Urinalysis Results Interpretation

Highlights

The urinary system consists of the kidneys, ureters, bladder, and urethra. The key elements in the system are the kidneys, a pair of purplish-brown organs located below the ribs toward the middle of the back. The kidneys remove excess liquid and wastes from the blood in the form of urine, keep a stable balance of salts and other substances in the blood, and produce a hormone that aids the formation of red blood cells. Narrow tubes called ureters carry urine from the kidneys to the bladder, a sack-like organ in the lower abdomen. Urine is stored in the bladder and emptied through the urethra.

The average adult passes about a quart and a half of urine each day. The amount of urine varies, depending on the fluids and foods a person consumes. The volume formed at night is about half that formed in the daytime.

A urinalysis is the safe, noninvasive, simple, study of urine, requiring only urination on the part of the human subject; it has no discomfort, no risk, no direct side effects, and no adverse responses. When performed through most conventional medical institutions, the patient is informed by the medical doctor that either everything showed up *normal* (which may not, actually, mean the same thing as *healthy*) or that there was an abnormal reading with one of the parts of the test. However, both the meanings of the names of the tests conducted, as well as the cause of the abnormal readings, are rarely addressed by mainstream doctors or their staff members.

Educating patients about what medical terms mean, how abnormal results may manifest, and what the cause(s) of abnormal results could be, takes time and fortitude. Most conventional (medical) doctors do not have a lot of time to spend with their patients, these days. On average, they only spend 8 to 12 minutes with a patient. However, education is the most successful key constituent on Earth in the abnormal results-reversing solution.

Nonetheless, insurance providers do not reimburse doctors or policyholders for educational expenses, and they customarily refuse to provide coverage benefits for drugless options to health problems. They only seem to pay for drug treatments, invasive tests, and surgeries; and yet, they do pay for the side effects of prescription medications as well as the (illness) complications of the diseases the drugs are supposed to treat. Thus, doctors and most patients have no financial incentive to educate others or learn for themselves more about natural medicine (drugless) solutions, when there are abnormal urinalysis results (or any medical issue, for that matter). For this cause, the presentation of the following information is provided to you, the reader, without charge.

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Declaration

Doctors Anthony and Sandra Speroni cooperatively operate an education-based, natural medicine enterprise that is focused on genuine, safe, natural, permanent, drugless solutions, and is designed to enrich the opportunity for wellness restoration, optimal health, and long-term wellbeing for virtually everybody, including those with abnormal urinalysis results, who seek out their aid and consultancy services.

Exordium

Important Notice: The material you are about to read was written from a biased point of view. This is because the author believes natural medicine is, by many people, erroneously regarded as a complement and/or alternative to a *superior* medical tradition or philosophy, but, in reality, not much else could be more distant from the truth. In fact, the author believes that neither conventional nor complementary and alternative medicine stands superior one over the other, as both approaches excel in diverse, non-overlapping areas. The use of the latter term, later on in this work, is applied to aid the readers in the area of easy understanding by virtue of common terminology, and not in support of the proposal that natural medicine is some sort of inferior, alternative to any other medical system or discipline.

Further, this author believes natural medicine is, actually, worthy of being deemed the primary, if not sole, choice for healthcare throughout the world, whenever it comes to preventing sickness, supporting optimal health, sustaining perpetual wellbeing, and in matters addressing the mental, emotional, and spiritual needs of a person; particularly whenever people face wellness challenges involving underweight, overweight and obesity, chronic pain [especially backaches], stress, depression and sadness, rapid aging, ADHD [in both children and adults], and all chronic illnesses (which may show up in a urinalysis). Therefore, to further the aforementioned declaration, the use of the term *complementary and alternative medicine* (or CAM) throughout this work is done, simply, in accord with the National Center for Complementary and Alternative Medicine (NCCAM) definition of CAM; which is, obviously, therefore not intended to devalue the equitable station or employment of natural and traditional medicine in primary healthcare levels for the improvement of medical services.

Preface

Quite a few times in this material, we will make mention of a urinary tract infection, also known as a UTI. For this reason, before we even get started talking about diabetes, we will discuss this condition first. Urinary tract infections are a serious health problem, affecting millions of people each year.

Infections of the urinary tract are the second most common type of infection in the body. Urinary tract infections (UTIs) account for about 8.3 million doctor visits each year (according to: Ambulatory Care Visits to Physician Offices, Hospital Outpatient Departments, and Emergency Departments: United States, 1999–2000. *Vital and Health Statistics*. Series 13, No. 157. Hyattsville, MD: National Center for Health Statistics, Centers for Disease Control and Prevention, U.S. Dept. of Health and Human Services; September 2004). Women are especially prone to UTIs for reasons that are not yet well understood by medical doctors. One woman in five develops a UTI during her lifetime. UTIs in men are not as common as in women but can be very serious when they do occur.

What are the causes of UTI?

Normally, urine is sterile. It is usually free of bacteria, viruses, and fungi; but it does contain fluids, salts, and waste products. An infection occurs when tiny organisms, usually bacteria from the digestive tract, cling to the opening of the urethra and begin to multiply. The urethra is the tube that carries urine from the bladder to outside the body. Most infections arise from one type of bacteria, Escherichia coli (E. coli), which normally lives in the colon.

In many cases, bacteria first travel to the urethra. When bacteria multiply, an infection can occur. An infection limited to the urethra is called *urethritis*. If bacteria move to the bladder and multiply, a bladder infection, called *cystitis*, results. If the infection is not treated promptly, bacteria may then travel further up the ureters to multiply and infect the kidneys. A kidney infection is called *pyelonephritis*.

Microorganisms called Chlamydia and Mycoplasma may also cause UTIs in both men and women, but these infections tend to remain limited to the urethra and reproductive system. Unlike E. coli, Chlamydia and Mycoplasma may be sexually transmitted, and infections require treatment of both partners.

