St. Luke's MediLocus

聖路加国際病院附属クリニック　聖路加メディローカス

Health Screening
How to Interpret the Results of Tests and Examinations

How to Interpret the Results of Tests and Examinations

I. Introduction

This document "How to Interpret the Results of Tests and Examinations" is to explain the meaning, purposes, limitations, and so on of each test performed in health screening at St. Luke's MediLocus. Please keep in mind that just because you have undergone the health screening itself, it will not make your health management perfect. We will be very happy if this booklet can help you better understand the results of these tests and examinations and you can make use of our health screening to improve your health.

For you to be proactive in taking control of your own health, the comments provided in the "St. Luke's MEdiLocus Health Screening Report" and the nutritional and lifestyle guidance during the interviews according to your specific circumstances will be important. Additionally, the results of imaging methods and cytopathology diagnoses, which are not discussed during the interview, will also be described in the "Report of the Results of Health Screening." With regard to these tests in particular, please check the report and read the explanations provided in this booklet. At MediLocus, we place great importance on accuracy of diagnosis, and more than one doctor reviews the results of tests and examinations. Therefore, if the explanation given by a doctor during the interview is not consistent with the information in the report, please treat the judgment in the report as the final result.

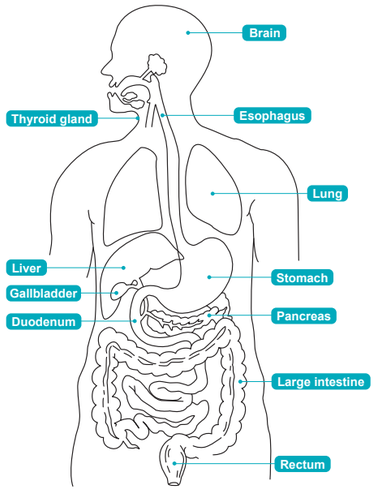
1. About Reference Range

"Reference range" are numerical values established based on the distribution of laboratory data for the vast majority of people who are considered healthy. For this reason, there is a chance that even people without health problems may deviate from a reference range in some cases. A deviation from a reference range does not necessarily mean that the person has a disease or disorder. Please keep in mind that there are differences among individuals and medical facilities.

2. Interpretations of the Results of Health Screening

Meaning of each diagnostic category (St. Luke's MediLocus)	
A	No abnormalities are found.
B	Although there are minor changes, there is no need to worry.
C12	Improving your lifestyle or a follow-up evaluation will be required. We recommend having a health checkup once a year.
C6	Improving your lifestyle or a follow-up evaluation will be required. We recommend a retest in 6 months.
C3	Improving your lifestyle or a follow-up evaluation will be required. We recommend a retest in 3 months.
D	You need to visit a medical institution.
E	Currently receiving treatment.

3. The Structure of the Body and Related Examinations



Brain ····· Brain MRI/MRA
Thyroid gland ···· TSH, FT4 thyroid ultrasound
Esophagus ····· Upper endscopy
Stomach ····· Upper endscopy
Duodenum ····· Upper endscopy
Lungs ····· Chest X-ray examinations, pulmonary function tests, chest CT scans
Heart ····· ECG, chest X-ray examinations, auscultation of heart sounds (medical examination), blood tests (NT-proBNP), cardiac ultlasound
Gallbladder, liver (pancreas) ··· Abdominal ultrasound, blood tests (bilirubin, AST [GOT], ALT [GPT], ALP, γ-GTP, hepatitis virus-related markers, etc.) MRCP
Kidneys, prostate gland ···· Abdominal ultrasound, urinalysis, blood tests (creatinine, PSA, etc.), pelvic MRI
Large intestine ·· Fecal occult blood tests (2-day method), colonoscopy
Uterus ····· Gynecological screening (Pap smear tests and gynecological examinations), pelvic MRI
Breasts ····· Breast X-rays, breast ultrasound
Eyes ····· Visual acuity, tonometory, funduscopy
Ears ····· Hearing tests
Bones ····· Bone density tests
Carotid artery ···· Carotid artery ultrasound
Aorta ····· PWV
Lower limb arteries ···· ABI

II. Explanation of Basic Medical Check-up

1 Consultation

We perform medical or physical examinations to supplement laboratory tests in line with the purposes of the health checkup. Test results with abnormal findings are indicated here.

2 Body Structure

We will measure your height, weight, body fat percentage, and abdominal circumference. Height is required when determining reference values for the pulmonary function tests.

BMI
(Reference range)
18.5 to 24.9

BMI is one of the indexes used to determine body size and shape (physical indexes). BMI is an acronym for **Body Mass Index**, which is used globally. Japanese people have been reported to be least likely to become ill when this index is 22.
The index is calculated by **the actual measured weight (kg) / height (m) / height (m)**.

According to the Japan Society for the Study of Obesity, the definition of obesity is a condition in which fat has excessively accumulated in the adipose tissue, and it is defined as a BMI (body weight kg/height m²) of 25 or greater.
Also, a BMI of 35 or greater is defined as severe obesity.

Normal weight

Normal weight is calculated by: **Height (m) × Height (m) × 22.**

Body fat percentage
(Reference range)
Male: Below 25%
Female: Below 30%

This is an estimate of the approximate percentage of fat in your weight. There are different types of instruments to measure the body fat percentage, and the reference values also vary. We use the bioimpedance method at MediLocus.

Measurement of abdominal circumference
(Reference range)
Male: Below 84.9
Female: Below 89.9

The accumulation of visceral fat is evaluated by measurement of the abdominal circumference at the level of your belly button. This is not the same as the so-called “waist size.” The body fat percentage is one of the important criteria for metabolic syndrome.
The abdominal circumference measurement on an abdominal CT scan described in section 11 of this chapter will be different from the actual measured value noted in this section (upright position). The actual measured value will be used for diagnosis of metabolic syndrome.

3 Blood pressure and pulse rate

Blood pressure

We perform a blood pressure measurement to check for hypertension. Systolic blood pressure represents the pressure when the heart contracts to the maximum, while diastolic blood pressure refers to the pressure when the heart relaxes to the maximum.
It is determined by the formula: **Blood pressure = Cardiac output × Peripheral vascular resistance**.
When peripheral vessels constrict, blood pressure rises, while dilatation of vessels reduces blood pressure. Furthermore, it has been reported that blood pressure is more likely to be elevated among obese people, because cardiac output (the volume of blood circulating throughout the body) increases.
Blood pressure fluctuates during the course of a day. It drops during the sleep state or physical and mental rest, and goes up during the physically active phase or stress. Therefore, measurement of blood pressure at home has been recommended in recent years. If you have complications or risk factors, such as diabetes, lipid metabolism disorders, reduced renal function, and so on, the reference values will be different, and you need more tight control of your blood pressure to prevent the progression of cardiovascular disorders. Please consult your doctor.

Pulse rate
(Reference range)
50 to 100 times per minute

This represents your pulse rate per minute.

4 ECG

ECG

A very low electric current is produced when the heart beats. ECG detects electrical activity through electrodes attached to the body surface and graphically represents them. In ECG, suspected cardiac arrhythmia, myocardial infarction, cardiac hypertrophy, and so on may be noted. Even if the ECG result is abnormal, it does not necessarily mean that the person has a disease or disorder. Nevertheless, if you have been advised to have a second test, please be sure to get tested. In addition, even if the ECG is normal, please talk to your physician or a doctor at MediLocus if you have any problems with your heart, such as angina, cardiac arrhythmia, and so on.

5 Heart Failure Screening

NT-proBNP
(Reference range)
125 pg/mL or lower

This blood test checks the function of the heart (the presence or absence of heart failure and its severity). Heart failure, hypertensive heart diseases, cardiomyopathy, heart valve diseases, myocardial infarction, and so on can elevate the level of NT-proBNP. It is also elevated with impaired renal function. If the level is high, a thorough examination will be required.

