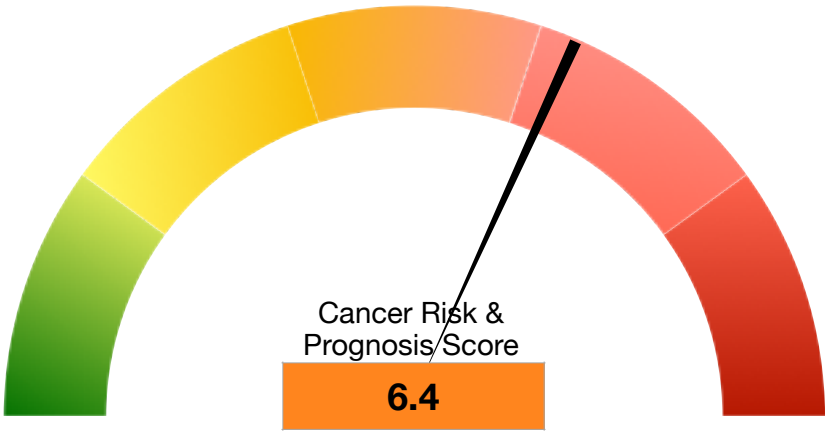
Above Cancer

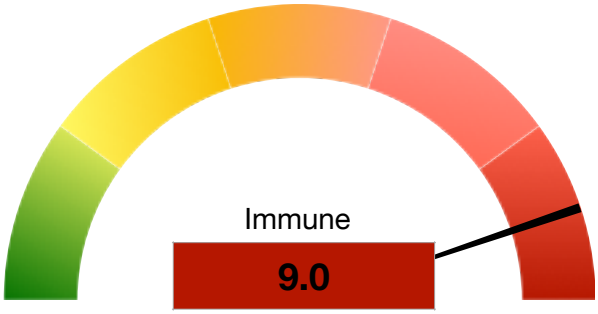
Risk Score and Prognosis Report

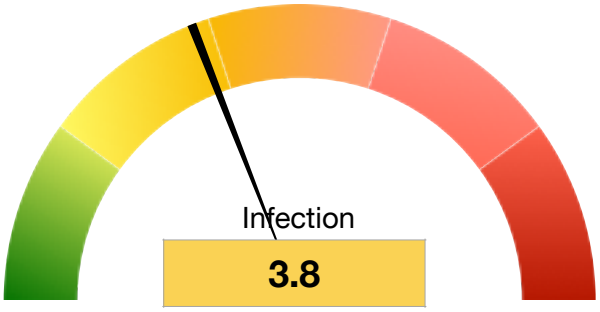
Your Position on the Cancer Risk Continuum

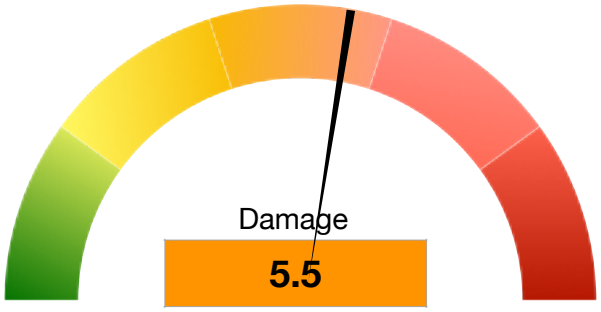


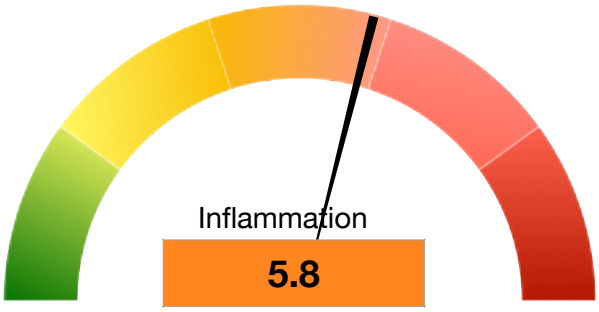
Cancer is a Multi-factorial Disease

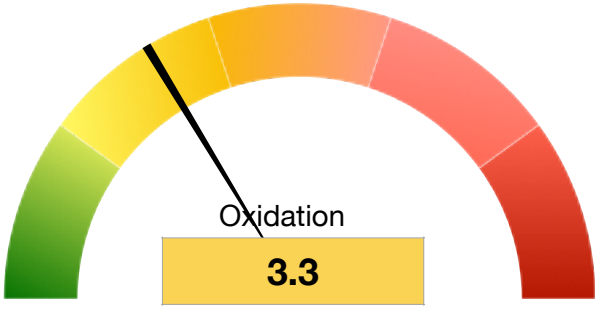
Here are Your Positions on Key Cancer Determinant Categories

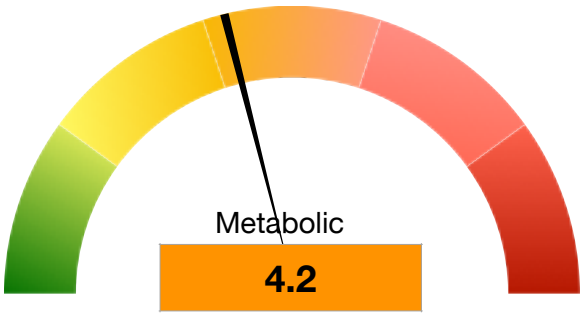












KEY: The color-code bar shows cancer and early mortality risk. **In the "green" segment, there is no statistical increase in cancer or mortality risk** based on many published studies. Outside of the green area **your risk increases significantly as indicated by the change in color towards red.**

The **vertical blue bar** in the circle (bullseye) is **your** lab value for the specific biomarker.

Immune Response

White Blood Cell Count (WBC): 20000

Optimal: 4,000 - 5,800 cells/microliter

Neutrophils (absolute): 8000

Optimal: 2,000 - 3,500 cells/microliter

Lymphocytes (absolute): 3000

Optimal: 1,000 - 2,000 cells/microliter

Vitamin D: 20

Optimal: 55 - 100 ng/ml

Inflammation

C-Reactive Protein (CRP): 4.0

Optimal: < 0.6 mg/mL

Homocysteine (HcY): 15

5.5 - 11.0 umol/L

Red Cell Distribution Width (RDW): 15

Optimal: 11.0 - 12.5%

Uric acid: 7

Optimal: 3.5 - 6.0 mg/dL

Tumor Necrosis Factor Alpha (TNF-alpha): 4

Optimal: < 1.5 pg/mL

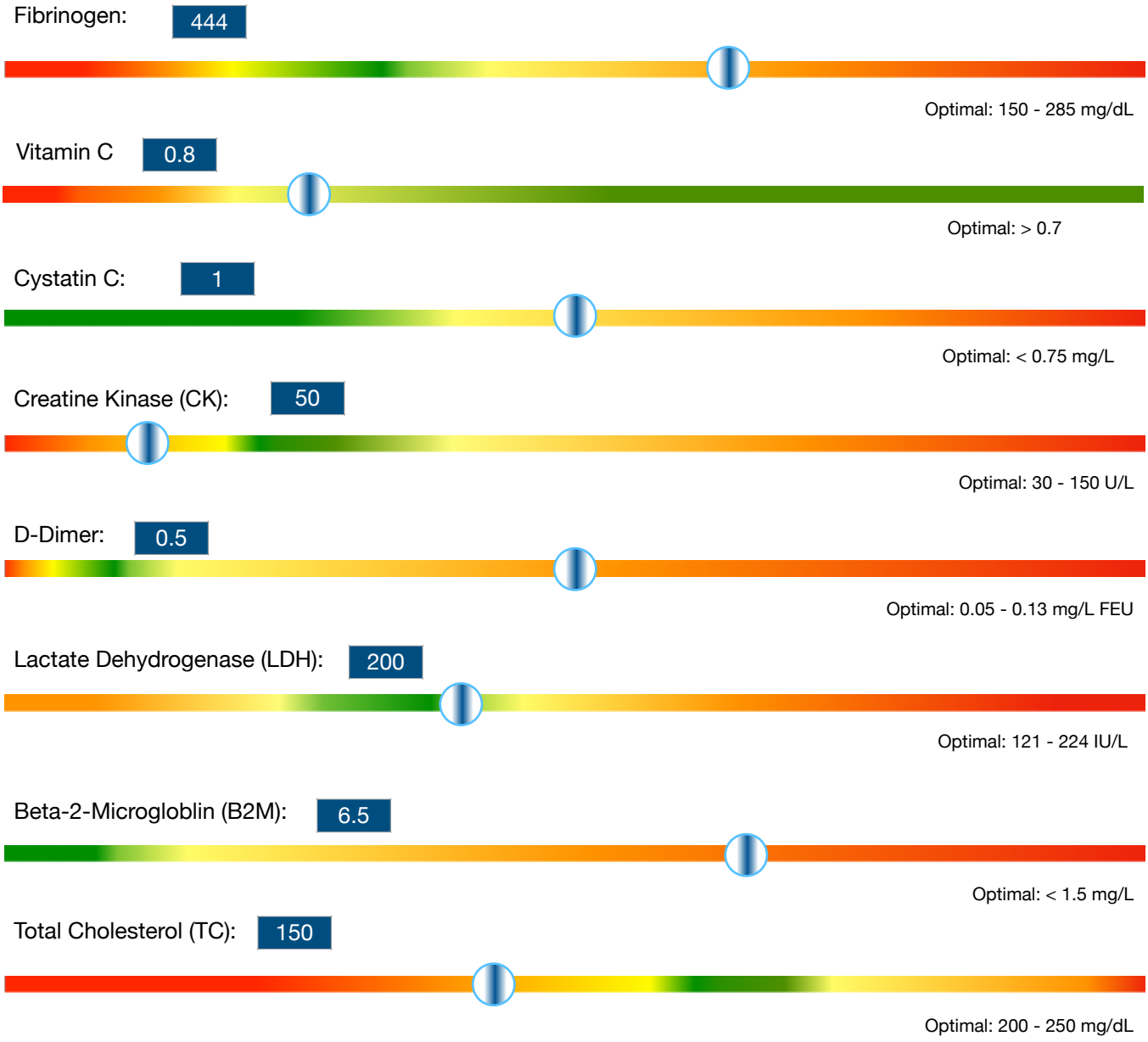
Erythrocyte Sedimentation Rate (ESR): 20

Optimal: < 6 mm/hr

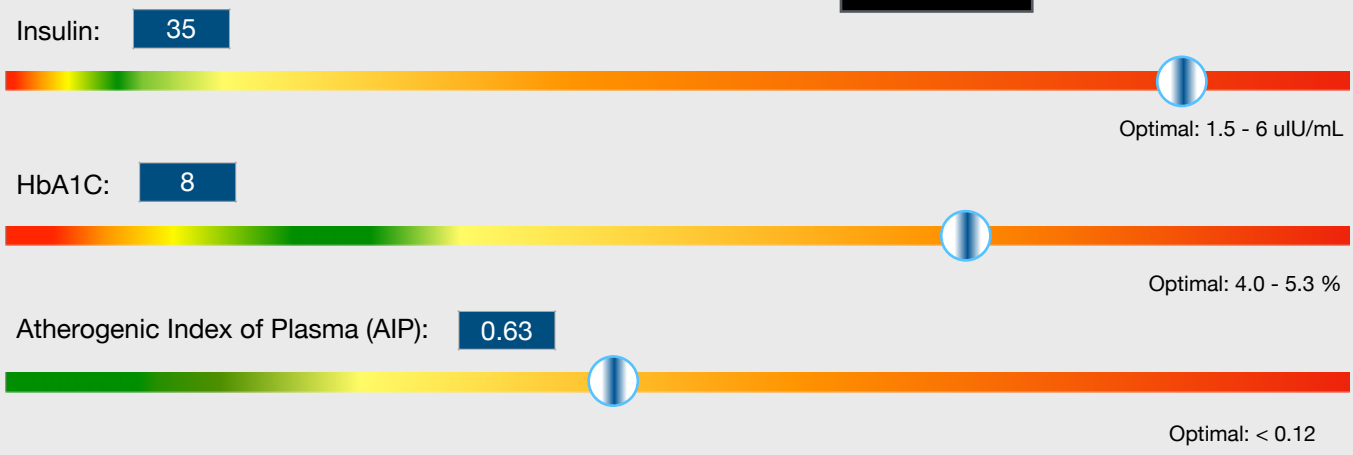
CRP / Albumin Ratio 1.1

Optimal: < 0.15 - 0.55

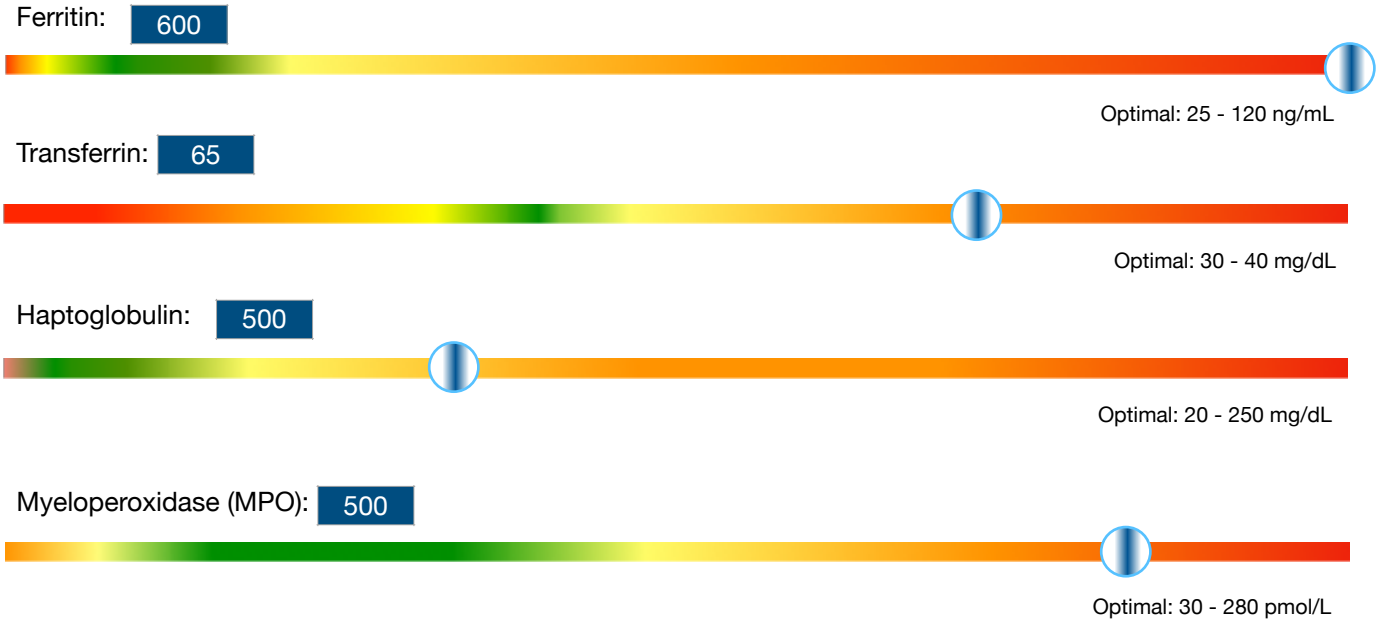
Tissue Damage



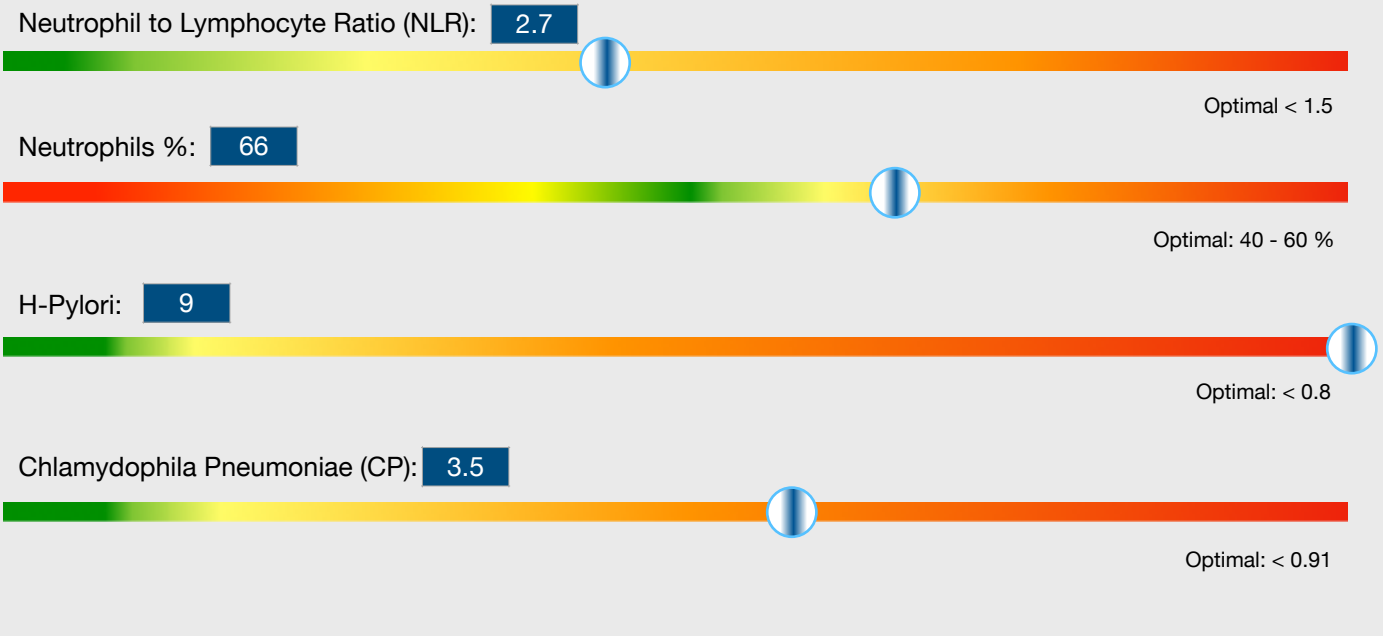
Metabolic



Oxidative Stress



Infection



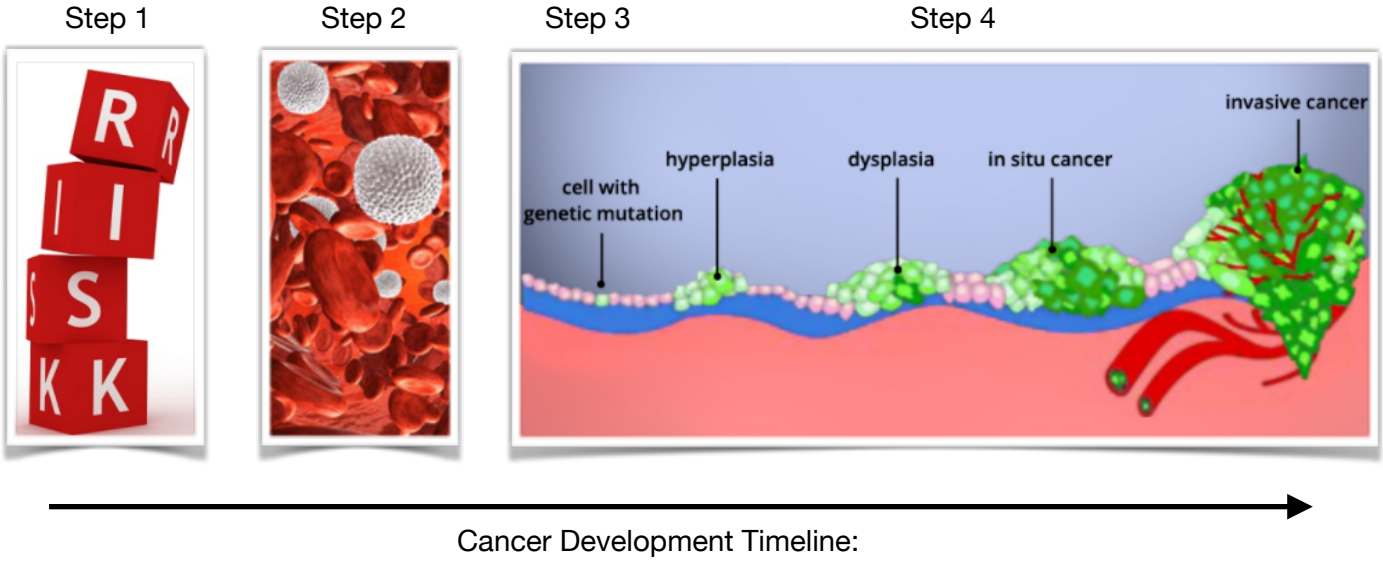
Why the Comprehensive CRISP Report for Cancer….