The urinary system is structured in a way that helps ward off infection. The ureters and bladder normally prevent urine from backing up toward the kidneys, and the flow of urine from the bladder helps wash bacteria out of the body. In men, the prostate gland produces secretions that slow bacterial growth. In both sexes, immune defenses also prevent infection. However, despite these safeguards, infections still occur. People with diabetes have a higher risk of a UTI because of changes in the immune system. Any other disorder that suppresses the immune system raises the risk of a urinary infection.

In the urinalysis test, the urine is examined for white and red blood cells and bacteria.

Urinalysis
A urinalysis is also known as: Urine test; Urine analysis; and UA.
The formal name, however, is urinalysis.

Urine is a body fluid waste that consists of excess water and waste products that have been filtered from the blood by the kidneys. For the best study results, you should not eat or drink for at least 4 hours (8 hours is better) before the test. Many urinalysis reagent values are best compared over the course of daily, morning, first urination samples. Prescription drugs can affect test results, leading to false highs and lows. Inform your practitioner if you have taken any medications within 72 hours of providing a urine sample for urinalysis.

A urinalysis is an array of tests performed on urine. It is conducted by the subject (you) providing a sample of urine and, then, the urine itself is studied. The test involves only normal urination, and there is no discomfort. The study evaluates the color and quality of the urine; further, it measures the presence and quantity of a number of chemicals in the urine. Therefore, the study findings can aid a wellness professional or your medical doctor in determining if additional laboratory tests may be needed along with an estimation regarding the health status of your kidneys and other select organs. Studies may often be conducted to detect the presence of a specific substance, such as an illegal drug.

There are 2 ways you can partake in a urinalysis. One way is the send a sample of your urine to a lab for evaluation and reporting. The lab has special tools it uses in order to check for crystals, bacteria, and other organisms in the urinary sediment, in addition to select chemicals in the urine. The other way is to have a sample of your urine evaluated using a reagent strip. This latter method allows you to know the results in 1 to 2 minutes.

There are 3 ways to study urine: uroscopy (visually); dipping reagent strips (chemically); and microscopically (under a microscope). This information will cover the first 2 methods named.

Uroscopy
Uroscopy is the historic, medical practice of visually examining urine for pus, blood, or other possible indicators of disease. This practice dates back thousands of years to the first written records of the civilizations in ancient Babylon, Egypt, and India; it required no technology. Today, this first step - the visual examination of urine - although quite limited, does provide preliminary information that may prove valuable (such as if blood appears in urine or the urine is tinted somewhat brownish) in respect to consistency or clarity, and in determining if additional, immediate laboratory testing may be necessary.

Clear and colorless
Clear urine with little to no yellow tint is often a sign of wellness and good health. It indicates proper hydration and excellent system filtration. Nevertheless, continuous urination producing only clear urine may be a sign of *diabetes insipidus*, which is a rare metabolic disorder involving the pituitary gland and the kidneys. Diabetes insipidus is not a subtype nor in any way related to the more common sugar diabetes (diabetes mellitus). Diabetes insipidus is, actually, a rare form of diabetes resulting from a deficiency of *vasopressin* (the pituitary hormone that regulates the kidneys).

Amber
The normal color of urine ranges from a deep amber to a pale yellow, depending upon how diluted or concentrated the urine is. Therefore, a visual observation alone of normal-colored urine will prove quite limiting in determining any real challenges to wellness.

Black

Black-colored urine is usually related to serious issues with the bladder, kidneys, or liver. Additionally, the cumulative effects of toxic levels of chemical exposure to (unrefined) oil and solvents may lead to black urine. Kidney infection, fatigue, acute abdominal spasms, a hoarse voice, and burning (or tingling) sensations mostly around the head and face areas accompany black-colored urine. Restricted joint mobility, kidney stones, and vascular hypertension may also be connected with urine of this discolor. There is also a hereditary, metabolic disorder known as *alkaptonuria* (also known as black pain disease, black urine disease, alcaptonuria, alcaptonuric ochronosis) caused by a defect in tyrosine and phenylalanine metabolism.

Blue

Eating foods and food products with high levels of barium, or consuming lots of artificial blue food coloring or the artificial blue coloring in prescription medications, or tryptophan malabsorption can be the root cause of blue-colored urine. There are likely to be other possible causes for urine to appear somewhat blue in color, so ask your doctor about your symptoms.

Brown

If the urine has a brownish tint, then, the subject may have *Icterus* (also called *jaundice*). Jaundice is a disease that causes the yellowish discoloration of the whites of the eyes, skin, and mucous membranes. The disease is caused by deposits of bile salts (also called *gall*) in these tissues. Bile salts are brownish-yellow or greenish-yellow fluids secreted by the liver, stored in the gallbladder, and released into the duodenum to aid in the emulsification, digestion, and absorption of fats consumed in the diet. Jaundice occurs as a symptom of various diseases, the best known of which is probably hepatitis. A urine sample having a brownish tint to it will almost always command more testing to be ordered.

Gold

When urine appears as a very dark, concentrated yellow to even gold, the cause is usually linked to dehydration, liver cancer, diarrhea, or more than 350 other conditions. This could also be the end result of heavy exercising.

Green

Depending upon how hydrated and concentrated the urine is, if there is a tint to deep-green color that the urine takes up, it is most often caused by vitamin B supplementation or asparagus in the diet.

Mahogany

Bile in urine may cause the urine to appear tea-like or mahogany in color. This discoloration is usually connected with some form of liver disorder (hepatitis) or a pancreatic disorder or pancreatic cancer.

Orange

Consuming mild to excessive volumes of carrot juice, excessive intake of foods containing carotene, excessive sweating, insufficient fluid intake, riboflavin (water-soluble vitamin of the B complex) intake, rifampicin (a bactericidal antibiotic drug) use, phenazopyridine (analgesic [brand name Pyridium] used to treat urinary tract infections) use, rhubarb, and/or senna can tint urine orange.

Pink

Blood in urine may appear as pinkish hues. However, there are 13 other possible causes for urine to appear pink. Some of these other reasons involve prescription laxatives (Alophen) and drugs with phenolphthalein, beetroot, blackberry, and a urinary tract infection. See "Red – blood" below for more information.