6 Respiratory Function

We examine the ventilatory capacity of the lungs. This test is important for studying the function of the respiratory system along with chest imaging.

Forced vital capacity
Percentage of vital capacity
(Reference range)
80% or higher

This refers to the maximum amount of air that a person can blow out after taking the deepest possible breath.

The percentage represents the ratio of actual forced vital capacity to the predicted vital capacity calculated based on the sex, age, and height of the individual.
This is calculated using the formula: **(Forced vital capacity / Predicted vital capacity) × 100**.
These values may be decreased in restrictive lung diseases (pulmonary fibrosis, interstitial lung disease, pleural disorders, and so on) or movement disorders of the diaphragm.

Forced expiratory volume in 1 second
Percentage of forced expiratory volume in 1 second
(Reference range)
70% or higher

This indicates forced expiratory volume in the first second after taking the deepest possible breath.
This refers to the ratio of forced expiratory volume in 1 second to forced vital capacity. The percentage is lower for people with diseases that can interfere with breathing out quickly.

This percentage tends to be lower in patients with obstructive lung diseases such as asthma and COPD (chronic obstructive pulmonary disease).

7 Chest X-ray

Chest X-ray

The main purpose of a chest X-ray is to detect problems or abnormalities of the respiratory or circulatory system. We can observe the lungs, airways, mediastinum, pleura, diaphragm, ribs, thorax, chest wall, heart, large blood vessels, foreign substances, postoperative changes, and so on. The examination provides a great deal of important information, so we cannot do without it.

8 Chest CT

Multi-slice CT scans of the chest

We can produce non-overlapping images of the normal structure by performing computed tomography of the chest. Detailed information about the location and characteristics of lesions can be obtained.
If abnormal findings are noted, we may recommend a second test or refer you to a specialist doctor.

9 Upper Endscopy

Upper Endscopy

This is what is called a gastrocamera examination. By directly observing the mucous membranes of the esophagus, stomach, and duodenum, we can make diagnoses of tumors (gastric cancer, esophagus cancer, and so on), ulcers (gastric ulcers, duodenal ulcers), inflammations (esophagitis, gastritis), polyps, and so on. A biopsy (taking a tissue sample from the lining of the area in question for a tissue examination) may be performed for a more detailed study as needed.

10 Abdominal ultrasound

Abdominal ultrasound

We apply ultrasound gel to the abdomen, place a probe (transducer) on the skin, and observe the liver, gallbladder, pancreas, spleen, kidneys, lymph nodes, and so on. The interior of the body will be examined using ultrasound. Although this method has advantages such as its relative simplicity and reduced impact on the patient's body, there is a disadvantage in that it is susceptible to the effects of body type and gas in the gastrointestinal tract. In particular, it is difficult to thoroughly study the pancreas, which is considered to be a limitation of ultrasound examinations. In addition, regarding the observation of organs of the lower abdomen (uterus, ovaries, prostate gland, and so on) in our health screenings, there are limitations to diagnosis with ultrasound. Therefore, we point out as suspected cases only when a major lesion or typical characteristics of diseases are found out.

11 Visceral Fat CT (abdominal CT scans)

Visceral fat refers to adipose tissue that accumulates in the greater omentum or mesentery surrounding the intra-abdominal organs, which are located within the body below the abdominal muscles. When the area of visceral fat is larger than 100 cm2, it is considered to be visceral fat obesity.

A large amount of visceral fat can trigger lifestyle-related diseases, which eventually may cause arteriosclerosis leading to myocardial infarction or cerebral infarction. Although visceral fat increases with excessive eating, physical inactivity, alcohol intake, and so on, it can be reduced by lifestyle improvement.

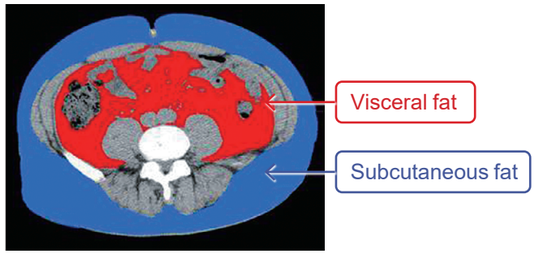
[Points to Note] The measurement of abdominal circumference shown in this CT result is different from that measured in the upright position.

Visceral fat area
(Reference range)
Below 99.9 cm^2

Images are taken at the position of your belly button using CT equipment (Image [1]), and the areas of visceral fat and subcutaneous fat are measured (Image [2]).

[1] A general CT image

[2] A CT image for measuring the visceral fat area



12 Fecal occult blood (2-day method)

Fecal occult blood (2-day method)
(Reference range)
(-)

This test checks stool samples for the presence or absence of blood from the gastrointestinal tract, and it is the main method of screening for colorectal cancer. If blood is found, the fecal occult blood test result will be positive. If either one of the two samples of stool submitted is positive, there is a possibility that the blood is caused by polyps or tumors in the large intestine, and an additional test to confirm the result will be needed. The result will be more reliable if two samples are used rather than a single one.

13 Complete Blood Count

We check the numbers of white blood cells, red blood cells, and so on in blood for the presence or absence of anemia or blood disorders.

Number of red blood cells

Oxygen taken up by the lungs is carried throughout the body's tissues by red blood cells.
Anemia occurs when the number of red blood cells is reduced for some reason, which can cause a variety of symptoms due to the reduced amount of oxygen transported through the whole body. On the other hand, too many red blood cells (erythrocytosis) can increase the viscosity of the blood, which may make blood vessels more likely to become clogged.

Hemoglobin
(Reference range)
Male: 13.7 to 16.8g /dL
Female: 11.6 to 14.8g /dL

Hemoglobin is a major component of red blood cells, and it is a protein that is used to carry oxygen. As hemoglobin is a red molecule that consists of a pigment containing iron called heme and globin protein, it is also referred to as the blood pigment. It is generally used as an index of anemia, and low values are associated with anemia.

Hematocrit
(Reference range)
Male: 40.7 to 50.1%
Female: 35.1 to 44.4%

The hematocrit is a measure of the proportion of blood that is composed of red blood cells, and it is expressed as a percentage. In general, the value changes in conjunction with the number of red blood cells and the amount of hemoglobin. It is decreased in anemia and may rise when polycythemia or dehydration occurs.

MCV (Mean Corpuscular Volume)
(Reference range)
Male: 84.5 to 100.2 fL
Female: 81.0 to 98.4 fL

The mean corpuscular volume is a measure of the average volume of a single red blood cell. It represents the size of the red blood cell and is used to distinguish between different types of anemia. This value is decreased in iron deficiency anemia, which is common in women.

MCH (Mean Corpuscular Hemoglobin Concentration)
(Reference range)
Male: 28.3 to 33.9 pg
Female: 26.5 to 32.9 pg

The mean corpuscular hemoglobin is the average amount of hemoglobin in a single red blood cell. In general, it shows variation similar to MCV.

MCHC (Mean Corpuscular Hemoglobin Concentration)
(Reference range)
Male: 32.4 to 35.2%
Female: 31.6 to 34.5%

MCHC is a measure of the concentration of hemoglobin in a given volume of red blood cells, and it is expressed as a percentage. It is an index that shows the level of hemoglobin concentration (high pigmentation and low pigmentation).

Platelets
(Reference range)
158 to 348 × 10^3/μL

Platelets are a cellular component of blood having the function of stopping bleeding by clumping together and clotting blood vessel injuries (hemostasis). If you have a very low platelet count, you may bleed more easily and take longer to stop bleeding than normal. On the other hand, if you have a very high platelet count, you may have a higher risk of thrombosis, in which blood clots in the vessels.

