Blood Chemistry Analysis

Functional Health Report

Practitioner Report

Prepared for	**Test Client** 41 year old female born Jun 25, 1981 35 years old at the time this lab test was taken.
Requested by	Dr. Stuart Hoover, NHD Essential2Health LLC
Collected Date	Aug 14, 2016
Lab	Quest

What's Inside?

An introduction to Functional Blood Chemistry Analysis and this report.

An in-depth functional system and nutrient evaluation.

A full breakdown of all individual biomarker results, showing distance from optimal, comparative and historical views.

SECTION 1: INTRODUCTION

1 What's Inside?
3 FBCA Introduction
4 Practitioner Report

SECTION 2: ASSESSMENT

6 Functional Body Systems
9 Accessory Systems
11 Nutrient Status
14 Nutrient Deficiencies
18 Clinical Dysfunctions

SECTION 3: ANALYSIS

22 Blood Test Results
29 Blood Test Comparative
32 Blood Test Score
34 Blood Test History
38 Out of Optimal Range

The health concerns that need the most support.

Additional notes and information pertinent to this report.

SECTION 4: HEALTH CONCERNS

46 Health Concerns
49 Recommended Further Testing

SECTION 5: APPENDIX

51 What To Look For
68 Disclaimer

1

An introduction to Functional Blood Chemistry Analysis and your Functional Health Report (FHR).

Introduction

1 What's Inside?
3 FBCA Introduction
4 Practitioner Report

Functional Blood Chemistry Analysis (FBCA)

Functional Blood Chemistry Analysis is the process by which blood biomarkers are organized, analyzed, and interpreted. FBCA provides a comprehensive assessment of the state of health in the main functional systems and the supporting accessory systems of the body. It also gives us a window into the nutrient status of the body and whether you are trending towards or away from optimal health.

WHY BLOOD TESTING?

Blood has a lot to tell us about our state of health and the blood chemistry and CBC / hematology test is the most commonly ordered medical lab test worldwide. These blood tests are an integral part of Western clinical medicine and are used to aid in the diagnostic decision-making process. Clients understand and are educated that blood testing is the norm for health assessment.

However, many people feel unwell long before a traditional blood test becomes diagnostic. More often than not, our clients are told by their physician that "everything on your blood test looks normal."

"NORMAL" IS NOT OPTIMAL

Most clients who feel "unwell" will come out "normal" on a blood test. Clinical experience suggests that these people are by no means "normal" and are a far cry from being functionally optimal. They may not yet have progressed to a known disease state but they are what we call dys-functional, i.e. their physiological systems are no longer functioning properly and they are starting to feel un-well.

The issue is not that the blood test is a poor diagnostic tool, far from it. The issue is that the ranges used on a traditional lab test are based on statistics, not on whether a certain value represents good health or optimal physiological function. The problem is that "normal" reference ranges represent "average" populations rather that the optimal level required to maintain good health. Most "normal" ranges are too broad to adequately detect health problems before they become pathology and are not useful for detecting the emergence of dysfunction.

THE FUNCTIONAL APPROACH

The functional approach to chem screen and CBC analysis is oriented around changes in physiology and not pathology. We use ranges based on optimal physiology, not the "normal" population. This results in a tighter "Functional Physiological Range," which allows us to evaluate the area within the "Normal" range to detect clients with changes in physiological "function." We can identify the factors that obstruct the client from achieving optimal physiological, biochemical, and metabolic functioning in their body.

Another thing that separates the Functional Blood Chemistry Analysis from the Traditional approach is we are not simply looking at one individual biomarker at a time in a linear report of the data. Rather, we use trend analysis between the individual biomarkers to establish a client's otherwise hidden trend towards or away from a functional health optimal.

THE FUNCTIONAL HEALTH REPORT

The Functional Health Report is the result of a detailed algorithmic analysis of your blood test results. Our analytical and interpretive software analyzes the blood test data for its hidden meaning and reveals the subtle, web-like patterns hidden within the numbers that signal the first stages of functional change in the body.

SUMMARY

In closing, Blood testing is no longer simply a part of disease or injury management. It's a vital component of a comprehensive Functional Medicine work up and plays a vital role in uncovering hidden health trends, comprehensive health promotion and disease prevention.

Practitioner Report

Your Practitioner Report is the result of a detailed and proprietary algorithmic analysis of your client's complex and comprehensive blood biomarkers.

DR. STUART HOOVER
Essential2Health LLC

NHD

THE FUNCTIONAL HEALTH REPORT

The Functional Health Report uniquely organizes and creates an interpretation providing a comprehensive insight and assessment into the state of previously hidden health trends of the main body systems, its supporting body accessory systems, along with reporting on the status of key nutrients and trends to and from clinical dysfunction.

The analytical and interpretive software analyzes the blood test data for its hidden meaning and reveals the subtle, web-like patterns hidden within the numbers that signal the first stages of functional change in the body.

ASSESSMENT

The Assessment section is at the very heart of the Functional Health Report. It is here that the findings of the algorithmic trend analysis are presented. The Functional Body Systems and Accessory Reports show the level of dysfunction that exists in the various physiological systems in the body.

The Nutrient Systems report gives you an indication of your client's general nutritional status as well as the degree of deficiency for individual nutrients.

The Assessment section also includes the Practitioner Only "Clinical Dysfunctions Report", which lists the individual dysfunctions and conditions themselves that may be causing the changes seen in the Body and Accessory Systems reports.

ANALYSIS

The Analysis section shows you the actual results of the blood test itself.

The Blood Test Results Report lists the results of the client's blood test results and shows you if an individual biomarker is outside of the optimal range and/or outside of the clinical lab range.

The Blood Test Results Comparative Report compares results of the client's latest and previous Chemistry Screen and Hematology test and gives you a sense of whether or not there has been an improvement on the individual biomarker level.

The Blood Test History report allows you to compare results over time and see where improvement has been made and allows you to track progress in the individual biomarkers.

A Blood Test Score report is made showing which markers exhibit the largest shifts away from an optimal norm either higher or lower.

HEALTH CONCERNS

All the information on the Assessment and Analysis sections of the report are summarized in the Health Concerns section, which focuses on the top areas of need as presented in this report.

Based on the results of the analysis of this blood test, there may be a "Recommended Further Testing" report, which indicates areas that may require further investigation.

APPENDIX

The appendix may contain the "What to Look For" report, which contains detailed descriptions and interpretation explanations of each biomarker that is out of optimal giving you even more information on dysfunctions associated with each biomarker.

2

An in-depth functional system and nutrient evaluation.

Assessment

6 Functional Body Systems
9 Accessory Systems
11 Nutrient Status
14 Nutrient Deficiencies
18 Clinical Dysfunctions

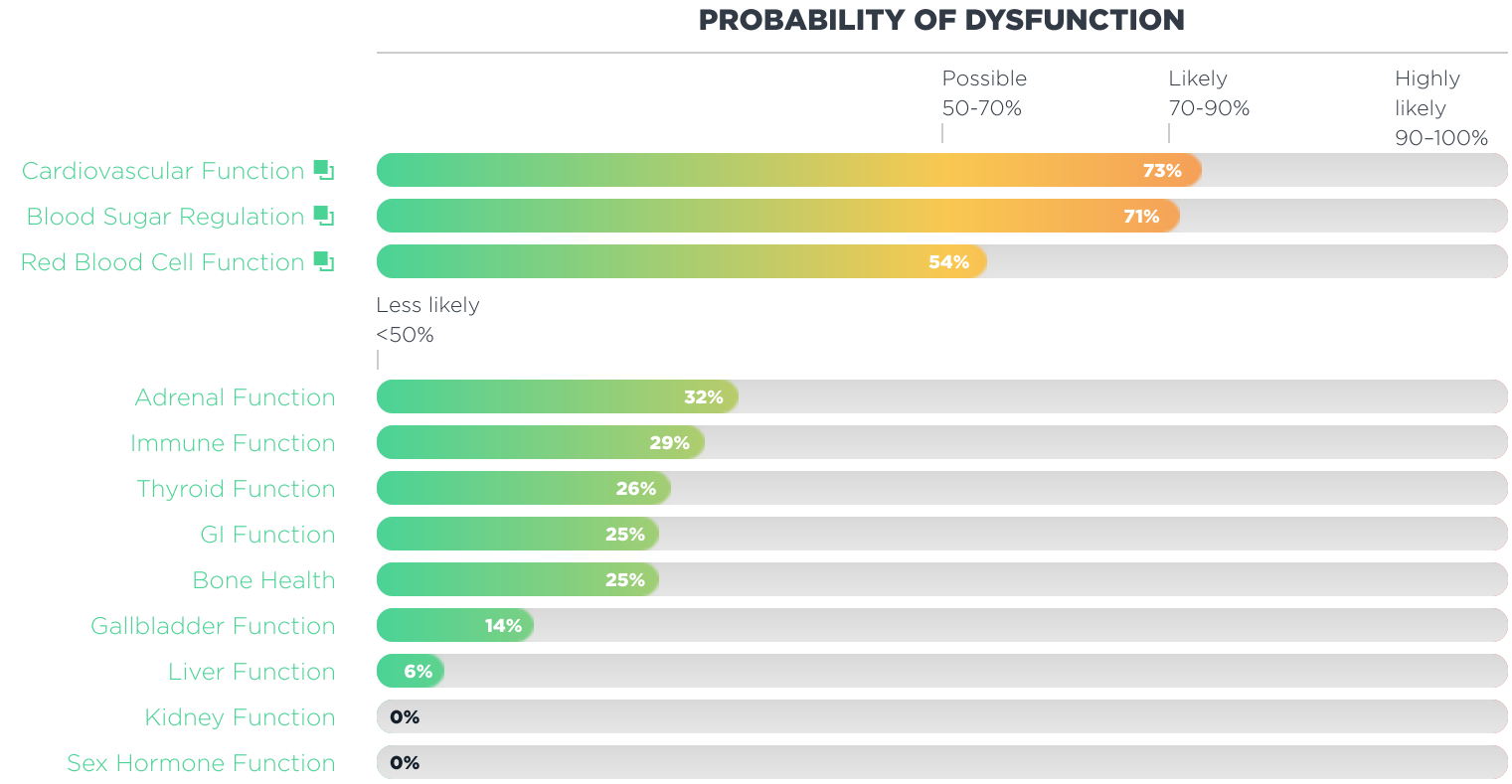
Functional Body Systems

The Functional Body System results represent an algorithmic analysis of this blood test. These results have been converted into your client's individual Functional Body Systems Report based on our latest research.

This report gives you an indication of the level of dysfunction that exists in the various physiological systems in the body.

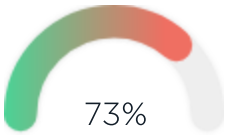
Please use this report in conjunction with the "Practitioner's Only Clinical Dysfunctions Report" to identify which dysfunctions and conditions are causing changes in the Functional Body Systems.

Each Body System that has a probability of dysfunction above 50% is included in the section that follows so you can read a detailed description and individual explanation of the results shown in this report.



Functional Body Systems Details

This section contains detailed descriptions and explanations of the results presented in the Functional Body Systems Report including all the biomarkers considered in the algorithmic analysis and the rationale behind the interpretation.



Dysfunction Likely
Improvement required.

CARDIOVASCULAR FUNCTION

It is likely that your client is heading towards an increased risk of cardiovascular disease. This could be the emerging endothelial dysfunction, atherosclerosis, or inflammation. Please refer to the "Clinical Dysfunctions" report to get a sense of the probability of dysfunction in these "conditions".

Rationale

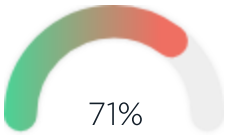
Triglyceride:HDL ↑, Cholesterol - Total ↑, Triglycerides ↑, LDL Cholesterol ↑, HDL Cholesterol ↓, Hs CRP - Female ↑, Vitamin D (25-OH) ↓

Biomarkers considered

Triglyceride:HDL, Glucose - Fasting, AST, LDH, Cholesterol - Total, Triglycerides, LDL Cholesterol, HDL Cholesterol, Ferritin, Fibrinogen, Hs CRP - Female, Hemoglobin A1C, Vitamin D (25-OH)

Client result not available - consider running in future tests:

Homocysteine, Testosterone Free - Female, Insulin - Fasting



Dysfunction Likely
Improvement required.

BLOOD SUGAR REGULATION

It is likely that your client is trending towards blood sugar dysregulation. This could be emerging hypoglycemia, early stages of dysglycemia, metabolic syndrome, or insulin resistance. Please refer to the "Clinical Dysfunctions" report to get a sense of the probability of dysfunction in these "conditions".

Rationale

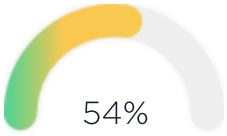
LDH ↓, Hemoglobin A1C ↑, Cholesterol - Total ↑, LDL Cholesterol ↑, HDL Cholesterol ↓, DHEA-S - Female ↓

Biomarkers considered

Glucose - Fasting, LDH, Hemoglobin A1C, Cholesterol - Total, Triglycerides, LDL Cholesterol, HDL Cholesterol, DHEA-S - Female

Client result not available - consider running in future tests:

Insulin - Fasting, Leptin - Female, C-Peptide, Fructosamine



Dysfunction Possible
There may be improvement needed in certain areas.

RED BLOOD CELL FUNCTION

It is possible that your client is in the early stages of anemia, which is causing an increase in their RBC Function score. While this may not require immediate attention, you may want to keep an eye on their nutrient status and keep monitoring this on future blood tests.

Rationale

Hemoglobin - Female ↓, MCHC ↓, RDW ↑, MCH ↓

Biomarkers considered

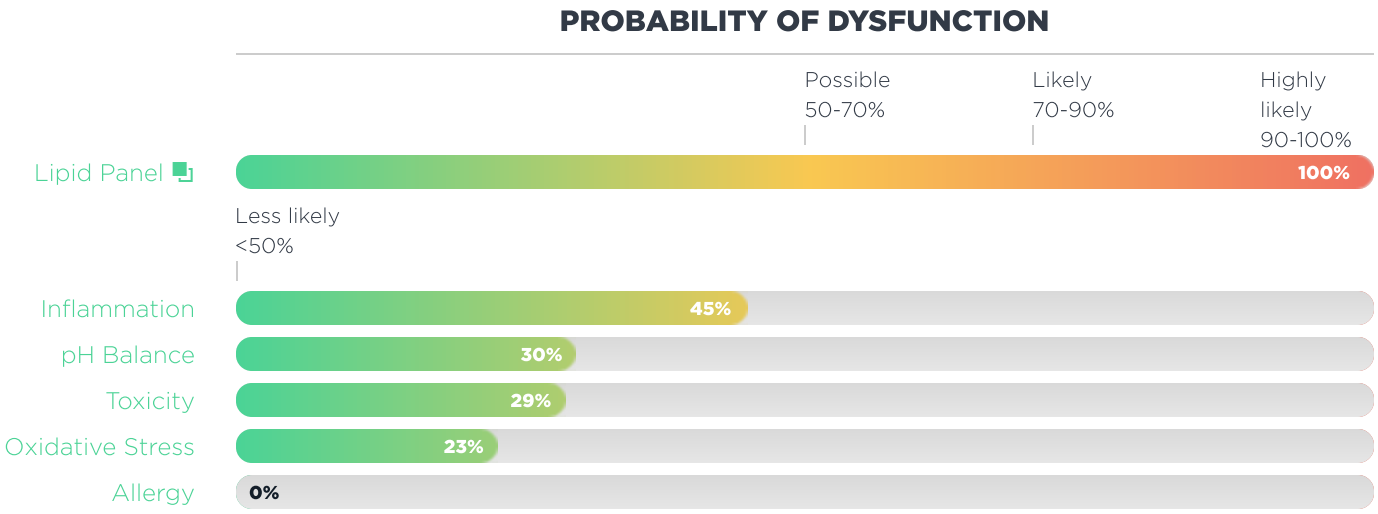
RBC - Female, Hemoglobin - Female, Hematocrit - Female, MCV, MCHC, RDW, MCH

Accessory Systems

The Accessory Systems are additional physiological systems that are not related to individual organs or body systems.

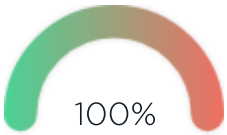
The Accessory Systems Report represents an algorithmic analysis of this blood test. These results have been converted into an individualized risk evaluation based on Optimal DX's latest research.

Each Accessory System that has a probability of dysfunction above 50% is included in the section that follows so you can read a detailed description and individual explanation of the results shown in this report.



Accessory Systems Details

This section contains detailed descriptions and explanations of the results presented in the Accessory Systems report including all the biomarkers considered in the algorithmic analysis and the rationale behind the interpretation.



Dysfunction Highly Likely. Much improvement required.

LIPID PANEL

Your client has a high Lipid Panel score. This indicates that there is likely a high risk of hyperlipidemia, which, along with other biomarkers, has been shown to indicate a potential risk of developing cardiovascular disease (CVD). Although hyperlipidemia is a cause, it's important to look at many other risks for CVD including smoking, blood sugar dysregulation, hypertension, elevated homocysteine, and other diet and lifestyle considerations, which could be causing the Lipid Panel score to be so high.