Purple

Purple toes and fingers, urine that appears purplish, nosebleeds, and coughing up blood are just some of the serious side effects the prescription drug Coumadin may produce. Additionally, a bacterial infection from such species as Providencia stuartii, Klebsiella pneumoniae, P. aeruginosa, Escherichia coli, and enterococcus can cause purple urine. Sometimes, the consumption of a food or food product high in barium, when mixed with blood, turns the urine purple. Regardless of the suggested cause, purple urine demands immediate medical investigation!

Red – blood

Urine colored blood red, with blood showing up in the urine, can have at least 389 different causes. These causes include such things as acute prostatitis, aloe poisoning, bladder cancer, copper toxicity, chemical toxicity (acetic acid, benzene gasoline, nitrates, turpentine oil, plus many others), cystitis, diabetic nephropathy, enlarged prostate, exercise, kidney cancer, kidney stones, malaria, Machupo virus, and penis cancer. By any cause, when blood is found in urine, the condition is called *hematuria*. Hematuria often indicates that there is a quite severe problem present. Further, immediate lab testing should be conducted. The appearance of blood in the urine commands prompt professional medical investigation!

Red – bright to light

If the urine has a reddish tint, there may be abnormal, limited, uncontrolled growth of cells in the urinary tract. This is a viable indication of internal bleeding or liver cancer. However, blackberries, beets and beet soup (borscht), and tuberculosis can also force the discoloration of urine to favor shades of red. Thus, the next step may be to perform additional lab work and check for infection and/or kidney disease.

Red – dark

When the color of urine favors a dark red, almost the color of port wine, there is a good chance that one of the several disorders of porphyrin metabolism is present. The disease is called disease *porphyria*. Porphyria is usually a hereditary disease of the body that affects metabolism, skin, and the nervous system. It produces abdominal pain, mental confusion, and other symptoms of discomfort.

White

White urine is oftentimes due to *pyuria* (presence of pus in the urine). Pyuria is usually a sign of a urinary tract infection. It is also associated with kidney cancer and tuberculosis. White, cloudy urine can, rarely, also be due to a morbid condition known in medicine as *Chyluria* (a fistula, or microscopic leak, between lymphatic vessels and the kidney). On a more positive side, almost every bacterial urinary infection can cause these white particles to appear in urine.

Moreover, there is also one other condition that can cause urine to appear whitish. This is *urolithiasis*. Urolithiasis means that there are stones in the urine ducts or bladder. This is a condition that has to be treated as soon as possible.

Yellow

The normal color of urine ranges from a deep amber to a pale yellow, depending upon how diluted or concentrated the urine is. Therefore, a visual observation alone of normal-colored urine will prove quite limited in determining any real challenges to wellness.

Cloudy or Hazy Distinguishing Trait Affecting Color

Often, an infection may cause urine to become cloudy, giving it a hazy appearance.

Foamy

If the urine appears foamy the next step may be to perform additional lab work and check for kidney disease.

Smell

Although it is a contradiction in terms of human senses, smelling the urine is also considered part of a visual examination. An abnormal sweet smell may be linked to diabetes.

Important Note

Commonly, urine color can be directly linked to medications and/or nutritional supplements and/or certain foods and/or food product dyes. For this reason, with the exception of, perhaps, blood in the urine, no immediate conclusions should be drawn, and urine studies should always be considered only one piece of the puzzle, when evaluating a state of wellness through uroscopy.

Chemical Study

The next method that we will discuss here, regarding the testing of urine, is a system which employs a *reagent strip* that is briefly dipped into the urine sample. A reagent is an agent used in a chemical reaction to detect, examine, measure, or produce other substances. These reagents change color based on the presence or absence of certain chemicals within the urine. The strip may contain 1 to about 10 reagents, with each reagent designed to individually provide results related to unique factors. After being dipped in the urine, the reagents are removed from the specimen and compared to a colored reference chart to determine the results.

Bilirubin

Bilirubin (also known as conjugated bilirubin or direct bilirubin; formerly referred to as *hematoidin*) hypothesized as having the physiological role of a cellular antioxidant, is a reddish-yellow pigment found in *bile*. Bile is a fluid produced by the liver and stored in the gallbladder; upon eating, bile is released by the liver into the duodenum. Bilirubin is formed as a breakdown (waste) product of hemoglobin.

This test may be done in order to study the possibility of liver and/or gallbladder problems. A normal result is negative. Positive results are a possible early indicator of liver disease and stem from such things as gallstones in the biliary tract, hepatitis, an injury resulting from surgery that affects the biliary tract, liver tumors, gallbladder tumors, biliary strictures, and cirrhosis.

Urine levels of bilirubin may be clinically significant because it is often a constituent of gallstones; or when at moderate levels, an indicator of stones in the common bile duct, a tumor obstructing the common bile duct, intravascular *hemolysis* (destruction or dissolution of red blood cells, with subsequent release of hemoglobin), *hemoglobinuria* (blood in the urine), or tubular cell conjugation (collection) of free bilirubin. Additionally, it causes the skin discoloration seen in jaundice, and appears in very high levels when there is severe liver failure with cirrhosis.

Normally, bilirubin is not found in the urine; but, from time-to-time, very diminutive amounts are excreted in the urine. If, however, the liver's function is impaired or there is biliary stricture (blocked drainage {benign or malignant}), some of the conjugated (collected and clumped together) bilirubin will leak out of the hepatocytes (cell of the liver) and appear in the urine. When bilirubin is present in urine, the urine is discolored to a point of dark amber. Large amounts of bilirubin in the body can lead to jaundice.

Drugs that can increase bilirubin measurements include allopurinol, anabolic steroids, some antibiotics, antimalaria medications, azathioprine, chlorpropamide, cholinergics, codeine, diuretics, epinephrine, meperidine, methotrexate, methyldopa, MAO inhibitors, morphine, nicotinic acid, birth control pills, phenothiazines, quinidine, rifampin, steroids, sulfonamides, and theophylline.