White blood cell count (WBC)
(Reference range)
3.3 to 8.6 × 10^3/μL

White blood cells mainly serve to protect the body from invasion by pathogens or foreign substances. They play a role in directly destroying pathogens and controlling the immune function.
As a general rule, the white blood cell count increases when you have been infected with bacteria or have an inflammation. It may also grow with cigarette smoking.
The white blood cell count may be increased or decreased in patients with bone marrow disorders. Furthermore, people with a low white blood cell count are more likely to become infected with viruses or bacteria.

Hemogram

White blood cells are divided into five groups (fractions), each with its own unique function: neutrophils, eosinophils, basophils, monocytes, and lymphocytes. In a hematological analysis, an increase and decrease for each differential is examined. An abnormal value in these test parameters does not necessarily mean that you have a disease or disorder. Evaluations are made by a combination of these results and other laboratory parameters in an integrated manner.

Blood type

Blood type is indicated in the ABO blood group system and the Rh blood group system. The blood type checked at birth may not be accurate in some cases. We encourage you to take this opportunity to recheck your blood type.

14 Glucose metabolism

Fasting blood sugar
(Reference range)
61-109 mg/dL

HbA1c (Hemoglobin A1c)
(Reference range by NGSP)
4.6-5.9%

This test checks for the presence or absence of diabetes or a tendency towards it. HbA1c represents your blood glucose condition during the past one to two months. It is known that diabetes accompanied by a rise in postprandial blood glucose levels and the state of hyperglycemia (tendency towards diabetes), which can be missed if tested with fasting blood glucose level alone, are common among Japanese people. In our health screenings, the combination of your fasting blood glucose level and HbA1c is comprehensively evaluated as your glucose metabolism.
Diabetes increases the risk of developing brain and cardiovascular disorders, which are among the top three causes of death, and with diabetes-specific complications, it becomes a major factor that can reduce the patient's life expectancy and QOL (quality of life). At MediLocus, we focus not only on early diagnosis, but also on preventing the development of diabetes as well as brain and cardiovascular disorders by early detection of potential patients with diabetes. Based on these test results, if you have been advised to have a glucose tolerance test, improve your lifestyle, see a specialist, and so on, it is important for you to take action.
[For Your Information] The Japan Diabetes Society announced that they would start to use the international standard value (NGSP value) when expressing HbA1c in routine clinical practice from April 1, 2012. The values based on the NGSP are generally about 0.4% higher than those (JDS values) that have been used in the past. The official conversion formula is as follows:
NGSP value (%) = 1.02 × JDS value (%) + 0.25%
NGSP: The National Glycohemoglobin Standardization Program
JDS: The Japan Diabetes Society

15 Lipid metabolism

These are tests concerning lipid metabolism. The measures described below indicate concentrations of lipids in the blood. If you have been encouraged to review or improve your lifestyle, please take action. In addition, if visiting a medical institution has been recommended, you should be sure to do so. Cholesterol and triglycerides are present in the blood, and when either level is abnormal, it is referred to as dyslipidemia (hyperlipidemia).

Total cholesterol
(Reference range)
130 to 219 mg/dL

This test is conducted to assess the sum total of cholesterol present in the blood. Cholesterol in the blood binds to specific proteins, and exists in the form of lipoproteins. There are several types of lipoproteins, but the two most important ones are called low-density lipoprotein (LDL) cholesterol and high-density lipoprotein (HDL) cholesterol.

LDL cholesterol
(Reference range)
60 to 139 mg/dL

HDL cholesterol
(Reference range)
40-99 mg/dL

NON-HDL cholesterol
(Reference range)
90 to 149 mg/dL

LDL cholesterol (known as "bad cholesterol") transports cholesterol to peripheral tissues, while HDL cholesterol (known as "good cholesterol") collects cholesterol in peripheral tissues and carries it to the liver. Therefore, having excessive LDL cholesterol will promote arteriosclerosis, whereas HDL cholesterol can work to improve arteriosclerosis.
Non-HDL cholesterol = [Total cholesterol] − [HDL cholesterol]
With regard to LDL cholesterol, because the accuracy of direct measurements that have been used in the past was not stable, non-HDL cholesterol has been adopted as a laboratory parameter by the Japan Society of Ningen Dock since 2018. This parameter is known to have the ability to predict ischemic heart diseases and cerebrovascular diseases at the same level as the parameter for LDL cholesterol, or even higher.

Triglycerides
(Reference range)
30 to 149 mg/dL

The triglyceride level is strongly affected by a meal before the test. If the level continues to be high, it may be stored as subcutaneous fat or visceral fat, and lead to obesity, metabolic syndrome, diabetes, and so on. These can become risk factors for brain and cardiovascular disorders, renal impairment, and so on. In addition, an excessive accumulation of triglycerides in the liver can result in fatty liver.
In recent years, it has been reported that non-alcoholic fatty liver in people who do not consume alcohol can progress to liver cirrhosis or liver cancer in some cases. In rare cases, a very high level of triglycerides can cause acute pancreatitis.

16 Uric acid

Uric acid
(Reference range)
3.0 to 7.0 mg/dL

An increase in blood uric acid levels (hyperuricemia) can trigger a gout attack. Furthermore, uric acid is also involved in the formation of stones in the urinary tract. Even if hyperuricemia does not cause an attack of gout, it can lead to hypertension or arteriosclerosis, which eventually may cause disorders of various organs such as the kidneys.

17 Enzymes

Amylase
(Reference range)
42 to 124 IU/L

This is a digestive enzyme present in pancreatic juice or saliva, and breaks down starch and so on. The level of amylase may be increased due to acute parotitis, sialolithiasis, intestinal obstruction, disorders of the ovaries, and so on, as well as disorders of the pancreas (when worsening of acute pancreatitis, chronic pancreatitis, and the like occurs).

CK (CPK: muscle damage enzyme)
(Reference range)
Male: 57 to 218 IU/L
Female: 46 to 171 IU/L

This is an enzyme that is present in great abundance in the muscles, and when an injury to a muscle occurs, it flows into the blood. The CK level is elevated in medical conditions that cause destruction of muscle tissues such as myocardial infarction, rhabdomyolysis, and so on, or inflammation of muscles, including myocarditis and polymyositis. A mild elevation of this enzyme may also be found with excessive muscle movements or cramps.

18 Liver function

There are a variety of factors responsible for impairment of liver function, so it is important to identify the cause for proper treatment. We will determine the cause (whether it is viral hepatitis, alcohol-induced, due to fatty liver, or other factors) by comprehensively taking into account the laboratory parameters listed below.

*If the involvement of alcohol intake or excessive eating has been pointed out, you should make it your first priority to improve your lifestyle.

Total bilirubin
(Reference range)
1.5 mg/dL or lower

The level of total bilirubin, which is the sum of direct and indirect bilirubin as described below, can be used as an index of jaundice. Total bilirubin can be increased due to diseases of the liver itself, disorders of the ducts where bile flows (bile ducts), a certain type of anemia, and so on.

Direct bilirubin
(Reference range)
0.4 mg/dL or lower

When the hemoglobin in old red blood cells is broken down, indirect bilirubin is produced, which binds to albumin and is released into the blood. It is then excreted in the bile after being converted to direct bilirubin in liver cells. Obstructive hepatobiliary diseases such as inflammatory diseases, including hepatitis, liver cancer, bile duct cancer, and pancreatic cancer, are accompanied by elevated levels of direct bilirubin, which can cause jaundice.

AST (GOT)
(Reference range)
32 U/L or lower

ALT (GPT)
(Reference range)
38 U/L or lower

These enzymes are primarily present in the liver. Elevated levels are associated with liver diseases. Although AST is also present in the heart and muscles, in cases where the levels of both AST and ALT are elevated, diseases of the liver are suspected. Assessments are made by comprehensively combining this result with hepatitis virus-related markers and other blood test findings.

