression of her tumor. After 4 months there was no visible sign of tumor. Her oral surgeon demanded to take a tissue biopsy, which proved that there was no evidence of cancer.

The first approach Health and Wellness of Carmel always uses is a 10-step program to achieve optimal wellness. The 10 steps are:

1. Emotional trauma and healing. Trapped emotions impair healing and can promote sympathetic dominance as opposed to the parasympathetic relaxed healing state of mind.

2. Encourage a strong belief system. Pray for healing and acknowledge that you deserve to be healed.

3. Nutrition. A healthy organic diet based upon the metabolic type of the patient and the type of cancer. Nutritional supplements to maximize the proper vitamins and minerals to support a strong immune system.

4. Physical activity and exercise to maximize strength stamina and sense of wellbeing.

5. A safe living environment free of biological pollutants, volatile organic compounds, EMF, and toxic individuals.

6. Detoxification. This often requires removal of heavy metals, nonheavy metal industrial pollutants and vaccine injuries. And support for the liver and lymphatics.

7. **Resolve dental issues including infected root canals**.

8. Grounding/earthing which allows electrons to flow from the earth into the body to create a neutral electrical charge to promote healing.

9. **Reducing pathogens** such as Borrelia burgdorferi which causes Lyme, Epstein-Barr virus and other herpes viruses, Candida, mycoplasma, chlamydia pneumonia which can suppress the immune system.

10. Peptides and glandular extracts specifically formulated to boost the immune system.

Their cancer treatment protocol is to eliminate the tumor burden within the body as well as eliminating or greatly reducing the level of circulating tumor cells. Circulating tumor cells, which are rarely monitored in traditional medicine, are a major cause of metastasis and relapse.

They also use personalized cancer testing. These tests can detect early signs of developing cancer, help to monitor existing cancers, and produce an individual profile of which cancer drugs and natural substances can be used to achieve the best treatment outcome.

Chemosensitivity testing from a simple blood test is one method of creating a precision and personalized program. Chemosensitivity testing involves evaluating an individual's cancer cells in the laboratory to see which drugs and natural substances demonstrate the best response in reducing tumor cell growth. This approach provides guidance about which treatments may be best for the individual in clinical practice. The testing can determine the sensitivity to hyperthermia, sugar, many natural compounds, and oxidative stress treatment such as IV vitamin C and ozone.

Some of the treatment modalities used to help individuals achieve cancer remission include:

- Sono Photo Dynamic Therapy (SPDT): this therapy uses a nontoxic agent that cancer cells absorb and hold on to. Specific light and sound activate the agent, which produces oxidative stress within the cancer cells as well as a complex immune response and attacks the cancer.
- Supportive Oligonucleotide Technique (SOT): SOT is custom made messenger RNA directed at the genetics of an individual tumor to induce apoptosis (cell death) in the circulating tumor cells including the circulating cancer stem cells and in primary and metastatic tumors.
- Immune Support Therapy (Advanced Dendritic Cell Therapy): Dendritic cells (DCs) are a highly specialized subtype of white blood cells with a unique function. DCs can pick up foreign cells or cell particles including cancer cells with the help of tentacle-like structures called "dendrites." Within the DC the cancer cells are destroyed. They take your own dendritic cells, have them multiply in the lab, train them to treat the tumor, and then infuse them back into your body.

- Vaxo-Q-RE therapy. Vaxo-Q-Re is best described as autologous adaptive cellular therapy. It consists of generating a large number of the patient's own macrophages and natural killer cells, which are part of the innate immune system, and activated dendritic cells, T cells and antibody producing plasma cells, which is part of the adaptive immune cells. The cells are then activated to attack the cancer cells and infused back into the patient.
- Whole body hyperthermia is an important treatment modality in the treatment of cancer, and its results are strongly supported by the criteria of evidence-based medicine. Hyperthermia is a therapy that consists of heating the core body temperature to over 102 degrees to treat tumors based on the differential response of tumor tissue and normal tissue to heat. Elevated temperatures also stimulate our body's natural killer cells to be more active.
- Thermofield® Noninvasive Deep Tissue Heating System is a revolutionary technology that transfers a large volume of electromagnetic energy deep into biological tissue using state-of-the-art applicator technology. The absorbed energy causes molecular friction, gently heating the targeted area to therapeutic temperatures (Between 108°F and 114°F) that selectively kill cancer cells without harming healthy tissue. The system makes the delivery of therapeutic hyperthermia safe, effective, easy to use, and affordable.

Additional modalities include IV ozone, hydrogen peroxide, vitamin C, ultraviolet blood irradiation (UBI): cancer cells die when exposed to high concentrations of oxygen. Also, peptide therapy is specifically used to boost the immune system and to help eliminate cancer cells.

It is important to understand that individuals with stage III or IV cancer usually have the best outcome when they use a blend of conventional and holistic cancer care. Traditional oncology has come a long way and has begun to produce targeted therapies. Traditional chemotherapy at the hands of the experts can lead to rapid destruction of cancer cells. Short-term therapy can provide dramatic response in the reduction of a tumor, with minor damage to the immune system and the rest of the body. Holistic health providers can use many modalities to restore the immune system and repair chemo damaged tissues.

At Health and Wellness of Carmel, they understand how the diagnosis of cancer could appear to be a devastating event in a person's life. However, there are plenty of options. They present another way to battle this condition. Often, their approach is one that does not require surgery, chemotherapy, or radiation therapy; all of which can have profound adverse effects on the health of the body. Most of all, these advanced therapies provide hope to the patient which is a powerful treatment in itself.

Robert J. Zieve, MD, is one of the most experienced and well-trained physicians in integrative medicine in the United States. Dr. Zieve graduated from the Ohio State University College of Medicine. He has practiced holistic and integrative medicine for over thirty-five years and worked for over twenty years as a Board-Certified specialist in emergency medicine and as the director of an emergency department at a small hospital. Additionally, he was President of the Arizona Homeopathic and Integrative Medical Association for two terms, from 1998 to 2000. And from 1999-2001, he was Medical Director of Paracelsus Fox Hollow Clinic, which was the United States affiliate of Paracelsus Klinik in Lustmühle, Switzerland.

Dr. Zieve observed that even though it takes five to fifteen years for microscopic cancer to develop into detectable cancer, it has generally been observed that most people with cancer have had a significant event happen in their lives within the two years prior to their cancers becoming detectable, which accelerated the development of those cancers so that they eventually became detectable. The events are ones that compromise immunity allowing pathogens to take hold and accelerate any existing disease, similar to what is observed in many who suffer from COVID-19 or got the spike protein jab.

Cancer can grow from a single cell to many cells, as it obtains its food locally, at the site of its manifestation. It can remain that way for many years, and people can live with it for the rest of their lives and never have it progress beyond that stage if they have a strong immune system that effectively carries out its surveillance. This process of carcinoma development in-situ goes on in everyone's bodies all of the time. For example, many people have carcinoma in-situ in their breasts or colons, which never develop into full-blown cancers, because they have strong tumor suppressor genes built upon strong immunity.

According to Dr. Zieve, it is important to note here that cancer is not a local disease. It's always a systemic disease. Even when a local breast cancer or melanoma is discovered and diagnosed via biopsy, there are usually cancer cells from the "mother ship" circulating through the body and making new homes elsewhere. One of the big mistakes that modern medicine makes is that it doesn't recognize the fact that by the time a local cancer is discovered, there are already metastatic cells from that particular cancer floating around the body. This is true even before the cancer is officially considered to be metastatic.

Dr. Zieve's approach to preventing and treating cancer is a whole-body approach. He identifies the weaknesses in the terrain of his patients, which refers to its biochemistry and physiology and can be discerned through blood tests. He determines factors such as patients' levels of

acidity, their **inflammation,** and mineral deficiencies, as well as whether they have heavy metal toxicity, lymphatic blockage, or blood that clots too easily. The objective is to get their bodies and internal terrain to self-regulate better.

It is important for patients to be diligent about their treatments. If you have a condition like herpes, you take 1500 mg of lysine daily for the rest of your life, because you know that the infection can come out at any time. If you have chronic rheumatoid arthritis or multiple sclerosis, both of which can be due to **Lyme disease**, you have to take care of yourself, because you will have Lyme organisms in your body for the rest of your life, and by taking care of yourself, you will keep them from causing you symptoms. It's the same thing with cancer; you have to be diligent and monitor it, as you maintain a good, healthy diet and nutritional protocol.

Colleen Huber, NMD, is a naturopathic medical doctor and primary care physician who currently practices in Tempe, Arizona. Dr. Huber focuses on herbal and environmental medicine, nutrition, and intravenous therapies. She received her naturopathic medical degree from Southwest College of Naturopathic Medicine.

Immune system evasion occurs when cancer camouflages itself and hides from the immune system while disabling some of its functions. Vitamin A can help to restore immune recognition, as can Vitamin D, although the role of Vitamin A in immune recognition remains under-appreciated among cancer practitioners.

This mechanism of cancer suggested by Dr. Huber is consistent with an infectious process. Dr. Minarovits, in a peer-reviewed paper titled, " Microbe-induced epigenetic alterations in host cells: the coming era of patho-epigenetics of microbial infections. A review,"[6] writes:

> "I suggest that in addition to viruses and bacteria, other microparasites (protozoa), as well as macroparasites (helminths, arthropods, fungi) may induce pathological changes by epigenetic reprogramming of host cells they are interacting with. Elucidation of the epigenetic consequences of microbe-host interactions (the emerging new field of patho-epigenetics) may have important therapeutic implications because epigenetic processes can be reverted and elimination of microbes inducing patho-epigenetic changes may prevent disease development."

Drs. Huber and Minarovits are saying the same thing. That is, cancer is infectious and can hide from the immune system as a survival mechanism by reprograming our (host) immune cells.

Juergen Winkler, MD, is Board Certified in Family Medicine. He completed his medical training at San Bernardino County Medical Center in 1991 and subsequently spent four years in the Air Force at two different bases. Dr. Winkler has maintained an interest in alternative and complementary medicine since medical school, and in 1996 he joined the American College for the Advancement in Medicine. He is also a member of the American College of Osteopathic Pain Management & Sclerotherapy, Inc. He has special training in chelation therapy, Insulin Potentiation Therapy (IPT) for cancer treatment, and Mesotherapy for pain management.

His focus is on controlling insulin levels and thus reducing glucose levels to slow cancer growth. However, his approach is not to just do tests to determine the status of patients' insulin status, cancers, and hormones but also to look for any other problems that might be impacting their health. Through additional testing, he often finds a need to detoxify them and clean up their immune systems. For instance, in the early stages of treatment, he measures their **inflammatory mediators, such as cytokines, to determine what's causing the inflammation** in their bodies. He checks the status of their immune cells, to see what, for example, the T-cells and natural killer (NK) cells are doing. The goal is to get their immune systems to be active and balanced, and he will prescribe remedies to accomplish the task. **Many patients have chronic infections** weakening their immune systems and impairing their ability to effectively fight cancer.

Dr. Winkler spends a lot of time figuring out what is going on with patients and their bodies. He addresses everything from diet, exercise, detoxification, inflammation, and angiogenesis to the nervous, immune, and hormonal systems. He also addresses spiritual and emotional issues; and even dental care, because there are correlations between dental root canals and problems with the rest of the body.

Elio Martin Rivera Celaya, MD, is Chief Medical Officer of Hope Wellness Center in Ciudad Acuña, Coahuila, Mexico. He is a conventionally trained medical physician with more than twenty-five years of clinical experience. Over the past fifteen years, he has also received cross-training in nutritional medicine. He received his medical degree from the University of Monterrey, in Nuevo Leon, Mexico, and is certified in chelation, oxygen, nutritional, and magnet therapy.

According to Dr. Celaya, cancer is caused by many things, **including viruses, bacteria, fungi, mycoplasmas**, heavy metals, genetically engineered foods, trans fatty acids, estrogen-mimicking compounds, and electromagnetic fields, as well as other environmental toxins and

factors. **All of this causes inflammation** in the body, which leads to excessive cell turnover and a lack of blood flow to cells, which then results in hypoxia and cells that are starving for oxygen or gasping for breath!

When cells do not receive enough oxygen, they must revert to a different type of energy production called anaerobic glycolysis. This system is very inefficient because it requires 40 times more glucose than normal aerobic metabolism. It also produces large amounts of lactic acid waste. When in a low-oxygen state, cells also produce signaling proteins called hypoxia inducing factors, which signal the brain to create more blood vessels in the area, in order to increase oxygen and meet the cells' elevated need for glucose.

The creation of new blood vessels from pre-existing blood vessels is known as angiogenesis. **Inflammation leads to cell hypoxia and angiogenesis**, which ultimately leads to uncontrolled cell growth and cancer. For example, 90 percent of people who develop primary liver cancer are those who also suffer, or who have previously suffered, from Hepatitis A, B, or C—diseases that cause chronic inflammation, and consequently, set the stage for liver cancer. Similarly, people who have smoked for many years develop chronic inflammation of the lungs, which leads to lung cancer. Men that have benign prostatic hypertrophy (prostate enlargement) and frequent urination (due mostly to infections and hormonal imbalances) have chronic inflammation of the prostate leading to prostate cancer. Fibrocystic breast disease causes chronic inflammation of the breast tissue, and it leads to breast cancer.

Dr. Celaya sensibly states, "Find the cause and the cure will be forthcoming." **Inflammation is the cause.** There's an old saying, "Find the cause and the cure will be forthcoming." Inflammation is the cause of cancer and is triggered by one or more of the aforementioned factors: viruses, bacteria, fungus, mycoplasma, heavy metals, genetically engineered foods, trans-fatty acids, estrogen-mimicking compounds, and electromagnetic fields. These factors then cause alterations in the genes that are responsible for cell cycle regulation. The gene alterations are then what perpetuate cancer, rather than the initial triggering factors. Once the genes have mutated, they must be normalized if the cancer is to be stopped.

Nina Reis, MD, is Hufeland Klinik's senior physician. She was born in 1957 in Kytmanowo (Russia) and earned her medical degree (MD) in 1980 from the University of Altaisk in Russia, where she specialized in pediatrics and surgery. In 1999, she moved to Bad Mergentheim, Germany, with her two children. From 2000 to 2004, she worked in the areas of internal medicine and surgery at the Caritas hospital in Bad Mergentheim. In February 2004, she met

Wolfgang Woeppel, MD. Dr. Reis was impressed with Dr. Woeppel's way of thinking and his successful results with cancer patients, the likes of which she had not seen before in conventional oncology.

Dr. Reis sees cancer, like most chronic diseases, as the result of disharmony in the body. Its causes are multi-factorial, so the treatment approach at our clinic involves bringing the body back into balance again. Dr. Woeppel, the founder of Hufeland Klinik, believed that chronic and (especially) malignant diseases occur when the metabolism and natural resistance of an organism are negatively altered by various "causal factors." These causal factors may happen either in the womb or after birth and include things like genetic abnormalities**, microbes, dental and tonsillar foci, abnormal intestinal flora**, poor diet, physical and chemical influences in the environment, and other possible factors.

Cancer is not just about the disorder of a single organ but is instead always about the expression of a comprehensive disorder of the whole person's body and soul. Therefore, holistic therapy must address the individual causes which led to cancer in the first place.

Isaac Eliaz, MD, MS, LAc has been a pioneer in the field of integrative medicine since the early 1980s, with a focus on cancer, immune health, detoxification and mind-body medicine. He is a respected formulator, clinician, researcher, author and educator, and a life-long student and practitioner of Buddhist meditation.

With 30+ years of training and experience, Dr. Isaac Eliaz is a highly skilled practitioner who offers a unique, holistic approach to health and healing. His extensive background in Western medicine and translational research, Traditional Asian medicine, and complementary modalities, has earned him recognition as an expert innovator and leader in the integrative treatment of complex, chronic conditions. In 2001, he founded Amitabha Medical Clinic in Santa Rosa, CA, where patients come from around the world to receive leading-edge, patient-centered treatment and care.

Dr. Eliaz uses Modified Citrus Pectin (MCP) and polybotanicals in the treatment of cancer. He explains specifically how MCP directly attacks cancer by binding to galectin-3 molecules ("sticky" surface molecules that promote angiogenesis and metastasis) and blocking their harmful effects, so cancer cells cannot spread and grow.

> "Over the last decade, a large body of peer-reviewed research has revealed that many of our most serious health concerns are associated with elevated levels of

> galectin-3 molecules," said Dr. Eliaz. "Modified Citrus Pectin - derived from citrus peels - is the only proven natural galectin-3 inhibitor and thus offers a powerful and all-natural way to address elevated galectin-3 for cancer, metastasis, and other chronic life-threatening illnesses."

Dysregulated inflammation is often implicated as a pathophysiological phenomenon underlying many chronic diseases and cancers in humans and animals. Biomarkers associated with the responses are those that are often involved in the mediation of inflammation: proinflammatory cytokines, nitric oxide, and lipid mediators including cyclooxygenase enzymes and NF-κB factors produced by **inflammatory cells. Inflammation is in part characterized by the activation of the subsets of the innate immune system, such as monocytes and macrophages**, and the secretion of inflammatory mediators like tumor necrosis factor-α (TNF-α), prostaglandin E2 (derived from cyclooxygenase-II), and nitric oxide. Plant-derived natural products with antioxidant and anti-inflammatory properties are thus potentially beneficial for **prevention and treatment of inflammation-associated chronic diseases and cancer.**

Dr. Julian Kenyon is a colleague of mine. He is a physician of integrative medicine and Medical Director of The Dove Clinic for Integrated Medicine, which has locations in Winchester and London, England. He is Founder-Chairman of the British Medical Acupuncture Society, which was established in 1980, and Co-Founder of the Centre for the Study of Complementary Medicine in Southampton and London, where he worked for many years before starting The Dove Clinic in 2000.

Dr. Kenyon is also Founder-President of the British Society for Integrated Medicine and is an established authority in the field of complementary treatment approaches for a wide range of medical conditions. He graduated from the University of Liverpool with a Bachelor of Medicine and Surgery degree in 1970, and subsequently with a Doctor of Medicine research degree. In 1972, he was appointed a Primary Fellow of the Royal College of Surgeons, Edinburgh. Dr. Kenyon has written approximately twenty books, has had many academic papers published in peer review journals and has been granted several patents. He has a particular interest in immune function and its relationship to the development of life-threatening illnesses and chronic disease in general.

According to Dr. Kenyon, cancer is a wound that doesn’t heal. In normal wound healing, a lot of growth processes happen, but these processes stop when the wound is healed. In cancer, the growth processes don’t stop, and what results is a tumor that continues to grow unchecked. Environmental factors have possibly played a role in the increased incidence of cancer over the

last fifty years. **The correlation between the behavior of cancers and infections is too similar to dismiss infectious causation triggered by adverse environments**.

According to Dr. Kenyon, dietary changes are also related to the rapid increase in the occurrences of cancer. In England, the longest-lived population was the mid-Victorian working class (the Victorian period was from 1837 to 1901). This has been well-studied, and research has established that these people lived longer than we do today. Their cancer incidence was about ten percent of ours, and their cancers were mostly hereditary. The working-class Victorians were mostly laborers, and the vats in which they stored their food were high in many different types of polyphenols, which are nutritional constituents of food that have anti-cancer properties. These vats also contained significant amounts of oligosaccharides, which protected the people's guts and in turn, aided in their cell-mediated immune function, which is the body's main defense against cancer. Also, they had large amounts of phytonutrients in their diets, which came from food that they grew themselves.