Emerging science show that multiple modifiable factors may lead to the development of a tumor or proliferation of cancer cells. The process of risk factor development with the ultimate formation of a cancer follows a clear process:

Step 1: Risk factors create a susceptibility
Step 2: Physiological markers change as your immune system detects a foreign "insult"
Step 3: Tissue changes develop as the underlying process of cancer overwhelms local immunity
Step 4: Cancer proliferates either as a tumor or other uncontrolled cell growth.

Diagnostics today focus on Step 4 of this process - detection of a mass or extensive cancer cell growth - usually precipitated by a health-related issues. This is very late stage detection. New diagnostics look at tumor and cancer-specific biomarkers - Step 3 in the cancer development process. While this is an improvement, the cancer is already both present and organized. At this stage, according to the Nobel Prize in Medicine, 2018 - the cancer can evade action of your immune system and quickly proliferate.

Our Diagnostics: We have vast experience with cancer patients having published peer-reviewed articles on cancer dating back 2 decades. We have examined risk factors an biomarkers in our patients and in tens of thousand published in the National Medical Library. Our advanced artificial intelligence (AI) team from Harvard Medical School and MIT developed a robust and sensitive algorithm to determine why you may progress from Step 1 and Step 2 risk to develop a cancer. This same algorithm also determines who is already progressing to Step 3 and Step 4.



Do we all have cancer cells?
Anyone who answers definitely is basing their answer on a hunch. It's safe to assume that the probability of detecting a single cancerous or pre-cancerous cell is very low. The more important question to consider is:

If a cancerous cell develops, will it proliferate into cancer?

This is the question we answer - through this CRISP report.

The next important question is -

If I'm diagnosed with cancer or a pre-cancerous polyp, for example, what is my prognosis?

We answer this question, too - through this CRISP report.

The value of multiple biomarkers in cancer prediction and prognosis.

Multiple biomarkers in cancer assessment has 200 medical publications noted in the National Library of Medicine dating back to 1998. The following are quotes from key reference materials:

Use of multiple biomarkers for a molecular diagnosis of prostate cancer

The identification of biomarkers capable of providing a reliable molecular diagnostic test for prostate cancer (PCa) is highly desirable clinically. We describe here 4 biomarkers which, in combination, distinguish prostate cancer from benign prostate hyperplasia (BPH).

https://doi.org/10.1002/ijc.20760

Inflammatory biomarker score and cancer: A population-based prospective cohort study

Conclusion: Our study suggests that inflammation is associated with cancer risk and mortality, and combining inflammatory biomarkers into a score is a robust method of elucidating this association**.**

https://link.springer.com/article/10.1186/s12885-016-2115-6

Prognostic Value of the CRP/Alb Ratio, a Novel Inflammation-Based Score in Pancreatic Cancer

The current study demonstrated the CRP/Alb ratio may serve as a significant and promising inflammatory prognostic score in pancreatic cancer. An elevated CRP/Alb ratio is an independent factor for poor prognosis with the cutoff value of 0.180.

https://link.springer.com/article/10.1245/s10434-016-5579-3

Inflammatory serum markers and risk and severity of prostate cancer: The PROCA-life study

Our study supports that hs-CRP including repeated measurements alone or in combination with WBC may be a useful inflammation-related biomarker for prostate cancer risk and prognosis.

https://onlinelibrary.wiley.com/doi/pdf/10.1002/ijc.32718

Association of baseline inflammatory biomarkers with cancer mortality in the REGARDS cohort

In race-stratified analysis, each unit increase in IL-6 was associated with increased risk of cancer mortality among African-Americans (HR: 3.88, 95% CI: 1.17–12.88) and Whites (5.25, 95% CI: 1.24–22.31). If replicated in larger, racially diverse prospective cohorts, these results suggest that cancer patients may benefit from clinical or lifestyle approaches to regulate systemic inflammation as a cancer prevention strategy.

doi: 10.18632/oncotarget.27108

High neutrophil-to-lymphocyte ratio and platelet-to-lymphocyte ratio predict poor survival in rectal cancer patients receiving neoadjuvant concurrent chemoradiotherapy

Pre-CCRT NLR and PLR are independent prognostic factors for rectal cancer patients and could be used as a potential biomarker to identify high-risk patients for more intense treatment and care.

Chronic inflammation towards cancer incidence: A systematic review and meta-analysis of epidemiological studies

This systematic review and meta-analysis provides epidemiological data on the relationship between chronic inflammation, as measured by inflammatory blood parameters, and cancer incidence. Study quality improvements can be done by better verification of inflammatory status (more than one baseline measurement of one parameter), adjusting for important confounders and ensuring long-term follow-up.

https://doi.org/10.1016/j.critrevonc.2020.103177

The **CRISP Report** uses studies like these to validate our predictive algorithms. Most of these studies use 2 - 5 markers to develop their risk score. The CRISP report includes 30 biomarkers explained on the following pages.

Our Validated Approach
Multiple Biomarkers and Chronic Risk Interpretation

Understanding Your Labs: Individual lab values are important in understanding both your acute and chronic health risks and risk for cancer.

More important is the story your labs tell about your cancer risk . . .

and your chronic health, when taken together. Many markers used to assess your chronic state of health also change (usually elevate) when you have an acute health problem.

Analyzing and evaluating many different biomarkers often helps a trained practitioner to differentiate between acute and chronic risks.

We encourage you to consult with our team of practitioners or someone truly knowledgeable about labs to tell your “health story.” The information on each biomarker below provides current data on their relationship to cancer risk, cancer development and prognosis.

Optimal Values

Traditional lab values on your lab report are "reference intervals" or "reference ranges" used to determine if you are acutely or imminently sick. These ranges are designed to look for "fire." However,

most diseases, including cancer, are chronic in nature - "smoke" not "fire."

In the CRISP Report, we have re-engineered "normal" lab values to reflect chronic disease and cancer risk. Essentially, we have "turned up the volume" on the lab values to "hear" a faint signal of distress that your body is trying to communicate - if we would only listen!

We have established science-based “optimal” biomarker ranges by determining, through researching the worldwide medical literature, when a level of a marker is associated with an increase in early mortality risk - based on sound statistical analysis. Any value that is highlighted with a color other than green implies that the marker, if it perpetuates at that level, may put you at future risk for cancer and early or sudden death.

Your CRISP (Cancer Risk Score and Prognosis) value:

This single value, displayed at the top of your report, is an aggregate score from many of the important biomarkers for cancer risk. Of all the individual markers, it is the single most predictive of your current and future health risk for cancer because it combines markers that predict cancer across a broad spectrum, from

inflammation
metabolic risk,
oxidative stress,
infection,
tissue damage, and
immune response.

Your optimal CRISP score is < 1.
Importantly, your solution to improving your odds against cancer is in your control. Every marker that constitutes this report is modifiable either from lifestyle and risk changes, high nutrient supplements, or treatments for underlying causes - not the chemo / radiation / surgery approach of the standard of care.

Your **CRISP** value: **6.4** **/ 10**

Risk Classifications

The National Cancer Institute lists several of the "most studied know or suspected risk factors for cancer. Their list includes: Age, Alcohol, Cancer-Causing Substances, Chronic Inflammation, Diet, Hormones, Immunosuppression, Infectious Agents, Obesity, Radiation, Sunlight, and Tobacco.

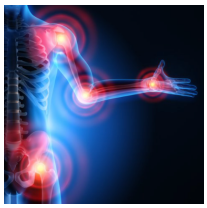
We have re-engineered the NCI list into logical, modifiable categories, and applied a risk scoring system to each. For example, tobacco does not cause cancer. However, the chronic use or smoking products that induce inflammation often do. The root-cause of cancer from excessive use of tobacco is chronic inflammation.

Accordingly, we have created the following groupings:

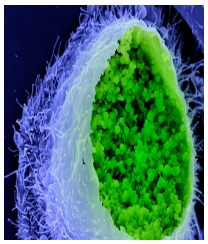
1. Immune health: The strength of your immune system significantly dictates you ability to fight any disease including the underlying causes of cancer. Diet, immunosuppression, and age of important contributors to overall immune health and cancer resilience.

2. Metabolic health: Diabetics have much higher rates of cancer compared to non-diabetics - all other factors being equal. Diabetes is a disease of elevated insulin and cellular insulin resistance. High levels of fasting insulin are highly correlated to the excess cancer risk in diabetics, and the general population too. Obesity and diet are the NCI factors that fit in this category.

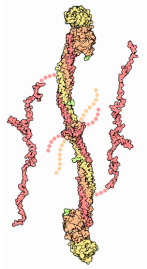
3. Oxidative stress: We live in a oxidative environment evidenced by our air containing 20% oxygen. However, other oxidizing substances, like ozone from air pollution, excess iron in our blood, and lack of natural antioxidants from whole foods increase our risk for disease and cancer. Diet, sunlight, radiation, and cancer-causing agents fall under this category.



4. Inflammation: Root-cause focused practitioners recognize that smoldering inflammation contributes to poor health, cancer, and a myriad of chronic diseases. The association between inflammation and cancer is profound. In mesothelioma, asbestos fibers cause the local tissue to turn cancerous. Why? Asbestos is extremely inert and cannot be consumed by macrophages. Instead, it causes constant and even perpetual inflammation locally, leading to the development of cancer. Diet, tobacco, and cancer-causing substances fit into this category.



5. Infection: Infection, particular chronic infection from viruses and bacteria, are largely under-appreciated as a cause of cancer. Most cancer-causing pathogens "fly under the radar." A person with these types of infections do not feel sick like when they have the flu. Periodontal disease is a poignant example. Many people don't realize they have periodontal disease. However, Harvard and Brown Universities report a strong connection between periodontal disease and pancreatic cancer. HPV and HIV are recognized cancer-causing pathogens. However, there are many more known and unknown. H-Pylori is noted for causing stomach ulcers but it is also identified as causal in gastric and colon cancers. Chlamydophila pneumoniae is strong affiliated with lung cancer. This organism, with whom up to 80% of older people have been exposed - may explain why non-smokers contract lung cancer.



6. Tissue Damage: Many physiological markers indicate tissue damage or repair processes. Damage may be caused by inflammation, oxidative stress, infection, or toxins. These biomarkers provide important clues as to the activity of our immune and related systems. In some cases, our immune response may be muted while the molecules involve in the repair of damage are active and detectable. These types of markers add significant confidence to the CRISP risk score.

Biomarkers and the data supporting their cancer prediction and prognosis

List of Biomarkers in the CRISP Report

White Blood Cell Count (WBC)	Atherogenic Index of Plasma (AIP)
Neutrophil Counts (Absolute)	Transferrin
Neutrophil % (% of all WBC)	Helicobacter Pylori (Infection)
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	Chlamydophila Pneumoniae (Infection)
Erythrocyte Sedimentation Rate (ESR)	Myeloperoxidase (MPO)
Ferritin	Troponin T
Uric Acid	Cystatin C
Vitamin D	Serum Amyloid A
Insulin (Fasting)	Creatine Kinase
HbA1C	CRP/Albumin Ratio
Total Cholesterol	Vitamin C

The following pages contains information on each biomarker. Specifically, each page contains:

- Name of biomarker
- Biomarker summary and general description
- Category of Cancer risk associated with the biomarker
- Traditional reference ranges compared to "normal / optimal" values used in the CRISP algorithm
- Accelerated mortality data associated with the biomarker
- References supporting the association between the biomarker and cancer risk.

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The **vertical blue bar** in the circle (bullseye) is **your** lab value for the specific biomarker.

White Blood Cell Count (WBC)

A type of blood cell that is made in the bone marrow and found in the blood and lymph tissue. White blood cells are part of the body's immune system. They help the body fight infection and other diseases. Types of white blood cells are granulocytes (neutrophils, eosinophils, and basophils), monocytes, and lymphocytes (T cells and B cells). Checking the number of white blood cells in the blood is usually part of a complete blood cell (CBC) test. It may be used to look for conditions such as infection, inflammation, allergies, and leukemia. Also called leukocyte and WBC. Source: National Cancer Institute

Category: Immune Health
Traditional Reference (normal) Range: 3,500 - 10,800
Cancer Risk Reference Range: 4,000 - 5,800 cells/microliter

WBC Count and the Risk of Cancer Mortality in a National Sample of U.S. Adults: Results from the Second National Health and Nutrition Examination Survey Mortality Study

Table 2. Risk of cancer mortality by quartile of WBC count

Outcome	WBC quartile (range, 1 × 10^9 cells/L)			
	Q1 (≤5.7)	Q2 (5.8-6.8)	Q3 (6.9-8.2)	Q4 (≥8.3)
Number at risk, *N*	2061	1829	1922	1862
All cancer, *n*	84	89	113	124
Mortality rate per 100,000	23.4	31.0	39.5	45.9

32% increase in Cancer mortality

This table shows that at a WBC of 5.8 (5,800) - which is well within "normal" by the standard of care reference ranges, risk of dying of cancer increases by 32% when compared to ranges considered normal by the CRISP algorithm. **At a WBC of <8.2 (8,200), still well within "normal" by traditional medicine, cancer mortality rates double.**

Selected Publications:

Title: Association Between Circulating White Blood Cell Count and Cancer Mortality

Finding: People with a WBC >7,400 have an almost 2 fold increase in all-type cancer mortality compared to people with a WBC <5,300 (cells/microliter).

Conclusion: These data provide new epidemiological evidence of an association between circulating WBC count, a widely available marker of inflammation, and subsequent cancer mortality.

Title: White Blood Cell Count and Total and Cause-Specific Mortality in the Women's Health Initiative

Finding: Cancer death rates were lowest at a WBC of 4,600 - 4,900. At a count of 8,000, the risk of death from cancer increased by 73%.

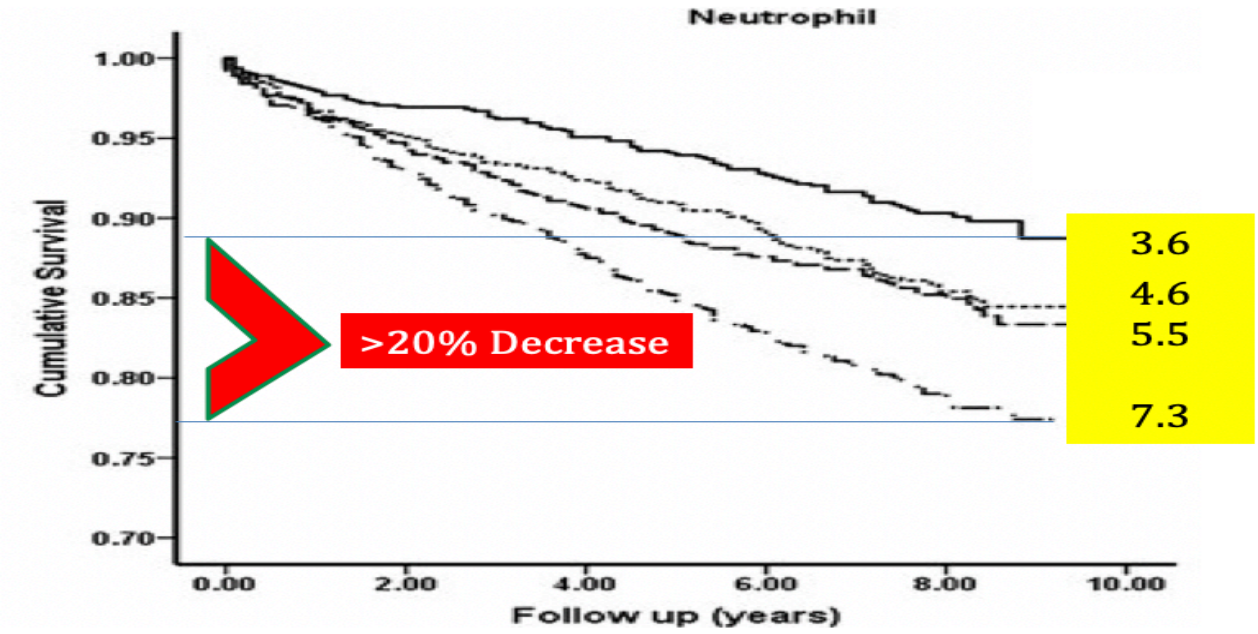
Conclusion: The authors conclude that high WBC counts are associated with increased risk of cancer-related mortality and that this relationship is independent of confounding factors such as diabetes and fasting glucose levels.

White Blood Cell Count (WBC): 20000 Optimal: 4,000 - 5,800 cells/microliter

Neutrophils (Absolute Count) Also called ANC

A measure of the number of neutrophils in the blood. Neutrophils are a type of white blood cell. They help the body fight infection. An absolute neutrophil count may be used to check for infection, inflammation, leukemia, and other conditions. The lower a person's absolute neutrophil count is, the higher the risk is of getting an infection or cancer. The same is true on the high end of the neutrophil count spectrum. Cancer treatment, such as chemotherapy, may reduce the absolute neutrophil count making you more susceptible to infection and future cancers. Source: National Cancer Institute

Category: Immune Health
Traditional Reference (normal) Range: 1,400 - 7,000
Cancer Risk Reference Range: 1,500 - 3,000 cells/microliter



Selected Publications:

Title: Tumor Associated Neutrophils. Their Role in Tumorigenesis, Metastasis, Prognosis and Therapy

Finding: A large body of evidence shows that neutrophil number in blood stream and tumor tissues of cancer patients does correlate with prognosis of the disease. Moreover, great neutrophil density in tumors is regarded as an independent index of poor prognosis.

Conclusion: The evaluation of neutrophils as prognosis index in many tumors has been clearly assessed: high neutrophil number and/or elevated Neutrophil-to-Lymphocyte Ratio (NLR) do correlate a poor outcome of the patient.

Title: Tumor-Associated Neutrophils in Cancer

Finding: All these findings indicate that neutrophils could be considered a potential prognostic marker for cancer patients. When a significantly high number of infiltrated neutrophils are present in tumors compared to normal tissues, neutrophils may serve as a diagnostic indicator.

Conclusion: Neutrophils—the most abundant white blood cells in the circulation system—constitute a significant part of the tumor microenvironment. Neutrophils play major roles linking inflammation and cancer and are actively involved in progression and metastasis.

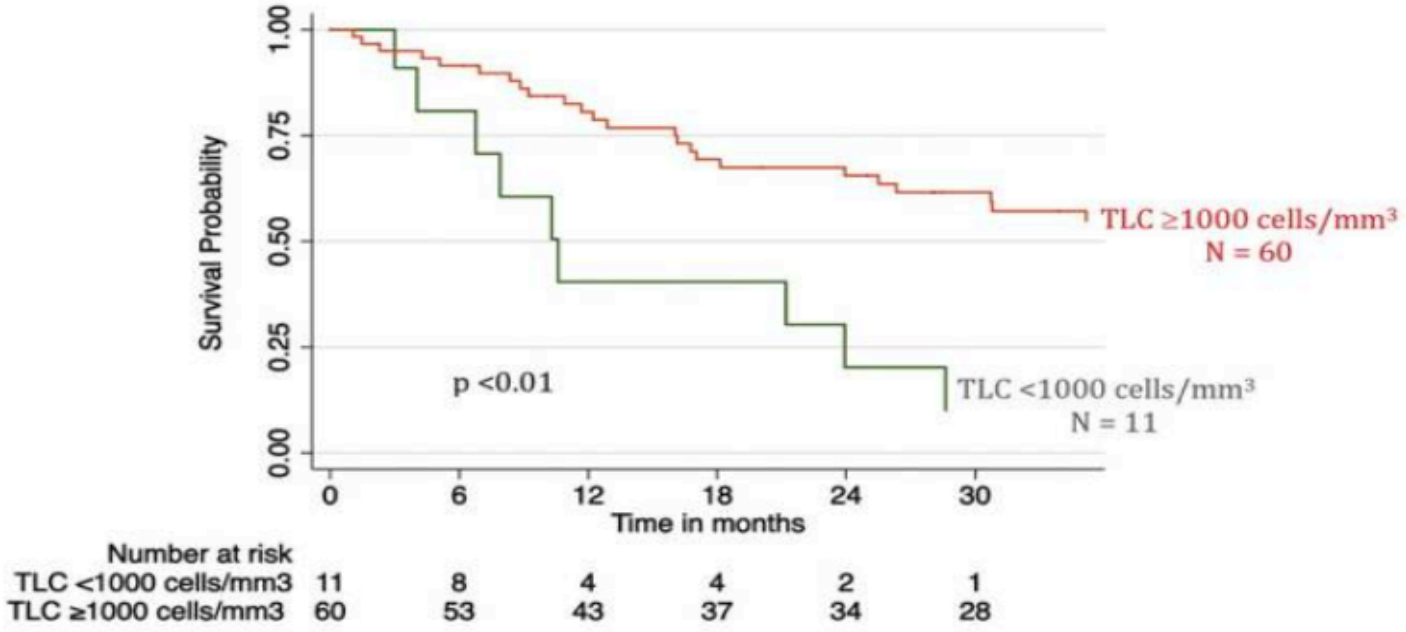
Neutrophils (absolute): 8000

Optimal: 2,000 - 3,500 cells/microliter

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
Cancer Risk Reference Range: 1,000 - 2,500 cells/microliter



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.