γ-GTP (GPT)
(Reference range)
90 U/L or lower

This is an enzyme that is present in the liver, pancreas, blood, kidneys, and so on. Because most γ-GTP in the blood is derived from the liver, an increase of this enzyme in the blood indicates mainly liver or biliary diseases. The γ-GTP value can be increased when the flow of bile is impaired. In addition, liver diseases caused by alcohol or drugs are also accompanied by increased levels of γ-GTP.

ALP (IFCC) (Alkaline Phosphatase)
(Reference range)
38 to 113 U/L

This enzyme is present in the bones, kidneys, small intestine, bile ducts, liver, placenta, and so on. The ALP value can be increased due to impairment of the flow of bile, abnormalities of the hormones involved in pregnancy, the growth period, bone fracture, and bone metabolism, in addition to liver diseases.

LD (LDH) (Lactate Dehydrogenase)
(Reference range)
124-222 U/L

This enzyme is widely distributed in the liver, heart, kidneys, lungs, skeletal muscles, blood cells, and so on. When the cells of organs are impaired for some reason, your LDH levels can be elevated.

Total protein
(Reference range)
6.6 to 7.9 g/dL

The total protein value is used to assess general nutritional status and so on. It can also be helpful as a barometer of liver function or kidney disease conditions.

Albumin
(Reference range)
4.1-5.1 g/dL

Albumin is a protein that accounts for about 70% of the total serum proteins, and it is produced in the liver. This value is commonly used as an index to evaluate nutritional status. Low albumin values may result in swelling or ascites. In addition to liver cirrhosis and nephrotic syndrome, poor nutritional status due to malabsorption syndrome or chronic disease are associated with decreased albumin levels.

Cholinesterase
(Reference range)
185 to 431 U/L

This is a type of enzyme that is produced in the liver. This value is mainly used as an index to evaluate the protein synthesis capacity of the liver, and low values are associated with fulminant hepatitis, liver cirrhosis, and so on. In addition, malnutrition and malignant tumors can also decrease the level of cholinesterase. On the other hand, elevated levels of cholinesterase may be shown in patients with nephrotic syndrome, fatty liver, hyperthyroidism, diabetes, and so on.

19 Kidney Function

Urea nitrogen (BUN)
(Reference range)
20 mg/dL or lower

Creatinine
(Reference range)
Male: 1.07 mg/dl or lower
Female: 0.79 mg/dl or lower

These tests both check the function of the kidneys, but the level of serum creatinine is particularly important. Reference values vary depending on age, sex, body size and shape, and so on. When the function of the kidneys is reduced, the creatinine levels in the blood will increase. Like metabolic syndrome, reduced renal function has also drawn attention as a risk factor for brain and cardiovascular disorders, and early detection is critical.
Particularly if you are currently receiving treatment for diabetes or hypertension, your renal function tests are important, and you are advised to report the results to your doctor.

eGFR
(Reference range)
60 mL/min/1.73 m^2 or higher

This is a simple index of renal function calculated based on age and serum creatinine. It is used as a tool for screening chronic kidney diseases.

20 Electrolytes

Sodium (Na)
(Reference range)
138 to 145 mEq/L

Potassium (K)
(Reference range)
3.6 to 4.6 mEq/L

Chloride (Cl)
(Reference range)
101 to 108 mEq/L

Calcium (Ca)
(Reference range)
8.8 to 10.1 mg/dL

Inorganic phosphorus (P)
(Reference range)
2.7 to 4.6 mg/dL

The levels of electrolytes such as sodium, potassium, and so on in the blood can be determined by these tests. Normally, these electrolytes are constantly maintained at a certain level by the endocrine system, kidneys, and other overall body functions based on a well-balanced diet and lifestyle. After finding abnormal results in these tests, endocrine diseases or kidney diseases can also be revealed. Abnormalities of parathyroid function, in particular, can sometimes be found by these laboratory measurements. However, an abnormal result does not necessarily mean that you have a disease or disorder. The result is comprehensively evaluated in combination with other laboratory findings.

21 Thyroid function

TSH
(Thyroid Stimulating Hormone)
(Reference range)
0.45 to 4.95μIU/mL

FT4
(Free Thyroid Hormone)
(Reference range)
1.00 to 1.64ng/dL

In these tests, we assess the function of the thyroid gland. Thyroid hormones are essential for the maintenance of metabolism, biological activity, and mental activity, but symptoms due to thyroid function abnormalities are often missed. At MediLocus, we perform measurements of two types of hormones, TSH and FT4, for early detection of thyroid function problems.
TSH is a hormone secreted by the pituitary gland in the brain. It controls the secretion of thyroid hormones, and if there is a thyroid gland abnormality, the TSH value changes before the thyroid hormones change. FT4 is one of the thyroid hormones.

22 Urinalysis

These are important tests that allow us to examine your kidneys, bladder, and so on. Urine is produced in the kidneys, plays a role in eliminating waste products from the body, and regulates the body's internal condition.

Specific gravity
(Reference range)
1.007 to 1.025

This measures the concentration of urine. The specific gravity increases as substances are added to urine. Low specific gravity is shown in patients with chronic nephritis or diabetes insipidus, but the value can also fluctuate with changes in the amount of fluid intake or sweating in healthy people.

pH
(Reference range)
5.0 to 7.5

A urine pH level test analyzes the acidity or alkalinity of a urine sample. Although urine is normally mildly acidic, it may become alkaline due to some effects of food or drugs. We cannot identify diseases or disorders with the urine pH level alone, and assessments are made by comprehensively combining the result with other laboratory findings.

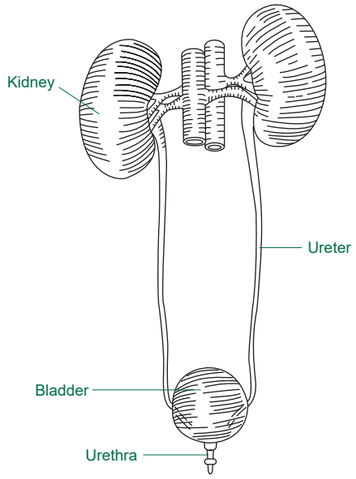
Protein
(Reference range)
(-)

Not only patients with diseases of the renal/urinary system, but also those with systemic diseases may test positive (+) for urinary proteins. However, a positive test is caused by the kidneys in many cases. Comprehensive evaluations are made while taking into account the presence or absence of risk factors such as kidney function impairment, hypertension, diabetes, and so on, as well as previous history of these factors. In addition, your urinary protein test may be temporarily positive if you have a fever or have engaged in vigorous physical activity.

Glucose
(Reference range)
(-)

Currently, we perform screening for diabetes with the blood glucose level and HbA1c, regardless of the result of the urine glucose test (positive or negative) (see "Section 14: Glucose metabolism"). Please note that a non-diabetic condition called renal glycosuria can also give a positive test (+) for urine glucose.

Structure of the urinary tract (kidneys, ureter, bladder)



Ketones
(Reference range)
(-)

When carbohydrate metabolism is impaired or the intake of carbohydrates is insufficient, the body switches the source of energy from carbohydrates to lipids. As a result, lipid metabolism is accelerated, and lipids are converted into ketones. Some of the ketones are excreted in the urine from the blood via the kidneys.
In patients with diabetes, sometimes carbohydrates cannot be properly used as a source of energy due to a lack of insulin, decreased insulin sensitivity in each tissue, and so on, and lipids may be used instead. In such cases, ketones may be present in the urine.
Furthermore, lipids may become the source of energy and ketones may be excreted in the urine when the body cannot take up and absorb enough carbohydrates due to a restricted diet, diarrhea, vomiting, and so on, as well as when the energy supplied from carbohydrates alone is not sufficient after vigorous physical activity and so on.