Chapter 3: Sonophotodynamic Therapy for Cancer

"…after assessment gives the **unique frequency** to operate on patients, **waves of sound** kill **the cancers**. They become lifeless and the poisons leave the body. '

Nostradamus - 16th Century

Dr. Kenyon is one of the few doctors in the world that delivers sonophotodynamic therapy (SPDT) to patients with cancer. Photodynamic therapy (PDT) is known and provided, however infrequently, at clinics like Cancer Centers of America. However, a major inadequacy of PDT is the inability of light to penetrate deeply into the body and reach an active tumor site.

PDT defined: PDT is the use of light-sensitive substances, which accumulate selectively in cancer cells and when exposed to the light of an appropriate wavelength causes an excited state, that is able to transfer its energy to oxygen. This transfer of energy causes the electrons in oxygen to rearrange and assume a different electronic configuration, where all electrons in the oxygen molecule have paired up, resulting in a particular electron spin configuration. This is highly reactive and initiates a series of events that leads to the release of Cytochrome C from the mitochondria (these are the engines of the cell and are present in large numbers in all cells) and this initiates tumor cell death. Tumors tend to be hypoxic (lacking in oxygen), so in treatment protocols in some cases, ozone autohemotherapy is also used, which is a method of increasing oxygen at the tumor site.

Sonodynamic Therapy: SDT is the use of low-level ultrasound that produces tumor destruction from the non-thermal effects of ultrasound, especially cavitations in malignant cells. Ultrasonic cavitations generate free radicals from the breakdown of water molecules. The Photodynamic agent used is also sensitive to ultrasound frequencies. This approach allows deeper penetration into the body. Sonodynamic therapy is carried out using a simple therapeutic ultrasound machine with an especially designed treatment head known as a maniple, which is applied over the affected area with some ultrasound gel placed on the skin. This is done after the light bed exposure.

The Combination - SPDT: This uses light therapy followed by low-level ultrasound, which kills cancer cells using a non-thermal effect, especially cavitation. The agent used is sensitive to the ultrasound frequency of 3 Mhz. Following the light bed exposure (Photodynamic Therapy), the patient sits in a comfortable chair and the ultrasonic probe, covered with ultra sound gel, is

moved over the skin on the area nearest to the main tumor mass. The use of ultrasound enables penetration significantly deeper into the body.

The Sensitizer: Most photosensitizers come from a class of naturally occurring compounds called porphyrins. Natural porphyrins are breakdown products from recycled hemoglobin and are inherently light sensitive. These accumulate in tumors and cause cancer cells to auto-fluoresce. The first generation of photosensitizers approved for use in cancer treatment - photofrin, - were derived from hemoglobin, while some of the more advanced agents are Chlorophyll derivatives.

PDT has several advantages over surgery and radiotherapy; it is comparatively non-invasive, it can be targeted accurately and repeated doses can be given without the total dose limitations associated with radiotherapy, and the healing process results in little or no scarring. PDT can always be done on an out-patient or in-patient setting, and it has no significant side effects.

Sonodynamic Photodynamic Therapy (SPDT) is a significant advance on PDT. This uses a specific agent which does not have to be given intravenously and can be given orally. It accumulates selectively in tumor sites and does not persist in the skin, so no photosensitivity occurs. It is also a whole-body treatment and does not require the use of lasers.

The agent is sensitized by a specialized light bed consisting of several tens of thousands of light-emitting diodes, emitting in the red-light region and the infrared region of the spectrum. Because the breakdown wavelengths of the oral agent also occur in the infrared region, this allows deeper penetration into the body, enabling tumors to be treated from the surface. Therefore, this is a non-invasive, whole-body treatment. The treatment program can be repeated as often as is necessary, and for advanced tumors it is best to treat slowly so as to avoid too rapid a tumor break down in too short a time.

Here is an example of the SPDT protocol used by Dr. Kenyon at the Dove Clinic.

The procedure of sonodynamic therapy is carried out using a simple therapeutic ultrasound machine with a specially-designed treatment head known as a maniple, which is applied over the affected area, along with ultrasound gel.

In our practice, patients usually do photodynamic treatments on the light bed followed by sonodynamic therapy. Sonodynamic photodynamic therapy (SPDT), or the combination of the two therapies, represents a significant advancement over earlier methods of photodynamic therapy. We can now give patients the light-sensitive substances to take orally, whereas

previously, we had to administer them intravenously. This is advantageous because giving patients a light-sensitive agent orally (sublingually) allows it to accumulate more slowly at the tumor site, which means that less of that agent gets excreted through the kidneys.

When given intravenously, there's an immediate, large peak of the light-sensitive substance(s) in patients' serum (blood) which leads to significantly larger amounts of the substance getting excreted through their kidneys. The agents that we use in sono- and photodynamic therapy accumulate selectively at the tumor sites and don't produce the same photosensitive side effects that occur with standard photodynamic therapy.

Sonodynamic Therapy Creates Free Radicals

Many believe that SPDT, as a therapeutic pathway to produce cell-killing free radicals is not possible because the "sono" part of SPDT is not sufficiently energetic to produce them. However, a very esteemed researcher at the NIH proved otherwise. Peter Riesz, Ph.D., Senior Investigator in the Radiation Biology Branch of the Center for Cancer Research is the scientist that performed the landmark work that demonstrated sonodynamic therapy can lead to aggressive free radical formation.

Dr. Riesz earned his Ph.D. in physical chemistry at Columbia University in New York in 1953. Before joining the National Cancer Institute as a research chemist in 1958, he was a research associate in the chemistry departments at the Argonne National Laboratory, Brookhaven National Laboratory and Pennsylvania State University.

Dr. Riesz' research centered around unraveling the chemical effects of ultrasound. He was the first to provide direct evidence for the generation of free radicals from ultrasound. He determined the threshold levels of ultrasound above which free radicals are produced. The abstract to one of his peer-reviewed papers titled, "Sonodynamic therapy - a review of the synergistic effects of drugs and ultrasound"[7] is reproduced here.

> "Sonodynamic therapy, the ultrasound dependent enhancement of cytotoxic activities of certain compounds (sonosensitizers) in studies with cells in vitro and in tumor bearing animals, is reviewed. The attractive features of this modality for cancer treatment emerges from the ability to focus the ultrasound energy on malignancy sites buried deep in tissues and to locally activate a preloaded sonosensitizer.

> Possible mechanisms of sonodynamic therapy include generation of sonosensitizer derived radicals which initiate chain peroxidation of membrane lipids via peroxyl and/or alkoxyl radicals, the physical destabilization of the cell membrane by the sonosensitizer thereby rendering the cell more susceptible to shear forces or ultrasound enhanced drug transport across the cell membrane (sonoporation)."

Evidence against the role of singlet oxygen in sonodynamic therapy is discussed. The mechanism of sonodynamic therapy is probably not governed by a universal mechanism, but may be influenced by multiple factors including the nature of the biological model, the sonosensitizer and the ultrasound parameters. The current review emphasizes the effect of ultrasound induced free radicals in sonodynamic therapy."

The important point is that aggressive oxidative free radicals can be produced with a relatively low energy source - ultrasound - and constitutes a viable treatment for pathogens and tumor destruction.

Dr. Kenyon has published several papers on SPDT, several of which I am a co-author. Here is a listing of his and related publications and some graphics that demonstrate the effectiveness of SPDT against cancer.

- Activated cancer therapy using light and ultrasound-a case series of sonodynamic photodynamic therapy in 115 patients over a 4-year period
- Outcome Measures Following Sonodynamic Photodynamic Therapy-A Case Series
- Objective Outcome Measures Following Sonodynamic Photodynamic Therapy–A Case Series
- Regulatory T Cells in Cancer Treatment–The Role of Low Dose Cyclophosphamide in Sonodynamic Photodynamic Therapy and Immunotherapy
- Photodynamic and Sonodynamic Therapy, Experiences with a Novel Approach
- Rationale of Combined PDT and SDT Modalities for Treating Cancer Patients in Terminal Stage—The Proper Use of Photosensitizer
- Toxicity and Cytopathogenic Properties Toward Human Melanoma Cells of Activated Cancer Therapeutics in Zebra Fish
- Method of Use of Porphyrins in Preparing a medicament For Sonodynamic Therapy and a Method of Sonodynamic Therapy Using Porphyrins
- Sonodynamic and Photodynamic Therapy in Advanced Breast Carcinoma: A Report of 3 Cases

- The Tumoricidal Effect of Sonodynamic Therapy (SDT) on S-180 Sarcoma in Mice
- Sonodynamic and Photodynamic Therapy in Advanced Refractory Breast Cancer

Some selected graphical data from these publications are included here.

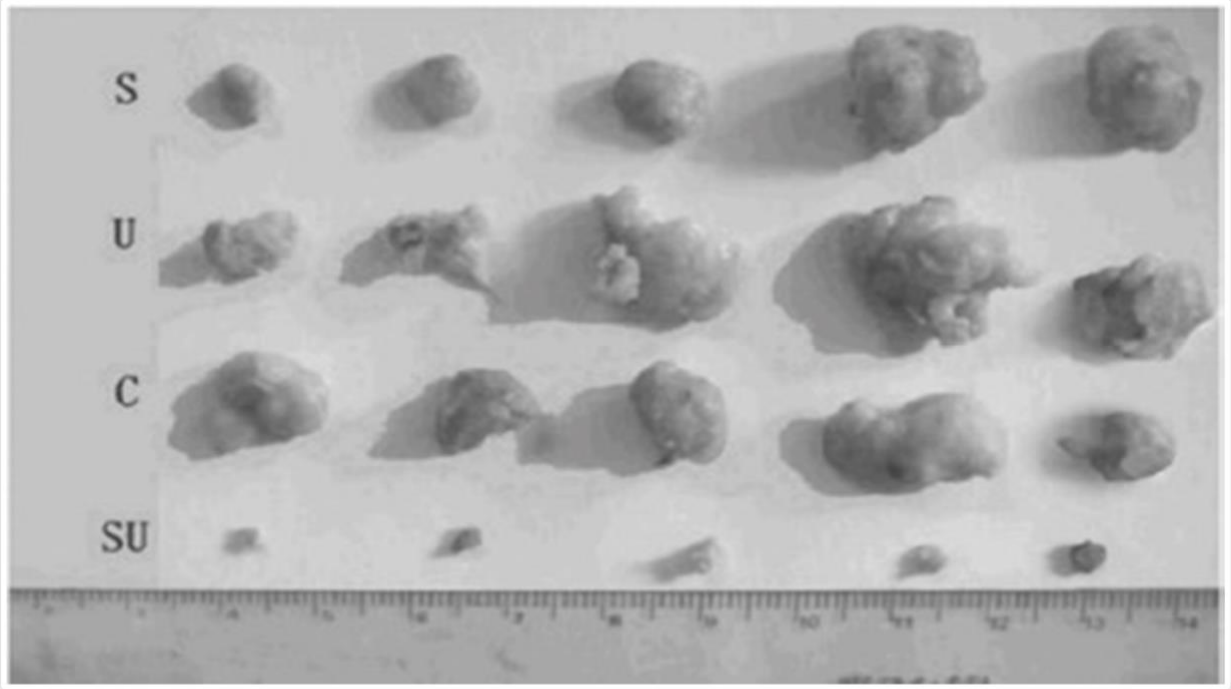
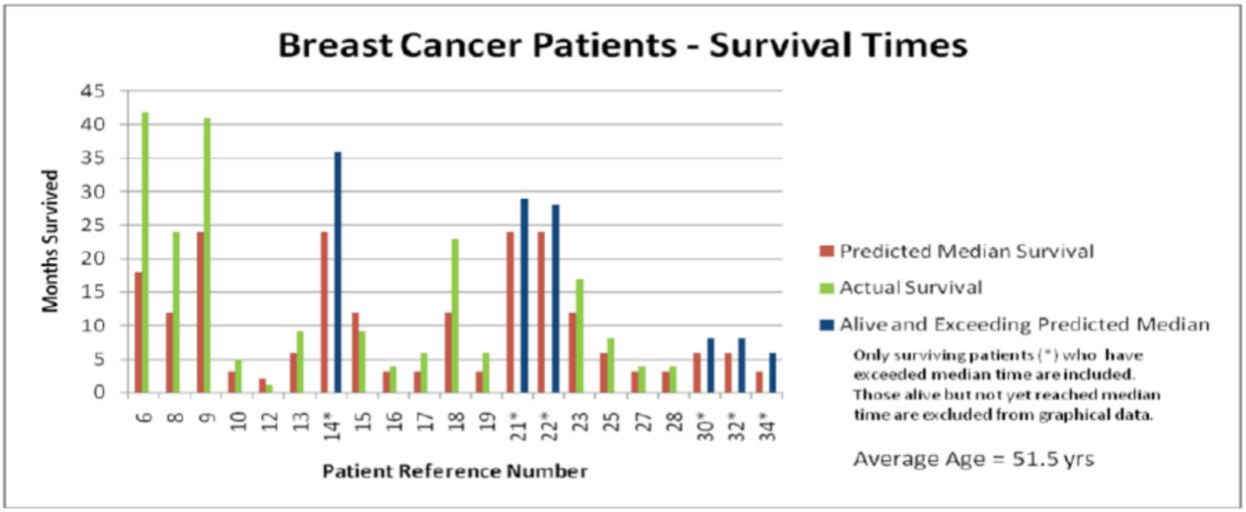
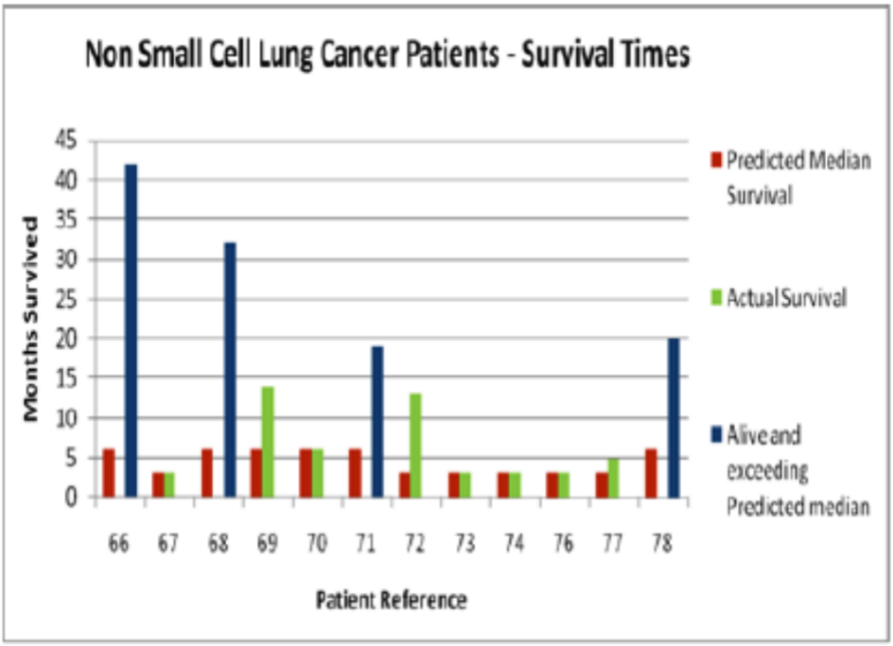
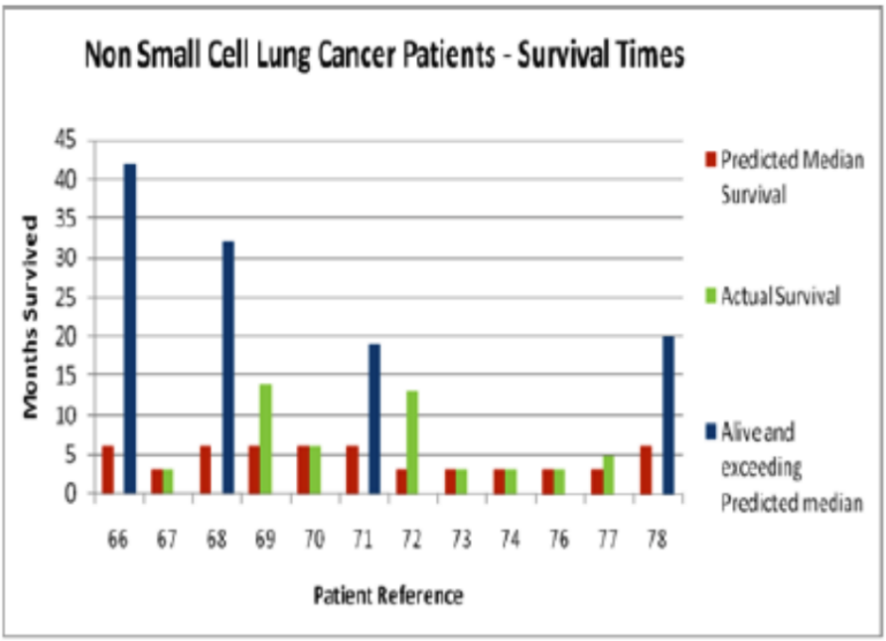


Figure 2: Photographs of mouse S-180 tumours peeled off 15 days after treatment from each group of mice, showing significant reduction in tumour volume after combined sonnelux-1 and ultrasound administration i n a light tight room. Top line (S) – Sonnelux-1 treatment without ultrasound or light exposure. Second line (U) - ultrasound 1. 2W/cm2 without Sonnelux-1 administration. Third line (C) – Control sample without ultrasound or Sonnelux-1 administration. Fourth line (SU) - Sonnelux 1 treatment plus ultrasound 1.2W/cm2 in a light tight room.







SPDT is not a panacea because, as a tumor progresses, the likelihood of reversing the damage diminishes. However, the treatment modality is important as a primary or adjuvant therapy because it does:

- destroy active tumor tissue
- treats infection and other causal agents through a strong, targeted, oxidative process.

This 2-pronged approach makes SPDT treatment an important option across all types of solid tumor cancers.

Chapter 4: Nobel Prize in Medicine and Cancer

The Nobel Prize research of 2018 is what the standard of care has to offer to augment the current slash, burn, and poison approach to cancer treatment. Slash stands for surgery, burn is radiation, and poison is chemotherapy. The short answer is this Nobel Prize approach does not work well and, at best, is similar in efficacy to the standard approach which offers about a 1% remission rate on absolute terms. Reading the medical literature makes this conclusion obvious. Outcomes like long-term survival are not part of the narrative around these new checkpoint inhibitors therapeutics also referred to as immunotherapy.

The New York Times excitedly reported on the immune therapy breakthrough in an article titled, "2018 Nobel Prize in Medicine Awarded to 2 Cancer Immunotherapy Researchers."8 The article seems to imply that the Nobel Prize work is a substantial improvement compared to previous work on immunotherapy. Here are a couple of excerpts from that article.

> "Earlier attempts by other researchers to recruit the immune system to fight cancer sometimes worked but more often did not. Dr. Allison and Dr. Honjo succeeded where others had failed by deciphering exactly how cells were interacting so they could fine-tune methods to control the immune system."
>
> "Checkpoint inhibitors do not work for everyone and they have only been approved for some cancers. They can have severe side effects, and they are expensive, costing more than $100,000 a year. But the approach, known as immunotherapy, has become a mainstay of treatment for a number of types of cancer, and a great deal of research is underway — including work by Dr. Allison and Dr. Honjo — to find the best ways of combining checkpoint inhibitors with one another and with standard treatments to help more patients."

Checkpoint inhibitors may be a mainstay of cancer treatment now, but the work of Honjo and Allison did not actually provide any substantial improvement over previous developments.

An example of the real value of this Nobel Prize work to you is provided in a 2022 publication titled, "Tumor immunotherapies by immune checkpoint inhibitors (ICIs); the pros and cons."[9] Here is an excerpt from the publication.

