

Difäm

German Institute for Medical Mission

Podcast on Corona testing

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Welcome to this new Difäm Health Community Podcast. My name is xxx and I am a member of the Difäm health team. Today we want to put a focus on different SARS-COV-2 tests. There are tests for diagnostic purposes and tests that provide information about the immune status of a person.

Today, I am here with my colleague xxx . Xxx, can you explain what kind of tests exist regarding Covid-19?

Thanks xxx. Hello everybody out there.

Basically we have two kinds of tests in the context of Covid-19. We have diagnostic tests that help you to confirm a current, active infection in a patient, and we have antibody tests which confirm a former, now inactive infection with Sars-CoV-2. Diagnostic tests are performed on a sample of surface cells taken from the nose or the throat as well as from saliva. Antibody tests are performed on a blood sample of the patient.

Let us start with the diagnostic tests that confirm an active, ongoing infection. I assume that these are very important to control the pandemic.

You are right. Diagnostic tests are needed to control the transmission of the virus. The diagnostic tests come as molecular or antigen tests. Molecular tests look for specific parts in the genome of the virus. PCR tests which stands for Polymerase Chain Reaction are molecular tests. There are other methods currently in research but not readily available so far. However, PCR tests are very specific and very sensitive and are currently the gold standard in confirming a Covid infection. They can detect even low levels of the virus in the sample because the test can amplify which means multiply existing genomic particles. The bad news is that you need a specifically equipped laboratory to perform these tests. Furthermore, PCR analysis takes several hours up to days before the result is available.

That takes us to the rapid tests, which are mostly antigen tests. Am I right?

Yes, most rapid tests are antigen tests. Antigen tests work in a different way. They use synthetic antibodies to look for protein markers on the outside of the virus. In order to get a reliable correct result with a rapid test, the sample has to contain quite a number of viruses. If the infection is still young and the virus has not yet replicated so much, rapid tests will not be able to detect an infection. They are very specific but not very sensitive.

Could you please explain again the difference between sensitivity and specificity with regard to a test?

Sure. A highly specific test is a test that can correctly identify the persons who are not infected and do not carry the virus. This is the true negative rate. A highly sensitive test will identify all those who are definitely infected with the virus. Therefore, sensitivity describes the true positive rate. The sensitivity and specificity of tests is normally marked on the package. It is well worth to have a look at it and see, what the percentages are with the test I am working with.

Okay. Just to summarize: molecular tests like PCR or LAMP are more complicated to perform and need special machines in a laboratory. They are highly specific and sensitive, meaning that they filter correctly those who are not infected and those who are infected. Antigen tests, which are mostly the rapid tests can be performed at the service point. They are specific and so will find

correctly those who are not infected. However, their sensitivity is lower meaning that there will be infected people with a yet low virus load that will show as negative in the test.

Let us now look at antibody tests. You said that antibody tests are performed on blood samples.

This is correct. Antibody tests try to find out if your immune system has already produced antibodies against SARS-CoV-2. This will be the case if you have been infected before. So, this test looks into the past: have you ever had an infection? Remember: Our immune system provides us with specific antibodies against disease agents like a virus. This means, that if you have antibodies against SARS-CoV-2 in your blood, you have already had an infection in the past. If you did not feel sick at any point, you probably might have undergone an asymptomatic course of COVID-19.

If you want to freshen up your knowledge on our body's immune response to SARS-CoV-2, listen to our podcast on that topic. You can find it on the health community website under www.difaem-community.de.

Will everyone who has had Covid-19 test positive in an antibody test?

No, unfortunately not. Antibodies do wane after time. Up until now, we do not know how long antibodies will stay after an infection. It seems that the time is quite different in different people. Therefore, based on the current stage of knowledge, it is recommended for persons who had Covid-19 to get one shot of vaccination to booster the antibody situation in the body. Early after infection the so-called titters, indicating the amount of antibodies, are high then a contraction phase follows in which antibody levels are reduced, which then leads into a memory phase. Likewise for vaccination antibodies: they do wane after time, but, as for now, not as fast as antibodies after an infection. The research on this topic is ongoing because the antibody activity also has implications for vaccination and for how long a vaccine will protect us from reinfection.

The availability of Covid-19 tests is very limited in countries with restrained resources. You can be lucky if there is a hospital close to you with a laboratory that can perform a PCR test. The most common type of test available is the antigen rapid test. How should those tests be used in a health facility?