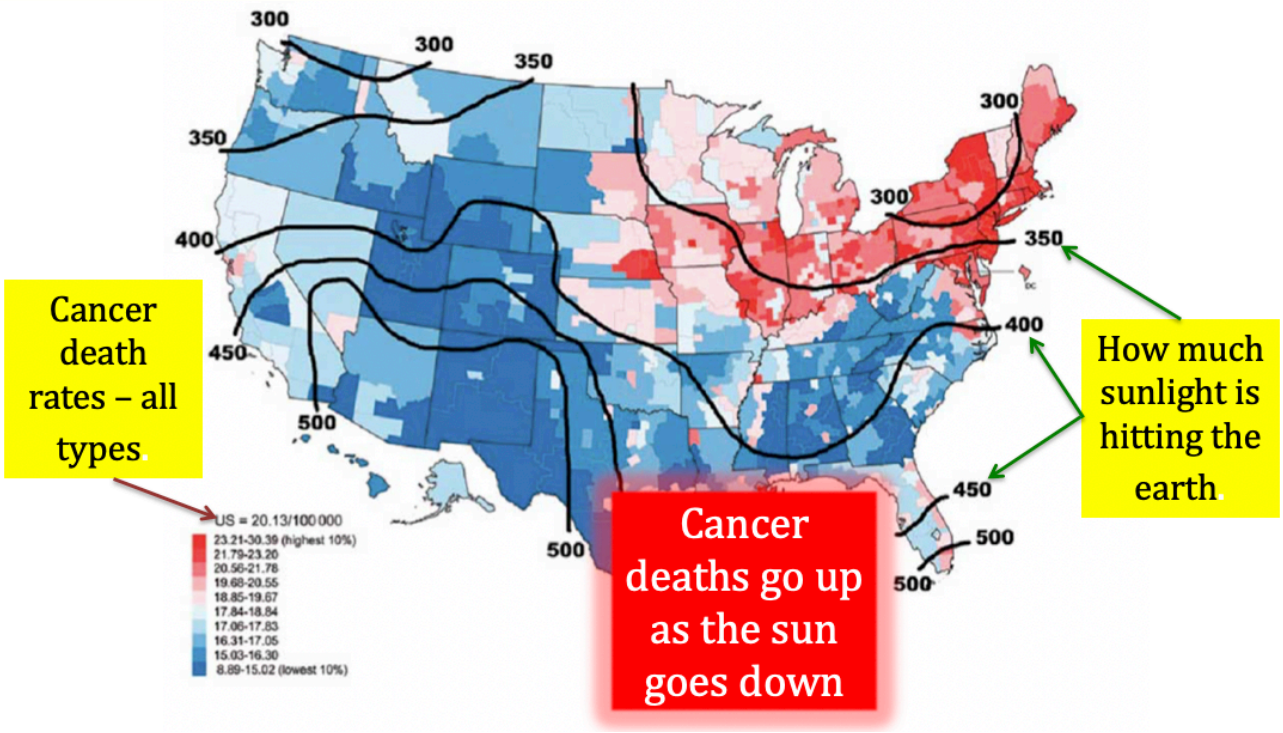
Lymphocytes (absolute): 3000

Optimal: 1,000 - 2,000 cells/microliter

Vitamin D (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 exposed to sunshine can make vitamin D. In studies of cancer cells and of 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
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 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.

Vitamin D: 20

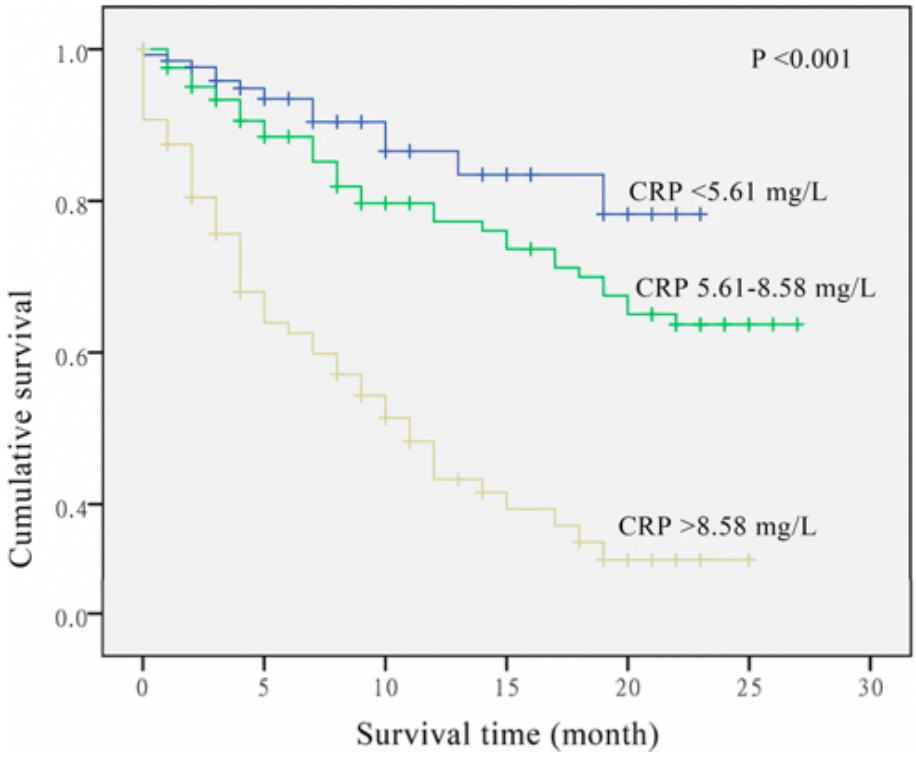
Optimal: 55 - 100 ng/ml

C-Reactive Protein (CRP)

C-reactive protein (CRP) an acute-phase reactant inflammatory protein is synthesized in hepatocytes in response to cytokines that are released from leucocytes within the tumor microenvironment. Several epidemiological studies appraised an association of CRP with breast cancer risk. Source: International Journal of Breast Cancer

Category: Inflammation
Traditional Reference (normal) Range: 0 - 3.0
Cancer Risk Reference Range: <

Non Small Cell Lung Cancer



Selected Publications:

Title: C-reactive protein and colorectal cancer risk: A systematic review of prospective studies

Finding: We combined relative risks (RR) for colorectal cancer associated with a one unit change in high-sensitivity C-reactive protein and found that for one unit elevation in C-reactive protein led to a 12% increase in this cancer.

Conclusion: Pre-diagnostic high-sensitivity C- reactive protein concentrations are associated with an increased risk for colorectal cancer.

Title: C-reactive protein and risk of breast cancer: A systematic review and meta-analysis

Finding: Altogether fifteen cohort and case-control studies were included in this meta-analysis, involving a total of 5,286 breast cancer cases. The combined overall risk per natural log unit increase in CRP for breast cancer was 16%.

Conclusion: The meta-analysis indicated that elevated CRP levels was associated with increased risk of breast cancer.

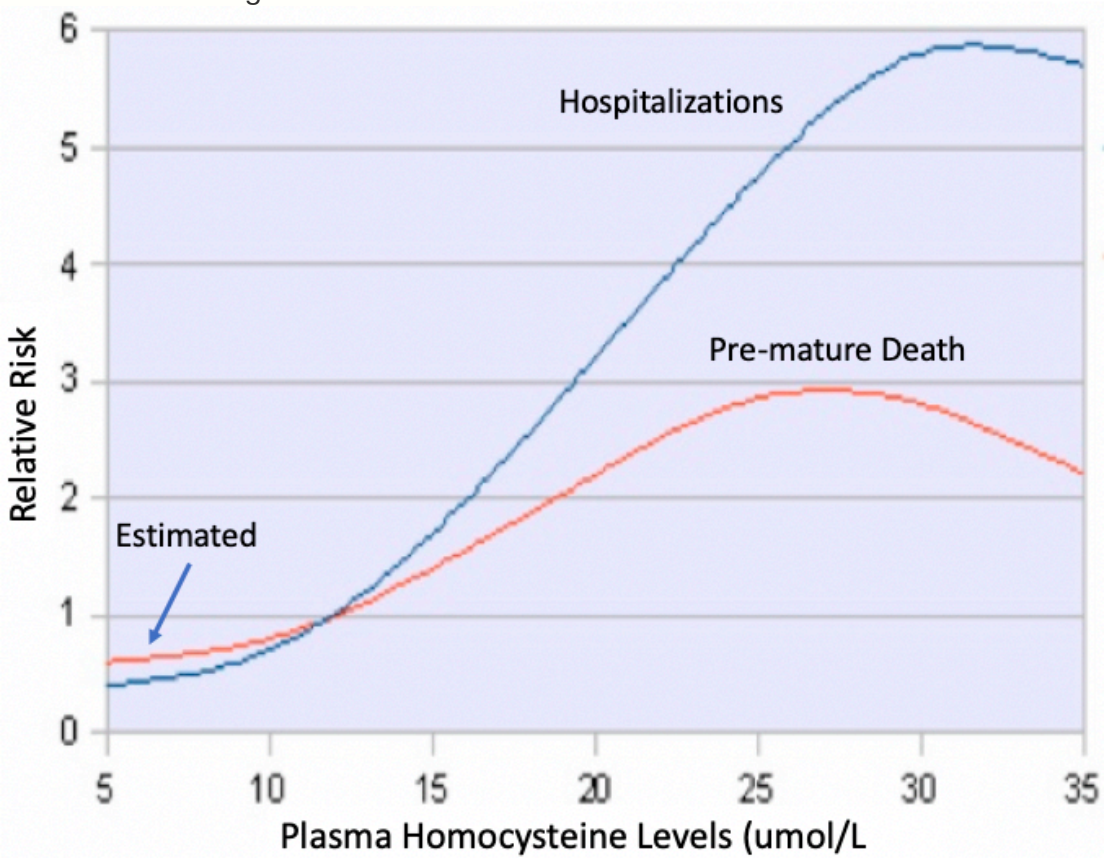
C-Reactive Protein (CRP): 4.0

Optimal: < 0.6 mg/mL

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 hyperhomocystinuria and cancer. Source: Nature Journal www.nature.com

Category: Inflammation
Traditional Reference (normal) Range: 0.0 - 17.2
Cancer Risk Reference Range: 5.5 - 11.0 umol/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

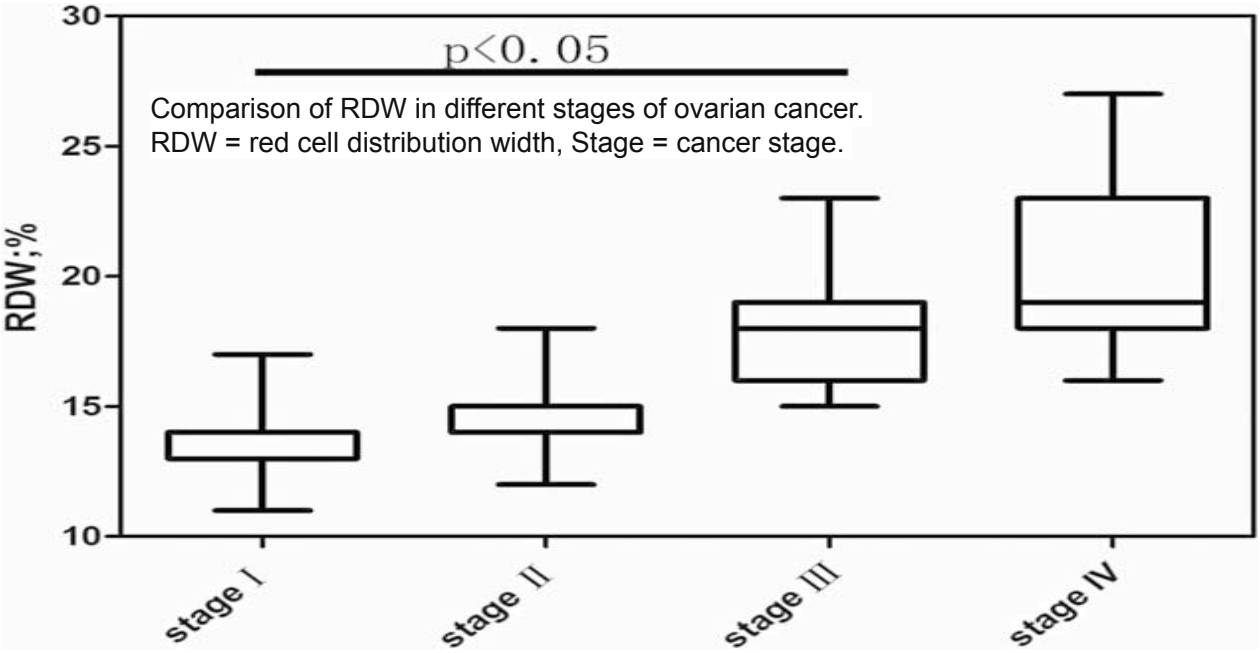
Conclusion: Homocysteine levels have been found to be a very good indicator of whether cancer therapies are working. The homocysteine level rises with tumors grow, and falls when they shrink.

Homocysteine (HcY): 15 5.5 - 11.0 umol/L

Red Blood Cell Distribution Width (RDW)

Red blood cell distribution width is a measure of the range of variation of red blood cell volume that is reported as part of a standard complete blood count. Usually red blood cells are a standard size of about 6–8 µm in diameter. Certain disorders including Cancer, however, cause a significant variation in cell size. Source: WebMD

Category: Inflammation
Traditional Reference (normal) Range: 11.7 - 15.4%
Cancer Risk Reference Range: 11.0 - 12.5%



Selected Publications:

Title: The value of red cell distribution width in patients with ovarian cancer

Finding: The RDW was significantly different among 4 different stages of ovarian cancer. Correlation analysis demonstrated that the RDW was negatively correlated with the hemoglobin concentration (Hb). The RDW was positively correlated with the cancer stage and CA-125 concentration.

Conclusion. The RDW is associated with ovarian cancer and is a potential marker of its progression.

Title: Combining Red Blood Cell Distribution Width (RDW) and CEA Predict Poor Prognosis for Survival Outcomes in Colorectal Cancer

Finding: RDW was significantly positively correlated with abnormal high values of tumor serum markers CEA and CA19-9. More importantly, analysis found that the abnormal increase in RDW in colorectal cancer was associated with the shortening of disease free survival and overall survival in patients who were followed up for 3 and 5 years

Conclusion: RDW is correlated with the pathological features of colorectal cancer, indicating a worse malignant tendency of tumor. RDW can independently evaluate the prognosis of colorectal cancer patients, and combined with the high value of CEA, it can effectively indicate the adverse recurrence and survival prognosis.

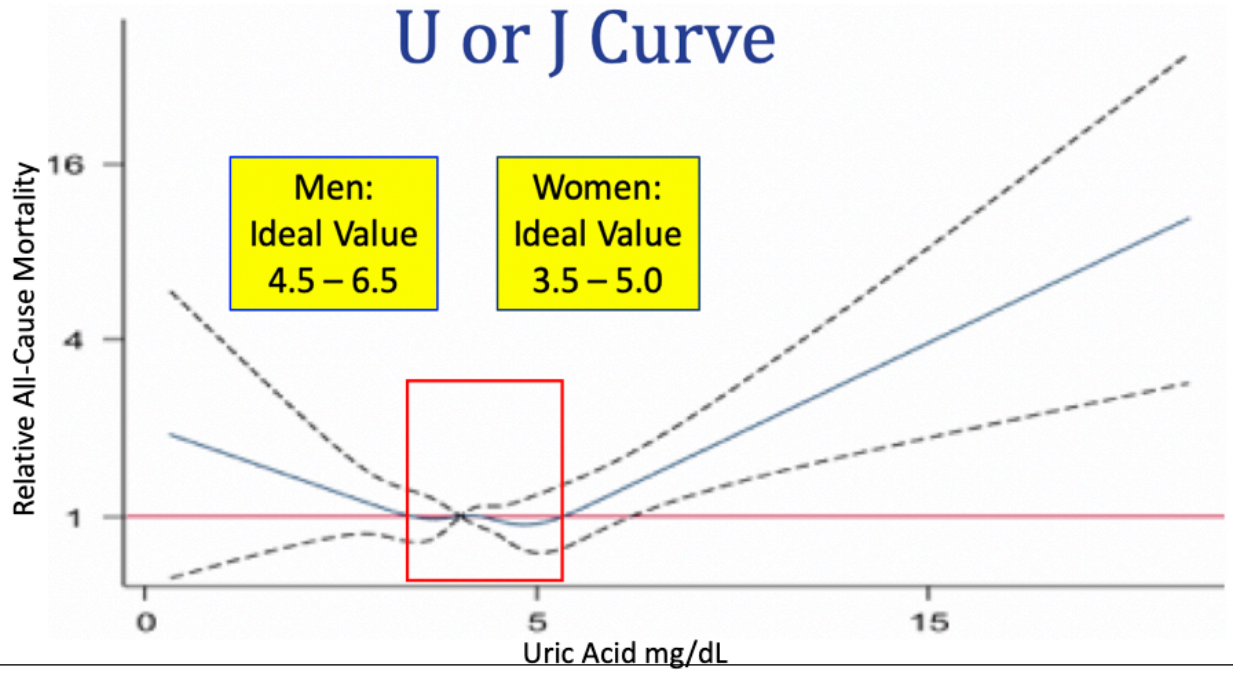
Red Cell Distribution Width (RDW): 15

Optimal: 11.0 - 12.5%

Uric Acid

A waste product left over from normal chemical processes in the body and found in the urine and blood. Abnormal buildup of uric acid in the body may cause a condition called gout. Increased levels of uric acid in the blood and urine can be a side effect of chemotherapy or radiation therapy. Recent evidence has demonstrated that elevated serum uric acid (hyperuricemia) is associated with excess cancer risk, recurrence, and mortality. Although uric acid (UA) can function as a systemic antioxidant, its pro-inflammatory properties have been postulated to play an important role in the pathogenesis of cancer. Source: National Cancer Institute

Category: Inflammation
Traditional Reference (normal) Range: 2.5 - 7.1
Cancer Risk Reference Range: Men: 4.5 - 6.5; Women: 3.5 - 5.0



Selected Publications:

Title: Contribution of uric acid to cancer risk, recurrence, and mortality

Finding: This review will summarize the evidence that elevated UA may be a true risk factor for cancer incidence and mortality, and mechanisms by which UA may contribute to cancer pathogenesis will be discussed in the hope that these will identify new opportunities for cancer management.

Conclusion. The development and progression of cancers that are amenable to life style modification are chronic inflammation and the metabolic syndrome. Uric acid may contribute to the cancer pathogenesis.

Title: Circulating uric acid levels and subsequent development of cancer in 493,281 individuals: findings from the AMORIS Study

Finding: Site-specific analysis showed a positive association between uric acid and risk of colorectal, hepatobiliary, kidney, non-melanoma skin, and other cancers in men and of head and neck and other cancers in women. An inverse association was observed for pulmonary and central nervous system (CNS) cancers in men and breast, lymphatic and haematological, and CNS malignancies in women.

Conclusion: Altered uric acid levels were associated with risk of overall and some specific cancers, further indicating the potential role of uric acid metabolism in carcinogenesis.