> "As described, six drugs targeting PD-1 or its ligand PD-L1 and one targeting CTLA-4 have been approved to treat diverse types of solid tumors and classic Hodgkin's lymphoma. When used as monotherapy, the drugs mainly have a remarkable

> increase in objective response rate (ORR) and demonstrate a manageable safety profile. However, more than 50% of patients failed to respond to treatment."

Key points:

- More than 50% of the people did NOT show any response.

How much more? 90%? And, did these patients who received no benefit have side effects? Most studies are short-term. These drugs, even though called "immunotherapy" actually suppress your immune system. Think about how much effort health-focused people make to improve immunity yet these drugs can nullify those efforts without any benefit most of the time.

- Positive results are measured using ORR.

This ORR is a measure of tumor burden. It is not a measure of survival or other benefits to the patient. If these drugs worked, the outcomes would be measured based on improvement in survival.

We must be skeptical about side effects, or more appropriately stated, harm caused by taking these drugs. The aforementioned paper discusses the paltry potential benefit from this treatment but also discusses toxicities.

> "Unfortunately, ICIs therapy has also been associated with the occurrence of some immune-related untoward events, which diverge among patients based on the agent, malignancy, and individual susceptibilities. Skin and colon are the most mutual organs, while the liver, lungs, kidneys, and heart are negatively affected by ICIs. Invariably, such toxicities are detected by excluding other secondary infectious or inflammatory underlies. Corticosteroids are generally utilized to alleviate moderate and severe immune-related unwanted events, whereas additional immunosuppressive modalities may sometimes be required. The incidence of such toxicities may necessitate cessation of immunotherapy regarding the specific toxicity and its severity."

Ugh, the immunosuppressing ICI therapy needs the application of other immunosuppressing agents to clean up the mess created by these new drugs. And, when the patient dies, it is easy to blame it on an underlying condition rather than the treatment. Notice that just about all the major organs are impacted by the toxicity of ICIs - skin, colon, liver, lungs, kidneys, and heart. The brain is not on the list - yet. More research is clearly needed.

Be forewarned that cancer vaccines are next on the pharmaceutical agenda. This topic was broached in the paper.

> "Therapeutic cancer vaccines facilitate tumor regression, elimination of minimal residual disease (MRD), and also establishing the long-term antitumor memory and avoiding non-specific or adverse reactions. To date, FDA has approved three vaccines, including Bacillus Calmette-Guérin (BCG) live, sipuleucel-T, and also talimogene laherparepvec (TVEC) for patients with early-stage bladder cancer, prostate cancer, and melanoma, respectively."

The most recent publication on checkpoint inhibitors reports very positive results.[10] Are they real? Here is the results summary from the article.

> "A total of 12 patients have completed treatment with Dostarlimab and have undergone at least 6 months of follow-up. All 12 patients (100%; 95% confidence interval, 74 to 100) had a clinical complete response, with no evidence of tumor on magnetic resonance imaging, 18F-fluorodeoxyglucose–positron-emission tomography, endoscopic evaluation, digital rectal examination, or biopsy. At the time of this report, no patients had received chemoradiotherapy or undergone surgery, and no cases of progression or recurrence had been reported during follow-up (range, 6 to 25 months). No adverse events of grade 3 or higher have been reported."

The New York Times jumped on this trial in an article full of superlatives. Superlatives are almost always a red flag. Be cautious of these results but also, we must maintain an open mind. This is one instance where I agree with the pundits, more studies are required with many more participants and over a longer period of time. And, the endpoint must be survival, not the presence or size of the tumor. It would be nice to see the results of a study not sponsored by the manufacturer. It is also a bit odd that the NY Times reports that 18 patients were involved but the actual study reports that only 12 completed the treatment.

This drug trial was not without adverse effects or events. The study noted no adverse events of grade 3 or higher have been reported. There is a difference between "reported" and "occurred." This is why larger studies are needed. This is the adverse event grading system according to cancer.gov.

Grade refers to the severity of the Adverse Event (AE).

Grade 1 Mild AE

Grade 2 Moderate AE

Grade 3 Severe AE

Grade 4 Life-threatening or disabling AE

Grade 5 Death related to AE

It is encouraging that no severe side effects were reported but what were the Grade 2 events like and how many of the 12 had them?

Does cancer really evade the immune system? This is what we have been told, but is it true? The only real proof to support this thesis is the tumor itself. If the tumor grows, then it must evade immunity - right? But every chronic disease, using this reasoning, evades the immune system. Could this be another ploy by big pharma and their FDA partner to eventually mandate cancer vaccines for all?

These reported results cause me to recall a paper written by the prestigious Stanford professor, John Ioannidis. The title of that paper is, "Why Most Published Research is False."[11] When you read that paper, many of the criteria stated by Dr. Ioannidis appear in this checkpoint inhibitor report. That is, many of the criteria that infer false conclusions.

Part of the justification for this new immunotherapy is the presumption that cancer evades the immune system. Thus, therapeutic approaches "help" the immune system. A search for statements about cancer evading the immune system yields 20,000,000 unique hits. Here is one of those references from cancerresearchuk.org.

> "But as time goes on, cancer cells can develop genetic changes that help them escape the immune system. This is what has been called the 'escape phase'. “Unfortunately, once cancer cells really start to change and grow, they come up with ingenious ways of bypassing our immune cells and escaping their detection.”

This point boils down to how immunity is measured. The most fundamental part of our immune system is that of innate immunity. This system consists of 5 different general types of white blood cells.

Rest assured that cancer does NOT escape the scrutiny and efforts of the immune system. It is all about the proper interpretation of biomarker data. In the United States, and adopted globally, biomarker "normal" values are based on populations - not on science. And, the normal

markers are based on acute (flaming), not chronic (smoldering) disease. When cancer is fully developed, biomarkers show flaming levels. When it is developing, biomarkers are only "smoldering" and the standard of care interpretation is that there is no immune response because the ranges of normal are inappropriately defined. The assertion that cancer evades the immune system is dead wrong.

The following are labs from a lady with late-stage metastatic breast and liver cancer. She survived cancer with treatment that included a combination of nutrition, anti-infection, and chemotherapy.

▲ WBC [01]	11.4	High
▼ RBC [01]	3.67	Low
▲ Monocytes(Absolute) [01]	1.8	High
▲ Platelets [01]	531	High
▲ Sedimentation Rate-Westergren [01]	72	High
▲ BUN [01]	33	High
▲ Creatinine [01]	1.24	High
▼ eGFR If NonAfricn Am	50	Low
▼ eGFR If Africn Am	58	Low
▲ Uric Acid [01]	13.9	High
▲ Cholesterol, Total [01]	345	High
▲ Triglycerides [01]	304	High
▼ HDL Cholesterol [01]	25	Low
▲ VLDL Cholesterol Cal	66	High
▲ LDL Chol Calc (NIH)	254	High
▲ C-Reactive Protein, Cardiac [01]	93.08	High
▲ Homocyst(e)ine [01]	17.6	High
▲ TSH [01]	9.760	High
Thyroxine (T4) [01]	8.4	
▼ Triiodothyronine (T3) [01]	50	Low
▼ Triiodothyronine (T3), Free [01]	1.5	Low
▲ Reverse T3, Serum [A, 02]	81.2	High

▲ BUN/Creatinine Ratio	27	High
Sodium [01]	136	
Potassium [01]	4.8	
▼ Chloride [01]	91	Low
Carbon Dioxide, Total [01]	24	
■ *Calcium* [01]	*16.2*	*Critical*
Protein, Total [01]	7.0	
▼ Albumin [01]	3.4	Low
Globulin, Total	3.6	
▼ A/G Ratio	0.9	Low
Bilirubin, Total [01]	1.0	
▲ Alkaline Phosphatase [01]	142	High
▲ AST (SGOT) [01]	373	High
▲ ALT (SGPT) [01]	48	High
▼ Iron Bind.Cap.(TIBC)	169	Low
▼ UIBC [01]	130	Low
Iron [01]	39	
Iron Saturation	23	
▲ Ferritin, Serum [01]	3335	High

Labs like these do anything but indicate that cancer evaded the immune system. Almost every biomarker measured was out of the standard of care range including white blood cell counts. Her NLR was 4. In this case, it was not extraordinarily high and that is why multiple biomarkers must be obtained.

The following are labs from a gentleman who succumbed to metastatic cancer.

WBC	*54.1*	*Critical*	Alkaline Phosphatase	254	High
RDW	16.0	High	AST (SGOT)	101	High
Platelets	*41*	*Alert*	ALT (SGPT)	342	High
Baso (Absolute)	1.6	High	Iron	160	
Myelocytes	3	High	Ferritin, Serum	3293	High
Other, Lineage Uncertain	26	High	BUN	43	High
Neutrophils (Absolute)	11.4	High	Creatinine	2.47	High
Lymphs (Absolute)	16.2	High	eGFR If NonAfricn Am	25	Low
Monocytes(Absolute)	9.2	High	Uric Acid	12.5	High
Homocyst(e)ine	22.2	High	Triglycerides	271	High
Sedimentation Rate-Westergren	45	High	HDL Cholesterol	19	Low
			VLDL Cholesterol Cal	48	High
Glucose	190	High	LDL Chol Calc (NIH)	122	High
Hemoglobin A1c	8.4	High	C-Reactive Protein, Cardiac	65.84	High

The NLR, in this case, was 0.7. The optimal range for the NLR is 1.2 - 1.5. In general, the risk increases much more dramatically on the low side of normal compared to the high side. As stated earlier, few if any studies exist on the association of cancer with a low NLR.

After looking at these labs, it is difficult to assert that cancer evades our immune system. Could it be that the powers that be want to drive a specific type of treatment that has nothing to do with inflammation and infection? In both cases, the primary white blood cells of innate immunity were consistently and, in the case of the gentleman, extraordinarily high.

What about cancer at its genesis? What does a white blood cell count profile look like under this circumstance? Currently, the way labs are measured and interpreted it is impossible to determine if cancer is matriculating. Most diseases are chronic and thus smolder for a long period of time prior to expressing symptoms or disease. Paramount to characterizing and reversing chronic processes is the proper interpretation of labs. The current reference ranges must be mothballed as they do more to protect doctors from liability than to protect you from progress into serious disease. Data on early mortality or survival is a powerful predictor of health. An appropriate way of interpreting labs is based on early mortality risk – not the subjective population statistics currently imposed on us. This science-based approach must be applied in order to understand your smoldering cancer risk and status.

The COVID-19 pandemic provided bona fide evidence that our healthcare system is deficient. So-called “big data” that has been around in healthcare for decades contributed no solutions to the pandemic. Big Data is supposed to help healthcare providers by providing new insights into existing health information in unprecedented ways. The potential of big data in healthcare, however, relies on the ability to detect patterns and to turn high volumes of data into actionable knowledge for precision medicine and decision-makers. Thus, big data’s non-contribution to the crisis illustrates that it too lacks precision and accuracy. The data available

to these programs is quite “big” but it is hardly good data. The expression “garbage in, garbage out” comes to mind.

The article, “Benefits and challenges of Big Data in healthcare: an overview of the European initiatives,”[12] unwittingly explains the limitations of big data. Some key excerpts from this paper include:

1. According to McKinsey, the term Big Data refers to datasets whose size is beyond the ability of typical database software tools to capture, store, manage, and analyze.
2. Gartner proposed the popular definition of Big Data with the ‘3V’: Big Data is volume, high-velocity, and high-variety information assets.
3. According to other definitions, Big Data is also characterized by a fourth dimension: Veracity, concerning the quality, authenticity, ‘trustworthiness’ of data.
4. Furthermore, there is an emergent discussion that ‘Big’ is no longer the defining parameter, but rather how ‘smart’ the data are, focusing on the insights that the volume of data can reasonably provide.

Point 2 above uses the concept “high-variety information assets.” Since the same lipid and metabolic labs are drawn on everyone, including those with cancer, this hardly constitutes “high variety.” This must change.

Point 3 is the most important concept. The quality, authenticity, and trustworthiness of the medical data used to improve your health are inferior, unfortunately due to the design of the payer system, drug companies, and statistics used to rationalize decisions about your health. Since reference ranges used to determine your health are based on populations, not science, you are often assumed healthy when, in fact, you have a smoldering disease.

Point 4 is about smart data. Deming perfected the process of continuous improvement which means learning from mistakes and triumphs and evolving. If doctors are restricted by the coding system, there is no evolution and no advancement in “smart” data. Doctors are essentially rereading “See Spot Run” rather than advancing to “The Tale of Two Cities.” That is, they too often rely on the glossy pharmaceutical brochure rather than delving deep into the medical research literature that does have many right answers if you know how to filter out the bias. Big data will be challenged to build such a filter. The only solution for you is to know how to interpret your own labs. Your standard of care doctor does not.

To understand your health, you must first know what values for biomarkers are truly normal, meaning they indicate no or very low risk. Dr. Clement Trempe of Harvard Medical School would often start a conversation with other doctors with the phrase, “Are you proud of your workup?” What he meant is - have you done all the proper assessments and diagnostic tests to determine what is causing the aliments presented by your patients? He was the first doctor to indicate to me that reference ranges for biomarkers were changing in the wrong direction over time. That is, their values were not predictive of early, low-grade disease. He also said that early mortality is the most important medical endpoint. The most logical reference range for a biomarker, then, is based on widely available early mortality data. The standard of care reference ranges are not based on sound science.

The entire purpose of today’s laboratory reference ranges is to determine if you have a diagnosable medical condition. However, these ranges completely ignore the fact that health and disease are a continuum. Diabetes “happens” when your A1C is 6.5% or above. However, to be truly healthy, the preferred value for A1C should be within the range of 4 - 5%. At <5% human physiology is completely “insulin sensitive.” That means the hormone insulin is 100% efficient at escorting glucose into a cell that requires energy. Any value above an A1C of 5 percent infers the beginnings of the human-defined disease of type 2 diabetes as cells are becoming insulin resistant. For the A1C value, the standard of care has risk “steps” for pre-diabetes and diabetes, thus a continuum of sorts. However, no or little action is taken for any value below an actual disease diagnosis. Normally, when a doctor reviews lab values, you are never told about shades of grey. Instead, you are told either a biomarker is “ok” or “abnormal.”

The A1C value is a familiar blood marker value and many of us know that and do not want to be pre-diabetic (A1C 5.7 - 6.4%). However, there are many other markers that are far more impactful to current (acute) and future (chronic) states of health and we need to know what is a good “pre-disease” level as opposed to the level that classifies us on either side of the health/sick point.

Upon deciphering the definition of reference ranges (also called intervals), confidence in these values, as applied to your health, is not instilled.

Here is an excerpt from testing.com:[13]

> “Some lab tests provide a simple "yes" or "no" answer. For instance, was the test positive for the bacteria that cause strep throat? Many other tests, however, are reported as numbers or values. Laboratory test results reported as numbers are not

meaningful by themselves. Their meaning comes from comparison to reference values. Reference values are the values expected of a healthy person. They are sometimes called "normal" values."

There are three important facts you need to know about reference ranges:

1. A normal result in one lab may be abnormal in another: You must use the range supplied by the laboratory that performed your test to evaluate whether your results are "within normal limits." While the accuracy of laboratory testing has significantly evolved over the past few decades, some lab-to-lab variability can occur due to differences in testing equipment, chemical reagents used, and analysis techniques. Consequently, for most lab tests, there is no universally applicable reference value.

Note the way the statement about reference range variability makes it sound almost scientific. However, these ranges do not change that frequently. When they do, it is usually by consensus of large medical societies and other interests. Please note that the range for total cholesterol continues to tighten in favor of the prescription of statin and other lipid-lowering drugs. The range for the normal white blood cell count has widened. This broader range protects doctors from liability in case the patient does poorly or dies. There is no clear one-for-one drug to lower white blood cell counts so the reference range on the high side is close to that measured in people with severe conditions like lymphoma or sepsis.

2. A normal result does not promise health: While having all test results within normal limits is certainly a good sign, it's not a guarantee. For many tests, there is a lot of overlap between results from healthy people and those with diseases, so there is still a chance that there could be an undetected problem. Lab test results in some people with disease fall within the reference range, especially in the early stages of a disease.

The Women's Health Initiative, a very large prospective study, shows that women with a white blood cell count of 6700 have twice the fatal heart disease compared to women with a white blood cell count of 4700. The upper value of normal in the reference range is 11,000. So clearly, women having a white blood cell count over 6700 but below 11,000 is scientifically proven not to be a promise of good health. Yet, the value of 6700 falls well within the range of "normal" in the standard of care. Is there any wonder why cancer supposedly evades the immune system with this type of interpretation of normal?

3. An abnormal result does not mean you are sick: A test result outside the reference range may or may not indicate a problem. Since many reference values are based on statistical ranges in healthy people, you may be one of the healthy people outside the

> statistical range, especially if your value is close to the expected reference range. However, the abnormal value does alert your healthcare provider to a possible problem, especially if your test result is far outside the expected values.

The explanation of reference ranges is further exemplary as to why the standard of care must be dismantled. The CDC states that 90% of healthcare and healthcare dollars are for chronic conditions. A chronic disease including cancer, by definition, does not kill quickly. Therefore, it can "smolder" for a long time before accelerating into a bad result. Often, labs for people with even severe chronic conditions do not rise too far into the "smoldering" level – and almost never leave the broad confines of reference ranges. As the chronic condition progresses, symptoms and lab values follow the bell curve with biomarkers rising rapidly and sometimes even surpassing the upper or lower limit of a reference range. These measurements are often obtained too late, usually after a tragic health event.

Summary: A normal result varies from lab-to-lab - for the same test! A normal result does not promise health, and an abnormal result does not mean you are sick. Total cholesterol measurement is a good example of an abnormal result that does not mean you are sick. The normal ranges for cholesterol are wrong in most instances.

Do you find the way the standard of care makes conclusions about your health disturbing? Is there science that can be applied to improve the accuracy of reference ranges? Humans landed on the moon in 1969. We can do better today. The relationship between biomarkers and early mortality risk data is all published and is what my team uses to properly interpret your labs.

In a subsequent chapter, I cover biomarkers associated with cancer risk. However, white blood cell counts are included here because the main thesis of the standard of care is that cancer cannot be detected very early because it evades immunity. You now know it is not true. The most basic marker of immunity - innate immunity in particular - is your white blood cell count (WBC). The value is a combination of all five types of white blood cells.

White Blood Cell Counts (WBC)

The process for determining the right reference range is laborious and involves searching deep into the medical literature published in the NLM. It starts with a basic search on the terms "WBC" and "mortality" that yields 260,000 references. The combination term "white blood cell" and mortality yields an equally daunting number of references, specifically 305,000. Fortunately, search engines provide refinements, one of which is "word in the title of the document only." Using this search strategy yields 17 and 149 references, respectively. The term

"survival" is another way mortality data is expressed. The title-only search with survival, replacing mortality yields 25 and 52 references, respectively. These 200 or so references are the starting point for researching and establishing the relationship between WBC and mortality, on the way to establishing a scientific reference range.

Indeed, even mortality is not a perfect endpoint for a biomarker reference range. Some people may be chronically ill due to a disease process that leads to an elevation of the WBC biomarker, and they do not die young, statistically. Therefore, view the reference range derived from early mortality data as scientific, but still not completely optimal. For example, the proper reference range for WBCs, based on early mortality data, is 4,000 – 5,700 counts/mL. Healthiest people have WBC counts of 4,200 – 4,600. However, as stated above, mortality risk is much less subjective compared to, say, heart disease or some other disease syndrome.

The next task is to read the papers that link WBC and mortality to evaluate the statistics behind the studies. Many papers are eliminated because, not all the papers with the apparently right title, have the right data. In medical speak, the study performed was not properly "powered" to draw definitive conclusions about the relationship between the two variables. Plenty of studies do meet the "power" criteria for WBC and early or "all cause" mortality risk so science-based normal ranges can be determined.