Urobilinogen
(Reference range)
1.0E U/dL or lower

Urobilinogen is produced when bilirubin (a bile pigment) is reduced in the intestinal tract. Some of it is excreted in the urine even in healthy people (±). A large amount of urobilinogen is excreted when the liver is impaired, and biliary diseases may give a negative test (−).

Occult blood
(Reference range)
(-)

This test examines whether or not hemoglobin in red blood cells is present in urine. Diseases of the renal/urinary system can give a positive test (+). If the test is positive, comprehensive evaluations are made by a combination of this result and other findings, such as blood tests, ultrasound, and so on.

Urinary sediment

In this test, urine is centrifuged and the sediment cellular components are observed through a microscope. An increase in the number of red blood cells in your urine suggests the possibility that you have an inflammation, including nephritis, tumors, calculus, and so on, while a high number of white blood cells mainly indicates bacterial infection in the renal/urinary system, inflammation, and so on. The determination of sediments in the urine will be made by comprehensively combining this with other laboratory findings.

23 Infectious Reactant

CRP
(C-Reactive Protein)
(Reference range)
0.30 mg/dL or lower

If you have infectious or non-infectious inflammation in the body, your CRP level can be elevated in the blood. When the inflammation subsides, the level will drop. It can serve as an index in observing the course of the inflammation.

24 Rheumatoid factor

RF
(Rheumatoid Factor)
(Reference range)
Negative
0-15 IU/mL

Rheumatoid arthritis, other collagen diseases, liver diseases, tumors, tuberculosis, and so on can give a positive test (+) for RF. Even healthy people test positive in many cases, so a positive test does not necessarily mean that you have rheumatoid arthritis. The result needs to be comprehensively assessed in combination with subjective symptoms (morning hand stiffness and joint pain), joint findings, and so on.

25 Infectious Disease

Hepatitis virus tests

There are various types of hepatitis, including viral hepatitis, autoimmune hepatitis, drug-induced hepatitis, and alcoholic hepatitis. Among the viruses that cause hepatitis, the majority of those that lead to liver cancer are types B and C. The disease progresses from chronic hepatitis, which is asymptomatic, to cirrhosis and then to liver cancer. Because early detection also makes it possible to protect against progression to liver cancer, the detection of hepatitis viruses while there are no symptoms is one of the important roles of a health checkup. If you are advised to undergo a detailed examination due to the involvement of this virus, please be sure to visit a doctor.

What is a hepatitis virus carrier?
This is a state in which a hepatitis virus is present in the body. In many cases, it has been reported that chronic inflammation of the liver is observed.

HCV antibodies
(Reference)
(-)

If you have a positive HCV antibody test (+), it means that you have been exposed to and infected with hepatitis C at some point in the past, or you are infected with it now. It is necessary to examine whether or not the hepatitis C virus is present in your body at present if the test turns out to be positive (+).

HBs antigen
(Reference)
(-)

If you tested positive (+), you are likely to have the hepatitis B virus at present. You will be required to have a more detailed examination for the hepatitis B virus.

HBs antibodies
(Reference)
(-)

If you have a positive test (+), it indicates that you have been infected with hepatitis B at some point in the past, but that you are immune to the virus now. In addition, people who have been vaccinated against hepatitis B also test positive (+). There is nothing to worry about if you have a positive test (+).

Syphilis tests

These tests check for the presence or absence of syphilis infection. Syphilis is a chronic systemic disease caused by infection with the pathogen *Treponema pallidum*. There are two methods of testing: RPR and TPLA. These are serological tests, in which RPR uses cardiolipin, a lipid antigen extracted from bovine hearts, while TPLA uses *Treponema pallidum* antigens. Because it uses a bovine lipid antigen, RPR may give positive results (biological false positives) for diseases other than syphilis.
It may take one to two months for the syphilis reaction to become positive after infection with *Treponema pallidum*, and the RPR may become negative due to treatment. A comprehensive judgment is necessary for evaluating the test results, so please consult your doctor.

RPR
(Reference)
(-)

TPLA
(Reference)
(-)

These tests examine whether or not you are infected with syphilis. Syphilis is a chronic systemic disease that occurs by being infected with a pathogen called *Treponema pallidum*.
Assessments are made by a combination of RPR and TPLA assays. If you tested negative (−) for both of them, it is considered that you are unlikely to be infected with syphilis, whereas positive tests (+) for both suggest that you are infected with syphilis. Most cases of a combination of RPR (+) and TPLA (−) results are biological false positive reactions, which means that the RPR assay turns out to be positive even when you do not actually have syphilis.

26 Tumor markers

CA 19-9
(Reference range)
37 U/mL or lower

Among cancers of the digestive system, elevated levels of CA 19-9 are associated with cancers of the pancreas, gallbladder, or bile duct. Other cancers of the digestive system (gastric cancer, colorectal cancer, and so on), lung cancer, breast cancer, and ovarian cancer may also increase the value of CA 19-9. A mild elevation of CA 19-9 may be shown in benign disorders such as cholelithiasis and chronic pancreatitis. Thus, if an abnormal value is indicated, the result is comprehensively assessed in combination with other laboratory parameters. As in the case of the CEA test described below, this method is not suitable for the detection of cancers in an early stage.

CEA
(Reference range)
5.0 ng/mL or lower

This is a type of protein that is present in the fetal intestinal tract. It is also produced in tissues where cancer cells are growing, and it is known as a tumor marker for gastric cancer and colorectal cancer. Liver cancer, biliary cancer, pancreatic cancer, and so on can also elevate the CEA level. Other than the digestive system, cancers of the thyroid gland, lungs, mammary glands, uterus, and ovaries may lead to elevated levels. In addition, advanced age and cigarette smoking are also associated with increased CEA values.
As noted above, there are various factors that can result in abnormal CEA values, but not all advanced cancers can give an abnormal value. Furthermore, this test is not suitable for the detection of cancers in an early stage. In addition, even if an abnormal value is found, this does not necessarily mean that cancer is present. Therefore, the result is comprehensively evaluated in combination with other laboratory parameters.

PSA
(Prostate-Specific Antigen)
(Reference range)
4.0 ng/mL or lower
*For men only

This is effective for the early detection of prostate cancer. However, increased levels of PSA may also be shown in patients with inflammation of the prostate and so on.
Please see a specialist if a second test (including a retest) has been recommended.
If you are taking medicine involving a hormone, the value may change, so you need to tell your doctor about the result.

CA 125
(Reference range)
35 U/mL or lower
*For women only

It is known that elevated levels of CA 125 are found in about 80% of patients with ovarian cancer. The level of CA 125 may also be increased due to benign endometriosis affected by menstruation or pregnancy. On the other hand, ovarian cancer or endometriosis may not raise CA 125 levels in some cases. Therefore, if an abnormal value is shown, the result is comprehensively assessed in combination with other laboratory parameters.

27 Visual acuity, Tonometry

Visual acuity
(Reference range)
Uncorrected or corrected vision of at least 0.7

In addition to refractive errors such as nearsightedness and astigmatism, eye diseases such as cataracts and glaucoma can also lead to a decrease in visual acuity.
Measurements of uncorrected or best-corrected visual acuity (with the use of eyeglasses or contact lenses) are displayed.