Rationale

Cholesterol - Total ↑, Triglycerides ↑, LDL Cholesterol ↑, Cholesterol : HDL ↑, Triglyceride:HDL ↑, HDL Cholesterol ↓

Biomarkers considered

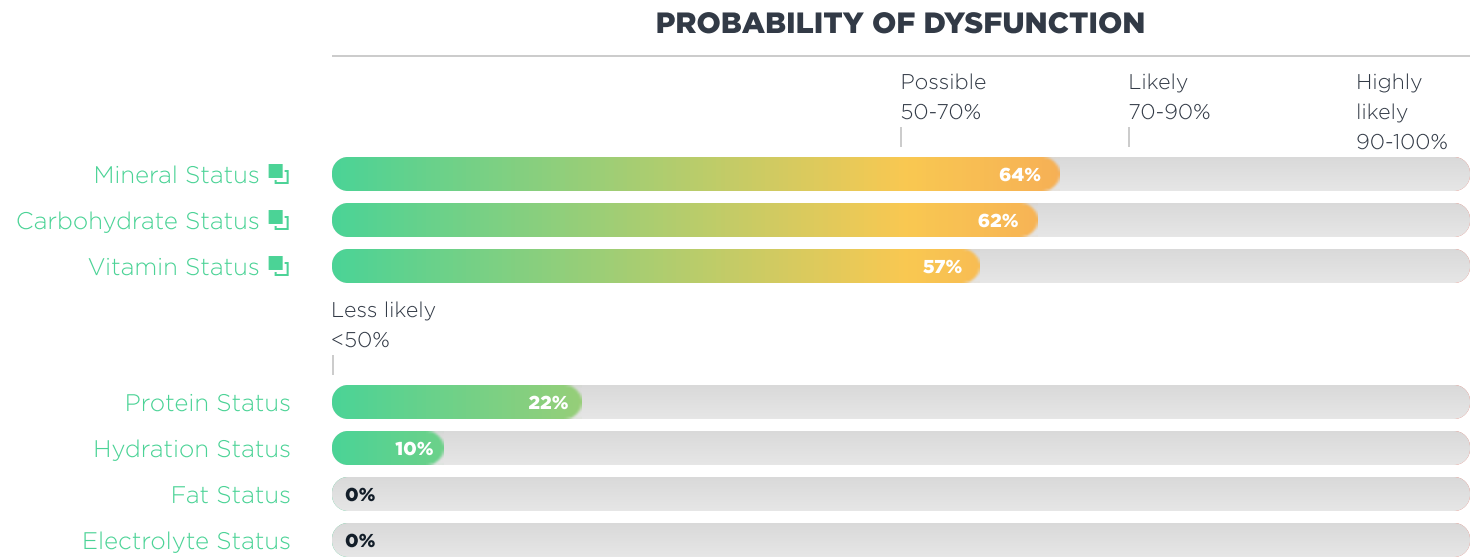
Cholesterol - Total, Triglycerides, LDL Cholesterol, Cholesterol : HDL, Triglyceride:HDL, HDL Cholesterol

Nutrient Status

The Nutrient Status results represent an algorithmic analysis of this blood test. These results have been converted into your client's individual Nutrient Status Report based on our latest research.

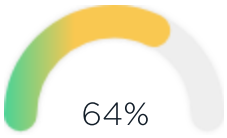
This report gives you an indication of your client's general nutritional status. The Nutrient Status is influenced by actual dietary intake, digestion, absorption, assimilation, and cellular uptake of the nutrients themselves.

Each Nutrient category that has a probability of dysfunction above 50% is included in the section that follows so you can read a detailed description and individual explanation of the results shown in this report.



Nutrient Status Details

This section contains detailed descriptions and explanations of the results presented in the Nutrient Status report including all the biomarkers considered in the algorithmic analysis and the rationale behind the interpretation.



Dysfunction Possible. There may be improvement needed in certain areas.

MINERAL STATUS

Your client may be in the early stages of mineral deficiency or need, causing an increase in their Mineral Status score. While this may not require immediate attention, you may want to keep an eye on their mineral levels and keep monitoring this on future blood tests.

Rationale

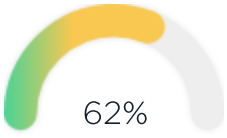
Magnesium - Serum ↓, Alk Phos ↓, Iron - Serum ↓, Ferritin ↓, TIBC ↑

Biomarkers considered

Magnesium - Serum, Potassium, Uric Acid - Female, Calcium, Phosphorus, Alk Phos, GGT, Iron - Serum, Ferritin, TIBC, % Transferrin saturation, T3 - Total, T3 - Free, MCV

Client result not available - consider running in future tests:

Copper - Serum, Zinc - Serum



Dysfunction Possible. There may be improvement needed in certain areas.

CARBOHYDRATE STATUS

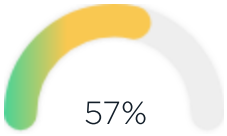
Your client may be in the early stages of having difficulties handling their dietary intake of carbohydrates, especially refined carbohydrates, and sugars. This may begin to cause shifts in their ability to regulate blood sugar. While this may not require immediate attention, you may want to keep an eye on this on future blood tests.

Rationale

LDH ↓, Cholesterol - Total ↑, LDL Cholesterol ↑, HDL Cholesterol ↓

Biomarkers considered

Glucose - Fasting, Phosphorus, LDH, Cholesterol - Total, Triglycerides, LDL Cholesterol, HDL Cholesterol, Total WBCs



Dysfunction Possible. There may be improvement needed in certain areas.

VITAMIN STATUS

Your client may be in the early stages of vitamin deficiency or need, causing an increase in their Vitamin Status score. While this may not require immediate attention, you may want to keep an eye on their vitamin levels and keep monitoring this on future blood tests.

Rationale

Anion Gap ↑, Vitamin D (25-OH) ↓

Biomarkers considered

Anion Gap, Albumin, AST, ALT, GGT, Vitamin D (25-OH), MCV

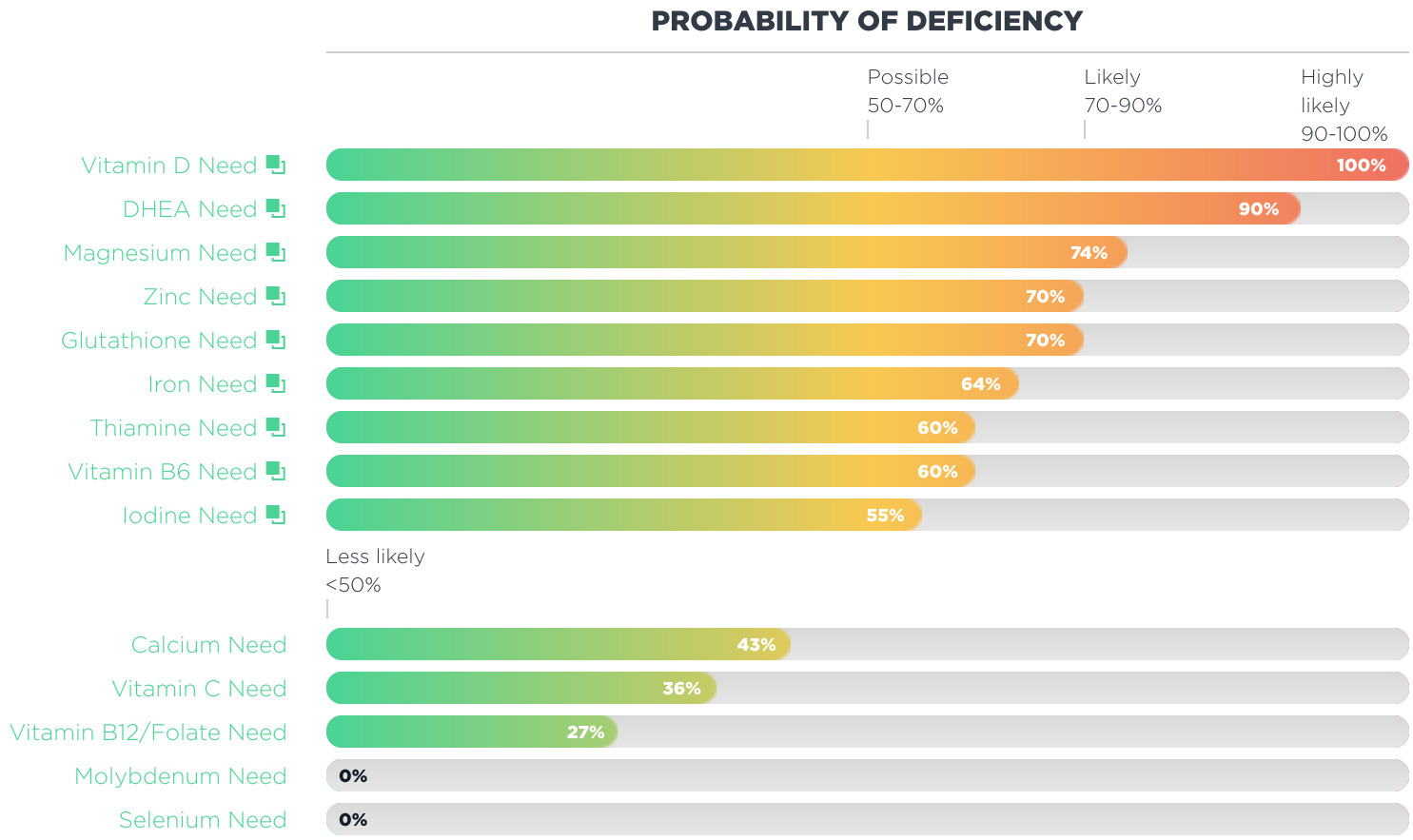
Client result not available - consider running in future tests:

Homocysteine, Methylmalonic Acid, Folate - Serum, Vitamin B12

Individual Nutrient Deficiencies

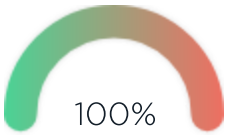
The values represent the degree of deficiency for individual nutrients based on your client's blood results. The status of an individual nutrient is based on a number of factors such as actual dietary intake, digestion, absorption, assimilation and cellular uptake of the nutrients themselves. All of these factors must be taken into consideration before determining whether or not your client actually needs an individual nutrient.

Each individual Nutrient Deficiency that has a probability of dysfunction above 50% is included in the section that follows so you can read a detailed description and individual explanation of the results shown in this report.



Individual Nutrient Deficiency Details

This section contains detailed descriptions and explanations of the results presented in the Nutrient Deficiencies report including all the biomarkers considered in the algorithmic analysis and the rationale behind the interpretation.



Deficiency Highly Likely. Much improvement required.

VITAMIN D NEED

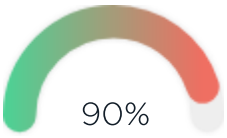
The results of this blood test indicate that this client's Vitamin D levels might be lower than optimal.

Rationale

Vitamin D (25-OH) ↓

Biomarkers considered

Vitamin D (25-OH)



Deficiency Highly Likely. Much improvement required.

DHEA NEED

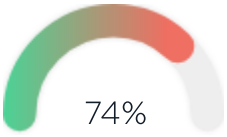
The results of this blood test indicate that this client's DHEA levels might be lower than optimal.

Rationale

DHEA-S - Female ↓

Biomarkers considered

DHEA-S - Female



Deficiency Likely. Improvement required.

MAGNESIUM NEED

A magnesium need is associated with a decreased serum and/or RBC magnesium, and a decreased GGTP.

Rationale

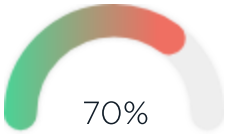
Magnesium - Serum ↓

Biomarkers considered

Magnesium - Serum, GGT

Client result not available - consider running in future tests:

Magnesium - RBC



Deficiency Likely.
Improvement required.

ZINC NEED

Consider a zinc need if the Serum Zinc levels are decreased along with a decreased Alk phos.

Rationale

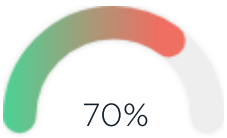
Alk Phos ↓

Biomarkers considered

Alk Phos

Client result not available - consider running in future tests:

Zinc - Serum



Deficiency Likely.
Improvement required.

GLUTATHIONE NEED

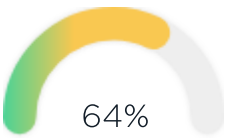
Suspect a glutathione need if the GGT is elevated. An elevated GGT is most commonly associated with alcohol consumption or gallbladder issues but suspect a glutathione need if GGT is elevated and there is no evidence of gallbladder dysfunction.

Rationale

GGT ↑

Biomarkers considered

GGT



Deficiency Possible.
There may be improvement needed in certain areas.

IRON NEED

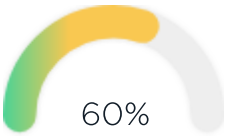
Consider an iron need if there is a decreased serum iron with a decreased MCH, MCV, and MCHC, ferritin, % transferrin saturation and/or HGB and/or HCT, and an increased RDW and an increased TIBC.

Rationale

Iron - Serum ↓, Ferritin ↓, Hemoglobin - Female ↓, MCHC ↓, MCH ↓, TIBC ↑, RDW ↑

Biomarkers considered

Iron - Serum, Ferritin, RBC - Female, Hemoglobin - Female, Hematocrit - Female, MCV, MCHC, % Transferrin saturation, MCH, TIBC, RDW



Deficiency Possible.
There may be improvement needed in certain areas.

THIAMINE NEED

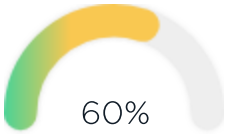
Consider Thiamine deficiency with an increased anion gap along with a decreased CO_2. Hemoglobin and hematocrit levels may be normal or decreased. Due to thiamine's role in glycolysis, LDH levels may be decreased and glucose levels may be normal to increased.

Rationale

Anion Gap ↑, LDH ↓, Hemoglobin - Female ↓

Biomarkers considered

Anion Gap, CO2, Glucose - Fasting, LDH, Hemoglobin - Female, Hematocrit - Female



Deficiency Possible. There may be improvement needed in certain areas.

VITAMIN B6 NEED

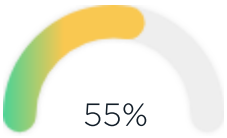
Consider a B6 need if there is a decreased MCV, MCH, MCHC, HGB and/or HCT and an increased or normal serum iron and/or ferritin. You may also see a decreased SGOT/AST, SGPT/ALT or GGTP.

Rationale

Hemoglobin - Female ↓, MCH ↓, MCHC ↓

Biomarkers considered

Ferritin, Iron - Serum, AST, ALT, GGT, Hemoglobin - Female, Hematocrit - Female, MCV, MCH, MCHC



Deficiency Possible. There may be improvement needed in certain areas.

IODINE NEED

Consider an iodine need if the total T4 is decreased along with a decreased free T4. The total T3 is often increased and the TSH may be normal or mildly elevated.

Rationale

T4 - Total ↓, T4 - Free ↓

Biomarkers considered

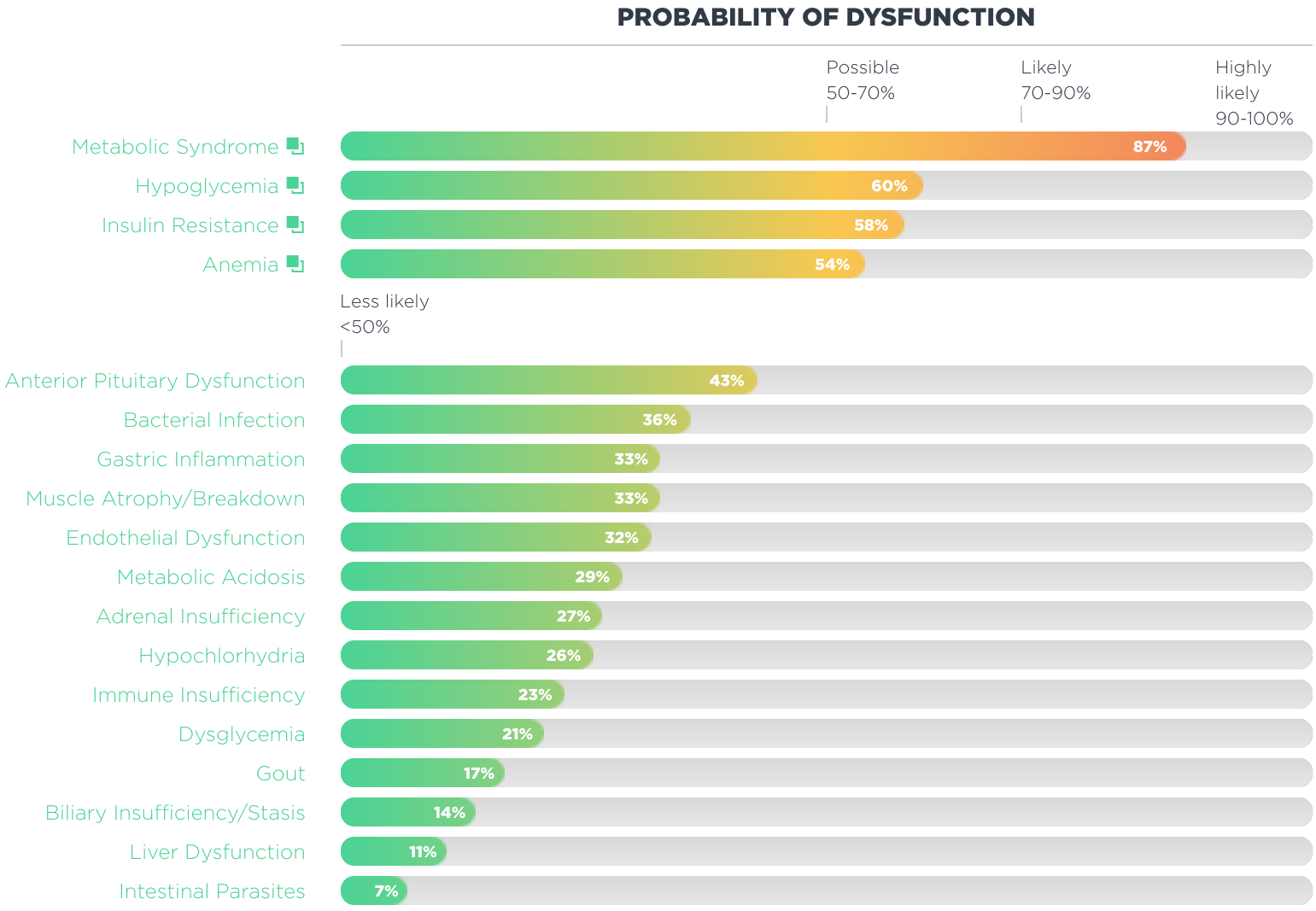
T4 - Total, T4 - Free, T3 - Total, T3 - Free, T3 Uptake, TSH

Clinical Dysfunctions

Advanced practitioner only report

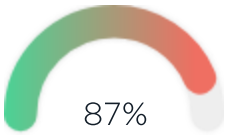
The Clinical Dysfunctions Report shows a list of likely Health Concerns that your client may be suffering from based on an analysis of their Chemistry Screen and CBC results.