The current "normal" ranges for WBC levels are presented in Table 1.

Source	WBC (cells / microliter) Normal Range
LabCorp	Varies: 3,400 – 10,800 or 4,500 – 10,000
Mayo Clinic (December, 2020)	3,400 – 9,600
Mayo Clinic 2 (Date not given)	4,000 - 11,000
WebMd	4,500 – 11,000
Quest Diagnostics	3,800 – 10,800
MedLinePlus	4,500 – 11,000
Accu Reference Medical Labs*	4,200 – 11,800
Cleveland Clinic	5,000 – 10,000
MedPage Today	5,000 – 12,000

Table 1. Standard-of-Care reference ranges for "normal" white blood cell counts are based on the accepted definition of normal levels but not on safe or optimal levels.

LabCorp and Quest Diagnostics are the major testing labs in the United States. They provide your results to your doctor. Your doctor then tells you that, if the WBC count is below 10,800,

or 9,600, or 10,000, or 11,000, or 12,000 on the high end of the WBC normal range, you are normal and healthy. Your doctor may also declare your good health if your WBC count is above 3,400, or 3,800, or 4,000, or 4,200, or 4,500, or 5,000. With this kind of variability, your health may be subject to an identity crisis requiring a mood-altering drug. The normal values on both the low and high sides continue to rise, with the possible exception of that published by the Mayo Clinic. However, since they have two published normal ranges associated with their brand, it is difficult to draw a conclusion. The trend, however, is that the point at which you cross into poor health keeps increasing on the high and low sides.

The following are selected studies on WBC, early mortality, heart disease, and cancer.

National Institute on Aging, National Institutes of Health weighed in on white blood cell counts. A team from the NIH and Italy produced a study titled, "White Blood Cell Count and Mortality in the Baltimore Longitudinal Study of Aging."[14] They start off their paper with a strong statement about the value of WBC count:

> **"White blood cell (WBC) count is a marker of systemic inflammation, and** elevated WBC count is associated with all-cause mortality [15] as well as cancer, [16] cerebrovascular, [17] and cardiovascular [18] mortality. The WBC count is an independent risk factor for cardiovascular and cerebrovascular events."[19]

That is a strong endorsement for this readily available and inexpensive biomarker of the innate immune response. The National Institutes of Health concluded:

> "Participants with baseline WBC <3,500 cells/mm3 and WBC >6,000 cells/mm3 had higher mortality than those with 3,500 to 6,000 WBC/mm3."
>
> "Participants who died had higher WBC than those who survived, and the difference was statistically significant within 5 years before death."

This very important study teaches us a few things:

1. WBC < 3,500 is a prognosticator of early and unnecessary mortality. Lower white blood cell counts are often associated with pathogenic viral infections and associated cancers.
2. Several of the reported reference ranges indicate WBC counts are abnormal in a range that is actually normal, specifically between approximately 3,500 and 5,000 cells/mL.

3. WBC >5,700 cells/mL is a prognosticator of early and unnecessary mortality from cancer.
4. The WBC is elevated (at least) 5 years before death, thus it is a strong diagnostic predictor of your future longevity.

A comparison between the data from this NIH paper, published in 2007, and so-called authoritative sources that publish reference ranges is shown in Table 2.

Source	WBC Lower Normal	WBC Upper Normal
Upper and Lower Risk Ranges – 2007 Study	3,500	5,700
Standard Reference Range	4,200	10,900

Table 2. WBC ranges Row 1. Ranges are based on the risk of dying young. Row 2. The average standard of care reference ranges from several sources.

That means all those people and patients who rely on their doctors, the major clinical laboratories, and the authoritative medical establishment, who have a WBC >6,000 but less than 10,900 are at much greater risk of dying or suffering from severe cardiovascular disease in the future. What percentage of the U.S. population do you surmise is between 6,000 and 10,900? Guess a lot! How can we be so sure? Death from cardiovascular diseases is the #1 killer of Americans and, in the case of famous people like Tim Russert and Bernard Tyson, medicine claims to be baffled.

Two studies provide bookends to the timeline for understanding normal versus abnormal WBC counts. The purpose is to show that this information is not new and continues to be investigated but the research is not influencing clinical delivery.

Study 1. October 11, 1985, "Prognostic Importance of the White Blood Cell Count for Coronary, Cancer, and All-Cause Mortality."[20] The key points made in this article include:

- For each decrease in WBC count of 1,000 per mL, the risk for CHD death decreased by14% (when higher than 6,000 counts per mL)
- People with a WBC count of 7,750 per mL, on average, had worse outcomes compared to those with average counts of 6,080 per mL

The article abstract is reproduced here.

> "The relationship of white blood cell count (WBC) to fatal and nonfatal coronary heart disease (CHD) incidence and all-cause and cancer mortality was assessed in a subset of participants in the Multiple Risk Factor Intervention Trial (MRFIT). For this group of 6,222 middle aged men, the total WBC count was found to be strongly and

> significantly related to the risk of CHD, independent of smoking status. Change in WBC count from baseline to the annual examination just prior to the CHD event was found to be a significant and independent predictor of CHD risk.
>
> For each decrease in WBC count of 1,000/cu mm the risk for CHD death decreased by 14%, controlling for baseline WBC count and other CHD risk factors (smoking, cholesterol level, diastolic blood pressure). The WBC count was strongly related cross-sectionally to cigarette smoking and smoking status as indicated by serum thiocyanate concentration. Smokers on average had a WBC count of 7,750/cu mm compared with 6,080/cu mm for nonsmokers. The WBC count was also significantly associated with cancer death, independent of reported smoking and serum thiocyanate levels."

A 2022 paper concluded that people who suffer a heart attack and have to be hospitalized die in proportion to their WBC counts. This paper does not give WBC count ranges, however. It is titled, “Correlation between White Blood Cell Count and Myocardial Infarction Mortality in Patients admitted at Tertiary Care Center of Philippines.”21

Study 2. November 18, 2021, “Is White Blood Cell Count Associated with Mortality in Peritoneal Dialysis Patients? A Retrospective Single-Center Analysis.” This paper in important because the authors show all-cause mortality versus “tertiles” – that is 3 different ranges – of WBC counts. They also performed mathematical modeling to create a continuous scale of all-cause mortality risk – a continuum of risk, that is. Several illuminating conclusions emerge from this study.

When WBC count was modeled as a continuous variable and survival models were created, it was found that the mortality risk increased by 23 percent for every 1000 WBC count per mL increase (on the high side of normal WBC counts)

All-cause mortality increased by 270 percent when WBC increased from <8,200 counts/mL to the range 8,200 – 10,500 counts/mL. This second range is considered normal by doctors throughout the world.

WBC counts above 10,500 per mL led to a 450% in all-cause mortality compared to the <8,200 per mL group.

Total cholesterol levels were essentially the same across all groups. Therefore, cholesterol provided no diagnostic value for all-cause mortality.

Figure 4 shows the relationship between WBC counts and all-cause mortality in the continuously variable model - at least on the high end of the WBC count range. As with the NLR marker, data on low levels of WBC are less prolific.

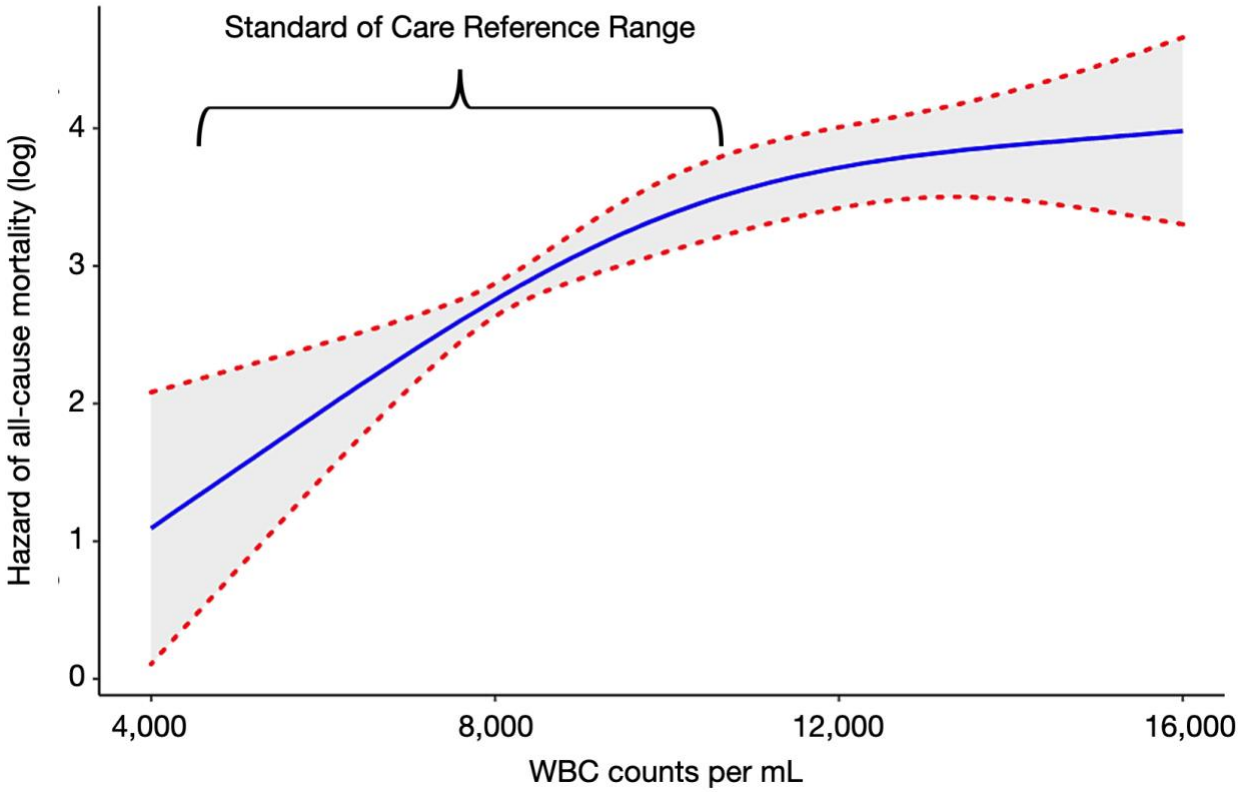


Figure 4. The association between log-relative hazard of all-cause mortality and the white blood cell count.

This research study did not evaluate low levels of white blood cell counts. Based on a substantial number of related research studies, the hazard of dying young increases much more dramatically below 4,000 counts per mL compared to levels above 5,700 counts. The proper range for WBC counts for optimal health is 4,000 – 5,700, based on mortality data. There is less reliable data on the lower end of the spectrum, as most studies lump low values into a group that overlaps with the true normal range making it difficult to accurately evaluate this region.

Another well-respected large study is the Second National Health and Nutrition Examination Survey (NHANES I, II, and III). An abstract from one of the many publications produced by this study provides an excellent summary and is provided here.

> "Inflammation has been shown to be a risk factor for several chronic diseases. Few epidemiologic studies have examined the relationship between markers of inflammation and cancer. The current study included 7,674 Second National Health

> and Nutrition Examination Survey (NHANES II) participants, 30 to 74 years of age, between 1976 and 1980. Mortality follow-up through December 31, 1992, was assessed using the National Death Index and Social Security Administration Death Master File.
>
> A graded association between higher WBC and higher risk of total cancer mortality was observed [highest versus lowest quartile (relative risk [RR] 2.23; 95% confidence interval [CI], 1.53-3.23)] after adjusting for age, sex, and race. After further adjustment for smoking, physical activity, body mass index, alcohol intake, education, hematocrit, and diabetes, WBC remained significantly associated (P trend = 0.03) with total cancer mortality [highest versus lowest quartile (RR 1.66; 95% CI, 1.08-2.56)].
>
> These findings support the hypothesis that inflammation is an independent risk factor for cancer mortality. Additional studies are needed to determine whether circulating levels of inflammatory markers are associated with increased risk of incident cancer."

Realize that WBC counts are not a measure of inflammation. They are a measure of infectious burden. Inflammation is the immune response to the infection. Key summary points from the study are:

- 7,674 people were included in the study findings and that is approximately 300% more than are in randomized trials for the approval of a drug.
- People with optimal WBC counts are over 200% less likely to die from cancer.
- The data provides bona fide proof that cancer is an infectious disease in many cases. Those cases are defined by WBC counts outside of the science-based range of normal or those with an elevated NLR.

Figure 5 presents the summary of the NHANES II data.

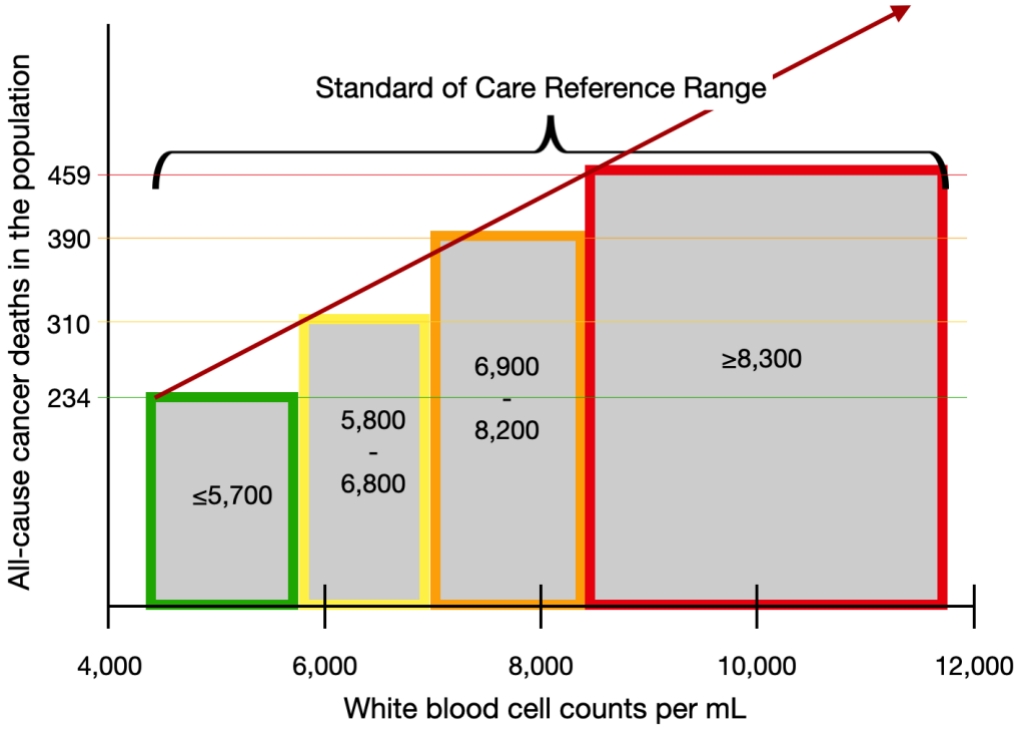


Figure 5. Risk of cancer all-cause mortality by quartile (groups) of WBC counts.

The numbers that modern medicine assigns to "normal" (interpreted as "healthy" ranges) are DEAD wrong. What is the "high" WBC count of concern? The research we cite here shows that health is not defined by some arbitrary cut-off number. That is, you are not healthy at a value of 5699 but unhealthy at 5700. **WBC counts express a continuum of health. This is the real world.**

In summary, your cancer risk is low at a WBC between 4000 and 5700 counts/mL. However, people with the most optimal health have a WBC between 4200 and 4800 counts/mL.

One final point. Using a single biomarker like WBC, even when interpreted correctly. Your health is a story and one biomarker only sees a part of that story. The next chapter goes into the value of multiple biomarkers and explains how even an optimal WBC value may not infer optimal health.

Do you believe that cancer evades the immune system? Do you believe that treatments that suppress immunity will ultimately improve cancer outcomes?

Chapter 5: Modern Germ Theory of Disease

Paul W. Ewald is an evolutionary biologist, specializing in the evolutionary ecology of parasitism, evolutionary medicine, agonistic behavior, and pollination biology. He is the author of Evolution of Infectious Disease (1994) and Plague Time: The New Germ Theory of Disease (2000 and 2002), and is currently director of the program in Evolutionary Medicine at the Biology Department of the University of Louisville.

Ewald is known for his "theory of virulence", suggesting that "the deadlier the germ, the less likely it is to spread," and his theory that many common diseases of unknown origin are likely the result of chronic low-level infections from viruses, bacteria or protozoa. Having "high cholesterol" and being treated with a statin drug is still a disease of unknown origin. No one has a statin deficiency.

Dr. Ewald was featured in an article in "The Atlantic" titled, "A New Germ Theory."[22] A key tell-all statement in that article is reproduced here and sets the framework for the concept that most chronic diseases are infectious in nature - including cancer.

> "Germ Theory, Part II, as conceived by Ewald and his collaborator, Gregory M. Cochran, flows from the timeless logic of evolutionary fitness. Coined by Darwin to refer to the fit between an organism and its environment, the term has come to mean the evolutionary success of an organism relative to competing organisms.
>
> Genetic traits that may be unfavorable to an organism's survival or reproduction do not persist in the gene pool for very long. Natural selection, by its very definition, weeds them out in short order. By this logic, any inherited disease or trait that has a serious impact on fitness must fade over time, because the genes that spell out that disease or trait will be passed on to fewer and fewer individuals in future generations. Therefore, in considering common illnesses with severe fitness costs, we may presume that they are unlikely to have a genetic cause.
>
> If we cannot track them (the disease) to some hostile environmental element (including lifestyle), Ewald argues, then we must look elsewhere for the explanation. "When diseases have been present in human populations for many generations and still have a substantial negative impact on people's fitness," he says, "they are likely to have infectious causes."

Dr. Paul Ewald addresses the chronic disease and chronic infection conundrum in a book titled, "Plague Time" written in 2000. In the chapter titled "Stealth of the Chronic," he explains that chronic diseases are seldom associated with infection due to the concept of crypticity. This simply means that it is difficult to associate the moment of the exposure to an infectious species with the disease that develops up to decades after the exposure. This has everything to do with cancer, heart disease, and a myriad of other chronic diseases. Dr. Ewald explains this challenge in the following way.

Chronos, from the Greek, means "time." Chronic diseases are distinguished from acute diseases because they are drawn out over time. Many chronic infectious diseases, like the most common diseases that menace us today, often have acute phases, but almost all of them have a chronic phase. Lyme disease is a classic example. Someone may experience joint pain or other symptoms that resolve, only to have reactivation decades later when the infected person is immune-compromised sometime in the future.

Shingles are another example. Shingles are a viral infection that causes a painful rash. Although shingles can occur anywhere on your body, it most often appears as a single stripe of blisters that wraps around either the left or the right side of your torso. Shingles are caused by the varicella-zoster virus — the same virus that causes chickenpox. After someone has had chickenpox, the virus lies inactive in nerve tissue near the spinal cord and brain. Years later, the virus may reactivate as shingles.

Do you think the varicella-zoster virus is the only infectious species that can behave this way? That is, lie dormant waiting for a vulnerability to reactivate and cause dis-ease or an actual disease?

This continuum between acute and chronic disease reveals a surprising inconsistency in generalizations about disease causation. The examples above and others like STDs and tuberculosis should have led to the recognition that infectious diseases can be chronic. But when it comes to chronic diseases that do not have a distinct acute phase, infectious causation is often either dismissed or not even considered. Peptic ulcers, for example, do not have a distinct acute phase, and the infectious causation of ulcers - that being triggered by helicobacter pylori - was dismissed for a century in spite of supportive evidence. Warren and Marshall were awarded the Nobel Prize in 2005 for their definitive work on the ulcer - helicobacter cause and effect relationship.