Drugs that can decrease bilirubin measurements include barbiturates, caffeine, penicillin, high-dose salicylates such as aspirin, indomethacin, and ascorbic acid.

Blood

When blood (*hemoglobin*) is detected in the urine the condition is call *hemoglobinuria*. Hemoglobin is an oxygen-transporting protein found inside red blood cells (RBCs). If hemoglobin is found in urine it indicates that blood is in the urine (known as hematuria), where it is not usually found in high quantities. Nevertheless, it is normal for a small number of RBCs (100 mg/dl plasma) to be present in urine, with the normal diminutive quantity usually resulting in a negative reagent reading.

However, it is important to note that any *positive* reagent result, even representing tiny amounts of RBCs in urine can hold significant meaning. Many people have hematuria without any other related problems, though. Often no specific cause can be found by conventional medicine. Moreover, certain drugs, beets, or other foods may also cause discoloration of the urine that may mimic hematuria. Remember, though, that hematuria is not a disease itself; but rather, it may be a sign of an underlying disorder.

Nevertheless, because hematuria may be the result of a tumor, kidneys stones, trauma to any of the urinary organs, or other serious problems, a doctor should be consulted. Further, this condition could be very serious, because blood in urine can mean the subject has a UTI, and because there are numerous diseases of the kidney and urinary tract, as well as trauma, medications, smoking, and exhausting exercises that can cause hematuria or hemoglobinuria. A urine study, however, can neither determine the severity of disease nor can it be used to identify from where the blood is coming.

In addition to finding RBCs, the doctor may find white blood cells that signal a urinary tract infection or casts, which are groups of cells molded together in the shape of the kidneys' tiny filtering tubes that signal kidney disease. Excessive protein in the urine also signals kidney disease. When a urine sample is taken, it should not be contaminated with blood from menstruation in females.

Glucose

The urine glucose reagent area of the dipstick measures the amount of glucose (sugar) in the sample of urine provided for studying. The presence of glucose in the urine is called *glycosuria* or *glucosuria*. Glucose is not usually found in urine. If it is, further testing is needed to determine if the subject has diabetes mellitus. Presently, only the blood glucose test, and not urine, is done to confirm if a person is a diabetic. Other conditions that are possible when there is glycosuria include renal glycosuria (when glucose is released from the kidneys into the urine) and pregnancy.

Drugs that may increase urine glucose measurements include: Aminosalicylic acid, Cephalosporins, Chloral hydrate, Chloramphenicol, Dextrothyroxine, Diazoxide, diuretics (loop and thiazides), estrogens, Ifosfamide, Isoniazid, Levodopa, Lithium, Nafcillin, Nalidixic acid, and large doses of Nicotinic acid.

Other causes for *false positives* (meaning the reality is things could be negative but are testing positive; thus, it is best to rule out the cause and retest) on the glucose reading of a urinalysis include: Ascorbic acid; Nalidixic Acid; Cephalosporins; Probenacid; Levodopa; Ketones.

Causes of *false negatives* (meaning the reality is things could be positive but are testing negative; thus, it is best to rule out the cause and retest) on the glucose reading of a urinalysis include: increased specific gravity, uric acid, and vitamin C.

Ketones

Ketones (also known as ketone bodies) are not normally found in the urine. A ketone body is a chemical produced when the human body breaks down fat tissue stored around the body for energy. The use of fat instead of sugar by the body is commonly done following heavy exercise and during long-term exposure to cold. There are also other causes for an increase in fat metabolism, that include, but are not limited to, such things as a shortage of insulin in the bloodstream, a low amount of carbohydrate in the diet (high-protein diets), starvation, dehydration, alcoholic ketoacidosis (acidosis with an accumulation of ketone bodies), diabetic ketoacidosis (DKA), isopropanol (a type of non-drinking, secondary alcohol, which serves as a major component of rubbing alcohols; found in antifreeze,

cosmetics and personal care products, deicers, paints and resins, pharmaceuticals, food, inks and adhesives) toxicity, recurrent vomiting, pregnancy, and when the body cannot use carbohydrates properly.

The normal result for ketones in a urinalysis is negative. Because ketones in urine may be an early indication of insufficient insulin in a person who has diabetes, it is important to retest the urine, consider a blood glucose (sugar) study, and determine the cause of the positive result. High levels of ketones can lead to a diabetic coma.

The causes of false positive ketones on urinalysis include: low urine pH (acidic); increased urine specific gravity; phenolphthalein (a laxative used in many preparations under various trade names); the amino acid L-dopa; and the drugs Levodopa, Bendopa, Brocadopa, Larodopa (all used to treat Parkinson's disease).

Leukocytes

Leukocytes, also known as white blood cells, are involved in the body's immune response to illnesses and injuries. Under healthy, normal circumstances, human urine does not contain any blood cells because, except in cases of illness or injury, there is no contact between the blood system and the urinary system. The normal filtration processes of the kidneys remove blood cells, and those cells are ultimately excreted as a component of feces.

Consequently, the presence of leukocytes in urinalysis is indicative of a health problem. The normal test result is negative. Natural health practitioners deem a positive urine leucocytes reagent area on a dipstick as positive proof of, among possible other things, a gut deranged from pathological bacteria and yeasts. Gut *dysbiosis* (an imbalance in the intestinal bacteria that precipitates changes in the normal activities of the gastrointestinal tract, frequently resulting in health problems) contributes significantly to chronic conditions due to the constant poisoning of the tissues from bacterial *exotoxins* (poisonous substances secreted by a microorganism and released into the medium in which it grows).

Moreover, reagent detection of leukocytes in urinalysis can be related to an underlying infection within the urinary tract. A urinary tract infection (UTI) is usually caused when bacteria enter the urethra. The urethra is the part of the body from which urine is expelled. *Urethritis* is the medical term for this type of infection. The infection may later become established in the bladder (where it is then called *cystitis*). Both infections lead to leukocytes showing positive on the dipstick.