Each Clinical Dysfunction that has a probability of dysfunction above 50% is included in the section that follows so you can read a detailed description and individual explanation of the results shown in this report.



Clinical Dysfunctions Details

This section contains detailed descriptions and explanations of the results presented in the Clinical Dysfunctions report including all the biomarkers considered in the algorithmic analysis and the rationale behind the interpretation.



Dysfunction Likely. Improvement required.

METABOLIC SYNDROME

Consider metabolic syndrome with an increased triglyceride, an increased total cholesterol, an increased LDL cholesterol, a decreased HDL, an increased fasting blood glucose and an increased hemoglobin A1C. Additional elements that may be out of range with metabolic syndrome include an increased fasting insulin, an increased uric acid and decreased DHEA.

Rationale

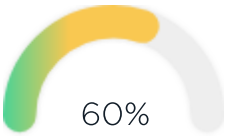
Triglycerides ↑, Hemoglobin A1C ↑, Cholesterol - Total ↑, LDL Cholesterol ↑, HDL Cholesterol ↓, DHEA-S - Female ↓, Sex Hormone Binding Globulin - Female ↓

Biomarkers considered

Glucose - Fasting, Triglycerides, Hemoglobin A1C, Uric Acid - Female, Cholesterol - Total, LDL Cholesterol, HDL Cholesterol, DHEA-S - Female, Sex Hormone Binding Globulin - Female

Client result not available - consider running in future tests:

Insulin - Fasting, Leptin - Female



Dysfunction Possible. There may be improvement needed in certain areas.

HYPOGLYCEMIA

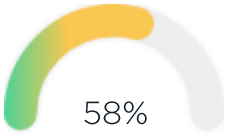
Consider hypoglycemia with a decreased fasting blood glucose along with a decreased LDH. Additional elements that may be out of range with hypoglycemia include a decreased Hemoglobin A1C and an increased SGPT/ALT level.

Rationale

LDH ↓

Biomarkers considered

Glucose - Fasting, LDH, Hemoglobin A1C



Dysfunction Possible. There may be improvement needed in certain areas.

INSULIN RESISTANCE

Insulin resistance is the condition in which people lose sensitivity to the hormone insulin. As the cells become resistant to insulin, levels of insulin and blood glucose will rise. Consider insulin resistance with an increased fasting insulin and an increased fasting blood glucose, an increased Hemoglobin A1C, an increased triglyceride and an increased Triglyceride/HDL ratio. You may also see an increased total cholesterol, an increased C-Peptide, a decreased HDL and a decreased phosphorous.

Rationale

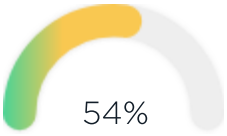
Triglycerides ↑, Triglyceride:HDL ↑

Biomarkers considered

Triglycerides, Triglyceride:HDL, Hemoglobin A1C, Glucose - Fasting, Cholesterol - Total

Client result not available - consider running in future tests:

C-Peptide, Insulin - Fasting, Leptin - Female



Dysfunction Possible. There may be improvement needed in certain areas.

ANEMIA

Anemia is a condition in which there is a decreased amount of hemoglobin, a decreased number of circulating RBCs, and a decrease in the hematocrit. Anemia is a symptom not a disease, and the cause of an anemia must be sought out. Come of the common causes of anemia include deficiencies of iron and certain vitamins (B12, folate, B6, copper), blood loss and increased destruction of red blood cells. If anemia shows high on this report, the underlying cause must be ruled out and treated.

Rationale

Hemoglobin - Female ↓, MCHC ↓, RDW ↑, MCH ↓

Biomarkers considered

RBC - Female, Hemoglobin - Female, Hematocrit - Female, MCV, MCHC, RDW, MCH

A full breakdown of all the individual biomarker results, showing you if a particular biomarker is outside of the optimal range or outside of the clinical lab range plus a comparative and historical view.

Analytics

22 Blood Test Results
29 Blood Test Comparative
32 Blood Test Score
34 Blood Test History
38 Out of Optimal Range

Blood Test Results

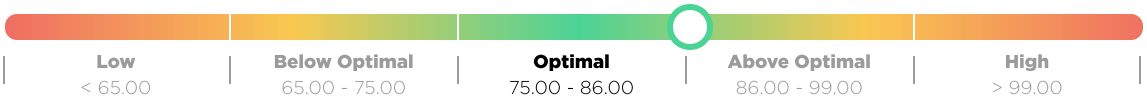
The Blood Test Results Report lists the results of your client's Chemistry Screen and CBC and shows you whether or not an individual biomarker is outside of the optimal range and/or outside of the clinical lab range. The biomarkers are grouped into their most common categories.

Some biomarkers in the Blood Test Results Report that are above or below the Optimal or Standard Range may be hyperlinked into the "Out of Optimal Range Report", so you can read some background information on those biomarkers and why they may be high or low.

Alarm Low	Low	Below Optimal	Optimal	Above Optimal	High	Alarm High	Total
0	3	14	39	12	2	0	70