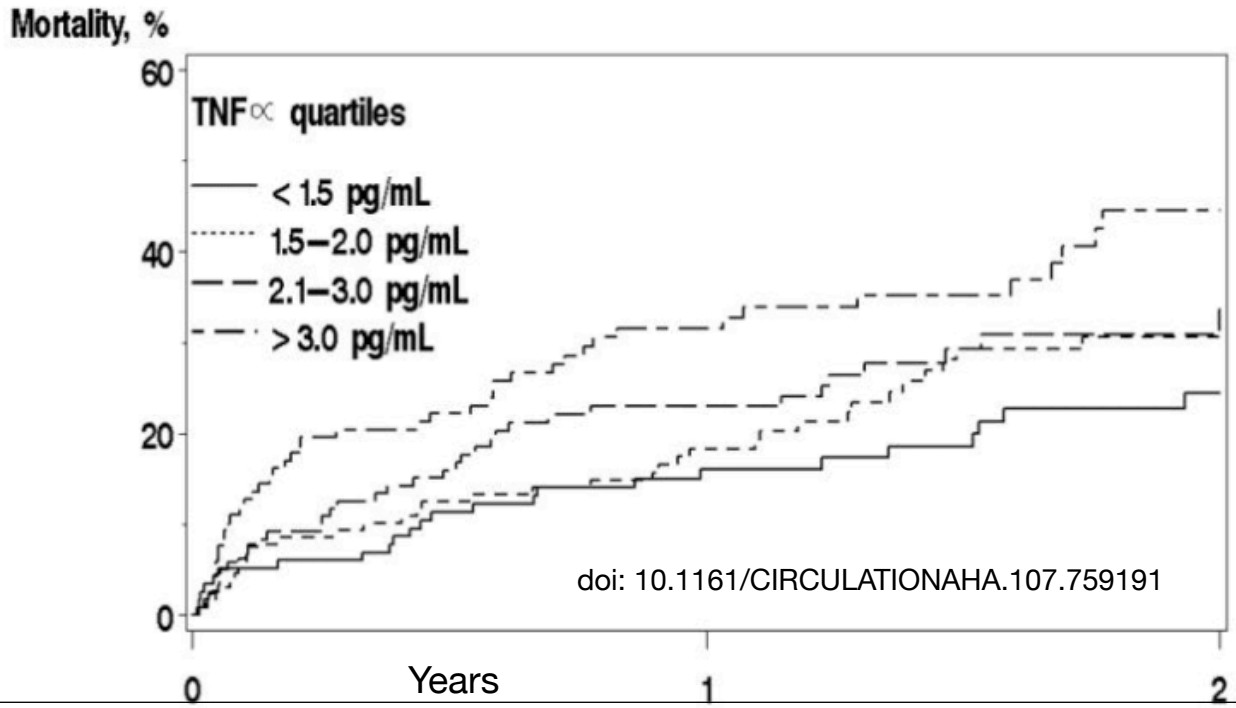
Uric acid: 7

Optimal: 3.5 - 6.0 mg/dL

Tumor Necrosis Factor alpha (TNF-α)

TNF-α is a protein made by white blood cells in response to an antigen (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
Cancer Risk Reference 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 maintenance and homeostasis of the immune system, inflammation and host defence. 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.

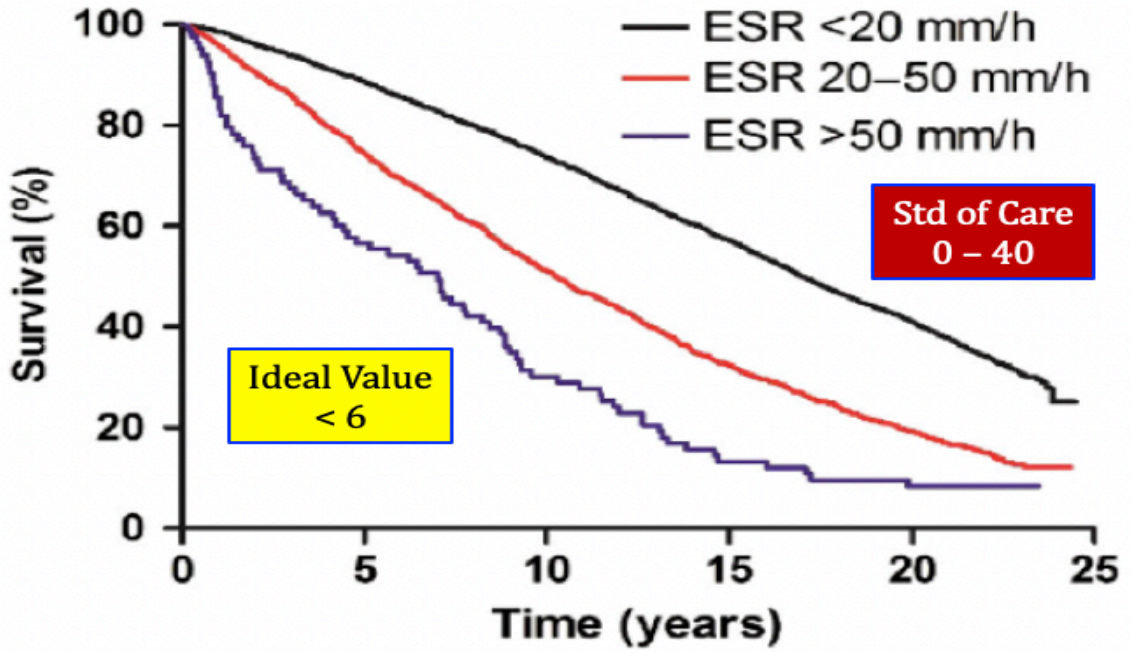
Tumor Necrosis Factor Alpha (TNF-alpha): 4

Optimal: < 1.5 pg/mL

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
Cancer Risk Reference Range: < 6 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.

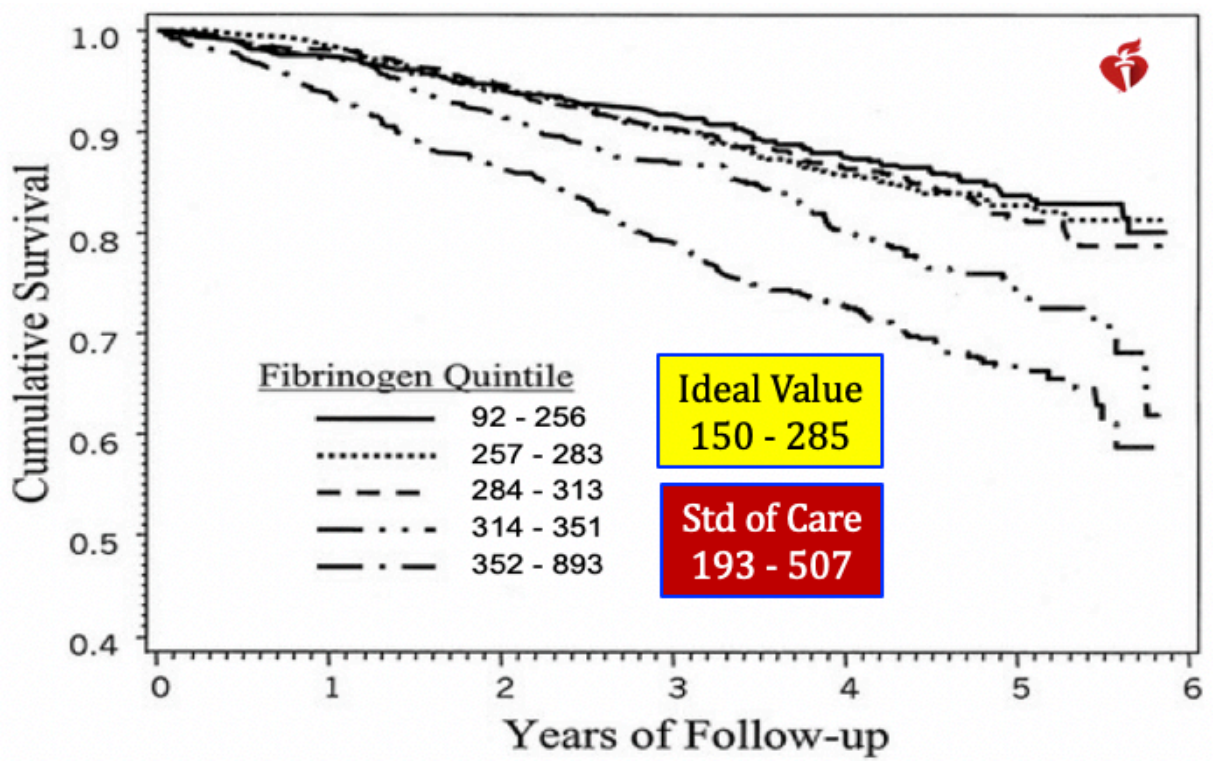
Conclusion: Elevated ESR is a strong marker of undiagnosed cancer and is associated with poorer survival. Impact: Our findings may help clinicians in assessing absolute risk, common sites, and prognosis of cancers discovered in patients with elevated ERS.

Erythrocyte Sedimentation Rate (ESR): 20 Optimal: < 6 mm/hr

Fibrinogen

A protein involved in forming blood clots in the body. It is made in the liver and forms fibrin. Fibrin is the main protein in a blood clot that helps stop bleeding and heal wounds. Sometimes fibrin-like substances may be found in higher than normal amounts in the blood and urine of patients with some types of cancer or other conditions. Measuring the amount of these substances may help to check how well cancer treatment is working or if the cancer has gotten worse. Fibrinogen is a type of tumor marker. Source: National Cancer Institute

Category: Tissue Damage / Repair
Traditional Reference (normal) Range: 193 - 507
Cancer Risk Reference Range: 150 - 285 mg/dL



Selected Publications:

Title: Smoking, Fibrinogen and Cancer Mortality

Finding: Elevated fibrinogen levels were associated with an increased risk of respiratory/intrathoracic organ cancer mortality. Compared to fibrinogen <259 mg/dl, fibrinogen 294-335 mg/dl had an adjusted hazard ratio of **3.68** (95% CI: 1.80-7.55), and fibrinogen > 336 mg/dl had an adjusted hazard ratio of **3.78** (95% CI: 1.84-7.75). **Interpretation: Almost 4 times higher rates of cancer.**

Conclusion: Elevated fibrinogen levels has been linked to angiogenesis and metastases of tumors.

Title: Response Of Plasma Fibrinogen And Plasminogen To Hormone Treatment And The Relation Of Pretreatment Values To Mortality In Patients With Prostatic Cancer

Finding: The levels of fibrinogen were significantly positively correlated with death rates from all causes and nearly significantly with prostatic cancer,

Conclusion: Elevated pretreatment fibrinogen levels were associated with an increased proportion of deaths at 1 year from all causes and from cancer of the prostate.

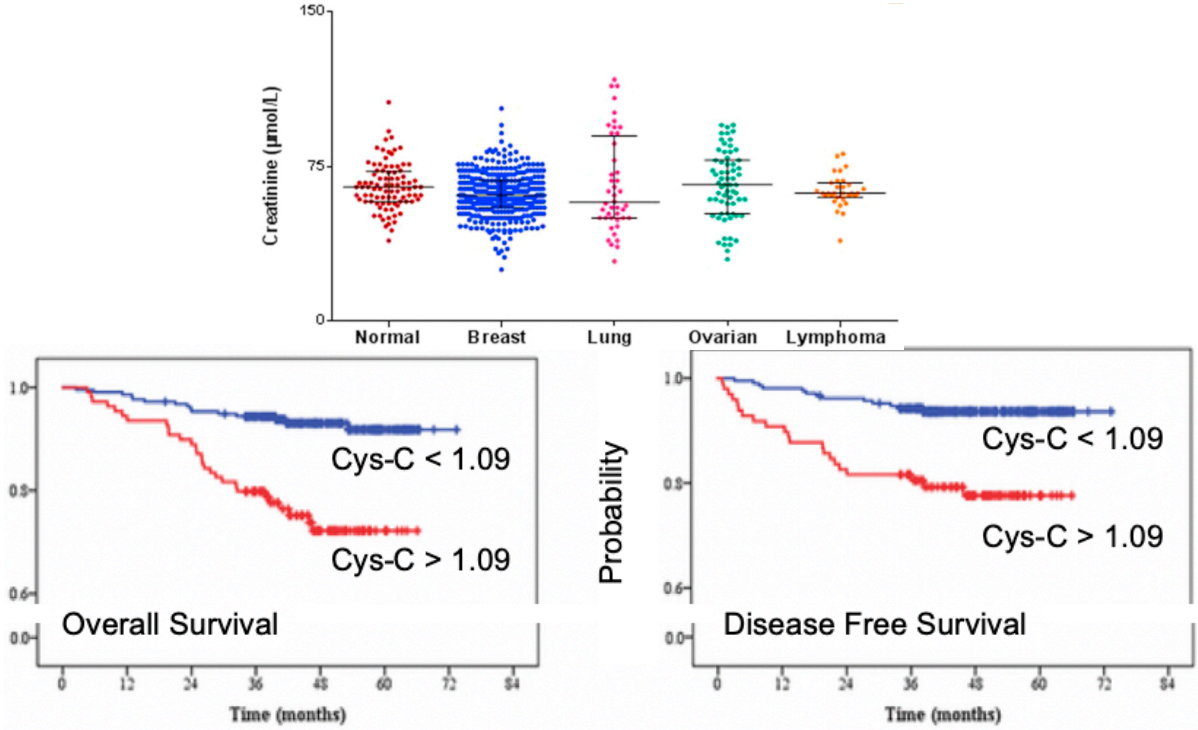
Fibrinogen: 444

Optimal: 150 - 285 mg/dL

Cystatin C (Cys-C)

Cystatin-C (Cys-C) is a cysteine protease inhibitor produced by nearly all nucleated cells and excreted into the bloodstream. Cys-C has multiple biological functions including controlling extracellular proteolysis via inhibition of cysteine peptidases, modulating immune system and exerting antibacterial and antiviral activities. Source: Medicine School of Sun Yat-Sen University, Guangzhou, China

Category: Tissue Damage / Repair
Traditional Reference (normal) Range: 0.62 - 1.16
Cancer Risk Reference Range: < 0.75 mg/L



Selected Publications:

Title: Evaluation of cystatin C in malignancy and comparability of estimates of GFR in oncology patients

Finding: Cystatin C concentrations were significantly higher in oncology patients both prior to commencing chemotherapy and during cycles of treatment when compared with a reference population. When examined according to cancer type in a subset of female patients (n=98: breast, n=63; lung, n=12; lymphoma, n=5; ovarian, n=18) we observed significantly higher concentrations in those diagnosed with breast and lung cancer.

Conclusion: The results in this study demonstrate potential cancer and treatment effects on cystatin C measurement.

Title: Preoperative serum cystatin-C as a potential biomarker for prognosis of renal cell carcinoma

Finding: High preoperative Cys-C (>1.09 mg/L) is significantly associated with shorter overall survival in all RCC patients. Moreover, Multivariate Cox regression analyses also showed that in the 306 patients without metastasis, high preoperative Cys-C was also associated with shorter disease-free survival.

Conclusion: An elevated preoperative Cys-C level was demonstrated to be related with worse survival in patients with renal cell carcinoma. Measuring preoperative serum Cys-C might be a simple way for finding poor prognostic patients and patients with elevated preoperative Cys-C level should be more closely followed up.

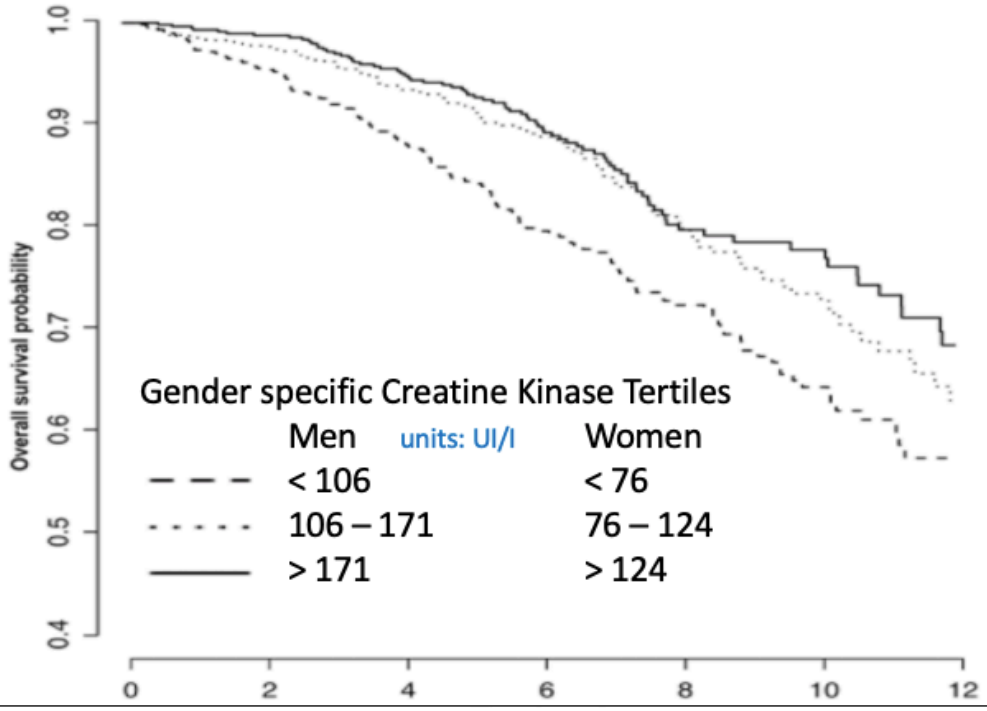
Cystatin C: 1

Optimal: 0.62 - 1.16 mg/L

Creatine Kinase (CK)

Creatine kinase (CK), also known as creatine phosphokinase (CPK) or phosphocreatine kinase, is an enzyme expressed by various tissues and cell types. CK catalyses the conversion of creatine and uses adenosine triphosphate (ATP) to create phosphocreatine and adenosine diphosphate (ADP). Clinically, creatine kinase is assayed in blood tests as a marker of damage of CK-rich tissue. Aberrant CK levels may impair cell viability under normal or stressed conditions and induce cell death. The involvement of CK in cell cycle regulation and cellular energy metabolism makes it a potential diagnostic biomarker and therapeutic target in cancer. Source: "Practice of Toxicologic Pathology"

Category: Tissue Damage / Repair
Traditional Reference (normal) Range: 32 - 182
Cancer Risk Reference Range: 80 - 150 U/L



Selected Publications:

Title: Creatine kinase in cell cycle regulation and cancer

Finding: Cell cycle regulation is also a key point to understanding the mechanisms underlying cancer progression. It has been known for about 40 years that aberrant CK levels are associated with various cancers and for over 30 years that CK is involved in mitosis regulation.

Conclusion: The involvement of CK in cell cycle regulation and cellular energy metabolism makes it a potential diagnostic biomarker and therapeutic target in cancer.

Title: Low Serum Creatine Kinase Levels in Breast Cancer Patients: A Case-Control Study

Finding: The mean serum CK level in patients with >2 cm tumor was significantly lower than that in patients with ≤2 cm tumors (73 vs 79 U/L, respectively). Moreover, patients with stage III breast cancer also showed a significantly lower serum CK levels than patients with stage I and II breast cancer (69 U/L vs 77, respectively). Notably, our results indicated for the first time that there was a negative correlation between serum CK levels and breast cancer stage.

Conclusion: Serum CK level, which may reflect the status of host immunity, may be an important factor in determining breast cancer development and progression.