Nitrite

When the reagent on the urinalysis dipstick detects nitrite, it may be because some bacteria are reducing nitrates to nitrites, which would indicate either a urinary tract infection or gross hematuria (blood in the urine). The test can detect about 91% of UTIs, when conducted on the first morning urine specimen. This may be useful for women who have recurrent UTIs.

The normal result for nitrites is negative. Causes of false positive nitrite on urinalysis include: vaginal contaminant; the pharmaceutical agent phenazopyridine (brand name Pyridium – an analgesic used to treat UTIs); and when the dipstick was exposed to air for a long period or expired.

pH

The term *pH* stands for the *potential of hydrogen* within the urine (or other fluids); it represents a measurement of hydrogen ion concentration (acidity or alkalinity) of the urine. According to conventional medical standards, the healthy, normal pH of human urine is less than 7; the full normal range is between 6 and 8, though. The pH of urine

indicates the efforts of the human body via the kidneys, adrenals, lungs, and gonads to regulate pH through the buffer salts and hormones.

After digestion, foods will end up as "ash" that can be either alkaline (greater than 7.0) or acidic (less than 7.0). The pH of this "ash" is ultimately determined by its mineral contents, which comes from the breakdown of the foods consumed. If urine pH is too low (acid), it could be because of a diet that is too high in protein and refined carbohydrates, or because of anorexia, or because of starvation. If urine pH is too high (alkaline), it may be due to an overconsumption of vegetables in the diet, too little protein being eaten at meal times, or a UTI. See chart below for further information relative to pH ranges.

In a perfect world, pH of the urine (and all other body fluids) would remain at their respective optimal values, all day long. Balancing pH, however, is a continuous exercise going on inside the body of every person on Earth. Consequently, pH values constantly change in all body fluids. Due to the continuous work and constant changes regarding pH, there is no set value that must be achieved at all times, such as something like 6.4. With pH there are no absolutes - just some ranges that are better than others. The key to healthily balancing pH values is to maintain optimum alkalinity levels and alkalizing mineral supplies, during most hours of the day. Notwithstanding, it remains a good thing for practitioners to encourage subjects toward achieving urine (and even saliva) pH scores of 6.4, because this pretty much ensures that the blood pH will be at 7.4 and the interstitial fluid pH will be at 7.33; all of which point toward an environment conditioned to support optimum health.

By the way, nobody should be fooled by the sales propaganda in the healthcare marketplace that suggests that the higher the pH readings the healthier the subject is. There is nothing further from the truth! "... Death is associated with [blood] pH imbalances of 7.80 and above or 7.0 and below ..." *Balance your pH*, by James LeBeau. Regardless of how pH is measured, it is common for it to fluctuate during the day; the morning times favoring acid and evenings, usually more alkaline.

If a pH test shows an internal value higher or lower than the ideal value, you have a strong indication that the subject's body systems and organs are working under the extreme strains of: toxicity; fighting a disease(s); or combating stress factors. This means that the subject's internal fluids are being poisoned by too much acid. That fact, in and of itself, does not mean the subject has a particular disease. It is, simply, a *warning sign*, unrelated to any diagnosis, cautioning that unless dietary and emotional response changes are made, the subject has an excellent chance to: start developing some kind of disease; experience failing health; and possibly diminish her or his life expectancy.

Urine pH depends upon *when* it is measured, because it is affected by metabolic cycles as well as ingestion of food and drink. It is most reliable when measured at the first morning urination, before ingestion of any food (fasting pH). At this time it should be below 6.5. To get a valid urine pH check, the subject should eat only certain foods and food products for 2 days during the urine testing phase. Both urine and blood pH values are less reliable than interstitial pH study results. Notwithstanding, usage of the urine pH values will allow possible, relatively early detection of dysfunctions, disorders, or diseases.

The pH values of urine and saliva are indications of how a subject may be functioning internally. The actual acid or alkaline level of a subject's internal environment affects how his or her body functions. High urine pH is not good from any perspective at any time; and all the people shouting, "Alkalize, alkalize, alkalize!" have no idea of how real biochemistry works.

Human urine pH can vary from around 4.5 to 9.0 for its extremes; but, at least during some portion of the day, it needs to range between 6.4 – 6.8 (the ideal range), in order for the body to absorb and utilize all minerals it receives through drinking and eating. Hence, for physiologic health, a person never wants to see urine pH above 6.8 (see

chart below). Moreover, when urine pH is checked at various times of the day, it is healthy for some of those checks to get down into the 5 range, because this is an indication of adaptive capacity, reflecting metabolic acids can and are being removed from the body.

The pH adjusts according to the food and liquids put in the system and the stress load on the subject. Digestive fluids range near a pH of 3.0, but can be as low as pH 1.0 - a very strong acid - in order to chemically react with food and food products, and allow the fluids to break such things down into usable substances by the body. The colon stays around 6.8, in order to do its work. Every other part of the body demands an alkaline state.

Urine Averaged pH Values

< 4.5 The body has been experiencing long-term acid stress, when the waking pH is below 6.1. Alkaline reserves are probably varying from very low to being totally exhausted.

< 5.0 The body cannot readily absorb the following minerals: Beryllium, Boron, Calcium, Carbon, Chlorine, Chromium, Cobalt, Copper, Fluorine, Germanium, Hydrogen, Iodine, Iron, Lithium, Magnesium, Manganese, Molybdenum, Nitrogen, Oxygen, Phosphorus, Potassium, Selenium, Silica, Silver, Sodium, Sulphur, Titanium, Vanadium, and Zinc. Further, the body cannot readily absorb the following vitamins: A, B, E, F, and K.

< 5.5 The body cannot readily absorb the following minerals: Calcium, Chlorine, Chromium, Cobalt, Copper, Germanium, Iodine, Iron, Magnesium, Manganese, Molybdenum, Phosphorus, Potassium, Selenium, Silica, Silver, Sodium, Sulphur, Titanium, Vanadium, and Zinc. Further, the body cannot readily absorb the following vitamins: A, B, E, F, and K.

5.6 - 6.0 Vitamin D may be deficient. Immune system is likely compromised.