BLOOD GLUCOSE

Glucose - Fasting
86.00 mg/dL

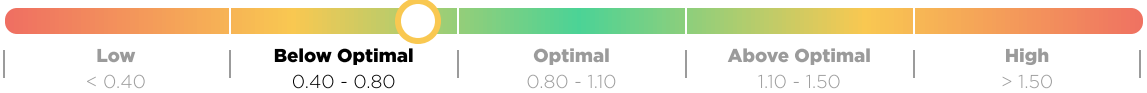


Hemoglobin A1C
5.40 %

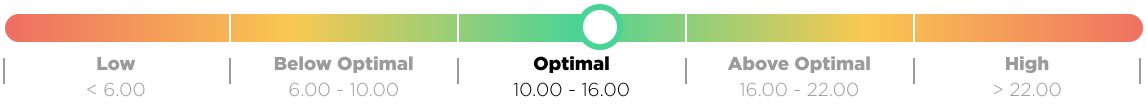
RENAL

BUN
10.00 mg/dL

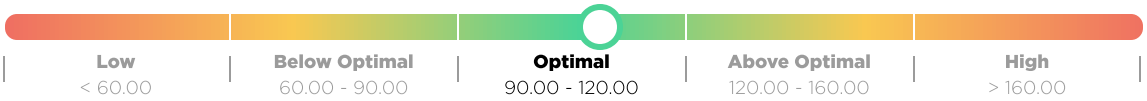
Creatinine
0.72 mg/dL



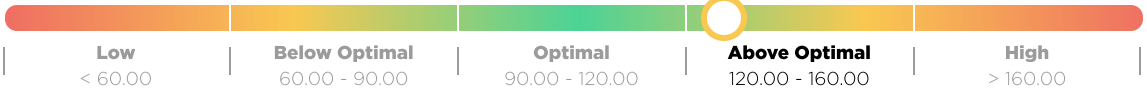
BUN : Creatinine
13.88 Ratio



eGFR
108.00 mL/min/1.73m2



eGFR African American
126.00 mL/min/1.73m2

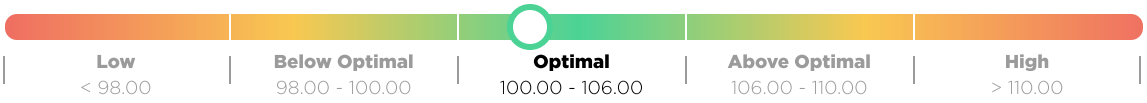


ELECTROLYTES

Sodium
136.00 mEq/L

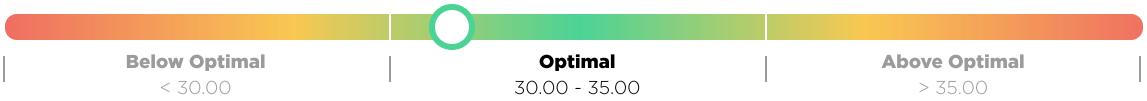
Potassium
4.40 mEq/L

Chloride
102.00 mEq/L



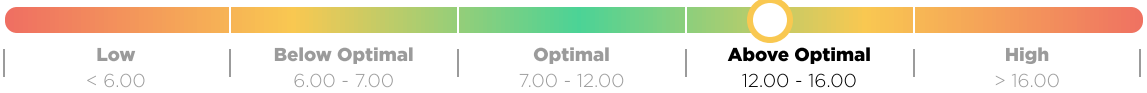
CO2
25.00 mEq/L

Sodium : Potassium
30.90 ratio

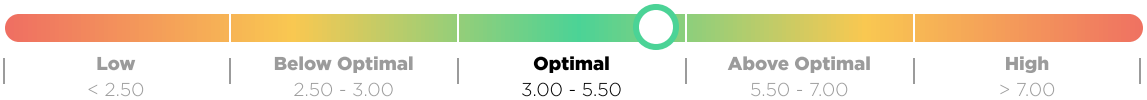


METABOLIC

Anion Gap
13.40 mEq/L

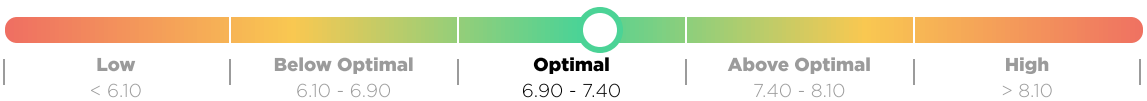


Uric Acid - Female
5.20 mg/dL

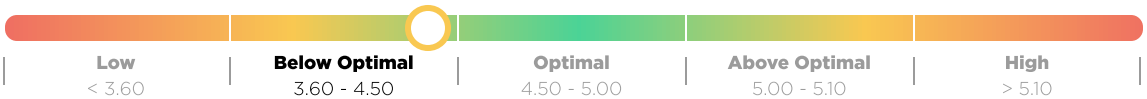


PROTEINS

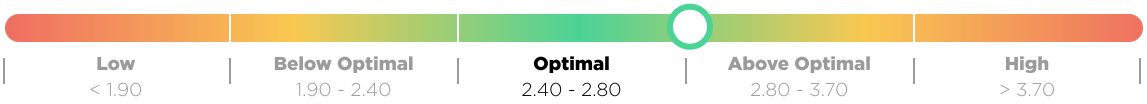
Protein - Total
7.20 g/dL



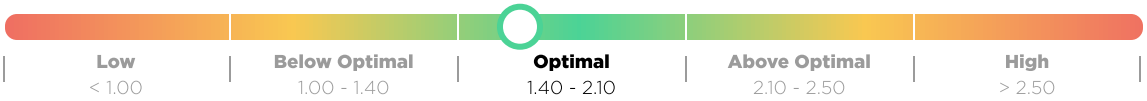
Albumin
4.40 g/dL



Globulin - Total
2.80 g/dL

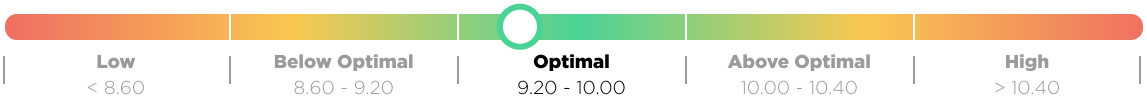


Albumin : Globulin
1.60 ratio

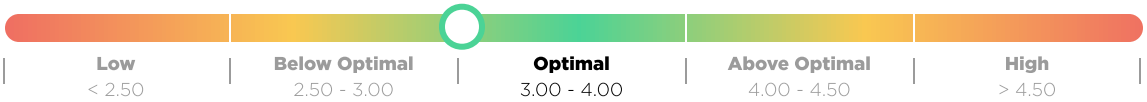


MINERALS

Calcium
9.40 mg/dL



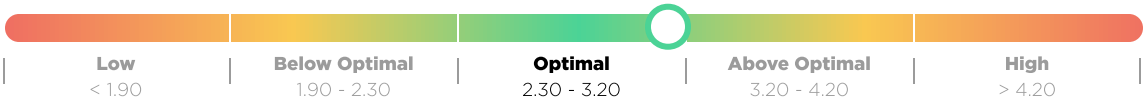
Phosphorus
3.00 mg/dL



Magnesium - Serum
2.10 mg/dl

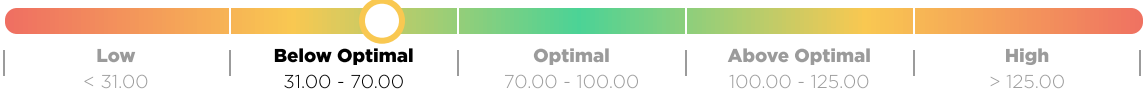
Calcium : Albumin
2.13 ratio

Calcium : Phosphorus
3.13 ratio



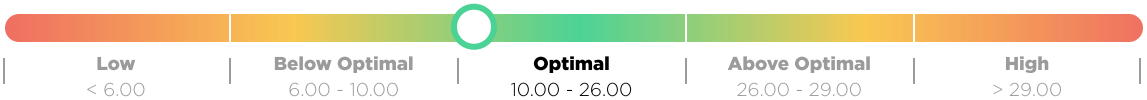
LIVER AND GB

Alk Phos
57.00 IU/L



AST
13.00 IU/L

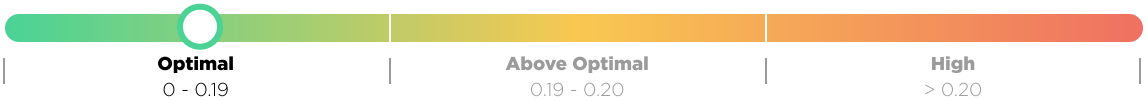
ALT
11.00 IU/L



LDH
135.00 IU/L

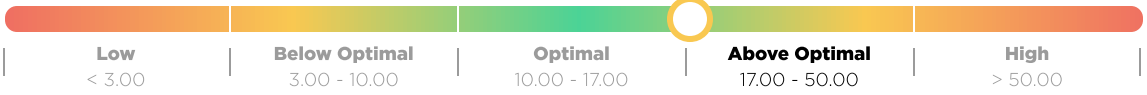
Bilirubin - Total
0.60 mg/dL

Bilirubin - Direct
0.10 mg/dL



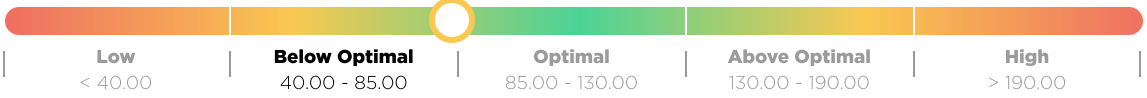
Bilirubin - Indirect
0.50 mg/dL

GGT
18.00 IU/L

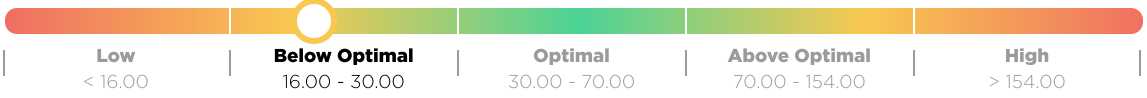


IRON MARKERS

Iron - Serum
83.00 µg/dL

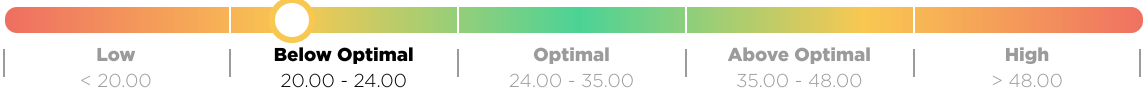


Ferritin
21.00 ng/mL



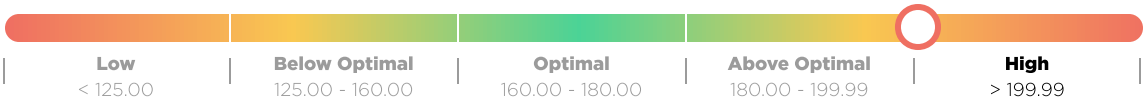
TIBC
397.00 µg/dL

% Transferrin saturation
21.00 %



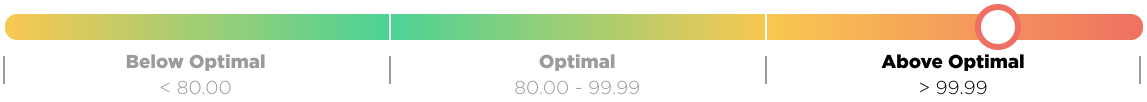
LIPIDS

Cholesterol - Total
203.00 mg/dL

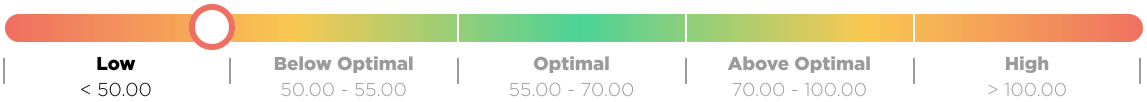


Triglycerides
97.00 mg/dL

LDL Cholesterol
135.00 mg/dL



HDL Cholesterol
49.00 mg/dL



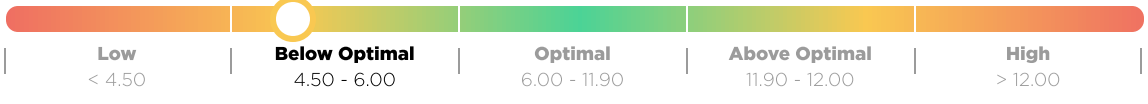
Cholesterol : HDL
4.10 Ratio

Triglyceride:HDL
1.97 ratio

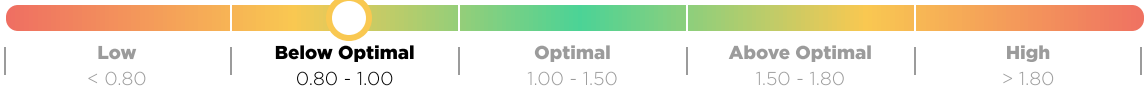
THYROID

TSH
2.17 µU/mL

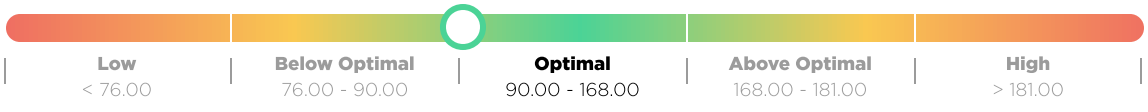
T4 - Total
4.90 µg/dL



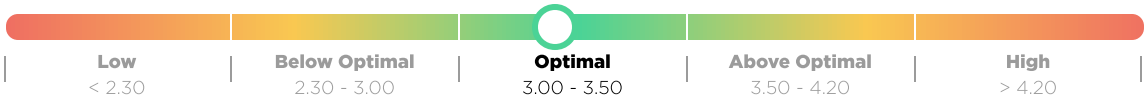
T4 - Free
0.90 ng/dL



T3 - Total
91.00 ng/dL



T3 - Free
3.20 pg/ml



Reverse T3
16.00 ng/dl

T3 Uptake
35.00 %

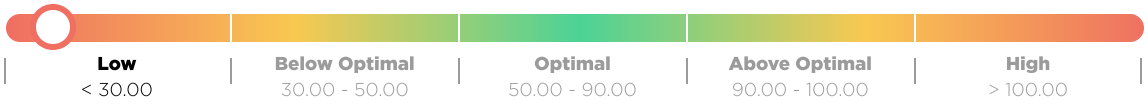
Free Thyroxine Index (T7)
1.70 Index

Thyroid Peroxidase (TPO) Abs
2.00 IU/ml

Thyroglobulin Abs
<1.00 IU/ml

VITAMINS

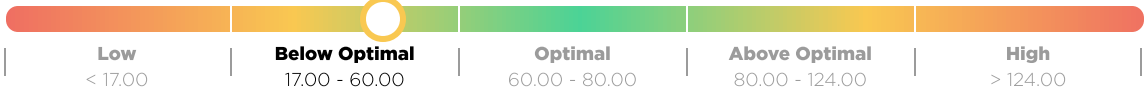
Vitamin D (25-OH)
22.00 ng/ml



HORMONES

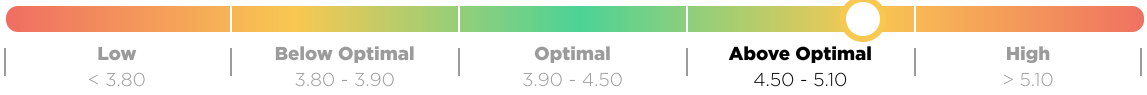
DHEA-S - Female
103.00 µg/dl

Sex Hormone Binding Globulin - Female
46.00 nmol/L

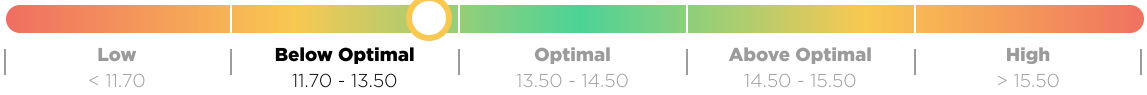


CBC/HEMATOLOGY

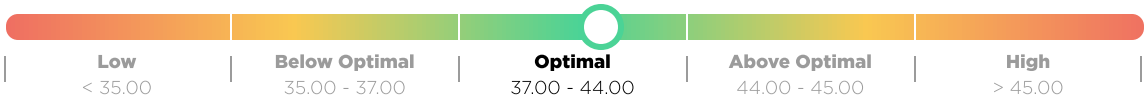
RBC - Female
4.97 m/cumm



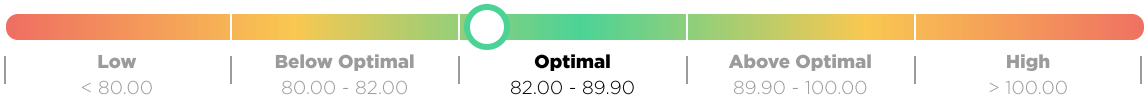
Hemoglobin - Female
13.30 g/dl



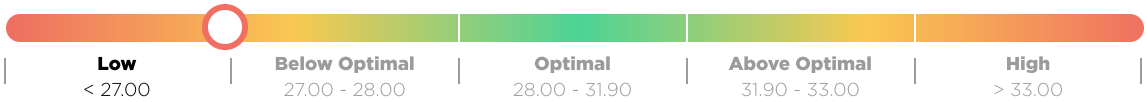
Hematocrit - Female
41.20 %



MCV
83.00 fL

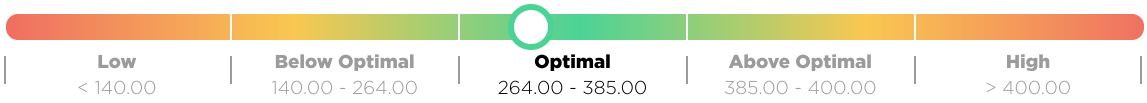


MCH
26.70 pg



MCHC
32.20 g/dL

Platelets
301.00 10E3/µL

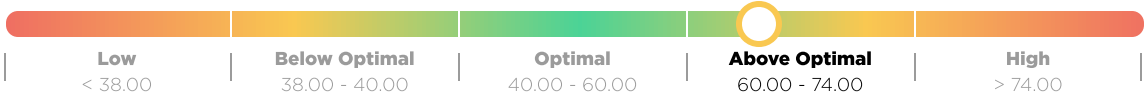


RDW
14.70 %

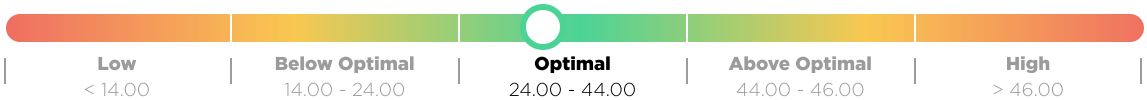
WHITE BLOOD CELLS

Total WBCs
6.00 k/cumm

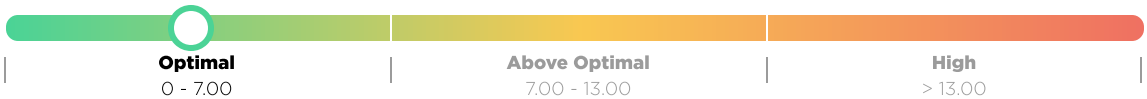
Neutrophils - %
64.20 %



Lymphocytes - %
31.40 %



Monocytes - %
3.30 %



Eosinophils - %

0.80 %

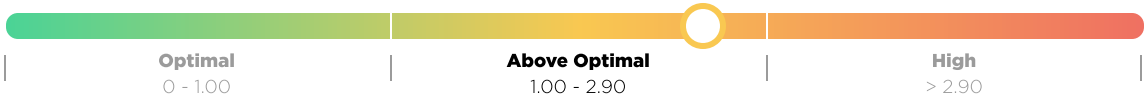
Basophils - %

0.30 %

INFLAMMATION

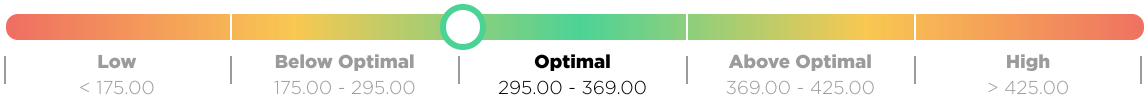
Hs CRP - Female

2.60 mg/L



Fibrinogen

295.00 mg/dl



Blood Test Results Comparative

The Blood Test Results Comparative Report lists the results of your client's latest and previous Chemistry Screen and CBC and shows you whether or not an individual biomarker is outside of the optimal range and/or outside of the clinical lab range.

Comparative total number of biomarkers by optimal range

	Alarm Low	Low	Below Optimal	Optimal	Above Optimal	High	Alarm High
Current	0	3	14	39	12	2	0
Previous	1	2	6	36	8	1	0

Biomarker	Quest Previous Apr 27 2013	Quest Current Aug 14 2016	Optimal range	Standard range	Units
Glucose - Fasting	79.00	86.00	75.00 - 86.00	65.00 - 99.00	mg/dL
Hemoglobin A1C		5.40 ↑	4.60 - 5.30	0 - 5.70	%
BUN	11.00	10.00	10.00 - 16.00	7.00 - 25.00	mg/dL
Creatinine	0.82	0.72 ↓	0.80 - 1.10	0.40 - 1.50	mg/dL
BUN : Creatinine	13.00	13.88	10.00 - 16.00	6.00 - 22.00	Ratio
eGFR	96.00	108.00	90.00 - 120.00	60.00 - 160.00	mL/min/1.73m2
eGFR African American		126.00 ↑	90.00 - 120.00	60.00 - 160.00	mL/min/1.73m2
Sodium	139.00	136.00	135.00 - 142.00	135.00 - 146.00	mEq/L
Potassium	4.90	4.40	4.00 - 5.00	3.50 - 5.30	mEq/L
Chloride	102.00	102.00	100.00 - 106.00	98.00 - 110.00	mEq/L
CO2	27.00	25.00	25.00 - 30.00	19.00 - 30.00	mEq/L
Sodium : Potassium	28.37 ↓ ↓	30.90	30.00 - 35.00	30.00 - 35.00	ratio
Anion Gap	14.90 ↑	13.40 ↑	7.00 - 12.00	6.00 - 16.00	mEq/L

Biomarker	Quest Previous Apr 27 2013	Quest Current Aug 14 2016	Optimal range	Standard range	Units
Uric Acid - Female	5.00	5.20	3.00 - 5.50	2.50 - 7.00	mg/dL
Protein - Total	7.60 ↑	7.20	6.90 - 7.40	6.10 - 8.10	g/dL
Albumin	4.70	4.40 ↓	4.50 - 5.00	3.60 - 5.10	g/dL
Globulin - Total	2.90 ↑	2.80	2.40 - 2.80	1.90 - 3.70	g/dL
Albumin : Globulin	1.60	1.60	1.40 - 2.10	1.00 - 2.50	ratio
Calcium	9.60	9.40	9.20 - 10.00	8.60 - 10.40	mg/dL
Phosphorus	4.00	3.00	3.00 - 4.00	2.50 - 4.50	mg/dL
Magnesium - Serum	1.90 ↓	2.10 ↓	2.20 - 2.50	1.50 - 2.50	mg/dl
Calcium : Albumin	2.04	2.13	0 - 2.60	0 - 2.60	ratio
Calcium : Phosphorus	2.40	3.13	2.30 - 3.20	1.90 - 4.20	ratio
Alk Phos	61.00 ↓	57.00 ↓	70.00 - 100.00	31.00 - 125.00	IU/L
AST	17.00	13.00	10.00 - 26.00	10.00 - 35.00	IU/L
ALT	12.00	11.00	10.00 - 26.00	6.00 - 29.00	IU/L
LDH	148.00	135.00 ↓	140.00 - 200.00	100.00 - 200.00	IU/L
Bilirubin - Total	0.40	0.60	0.30 - 0.90	0.20 - 1.20	mg/dL
Bilirubin - Direct	0.12	0.10	0 - 0.19	0 - 0.20	mg/dL
Bilirubin - Indirect	0.28	0.50	0.10 - 0.70	0.20 - 1.20	mg/dL
GGT	17.00	18.00 ↑	10.00 - 17.00	3.00 - 50.00	IU/L
Iron - Serum	76.00 ↓	83.00 ↓	85.00 - 130.00	40.00 - 190.00	µg/dL
Ferritin		21.00 ↓	30.00 - 70.00	16.00 - 154.00	ng/mL
TIBC		397.00 ↑	250.00 - 350.00	250.00 - 425.00	µg/dL
% Transferrin saturation		21.00 ↓	24.00 - 35.00	20.00 - 48.00	%
Cholesterol - Total	193.00 ↑	203.00 ↑ ↑	160.00 - 180.00	125.00 - 199.99	mg/dL
Triglycerides	77.00	97.00 ↑	70.00 - 80.00	0 - 149.99	mg/dL
LDL Cholesterol	120.00 ↑ ↑	135.00 ↑ ↑	80.00 - 99.99	0 - 99.99	mg/dL
HDL Cholesterol	58.00	49.00 ↓ ↓	55.00 - 70.00	50.00 - 100.00	mg/dL
Cholesterol : HDL	3.30 ↑	4.10 ↑	0 - 3.00	0 - 5.00	Ratio
Triglyceride:HDL	1.33	1.97 ↑	0.50 - 1.90	0 - 2.00	ratio
TSH	2.98	2.17	1.30 - 3.00	0.40 - 4.50	µU/mL
T4 - Total	5.90 ↓	4.90 ↓	6.00 - 11.90	4.50 - 12.00	µg/dL
T4 - Free		0.90 ↓	1.00 - 1.50	0.80 - 1.80	ng/dL
T3 - Total		91.00	90.00 - 168.00	76.00 - 181.00	ng/dL
T3 - Free		3.20	3.00 - 3.50	2.30 - 4.20	pg/ml
Reverse T3		16.00	10.00 - 25.00	8.00 - 25.00	ng/dl
T3 Uptake	35.00	35.00	27.00 - 35.00	22.00 - 35.00	%
Free Thyroxine Index (T7)		1.70	1.70 - 4.60	1.40 - 3.80	Index
Thyroid Peroxidase (TPO) Abs		2.00	0 - 6.80	0 - 9.00	IU/ml

Biomarker	Quest Previous Apr 27 2013	Quest Current Aug 14 2016	Optimal range	Standard range	Units
Thyroglobulin Abs		<1.00	0 - 1.00	0 - 1.00	IU/ml
Vitamin D (25-OH)	18.90 ⚠	22.00 ↓ ↓	50.00 - 90.00	30.00 - 100.00	ng/ml
DHEA-S - Female		103.00 ↓	275.00 - 391.00	18.00 - 391.00	µg/dl
Sex Hormone Binding Globulin - Female		46.00 ↓	60.00 - 80.00	17.00 - 124.00	nmol/L
RBC - Female	4.81 ↑	4.97 ↑	3.90 - 4.50	3.80 - 5.10	m/cumm
Hemoglobin - Female	12.70 ↓	13.30 ↓	13.50 - 14.50	11.70 - 15.50	g/dl
Hematocrit - Female	39.70	41.20	37.00 - 44.00	35.00 - 45.00	%
MCV	83.00	83.00	82.00 - 89.90	80.00 - 100.00	fL
MCH	26.40 ↓ ↓	26.70 ↓ ↓	28.00 - 31.90	27.00 - 33.00	pg
MCHC	32.00 ↓	32.20 ↓	34.00 - 36.00	32.00 - 36.00	g/dL
Platelets	399.00 ↑	301.00	264.00 - 385.00	140.00 - 400.00	10E3/µL
RDW	14.00 ↑	14.70 ↑	11.00 - 12.60	11.00 - 15.00	%
Total WBCs	5.70	6.00	5.50 - 7.50	3.80 - 10.80	k/cumm
Neutrophils - %	54.00	64.20 ↑	40.00 - 60.00	38.00 - 74.00	%
Lymphocytes - %	40.00	31.40	24.00 - 44.00	14.00 - 46.00	%
Monocytes - %	5.00	3.30	0 - 7.00	4.00 - 13.00	%
Eosinophils - %	1.00	0.80	0 - 3.00	0 - 3.00	%
Basophils - %	0.00	0.30	0 - 1.00	0 - 1.00	%
Hs CRP - Female		2.60 ↑	0 - 1.00	0 - 2.90	mg/L
Fibrinogen		295.00	295.00 - 369.00	175.00 - 425.00	mg/dl

Blood Test Score Report

This report shows the biomarkers on the blood test that are farthest from the median expressed as a %.

The biomarkers that appear closest to the top and the bottom are those biomarkers that are farthest from the median and should be carefully reviewed.