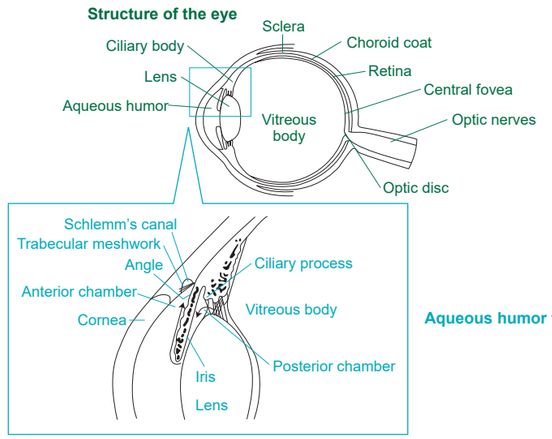
Tonometry
(Reference range)
7 to 20 mmHg

Tonometry is measured with an air-puff tonometer, which blows a small puff of air at the cornea. If your intraocular pressure is 21 mmHg or higher, there is a possibility that you have glaucoma. If you have been recommended to have a second test, you must see an ophthalmologist.

[For Your Information] There is a medical condition called normal tension glaucoma that has similar symptoms to glaucoma even though the tonometry remains normal. Tunnel vision can occur due to optic neuropathy. The condition is characterized by changes occurring in the area of the optic disc, so the funduscopy described below is helpful in early detection of the disease.

Structure of the eye
After the age of 40, it seems that many people start to experience blurred vision or a decrease in visual acuity and become conscious of the effects of aging. However, it is also possible that a loss of visual acuity is caused by a serious eye disease. If you have any unusual symptoms, you should consult an ophthalmologist.

Aqueous humor flow
In the interior of the eyeball, there is a flow of liquid called the aqueous humor that transports nutrients to the cornea and lens. The intraocular pressure can be maintained at a certain level with this aqueous humor. When the balance between the amount of production and flow of the aqueous humor is disrupted, problems with tonometry are likely to occur.



28 Funduscopy

Funduscopy
(Reference)
Hypertensive changes
H0
Atherosclerotic changes
S0

We observe the retina, optic nerves, blood vessels, and so on that are present at the back of the eye (the funduscopy). As the blood vessels in the funduscopy are the only ones that can be seen from outside the body, hypertensive changes in arteries and atherosclerotic changes can be assessed. The severity of hypertensive changes and atherosclerotic changes are each categorized into five stages: from H0 to H4 for hypertensive changes, and from S0 to S4 for atherosclerotic changes. In addition, this test can check for the presence or absence of diabetic changes, and it is a useful screening tool for a large number of ophthalmologic diseases such as retinal diseases, including bleeding in the funduscopy and macular degeneration, optic neuropathy such as normal tension glaucoma, cataracts, and so on.
Nevertheless, our evaluations in our health screenings are based on photos of the ocular fundus, so there are limitations. If you have been advised to have a thorough examination, please see an ophthalmologist.
If the retina cannot be properly observed because of a lack of light due to cataracts, turbidity in the vitreous body, insufficient opening of the pupil, and so on, your test is indicated as undeterminable. If your result is undeterminable, you are recommended to consult an ophthalmologist.

29 Hearing

Hearing
(Reference range)
1000 Hz: Normal
(30 dB or lower)
4000 Hz: Normal
(30 dB or lower)

Your hearing is tested with a low tone of 1000 Hz (hertz) and a high tone of 4000 Hz. Normal hearing is considered to be 30 dB or lower for both the high and low tones. If your hearing test results are abnormal, it means that a decrease in hearing is noted, and it is recommended for you to visit an otolaryngologist.
In general, the detection of high-pitched sounds becomes more difficult with advancing age. However, if you have experienced a sharp drop in hearing or it interferes with your daily life, please see an otolaryngologist.

30 Bone density

Bone density
YAM (Young Adult Mean) Comparison range
(Reference range)
80% or higher
(When the mean range of young adults is set as 100%)

Bone density literally refers to the density of bones (the amounts of minerals, such as calcium and magnesium), and it normally decreases with advancing age, and also with reduced secretion of the female hormone that maintains the bones after menopause. If your bone density has reduced to a significant degree, you may be at risk for developing a condition called osteoporosis, which leaves your bones very vulnerable to fracture. Reduction in bone density is also associated with the use of synthetic adrenocortical steroids, disorders of the thyroid or parathyroid gland, and so on.
The level of bone density is expressed as the comparison ratio (%) of the actual measurement of bone density to the mean value of young adults. Bone density of 80% or higher is determined as normal, 71 to 79% as low bone mass, and 70% or lower as osteoporosis.

31 Gynecological examination (*For women only)

Pap smear tests

A Pap smear is performed to examine for the presence or absence of cervical dysplasia or cancer. We collect cells from the cervix using a brush (or cotton swabs). The results of Pap tests are evaluated in the Bethesda system. The conventional classification system (the old system) is also shown.
The category NILM is determined to indicate no abnormalities. In the case of ASC-US, the result of the HPV (human papilloma virus) test described below will be incorporated in deciding on a course of action. A thorough examination will be required for the categories ASC-H, LSIL, HSIL, SCC, AGC, AIS, adenocarcinoma, and other malignant neoplasms.

Pap smear tests

Bethesda system (new system)	Possible lesions
NILM	Normal, non-neoplastic, inflammation
ASC-US (Atypical Squamous Cells of Undetermined Significance)	Suggestive of a low-grade squamous intraepithelial lesion
ASC-H	Suggestive of a high-grade squamous intraepithelial lesion
LSIL	Mild dysplasia
HSIL	Moderate dysplasia, Severe dysplasia, Carcinoma in-situ
SCC	Squamous cell carcinoma
AGC (Atypical Glandular Cells)	Suggestive of atypical glandular cells or adenocarcinoma
AIS	Adenocarcinoma in situ
Adenocarcinoma	Adenocarcinoma
Other malig.	Other malignant neoplasms

HPV
(Human Papilloma Virus)

(Reference range)
(-)

The test examines whether or not you are infected with human papilloma virus, which can be a cause of cervical cancer.
Results of HPV testing
Positive (+): This means that it is very likely that HPV is present.
Negative (-): This indicates that you are not infected with HPV, or that you have been infected in the past but have now recovered or the virus has been suppressed below the detection sensitivity.
Interpretation of the Pap smear test for people who have had an HPV test
Interpretation of the Pap smear test combined with HPV test results
- If both the Pap smear test and the HPV test are negative: The possibility of cancer or precancerous lesions (dysplasia) is considered to be very low. Please continue to receive regular checkups.
- If both the Pap smear test and HPV test are positive: A detailed examination is necessary, so please visit a medical institution.
- If only one of the Pap smear test or HPV test is positive: How this will be handled will differ depending on your medical history. Please refer to the doctor's comments.

Gynecological examination

In gynecological examination, we perform internal examinations, including a visual inspection, palpation, and speculum examination on an internal examination table as well as transvaginal ultrasound to observe the uterus and ovaries through the vagina using a long, thin ultrasound probe (transducer). The examinations can also be conducted during menstruation. First, the condition of the vulva, vagina, and vaginal portion of the cervix are checked by a visual inspection and speculum examination. In palpation, a bimanual examination of the vagina and abdomen is performed. A Pap smear test is conducted at the same time as performing the speculum examination. Transvaginal ultrasound is an excellent examination for the diagnosis of uterine fibroids and ovarian tumors, but intestinal gas may make it difficult to observe them in some cases.

32 Breast examination (*For women only)

At MediLocus, given the current situation in which the number of cases of breast cancer among Japanese women is growing, we perform screening for cancer with imaging techniques according to the guidelines established by the Ministry of Health, Labour and Welfare.

Breast X-ray examinations
(Mammography)

In mammography, a breast is pressed from top to bottom and from side to side, and X-ray images of the mammary glands are taken. Since the breast is pulled and the mammary glands are compressed firmly in order to take images of the entire mammary tissue, pinching pain may be felt in the breast. Minimal changes that may not be felt as lumps by palpation can be detected by mammography.