A shocking realization arrives when we notice the general trend of which peptic ulcers are merely a specific example. All the diseases that were accepted as infectious during the last quarter of the nineteenth century were either entirely or largely acute. Diseases were obvious because sufferers had obvious symptoms just after they were infected. However, all the human diseases that have been accepted as infectious during the past quarter-century have been entirely or largely chronic. They are caused by stealth infections.

Infectious causation of some acute diseases was recognized early in the 1800s as a result of conspicuous chains of transmission. The infectious nature of smallpox, measles, and chick pox was recognized by medical experts and the general public decades before the microscope led Koch, Pasteur, and other early microbe hunters to the first cause-effect linkage of bacteria with the disease during the 1870s and 1880s.

Before the identification of microbes, the concept of infection was less tangible, and the distinction between infection and contagion was often blurred. But infection was invoked to refer to a disease caused by something that grew inside people and could be transmitted to others to continue the process.

At the end of the nineteenth century, after the microbe hunters of Pasteur's time had observed some of the bacteria that cause diarrheal diseases, the writers of medical texts were still arguing about whether the bacteria caused the diseases or were just innocent bystanders. Three decades after the transmission of cholera had been neatly demonstrated by the London physician John Snow, and a few years after the bacterial agent of cholera had been identified by Robert Koch, the disease was finally acknowledged as infectious by the pundits.

Vector-borne diseases are infectious diseases delivered to humans by some type of organism, a mosquito or a tick, for example. It took quite a while for this delivery method to be accepted as the root cause of serious disease. If a disease is transmitted by a mosquito, an observer might track down every contact of a sick person without turning up another person who has the disease. This is just what happened in a study of yellow fever in 1822 that killed a slew of French soldiers. It took another sixty years before the epidemiologist Carlos Finlay correctly implicated mosquitoes as the vector for yellow fever.

Infectious STDs posed a similar problem in creating an association between exposure and disease. In this case, the information on exposure was largely withheld even from close friends and family. In this sense, sexually transmitted infections introduce a novel source of crypticity - embarrassment or shame. Because few people have sex in public and most do not go around

broadcasting their sexual activities, knowledge about who has had potentially transmissible contact with whom is lacking.

Grasping the concept of infectious causation of chronic diseases in the modern era has hit both political and scientific roadblocks. Infectious diseases are diverse. They have diverse transmission modes, are diverse in their use of host (our) tissues, and diverse in the harm they cause. Medicine understands acute infectious diseases fairly well because the chains of infectious transmission range from being very conspicuous to pretty conspicuous. A few, such as smallpox and malaria, cause terrible problems for people. But the vast majority rarely kill, and most are so mild that the health impacts they cause would not be sufficiently high to implicate infection based on the severity of the usual acute infectious disease suspects.

The continuum concept of disease, presented in Chapter 1, is an important concept to help us understand infectious diseases. In traditional medicine, you are either healthy or sick. That is, you either have a medical diagnosis or you do not. This is, of course, absurd - but expedient for doctor-patient encounters, insurance reimbursement, and the use of the prescription pad. However, we all lie on the health-disease continuum, Figure 6.

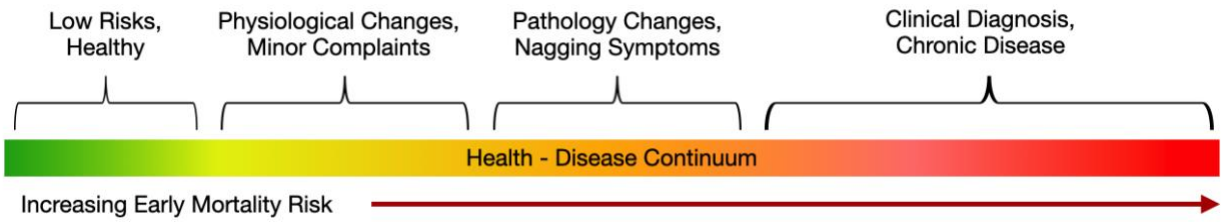


Figure 6. Stages of the health-disease continuum.

The same holds true for infections. Most organisms are beneficial, for example, those of the vast microbiome. Others are called commensal meaning there is neither harm nor benefit, and a small percentage are truly harmful. Even within the group of harmful microbes, there is wide variation in virulence. It is the virulence of the pathogens that determines the severity of disease, and arguably more important - transmissibility. This does not imply that there is a direct correlation between how harmful a pathogen is and its actual ability to be transmitted. Rather, when a disease is obvious because the pathogen causing the disease is quite toxic, then containment and hygiene measures can be implemented quickly to curb the spread. In these cases, the infected person displays symptoms almost immediately. Figure 7 below explains this concept graphically. Ultimately, this figure explains how infections of mild, but clear virulence, are able to spread and cause chronic diseases, including cancer, that plague our society.

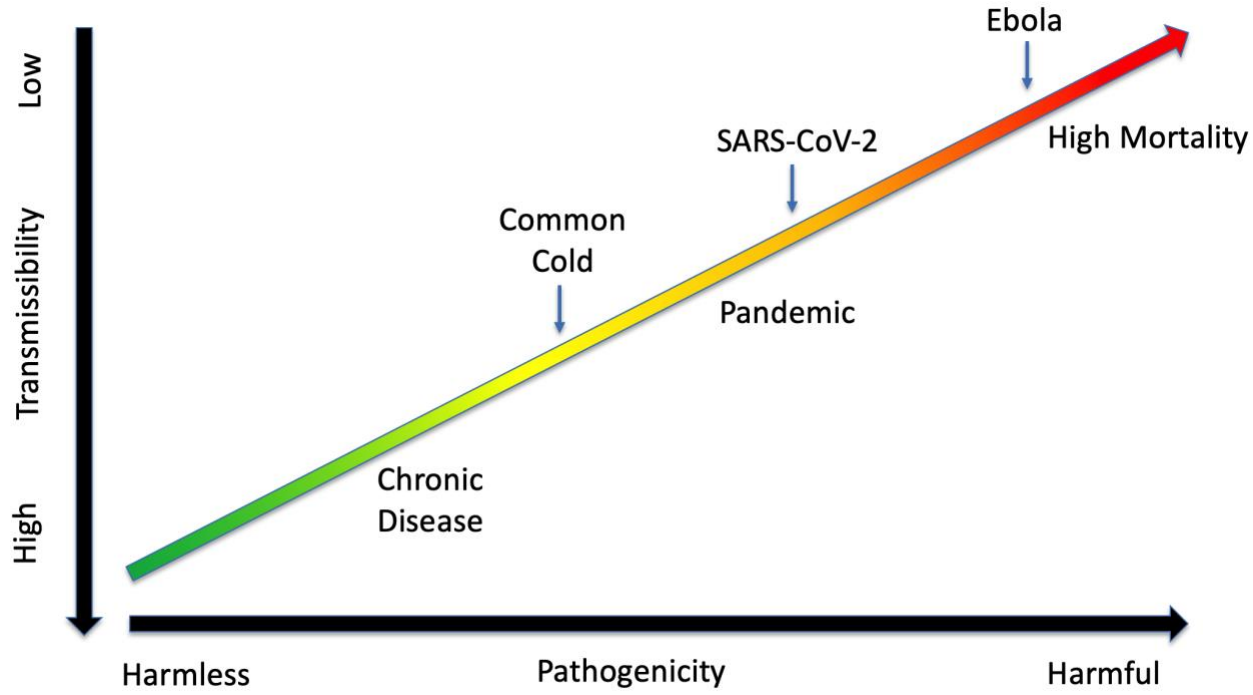


Figure 7. Relationship between pathogenicity of an infectious species and likelihood of transmissibility.

Few in healthcare grasp the distribution of virulence among chronic infectious diseases. Gaps between acute and chronic phases and the difference in symptoms between these phases contributed to the confusion. Syphilis, for example, causes lesions on the genitalia but the chronic phase includes heart disease, insanity, and paralysis. Syphilis became known as the great imitator.

In the 1950s, the connection between infections and chronic disease was, for the most part, abandoned. It just took too much effort and imagination to believe that something could hide in a latent form for decades and then cause disease. The belief was that disease, like heart disease or cancer sprung up suddenly and "out of the blue." It is not entirely clear why medicine dropped the ball. In the 1940s the hypothesis for the infectious causation of peptic ulcers, cardiovascular disease, and cancer was still being considered. In some cases, people were being cured with newly discovered antibiotics. A combination of developments in science and medicine were misinterpreted and misapplied as leaders failed to guard against the biases of human thought - or even stronger influences - the fact that a cured patient is a lost customer.

With regard to associating a disease that springs up later in life with early infectious exposure, cancer provides a poignant example. Consider adult T-cell leukemia, the lethal disease that

results from a cancerous growth of white blood cells. This cancer has been especially well studied in Japan, where people who die from it are infected by a virus as babies from their mother's milk. Though infected during the first year of life, they first develop leukemia many decades later. And, about half the people who eventually develop the specific cancer do so after their sixtieth birthday. Only about one out of every twenty-five infected people develops that cancer.

Imagine trying to apply infectious causation postulates (that of Koch) to evaluate whether suspected viruses cause this cancer. Human subjects cannot be used for ethical reasons. Even if they could, who would conduct a study that might take sixty years to complete - who would fund it? An agent of such a disease might cause the disease only in humans, precluding the use of laboratory animals. If the agent does cause such a disease in laboratory animals, the disease would have to be different if only because lab animals do not live sixty years. For example, if it develops more rapidly, one can always argue the laboratory model is not generating the same disease and is therefore not trustworthy. This kind of argument was used by cancer researchers during the early decades of the twentieth century to dismiss the relevance of the Rous sarcoma virus, which was shown to be an infectious cause of muscle cancer in chickens in 1909.

In breast cancer, the body of evidence in lab animals supports viral causation. Periodontal infection is strongly connected to breast cancer risk. Instead, the standard of care focuses on genetic causation. However, current evidence suggests that genetics accounts for, at most, 20 percent of all breast cancers. It may be that the genes associated with chronic diseases, including cancers, may turn out to be genes that make an individual susceptible to the infectious cause of the disease. Also, recall that microbes can change the host genome. Thus, what percentage of the so-called genetic causes are actually infections at the root? No one knows because this is not being adequately studied. It is not being adequately studied because those who hold the funding dollars will not release it for this type of study. It becomes an issue of bias and money.

Medical authorities and the policies they created played a large role in the current view of infections and chronic diseases. In 1967, U.S. surgeon general William H. Steward made this statement, “It is time to close the book on infectious diseases, and declare the war against pestilence won.” He, of course, was referring to acute infectious diseases and the relatively new treatment - antibiotics. This statement was probably not intended to "close the books" on chronic disease and infection, but that is arguably the way it was interpreted and subsequently implemented.

Dr. Stewart's remarks could be interpreted as shifting attention from infectious diseases to chronic diseases. Of course, if chronic diseases are caused by infection, this shift makes no sense. Regardless, funding switched to chronic diseases under the hidden assumption that the viable hypotheses for causation of chronic diseases excluded hypotheses suggesting infection. In came Ansel Keys and his biased "fat" hypothesis which eventually ushered in a single-minded focus on low fat and eventually statin drugs, both of which exacerbate infection and cancer. Coincidence?

Nixon's War on Cancer was not the abject failure as we have been led to believe. Because of the robust funding available, some monies flowed into the study of infectious causation. During the 1960s and 1970s, cancer researchers were divided into camps that took an either-or attitude. Cancer was attributed to noninfectious agents and human genes or to infectious agents, but rarely to a combination of all factors. There was no evidence then, and there is none now to justify this divided approach except that medical research is its own industry independent of clinical medicine. Researchers tend to work in very tight swim lanes as a way to become recognized experts - albeit in a very narrow niche. This increases their odds of funding compared to a generalist (like me or Dr. Carter).

Two giants of medicine from the 1800s - Pasteur and Bernard - showed you cannot separate infection and internal terrain. And, ultimately internal terrain - your overall health - is most important. That point is made remarkably clear by adult T-cell leukemia where only 4 percent of those infected developed the disease. Thus, a hypothesis of infection cannot reasonably exclude noninfectious influences. All infectious diseases are influenced by situational determinants of health.

The various factions are still fighting for funds and recognition of their narrow thesis. However, we can look back and prioritize the findings to date. Ultimately, we need to assess which approach or approaches have provided the best improvements in health - not just in cancer outcomes. The genetic camp made important contributions to basic biology. They are still making promises about how their approaches will improve human health, holding out hopes, for example, for genetic manipulation as a solution. We shall see but no real solutions have been provided by this approach.

In contrast, those who were studying the infectious causation of cancer have made tangible improvements in human health over the past several decades, particularly by demonstrating the value of reducing the transmission of infectious agents. Historically, hygiene - that is,

controlling transmission - has consistently outperformed any other "treatment" of disease. Figure 8 shows death rates from tuberculosis over the past 160 years (By Ljstalpers - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=54316893)

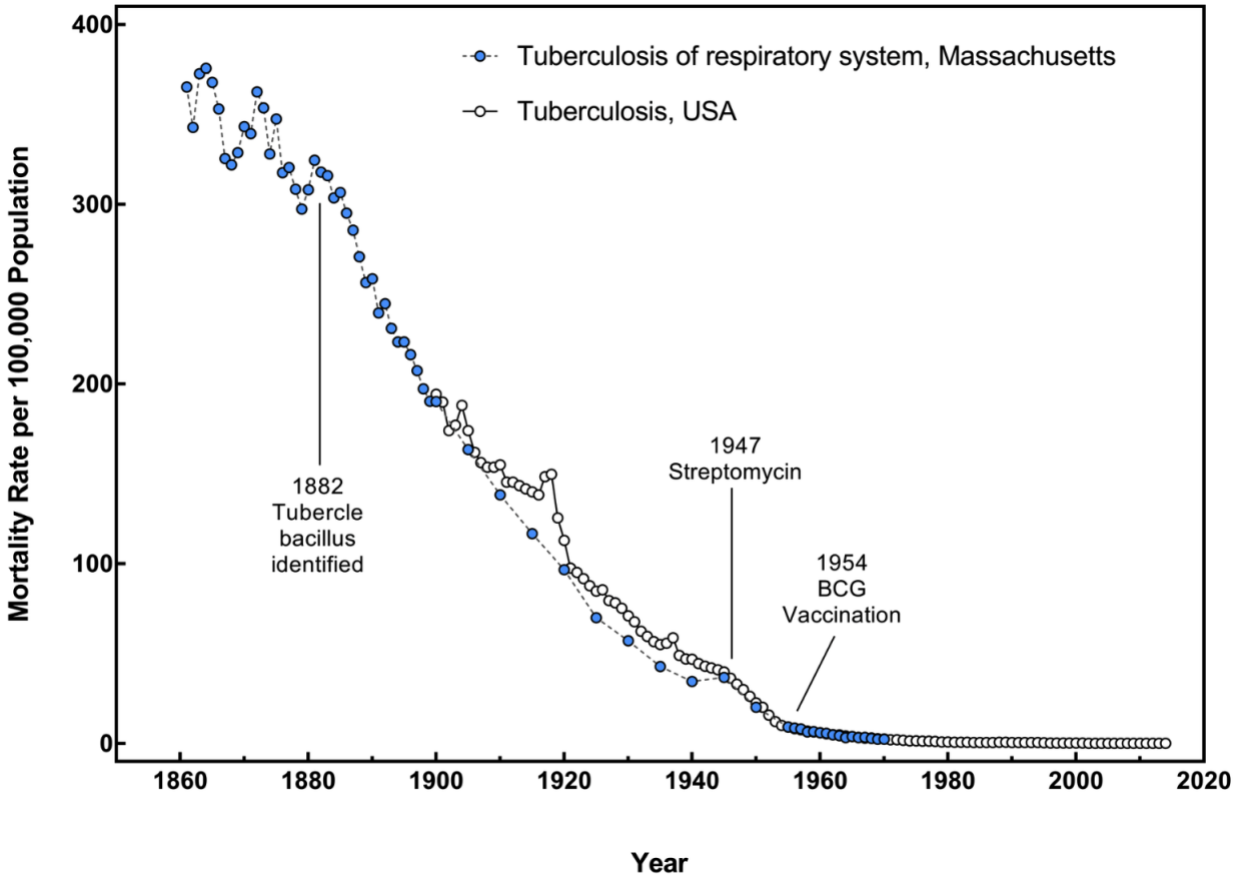


Figure 8. Death rates from tuberculosis over the past 160 years.

Notice the unremarkable change in the mortality trend upon the introduction of antibiotics (1947) and vaccination (1954). The overwhelming impact on mortality reduction was due to hygiene - that is, minimizing transmission.

With regard to hygiene and transmission, any woman who so chooses can now reduce her risk of cervical cancer by using barrier contraceptives and by having fewer sexual partners, because these activities reduce the chances of becoming infected with the papillomaviruses that cause cervical cancer. Anyone who receives a blood transfusion today has a reduced risk of liver cancer because the blood supply is now protected against hepatitis B and C viruses, which were shown to cause liver cancer during the last quarter of the twentieth century.

Anyone who wants to reduce the risk of stomach, colon, anal, gastric, and esophageal cancers can do so by eliminating Helicobacter pylori through antibiotics or other treatments. Additionally, this pathogen is transmitted through shared fluids of the mouth so avoiding such contact or testing and treating family and partners will substantially reduce exposure and risk. The list of tangible successes goes on and appears to be expanding to include several cancers that appear to be on the verge of being ascribed to infectious causation. Examples include pancreatic and breast cancer that may be triggered or exacerbated by periodontal disease.

According to Littman,[23] chlamydia pneumoniae causes lung cancer. "Chlamydia pneumoniae is a common cause of acute respiratory infection and has been hypothesized to cause several chronic diseases, including lung cancer. In six studies identified, previous C. pneumoniae infection was defined on the basis of serologic (blood testing) criteria, which varied between studies. All studies reported elevated relative risk estimates for the association of serologic evidence of infection and risk of lung cancer. The results were relatively consistent, supporting a causal association. Inflammation caused by chronic infection with C. pneumoniae may be involved in the carcinogenic process."

Chlamydia pneumoniae is transmissible through the air by sneezing or coughing, for example. The best ways to protect yourself from diseases caused by this organism are similar to most infectious diseases that emanate from the respiratory system. SARS-CoV-2 is an example. These include:

- Optimize immunity by consuming high nutrient-dense foods
- Optimize digestion to get the full benefits from foods
- Test for pathogens and treat as appropriate
- Manage barrier immunity on a regular basis. This means cleansing mucosal systems
- Encourage your "inner circle" to do the same

Are there noninfectious factors with strong scientific evidence supporting cancer causation? One might argue glyphosate, heavy metals, and excessive sunlight are major causes, but the real data is not there to support most of the incidences of cancer. Unexplained cancers account for at least three-quarters of all cancer. Infectious causation now accounts for 15 to 20 percent of human cancers, even as reported by the American Cancer Society. Suggestive evidence implicates infectious causes for most of the remainder. The meager percentage with so-called

known causes that are not related to infections may well have an infection somewhere in the cancer cascade, if we knew where and how to look.

Claude Bernard, the true author of the importance of internal terrain - or homeostasis - he called the "Milieu Intérieur"; famously and correctly wrote:

"The experimenter who does not know what he is looking for will not understand what he finds."

Claude Bernard, ~1870

Chapter 6: Biomarkers for Cancer Risk and Prognosis

Biomarkers clearly predict future cancer, cancer prognosis, and overall cancer risk. The labs for the 2 cancer patients discussed in the previous chapter make this point very clearly. Just compare the white blood cell counts of the two individuals:

Patient 1:	WBC = 11,400 counts/mL	survived
Patient 2:	WBC = 54,100 counts/mL	died

Is this not sufficient proof of cause and effect?