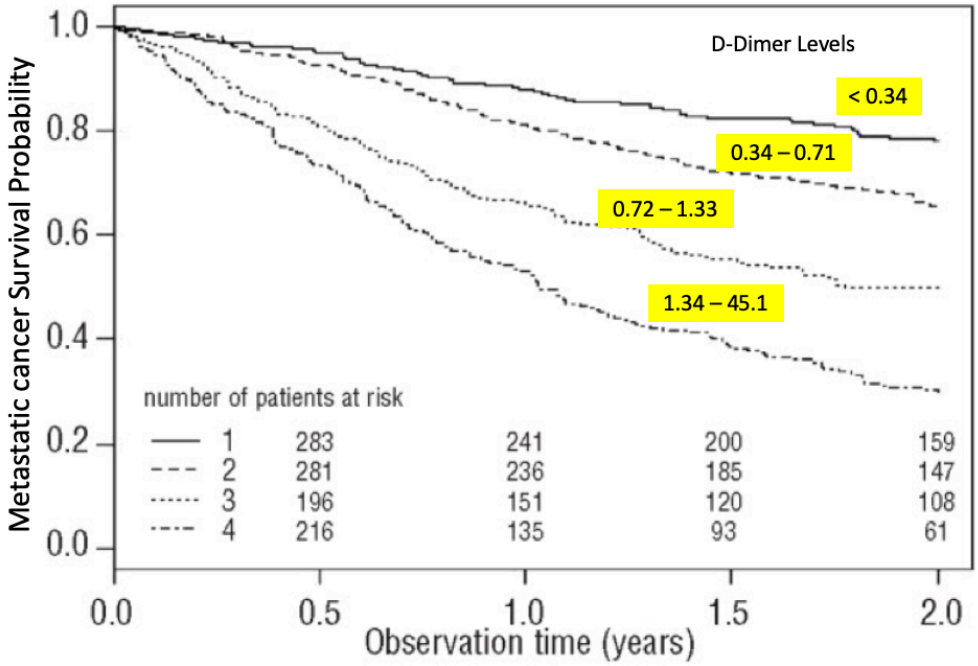
Creatine Kinase (CK): 50

Optimal: 30 - 150 U/L

D-Dimer

D-dimer is a widely used biomarker for indicating the activation of coagulation and fibrinolysis, and is reported to serve important roles in cancer progression. As D-dimer plasma levels are elevated after clot formation, the measurement of D-dimer is routinely used in conjunction with clinical parameters in the initial assessment of suspected acute venous thromboembolism. Elevated D-dimer levels may also be observed in other clinical settings, such as cancer, pregnancy and infectious diseases or following trauma and surgery. Source: Comprehensive Cancer Center Vienna

Category: Tissue Damage / Repair
Traditional Reference (normal) Range: < 0.49
Cancer Risk Reference Range: < 0.14 mg/L FEU



Selected Publications:

Title: High D-dimer levels are associated with poor prognosis in cancer patients

Finding: The overall survival probabilities for patients with D-dimer levels categorized into four groups based on the 1st, 2nd and 3rd quartiles of the D-dimer distribution in the total study population were 88%, 82%, 66% and 53% after 1 year.

Conclusion: Systemic activation of hemostasis is frequently observed in cancer patients, even in the absence of thrombosis. Moreover, this activation has been implicated in tumor progression, angiogenesis and metastatic spread. High D-dimer levels were associated with poor overall survival and increased mortality risk in cancer patients.

Title: D-dimer as a potential clinical marker for predicting metastasis and progression in cancer

Finding: The plasma levels of D-dimer were significantly higher in patients with breast cancer, gastric cancer, pancreatic cancer, colon cancer and rectal cancer, compared with the healthy controls. It was also determined that the plasma D-dimer levels were positively associated with clinical cancer stage and metastasis.

Conclusion: D-dimer is a widely used biomarker for indicating the activation of coagulation and fibrinolysis, and is reported to serve important roles in cancer progression. These findings suggested that the plasma D-dimer level may be used as marker for predicting cancer metastasis and progression.

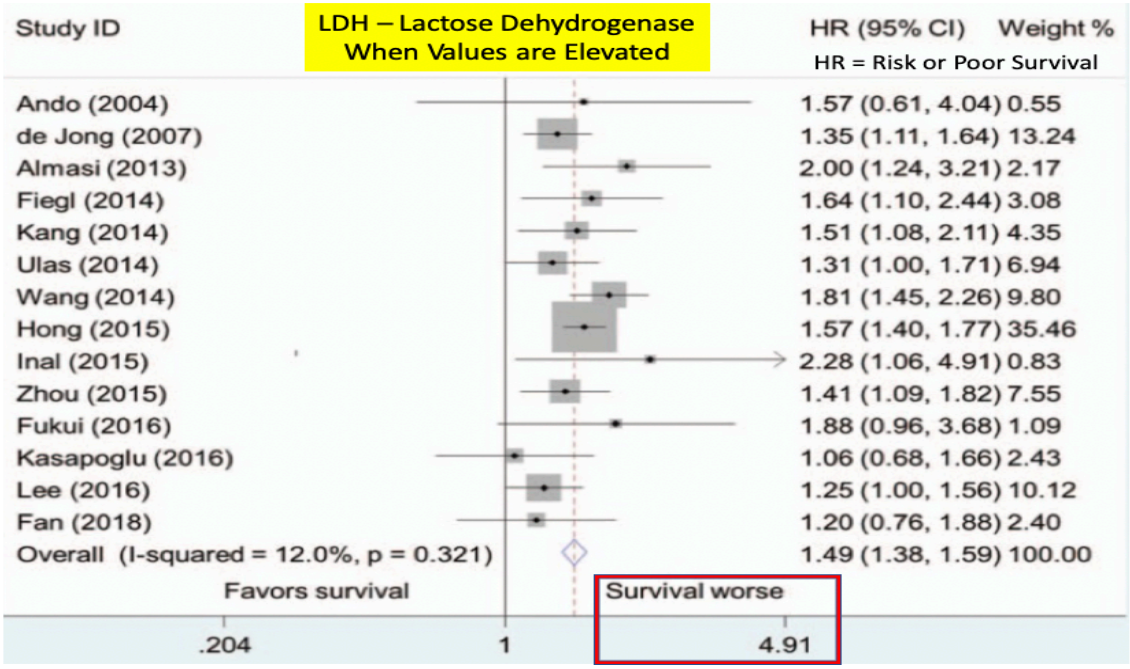
D-Dimer: 0.5

Optimal: 0.05 - 0.13 mg/L FEU

Lactate Dehydrogenase (LDH)

This test measures the level of lactate dehydrogenase (LDH), also known as lactic acid dehydrogenase, in your blood or sometimes in other body fluids. LDH is a type of protein, known as an enzyme. LDH plays an important role in making your body's energy. It is found in almost all the body's tissues, including those in the blood, heart, kidneys, brain, and lungs. Source: State Key Laboratory of Cancer Biology, Department of Biochemistry and Molecular Biology, Fourth Military Medical University, Xi'an, Shaanxi, China

Category: Tissue Damage / Repair
Traditional Reference (normal) Range: 121 - 224
Cancer Risk Reference Range: 121 - 224 IU/L



Selected Publications:

Title: Lactate Dehydrogenase (LDH) Response to First-Line Treatment Predicts Survival in Metastatic Breast Cancer: First Clues for a Cost-Effective and Dynamic Biomarker

Finding: Plasmatic LDH was confirmed as an independent prognostic factor in metastatic breast cancer. Patients who maintained elevated LDH levels after 12 weeks of first-line treatment experienced worse progression-free survival and reduced overall survival compared to patients with stable normal LDH levels, even after adjustment for other prognostic factors.

Conclusion: Elevated plasmatic lactate dehydrogenase (LDH) levels are associated with worse prognosis in various malignancies, including metastatic breast cancer (MBC).

Title: Higher pretreatment lactate dehydrogenase concentration predicts worse overall survival in patients with lung cancer

Finding: Our results demonstrate that higher pretreatment LDH concentration is associated with worse overall survival in patients with lung cancer. The findings may assist future diagnostics by helping predict prognosis in lung cancer patients.

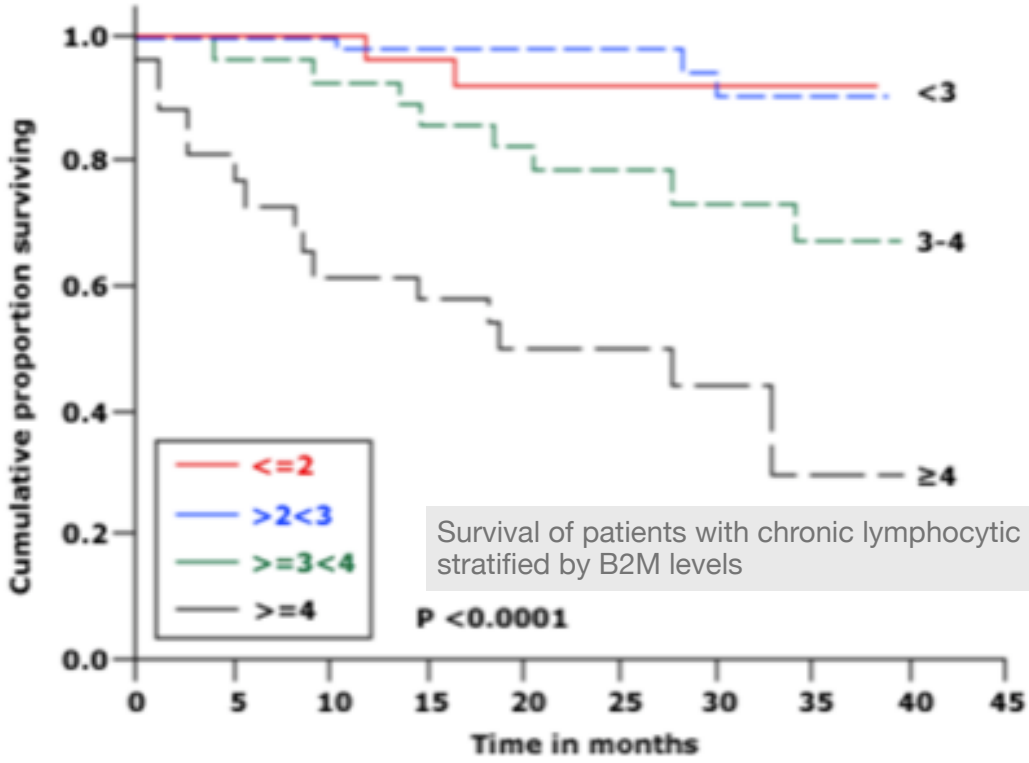
Conclusion: After pooling the results of the 14 studies together, higher pretreatment LDH concentration was significantly associated with an increased risk of overall mortality in patients with lung cancer.

Lactate Dehydrogenase (LDH): 200 Optimal: 121 - 224 IU/L

β2-Microglobulin (B2M)

B2M is a small protein normally found on the surface of many cells, including lymphocytes, and in small amounts in the blood and urine. An increased amount in the blood or urine may be a sign of certain diseases, including some types of cancer, such as multiple myeloma or lymphoma. Source: National Cancer Institute

Category: Tissue Damage / Repair
Traditional Reference (normal) Range: 0.6 - 2.4 mg/L
Cancer Risk Reference Range: 0 - 1.5 mg/L



Survival of patients with chronic lymphocytic leukemia stratified by B2M levels

Selected Publications:

Title: Serum β2-microglobulin in controls and cancer patients

Finding: Patients with more advanced breast cancer had higher levels than those with 'early' disease, as did patients with stomach cancer compared to those with colorectal cancer. One possible interpretation is that levels increase with increasing tumor bulk.

Conclusion: Serum B2M may be useful as one of a battery of tests in the management of cancer patients.

Title: : Evaluation of serum Beta2-microglobulin in oral cancer

Finding: The values of serum B2M appear to be more significantly elevated in malignant conditions. Elevated levels of serum B2M have been observed in significant percentage of patients with cancers including: acute and chronic leukemias, non-Hodgkin's lymphoma, myeloma and in tumors of breast, lung, colon, stomach, cervix and uterus.

Conclusion: There was a significant increase in B2M levels in oral cancer patients.

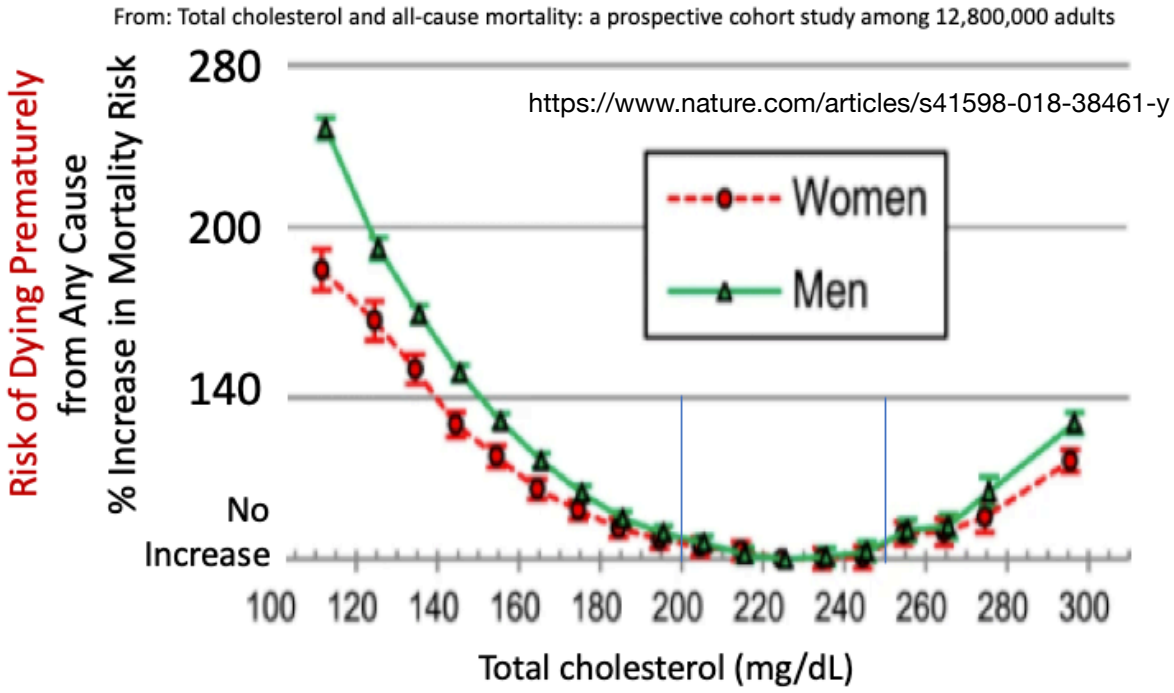
Beta-2-Microgloblin (B2M): 6.5

Optimal: < 1.5 mg/L

Total Cholesterol (TC -sum of HDL, LDL, and free Cholesterol) Page 1 of 2

Cholesterol is essential for human health. It is the building block of steroid hormones, including the stress hormone cortisol and the male and female sex hormones, including testosterone and the estrogens. Cholesterol is also an essential component of the membranes that surround all human cells. More than simply holding cells together, these membranes have a crucial role in regulating cell function and allowing chemicals to pass into and out of cells. Increased serum cholesterol levels have been reported to be positively correlated with a higher risk of developing cancers, such as colon, rectal, prostatic and testicular cancer as cholesterol is produced by the liver in response to the damage exerted by cancerous tissue. Source: Harvard Medical School

Category: Tissue Damage / Repair
Traditional Reference (normal) Range: <199 mg/dL
Cancer Risk Reference Range: 200 - 240



Selected Publications:

Title: Total cholesterol and all-cause mortality by sex and age: a prospective cohort study among 12.8 million adults

Finding: several cancers have been suggested to be associated with lower TC. thus, **the ranges associated with lowest risk might be even higher for these diseases than those for all-cause mortality.**

Conclusion: Cancer risk goes DOWN as total cholesterol goes UP.

Title: Total Cholesterol and Cancer Risk in a Large Prospective Study in Korea

Finding: Higher total cholesterol was associated with LOWER incidence of liver, stomach, breast, and lung cancer.

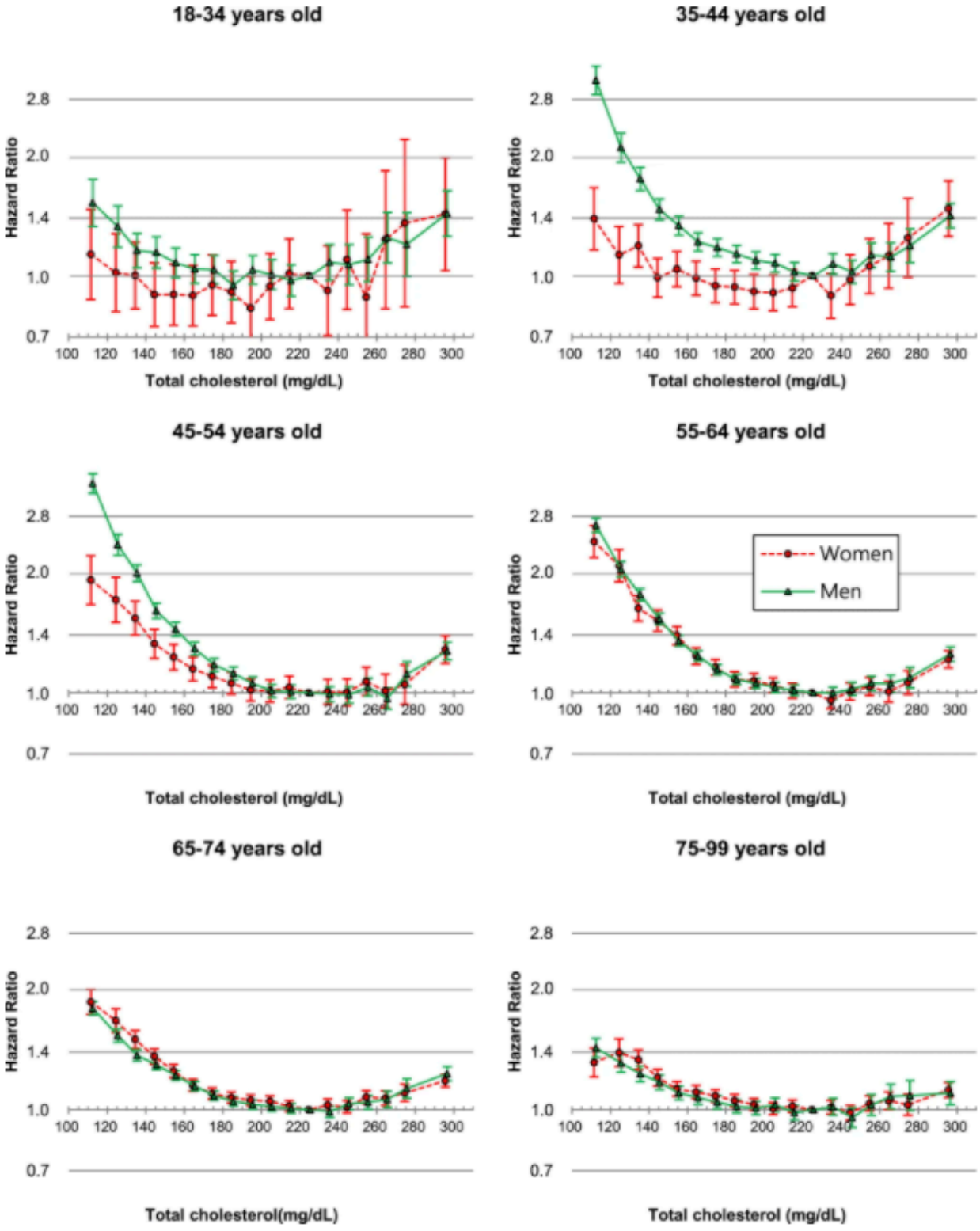
Conclusion: Total cholesterol was inversely associated with all-cancer incidence in both men and women

Total Cholesterol (TC): 150 Optimal: 200 - 250 mg/dL

nature
International weekly journal of science

Nature has an impact factor (2014) of 42.351, making it the **most cited science journal in the world**.