Biomarker	Lab result	Optimal range		% deviation	Optimal range
		Low	High		Low High
LDL Cholesterol	135.00	80.00	99.99	225	
Triglycerides	97.00	70.00	80.00	220	
Hs CRP - Female	2.60	0	1.00	210	
RDW	14.70	11.00	12.60	181	
Cholesterol - Total	203.00	160.00	180.00	165	
RBC - Female	4.97	3.90	4.50	128	
TIBC	397.00	250.00	350.00	97	
Cholesterol : HDL	4.10	0	3.00	87	
Anion Gap	13.40	7.00	12.00	78	
Neutrophils - %	64.20	40.00	60.00	71	
eGFR African American	126.00	90.00	120.00	70	
GGT	18.00	10.00	17.00	64	
Hemoglobin A1C	5.40	4.60	5.30	64	
Triglyceride:HDL	1.97	0.50	1.90	55	
Glucose - Fasting	86.00	75.00	86.00	50	
Globulin - Total	2.80	2.40	2.80	50	
T3 Uptake	35.00	27.00	35.00	50	
Thyroglobulin Abs	<1.00	0	1.00	50	
Calcium : Phosphorus	3.13	2.30	3.20	42	
Uric Acid - Female	5.20	3.00	5.50	38	
Calcium : Albumin	2.13	0	2.60	32	
Bilirubin - Indirect	0.50	0.10	0.70	17	
BUN : Creatinine	13.88	10.00	16.00	15	
Protein - Total	7.20	6.90	7.40	10	
Hematocrit - Female	41.20	37.00	44.00	10	
eGFR	108.00	90.00	120.00	10	
Bilirubin - Direct	0.10	0	0.19	3	
TSH	2.17	1.30	3.00	1	
Bilirubin - Total	0.60	0.30	0.90	0	
Monocytes - %	3.30	0	7.00	-3	
Potassium	4.40	4.00	5.00	-10	
T3 - Free	3.20	3.00	3.50	-10	

Biomarker	Lab result	Optimal range		% deviation	Optimal range	
		Low	High		Low	High
Reverse T3	16.00	10.00	25.00	-10		
Lymphocytes - %	31.40	24.00	44.00	-13		
Chloride	102.00	100.00	106.00	-17		
Platelets	301.00	264.00	385.00	-19		
Basophils - %	0.30	0	1.00	-20		
Thyroid Peroxidase (TPO) Abs	2.00	0	6.80	-21		
Albumin : Globulin	1.60	1.40	2.10	-21		
Eosinophils - %	0.80	0	3.00	-23		
Calcium	9.40	9.20	10.00	-25		
Total WBCs	6.00	5.50	7.50	-25		
AST	13.00	10.00	26.00	-31		
Sodium : Potassium	30.90	30.00	35.00	-32		
Sodium	136.00	135.00	142.00	-36		
MCV	83.00	82.00	89.90	-37		
ALT	11.00	10.00	26.00	-44		
T3 - Total	91.00	90.00	168.00	-49		
BUN	10.00	10.00	16.00	-50		
CO2	25.00	25.00	30.00	-50		
Phosphorus	3.00	3.00	4.00	-50		
Fibrinogen	295.00	295.00	369.00	-50		
Free Thyroxine Index (T7)	1.70	1.70	4.60	-50		
Iron - Serum	83.00	85.00	130.00	-54		
LDH	135.00	140.00	200.00	-58		
T4 - Total	4.90	6.00	11.90	-69		
Albumin	4.40	4.50	5.00	-70		
T4 - Free	0.90	1.00	1.50	-70		
Hemoglobin - Female	13.30	13.50	14.50	-70		
Ferritin	21.00	30.00	70.00	-72		
Creatinine	0.72	0.80	1.10	-77		
% Transferrin saturation	21.00	24.00	35.00	-77		
MCH	26.70	28.00	31.90	-83		
Magnesium - Serum	2.10	2.20	2.50	-83		
HDL Cholesterol	49.00	55.00	70.00	-90		
Alk Phos	57.00	70.00	100.00	-93		
Vitamin D (25-OH)	22.00	50.00	90.00	-120		
Sex Hormone Binding Globulin - Female	46.00	60.00	80.00	-120		
MCHC	32.20	34.00	36.00	-140		
DHEA-S - Female	103.00	275.00	391.00	-198		

Blood Test History

Key

- Optimal
- Above / Below Optimal
- Above / Below Standard
- Alarm High / Alarm Low

The Blood Test History Report lists the results of your client's Chemistry Screen and CBC tests side by side with the latest test listed on the right-hand side. This report allows you to compare results over time and see where improvement has been made and allows you to track progress.

Biomarker	Latest 2 Test Results	
	Quest	Quest
	Apr 27 2013	Aug 14 2016
Glucose - Fasting	79.00	86.00
Hemoglobin A1C		5.40 ↑
BUN	11.00	10.00
Creatinine	0.82	0.72 ↓
BUN : Creatinine	13.00	13.88
eGFR	96.00	108.00
eGFR African American		126.00 ↑
Sodium	139.00	136.00
Potassium	4.90	4.40
Chloride	102.00	102.00
CO2	27.00	25.00
Sodium : Potassium	28.37 ↓ ↓	30.90
Anion Gap	14.90 ↑	13.40 ↑
Uric Acid - Female	5.00	5.20
Protein - Total	7.60 ↑	7.20
Albumin	4.70	4.40 ↓
Globulin - Total	2.90 ↑	2.80
Albumin : Globulin	1.60	1.60

Biomarker	Latest 2 Test Results	
	Quest	Quest
	Apr 27 2013	Aug 14 2016
Calcium	9.60	9.40
Phosphorus	4.00	3.00
Magnesium - Serum	1.90 ↓	2.10 ↓
Calcium : Albumin	2.04	2.13
Calcium : Phosphorus	2.40	3.13
Alk Phos	61.00 ↓	57.00 ↓
AST	17.00	13.00
ALT	12.00	11.00
LDH	148.00	135.00 ↓
Bilirubin - Total	0.40	0.60
Bilirubin - Direct	0.12	0.10
Bilirubin - Indirect	0.28	0.50
GGT	17.00	18.00 ↑
Iron - Serum	76.00 ↓	83.00 ↓
Ferritin		21.00 ↓
TIBC		397.00 ↑
% Transferrin saturation		21.00 ↓
Cholesterol - Total	193.00 ↑	203.00 ↑ ↑
Triglycerides	77.00	97.00 ↑
LDL Cholesterol	120.00 ↑ ↑	135.00 ↑ ↑
HDL Cholesterol	58.00	49.00 ↓ ↓
Cholesterol : HDL	3.30 ↑	4.10 ↑
Triglyceride:HDL	1.33	1.97 ↑
TSH	2.98	2.17
T4 - Total	5.90 ↓	4.90 ↓
T4 - Free		0.90 ↓

Biomarker	Latest 2 Test Results	
	Quest	Quest
	Apr 27 2013	Aug 14 2016
T3 - Total		91.00
T3 - Free		3.20
Reverse T3		16.00
T3 Uptake 	35.00	35.00
Free Thyroxine Index (T7)		1.70
Thyroid Peroxidase (TPO) Abs		2.00
Thyroglobulin Abs		<1.00
Vitamin D (25-OH) 	18.90 ⚠	22.00 ↓ ↓
DHEA-S - Female		103.00 ↓
Sex Hormone Binding Globulin - Female		46.00 ↓
RBC - Female 	4.81 ↑	4.97 ↑
Hemoglobin - Female 	12.70 ↓	13.30 ↓
Hematocrit - Female 	39.70	41.20
MCV 	83.00	83.00
MCH 	26.40 ↓ ↓	26.70 ↓ ↓
MCHC 	32.00 ↓	32.20 ↓
Platelets 	399.00 ↑	301.00
RDW 	14.00 ↑	14.70 ↑
Total WBCs 	5.70	6.00
Neutrophils - % 	54.00	64.20 ↑
Lymphocytes - % 	40.00	31.40
Monocytes - % 	5.00	3.30
Eosinophils - % 	1.00	0.80
Basophils - % 	0.00	0.30
Hs CRP - Female		2.60 ↑
Fibrinogen		295.00

Out of Optimal Range

The following report shows all of the biomarkers that are out of the optimal reference range and gives you some important information as to why each biomarker might be elevated or decreased.

Each biomarker in the Out of Optimal Range report hyperlinks back into the Blood Test Results report so you can a see a more detailed view of the blood test result itself.

Total number of biomarkers by optimal range

Alarm Low	Low	Below Optimal	Optimal	Above Optimal	High	Alarm High	Total
0	4	14	38	12	2	0	70

Above Optimal

135.00 mg/dL

LDL CHOLESTEROL

LDL functions to transport cholesterol and other fatty acids from the liver to the peripheral tissues for uptake and metabolism by the cells. It is known as “bad cholesterol” because it is thought that this process of bringing cholesterol from the liver to the peripheral tissue increases the risk for atherosclerosis. An increased LDL cholesterol is just one of many independent risk factors for cardiovascular disease. It is also associated with metabolic syndrome, oxidative stress, and fatty liver.

97.00 mg/dL

TRIGLYCERIDES

Serum triglycerides are composed of fatty acid molecules that enter the bloodstream either from the liver or from the diet. Levels will be elevated in metabolic syndrome, fatty liver, in people with an increased risk of cardiovascular disease, hypothyroidism, and adrenal dysfunction

2.60
mg/L

HS CRP - FEMALE

High Sensitivity C-Reactive Protein (Hs-CRP) is a blood marker that can help indicate the level of chronic inflammation in the body. Increased levels are associated with an increased risk of inflammation, cardiovascular disease, stroke, and diabetes.

14.70
%

RDW

The Red Cell Distribution Width (RDW) is essentially an indication of the degree of abnormal variation in the size of red blood cells (called anisocytosis). Although the RDW will increase with vitamin BI2 deficiency, folic acid, and iron anemia, it is increased most frequently with vitamin B12 deficiency anemia.

203.00
mg/dL

CHOLESTEROL - TOTAL

Cholesterol is a steroid found in every cell of the body and in the plasma. It is an essential component in the structure of the cell membrane where it controls membrane fluidity. It provides the structural backbone for every steroid hormone in the body, which includes adrenal and sex hormones and vitamin D. The myelin sheaths of nerve fibers are derived from cholesterol and the bile salts that emulsify fats are composed of cholesterol. Cholesterol is made in the body by the liver and other organs and from dietary sources. The liver, the intestines, and the skin produce between 60-80% of the body's cholesterol. The remainder comes from the diet. Increased cholesterol is just one of many independent risk factors for cardiovascular disease. It is also associated with metabolic syndrome, hypothyroidism, biliary stasis, and fatty liver.

4.97
m/cumm

RBC - FEMALE

The RBC Count determines the total number of red blood cells or erythrocytes found in a cubic millimeter of blood. The red blood cell functions to carry oxygen from the lungs to the body tissues and to transfer carbon dioxide from the tissues to the lungs where it is expelled. Increased levels are associated with dehydration, stress, a need for vitamin C and respiratory distress such as asthma.

397.00
µg/dL

TIBC

Total Iron Binding Capacity is an approximate estimation of the serum transferrin level. Transferrin is the protein that carries most of the iron in the blood. Elevated levels of TIBC are associated with iron deficiency anemia.

4.10
Ratio

CHOLESTEROL : HDL

The ratio of total cholesterol to HDL is a far better predictor of cardiovascular disease than cholesterol by itself. A lower ratio is ideal because you want to lower cholesterol (but not too low) and raise HDL. A level below 3.0 would be ideal. Every increase of 1.0, i.e. 3.0 to 4.0 increases the risk of heart attack by 60%.

13.40
mEq/L

ANION GAP

The anion gap is the measurement of the difference between the sum of the sodium and potassium levels and the sum of the serum CO2/bicarbonate and chloride levels. Increased levels are associated with thiamine deficiency and metabolic acidosis.

64.20
%

NEUTROPHILS - %

Neutrophils are the white blood cells used by the body to combat bacterial infections and are the most numerous and important white cell in the body's reaction to inflammation. Neutrophils - % tells us the % distribution of neutrophils in the total white blood cell count. Levels will be increased in bacterial infections.

126.00
mL/min/1.73m2

EGFR AFRICAN AMERICAN

The eGFR is a calculated estimate of the kidney's Glomerular Filtration Rate. An elevated eGFR is not clinically significant.

18.00
IU/L

GGT

Gamma Glutamyl Transferase (GGT) is an enzyme that is present in highest amounts in the liver cells and to a lesser extent the kidney, prostate, and pancreas. It is also found in the epithelial cells of the biliary tract. GGT will be liberated into the bloodstream following cell damage or destruction and/or biliary obstruction. GGT is induced by alcohol and can be elevated following chronic alcohol consumption and in alcoholism.

5.40
%

HEMOGLOBIN A1C

The Hemoglobin A1C (HgbA1C) test measures the amount of glucose that combines with hemoglobin during the normal lifespan of a red blood cell, which is about 120 days. Elevated levels of HgbA1C are associated with elevated blood glucose in the past 120 days. Hemoglobin A1C is used primarily to monitor long-term blood glucose control and to help determine therapeutic options for treatment and management. Studies have shown that the closer to normal the hemoglobin A1C levels are kept, the less likely those clients are to develop the long-term complications of diabetes.

1.97
ratio

TRIGLYCERIDE:HDL

The Triglyceride:HDL ratio is determined from serum triglyceride and HDL levels. Increased ratios are associated with increased cardiovascular risk and an increased risk of developing insulin resistance and Type II Diabetes.

Below Optimal

103.00
µg/dl

DHEA-S - FEMALE

DHEA is produced primarily from the adrenals and is the most abundant circulating steroid in the human body and influences more than 150 known anabolic (repair) functions throughout the body and brain. It is the precursor for the sex hormones: testosterone, progesterone, and estrogen. Decreased levels are associated with many common age-related conditions, including diseases of the nervous, cardiovascular, and immune systems such as metabolic syndrome, coronary artery disease, osteoporosis, mood disorders and sexual dysfunction. Ideally, DHEA levels should be maintained at the level of a healthy 30-year-old to maximize the anti-aging effects.

22.00
ng/ml

VITAMIN D (25-OH)

This vitamin D test measures for levels of 25-OH vitamin D and is a very good way to assess vitamin D status. Decreased vitamin D levels are a sign of Vitamin D deficiency.

32.20
g/dL

MCHC

The Mean Corpuscular Hemoglobin Concentration (MCHC) measures the average concentration of hemoglobin in the red blood cells. It is a calculated value. Decreased levels are associated with a vitamin C need, vitamin B6 and iron deficiencies, and a heavy metal body burden.

46.00
nmol/L

SEX HORMONE BINDING GLOBULIN - FEMALE

Sex Hormone Binding Globulin (SHBG) is a protein produced primarily in the liver and to some extent the testes, uterus, brain, and placenta. SHBG acts as a transport molecule for carrying estrogen and testosterone around the body and delivering them to receptors on the cells. Decreased SHBG levels are associated with metabolic syndrome and an increased risk of cardiovascular disease.

57.00
IU/L

ALK PHOS

Alkaline phosphatase (ALP) is a group of isoenzymes that originate in the bone, liver, intestines, skin, and placenta. It has a maximal activity at a pH of 9.0-10.0, hence the term alkaline phosphatase. Decreased levels of ALP have been associated with zinc deficiency.

49.00
mg/dL

HDL CHOLESTEROL

HDL functions to transport cholesterol from the peripheral tissues and vessel walls to the liver for processing and metabolism into bile salts. It is known as “good cholesterol” because it is thought that this process of bringing cholesterol from the peripheral tissue to the liver is protective against atherosclerosis. Decreased HDL is considered atherogenic (tending towards the formation of fatty plaques in the artery).

26.70
pg

MCH

The Mean Corpuscular Hemoglobin (MCH) is a calculated value and is an expression of the average weight of hemoglobin per red blood cell. MCH, along with MCV can be helpful in determining the type of anemia present. Decreased levels are associated with a vitamin C need, vitamin B6 and iron deficiencies, and a heavy metal body burden.

2.10
mg/dl

MAGNESIUM - SERUM

Magnesium is important for many different enzymatic reactions, including carbohydrate metabolism, protein synthesis, nucleic acid synthesis, and muscular contraction. Magnesium is also needed for energy production and is used by the body in the blood clotting mechanism. A decreased magnesium is a common finding with muscle cramps.

21.00
%

% TRANSFERRIN SATURATION

The % transferrin saturation index is a calculated value that tells how much serum iron is bound to the iron-carrying protein transferrin. A % transferrin saturation value of 15% means that 15% of iron-binding sites of transferrin is being occupied by iron. It is a sensitive screening test for iron deficiency anemia if it is below the optimal range.

0.72
mg/dL

CREATININE

Creatinine is produced primarily from the contraction of muscle and is removed by the kidneys. Decreased levels are associated with muscle loss.

21.00
ng/mL

FERRITIN

Ferritin is the main storage form of iron in the body. Decreased levels are strongly associated with iron deficiency where it is the most sensitive test to detect iron deficiency.

4.40
g/dL

ALBUMIN

Albumin is one of the major blood proteins. Produced primarily in the liver, Albumin plays a major role in water distribution and serves as a transport protein for hormones and various drugs. Albumin levels are affected by digestive dysfunction and a decreased albumin can be an indication of malnutrition, digestive dysfunction due to HCl need (hypochlorhydria), or liver dysfunction. Malnutrition leads to a decreased albumin level in the serum primarily from lack of available essential amino acids. Decreased albumin can also be a strong indicator of oxidative stress and excess free radical activity.

0.90
ng/dL

T4 - FREE

T-4 is the major hormone secreted by the thyroid gland. T-4 production and secretion from the thyroid gland are stimulated by the pituitary hormone TSH. Deficiencies of zinc, copper, and vitamins A, B2, B3, B6, and C will cause a decrease in the production of T4 by the follicles of the thyroid gland. Free T-4 is the unbound form of T4 in the body. Only about 0.03 – 0.05% of circulating T4 is in the free form. Free T-4 will be decreased in hypothyroidism and is associated with iodine deficiency.