< 6.0 The body cannot readily absorb the following minerals: Chromium, Cobalt, Copper, Germanium, Iodine, Iron, Manganese, Molybdenum, Selenium, Silver, and Zinc.

< 6.3 The body may be overall acidic and/or the subject's diet is too high in protein or too low and losing valuable, mineral-buffer reserves.

6.4 Ideal mark. Blood pH should be at 7.4 and the interstitial fluid pH should be at 7.33.

6.4 – 6.8 Ideal range. All minerals consumed through solids and liquids are capable of being absorbed into the body.

6.5 - 6.7 Alkaline reserve is adequate but running low. This is a warning stage. Early signs of aging may follow.

6.8 - 8.0 The subject's supplies of immediately available buffers and reserve buffers are nearly zero. Further, the subject's system may be employing its emergency pH buffer backups of ammonia, protein, or both. Natural health practitioners watch for bone loss, when the urine pH is in this range.

> 7.0 Very likely tissues are not saturated enough with vitamin C (ascorbic acid).

> 8.0 The organism is overwhelmed. Immediate action commanded.

In all cases, even with normal readings, an electro interstitial scan may serve well in providing a more accurate idea of internal pH values, condition of the internal terrain, and functional status of select organs.

Many factors affect pH. Food is just one of them and can be easily used to support alkalinity. Notwithstanding, one must never forget that good health, actually, does require various acid-forming activities, foods, and food products. Factors that affect alkalinity include:

- Chewing all food well
- Allow well-chewed carbohydrates to thoroughly mix with saliva (digestion begins in the mouth)
- Avoid simple carbohydrates
- Eat a goodly portion of foods raw throughout the day
- Avoid cooking food too long and too much
- Relax at meal times
- Stay calm and avoid anger
- Avoid stressful circumstances as best as possible
- Minimize adrenaline rushes
- Drink lots of water with alkaline-forming minerals in it all day long
- Eat mostly fruits and vegetables, especially those low in sugar
- Avoid products with sugar, white rice, corn, and white flour in them
- Watch the fats consumed
- Avoid, as much as possible, legal and illegal drugs
- Exercise and take antioxidants

Mildly alkaline body fluids are capable of carrying twenty (20) times more oxygen than slightly acidic fluids. The cells use oxygen for energy. The more the body leans toward the alkaline scale values, the more efficiently it utilizes oxygen. Oxygen and alkalinity equate to optimal energy.

Common alkaline minerals:

- Sodium
- Potassium
- Calcium
- Magnesium
- Iron

Common acidic minerals:

- Phosphorus
- Chlorine
- Sulfur
- Iodine
- Bromine

These minerals are neither good nor bad on their own - it is the balance or imbalance of all of them together, along with other minerals not mentioned above, that contributes powerfully to making a person acidic or alkaline (in Chinese medicine, Yin or Yang).

Protein

The protein test reagent is designed to measure the amount of *albumin* (also known as albumen) in the urine. Albumin is a group of water-soluble, serum proteins produced primarily in the liver (which uses more than 500 amino acids to manufacture it). It can be *coagulated* (form solid or semisolid masses) by heat. It is the most abundant protein component of blood.

Albumin possesses many functions including maintaining the *osmotic pressure* (the cause of fluid remaining within the bloodstream instead of leaking out into the tissues), which makes it is essential for proper blood circulation; it is

crucial for metabolism of compounds in the body; it supports transporting essential fatty acids from *adipose tissue* (fat) to muscle tissue; it acts as an antioxidant (protecting tissues from free radicals); it detoxifies the fluids surrounding cells; and it is essential for transporting vitamins, magnesium, copper, zinc, bilirubin, uric acid, sex hormones, thyroid hormone, other hormones, and fatty acids throughout the body.

Other bloodstream proteins, which are all larger than albumin, are not detected by the urine test reagent but may be measured with a separate urine protein test. It is normal for the reagent on the dipstick to read with trace (albumin) protein or less. Other urine protein tests may produce more accurate measurements per deciliter. Everything over 10 mg/dl, resulting in any test, must be further investigated. However, a urine albumin result below 30 is common (normal), but the fewer albumins in urine, the better.

There are 6 reading levels:

1. Negative: <10 mg/dl
2. Trace: 10-20 mg/dl
3. Protein 1+: 30 mg/dl — Microalbuminuria is defined as the excretion of 30 to 150 mg of protein per day and is a sign of early renal disease, particularly in diabetic patients.
4. Protein 2+: 100 mg/dl — Proteinuria is defined as urinary protein excretion of more than 150 mg per day (10 to 20 mg/dl) and is the hallmark of renal disease.
5. Protein 3+: 300 mg/dl
6. Protein 4+: 1000 mg/dl

Albumin urine levels drop when the immune system engages in a battle with invading bacteria, fungi, prions, and viruses. Moreover, levels will tend to decrease when the body is overwhelmed by toxins and other dangerous substances that enter the body through the skin or are inhaled, drunk, or eaten. Notwithstanding, if albumin levels remain low (below 3.5 mg/dl) for long periods of time (several months or longer), there is a serious challenge to wellness that must be considered.

On one hand, though, if a person has bed sores and/or presents signs of *edema* (the accumulation of fluid) as in *pedal edema* (in the ankles) or *pulmonary edema* (in the lungs) and the urine albumin test level is negative, this may signal symptoms of congestive heart failure, kidney illness, or liver disease (cirrhosis). A very low albumin level (below 3.5 mg/dl) is indicative of prolonged protein depravation, which usually results from malnutrition. This means that the human body has already begun to breakdown muscle in order to compensate for an inadequate intake of protein.

On the other hand, if urine protein is elevated -- 1+: 30 mg/dl --, the medical term for this condition is *proteinuria*. Proteinuria can be an early sign of kidney disease, because albumin is the very first protein found in urine when kidney dysfunction begins to develop. Proteinuria can also be the result of false positives caused by vaginal secretions getting into the urine, disorders that produce high amounts of proteins in the blood (such as multiple myeloma), conditions that destroy red blood cells, inflammation anywhere in the body, any type of cancer, a prostate infection, a bladder infection, a urethra infection, or dehydration.