The most important biomarkers for cancer are the simplest, least expensive, and reflect innate immunity - your total white blood cell count, the differential of the white blood cells, and the neutrophil-to-lymphocyte ratio. Another profound marker for cancer, in general, and certainly based on the two examples, is ferritin.

Why ferritin? Because your brain is smart and knows if cancer or another infectious disease is brewing even if you are unsure. Here is my ferritin value during the height of my COVID-19 experience in December of 2021, when my internal temperature was around 103^{o}F.

Lewis' ferritin level during COVID-19: 1353 ng/mL; Iron was 14 ug/dL

Iron is a key component of hundreds of proteins and enzymes that support essential biological functions, such as oxygen transport, energy production, and DNA synthesis. Hemoglobin, myoglobin, cytochromes, and peroxidases require iron-containing heme as a prosthetic group for their biological activities. Because the body excretes very little iron, iron metabolism is tightly regulated. In particular, the iron regulatory hormone, hepcidin, blocks dietary iron absorption, promotes cellular iron sequestration and reduces iron bioavailability when body iron stores are sufficient to meet requirements.

Iron-containing enzymes are required for viruses, most likely including coronaviruses (CoVs), to complete their replication process. Moreover, poor prognosis occurred in the conditions of iron overload for patients upon infections of viruses. Most organisms require iron to replicate and thrive. The Georges Banks is the richest fishing ground in the world. The waters are murky due to prolific populations of microorganisms at the base of the food chain. Large iron reserves from the iron range of Minnesota and around Sorel, Canada dump iron into the St. Lawrence River ultimately feeding the Georges Banks with iron.

Some studies suggest "limiting iron represents a promising adjuvant strategy in treating viral infection through oral uptake or venous injection of iron chelators, or through the manipulation of the key iron regulators."[24] However, your body is way ahead of this "cutting edge" research. It is called "anemia of chronic inflammation." In reality, it is anemia of chronic infection. This syndrome has many names. The definition by the National Institutes of Health is: "Anemia of inflammation, also called anemia of chronic disease or ACD, is a type of anemia that affects people who have conditions that cause inflammation, such as infections, autoimmune diseases, cancer, and chronic kidney disease (CKD)."

Simply put, your brain recognizes that pathogens need iron to replicate. The body does not have a robust system to shed iron, but it does have a convenient iron storage protein called ferritin. When a virulent pathogen is detected by your immune system, signals are sent to sequester excess iron in ferritin. Arguably more important, but less studied compared to ferritin itself is the ferritin to free iron (or just iron) ratio. Let's look at the iron and ferritin values for the 3 individuals - myself included:

Individual	Condition	Iron value	Ferritin value	Ferritin/Iron Ratio
Cancer Man	Cancer	160	3293	21
Cancer Lady	Cancer	39	3335	86
Lewis	COVID-19	14	1353	97
Optimal (roughly)		100	100	1

The ferritin to iron ratio may seem inconsistent with the outcomes. That is, the man with cancer died yet his ratio was the lowest. However, the ratio reflects the current acute state of the disease. The man had slowly developed cancer and a myriad of other chronic conditions. The lady, based on her symptoms at the time of the blood draw, was much sicker compared to the man. I had a severe case of acute COVID-19 and struggled to get myself to the lab. In this sense, the ratios were quite accurate at characterizing each of our states of health at the time of the measurement.

You still may disagree that cancer is an infectious disease. However, what cannot be argued is the similar way in which our bodies respond to cancer and a virus like SARS-CoV-2. However, the definition of anemia of chronic inflammation implicates infection. Inflammation is almost always caused by an infectious process. Either way, iron labs can be extraordinarily predictive.

As good as WBC, NLR, and the iron markers are at explaining cancer and chronic diseases, diagnostic precision for cancer, future cancer risk, and chronic conditions is substantially enhanced when multiple biomarkers are used. The concept "the more the merrier" comes to mind.

Using and interpreting multiple biomarkers to predict disease and early mortality is surprisingly uncommon even in medical research. It is much easier to do a study and draw conclusions on the impact of a single biomarker. Studies on a single value in complex organisms like humans is naïve. This led Dr. John Ioannidis, Chaired Professor at Stanford Medical School, to write the paper titled, “Why most published research findings are false.”[25] Medical research, distinct from clinical delivery, delves into areas of medicine, the majority of which seldom see the clinical light of day. An NLM search of “blood biomarkers” and the word “predict,” yields a scant 107 references. Replacing the word “blood” with “multiple” yields even fewer references, 62 in total.

The article, “Predicting mortality with biomarkers: a population-based prospective cohort study for elderly Costa Ricans” is an example of a study using multiple biomarkers.[26] The conclusion of the article is poignant at illuminating how key biomarkers that predict health and survival are seldom obtained. According to Rosero-Bixby and Dow, the authors:

> “Medicine needs a deeper understanding of the meaning of some biomarkers in elderly populations, as well as outside of the developed country settings, where they have been primarily studied. Given this lack of information, we cannot tell whether the results found for elderly Costa Ricans are a peculiarity of this country, whose adult population has an exceptionally high life expectancy, or whether they may be extrapolated to other adult populations in the developing world.”

The biomarkers highlighted in their study are common but not commonly drawn by your doctor. They include; high sensitivity C reactive protein (CRP), HbA1c, and DHEAS, a steroid. C reactive protein is a marker of inflammation and is inexpensive to obtain. Few doctors will order a CRP test even if a diagnostic code justifies it being run and paid for as few know how to lower an elevated value. It is startling that there is insufficient data on CRP from the United States and global populations to draw conclusions beyond the narrow Costa Rican population studied.

Cancer is a disease in which multiple biomarkers have been evaluated more frequently compared to other diseases. An NLM query of the terms “multiple biomarkers cancer,” yields

198 separate peer-reviewed titles. In one rather typical example, the biomarkers used were not common or affordable. For example, in the study titled, “The prognostic factors and multiple biomarkers in young patients with colorectal cancer,” the biomarkers used were: PRL, Wrap53, RBM3, DNA status, TAZ, D2-40, Apoptosis, Fibrosis, Microsatellite status, SPF, Cox-2, p73, PINCH, Necrosis, CD163, Ki-67, FXYD-3, NFKB, Mac30, p53, Inflammatory infiltration, AEG-1, c-erbB-2, and ras. You will not be getting this panel at Labcorp or Quest and wherever you obtain these, they will be expensive.

Interpreting multiple biomarkers is often daunting for the uninitiated. Consequently, scoring systems that aggregate the value of multiple labs into a single value have emerged. Most of the accepted scoring systems focus on lipid levels. Optimal values of lipids are absolutely misinterpreted in the standard of care so these scoring systems are relatively useless. These scoring systems lack depth and breadth of biomarkers so the scoring result, although easier to read, is NOT a significant improvement in evaluating your health and treatment needs compared to single biomarkers.

Multiple biomarkers, in general, can improve the predictive power of a panel. The limitations - depth of the biomarkers used and how the biomarkers are interpreted to convey risk - when overcome, make multiple biomarkers extremely predictive. In a study of 3209 people assessed with 10 biomarkers, persons with multi-marker scores in the highest quintile (groups of 5 ranges of biomarker values) as compared with those with scores in the lowest two quintiles had elevated risks of death and major cardiovascular events of 4.08 (408%) and 1.84 (adjusted hazard ratios), respectively.[27] This far exceeds the predictive hazard ratio for a single marker like cholesterol which varies from 0.89 to 1.25 depending upon the study.[28] A hazard ratio of <1 means cholesterol levels were determined to be protective and stave off early mortality, not the expected result based on the massive volume of statin prescriptions.

We have developed a unique, precision-based and personalized risk scoring system based on a myriad of biomarkers titrated to cancer and cancer risk. Because cancer is a chronic disease, our system is equally applicable to most, if not all, chronic diseases. Indeed, certain biomarkers have greater specificity towards one disease as opposed to another. We accommodate this knowledge by providing more than one comprehensive lab panel to our patients.

In order to empower our patients, we provide information on the meaning of their biomarker results at three (3) levels, each of which progresses to increasing precision and complexity.

Level 1: An overall risk score based on all the relevant biomarkers. The scoring is based on early mortality risk and not the standard of care reference ranges which are not scientific. An example overall score is provided in Figure 9 below.

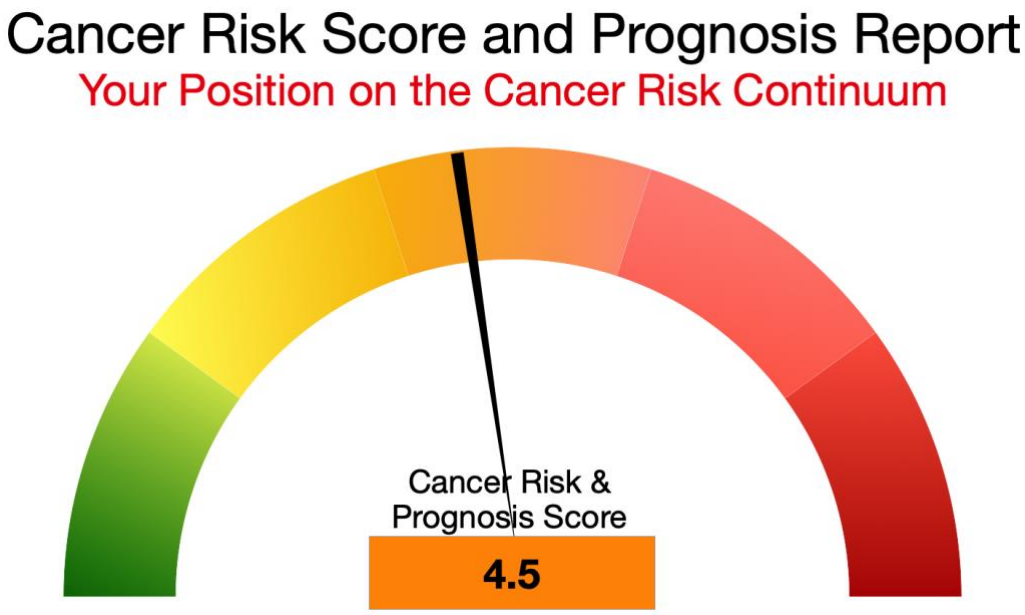


Figure 9. A cancer risk score is based on multiple biomarkers. Each biomarker was assessed for early cancer mortality risk. Thus, combining markers into a single score is appropriate.

Level 2: Scoring for major classes of disease mechanisms. This helps us and our patients understand where to prioritize treatment and remediation focus. Each category contains multiple biomarkers to enhance the accuracy and precision of the category score. The major categories are:

- Immune strength
- Inflammation and oxidative stress
- Metabolic status
- Clotting and clumping (blood integrity)
- Infectious burden
- Tissue damage

An example category report is provided in Figure 10 below.

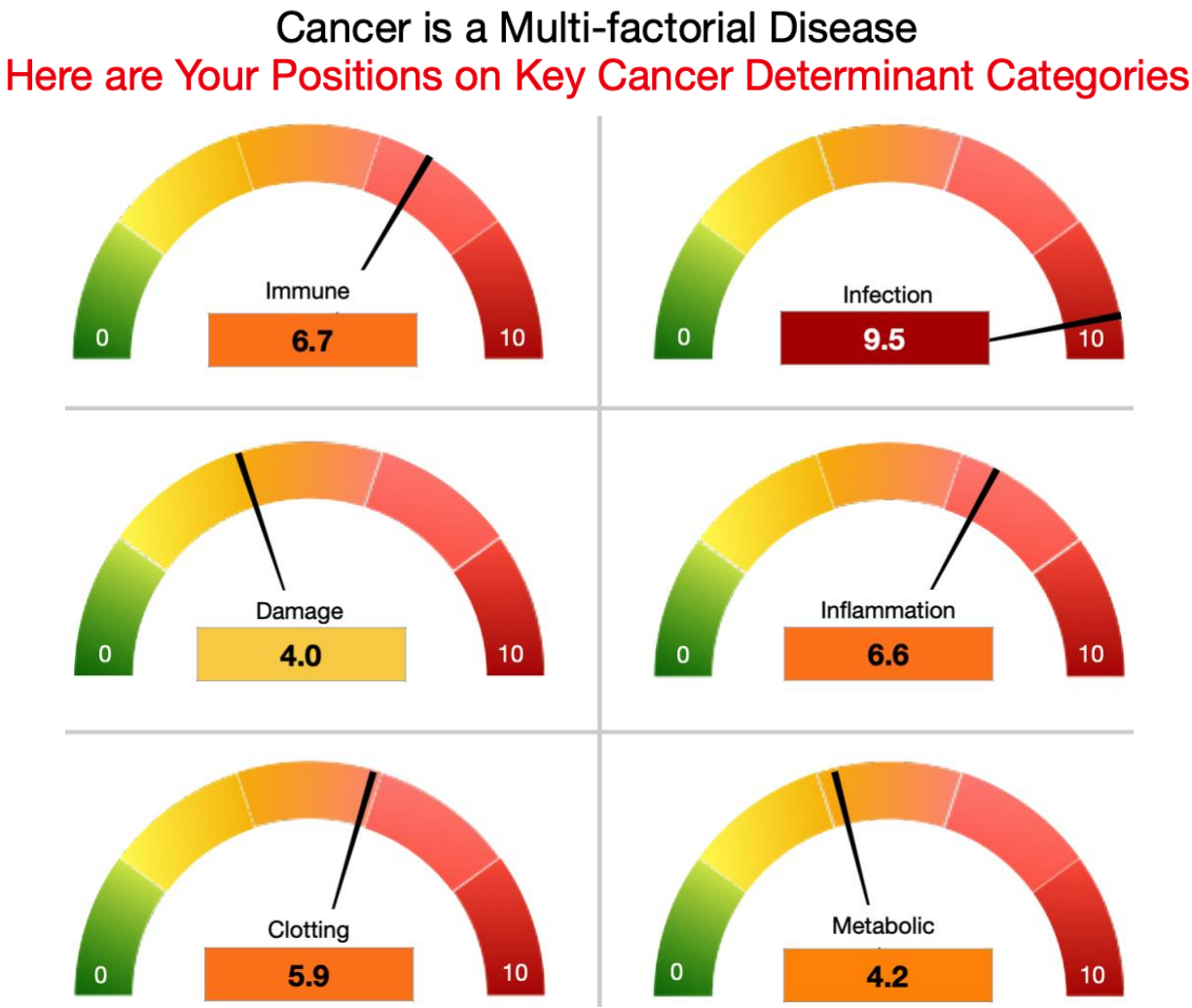


Figure 10. Cancer risk continuums based on cancer causal factors and cancer manifestations to physiology.

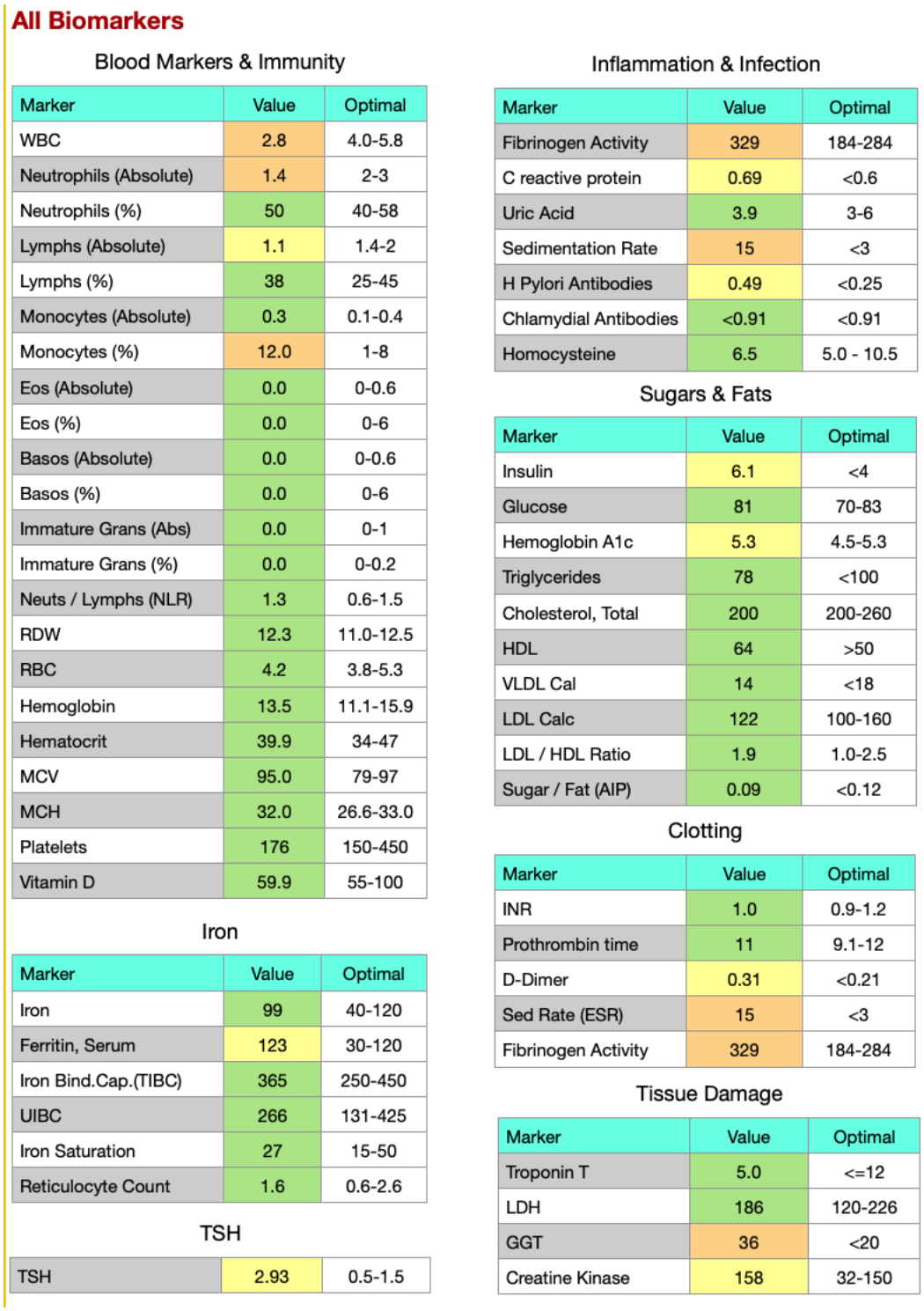
Level 3. Individual biomarkers. This section includes:

- all relevant biomarkers,
- an explanation of the biomarker and its relevance to the disease condition,
- their science-based reference ranges,
- your position on the biomarker value "continuum" compared to the optimal value,
- Selected references that explain how we derived the information,
- A graphic that helps you visualize what medical researchers are concluding about the predictive value of the biomarker.

A list of biomarkers for cancer risk and prognosis is provided here:

White Blood Cell Count (WBC)	Atherogenic Index of Plasma (AIP)
Neutrophil Counts (Absolute)	Transferrin
Neutrophil %	Helicobacter Pylori
Lymphocyte Counts (Absolute)	Tumor Necrosis Factor alpha (TNF-a)
Neutrophil to Lymphocyte Ratio	D-Dimer
Red Blood Cell Distribution Width	Lactate Dehydrogenase (LDH)
Homocysteine (HcY)	Beta-2-Microglobulin (B2M)
C-Reactive Protein (CRP)	Haptoglobin
Fibrinogen	Chlamydia Pneumoniae
Erythrocyte Sedimentation Rate (ESR)	Myeloperoxidase (MPO)
Ferritin	Iron
Ferritin to Iron Ratio	Troponin T
Uric Acid	Cystatin C
Vitamin D	Serum Amyloid A
Insulin (Fasting)	Creatine Kinase
HbA1C	CRP/Albumin Ratio
Total Cholesterol	HDL
LDL to HDL Ratio	Vitamin C

Selected examples of the individual biomarker summary reports for biomarkers are provided in Figure 11 below.