Breast ultrasound

This is an imaging procedure that uses ultrasound to observe the mammary glands. As in the case of breast X-rays, minimal changes that may not be felt as lumps by palpation can be detected by breast ultrasound. This is a suitable testing method for breasts with dense mammary glands (breasts with abundant mammary tissues and connective tissues compared to adipose tissues).
In the report of the results of health checkups, assessment categories are also included in addition to the explanation of results. With regard to the findings obtained in mammography, assessments for tumor masses, calcification, other observations, and so on are made by category. A thorough examination will be required for findings of Category 3 or higher. Similarly, we categorize mass-forming lesions and non-mass-forming lesions that are noted in the data defined on breast ultrasound. Findings of Category 3 or higher will also require a more detailed examination.
In our health screenings, we make a comprehensive evaluation based on both breast X-ray findings and breast ultrasound findings.

Assessment Categories for Mammography and Ultrasound

Catagory 1	No abnormal findings
Catagory 2	Benign
Catagory 3	Difficult to determine whether benign or malignant
Catagory 4	Suggestive of malignancy
Catagory 5	Malignancy

III. Explanations of Cancer Screening Test Parameters

1 Sputum cytology

Sputum cytology

Sputum is the mucosal secretion of the trachea, bronchi, and laryngopharynx, which contains cells that have peeled off and fallen from the airways. In this cytological study, we use a microscope to examine whether atypical or cancer cells are present in the sputum. This is a useful screening tool for lung cancer in the hilar area (the trachea or thick bronchi). If it is determined to be Class III or higher in the classification system, a retest or thorough examination is recommended. Please note that this test is performed to supplement a chest X-ray examination or chest CT scan, and a normal cytology test result does not rule out the possibility of having lung cancer. When the amount of sputum in the sample is not sufficient for cytology, the result will be undeterminable.

Classification system

Class I : No abnormalities are found.
Class II : Although there are mild cellular changes due to inflammation and so on, they are considered to be benign changes.
Class IIIa : Mild or moderate epithelial dysplasia is observed.
Class IIIb : Severe epithelial dysplasia is noted.
Class III : Mainly glandular epithelial dysplasia and squamous epithelial dysplasia are observed.
Class IV : Cells suggestive of cancer are found.
Class V : Cells considered to be cancer are found.
*The cytodiagnosis classification system is different from cancer staging systems.

2 Thyroid ultrasound

Thyroid ultrasound

The size and shape of the thyroid gland, parenchymal change, blood flow in the parenchyma, the presence or absence of a tumor mass, and so on will be studied. By these examinations, we will determine the presence or absence of diffuse thyroid lesions (Graves' disease and Hashimoto's disease), evaluate an increase or decrease in thyroid function, make diagnoses of tumor mass and grade, and so on. Along with these, we also check whether swelling of the lymph nodes is present in the neck.

3 Helicobacter pylori

Blood sampling for serum pepsinogen

(Reference range)
Serum pepsinogen Level I: 70.1 ng/mL or higher
Serum pepsinogen I/II Ratio: 3.1 or higher

The test analyzes pepsinogen levels in the blood. If you have been infected with *Helicobacter pylori* bacteria over an extended period of time, changes occur in the gastric mucosa, which can lead to a condition called chronic atrophic gastritis. Chronic atrophic gastritis is one of the factors indicating a high risk for gastric cancer. However, because specific symptoms do not occur in patients with chronic atrophic gastritis, it is not easy to make the diagnosis based on clinical symptoms alone. Research by specialists has demonstrated that chronic atrophic gastritis is highly correlated with the serum pepsinogen I/II ratio, and the serum pepsinogen I/II ratio is found to be lower in patients with chronic atrophic gastritis. Although the measurement of serum pepsinogen levels itself is not a test for *H. pylori* bacteria, it can indirectly show whether or not you have chronic atrophic gastritis due to *H. pylori* bacteria infection.

Urea breath test

(Reference range)
Below 2.5‰ (per mille)

An enzyme found in *H. pylori* bacteria called urease breaks down urea in the stomach into ammonia and carbon dioxide. With the breaking-down of urea, carbon dioxide produced simultaneously with ammonia is quickly absorbed into the blood, from which it moves to the lungs, and carbon dioxide gas is emitted in the breath. The urea breath test makes use of this principle. You take a drug (^{13}C urea), and your breaths before and after taking the drug are collected for the diagnosis. If you have an *H. pylori* infection, a large amount of $^{13}CO_2$ will be detectable in your breath because urea has been broken down. On the other hand, if you are not infected, very little $^{13}CO_2$ is emitted as urea is not being broken down. However, caution is required for the diagnosis, because if you are currently taking or have recently stopped taking some kind of drug for the treatment of gastric ulcers or antibiotics, your test may turn out to be negative even if *H. pylori* bacteria are present.

Helicobacter pylori

(Reference range)
(-)

If you have an *H. pylori* infection, you develop antibodies to resist the bacteria. In this health screening, we measure serum IgG antibodies to *Helicobacter pylori.* If your antibody titer is high, the bacteria are likely to be found in your stomach. Although the antibody titer will decrease after treatment to eradicate *H. pylori*, it may take more than a year in some cases, and caution is needed in determining the result.
In addition, when the antibody titer is 3 U/mL or higher and below 10 U/mL, either a positive or false negative result can be produced. Thus, tests other than the measurement of antibody titers (such as an *H. pylori* stool antigen test or urea breath test) should also be performed.

4 Colonoscopy

Colonoscopy

Laxative products are first used to clean your large intestine. Then, an endoscope is inserted through the anus to directly observe the linings of the rectum and large intestine. This is a useful method for diagnosing polyps in the large intestine, colorectal cancer, diverticulosis of the colon, inflammatory bowel disease, and so on. We may make a histological diagnosis by collecting a sample from the lesion as needed.

5 Pelvic MRI

Pelvic MRI

MRI (Magnetic Resonance Imaging) is a method of examination to create cross-sectional images of the body using magnetism and electromagnetic waves. In the pelvic region, primarily the bladder, uterus, ovaries, and prostate gland are observed. If a tumor mass is detected, this procedure is also effective in determining whether the mass is benign or malignant. Diffusion weighted imaging, which is one of the imaging procedures, is considered to be useful for detecting malignant diseases, and it is an effective screening tool for cancer along with PET scans.