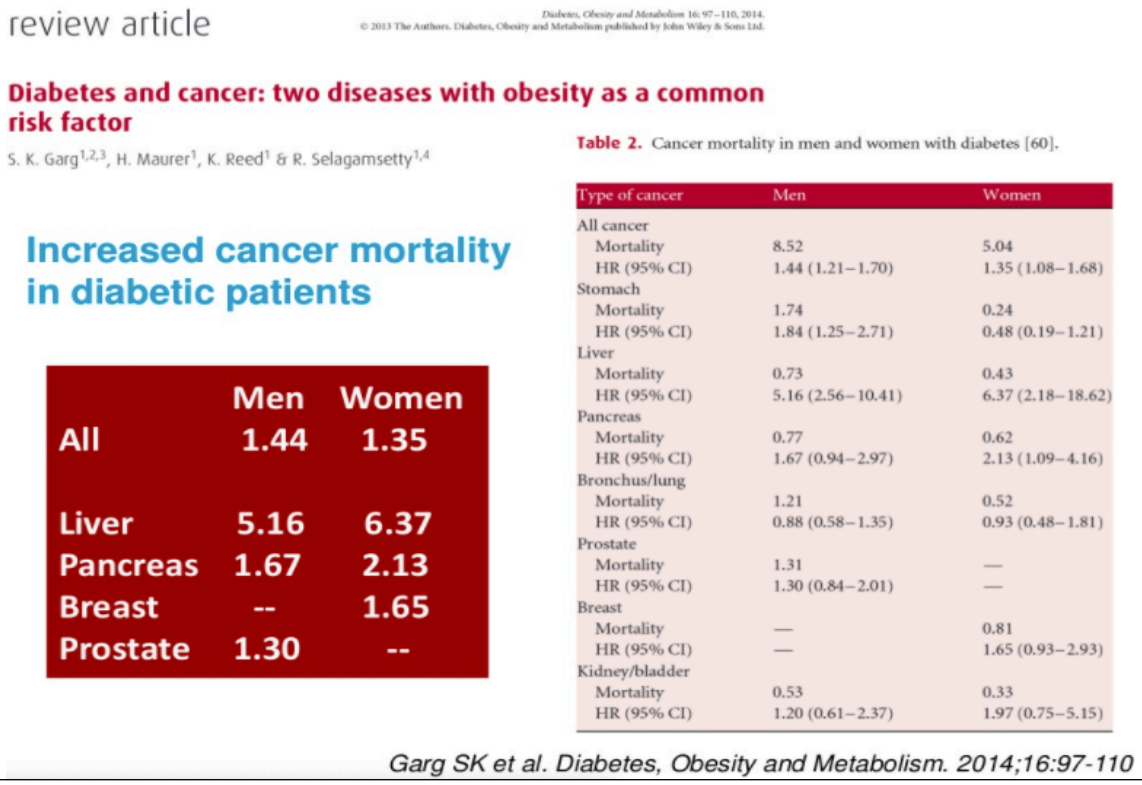
From: Total cholesterol and all-cause mortality by sex and age: a prospective cohort study among 12.8 million adults



Insulin (Fasting)

Insulin is a hormone made by the islet cells of the pancreas. Insulin controls the amount of sugar in the blood by moving it into the cells, where it can be used by the body for energy. Fasting insulin is superior to HbA1C and fasting glucose at assessing diabetes status and cancer risk. Diabetes is a disease of insulin resistance **first** and elevated blood glucose **second**. Cancer mortality rates are directly proportional to fasting insulin levels. Source: National Cancer Institute

Category: Metabolic
Traditional Reference (normal) Range: 2.6 - 24.9 uIU/mL
Cancer Risk Reference Range: 1.5 - 6 uIU/mL



review article

Diabetes, Obesity and Metabolism 16: 97–110, 2014.
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Diabetes and cancer: two diseases with obesity as a common risk factor

S. K. Garg[1,2,3], H. Maurer[1], K. Reed[1] & R. Selagamsetty[1,4]

Increased cancer mortality in diabetic patients

	Men	Women
All	1.44	1.35
Liver	5.16	6.37
Pancreas	1.67	2.13
Breast	--	1.65
Prostate	1.30	--

Table 2. Cancer mortality in men and women with diabetes [60].

Type of cancer	Men	Women
All cancer		
Mortality	8.52	5.04
HR (95% CI)	1.44 (1.21–1.70)	1.35 (1.08–1.68)
Stomach		
Mortality	1.74	0.24
HR (95% CI)	1.84 (1.25–2.71)	0.48 (0.19–1.21)
Liver		
Mortality	0.73	0.43
HR (95% CI)	5.16 (2.56–10.41)	6.37 (2.18–18.62)
Pancreas		
Mortality	0.77	0.62
HR (95% CI)	1.67 (0.94–2.97)	2.13 (1.09–4.16)
Bronchus/lung		
Mortality	1.21	0.52
HR (95% CI)	0.88 (0.58–1.35)	0.93 (0.48–1.81)
Prostate		
Mortality	1.31	—
HR (95% CI)	1.30 (0.84–2.01)	—
Breast		
Mortality	—	0.81
HR (95% CI)	—	1.65 (0.93–2.93)
Kidney/bladder		
Mortality	0.53	0.33
HR (95% CI)	1.20 (0.61–2.37)	1.97 (0.75–5.15)

Garg SK et al. Diabetes, Obesity and Metabolism. 2014;16:97-110

Selected Publications:

Title: Diabetes and cancer: Two diseases with obesity as a common risk factor

Finding: There is a growing body of evidence to support a connection between diabetes, elevated insulin levels, obesity and cancer. Multiple meta-analyses of epidemiological data show that people with diabetes are at increased risk of developing many different types of cancers, along with an increased risk of cancer mortality.

Conclusion: Mortality rates in diabetes, obesity and cancer populations are high, with both T2DM and obesity being independently associated with an increased risk of cancer-related mortality.

Title: Colorectal Cancer Mortality and Factors Related to the Insulin Resistance Syndrome

Finding: CRC mortality increased by 300% from the lowest measured quartile of study participants to the highest quartile based on insulin resistance syndrome measurements.

Conclusion: our findings of significant associations of plasma glucose and insulin resistance syndrome risk factor clustering with risk of CRC are in support of the hypothesis that hyperinsulinemia is involved in colon carcinogenesis.

35

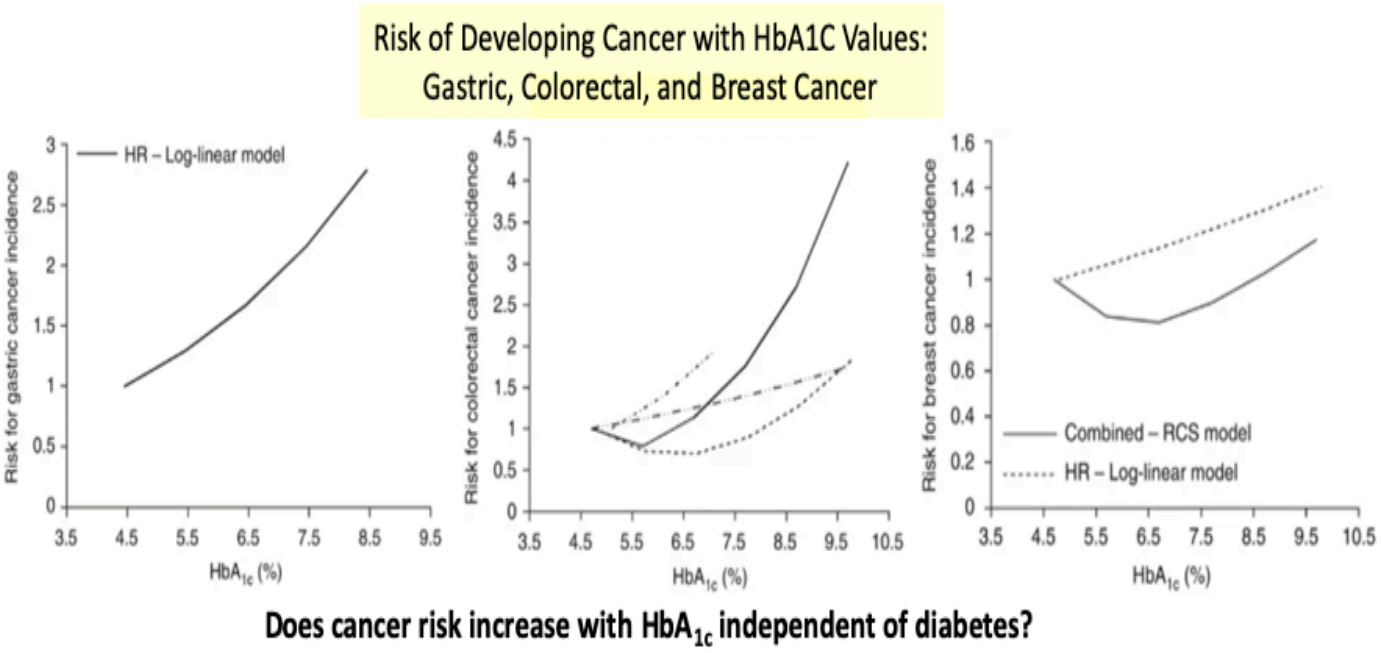
Optimal: 1.5 - 6 uIU/mL

Insulin:

Hemoglobin A1c

Hemoglobin A1c, also called A1c or glycated hemoglobin, is hemoglobin with glucose attached. The A1c test evaluates the average amount of glucose in the blood over the last 4 to 6 months by measuring the percentage of glycated hemoglobin in the blood. Even people in the "non-diabetic" range as measured by Hemoglobin A1c have an increased risk associated with all cancers. Source: Department of Diabetes Research, Diabetes Research Center, National Center for Global Health and Medicine, Tokyo, Japan

Category: Metabolic
Traditional Reference (normal) Range: 4.8 - 6.4 %
Cancer Risk Reference Range: 4.0 - 5.3 %



Selected Publications:

Title: Does cancer risk increase with HbA1c, independent of diabetes?

Finding: The data reveal that chronic hyperglycemia, as measured by HbA1C. correlates with increased cancer risk for a number of cancers, Evidence is also provided that risk is already increased in the pre-diabetic and the high end of "normal" ranges for several cancers.

Conclusion: A high HbA1c level shows a clear association with worse survival in patients with pancreatic cancer.

Title: Clinically Defined Type 2 Diabetes Mellitus and Prognosis in Early-Stage Breast Cancer

Finding: In a study of people with early-stage breast cancer, the risk of all-cause mortality was found to be twice as high in women with HbA1c ≥ 7% compared with women with HbA1c <6.5%. Fasting insulin levels were elevated consistent with the elevation of A1C.

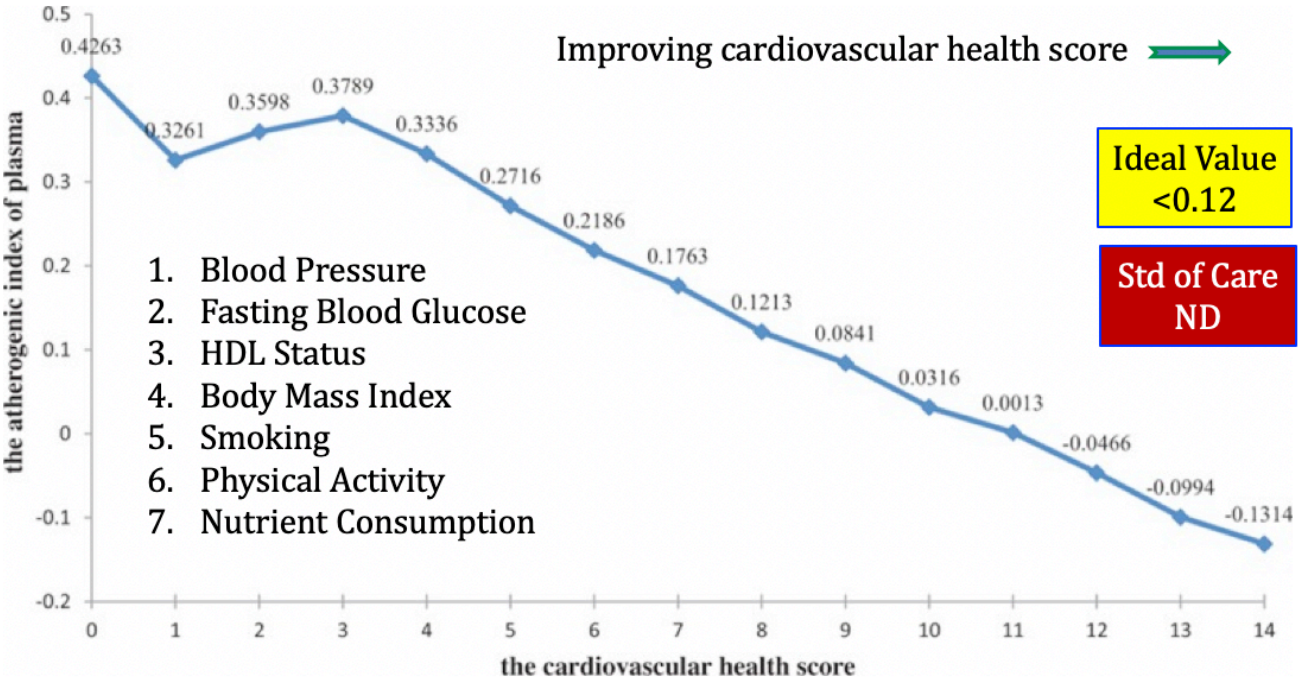
Conclusion: Chronic hyperglycemia is statistically significantly associated with reduced overall survival in survivors of early-stage breast cancer.

HbA1C: 8

Atherogenic Index of Plasma (AIP) aka Plasma Atherogenic Index (PIA)

Atherogenic index of plasma (AIP), a logarithmically transformed ratio of triglycerides (TGs) / high-density lipoprotein (HDL), is considered a marker of cardiovascular disease risk, based on observed strong, positive associations between AIP and lipoprotein particle size. Importantly, since triglycerides are considered a marker of excess blood sugars and HDL infers lack of essential fats in circulation, the AIP translates into an important single indicator of sugar excess and fat deficiency. Source: Mayo Proceedings

Category: Metabolic
Traditional Reference (normal) Range: Not Established
Cancer Risk Reference Range: < 0.11



Selected Publications:

Title: High atherogenic index of plasma and cardiovascular risk factors among Ghanaian breast cancer patients

Finding: Comorbidities impact negatively on breast cancer prognosis. AIP was significantly elevated in the breast cancer patients compared to the controls and a greater proportion(88%) of the patients presented with advanced breast cancer.

Conclusion: AIP and cardiovascular risk factors were high in the breast cancer patients.

Title: Relationship between plasma Atherogenic index and final pathology of Bosniak III-IV renal masses: a retrospective, single-center study

Finding: AIP correlated with the degree of RCC and malignancy. Median PAI value was 0.63 and significantly higher in malignant cases. The AIP cut-off value for malignancy was ≥0.34. The sensitivity was calculated as 88.2% and specificity as 45.8%, the positive predictive value as 90.8. Cancer did NOT track with triglycerides but did with AIP.

Conclusion: The AIP can be used as a predictive tool in suspicion of malignant renal masses. In case of a benign pathology, AIP levels may be encouraging for surgeons for nephron-sparing surgery.

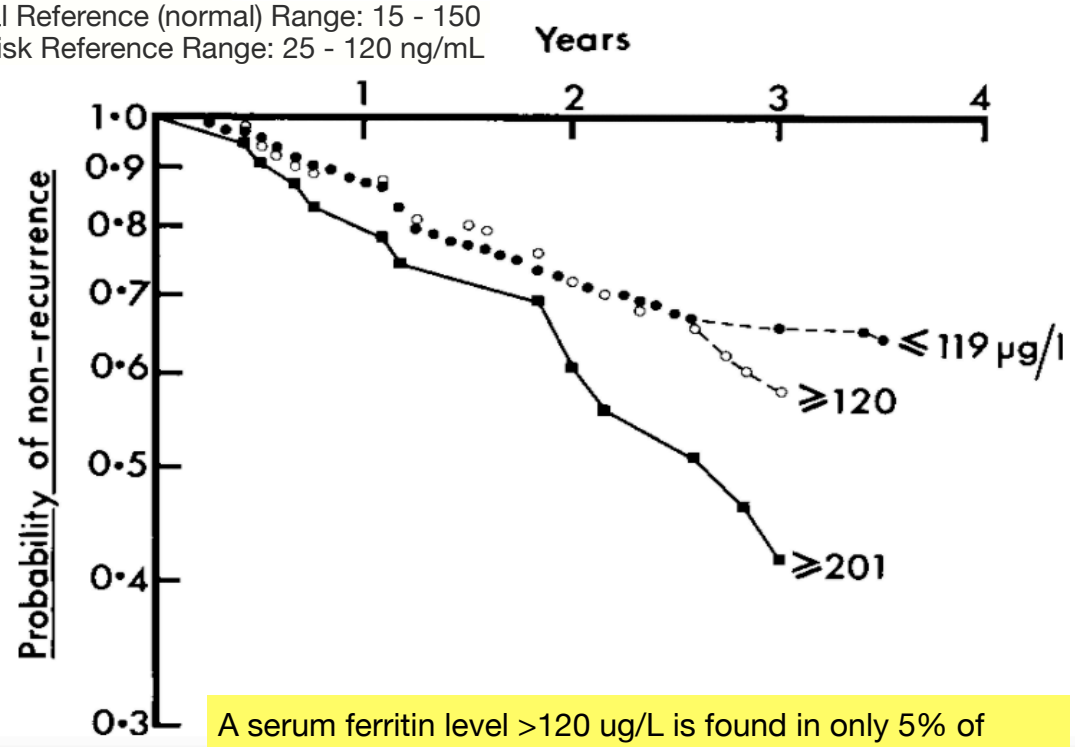
Atherogenic Index of Plasma (AIP): 0.63

Optimal: < 0.12

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 Reference Range: 25 - 120 ng/mL



A serum ferritin level >120 ug/L is found in only 5% of normal women, but ~25% of patients with breast cancer.

Probability of non-recurrence in breast cancer patients comparing 3 groups distinguished 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.

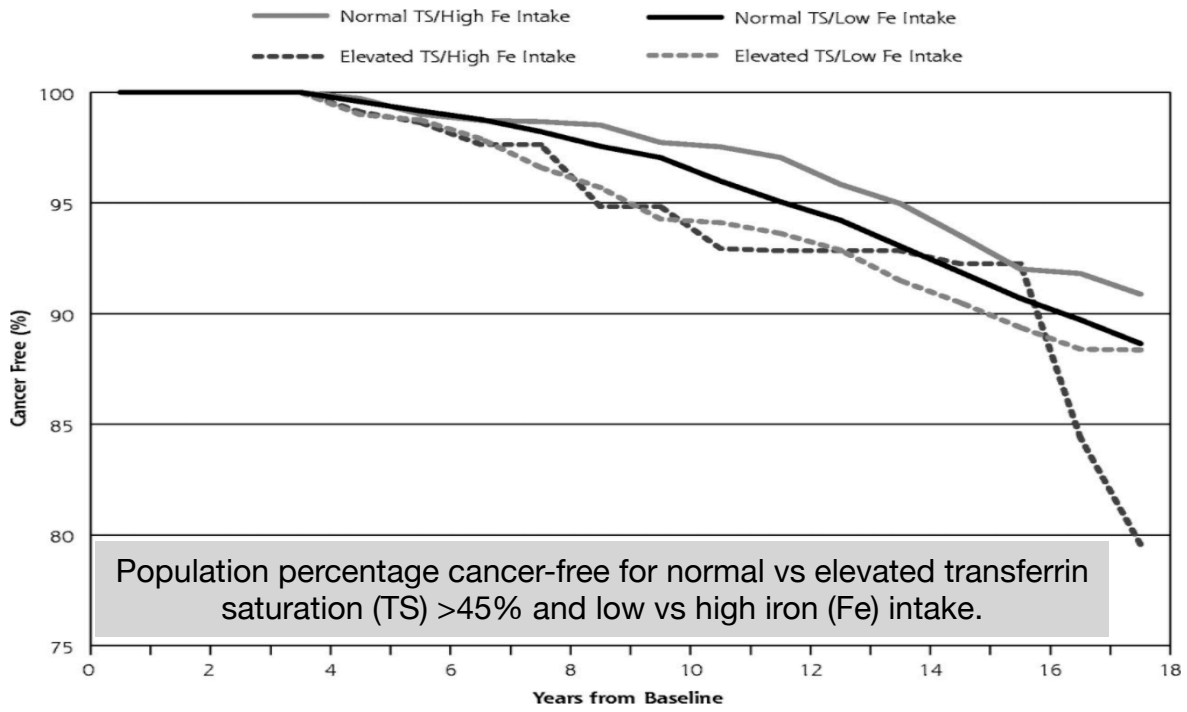
Ferritin: 600

Optimal: 25 - 120 ng/mL

Transferrin Saturation (TS)

TS is the value of serum iron divided by the total iron-binding capacity of the available transferrin, the main protein that binds iron in the blood. This value tells how much serum iron is bound. A value of 15% means that 15% of iron-binding sites of transferrin are being occupied by iron. A low transferrin saturation is a common indicator of iron deficiency anemia whereas a high transferrin saturation may indicate iron overload or hemochromatosis. Source: American Association for Clinical Chemistry

Category: Oxidative Stress
Traditional Reference (normal) Range: 15 - 55%
Cancer Risk Reference Range: 30 - 40%



Population percentage cancer-free for normal vs elevated transferrin saturation (TS) >45% and low vs high iron (Fe) intake.

Selected Publications:

Title: Lymphocyte labile iron pool, plasma iron, transferrin saturation and ferritin levels in colon cancer patients

Finding: Surprisingly, in our study carcinoma patients showed statistically significant lower values of transferrin saturation, total iron binding capacity and serum iron level when compared with a control group (Control group: transferrin saturation = 30%; Cancer group: 22%)

Conclusion: Usually, in malignant diseases plasma iron level falls due to cytokines activity. Our observations show that the restriction of iron availability for tumor cells happens to slow its growth (anemia of chronic disease).