13.30
g/dl

HEMOGLOBIN - FEMALE

Hemoglobin is the oxygen-carrying molecule in red blood cells. Low levels of hemoglobin are associated with anemia. Measuring hemoglobin is useful to determine the cause and type of anemia and for evaluating the efficacy of anemia treatment.

4.90
µg/dL

T4 - TOTAL

T-4 is the major hormone secreted by the thyroid gland. T-4 production and secretion from the thyroid gland is stimulated by the pituitary hormone TSH. Total T4 reflects the total amount of T4 present in the blood i.e. amount bound to thyroid binding globulin and free levels. Decreased total T-4 levels are associated with Hypothyroidism and/or a selenium deficiency.

135.00
IU/L

LDH

LDH represents a group of enzymes that are involved in carbohydrate metabolism. Decreased levels of LDH often correspond to hypoglycemia (especially reactive hypoglycemia), pancreatic function, and glucose metabolism.

83.00
µg/dL

IRON - SERUM

Serum iron reflects iron that is bound to serum proteins such as transferrin. Serum iron levels will begin to fall somewhere between the depletion of the iron stores and the development of anemia. Decreased iron levels are associated with iron deficiency anemia, hypochlorhydria and internal bleeding. The degree of iron deficiency is best appreciated with ferritin, TIBC and % transferrin saturation levels.

4

The Health Concerns report takes all the information on the Analytics and Assessment sections and focuses on the top areas of health concern that need the most support.

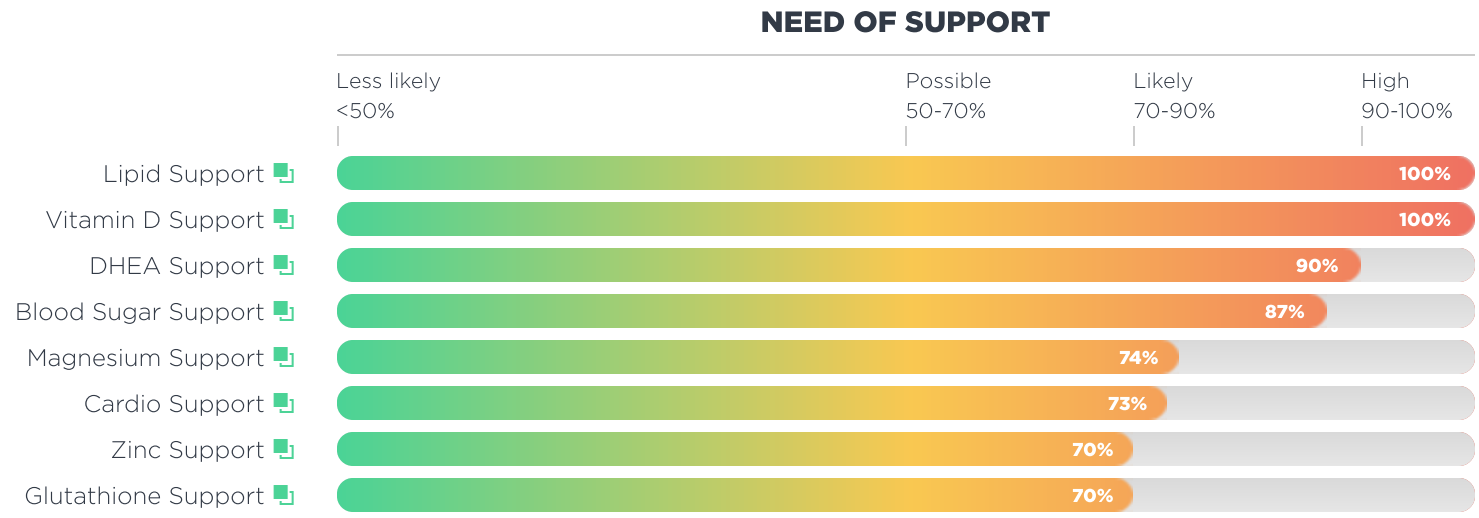
Health Concerns

46 Health Concerns
49 Recommended Further Testing

Health Concerns

The Health Concerns report takes all the information on the Functional Health Report and focuses on the health concerns that need the most support.

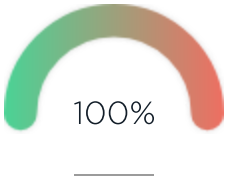
Each area of health concern that needs support is included in the section that follows so you can read a detailed description and individual explanation of the results shown in this report.



Health Concerns Details

This section contains an explanation of the results presented in the Health Concerns report including all the biomarkers considered in the algorithmic analysis and the rationale behind the interpretation.

LIPID SUPPORT

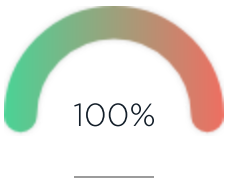


The results of this blood test indicate a tendency towards hyperlipidemia, which has been shown to increase the risk of developing atherosclerotic coronary artery disease. There is a need for cardiovascular support, especially support to help lower excessive blood fats.

Rationale

Cholesterol - Total ↑, Triglycerides ↑, LDL Cholesterol ↑, Cholesterol : HDL ↑, Triglyceride:HDL ↑, HDL Cholesterol ↓

VITAMIN D SUPPORT

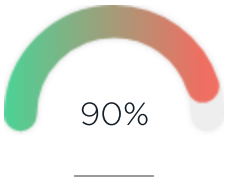


The results of this blood test indicate that this client's vitamin D levels might be lower than optimal and shows a need for vitamin D supplementation.

Rationale

Vitamin D (25-OH) ↓

DHEA SUPPORT

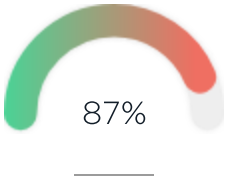


The results of this blood test indicate that this client's DHEA levels might be lower than optimal and shows a need for DHEA supplementation.

Rationale

DHEA-S - Female ↓

BLOOD SUGAR SUPPORT

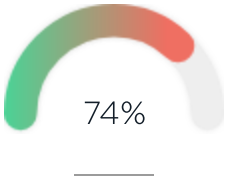


The results of this blood test indicate a tendency towards metabolic syndrome and a need for blood sugar support.

Rationale

Triglycerides ↑, Hemoglobin A1C ↑, Cholesterol - Total ↑, LDL Cholesterol ↑, HDL Cholesterol ↓, DHEA-S - Female ↓, Sex Hormone Binding Globulin - Female ↓

MAGNESIUM SUPPORT

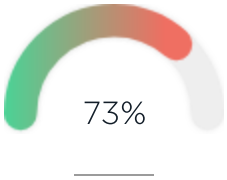


The results of this blood test indicate that this client's magnesium levels might be lower than optimal and shows a need for magnesium supplementation.

Rationale

Magnesium - Serum ↓

CARDIO SUPPORT

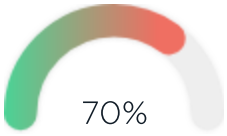


The results of this blood test indicate a higher than optimal cardiovascular risk for this client and shows a need for cardiovascular support.

Rationale

Triglyceride:HDL ↑, Cholesterol - Total ↑, Triglycerides ↑, LDL Cholesterol ↑, HDL Cholesterol ↓, Hs CRP - Female ↑, Vitamin D (25-OH) ↓

ZINC SUPPORT

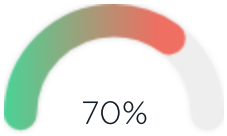


The results of this blood test indicate that this client's zinc levels might be lower than optimal and shows a need for zinc supplementation.*

Rationale

Alk Phos ↓

GLUTATHIONE SUPPORT



The results of this blood test indicate that this client's glutathione levels might be lower than optimal and may show a need for glutathione supplementation. XXXX

Rationale

GGT ↑

Further Testing

Advanced practitioner only report

Based on the results of the analysis of this blood test, the following areas may require further investigation. The suggestions for further testing are merely examples and do not attempt to provide you with an exhaustive list of further evaluation methods.

ADDITIONAL LIPID TESTING

The results of this blood test indicate that this client may be dealing with hyperlipidemia, which may be causing the biomarkers in the "Rationale" section to be out of the optimal range. If you haven't done so already, you may want to consider running additional lipid tests such as an NMR Lipoprofile test to get more information on the nature of hyperlipidemia and its associated cardiovascular disease risk. The NMR Lipoprofile test is an expanded lipid panel that directly measures LDL, HDL, VLDL, Total cholesterol, and triglyceride levels. The test also measures the following: LDL Particle Number (LDL-P), Small LDL Particle Number (Small LDL-P), LDL Size, HDL Particle Number (HDL-P), HDL Size, Large HDL-P, VLDL Size, and Large VLDL-P. Finally, the test measures Lipoprotein (a) (Lp(a)), high levels of which are a very strong risk factor for heart attacks and strokes.

Rationale

Cholesterol - Total ↑,Triglycerides ↑,LDL Cholesterol ↑,Cholesterol : HDL ↑,Triglyceride:HDL ↑,HDL Cholesterol ↓

5

Highly detailed and interpretive descriptions of the results presented in each of the assessment and analysis section reports.

Appendix

51 What To Look For
68 Disclaimer

What to Look For When Values Are Out of Range

Advanced professional only report

This report shows what you need to look for when the blood tests results are out of the optimal reference range. The report lists all the biomarkers that are above or below the optimal reference range and lists all the possible associated health concerns with a short description.

% TRANSFERRIN SATURATION ↓

(21.00 %)

Anemia- iron deficiency

If the total iron binding capacity is increased (>350 or 62.7 mmol/dL) along with a decreased total iron (< 85 or 15.22 mmol/dL), MCV (<82), MCH (<28), Serum ferritin (< 30), % transferrin saturation and/or HGB (<13.5 or 135 g/L in women and 14 or 140 in men) and/or HCT (<37 or 0.37 in women and 40 or 0.4 in men) , iron anemia is probable.

ALBUMIN ↓

(4.40 g/dL)

Hypochlorhydria

A decreased albumin level (<4.0 or 40g/L) is often associated with a decreased production of hydrochloric acid in the stomach (hypochlorhydria). Hypochlorhydria is associated with an increased globulin level (>2.8 or 28 g/L) and a normal or decreased total protein (<6.9 or 69 g/L) and/or albumin (<4.0 or 40g/L), an increased BUN (>16 or 5.71 mmol/L), a decreased or normal total protein (<6.9 or 69 g/L) and/or albumin (<4.0 or 40g/L) and/or decreased serum phosphorous (<3.0 or <0.97 mmol/L). Other values that may be reflective of a developing or chronic hypochlorhydria include increased or decreased gastrin (<50 or >100), an increased MCV (>90) and MCH (>31.9), a decreased or normal calcium (<9.5 or 2.38 mmol/L) and iron (<85 or 15.22 mmol/dL), a decreased chloride (<100), an increased anion gap (>12) and a decreased alkaline phosphatase (<70).

Liver dysfunction

Albumin is produced almost entirely by the liver and dysfunction in the liver will have a great impact on albumin production and serum albumin levels. Therefore, a decreased albumin level may be indicative of a liver dysfunction that prevents the synthesis and formation of protein. A decreased albumin (<4.0 or 40g/L) may be observed before any changes in liver enzymes are noted. Functionally oriented liver problems, such as detoxification issues, liver congestion, and conjugation problems are extremely common and should be evaluated based upon early prognostic indicators. The liver should always be viewed in the context of the hepato-biliary tree. Some of the key clinical indicators include:

1. Pain between shoulder blades
2. Stomach upset by greasy foods
3. If drinking alcohol, easily intoxicated
4. Headache over the eye
5. Sensitive to chemicals (perfume, cleaning solvents, insecticides, exhaust, etc.)
6. Hemorrhoids or varicose veins

Oxidative stress and excess Free Radical Activity

Free radical pathology, which increases the risk for developing a neoplasm, should be investigated if albumin levels are decreased (<4.0 or 40g/L) along with a decreased lymphocyte count (<20), a total cholesterol that is suddenly below its historical level, an increased total globulin (>2.8 or 28 g/L) an increased uric acid (>5.9 or > 351 mmol/dL) and low platelet levels (<150). Oxidative stress can cause an increased destruction of red blood cells; in these situations you will see an elevated bilirubin level (>1.2 or 20.5 mmol/dL).

Vitamin C need

Albumin will frequently be decreased (<4.0 or 40g/L) along a decreased HCT (<37 or 0.37 in women and 40 or 0.4 in men), HGB (<13.5 or 135 g/L in women and <14 or 140 in men), MCH (<28), MCHC (<32), and serum iron (< 85 or 15.22 mmol/dL). There will also be an increased MCV (>90), alkaline phosphatase (>100), and fibrinogen >300.

Pregnancy

A decreased albumin reading (<4.0 or 40g/L) is considered normal in pregnancy.

ALK PHOS ↓

(57.00 IU/L)

Zinc deficiency

Alkaline phosphatase is a zinc dependent enzyme. Decreased levels (<70) have been associated with zinc deficiency along with decreased WBC or RBC zinc levels and a low normal or decreased total WBC. Follow up a decreased alkaline phosphatase with a zinc taste test.

ANION GAP ↑

(13.40 mEq/L)

Thiamine (vitamin B1) need

An increased anion gap (>12) is associated with thiamine deficiency. If the anion gap is increased (>12) along with a decreased CO2 (<25), thiamine deficiency is possible. Hemoglobin and hematocrit levels may be normal or decreased (<37 or 0.37 in women and 40 or 0.4 in men). Due to thiamine's role in glycolysis, LDH levels may be decreased and glucose levels may be normal to increased (> 86 mg/dL or 4.77 mmol/L).

Metabolic Acidosis

Consider metabolic acidosis if the anion gap is increased (>12) along with a decreased CO2 (<25) and an increased chloride (>106).

CHOLESTEROL - TOTAL ↑

(203.00 mg/dL)

Increased cardiovascular disease risk

Increased cholesterol levels are associated with an increased risk of developing cardiovascular disease, atherosclerosis, coronary artery disease and stroke. Although this may be true, it is important to look at many of the other risks for this disease before jumping to conclusion that elevated cholesterol levels are the culprit. Other risks for atherosclerosis, cardiovascular disease and stroke include: smoking, elevated homocysteine levels, elevated fasting glucose, elevated fasting insulin, elevated Hs-CRP, elevated fibrinogen, B6, B12 and folate deficiency, ingestion of chlorine, blood sugar dysregulation, and hypertension. Consider an increased risk of cardiovascular disease with an increased triglyceride level (>80 or 0.90 mmol/L) in relation to an increased total cholesterol (>180 or 4.66 mmol/L) with an increased uric acid level (>5.9 or > 351 mmol/dL), a decreased HDL (< 45 or < 1.16 mmol/L) and an increased LDL (>100 or 2.59 mmol/L). Platelet levels may also be increased (>385). Homocysteine levels are frequently increased > 7.2, Hs-CRP are frequently >0.55 in men and >1.5 in women, and fibrinogen levels are frequently increased above 300.

Primary hypothyroidism

Primary hypothyroidism is **possible** if the total cholesterol is increased (>180 or 4.66 mmol/L) along with an increased triglyceride (>80 or >0.90 mmol/L) and TSH (>2.0).

Adrenal insufficiency

Consider adrenal insufficiency if the total cholesterol is elevated (>180 or 4.66 mmol/L) with an increased triglyceride level (>80 or >0.90 mmol/L) and a decreased serum potassium (<4.0). Confirm with salivary adrenal studies or other functional adrenal tests.

Secondary Hypothyroidism (Anterior pituitary dysfunction)

Increased cholesterol levels are associated with thyroid hypofunction that is secondary to an anterior pituitary dysfunction. If cholesterol levels are increased (>180 or 4.66 mmol/L) with a decreased TSH (<1.3), and an elevated serum triglyceride (>80 or >0.90 mmol/L), then consider that anterior pituitary hypofunction is **probable**.

Gallbladder dysfunction - Biliary stasis

Thickened bile is the hallmark of biliary stasis. It may occur if the total cholesterol is increased (>180 or 4.66 mmol/L). GGTP levels will frequently be increased (>30) but not necessarily. Bilirubin levels may also be elevated (>1.2 or 20.5 mmol/dL). There may also be an increased alkaline phosphatase (>100) and SGOT/AST and SGPT/ALT may be normal or increased (>30). However, many cases of biliary stasis will show normal lab values.

Metabolic Syndrome

If triglycerides are increased above the total cholesterol level with increased LDL cholesterol (>100 or 2.59 mmol/L), a decreased HDL (< 55 or < 1.42 mmol/L), an increased fasting blood glucose (> 86 mg/dL or 4.77 mmol/L) and an increased fasting insulin (>5), then metabolic syndrome and hyperinsulinemia is **probable**.

Fatty liver (early development) and Liver congestion

If total cholesterol (>180 or 4.66 mmol/L), LDL (>100 or 2.59 mmol/L) and triglyceride levels (>80 or >0.90 mmol/L) are increased, and HDL levels are decreased (< 55 or < 1.42 mmol/L), then fatty liver is **possible**. Liver congestion, due to the early development of fatty liver, should be considered if total cholesterol is above 180 or 4.66 mmol/L, triglycerides are increased (>80 or >0.90 mmol/L), and the SGPT/ALT is below 10.

Early stage of insulin resistance

Elevated cholesterol and other lipids often accompany the elevated glucose levels that are seen in insulin resistance.

Poor metabolism and utilization of fats

This is often the case in clients that are eating an optimal diet and have elevated cholesterol and triglyceride levels.

Early stage Diabetes

Elevated blood lipids are seen in clients with diabetes. The triglycerides are often higher than the total cholesterol level. Lipid metabolism problems are a hallmark of the early stages of diabetes.

