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Created: July 27, 2010; Last Update: October 24, 2019; Next update: 2022. Most people will have already given a urine sample at some point in their lives. A sample can be analyzed using a number of different tests. These tests can help doctors diagnose certain diseases or to monitor their progress. For example, urine test strips can show whether you may have a urinary tract infection or diabetes. Here we describe the various urine tests, what they can be used for, and what the results tell us. The elimination of urine is very important for different bodily functions. It regulates the balance of water in the body, for example, and also gets rid of substances that are produced during metabolic processes and are no longer needed by the body. These include toxic substances in food or medicines. Urine tests can help detect diseases of the urinary system as well as metabolic diseases like diabetes or liver disease. The color, odor and amount of urine can already indicate whether something is wrong. If, for instance, someone passes only a little very dark urine, it could be a sign that they have not had enough to drink – or that their kidneys are no longer working properly. Cloudy or flaky urine could be a sign of a urinary tract infection. If the urine is reddish in color, there might be blood in it. To find out more, the urine needs to be tested using a test strip or in a lab. Five standard urine tests can be used to examine the different components of urine. Two of them can also be done at home, whereas the other three can only be done in a lab. Urine can easily be contaminated by bacteria, cells and other substances so it is a good idea to cleanse the genital area with water – but not soap – before giving a sample. To get an accurate result and avoid bacterial contamination, “clean” midstream urine is used. You take a sample of midstream urine by interrupting the flow of urine after a few seconds and then collecting this middle portion of the urine in a cup. Your doctor will let you know if there is anything else you should pay attention to for your specific test. A rapid urine test is the quickest way to test urine. This involves dipping a test strip with small square colored fields on it into the urine sample for a few seconds. After that you have to wait a little for the result to appear. Depending on the concentration of the particular substance you are testing for, the fields on the test strip change color. Then the resulting colors of the fields are compared with a color table. The color table can be found on the urine test package. It shows which colors indicate normal and abnormal values. In a rapid urine test, a test strip is dipped into the urine and then compared with the colored fields on the packaging. Rapid urine tests are usually done as part of routine examinations – for example at a family doctor’s office, during antenatal visits, when being admitted to the hospital, or before surgery. They are also used in people who have acute symptoms like lower abdominal pain, stomach ache or back pain, frequent painful urination, or blood in their urine. Some people who have diabetes use this test to check their sugar levels. Rapid urine tests can be done at doctor’s offices, in hospital, or at home. The test strips are available without a prescription at the pharmacy or on the internet. But they are not intended for self-diagnosis purposes, and should be used in consultation with a doctor. You can determine whether the results are within the normal range by using the package insert or the color chart on the package. The pH value, for example, can be used to find out whether there is an increased risk of developing urinary stones. This is the case if the pH is too acidic (if the value is below 5). A pH value over 7 may be a sign of a bacterial urinary tract infection. Tests measuring other things can help detect other problems: High protein levels may be a sign of nephritis (a kidney inflammation). Ketones and sugar in urine are signs of high blood sugar. Leukocytes or nitrite may be a sign of a bacterial infection. If the test results are abnormal, you need to see a doctor. As with all tests, the results of rapid urine tests are not always reliable. For this reason, it might be a good idea to have a more detailed test done in a lab. Urinalysis is an initial basic test of the main features of the blood. It is often part of a routine examination and is frequently performed when people are admitted to hospital and before surgery. It can also be used to check abnormal results from a rapid urine test. Complete urinalysis is done in a laboratory. It usually involves three steps: Assessment of the color, cloudiness and concentration of the urine Examination of the chemical composition of the urine using a test strip Examination of the urine under a microscope to look for bacteria, cells and parts of cells Using a microscope to examine the solid parts of urine: the picture shows red blood cells (above), white blood cells (middle) and a cast of clumped-together white blood cells (below). Urinalysis is used to find the cause of – or monitor – urinary tract infections, bleeding in the urinary system, or kidney or liver disease. It can also be used for diabetes, some diseases of the blood, and bladder stones. In addition to the substances that can be detected using a rapid test, urinalysis can also test for the following: Creatinine (breakdown product of muscle metabolism, an indicator of kidney function) Bacteria (not usually found in urine) Urinary casts (cylindrical stuck-together structures that form in the renal