The Sars-CoV-2 pandemic is driven significantly by early and asymptomatic viral transmission. Therefore, an early identification of an infectious person is very important in fighting the spread of the virus. A positive test result will tell us several things about a patient:

1. We have to isolate the patient to prevent the transmission of the virus to other patients as well as to staff and visitors.
2. We will have to take special precautions as medical staff when taking care of the patient.
3. We can better assess the often-diverse symptoms of a patient if we know that there is a Covid infection behind him or her.
4. We can advise patients who show no or only mild symptoms and who can recover at home that they should pay good attention to their body. They have to monitor when symptoms are getting worse and medical support has to be sought. Most people recover from Covid-19 without the help of a doctor or clinic. However, sometimes, further support is needed.

But let me just underline again the major shortfall of antigen rapid tests for Covid-19. When you have a positive antigen test result, you can be quite sure that the patient is positive. However, if you get a negative antigen test result, the patient could still be positive, but just at the beginning of his infection. Therefore, you may want to retest a person if you have the impression that he or she develops Covid-like symptoms at a later stage.

So, should we test every person who comes to our hospital or health centre?

Well, that would be perfect. But in most countries, the health facilities lack a sufficient number of rapid tests. Therefore, we have to use the tests prudently. There are different indications for testing a patient on Covid-19.

Firstly, the patient shows flu-like symptoms. That may be fever, a dry cough, shortness of breath. Be aware of other potential symptoms such as sore muscles, diarrhoea, tiredness or loss of taste and smell. In addition, you can measure the oxygen level of the patient's blood with a pulse oximeter.

Secondly, take a careful history of the patient. Has the patient been in closer contact with a person known to be infected with Covid-19? Has she or he travelled recently to areas with a high incidence of Covid-19? Is the person living in crowded circumstances that make transmission easy? Does the person work in a setting that is favourable to a Covid transmission such as teachers in school, health staff etc.? Has the person recently attended big crowds of people such as in church services or on the market without keeping the distance precautions or wearing a mask? If you ask these questions, you can assess the risk of someone having contracted Covid-19.

Can you give us some guidelines how we can prioritize who to test and who not to test if we have only a limited number of tests at our disposal?

Your health department may have given out guidelines on how to prioritize testing of patients for Covid-19. If this is not the case, you could give priority to:

- Critically ill patients with unexplained viral pneumonia or respiratory failure

In addition, you should test persons with fever or symptoms of a lower respiratory tract infection,

- o who either have a contact history with a Covid patient or...
- o who suffer from a chronic disease or are immunosuppressed like persons living with HIV, or...
- o who are hospitalized in your facility, or...
- o who are critical in responding to the health crisis such as health workers or officials in public health

How are the tests carried out?

Here you have to look carefully at the brand of the test. In the beginning of the Covid pandemic in 2020, for all tests the swaps had to be taken either oropharyngeal which means deep in the throat or nasopharyngeal which means deep in the nose or even from both sites. This is quite uncomfortable for the patient. However, the virus concentration is higher deep in the throat or the nose, so this swap tends to bring results that are more reliable.

The current antigen tests mostly require only a nasal swap for which you insert the cotton swap about 1.5 centimetres into the nose until the cotton is no more visible. You turn the swap about 4 to 6 times for about 15 seconds before removing it.

However, there are two rules that you should always follow when practicing a Covid test.

First rule: Use your personal protective equipment – a blouse or gown, gloves, a face shield or goggles and a mask, ideally an N95 or an FFP2 mask. You will come very close to the patient and you will handle infectious material. So there will be a very high risk of getting infected with Covid-19 if you do not protect yourself.

Second rule: Always read the instructions of a test before you use it. There are many different brands on the market now, which all differ a bit, in how you take the test correctly. If you want to get reliable results, you will have to use the test correctly.

Thank you very much for this comprehensive overview. Let me wrap up the key messages: There are tests with which we can diagnose an ongoing Covid infection. These come as antigen rapid tests or molecular tests like PCR. In addition, there are antibody tests, which can establish in hindsight if someone has undergone a Covid infection at some point in time. The antibody test cannot be used for diagnostic purposes.

If we only have a limited number of Covid tests at hand, we have to prioritize among patients who show symptoms, are particularly vulnerable due to other health conditions or have been in contact

with a confirmed Covid case. The majority of tests right now, especially the antigen rapid tests require a nasal swap. Before testing a patient, we should always put on our PPE and read the instructions of the test carefully.

Thanks to you for this summary.

Dear listeners - do not miss to get information and listen to our podcasts. You can easily access our podcast on our website: www.difaem-community.de

So, for now,

Be blessed and stay safe

Further material:

[World Health Organization African Region](#)

What are the challenges of COVID-19 treat in Africa and how can it be adopted in low resource settings? Dr Awa sheds more light on this.

https://www.youtube.com/watch?v=oxJp_cvhBd8

Viral tests for Covid-19 (CDC) You-tube video

<https://youtu.be/gff4GkGvW-Q>

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