CHOLESTEROL : HDL ↑

(4.10 Ratio)

A high cholesterol/HDL ratio is associated with an increased risk of cardiovascular disease.

CREATININE ↓

(0.72 mg/dL)

Muscle Atrophy/Nerve-Muscle Degeneration

Due to its connection to muscle metabolism serum creatinine will be decreased in cases of muscle atrophy or nerve-muscle degeneration.

DHEA-S - FEMALE ↓

(103.00 µg/dl)

Adrenal Insufficiency

Physiological stress raises cortisol output from the adrenal glands, which causes a decrease in DHEA-S levels in the serum and an increased cortisol to DHEA ratio, a hallmark sign for stage 2 and 3 adrenal insufficiency.

Hyperinsulinemia

High levels of insulin in the blood (hyperinsulinemia)increases cortisol and epinephrine output and decreases the DHEA levels in the serum. Low DHEA-S levels are found in early and late-stage insulin resistance and Diabetes.

Immune Insufficiency & Low sIgA

Cortisol and DHEA systemically modulate the production and turnover of specialized immune cells called immunocytes (also known as plasmacytes) that produce the secretory antibodies that protect us. The primary antibody of defense is secretory IgA (sIgA). When cortisol is elevated and DHEA is low, suppression of these mucosal immune cells occurs, compromising our first-line immune defense, resulting in low sIgA output.

Low levels of DHEA are associated with many common age-related conditions

Low levels of DHEA are associated with many common age-related conditions, including diseases of the nervous, cardiovascular, and immune systems such as metabolic syndrome, coronary artery disease, osteoporosis, mood disorders and sexual dysfunction.

EGFR AFRICAN AMERICAN ↑

(126.00 mL/min/1.73m2)

An elevated eGFR is not clinically significant

FERRITIN ↓

(21.00 ng/mL)

Anemia- iron deficiency

If ferritin is decreased (<30) along with decreased serum iron (< 85 or 15.22 mmol/dL) and % transferrin saturation, iron anemia is **probable**. This can be confirmed with a CBC, which will show a decreased RBC count (<3.9 in women or 4.2 in men), MCH (<28), MCV (<82), MCHC (<32), and/or HGB (<13.5 or 135 g/L in women and <14 or 140 in men) HCT (<37 or 0.37 in women and 40 or 0.4 in men) , and increased RDW (>13). If TIBC is increased (>350 or 62.7mmol/dL), microscopic bleeding is **possible**, and should be ruled out with reticulocyte count, urinalysis, and/or stool analysis. If serum phosphorous is decreased (<3.0 or <0.97 mmol/L) and serum globulin is increased (>2.8 or 28 g/L) or decreased (<2.4 or 24 g/L), iron anemia may be secondary to hypochlorhydria.

GGT ↑

(18.00 IU/L)

Dysfunction located outside the liver and inside the biliary tree

If the GGT is increased above the levels of the ALT and AST consider that the problem or area of involvement is possible outside the liver but inside the biliary tree (i.e. gall bladder, common bile duct, and pancreas)

Biliary obstruction

GGT levels rise when excretion is blocked by an obstruction somewhere in the biliary tree. Increased GGT along with an increased alkaline phosphatase is seen with biliary tree involvement. There will usually be significant increases in GGT (greater than 5 times higher than normal). If GGT (>30) and alkaline phosphatase (>100) are increased along with a normal or increased AST (>26) and ALT (>26), biliary obstruction with possible calculi is **probable**. Biliary obstruction with possible calculi becomes even more likely with an increased total bilirubin (>1.2 or 20.5 mmol/dL) and direct bilirubin (>0.2 or 3.4 mmol/dL).

Biliary stasis or insufficiency

Biliary stasis or insufficiency can often be caused by a mild obstruction in the extra-hepatic biliary duct. GGT levels will frequently be increased (>30) but not necessarily. Bilirubin levels will also be elevated (>1.2 or 20.5 mmol/dL) along with alkaline phosphatase (>100) and total cholesterol (>180 or 4.66 mmol/L). AST and ALT may be normal or increased (>26). Many cases of biliary stasis will show normal lab values. In these situations suspect biliary stasis or insufficiency if there are strong subjective indicators.

Liver cell damage

Another common cause of an increased GGT level is active or acute liver cell damage (i.e. chronic/acute hepatitis, active cirrhosis, infectious mononucleosis, hepatic necrosis, alcoholic hepatitis). There will usually be moderate increases in GGT 3-5 times higher than normal (200 - 300).

Excessive alcohol consumption, alcoholism

Increased GGT without an increase in the other liver enzymes suggests excessive alcohol consumption. If GGT is increased (>30) along with an increased serum triglyceride level (>80 or 0.90 mmol/L), excess alcohol use should be ruled out. Excessive alcohol use can seriously affect the liver function, therefore we may also see elevated AST (>26) and ALT levels (>26), but the GGT will usually be higher.

Acute or chronic pancreatitis

Suspect pancreatic pathology if the GGT is increased 5 times higher than the normal i.e. 320 U/L or higher.

Pancreatic insufficiency

Mild to moderate chronic pancreatitis can lead to a pancreatic insufficiency over time. In these cases GGT levels may be mild to moderately increased (>30). One of the most significant contributing factors to pancreatic insufficiency is an accompanying hypochlorhydria picture.

HDL CHOLESTEROL ↓

(49.00 mg/dL)

Hyperlipidemia and atherosclerosis

If HDL is less than 25% of the total cholesterol, then there is a strong clinical indication that hyperlipidemia is present. If the serum triglycerides (>80 or >0.90 mmol/L) and LDL (>100 or 2.59 mmol/L) are also increased, hyperlipidemia is likely present and atherosclerosis should be ruled-out.

Diets high in refined carbohydrates

The Standard American Diet (SAD), which is very high in refined carbohydrates, can contribute to decreased HDL levels (< 55 or < 1.42 mmol/L)

Metabolic Syndrome /hyperinsulinemia

If HDL levels are decreased (< 55 or < 1.42 mmol/L), triglycerides are increased above the total cholesterol level with increased LDL cholesterol (>100 or 2.59 mmol/L) and increased fasting blood glucose (> 86 mg/dL or 4.77 mmol/L), then metabolic syndrome and hyperinsulinemia are **probable**. Metabolic Syndrome can lead to adrenal dysregulation, so adrenal hyperfunctioning should be ruled out.

Oxidative stress

Unoxidized cholesterol, including HDL cholesterol, acts as an antioxidant and a free radical scavenger in the body, so decreased levels put the body at risk for developing oxidative stress, especially lipid peroxidation, and increases the chance of free radical induced diseases.

Heavy metal/Chemical overload

clients with historically low HDL and total cholesterol levels may be more prone to heavy metal and chemical toxins due to poor cell membrane integrity. This is irrespective of level of exposure, but related more to susceptibility of the individual patient. This may also leave clients at an increased risk for developing neoplasm.

Fatty liver (early development) and Liver congestion

If HDL levels are decreased (< 55 or < 1.42 mmol/L), and LDL (>100 or 2.59 mmol/L), triglyceride (>80 or >0.90 mmol/L) and total cholesterol levels (>180 or 4.66 mmol/L) are increased, then the early development of fatty liver is **possible**. Liver congestion, due to the fatty liver, should be considered if total cholesterol is above 220 or 5.69 mmol/L, triglycerides are increased (>80 or >0.90 mmol/L), and the SGPT/ALT is below 10. Fatty liver is caused by obesity, excessive alcohol consumption, prescription drugs (e.g. steroids), iron overload, solvent exposure, and rapid weight loss. Fatty changes to the liver tissue can impair the liver's detoxification ability. The degree of fatty liver changes is directly related to the amount of obesity. Fatty liver and liver congestion increases the risk of insulin resistance, hypertension, Metabolic Syndrome, and type II diabetes mellitus.

Hyperthyroidism

The increased metabolic activity found in hyperthyroidism can lead to decreased HDL levels. The body preferentially uses fatty acids, which are transported via lipoproteins, for energy in this heightened metabolic state.

Lack of exercise/ sedentary lifestyle

A sedentary lifestyle has been shown to decrease HDL levels. Increasing cardiovascular and resistance exercise is a very good way to elevate HDL levels.

HEMOGLOBIN - FEMALE ↓

(13.30 g/dl)

Anemia

Anemia is condition in which there is a decreased amount of hemoglobin, a decreased number of circulating RBCs, and a decrease in the hematocrit. Anemia is a symptom not a disease, and the cause of an anemia **must** be sought out: Deficiencies of iron and certain vitamins (B12, folate, B6), Blood loss, Increased destruction, decreased production or an anemia of chronic disease are all possible causes.

Anemia- Iron deficiency

This is the most prevalent anemia worldwide. The major causes are: Dietary inadequacies, Malabsorption, Increased iron loss and Increased iron requirements. If there is a decreased HGB (<13.5 or 135 g/L in women and <14 or 140 in men) and/or HCT (<37 or 0.37 in women and 40 or 0.4 in men), MCH (<28), MCV (<82), and MCHC (32), and a decreased serum iron (< 85 or 15.22 mmol/dL), ferritin (<30), % transferrin saturation, and an increased RDW (>13), then iron anemia is **probable**. If TIBC is increased (>350 or 62.7 mmol/dL), microscopic bleeding is **possible**, and should be ruled out with reticulocyte count, urinalysis, and/or stool analysis. Iron deficiency anemia may be secondary to hypochlorhydria if serum phosphorous is decreased (<3.0 or 0.97 mmol/L) and serum globulin is increased (>2.8 or 28 g/L) or decreased (<2.4 or 24 g/L).

Anemia- B6 deficiency

B6 anemia is not very common but possible given the deficiencies of B6 and other B complex vitamins. If there is a decreased HCT (<37 or 0.37 in women and 40 or 0.4 in men), HGB (<13.5 or 135 g/L in women and <14 or 140 in men), MCV (82), MCH (<28), MCHC (<32), and an increased to normal serum iron (>130 or 23.27 mmol/dL) and/or ferritin (>70), B6 anemia is **probable**. Look for a decreased SGOT/AST and/or SGPT/ALT and/or GGTP (<10).

Anemia- B12/folate deficiency

If there is a decreased HGB (<13.5 or 135 g/L in women and <14 or 140 in men) with a decreased HCT (<37 or 0.37 in women and 40 or 0.4 in men), RBC (<3.9 in women or 4.2 in men), and uric acid (<3.5 or 208 mmol/dL) and an increased MCH (> 31.9), MCV (>89.9), RDW (>13), LDH (>200) (especially the LDH-1 isoenzyme fraction,) and serum iron, then B12/folate anemia is **probable**. Often you will see decreased WBC (<5.0) and neutrophils (<40) and an increased LDH (>200) in megaloblastic anemia (i.e. anemia of large cells). Homocysteine may be >7.2. Check methylmalonic acid test. The presence of hypersegmented neutrophils (5 or more lobes in more than 5% of all neutrophils) has been reported to be more sensitive and reliable than an elevated MCV in detecting megaloblastic anemia and is not affected by coexisting iron deficiency. If MCV is >97 oral supplementation may be ineffective. B12 injections may be needed.

Copper anemia

If there is decreased HGB (<13.5 or 135 g/L in women and <14 or 140 in men) with a decreased HCT (<37 or 0.37 in women and 40 or 0.4 in men) and RBCs (<3.9 in women or 4.2 in men), and high MCV (>89.9), an increased to normal MCH (>31.9), and an increased or decreased hair copper, then copper anemia is possible. Check serum or WBC copper.

Vitamin C need

A decreased hemoglobin level is associated with vitamin C need. Albumin will frequently be decreased (<4.0 or 40g/L) along a decreased HCT (<37 or 0.37 in women and 40 or 0.4 in men), HGB (<13.5 or 135 g/L in women and <14 or 140 in men), MCH (<28), MCHC (<32), serum iron (< 85 or 15.22 mmol/dL). There will also be an increased MCV (>90), alkaline phosphatase (>100), fibrinogen (>300), and RBCs (>4.5 in women and >4.9 in men).

Digestive inflammation

A decreased HGB (<13.5 or 135 g/L in women and <14 or 140 in men) is by no means diagnostic for digestive inflammation (Crohn's disease, ileitis, colitis, gastritis, etc.) but one of a number of patterns seen with these disorders. Decreased total globulin (<2.4 or 24 g/L), decreased serum phosphorous (<3.0 or 0.97 mmol/L), increased BUN (>16 or 5.71 mmol/L), while serum gastrin generally will be increased, basophils (>1) and ESR increased.

Internal bleeding

An unrecognized internal bleed can cause a gradual decrease in hemoglobin due to the loss of blood. Internal bleeding is a serious condition and should be referred to a specialist qualified to diagnose and treat this condition.

HEMOGLOBIN A1C ↑

(5.40 %)

Diabetes mellitus

This test is a measurement of long-term blood glucose control and management. Values will be increased in clients with poorly controlled diabetes. It is important to remember that a patient who has recently made the changes to control their short-term blood glucose levels may still show elevated levels of glycosylated hemoglobin.

Insulin resistance (early stage) and glucose intolerance

An increased hemoglobin A1C above the optimal range is a sign that this individual is not controlling their long-term glucose levels very well. They are possibly in the insulin-resistant phase, also known as a pre-diabetic state. Research has shown that individuals progress through several stages of insulin resistance and glucose intolerance before becoming a classic type II diabetic. The stages include: Normal glucose tolerance hypoglycemia (often due to hyperinsulinemia) insulin insensitivity/resistance eventually overt type II diabetes.

HS CRP - FEMALE ↑

(2.60 mg/L)

Increased levels of CRP are associated with the following:

Abdominal obesity,
Peridontal disease,
High blood pressure
An increased risk of cardiovascular disease and stroke
Diabetes
Depression
Alzheimer's disease

IRON - SERUM ↓

(83.00 µg/dL)

Anemia- iron deficiency

This is the most prevalent anemia worldwide. The major causes are: Dietary inadequacies, Malabsorption, Increased iron loss, Increased iron requirements e.g. pregnancy. If there is a decreased serum iron (< 85 or 15.22 mmol/dL) with a decreased MCH (<28), MCV (<82), and MCHC (<32), ferritin (<33 in men and 10 in women), % transferrin saturation and/or HGB (<13.5 or 135 g/L in women and <14 or 140 in men) and/or HCT (<37 or 0.37 in women and 40 or 0.4 in men), and increased RDW (>13), then iron deficiency anemia is **probable**. If TIBC is increased (>350 or 62.7 mmol/dL), internal/microscopic bleeding is **possible**, and should be ruled out with reticulocyte count, urinalysis, and/or stool analysis. If serum phosphorous is decreased (<3.0 or <0.97 mmol/L) and serum globulin is increased (>2.8 or 28 g/L) or decreased (<2.4 or 24 g/L), iron anemia may be **secondary to hypochlorhydria.**

Hypochlorhydria

A low serum iron level is often associated with hypochlorhydria. Adequate levels of stomach acid are necessary for iron absorption. Hypochlorhydria is **possible** with a low serum iron (< 85 or 15.22 mmol/dL) and an increased (> 2.8 or 28 g/L) or decreased (<2.4 or 24 g/L) total globulin. Hypochlorhydria is **probable** if the BUN is also increased (>16 or 5.71 mmol/L) and/or serum phosphorous is decreased (<3.0 or <0.97 mmol/L).

Internal bleeding and internal microscopic bleeding

A decreased total serum iron (< 85 or 15.22 mmol/dL) may be due to internal bleeding. TIBC (>350 or 62.7 mmol/dL), transferrin, and reticulocyte count (>1) will be elevated. HGB (<13.5 or 135 g/L in women and <14 or 140 in men) and HCT (<37 or 0.37 in women and 40 or 0.4 in men) may be decreased or normal depending on the severity of the bleeding. Internal microscopic bleeding may present with a decreased TIBC (<250 or 44.8 mmol/dL) and an elevated reticulocyte count. If this pattern is present, internal bleeding must be ruled out with reticulocyte count, urinalysis, and/or stool analysis. **Refer to a doctor qualified to diagnose and treat internal bleeding.**

LDH ↓

(135.00 IU/L)

Reactive Hypoglycemia

A common finding in reactive hypoglycemia is a decreased fasting blood glucose along with a decreased LDH (<140). Hemoglobin A1C levels may also be reduced (<4.5% or 0.045). LDH is an important enzyme for pyruvate metabolism in glycolysis and is associated with pancreatic function and glucose metabolism.

LDL CHOLESTEROL ↑

(135.00 mg/dL)

Metabolic Syndrome /hyperinsulinemia

If LDL levels are increased (>100 or 2.59 mmol/L), triglycerides are increased (> 80 or 0.90 mmol/L) with decreased HDL cholesterol (< 55 or < 1.42 mmol/L), and increased fasting blood glucose (> 86 mg/dL or 4.77 mmol/L), then metabolic syndrome and hyperinsulinemia is **probable**. Metabolic Syndrome can lead to adrenal dysregulation, so adrenal hyperfunctioning should be ruled out.

Increased risk of atherosclerosis, cardiovascular risk and stroke

An increased LDL level is associated with the development of atherosclerosis and an increased risk for cardiovascular disease and stroke. If there is an increased triglyceride level (>80 or 0.90 mmol/L) in relation to total cholesterol (>180 or 4.66 mmol/L) with an increased uric acid level (>5.9 or > 351 mmol/dL), a decreased HDL (< 45 or < 1.16 mmol/L) and an increased LDL (>100 or 2.59 mmol/L), atherosclerosis is **probable**. Platelet levels may also be increased (>385). Homocysteine levels are frequently increased > 7.2 with atherosclerosis. Hs-CRP are frequently >0.55 in men and >1.5 in women, and fibrinogen levels are frequently increased above 300. Diabetes and thyroid hypofunction should also be considered with this pattern.