False positive readings for protein in urine can occur if the urine pH is greater than 7.5 (alkaline), there is a high increase in urine specific gravity (concentration), if the dipstick is immersed in the urine specimen for too long, and if the urine was contaminated by such things as (lots of) blood, pus, semen, or vaginal secretions. Further causes for false positives include the prescription medications penicillin, phenazopyridine, sulfonamide, and tolbutamide.

False negative readings for protein in urine are made possible if albumin is not the primary protein, there is a decrease in urine specific gravity (dilute {less than 1.015}), urine protein concentration is less than 10 mg/dl, the pH is acidic, or the presence of light chain protein.

Specific Gravity

For the purpose of this educational material, specific gravity (often abbreviated as *sg* and *sp gr*) is the ratio (comparison) of the density (compactness – the degree to which something is filled) of a substance (urine) to that of distilled water at a specified temperature {39.2°F (4.0°C)}. Hence, it is, actually, a physical characteristic of the urine measured through a chemical test to determine how concentrated the urine is. Knowing urine concentration aids in the decision-making processes that determine if a urine specimen under evaluation is the best one to use when attempting to detect a particular substance. For example, if a lab technician is looking for very small amounts of protein, a concentrated morning urine specimen would be a superior sample to a diluted sample.

Pure water has a specific gravity of 1, which means {nearly} zero *solutes* are dissolved in it. Solutes are substances that dissolve (disperse and become weaker) in another substance. Thus, a specimen of urine with a specific gravity of 3 is three times as dense as water at the same temperature. Specific gravity is a convenient concept because it is usually easier to measure than density, and its value is the same in all systems of units.

There are no "abnormal" specific gravity values. If there are zero solutes present in a urine sample (which is impossible, because all urine contains some solutes), the sg of urine would be 1.000 – the same as pure water. If a person drinks excessive quantities of water in a short period of time or gets an intravenous (IV) infusion of large volumes of fluid, then the urine sg may be as low as 1.002. The upper limit of the test pad, an sg of 1.035, indicates a concentrated urine, one with many solutes in a limited amount of water.

Alkaline urine can falsely decrease specific gravity. Proteinuria (presence of excessive amounts of protein in the urine), radiopaque dye (not permitting X-rays or other radiation to pass through), and intravenous dextran (substitute plasma in blood transfusions) can falsely increased specific gravity.

Urobilinogen

Urobilinogen is a colorless compound formed in the intestine after the breakdown of bilirubin (discussed above) by bacteria. Some of it is absorbed back into the bloodstream, while the remainder is excreted in urine (or bile or feces). Increased amounts of urobilinogen in the urine indicate an excessive amount of bilirubin in the blood.

Urobilinogen, in low concentrations, is commonly present in urine. When urine urobilinogen is low or the reagent tests negative, for a person with urine bilirubin and/or indications of liver dysfunction, it may indicate the presence of hepatic or biliary obstruction. Low test results may also indicate there is a failure of bile production.

Positive (elevated) test results may be due to liver diseases such as hepatitis and cirrhosis or liver metastases or liver infarction, as well as conditions associated with hemolytic anemia (extraordinary red blood cell destruction). Moreover, high test levels may indicate an overburdening of the liver or poisoning.

In either case of low or high urobilinogen levels, further investigation to determine the possible cause is merited.

Vitamin C

Many multiple reagent strips include a vitamin C reagent area. This is done as a check for vitamin C in the urine in order to see if it is acting as an interfering substance for several of the other reagent test areas (such as bilirubin, blood, glucose, and nitrite), depending on the manufacturer of the strip. Notwithstanding, for the purpose of this

material, we will cover the vitamin C reagent area as it is used for the purpose of screening for nutritional amounts of vitamin C, rather than as a test for interfering substances.

Studying the vitamin C reagent as a nutritional measurement is based on a theory that proposes if human tissues were saturated, then the water-soluble vitamin C would be excreted in large amounts in the urine. Research has shown that folks on a regular diet with no illness or severe stress on average excrete about 20 to 30 mg/dl (milligrams per *deciliter*) a day in their urine. A deciliter is a metric unit of volume equal to one-tenth of a liter. A liter is approximately 1.056 liquid quarts or 2.12 pints or 33.814 US fluid ounces.

Most natural health doctors prefer a urine vitamin C of 40 mg/dl or above, before making a satisfactory conclusion relative to this vitamin. When there is a consistent urine vitamin C of 20 mg/dl or lower, the results are very telling. Such low study results lend further fuel to all those in natural medicine who accept the maxim advanced by Linus Pauling that everybody is vitamin c deficient until proven otherwise.

Human beings cannot manufacture vitamin C (ascorbic acid or ascorbate). For this reason, we must obtain it through the diet or nutritional supplements. Nevertheless, vitamin C is responsible for many vital functions in the body and is essential for the formation, growth, and repair of bone, skin, and connective tissue; in helping to maintain healthy teeth and gums; in supporting a strong immune system; in the absorption of iron, which is needed to manufacture red blood cells; to counter free radicals; and a host of other chemical tasks. Making sure the body has enough vitamin C is important in order to help assure optimal functionality and long-term wellness.

A severe vitamin C deficiency leads to scurvy. This disease causes bruising, gum and dental problems, dry hair, dry skin, and anemia. Scurvy is not the only problem to which a vitamin C deficiency is linked. Other consequences of a deficiency in this vitamin include, but are not limited to: rapid aging, chronic fatigue, muscle weakness, irritability, joint aches, muscle aches, bleeding around hair follicles or bruises or gums, bleeding under the skin (capillary wall ruptures), nosebleeds, poor digestion, loose teeth, dry and brittle hair, brittle fingernails, hangnails, dry skin, rough skin, scaly skin, slow or non-healing wounds, anemia, multiple infections, weight loss, loss of appetite, and a weakened immune system. Nonetheless, the deficiency can be prevented by consuming a goodly sum of raw, fresh fruits and vegetables and/or by taking the recommended amount of vitamin C in daily nutritional supplements. Smokers require more, though.

