

Laboratory Tests and Disease Risk

Assessing a patient's "wellness" would involve a variety of laboratory tests.

Presented here is a synopsis of what might be included.

Arteriosclerosis

Coronary heart disease is not just a "man's disease." After menopause, women are equally affected, and therefore it is a major cause of death for both sexes. The most commonly recognized risk factors for coronary heart disease, cerebrovascular disease, and peripheral vascular disease are advancing age, sex (until menopause), smoking, overweight/obesity, physical inactivity, diabetes, hypertension, increased total and LDL cholesterol (LDL-C), increased total cholesterol/ HDL-C ratio, increased triglycerides, and decreased HDL-C. Although less appreciated, other important risk factors include increased C-reactive protein, homocysteine, fibrinogen, and factor VII; hematocrit (>48); leukocyte count (i.e. neutrophils) and possibly serum ferritin; decreased serum albumin; and clinical depression.

Type 2 Diabetes Mellitus

For many years type 2 diabetes was referred to as "late onset diabetes" since it was seldom seen in persons under 40 years of age. Unfortunately, today a diagnosis in early adulthood and even in a adolescence is not uncommon. Type 2 diabetes currently affects an estimated 16 million Americans, about 6 million of whom are unaware they have the disease. Most have the disease 4–7 years prior to diagnosis. At least 90% of cases are preventable with a healthy lifestyle including weight control, increased physical activity, appropriate diet, and smoking cessation/abstinence. Consequently, regular testing of fasting serum glucose levels is critical for all older adults, as well as for obese young adults and teenagers. For individuals with a serum level of 110–125 mg/dL (6.1–6.9 mmol/L), testing for glycosylated hemoglobin should also be considered.

Thyroid Dysfunction

The incidence of both hypo- and hyperthyroidism is common, currently affecting about 10%–12% of American adults, and incidence increases with age. Hypothyroidism is significantly more common in women than men. Signs and symptoms of thyroid disease, especially hypothyroidism, may be atypical, mild, indicative of early psychiatric problems, or simply thought to represent "old age." Although various professional organizations differ as to when thyroid stimulating hormone (TSH) screening should begin, the American Thyroid Association recommends that all women be tested at age 35 and every five years thereafter. For men, most organizations recommend regular testing during their sixth decade (50–60 years of age).

Cancer

Approximately 85% of cancers have been attributed to lifestyle factors: poor nutrition including excess intake of fat and inadequate intake of fiber, antioxidants (e.g. selenium, vitamins C & E), fruits, and vegetables (33%); smoking

(33%); and obesity (15%–20%). Increased levels of oxidized compounds, such as urinary 8-hydroxy-2-deoxyguanosine and other oxidized bases, may prove to be useful laboratory indices of cancer susceptibility. However, adequate clinical studies have yet to be carried out. Regular testing for prostate specific antigen (PSA), although somewhat controversial, is widely recommended for men 40–50 years and older in order to establish a baseline for calculating PSA velocity. In addition, regular fecal occult blood testing should be performed to detect GI bleeding, especially to identify early possible colon cancer or adenomatous polyps.

Immune Function

Loss of immune function is a well-known aging phenomenon. However, much of this immune function loss is due to secondary factors. Protein calorie undernutrition, particularly common in older people, is characterized by albumin levels less than 3.8 g/dL; in the absence of liver disease, systemic lupus, rheumatoid arthritis, or other chronic inflammatory diseases (e.g. sarcoidosis, tuberculosis, etc.), one should suspect protein malnutrition as a cause of immune function loss. Moreover, a serum transferrin level less than about 200 mg/dL and total lymphocyte count less than $1,800/\text{mm}^3$ (total white count \times % lymphocytes) also suggest chronic protein malnutrition.

These individuals are often not only protein malnourished, but also are lacking adequate vitamins (e.g., C and E) and minerals (e.g., Zn, Se). Numerous studies have shown that these deficiencies result in decreased immune function. Improved nutrition or supplementation results in increased T-cell subsets, interleukin-2 levels, IgG response to tetanus vaccine; and decreased susceptibility to respiratory infections, among other benefits.

Miscellaneous Diseases

A fasting chemistry profile consisting of potassium, urea nitrogen, and creatinine (renal); glucose (diabetes); enzymes (AST, ALT for viral hepatitis, chronic alcoholism, etc.); and direct and total bilirubin (liver, Gilbert's syndrome, hemolytic anemia) are important in establishing the health status of various organ systems. In addition, magnesium, an extremely important but underutilized analyte, is a co-factor for over 300 enzymes. Magnesium deficiency is also common in the so-called "healthy elderly," with the deficiency occurring in 10%–20% of individuals, depending on serum vs. erythrocyte measurement. Although the recommended daily intake is 350 mg/day, generally a person's average intake is estimated to be 175–225 mg/day.

A complete blood count (CBC), including the hematocrit, should also be "routine" for reasons noted above. Moreover, at least 10% of Americans 65 years and older are anemic (hemoglobin <11.0 g/dL), with about one-third of these cases due to nutritional deficiencies (e.g., iron, folic acid, vitamin B12).

Reference: Clinical Laboratory News March 2005 "Wellness Assessment- What Role Can Labs Play"