Title: Transferrin Saturation, Dietary Iron Intake, and Risk of Cancer

Finding: Persons with transferrin saturation of more than 41%, a level not previously considered to be increased, and who also ingest high amounts of dietary iron have an increased risk for cancer by >220%. Having high transferrin saturation with a normal diet did not carry increased risk.

Conclusion: Compared with persons at the high transferrin saturation (60%) level, persons at lower levels of transferrin saturation, down to 41%, represent a much larger population at potentially increased risk.

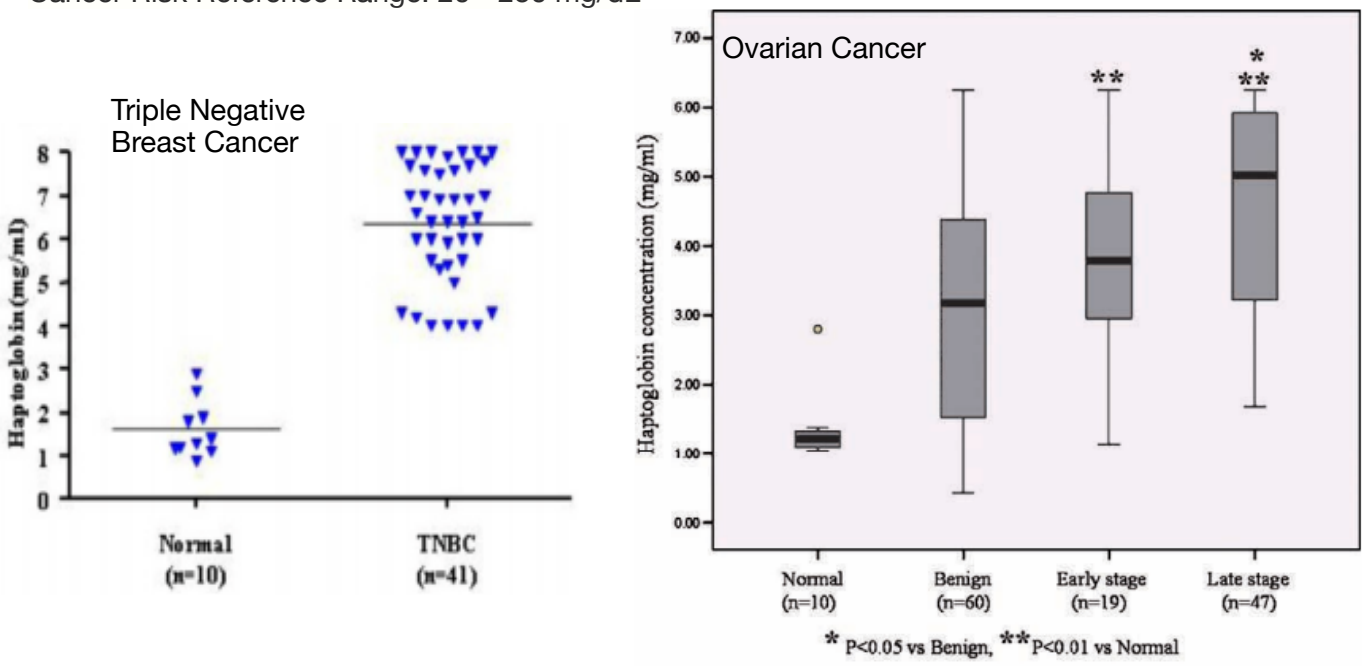
Transferrin: 65

Optimal: 30 - 40 mg/dL

Haptoglobin (Hg)

Haptoglobin is a protein produced by the liver that the body uses to clear free hemoglobin (found outside of red blood cells) from circulation. This protein plays a role in tight junction disassembly, intestinal permeability, heme iron recycling, antimicrobial activity and the regulation of hydrogen peroxide catabolism. Source: National Cancer Institute

Category: Oxidative Stress
Traditional Reference (normal) Range: 17 - 317 mg/dL
Cancer Risk Reference Range: 20 - 250 mg/dL



Selected Publications:

Title: Circulating Haptoglobin Is an Independent Prognostic Factor in the Sera of Patients with Epithelial Ovarian Cancer
Finding: Levels of serum haptoglobin significantly correlated with tumor type and stage. A significant correlation was observed between clinical stage and patient survival.
Conclusion: Our data also indicated that elevated serum haptoglobin levels were associated with poor outcome for overall survival in ovarian cancer.

Title: Elevated Serum Haptoglobin is Associated with Clinical Outcome in Triple-Negative Breast Cancer Patients
Finding: Triple-negative breast cancer (TNBC) disease is diagnosed more frequently in younger women, and is associated with a poor prognosis. Elevated levels of serum haptoglobin protein (Hp) are observed in many malignant diseases including breast cancer.
Conclusion: Our results indicate that serum levels of Hp may play a role as a potential serum biomarker and prognostic indicator among TNBC patients. Thus, Hp may present a new promising prognostic biomarker in TNBC patients.

Title: RESPONSE OF SERUM HAPTOGLOBIN TO HORMONE TREATMENT AND THE RELATION OF PRETREATMENT VALUES TO MORTALITY IN PATIENTS WITH PROSTATIC CANCER.
Finding: The levels of haptoglobin were significantly, positively correlated with death rates from all causes combined and with death rates from prostatic cancer. Patients with levels above 285 mg/dl in Study 2 and above 330 mg/dl in Study 3 had three- and fivefold higher death rates than patients with levels In the normal range.

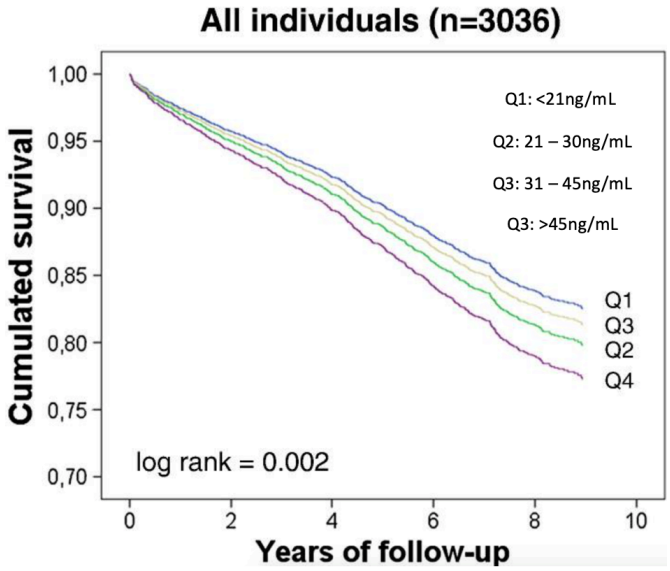
Haptoglobulin: 500

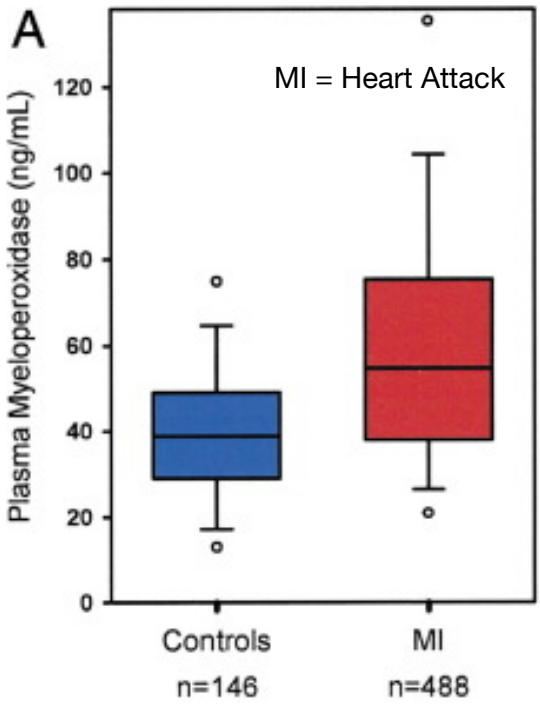
Optimal: 20 - 250 mg/dL

Myeloperoxidase (MPO)

Myeloperoxidase (MPO) belongs to the family of heme-containing peroxidases, produced mostly from polymorphonuclear neutrophils. This enzyme is released into the extracellular fluid after oxidative stress and different inflammatory responses. Several types of tissue injuries and the pathogenesis of several other major chronic diseases such as rheumatoid arthritis, cardiovascular diseases, liver diseases, diabetes, and cancer have been reported to be linked with MPO-derived oxidants. Thus, the enhanced level of MPO activity is one of the best diagnostic tools of inflammatory and oxidative stress biomarkers among these commonly-occurring diseases. Source: Department of Medical Laboratories, College of Applied Medical Sciences, Qassim University

Category: Oxidative Stress
Traditional Reference (normal) Range: 0 - 469 pmol/L
Cancer Risk Range: 30 - 280 pmol/L (4 - 40 ng/mL)





Selected Publications:

Title: Myeloperoxidase as an Active Disease Biomarker: Recent Biochemical and Pathological

Finding: For the clinical relevance of the circulating MPO level in acute myeloid leukemia (AML) patients showed higher plasma MPO levels (range 1.0–9514 ng/mL) as compared to control subjects (range 3.5–20.6 ng/mL).

Conclusion: Myeloperoxidase gained special importance as a well-known biomarker due to its role in a number of inflammatory diseases including rheumatoid arthritis, cardiovascular diseases, neurodegenerative diseases, diabetic retinopathy, liver diseases, cancer, and transplant rejection.

Title: Do serum biomarkers really measure breast cancer?

Finding: Overall, the selected serum proteins showed moderate ability for detecting lesions. They are probably more indicative of secondary effects such as inflammation rather than specific for malignancy.

Conclusion: We have performed biomarker-selection and classification techniques to identify blood serum proteins that are indicative of breast cancer in premenopausal women. The best biomarkers to detect breast cancer were MIF, MMP-9, and **MPO.**

Myeloperoxidase (MPO): 500

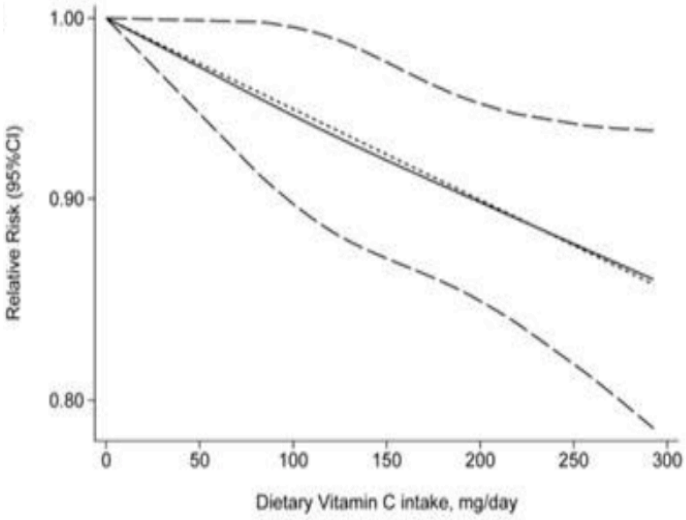
Optimal: 30 - 280 pmol/L

Vitamin C

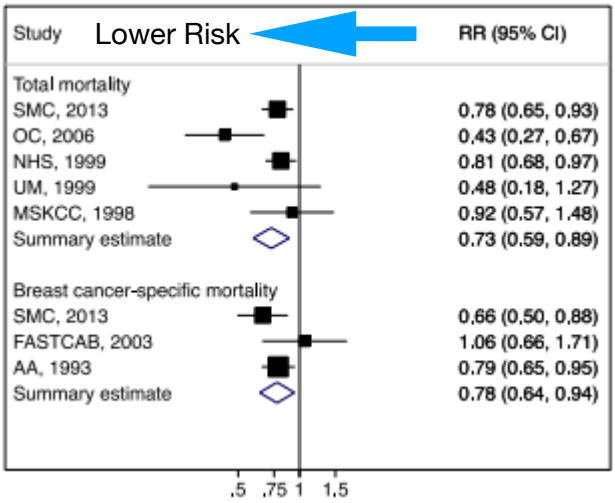
Vitamin C is an essential nutrient with redox functions at normal physiologic concentrations. Case series and observational studies f cancer patients who received high-dose oral and or intravenous vitamin C showed a clinical benefit. Laboratory studies have reported that high-dose vitamin C has redox properties and decreased cell proliferation in prostate, pancreatic, hepatocellular, colon, mesothelioma, and neuroblastoma cell lines. Source: National Cancer Institute

Category: Immune Health
Traditional Reference (normal) Range: 0.4 - 2.0 mg/dL
Cancer Risk Range: > 0.7 mg/dL

Dose-response relationship between dietary vitamin C intake and the relative risk of prostate cancer



Relative risk estimates of mortality following breast cancer diagnosis associated with a 100 mg per day increase in dietary vitamin C intake



Selected Publications:

Title: Association between Dietary Vitamin C Intake and Risk of Prostate Cancer: A Meta-analysis Involving 103,658 Subjects

Finding: The dose-response analysis found an inverse linear relation between the dietary intake of vitamin C and the risk of prostate cancer in the overall study, with **a 9% reduction in risk for every 150 mg/day increment in vitamin C intake**

Conclusion: intake of vitamin C from food was inversely associated with prostate cancer risk in this meta-analysis.

Title: Vitamin C and survival among women with breast cancer: A Meta-analysis

Finding: A 100 mg per day increase in dietary vitamin C intake resulted in a 27% reduction in total mortality and 22% for breast cancer mortality.

Conclusion: Results from this meta-analysis suggest that post-diagnosis vitamin C supplement use may be associated with a reduced risk of mortality. Dietary vitamin C intake was also statistically significantly associated with a reduced risk of total mortality and breast cancer-specific mortality.

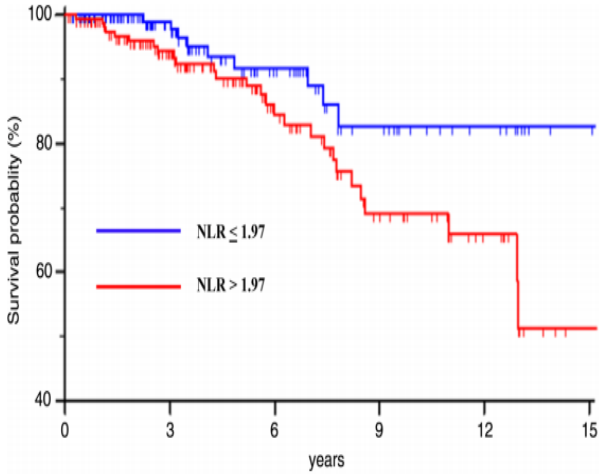
Vitamin C: 0.8 >0.7 mg/dL

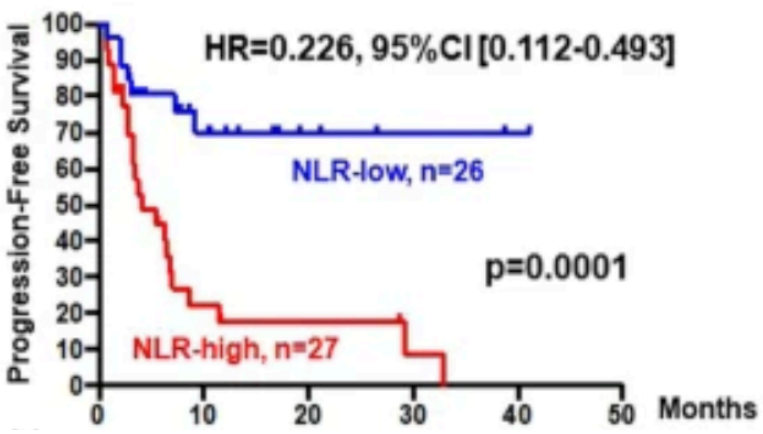
Neutrophil to Lymphocyte Ratio (NLR)

The NLR is the number of neutrophils divided by the number of lymphocytes. In general, neutrophils, a type of white blood cell, elevate 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 disease like cancer. Source: Journal of the National Cancer Institute

Category: Immune Health
Traditional Reference (normal) Range: None
Cancer Risk Range: < 1.5

Two Different Breast Cancer Studies





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 establishment of prognostic scores for clinical decision making across a broad array of cancers.

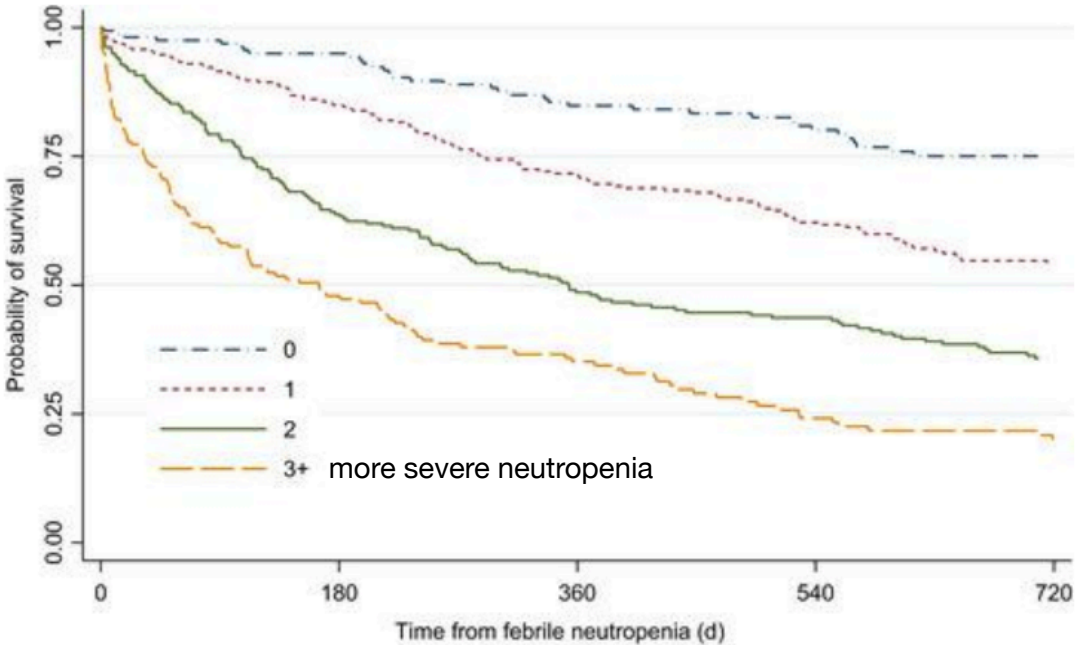
Neutrophil to Lymphocyte Ratio (NLR): 2.7

Optimal < 1.5

Neutrophil %

An increased % of neutrophils is an indication of bacterial or fungal infection, smoking, rigorous exercise, inflammation, or chronic leukemia. Decreased % of neutrophils is an indication of bone marrow disease, anemia, a severe or widespread bacterial or viral infection, or cancer immune suppression therapy. Source: Healthline

Category: Immune Health
Traditional Reference (normal) Range: None
Cancer Risk Range: 40 - 58%



Selected Publications:

Title: Neutrophilia and mortality in women with uterine carcinosarcoma

Finding: Uterine carcinosarcoma patients in the highest quartile of absolute neutrophil count had significantly reduced progression-free survival and overall survival, compared with patients in the lower absolute neutrophil count quartiles. High absolute neutrophil count was an independent poor prognostic factor for disease recurrence, with elevation by 300% for highest versus lowest quartile absolute neutrophil count, and for mortality increase of 450%.

Conclusion: High neutrophil count is an independent poor prognostic factor in patients with uterine carcinosarcoma

Title: Mortality and admission to intensive care units after febrile neutropenia in patients with cancer.

Finding: FN was associated with increased risk of all-cause mortality, infectious mortality, and ICU admissions with additional risks up to 230%.

Conclusion: Febrile neutropenia (FN) is a critical complication of chemotherapy associated with increased in-hospital mortality.