Vitamin C is a water-soluble vitamin, which means it is capable of being dissolved in water. Therefore, any excess amount of vitamin C consumed should load the blood to its maximum saturation point. An abundant supply of this vitamin in the bloodstream means that every other organ in the body is also able to maximize its tissue level of vitamin C. In healthy human tissues the maximum vitamin C pool varies. When all the organs possess the optimal levels of vitamin C, any excess amount should appear in the urine, providing, naturally, that there is normal renal function.

The half-life of vitamin C in tissues varies depending on the research literature adopted. The range is from 16 to 20 days. For the purpose of this article, we will assume the smallest number of days is accurate.

The process of vitamin C depletion appears early on in the urine, as the losses in blood or tissue take place. Plasma levels fall next. The final depletions effect leukocytes and platelets. When vitamin C stores are depleted, very little vitamin C appears in the urine.

Data from the medical research literature gives 3 different ranges, from 1500 to 5,000 mg (20, 22, and 32 mg per kg of body weight), when defining healthy vitamin C stores. For the purpose of this material, we will assume the highest level is the healthiest. Therefore, assuming a tissue level of 5000 mg, a lack of vitamin C in the diet for 16 days would reduce the tissue store to about 2500 mg; in 32 days it would be about 1250 mg; in 44 days it would be 625 mg; and

in 64 days it would be about 313 mg. Three hundred thirteen (313) mg is deemed biochemical *scurvy*. Further, it is probable that vitamin C levels in the body of 1500 mg or less will result in no urinary excretion of vitamin C whatsoever.

It is important to note that certain medications such as aspirin, aminopyrine, barbiturates, hydantoins, and paraldehyde, as well as cold or heat stress, are all known to increase the excretion of vitamin C in the urine, which could lead to a false positive.

Complementary Studies Concerning Wellness

In addition to urinalysis, natural medicine practitioners regularly support oxidative stress, interstitial fluid, and blood studies. The 10 most important and thus mainly recommended blood studies on a yearly basis, especially for folks age 40 and over, are:

1. C- Reactive Protein (CRP)
2. Complete Blood Count (CBC)
3. Chemistry Panel
4. DHEA
5. Estradiol
6. Fibrinogen
7. Homocysteine
8. Hemoglobin A1C
9. Testosterone
10. Thyroid Stimulating Hormone (TSH)

This simple set of wellness blood chemistry tests could save your life, preserve current health, improve your present wellness status, and support long-term wellbeing!

Summary of Urinalysis Results

Bilirubin	Formed as a waste product of hemoglobin. Normal result is negative. Positive results are a possible early indicator of liver disease and stem from such things as gallstones in the biliary tract, hepatitis, an injury resulting from surgery that affects the biliary tract, liver tumors, toxic liver damage, gallbladder tumors, biliary strictures, and cirrhosis.
Blood	Normal is negative or a small number of RBCs (100 mg/dl plasma) to be present in urine. Positive result may indicate UTI, tumor, kidneys stones, trauma to any of the urinary organs, or other serious problem.
Glucose	Glucose is not usually found in urine. If it is, further testing is needed to determine if the subject has diabetes mellitus.
Ketones	Normal is negative. Ketones (also known as ketone bodies) are not normally found in the urine. A ketone body is a chemical produced when the human body breaks down fat tissue stored around the body for energy. The use of fat instead of sugar by the body is commonly done following heavy exercise and during long-term exposure to cold. Positive result may be an early indication of insufficient insulin in a person who has diabetes.
Leukocytes	Leukocytes, also known as white blood cells, are involved in the body's immune response to illnesses and injuries. Normal is negative. Positive is indicative of a health problem, such as gut dysbiosis, poisoning of the tissues from bacterial exotoxins (poisonous substances secreted by a microorganism), or UTI.
Nitrite	Nitrite is caused by bacteria reducing nitrates, which would indicate either a urinary tract infection or gross hematuria (blood in the urine). Normal is negative.
pH	6.4 – 6.8 is ideal range. All minerals consumed through solids and liquids are capable of being absorbed into the body. Below 6.4 = acidic. Above 6.8 = alkaline.
Protein	Measures amount of albumin (albumen). Results below 30 = normal; the fewer albumins in urine, the better.
Specific gravity	There are no "abnormal" specific gravity values. Specific gravity is the ratio (comparison) of the density (compactness – the degree to which something is filled) of a substance (urine) to that of distilled water at a specified temperature {39.2°F (4.0°C)}.
Urobilinogen	Urobilinogen is a colorless compound formed in the intestine after the breakdown of bilirubin by bacteria. Positive results may be due to liver diseases such as hepatitis and cirrhosis or liver metastases or liver infarction, as well as conditions associated with hemolytic anemia (extraordinary red blood cell destruction); or they may indicate an overburdening of the liver or poisoning.
Vitamin C	Vitamin C of 40 mg/dl or above may indicate satisfactory tissue saturation of the vitamin. Otherwise, a deficiency is assumed.

Closing Remarks

The information provided hereinabove explained the purposes and meanings for the results of urinalysis. Dr. Speroni's interests are in natural medicine and how, by a carefully designed, custom, day-by-day, step-by-step, complete series of events, many people can experience normalization of urinalysis test results and restore healthy organ systems' function -- permanently! He educates the person consulting with him on everything she or he needs to know about how to optimize health at the cellular level, address the key problems that every person with abnormal urinalysis results has, and forever reverse challenges to wellness without drugs. The information Dr. Speroni provides is easy to understand, simple to implement, and intended to last a lifetime It is appropriate for all test subjects, family members, caregivers, and other natural health professionals who desire to focus on helping people speedily reverse the diseases and disorders from which they are suffering, using natural, safe, noninvasive countermeasures.

For more information, contact Dr. Anthony Speroni, today, at 407-349-5100 or by e-mail (click here).