tubules, not usually found in urine) Crystals (found if there are high concentrations of certain substances in the urine, not usually found in urine) Epithelial cells (cells that line the ureter, bladder and urethra) With the help of these values, laboratories can also use urinalysis to detect signs of other problems: Cholesterol crystals can be caused by high levels of cholesterol in the urine, for example. Urinary casts are usually a sign of kidney disease, such as an inflammation of the renal pelvis. Abnormal results can be discussed with a doctor and may be followed by more precise tests, such as a blood test. A urine culture is a test done in a laboratory to see whether urine has germs in it. A sample of midstream urine is put into a container. Then small plates with a growth medium that the germs can grow on are put into the sample and the container is closed tightly. The urine culture is then placed in an incubator for one to two days. If there are bacteria or fungi in the urine, visible colonies can grow. Round petri dish with bacteria or fungi taken from urine. These become visible after two to four days in an incubator. Urine cultures can be done to test whether there are bacteria or fungi in urine. If this is the case, you can often already see what type of bacteria or fungi they are, based on the size, form and color of the colonies. Urine cultures are usually done to detect bacteria and fungi in urine when testing for a urinary tract infection. If bacteria are found during laboratory testing, then the type of antibiotic needed is usually determined at the same time. This test involves collecting urine over a period of 24 hours: The first urine sample after waking up is not used, but the time of urination is noted. From then on, for the next 24 hours every single drop of urine is collected in a container. Once the 24 hours are up, you empty your bladder one last time and the urine is added to the sample already collected. Your doctor will give you the container for the urine sample. The container usually already has a substance in it to prevent bacteria from growing while the urine is still being collected. The urine should be kept in a refrigerator for the entire 24-hour period. It is then tested in a laboratory. 24-hour urine samples can be used to find out what amounts of certain substances (such as proteins, hormones, salts and metabolic products) are excreted from the body. The test results can tell us, for instance, how much protein and creatinine are in the urine. If too little of the metabolic product creatinine is being filtered out of the blood by the kidneys, the kidneys may not be working properly. High levels of protein in urine, known as proteinuria, can be caused by conditions such as heart failure, diabetes, inflammation of the renal pelvis, urinary tract infections, kidney disease or kidney cancer. Some disorders of the endocrine (hormonal) system increase the amount of hormones and their metabolic products in the urine. In order to detect those disorders, urine is often collected over a 24-hour period on several days and then tested. If your menstrual period is late, there are different tests available to find out whether you are pregnant. But they are not absolutely reliable. Most tests can already determine whether a woman is pregnant eight to ten days after her period was due. They are usually done like rapid urine tests, using a urine sample in the morning after getting up. You can find exact instructions in the package insert. Pregnancy tests can be bought in pharmacies, drugstores, department stores and on the internet. The urine of pregnant women contains a special hormone known as human chorionic gonadotropin (hCG), which is produced in the placenta. Many women who would like to find out whether they are pregnant will first do a pregnancy test. The results might be false if a woman does the test too soon, is taking medicine or drinks a lot of fluids before doing the test. Only a doctor can say for sure whether you are pregnant or not. Drugs can also be detected in urine for a while after being used. Depending on the type of test, cannabis can be detected up to several weeks after being consumed. Drugs like cocaine, ecstasy or heroin can show up in test results for up to five days. Various types of tests can be used here too: Rapid tests help give police fast results on site, while other drug tests need to be sent to a laboratory. Urine samples can also be used to test athletes for banned performance-enhancing substances (doping). Sources: Andreea S. Avelini P, Berg M, Blank I, Burk A. Lexikon der Krankheiten und Untersuchungen. Stuttgart: Thieme; 2008. Psyhrembel. Klinisches Wörterbuch. Berlin: De Gruyter; 2017. Thomas L. Labor und Diagnose. Indikation und Bewertung von Laborbefunden für die medizinische Diagnostik. Marburg: Medizinische Verlagsgesellschaft; 2007. IQWiG health information is written with the aim of helping people understand the advantages and disadvantages of the main treatment options and health care services. Because IQWiG is a German institute, some of the information provided here is specific to the German health care system. The suitability of any of the described options in an individual case can be determined by talking to a doctor. We do not offer individual consultations. Our information is based on the results of good-quality studies. It is written by a team of health care professionals, scientists and editors, and reviewed by external experts. You can find a detailed description of how our health information is produced and updated in our methods.



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