Hyperlipidemia

Increased LDL cholesterol and total cholesterol levels are associated with hyperlipidemia, which has been shown to indicate a potential risk of developing atherosclerotic coronary artery disease. If LDL is increased (>100 or 2.59 mmol/L) with an increased total cholesterol (>180 or 4.66 mmol/L) and an increased LDL/HDL ratio and an increased level of triglycerides (>80 or >0.90 mmol/L) with HDL less than 25% of the total cholesterol, hyperlipidemia is **probable**.

Oxidative stress

Increased LDL levels are associated with increasing free radical activity and oxidative stress. The peroxidation of LDL may promote the accumulation of cholesterol in the macrophages and smooth muscle cells, which can lead to atherosclerotic plaque formation.

Fatty liver (early development) and Liver congestion

If LDL levels are increased, along with increased triglyceride and total cholesterol levels, and HDL levels are decreased, the early development of fatty liver is possible. Liver congestion, due to the fatty liver, should be considered if total cholesterol is above 180 or 4.99 mmol/L, triglycerides are increased (>80 or >0.90 mmol/L), and the SGPT/ALT is below 10.

Diet- high in refined carbohydrates

The Standard American Diet (SAD), which is very high in refined carbohydrates, can contribute to increased LDL.

MAGNESIUM - SERUM ↓

(2.10 mg/dl)

Muscle Spasm

The laboratory results with muscle spasm are variable; however, decreased serum or RBC magnesium is a common finding.

MCH ↓

(26.70 pg)

Anemia- Iron deficiency

If there is a decreased MCH (<28), MCV (<82), MCHC (<32), and HCT (<37 or 0.37 in women and 40 or 0.4 in men) and/or HGB (<13.5 or 135 g/L in women and <14 or 140 in men), and a decreased serum iron (< 85 or 15.22 mmol/dL), ferritin (<30), % transferrin saturation, and increased (>13), then iron anemia is **probable**. If TIBC is increased (>350 or 62.7 mmol/dL), microscopic bleeding is possible, and should be ruled out with reticulocyte count, urinalysis, and/or stool analysis. Iron deficiency anemia may be secondary to hypochlorhydria if serum phosphorous is decreased (<3.0 or 0.97 mmol/L) and serum globulin is increased (>2.8 or 28 g/L) or decreased (<2.4 or 24 g/L).

Anemia- B6 deficiency

B6 anemia is not very common but possible given the deficiencies of B6 and other B complex vitamins. If there is a decreased MCV (<82), MCH (<28), MCHC (<32), HGB (<13.5 or 135 g/L in women and <14 or 140 in men), and/or HCT (<37 or 0.37 in women and 40 or 0.4 in men) and an increased or normal serum iron (>130 or 23.27 mmol/dL) and/or ferritin (>70), B6 anemia is **possible**. If there is a decreased MCV (<82), MCH (<28), with a decreased SGOT/AST, SGPT/ALT, or GGTP (<10), B6 anemia is **probable**.

Internal bleeding

An internal bleed can slowly deplete the body of iron due to the loss of red blood cells causing a decreased MCH. Internal bleeding is a serious condition and should be referred to a specialist qualified to diagnose and treat this condition.

Heavy metal body burden (e.g. lead, aluminum, cadmium and other toxic metals)

One of the significant effects of toxic metals is the impact they have on red blood cells especially hemoglobin. If there is a decreased MCH (<28) and MCHC (<32) with an increased Uric acid (>5.9 or > 351 mmol/dL), suspect a heavy metal body burden.

Vitamin C need

A decreased MCH level (<28) is associated with vitamin C need. Albumin will frequently be decreased (<4.0 or 40g/L)along a decreased HCT (<37 or 0.37 in women and 40 or 0.4 in men), HGB (<13.5 or 135 g/L in women and <14 or 140 in men), MCH (<28), MCHC (<32), serum iron (< 85 or 15.22 mmol/dL). There will also be an increased MCV (>90), alkaline phosphatase (>100), fibrinogen (>300), and RBCs (>4.5 in women and >4.9 in men).

MCHC ↓

(32.20 g/dL)

Vitamin C need

A decreased MCHC level is associated with vitamin C need. Albumin will frequently be decreased along a decreased HCT, HGB, MCH, serum iron. There will also be an increased MCV, alkaline phosphatase, fibrinogen.

Anemia- B6 deficiency

B6 anemia is not very common but possible given the deficiencies of B6 and other B complex vitamins. If there is a decreased MCV, MCH, MCHC, HGB, and/or HCT and an increased or normal serum iron and/or ferritin, B6 anemia is possible. If there is a decreased MCV, MCH, with a decreased SGOT/AST, SGPT/ALT or GGTP , B6 anemia is probable.

Anemia- Iron deficiency

This is the most prevalent anemia worldwide. The major causes are: Dietary inadequacies, Malabsorption, Increased iron loss,Increased iron requirements. If there is a decreased MCH , MCV , MCHC, and HCT and/or HGB, and a decreased serum iron, ferritin, % transferrin saturation, and increased RDW, then iron anemia is probable. If TIBC is increased, microscopic bleeding is possible, and should be ruled out with reticulocyte count, urinalysis, and/or stool analysis. Iron deficiency anemia may be secondary to hypochlorhydria if serum phosphorous is decreased and serum globulin is increasedor decreased.

Heavy metal body burden (e.g. lead, aluminum, cadmium, and other toxic metals)

One of the significant effects of toxic metals is the impact they have on red blood cells, especially hemoglobin. If there is a decreased MCH and MCHC with a decreased uric acid, suspect a heavy metal body burden. Confirm with a hair analysis or toxic element testing via blood or urine. The serum levels of the metals may also be increased, but in sub-acute conditions the serum levels may be normal. The hair and urinary/blood tests will frequently reflect the increase before it is seen outside the reference range in the serum.

NEUTROPHILS - % ↑

(64.20 %)

Childhood diseases (Measles, Mumps, Chicken-pox, Rubella, etc.)

The pattern seen in the Neutrophil count is as follows: Early in the infection Neutrophils - % will be >60% and the Neutrophils - Absolute will be increased >4.2. Levels will be decreased later with Neutrophils - Absolute <1.9 and Neutrophils - % and <40%.

Acute, localized, and general bacterial infections

The Neutrophil % result will be increased >60% and you'll see a Neutrophil absolute account >4.2. They are the primary cell type for fighting bacterial infections.

Acute viral infection

Neutrophils will tend to be normal

Chronic viral or bacterial infection

Frequently in a chronic infection, you'll see an increased Neutrophils - Absolute >4.2 along with an increased Neutrophils % >60% and a decreased total WBC count <5.0.

Inflammation

An increased Neutrophil - Absolute > 4.2 with a Neutrophil - % >60% will often be seen in acute and chronic inflammation (RA, SLE, Rheumatic fever and acute gout)

RBC - FEMALE ↑

(4.97 m/cumm)

Relative increases in RBC count

Whenever there is a decrease in blood volume, you will see a relative increase in the RBC count (>4.5 in women and >4.9 in men) usually with an increased HCT (>44 or 0.44 in women and >48 or 0.48 in men), and HGB (>14.5 or 145 in women or 15 or 150 in men). Common causes of a relative increase in RBC count include: Dehydration (decreased fluid intake, vomiting, diarrhea), Stress, Tobacco use, Overuse of diuretics

Dehydration

If the RBC count is increased suspect dehydration. Suspect a short-term (acute) dehydration if there is an increased HGB (>14.5 or 145 in women or 15 or 150 in men) and/or HCT (>44 or 0.44 in women and >48 or 0.48 in men) along with an increased RBC count (>4.5 in women and >4.9 in men). A relative increase in Sodium (>142) and Potassium (>4.5) can be noted as well. Suspect a long-term (chronic) dehydration if any of the above findings are accompanied by an increased Albumin (>5.0 or 50 g/L), increased BUN (>16 or 5.71 mmol/L), and/or serum Protein (>7.4 or 74 g/L).

Respiratory distress

In severe cases of asthma and emphysema you can expect an increased red cell count with decreased HGB (<13.5 or 135 g/L in women and <14 or 140 in men) and HCT (<37 or 0.37 in women and 40 or 0.4 in men) . The body responds to an inability to fully oxygenate the blood with an increase in red blood cells.

Vitamin C need

An increased RBC level is associated with vitamin C need. Albumin will frequently be decreased (<4.0 or 40g/L) along a decreased HCT (<37 or 0.37 in women and 40 or 0.4 in men), HGB (<13.5 or 135 g/L in women and <14 or 140 in men), MCH (<28), MCHC (<32), serum iron (< 85 or 15.22 mmol/dL). There will also be an increased MCV (>90), alkaline phosphatase (>100), and fibrinogen.

Polycythemia vera

A myeloproliferative disease that causes an increase in all blood cell lines. This disease will cause an increased HCT (>44 or 0.44 in women and >48 or 0.48 in men), and HGB (>14.5 or 145 in women or 15 or 150 in men), total bilirubin (>1.2 or 20.5 mmol/dL), uric acid (>5.9 or > 351 mmol/dL), basophils (>1), and ALP (>100). Further testing with blood coagulation studies is needed.

RDW ↑

(14.70 %)

Conditions Associated with an Increased RDW:

- Iron Deficiency
- Vitamin B12/folate Deficiency
- Pernicious Anemia
- Thalassemia
- Inflamamation

SEX HORMONE BINDING GLOBULIN - FEMALE ↓

(46.00 nmol/L)

Metabolic Syndrome

Low SHBG levels are associated with metabolic syndrome and the associated elements of that condition: Increased total cholesterol, Glucose, Triglycerides, LDL, fasting insulin and Uric acid, and decreased HDL and DHEA sulfate.

Cardiovascular Disease

Low SHBG levels are associated with an increased risk of cardiovascular disease and early calcification of blood vessels. Low SHBG levels are associated with increased levels of C-Reactive protein, elevated triglycerides and LDL levels.

T4 - FREE ↓

(0.90 ng/dL)

Primary hypothyroidism

In primary hypothyroidism the problem is located in the thyroid gland itself, which fails to produce thyroid hormone. Primary hypothyroidism is often preceded by autoimmune thyroid disease. If you have a client with suspected thyroid disease you should screen for thyroid antibodies. Primary hypothyroidism will present with TSH levels increased above 2.0 and you may see a normal or decreased total T4 level (<6.0 mcg/dL or 77 nmol/L) and/or T-3 (<90 ng/dl or 1.4nmol/L), free T4 (<1.0 ng/dl or 12.9 pmol/L), free T3 <3.0 ng/dl or 300 pg/dl), increased cholesterol (>180 or 4.66 mmol/L) and triglyceride level (>80 or 0.9 mmol/L). **Note**: Hypothyroidism can exist with an increased TSH and a normal Free T-4.

Secondary Hypothyroidism (Anterior Pituitary Hypofunction)

Thyroid hypofunction is often secondary to an anterior pituitary hypofunction (Secondary Hypothyroidism). Suspect anterior pituitary dysfunction if the subjective indications of thyroid hypofunction are present and the following pattern is seen: A decreased TSH, a normal T-3 uptake, a decreased or normal Total T4, a normal or decreased Free T4 and a normal or decreased Free T3. The likelihood increases if serum triglycerides are elevated and total cholesterol is increased. Additional elements that may be out of range with secondary hypothyrodism include an increased BUN above the "normal" range and an increased calcium. Anterior pituitary hypofunction is a common problem and one that is frequently mistaken for thyroid hypofunction (the subjective indications are usually identical and the client's axillary temperature will frequently be below normal).

Iodine deficiency

In an iodine deficieincy the total T4 will often be decreased (<6.0 µg/dl or 77 nmol/L), Decreased free T4 (<1.0 ng/dl or 12.9 nmol/L), The total T3 is often increased (> 168 ng/dl or 2.6 nmol/L) and a Normal or mildly elevated TSH (>2.0).

T4 - TOTAL ↓

(4.90 µg/dL)

Primary hypothyroidism

In primary hypothyroidism the problem is located in the thyroid gland itself, which fails to produce thyroid hormone. Primary hypothyroidism is often preceded by autoimmune thyroid disease. If you have a client with suspected thyroid disease you should screen for thyroid antibodies. Primary hypothyroidism will present with TSH levels increased above 2.0 and you may see a normal or decreased total T4 level (<6.0 mcg/dL or 77 nmol/L) and/or T-3 (<90 ng/dl or 1.4nmol/L), free T4 (<1.0 ng/dl or 12.9 pmol/L), free T3 <3.0 ng/dl or 300 pg/dl), increased cholesterol (>180 or 4.66 mmol/L) and triglyceride level (>80 or 0.9 mmol/L)

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Iodine deficiency

In an iodine deficiency the total T4 will often be decreased (<6.0 µg/dl or 77 nmol/L), Decreased free T4 (<1.0 ng/dl or 12.9 nmol/L), The total T3 is often increased (> 168 ng/dl or 2.6 nmol/L) and a Normal or mildly elevated TSH (>2.0).

TIBC ↑

(397.00 µg/dL)

Anemia- iron deficiency

If the total iron binding capacity is increased (>350 or 62.7 mmol/dL) along with a decreased total iron (< 85 or 15.22 mmol/dL), MCV (<82), MCH (<28), Serum ferritin (< 30), % transferrin saturation, and/or HGB (<13.5 or 135 g/L in women and <14 or 140 in men) and/or HCT (<37 or 0.37 in women and 40 or 0.4 in men) , iron anemia is **probable**.

Internal bleeding

With a high (>350 or 62.7 mmol/dL) TIBC there is always the possibility of microscopic bleeding, which should be ruled out with reticulocyte count, urinalysis, and/or stool analysis.

TRIGLYCERIDE:HDL ↑

(1.97 ratio)

Increased Risk of Cardiovascular Disease

An increased Triglyceride:HDL ratio is significantly associated with an increased risk for developing cardiovascular disease and is perhaps one of the best predictors of cardiac risk.

Increased Risk of Insulin Resistance and Type II Diabetes

An increased Triglyceride:HDL ratio is significantly associated with an increased risk for developing insulin resistance and Type II Diabetes.

TRIGLYCERIDES ↑

(97.00 mg/dL)

Metabolic Syndrome /hyperinsulinemia/early stage diabetes

If triglycerides are increased above the total cholesterol level with increased LDL cholesterol (>100 or 2.59 mmol/L), a decreased HDL (< 55 or < 1.42 mmol/L), and increased fasting blood glucose (> 86 mg/dL or 4.77 mmol/L), then metabolic syndrome and hyperinsulinemia is probable. Metabolic Syndrome can lead to adrenal dysregulation, so adrenal hyperfunctioning should be ruled out. Elevated triglycerides are seen in clients with diabetes. The triglycerides are often higher than the total cholesterol level. Lipid metabolism problems are a hallmark of the early stages of diabetes.

Fatty liver and Liver congestion

Increased triglycerides are associated with liver congestion and the early development of fatty liver (steatosis). If total cholesterol (>180 or 4.66 mmol/L), LDL (>100 or 2.59 mmol/L) and triglyceride levels (>80 or >0.90 mmol/L) are increased, and HDL levels are decreased (< 55 or < 1.42 mmol/L), then the early development of fatty liver is possible. Liver congestion, due to the fatty liver, should be considered if total cholesterol is above 180, triglycerides are increased (>80 or >0.90 mmol/L), and the SGPT/ALT is below 10.

Early stage of insulin resistance

Elevated triglycerides often accompany the elevated glucose levels that are seen in hyperinsulinism and insulin resistance.

Increased risk of cardiovascular disease, stroke and atherosclerosis

An increased triglyceride level is associated with the development of atherosclerosis and an increase in cardiovascular risk and stroke. Atherosclerosis is probable with an increased triglyceride level (>80 or 0.90 mmol/L) in relation to total cholesterol (>180 or 4.66 mmol/L) with an increased uric acid level (>5.9 or > 351 mmol/dL), a decreased HDL (< 45 or < 1.16 mmol/L) and an increased LDL (>100 or 2.59 mmol/L). Platelet levels may also be increased (>385). Homocysteine levels are frequently increased > 7.2 with atherosclerosis. Hs-CRP are frequently >0.55 in men and >1.5 in women, and fibrinogen levels are frequently increased above 300. Diabetes and thyroid hypofunction should also be considered with this pattern.

Poor metabolism and utilization of fats

This is often the case in clients that are eating an optimal diet and have elevated triglyceride and cholesterol levels.

Hypothyroidism

Primary hypothyroidism is possible if the triglycerides and cholesterol levels are increased along with an increased TSH >2.0. Consider Secondary Hypothyroidism if the TSH is decreased (<1.3).

Hyperlipoproteinemia

Lipoprotein disorders usually present with elevated total cholesterol and triglyceride levels. There are 6 distinctive sub-types of these disorders, which are mostly genetic in nature. The lipid electrophoresis is one of the bests methods for determining the various metabolic problems associated with hyperlipoproteinemia.

Alcoholism

Alcohol is extremely calorie dense. Regular alcohol consumption and alcoholism can lead to significantly elevated levels of triglycerides in the blood. This is often accompanied by a greatly increased GGTP.

VITAMIN D (25-OH) ↓

(22.00 ng/ml)

Vitamin D deficiency

A decreased Vitamin D is suggestive of a deficiency in vitamin D. Treatment should be initiated to raise the levels into the optimal range.

Vitamin D deficiency is associated with a number of diseases and disorders not limited to:

Diabetes Mellitus
Cancer
Hypertension
Cardiovascular disease
Autoimmune/inflammatory disorders
Vitamin D insufficiency is prevalent in clients with chronic musculoskeletal pain.

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