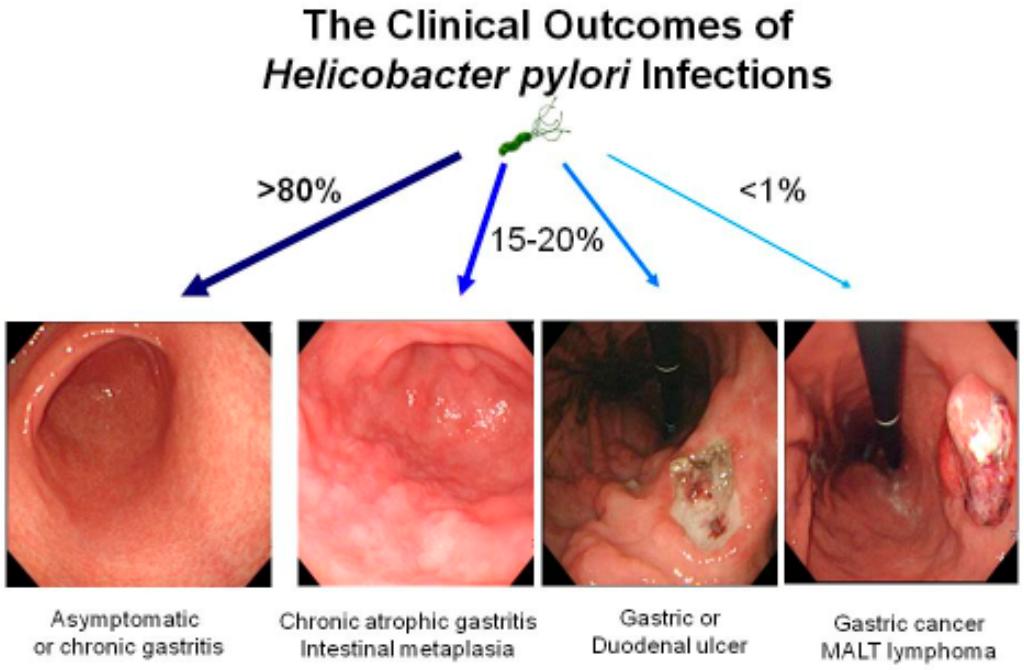
Neutrophils %: 66

Optimal: 40 - 60 %

Helicobacter pylori (H pylori)%

Helicobacter pylori, or H. pylori, is a spiral-shaped bacterium that grows in the mucus layer that coats the inside of the human stomach. It is a causal agent in a number of gut-related cancers. To survive in the harsh, acidic environment of the stomach, H. pylori secretes an enzyme called urease, which converts the chemical urea to ammonia. The production of ammonia around H. pylori neutralizes the acidity of the stomach, making it more hospitable for the bacterium. H. pylori enters the gut through the mouth. Source: National Cancer Institute.

Category: Immune Health
Traditional Reference (normal) Range: IgG Abs < 0.80
Cancer Risk Range: Same



Selected Publications:

Title: Family History of Gastric Cancer and Helicobacter pylori Treatment

Finding: Gastric cancer developed in 0.8% of participants (5 of 608) in whom H. pylori infection was eradicated and in 2.9% of participants (28 of 979) who had persistent infection. This is equivalent to a 365% increase in cancer development rate.

Conclusion: Among persons with H. pylori infection who had a family history of gastric cancer in first-degree relatives, H. pylori eradication treatment reduced the risk of gastric cancer.

Title: Effects of Helicobacter pylori Treatment on Gastric Cancer Incidence and Mortality in Subgroups

Finding: Treatment was associated with a statistically significant decrease of 280% in gastric cancer incidence and mortality decrease of 380% at ages 55 years and older.

Conclusion: H. pylori treatment can benefit older members and those with advanced baseline histopathology, and benefits are present even with post-treatment infection, suggesting treatment can benefit an entire population, not just the young or those with mild histopathology.

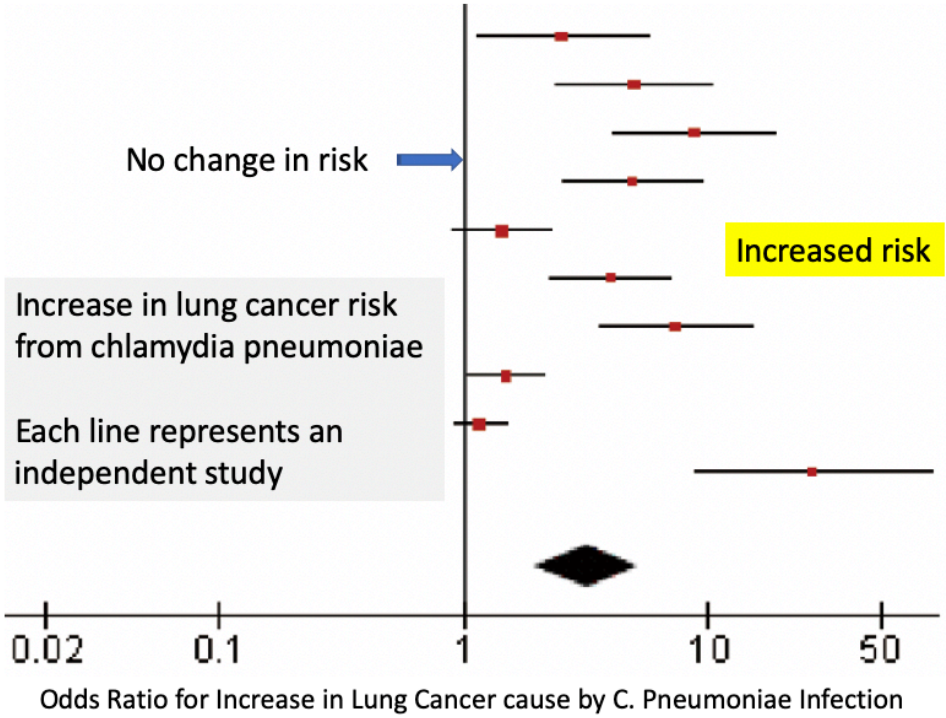
H-Pylori: 9

Optimal: IgG Abs < 0.80

Chlamydia pneumoniae (Chlamydophila or C. pneumoniae)

Chlamydia pneumoniae is a species of Chlamydia, an obligate intracellular bacterium that infects humans and is a major cause of pneumonia. Independent of pneumonia, this organism invades endothelium (blood vessels) creating vascular inflammation, calcification, and a localized hypoxic (oxygen-starved) environment leading to tissue destruction and disease. C. pneumoniae is a major cause of lung cancer in both smokers and non-smokers. Source: European Journal of Cancer

Category: Immune Health
Traditional Reference (normal) Range: IgG Abs < 0.80
Cancer Risk Range: Same



Selected Publications:

Title: Association between Chlamydia pneumoniae infection and lung cancer: a meta-analysis

Finding: Lung carcinoma is reported to be the most common cancer among women and men, representing huge social and economic burdens in both developing and developed countries. Results showed that C. pneumoniae infection was significantly related to the risk of lung carcinoma, with a 320% increased risk compared to a negative titre for IgA and 200% for IgG.

Conclusion: C. pneumoniae infection not only lead to worldwide widespread respiratory infections such as pneumonia, pharyngitis, bronchitis, and sinusitis, but also associated with asthma, chronic obstructive pulmonary disease, atherosclerosis, cancer, and Alzheimer's disease.

Title: Effects of Helicobacter pylori Treatment on Gastric Cancer Incidence and Mortality in Subgroups

Finding: Treatment was associated with a statistically significant decrease of 280% in gastric cancer incidence and mortality decrease of 380% at ages 55 years and older.

Conclusion: H. pylori treatment can benefit older members and those with advanced baseline histopathology, and benefits are present even with post-treatment infection, suggesting treatment can benefit an entire population, not just the young or those with mild histopathology.

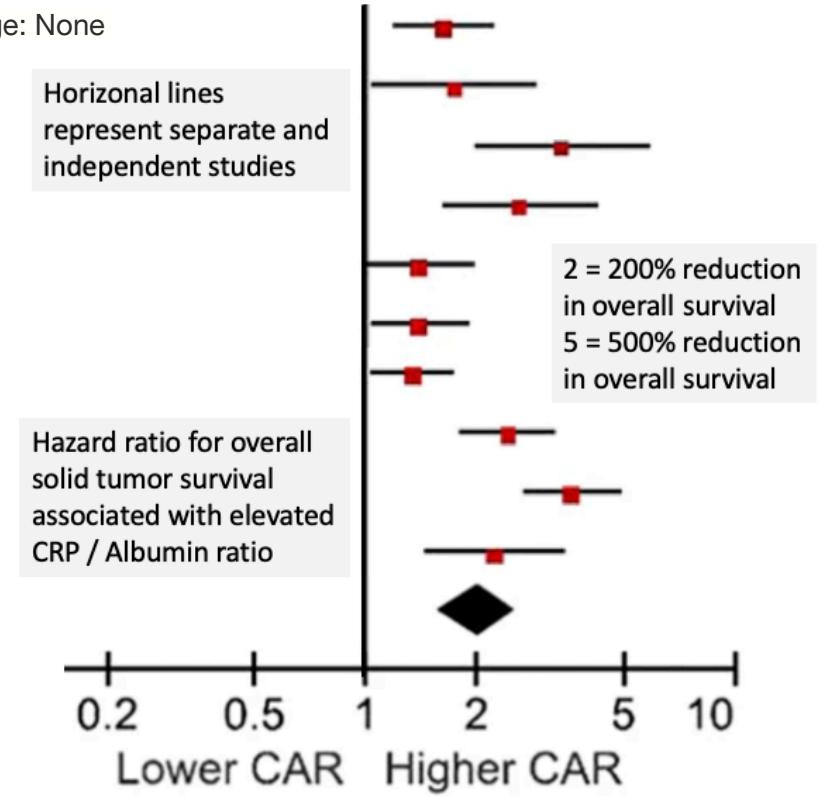
Chlamydophila Pneumoniae (CP): 3.5

Optimal: < 0.91

CRP / Albumin Ratio

Albumin is a type of protein found in blood, egg white, milk, and other substances. Albumin is made by the liver and makes up about 60% of the total protein in the blood and plays many roles. Albumin keeps fluid from leaking out of blood vessels, nourishes tissues, and transports hormones, vitamins, drugs, and substances like calcium throughout the body. Relationship between the c-reactive protein - albumin ration and various human cancers has been reported by many groups Source: National Cancer Institute

Category: Inflammation
Traditional Reference (normal) Range: None
Cancer Risk Range: 0.50



Selected Publications:

Title: Prognostic Role of the Pretreatment C-Reactive Protein/Albumin Ratio in Solid Cancers: A Meta-Analysis

Finding: The C-reactive protein/albumin ratio (CAR) has been shown to play a significant prognostic role in several cancers. We collected data from 10 studies and 5600 tumor patients, that examined the association between serum CAR and overall survival in patients with cancer. The data indicated that high CAR yielded worse survival in different cancers by 200% on average.

Conclusion: Despite decades of research, relatively few biomarkers are routinely used in clinics for specific types of cancer but CAR appears a highly promising candidate.

Title: The prognostic value of the preoperative c-reactive protein/albumin ratio in ovarian cancer

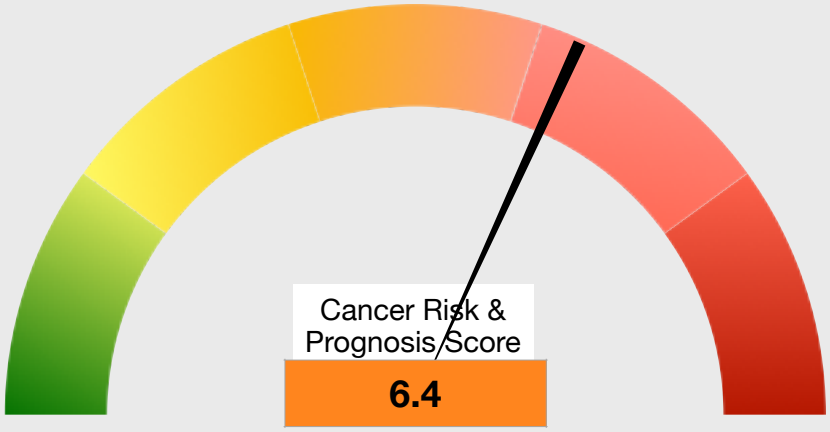
Finding: Patients with high CRP/Alb had poor overall survival compared to those with low CRP/Alb. Multivariable analysis showed that CRP/Alb, tumor stage, residual tumor and age were independent prognostic factors for overall survival.

Conclusion: The CRP/Alb is a novel independent marker of poor prognosis among ovarian cancer patients and shows **superior** prognostic ability compared to the established inflammation-based prognostic indices.

CRP / Albumin Ratio 1.1 Optimal: < 0.15 - 0.55

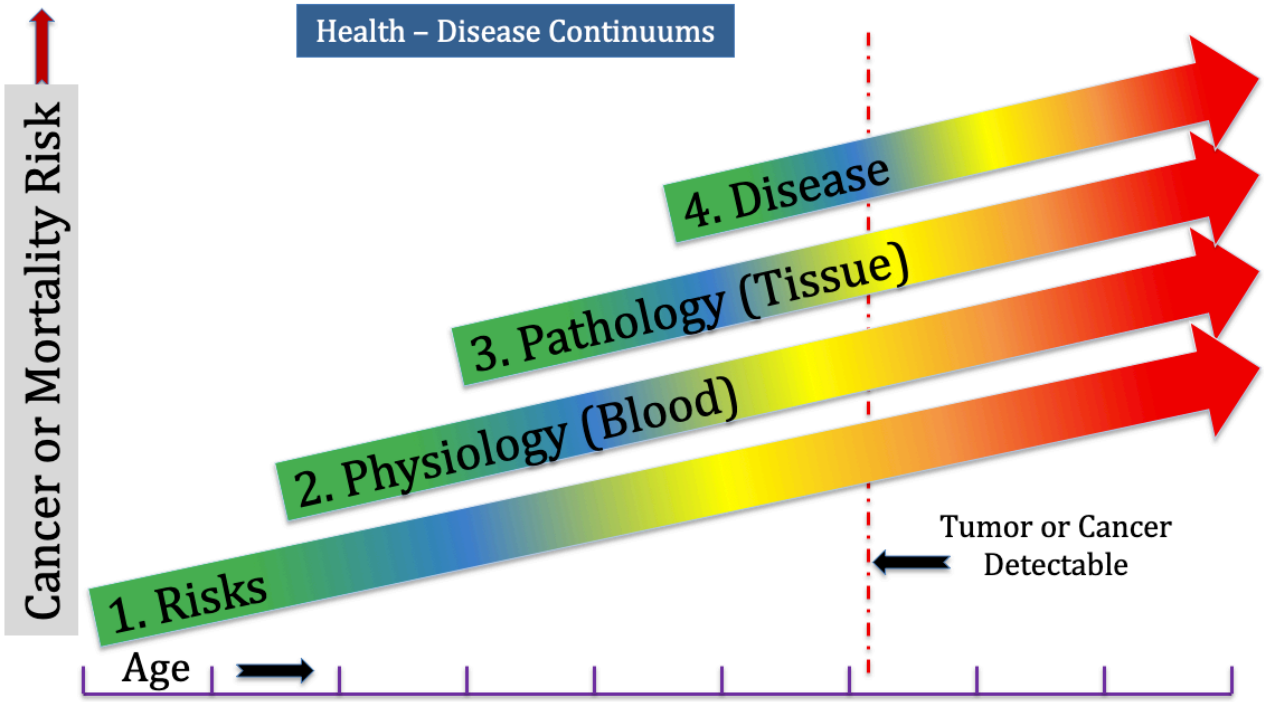
Cancer Risk Score and Prognosis "CRISP" Report

Your Position on the Cancer Risk Continuum



What can you do now?

Recognize that Cancer is a chronic disease. In arguably every case of cancer, **there are risk factors that contribute to the development and severity of the disease**. The image below explains your position on the "Cancer Risk Continuum" as a composite of 4 continuums: 1. Risks; 2. Physiology; 3. Pathology, and 4. Disease (overt diagnosis of Cancer).



What is modifiable by me?

Your Risks ARE Modifiable! Take our comprehensive risk assessment and work with one of our cancer risk specialists to start mitigating even the smallest risks. What we find is that embracing and changing several seeming small risks provides substantially better outcomes compared to focusing on a single or a few perceived "big" risks.

Go to www.cancerriskscore.com/CRA to take our assessment if you haven't already.

This journey may lead to additional testing but will most likely lead to a more profound understanding of your health and how you can take charge of it!

Interventions: Besides improving risks, our team may recommend both nutraceutical and pharmaceutical interventions, all of which have evidence-based peer-reviewed data supporting their use. In particular, we use interventions that lower the physiological markers associated with risk for future cancer or poor prognosis if you are diagnosed with cancer.

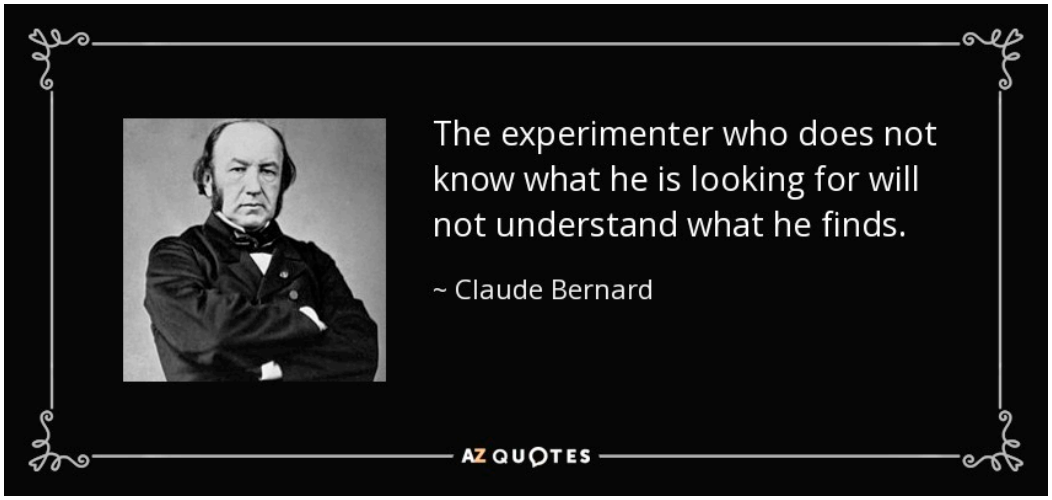
OUR PROMISE *to you!*

We will bring new insights into your risk or disease. We firmly believe that the current approach to cancer is symptomatic only and that:

1. Cancer can be predicted with reasonable certainty with the right set of assessments.
2. Your risk for cancer, based on the assessments, may be reduced significantly.
3. Your prognosis for a poor outcome may be improved by the same process.

If you have a tumor, recognize that there are **factors underlying the tumor responsible** for your condition. We will be diligent to uncover these factors, bring new light upon your situation, develop a path to follow to improve your odds, and provide the tools to objectively follow your progress.

Our mentor from the 19th Century - the first scientific doctor - explains what we do compared just treatment. We look everywhere we have to in order to find **your solutions**.



Table

Damage Pointer
Value
Pointer
End

Ta

Infe
Valu
Poi
End

RDW

x	Y
50	0

HcY

x	Y
60	0

Insulin

x	Y
88	0

A1C

x	Y
71	0

Fibrinogen

x	Y
20	0

ESR

x	Y
40	0

Uric Acid

x	Y
70	0

Cholesterol

x	Y
43	0

Vitamin D

x	Y
17	0

CRP

x	Y
20	0

AIP

x	Y
45	0

Ferritin

x	Y
100	0

% I

x

Troponin T

Troponins are a group of proteins found in skeletal and heart (cardiac) muscle fibers that regulate muscular contraction. Troponin tests measure the level of cardiac-specific troponin in th blood to help detect heart injury. Elevated troponin levels were associated with increased all-cau mortality in cancer patients and have been shown to predict manifest heart failure. Source: Department of Cardiology and Vascular Medicine, West German Heart and Vascular Center, Med Faculty, University Hospital Essen, Essen, Germany

Category: Tissue Damage / Repair
Traditional Reference (normal) Range: 0 - 0.4 ng/mL
Cancer Risk Reference Range: < 0.005 ng/mL

Reconsider marker - it is used for MI when treated with biologics....

Selected Publications:

Title: Biomarkers for the detection of apparent and subclinical cancer therapy-related cardiotoxi

Finding: High-sensitive troponin T in patients with primary cancer diagnosis has been shown to overall mortality with a cutoff value of 0.005 ng/mL. Elevated serum troponin T was furthermore associated with advanced tumor stage.

Conclusion: Within the growing field of cardio-oncology, biomarkers represent a pivotal instrum risk assessment, diagnosis and treatment monitoring of cancer-related and cancer therapy-relat cardiotoxicity. Complex interaction between cancer, cancer-therapy and cardiovascular conditio indicates the need for a multidisciplinary cardio-oncologic approach to ensure optimum treatme quality.

Troponin: 0.09

Optimal: < 0.0