All Biomarkers

Blood Markers & Immunity

Marker	Value	Optimal
WBC	2.8	4.0-5.8
Neutrophils (Absolute)	1.4	2-3
Neutrophils (%)	50	40-58
Lymphs (Absolute)	1.1	1.4-2
Lymphs (%)	38	25-45
Monocytes (Absolute)	0.3	0.1-0.4
Monocytes (%)	12.0	1-8
Eos (Absolute)	0.0	0-0.6
Eos (%)	0.0	0-6
Basos (Absolute)	0.0	0-0.6
Basos (%)	0.0	0-6
Immature Grans (Abs)	0.0	0-1
Immature Grans (%)	0.0	0-0.2
Neuts / Lymphs (NLR)	1.3	0.6-1.5
RDW	12.3	11.0-12.5
RBC	4.2	3.8-5.3
Hemoglobin	13.5	11.1-15.9
Hematocrit	39.9	34-47
MCV	95.0	79-97
MCH	32.0	26.6-33.0
Platelets	176	150-450
Vitamin D	59.9	55-100

Iron

Marker	Value	Optimal
Iron	99	40-120
Ferritin, Serum	123	30-120
Iron Bind.Cap.(TIBC)	365	250-450
UIBC	266	131-425
Iron Saturation	27	15-50
Reticulocyte Count	1.6	0.6-2.6

TSH

TSH	2.93	0.5-1.5

Inflammation & Infection

Marker	Value	Optimal
Fibrinogen Activity	329	184-284
C reactive protein	0.69	<0.6
Uric Acid	3.9	3-6
Sedimentation Rate	15	<3
H Pylori Antibodies	0.49	<0.25
Chlamydial Antibodies	<0.91	<0.91
Homocysteine	6.5	5.0 - 10.5

Sugars & Fats

Marker	Value	Optimal
Insulin	6.1	<4
Glucose	81	70-83
Hemoglobin A1c	5.3	4.5-5.3
Triglycerides	78	<100
Cholesterol, Total	200	200-260
HDL	64	>50
VLDL Cal	14	<18
LDL Calc	122	100-160
LDL / HDL Ratio	1.9	1.0-2.5
Sugar / Fat (AIP)	0.09	<0.12

Clotting

Marker	Value	Optimal
INR	1.0	0.9-1.2
Prothrombin time	11	9.1-12
D-Dimer	0.31	<0.21
Sed Rate (ESR)	15	<3
Fibrinogen Activity	329	184-284

Tissue Damage

Marker	Value	Optimal
Troponin T	5.0	<=12
LDH	186	120-226
GGT	36	<20
Creatine Kinase	158	32-150

Figure 11. Selected cancer risk and prognosis biomarkers, their values for an example patient, and optimal ranges based on early cancer mortality data.

Selected examples of how specific biomarkers are represented on the cancer risk and prognosis report are provided below. In some instances, we refer to cancer research studies to support

our information. In other instances, we reference both cancer and COVID-19 to illuminate the parallels between cancer research and research on viruses.

Lymphocytes (Absolute Count)

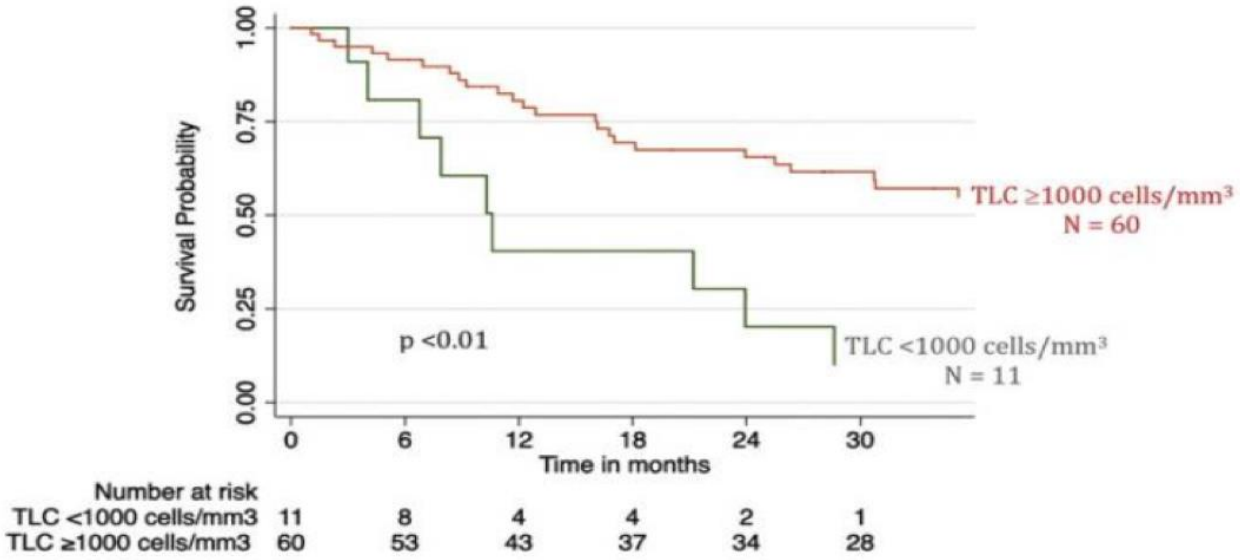
A type of immune cell that is made in the bone marrow and is found in the blood and in lymph tissue. The two main types of lymphocytes are B lymphocytes and T lymphocytes. B lymphocytes make antibodies, and T lymphocytes help kill tumor cells and help control immune responses. A lymphocyte is a type of white blood cell. Quantitative lymphocyte alterations are frequent in patients with cancer and strongly impact prognosis and survival. Source: National Cancer Institute

Category: Immune Health

Traditional Reference (normal) Range: 700 - 3,100 cells/mL

Cancer Risk Optimal Range: 1,400 - 1,800 cells/mL

TLC = Total Lymphocyte Count



Selected Publications:

Title: Lymphopenia and its association with reduced survival in patients with locally advanced cervical cancer

Finding: Women with a lymphocyte count of <500 experienced a death rate of about twice those with a lymphocyte count >1000.

Conclusion: More than half of cervical cancer patients treated with chemoradiation experienced severe and prolonged lymphopenia. The findings suggest that pre- and post-treatment lymphopenia is associated with decreased survival. Lymphopenia could be a reversible prognostic factor.

Title: Survival in Patients with Severe Lymphopenia for Newly Diagnosed Solid Tumors

Finding: An increased risk for death was attributable to (treatment-related lymphopenia) TRL in each cancer cohort (gliomas; resected pancreas; unresected pancreas; and lung). On average, mortality increased by 250%.

Conclusion: The immune system plays an important role in cancer surveillance and therapy. Chemoradiation can cause severe treatment-related lymphopenia (TRL) (<500 cells/mm3) that is associated with reduced survival.

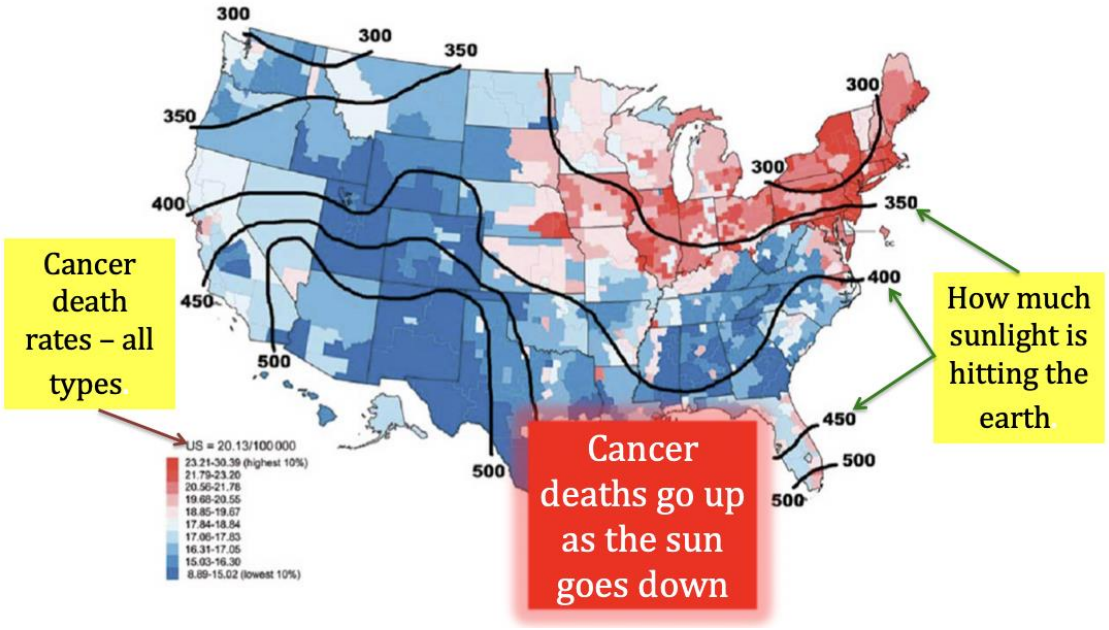
Vitamin D (Pro-Hormone D)

Vitamin D is a fat-soluble pro-hormone (substances that the body can turn into hormones). Vitamin D helps the body use calcium and phosphorus to make strong bones and teeth. Skin exposure to sunshine can make vitamin D. In studies of cancer cells and tumors, vitamin D has been found to have several activities that might slow or prevent the development of cancer, including promoting cellular differentiation, decreasing cancer cell growth, stimulating cell death (apoptosis), and reducing tumor blood vessel formation (angiogenesis). Source: National Cancer Institute

Category: Immune Health

Traditional Reference (normal) Range: 30 - 100 ng/mL

Cancer Risk Reference Range: 55 - 100 ng/mL



Selected Publications:

Title: Chapter One - Vitamin D, Cancer Risk, and Mortality

Finding: Anti-proliferative effects of 1,25-dihydroxyvitamin D, the biologically active form of vitamin D, are well established in various cell types by influencing cell differentiation and decreasing cell proliferation, growth, invasion, angiogenesis, and metastasis. Several meta-analyses showed that low serum levels of 25(OH)D was associated with colorectal cancer and overall mortality.

Conclusion: Epidemiological and preclinical studies support the development of vitamin D as a preventative and therapeutic anticancer agent, with significant associations especially found for low vitamin D status with overall mortality and cancer outcome, more than cancer incidence.

Title: Vitamin D has a greater impact on cancer mortality rates than on cancer incidence rates

Finding: During follow-up, 6,695 deaths occurred. Of these, 2,624 were from CVD, and 2,227 were from cancer. The team found a strong association between low vitamin D levels and death from cancer among participants with a history of the disease.

Conclusion: The implication of this finding is that vitamin D has a much stronger impact on survival after developing cancer than on reducing the risk of developing cancer.

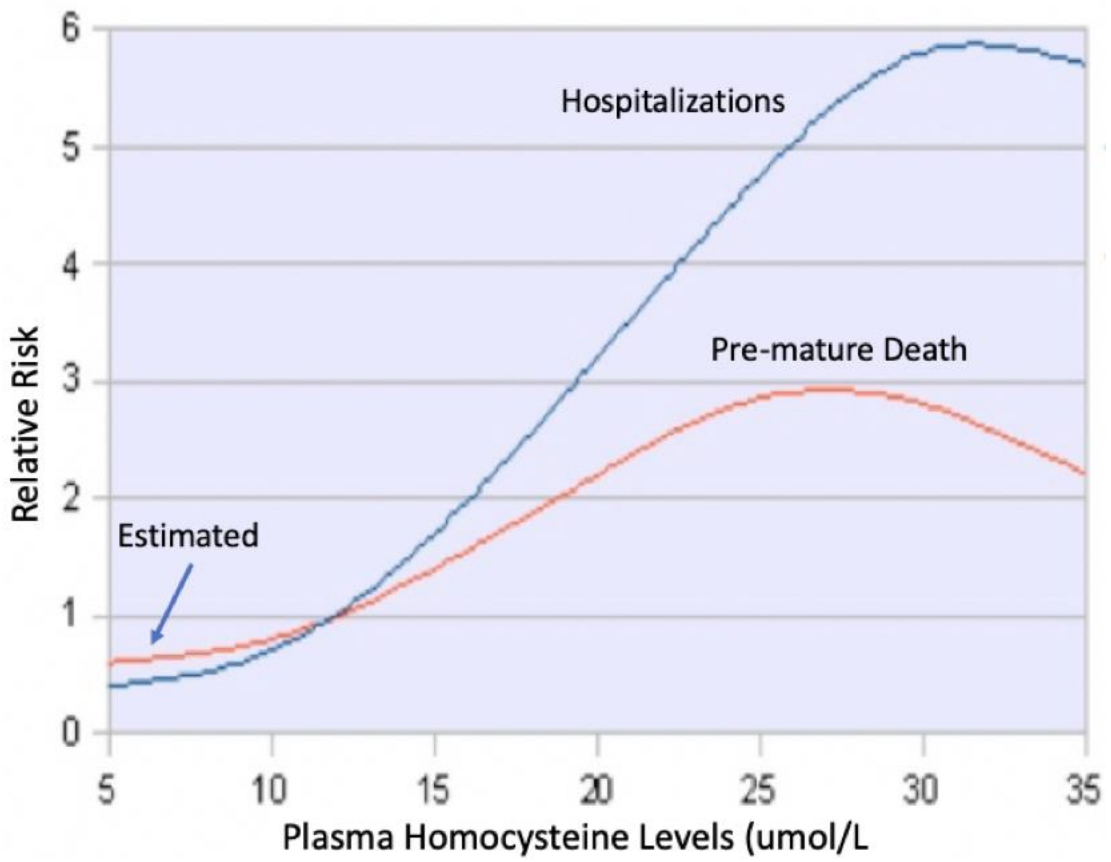
Homocysteine (HcY)

A homocysteine test measures the amount of homocysteine in your blood. Homocysteine is a type of amino acid, a chemical your body uses to make proteins. Normally, vitamin B12, vitamin B6, and folic acid break down homocysteine and change it into other substances your body needs. There should be very little homocysteine left in the bloodstream. Recent advances have proven that there is a close link between hyperhomocysteinemia (elevated homocysteine) and cancer. Source: Nature Journal www.nature.com

Category: Inflammation

Traditional Reference (normal) Range: 0.0 - 17.2 μmol/L

Cancer Risk Optimal Range: 5.5 - 10 μmol/L



Selected Publications:

Title: Disturbed homocysteine metabolism is associated with cancer

Finding: It is clear from this review that there are compelling genetic, epigenetic, and environmental factors that establish a close association between disturbed Hcy metabolism and cancer.

Conclusion. HcY can be used as a potential tumor biomarker for a variety of cancers

Title: Homocysteine and its role as Preventive and Prognostic Biomarker in Clinical Medicine

Finding: Cancer is triggered by damage to DNA - and having a high homocysteine level means your DNA is more vulnerable to damage

Conclusion: Homocysteine levels have been found to be a very good indicator of whether cancer therapies are working. The homocysteine level rises with tumor growth and falls when they shrink.

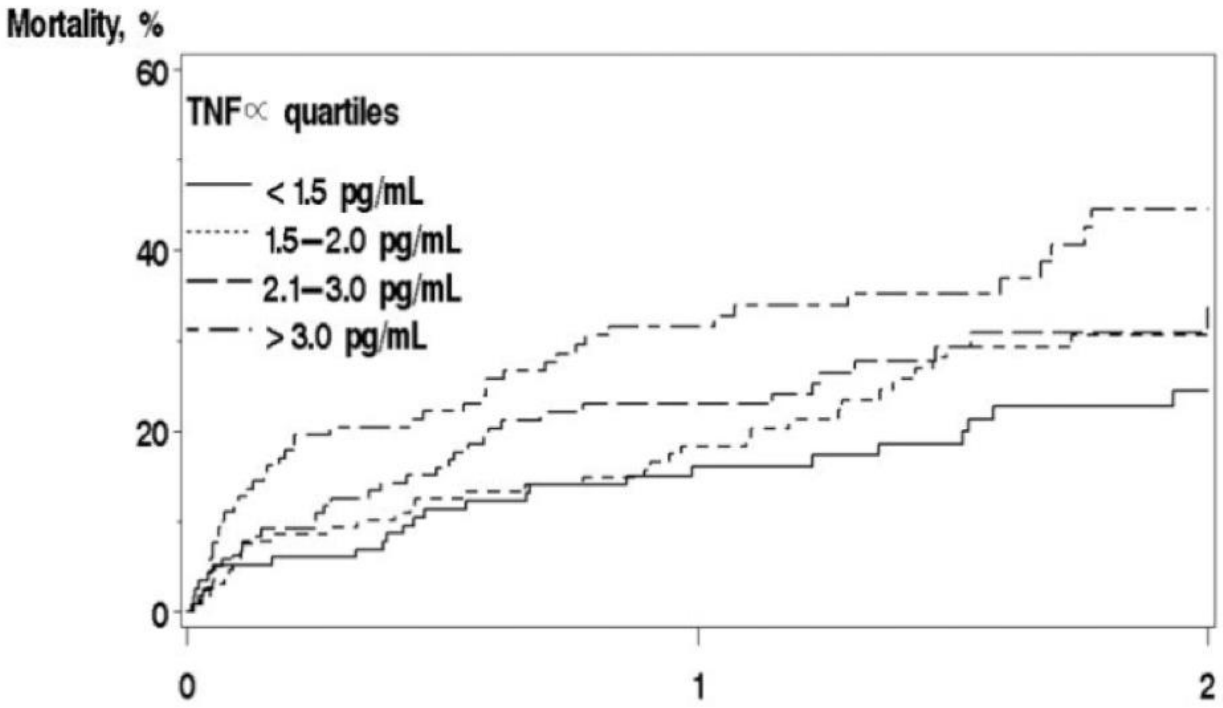
Tumor Necrosis Factor Alpha (TNF-α)

TNF-α is a protein made by white blood cells in response to an antigen (a substance that causes the immune system to make a specific immune response) or infection. Tumor necrosis factor can also be made in the laboratory. It may boost a person's immune response, and also may cause necrosis (cell death) of some types of tumor cells. Tumor necrosis factor is being studied in the treatment of some types of cancer. It is a type of cytokine. Source: National Cancer Institute

Category: Inflammation

Traditional Reference (normal) Range: < 2.2 pg/mL

Cancer Risk Optimal Range: < 1.5 pg/mL



Selected Publications:

Title: TNF-α in promotion and progression of cancer

Finding: Tumor necrosis factor-alpha is a member of the TNF/TNFR cytokine superfamily. In common with other family members, TNF-α is involved in the maintenance and homeostasis of the immune system, inflammation, and host defense. However, there is a 'dark side' to this powerful cytokine; it is now clear that, especially in middle and old age, TNF-α is involved in pathological processes such as chronic inflammation, autoimmunity, and, in apparent contradiction to its name, malignant disease. This article will discuss the involvement of TNF-α in the inflammatory network that contributes to all stages of the malignant process and consider the possibility that TNF-α may be a target for cancer therapy.