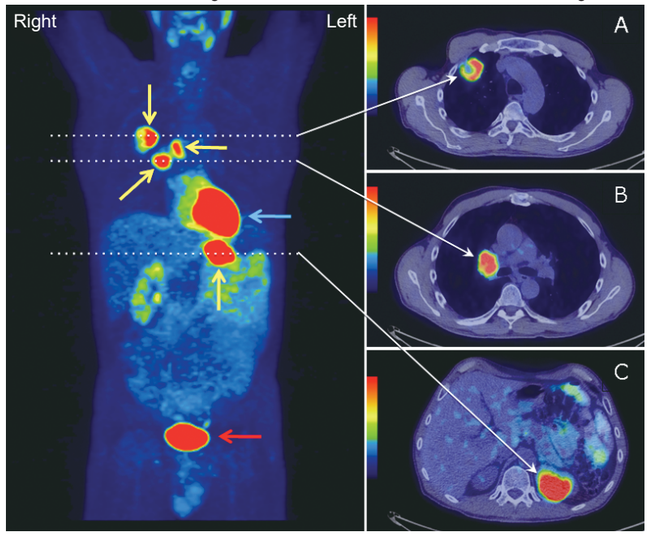
6 PET-CT

PET-CT

PET (Positron Emission Tomography) is an imaging technique. Cancer cells have a higher glucose metabolism than normal cells and need more glucose to grow. Making use of this property, we inject a test drug similar to glucose (18F-FDG) into the body to detect cancer. Because cancer cells take up several times more glucose than normal cells do, the injected 18F-FDG also accumulates in cancer lesions. As a larger amount of radiation is emitted from the areas where the drug is concentrated, we can find cancer lesions by detecting these areas and creating images of them. As a general rule, it has been reported that a PET scan can detect a cancer lesion if it has grown to about 1 cm.
In this examination, we can make it possible to more accurately determine the location of cancer inside the body, in addition to its presence or absence, using PET-CT equipment, which is a fusion of PET and CT imaging. Because FDG basically has the property of accumulating in active cells, it accumulates not only in tumors, but also in highly active inflammation, moving muscles, the stomach, intestine, heart, and brain.
The FDG concentration in normal cells is referred to as physiological accumulation. Sometimes it is difficult to distinguish physiological accumulation from the concentration in tumors. Furthermore, while FDG tends to accumulate in malignant tumors, a high FDG accumulation can also be seen in benign tumors such as those of the thyroid gland, salivary glands, and so on. In such cases, it is difficult to determine whether the tumor is benign or malignant on PET scans.
Additionally, FDG may not accumulate much in some cases such as cancers in an early stage, and certain kinds and histological types of cancers, so not all cancers can be detected. A thorough examination using ultrasound, CT, MRI, mammography, endoscopy, or tumor markers will be helpful for the diagnosis of such carcinomas.

Whole-body PET image: Front image

PET-CT images: Transverse section images



< Whole-body PET image: Front image >
The red areas shown in the picture are those with a high accumulation of FDG. Not all of these red areas indicate abnormal findings or lesions. In this example, abnormal FDG uptakes can be seen in the right side of the chest and the left upper abdomen (⇩). It is normal to find physiological accumulations of various degrees in the heart (⇩). Furthermore, even in normal conditions, an accumulation of FDG is found in the bladder where urine is retained as FDG is excreted in urine (⇩). Our highly qualified radiologists will read and interpret your images while taking into account all the characteristics of FDG.

< PET-CT images: Transverse section images >
In PET-CT scans, the anatomical location of lesions is accurately visualized with the fusion of PET and CT images. The abnormal FDG uptakes observed in the whole-body PET image can be clearly diagnosed as lung cancer of the right upper lobe (A), right hilar lymph node metastasis (B), and metastasis in the left kidney (C) (⇩).

IV. Explanation of Cardiovasculart Screening

1 Arteriousclerosis

PWV
(Pulse Wave Velocity)
(Reference)
Age is considered in the evaluation

This is a test that measures the speed of the pulse traveling from the heart through the arteries. The pulse travels through the arteries like a wave. The stiffer the walls of the blood vessels, the faster the waves are transmitted. The PWV test is one indicator of the stiffness of large arteries, and by knowing the pulse speed, it is possible to estimate the stiffness of the arteries. Your approximate “vascular age” is estimated with this value. If your vascular age is higher than your actual age, it is possible that arteriosclerosis is progressing.

ABI
(Ankle-Brachial Pressure Index)
(Reference range)
1.00 or higher and 1.40 or lower

The index of vascular occlusion (ABI value) is calculated from the ratio of blood pressure measured in the ankle to that in the upper arm, and the degrees of stenosis and occlusion of the artery are estimated. A value of 0.9 or lower is suggestive of narrowing or blockage of the arteries of the lower extremities, and 1.41 or higher is indicative of severe arterial calcification.
ABI value = (Ankle systolic blood pressure / Brachial systolic blood pressure)
*When blood pressure is measured in both arms and ankles in normal people, the ankle is associated with slightly higher pressure. Narrowing and blockage of arteries are more likely to occur in the arteries of the lower extremities, and when they occur, ankle blood pressure drops. By measuring the ratio of the upper arm blood pressure to ankle blood pressure, we can apply this principle to assess the degrees of stenosis and occlusion.

About arteriosclerosis

What is arteriosclerosis?
This refers to a condition in which the walls of the arteries harden with age, and blood circulation is impaired due to an accumulation of fat masses and the like on the lining of blood vessels, making the blood vessels more likely to become clogged.

Causes of arteriosclerosis
Progression of arteriosclerosis can be caused by a variety of factors, including advancing age, diabetes, disorders of lipid metabolism, hypertension, cigarette smoking, and so on.

If you are diagnosed with arteriosclerosis…
Arteriosclerosis itself has no symptoms. However, because it can lead to a number of diseases, such as myocardial infarction, angina, stroke, and aortic aneurysms, it is important for you to try to prevent them or their progression.

2 Echocardiography

Cardiac ultrasound

This is an imaging procedure that uses ultrasound to observe the shape (the size and wall thickness of the atrium and ventricles), function (the function of contraction and expansion and the movements of the valves), and blood flow (the presence or absence of valve regurgitation and septal defects) of the heart. With these examinations, we will be able to make diagnoses of diseases such as cardiac hypertrophy, enlargement of the heart, cardiomyopathy, heart valve diseases, myocardial infarction, and so on, and determine their severity.
The safety of ultrasound has been confirmed, and it is also used in examinations of fetuses. Furthermore, there will be no effects on prosthetic valves or pacemakers.

3 Carotid artery ultrasound

Carotid artery ultrasound

A carotid artery ultrasound is an imaging procedure that uses ultrasound to observe the carotid arteries in the neck (common carotid arteries and internal carotid arter-ies). This can help us learn whether or not arteriosclerosis is present, and if it is, its progression level. If arteriosclerosis occurs, the wall of the blood vessel will become thickened. Although it thickens with advancing age, when the total thickness of the intimal layer and medial layer in the three-layer structure of the artery wall exceeds 1.1 mm, it will be diagnosed as abnormal thickening. Other than thickening, there may also be partially elevated lesions due to the buildup of substances such as cholesterol called plaques in the vessel wall, which can cause narrowing (stenosis) of the carotid artery or cerebral infarction. If it has been determined that a more de-tailed examination would be required, please see a specialist.
If an atherosclerotic change is found in a carotid artery, progress of arteriosclerosis in other blood vessels of the body is also inferred, and the patient will have a higher risk of developing ischemic heart diseases (angina and myocardial infarction), cerebrovascular disorders, and so on.

4 Brain MRI/Brain MRA

Brain MRI/ Brain MRA

MRI (Magnetic Resonance Imaging) is an examination method that makes use of magnetism and electromagnetic waves to create cross-sectional images of the body. In brain MRI scans, the degree of brain atrophy and the presence or absence of age-related changes are observed. In addition, we can make diagnoses of cerebral infarction, old and new hemorrhage, brain tumors, and so on.
Brain MRA (Magnetic Resonance Angiography) visualizes the condition of blood vessels in the brain using the MRI method. With computer processing, it can show three-dimensional images, and we can make diagnoses of the degree of arterio-sclerosis, severity of stenosis, aneurysms, arteriovenous malformations, and so on.

V. Explanation of Optional Test Parameters

1 MRCP

MRCP

MRCP stands for Magnetic Resonance Cholangiopancreatography, which uses MRI equipment to image the bile ducts and pancreatic ducts. It is possible to examine lesions in the gallbladder and pancreas at the same time. Diagnosis of conditions such as bile duct and common bile duct stones, gallbladder cancer, pancreatic cancer, and pancreatic cystic lesions is possible.

SLIH-2018.8.1-ver.1.0

■Errata sheet■

The following errors were found in this document. We apologize for the correction.

Page		Incorrect	Correct
P8	HDL-CHOLESTEROL	40～99mg/dL	40 mg/dL or higher
	Non HDL-CHOLESTEROL	90～149mg/dL	90～169mg/dL
P9	γ-GTP	90 U/L or less	50 U/L or less
	LD（LDH）	124–222 U/L	222 U/L or less