Title: Association of interleukin-6 and tumor necrosis factor-α with mortality in hospitalized patients with cancer

Finding: Elevated levels of IL-6, IL-10, and TNF-α were associated with decreased survival. Overall survivals in patients with elevated levels of IL-6, IL-10, and TNF-α were 53.7%, 56.6%, 53.6%, respectively, compared with 85.7%, 82.5%, and 83.6%, respectively, in those with lower levels. Patients with increased levels of both IL-6 and TNF-α had a nearly 6-fold increase in mortality (hazard ratio, 5.82) compared with patients with lower levels.

Conclusion: These biomarkers may serve as prognostic biomarkers and therapeutic targets for this high-risk population.

Erythrocyte Sedimentation Rate (ESR)

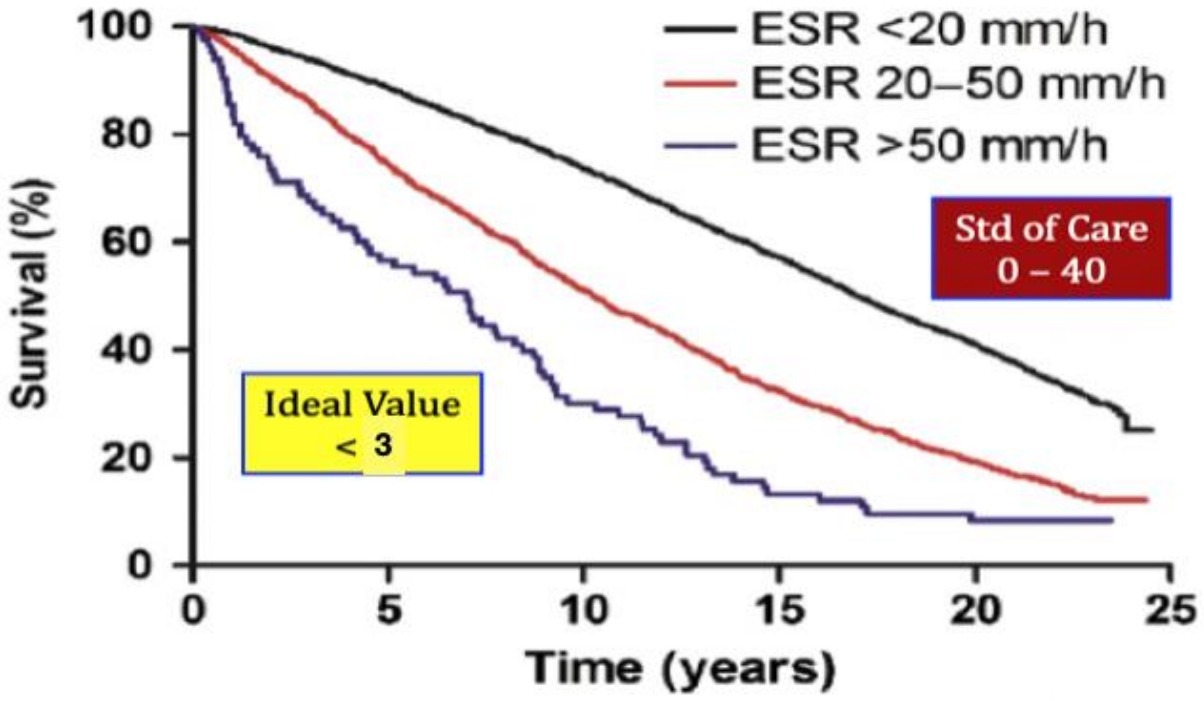
Sed rate, or erythrocyte sedimentation rate (ESR), is a blood test that can reveal inflammatory activity in your body. When your blood is placed in a tall, thin tube, red blood cells (erythrocytes) gradually settle to the bottom. Inflammation can cause the cells to clump. Because these clumps are denser than individual cells, they settle to the bottom more quickly. - Source: National Cancer Institute

Importantly, the ESR is a measure of the electrical properties of the red blood cell membrane - which is a tiny battery. When ESR is high, your cellular "battery" is discharged. Source: Dr. Lewis

Category: Inflammation

Traditional Reference (normal) Range: 0 - 40 mm/hr

Cancer Risk Reference Range: < 3 mm/hr.



Selected Publications:

Title: Erythrocyte Sedimentation Rate- A Predictor of Malignant Potential in Early Prostate Cancer

Finding: A statistically significant relationship between ESR at diagnosis and overall as well as disease-specific survival was demonstrated by univariate and multivariate analyses. The dichotomized ESR (<20 mm/h vs. >20 mm/h) at the time of diagnosis distinguished between aggressive and non-aggressive tumors.

Conclusion: Our results indicate that ESR is a significant predictor of survival in early localized prostate cancer.

Title: Cancer Risk and Prognosis after a Hospital Contact for an Elevated Erythrocyte Sedimentation Rate

Finding: We observed an increased risk of cancer after a hospital contact with elevated ESR. In the first year of follow-up, the cancer risk was 8.5% and the increase in cancer risk was greater than 5-fold, compared with general population rates.

Conclusion: Elevated ESR is a strong marker of undiagnosed cancer and is associated with poorer survival. Impact: Our findings may help clinicians in assessing absolute risk, common sites, and prognosis of cancers discovered in patients with elevated ERS.

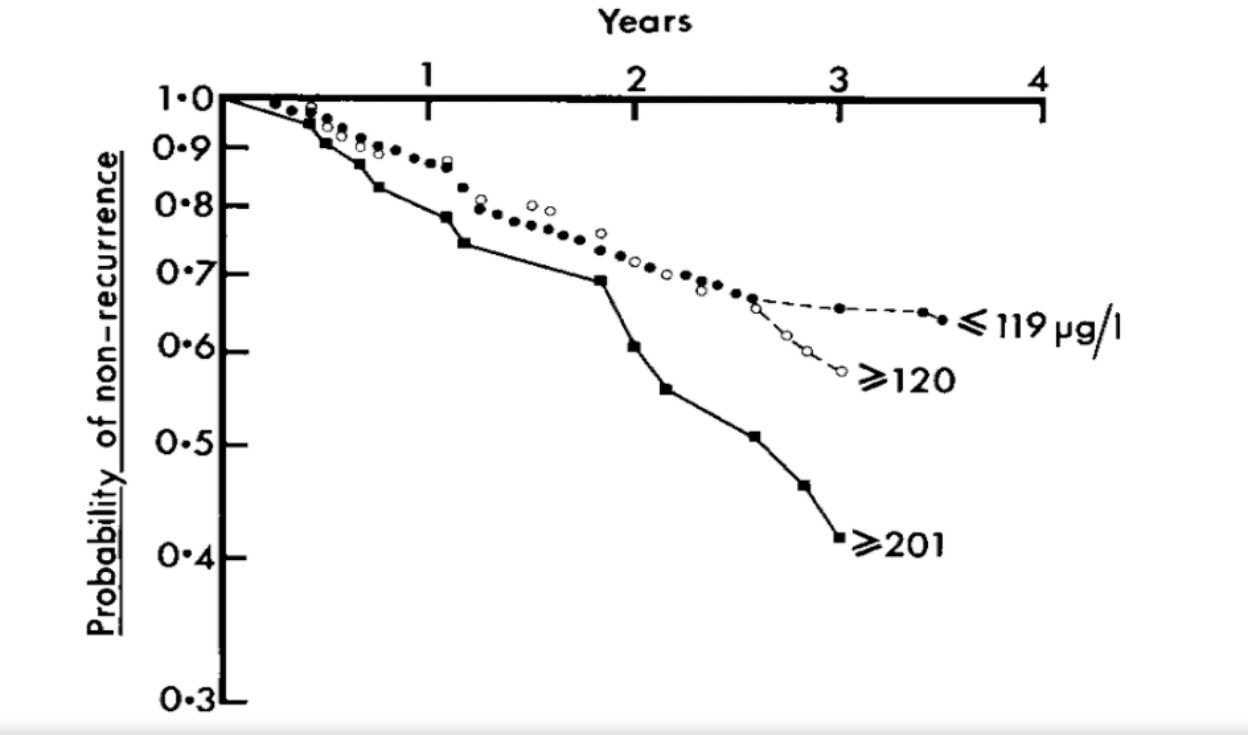
Ferritin

Ferritin is a protein that binds to iron and stores it for use by the body. Ferritin is found in cells in the liver, spleen, bone marrow, and other tissues. Serum ferritin level increases in malignancy and high serum ferritin level is associated with poor survival in various cancers. Source: Department of Clinical Oncology, College of Korean Medicine

Category: Oxidative Stress

Traditional Reference (normal) Range: 15 - 150

Cancer Risk Optimal Range: 25 - 120 ng/mL



Probability of non-recurrence in breast cancer patients comparing 3 groups dlistinguished by their initial plasma ferritin concentration on first presentation.

Selected Publications:

Title: Role of ferritin alterations in human breast cancer cells

Finding: Breast cancer is the most common malignancy in women. Recent studies show a crucial role of perturbations in ferritin levels and tightly associated with this, the deregulation of intracellular iron homeostasis, and poor breast cancer prognosis.

Conclusion: These results suggest that perturbations in ferritin levels are associated with the progression of breast cancer toward a more advanced malignant phenotype.

Title: The significance of ferritin in cancer: Anti-oxidation, inflammation, and tumorigenesis

Finding: Serum ferritin is elevated in patients with Hodgkin's lymphoma, hepatocellular carcinoma, neuroblastoma, glioblastoma, squamous cell carcinoma of the head and neck, renal cell carcinoma, melanoma, non-small-cell lung cancer, pancreatic cancer, and breast cancer. This increase is often associated with more progressive disease and shorter survival.

Conclusion: Ferritin is highly expressed in tumor-associated macrophages which have been recently recognized as having critical roles in tumor progression and therapy resistance. These

characteristics suggest ferritin could be an attractive target for cancer therapy because its down-regulation could disrupt the supportive tumor microenvironment, kill cancer cells, and increase sensitivity to treatment.

Neutrophil to Lymphocyte Ratio (NLR)

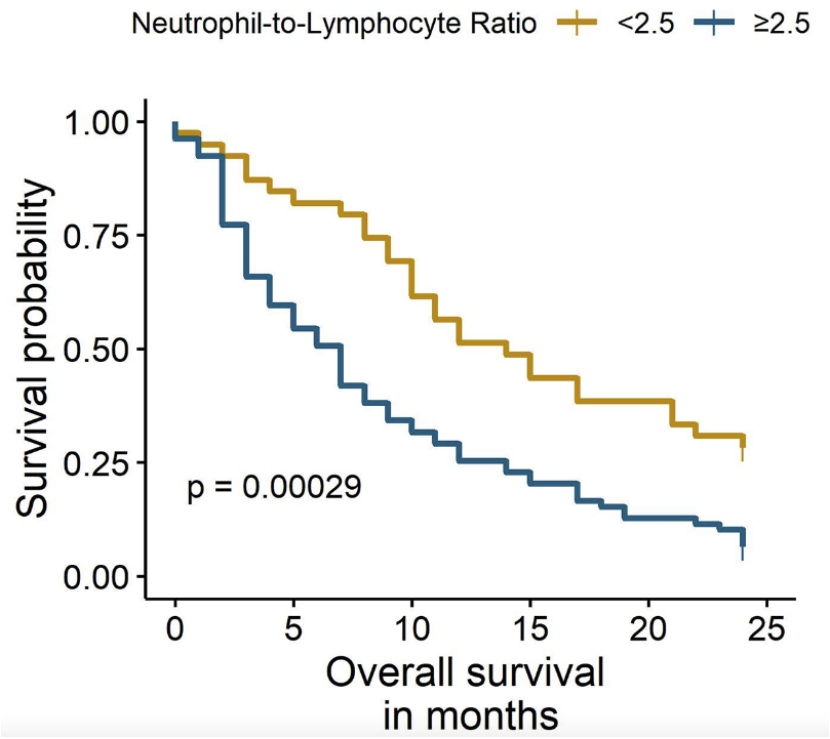
The NLR is the number of neutrophils divided by the number of lymphocytes. In general, neutrophils, a type of white blood cell, will elevate in the presence of bacterial infection. Lymphocytes, also a type of white blood cell, will decrease in the presence of a viral infection. Thus, the NLR is a measure of your infectious burden. Importantly, the NLR value is amplified or magnified compared to other individual markers, providing better measurement or prediction of very early diseases like cancer. Source: Journal of the National Cancer Institute

Category: Immune Health; Infection

Traditional Reference (normal) Range: None

Cancer Risk Optimal Range: 1.2 - 1.5

Neutrophil-to-lymphocyte ratio predicts early mortality in females with metastatic triple-negative breast cancer:



Selected Publications:

Title: Neutrophil to lymphocyte ratio (NLR) for prediction of distant metastasis-free survival (DMFS) in early breast cancer: a propensity score-matched analysis

Finding: Distant metastasis-free survival is enhanced by up to 300% in the low NLR group compared to the high NLR group.

Conclusion: This study shows a significant correlation between high NLR and worse prognosis in Caucasian patients with early breast cancer by means of propensity score-matched analysis.

Title: Prognostic Role of Neutrophil-to-Lymphocyte Ratio in Solid Tumors: A Systematic Review and Meta-Analysis

Finding: One hundred studies comprising 40559 patients were included in the analysis. An NLR of <4 was used to determine risks. Overall, NLR > 4 was associated with: Overall Survival declined by 181%, an effect observed in all disease subgroups, sites, and stages. Risks for NLR > 4 for cancer-specific survival, progression-free survival, and disease-free survival were 161%, 163% and 227%, respectively.

Conclusion: A high NLR is associated with an adverse overall survival (OS = high mortality) in many solid tumors. The NLR is a readily available and inexpensive biomarker. It is a valuable addition to the establishment of prognostic scores for clinical decision-making across a broad array of cancers.

Cancer Therapy - Is the Future Here Now?

The Journal of the American Medical Association (JAMA) mostly promotes and protects physician membership and pharmaceutical interventions. Oncology is particularly protected due to the profits afforded doctors by the treatments.

According to an article by NBC News,[29] "It is a unique situation in medicine: Unlike other kinds of doctors, cancer doctors are allowed to profit from the sale of chemotherapy drugs. "The significant amount of our revenue comes from the profit, if you will, that we make from selling the drugs," says Dr. Peter Eisenberg, a private physician who specializes in cancer treatment.

Doctors in other specialties simply write prescriptions. But oncologists make most of their income by buying drugs wholesale and selling them to patients at marked-up prices. "So, the pressure is frankly on to make money by selling medications," says Eisenberg."

"Brand-name chemotherapy is often incredibly expensive, in excess of $100,000 per patient. Sometimes there are excellent generic alternatives, but many oncologists are hesitant to prescribe generics because such prescriptions cost them money. For many medicines, you see, oncologists receive a 6% markup, meaning when they infuse a patient with a $10,000 monthly course of chemotherapy, their practice yields an extra $600. By contrast, if the practice treated that patient with a generic chemotherapy, they'd be out most of that extra money."[30]

In an interesting departure, JAMA Oncology published a paper that potentially provides a path away from traditional treatments within traditional medicine. The title of that article is,

"The Potential of the Gut Microbiome to Reshape the Cancer Therapy Paradigm"

Here is the abstract:

> "Importance: The gut microbiome, home to the vast kingdom of diverse commensal bacteria and other microorganisms residing within the gut was once thought to only have roles primarily centered on digestive functions. However, recent advances in sequencing technology have elucidated the intricate roles of the gut microbiome in cancer development and the efficacy of therapeutic response that need to be comprehensively addressed from a clinically translational angle.
>
> Observations: This review aims to highlight the current understanding of the association of the gut microbiome with the therapeutic response to immunotherapy, chemotherapy, radiotherapy, cancer surgery, and more, while also contextualizing possible synergistic strategies with the microbiome for tackling some of the most challenging tumors. It also provides insights on contemporary methods that target the microbiota and the current progression of findings being translated from bench to bedside.
>
> Conclusions and Relevance: Ultimately, the importance of gut bacteria in cancer therapy cannot be overstated in its potential for ushering in a new era of cancer treatments. With the understanding that the microbiome may play critical roles in the tumor microenvironment, holistic approaches that integrate microbiome-modulating treatments with biological, immune, cell-based, and surgical cancer therapies should be explored."

Nature magazine also delves into the microbiome as a potential cancer therapy - at any point along the cancer continuum. Titled, "How gut reactions are shaping cancer treatment,"[31] the

authors explain the following. "Cancer treatment is no longer the domain just of oncologists. It now also involves specialists in microbiology, artificial intelligence, diet and nutrition, genomics, bioinformatics, and computing. Work at Sloan Kettering and Stanford is revealing how the gut microbiome can make the difference between treatment success or failure."

Ultimately, what does your microbiome do? Simply put, it is your "good" symbiotic bacteria and other species types defending you from harmful pathogenic organisms.

Your microbiome is antibiotic towards pathogenic infectious species.

Cancer is an infectious disease.

For information on how to be properly evaluated for cancer risk and prognosis, contact us at www.healthrevivalpartners.com or write to Dr. Lewis at tlewis@healthrevivalpartners.com

Be Bold - Be Brave - Be Well

About the Authors

Thomas J. Lewis, Ph.D.

He is a Medical Scientist. He holds a Ph.D. in Chemistry from MIT and certification from the Harvard School of Public Health in Toxicology and Nutrition in the Public Interest. He is an entrepreneur and healthcare professional with expertise in toxic substances, drug development, biotechnology, health technology, and medical protocol development. For the past decades, he has worked closely with senior researchers and clinicians at Harvard Medical School and has developed a program for chronic disease root cause prevention, screening, diagnosis, and treatment. Alzheimer's disease and the most serious eye diseases, such as macular degeneration and glaucoma have been a particular focus.

Dr. Lewis opened the first-of-its-kind Alzheimer's prevention, screening, early detection, and treatment center in the Orlando, Florida area in 2014. He worked closely with Dr. Clement Trempe, 41 years at Harvard Medical School, who was one of the few doctors in the world who treated chronic eye diseases as systemic inflammatory conditions – and reversed these conditions with great success. It was through this work that Dr. Trempe developed his protocol for diagnosing, treating, and reversing Alzheimer's disease which is now an integral part of the Health Revival offerings.

Dr. Lewis has written three books: "The End of Alzheimer's – The Brain and Beyond," (2nd Ed.), "Uncovering Chronic Inflammation and Hidden Infections," and "Quarterback Your Own Health – How to Take and Lower Your Chronic Disease Temperature."

He has several patents and numerous publications. The most recent patent involves the identification and use of both physiological and pathological biomarkers that are able to accurately predict future morbidity (disease) and mortality. This risk is presented by way of a single risk value coined your "Chronic Disease Temperature™. He has also created a software-based medical intake form that is designed to determine the current and future risk of accelerated aging and chronic disease in individuals.

For information on how to be properly evaluated for cancer risk and prognosis, contact us at www.healthrevivalpartners.com or write to Dr. Lewis at tlewis@healthrevivalpartners.com

Michael L. Carter, M.D.

Dr. Carter is one of the top functional medicine doctors in America. He started his medical career as an anesthesiologist, then went into aesthetic medicine, and over the past decade has completely committed to learning and practicing functional medicine. He is both Institute for Functional Medicine and American Academy of Anti-Aging Medicine certified. In addition, he is Bredesen and Trempe trained at delivering the best emerging medical practices to prevent and reverse Alzheimer's and dementias.

Dr. Carter has extended his learning in the following areas: stem cells; peptide therapy; energy medicine; hormones; Lyme disease; other occult infections including Chlamydia pneumoniae and their vascular consequences; autoimmune conditions; chronic pain, wound healing; mood disorders; eye diseases; and neurodegeneration.

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Cancer *IS*

an Infectious Disease

Michael L. Carter, M.D.

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A New Model for Measuring, Preventing, and Reversing Cancer Risks