



## MAC

### Summary

MAC is a life-threatening bacterial infection. HIV positive people whose CD4+ counts are below 50 may be at risk of developing MAC. Symptoms of MAC include fever, weight loss, night sweats, watery diarrhea, cramping, fatigue and weakness. Antibiotic drugs are used to prevent and to treat MAC.

### What is MAC?

*Mycobacterium avium* complex (MAC) is an infection caused by a group of closely related bacteria, including *Mycobacterium avium* and *Mycobacterium intracellulare*. These bacteria are commonly found in soil and water, and they probably enter the body either by being breathed in or swallowed. In HIV negative people, MAC bacteria usually cause disease in the lungs. In people with AIDS, the bacteria can spread throughout the body and cause widespread infection in almost any organ system.

### Who is at risk for MAC?

MAC is an AIDS-defining condition. Like most of the conditions associated with AIDS, MAC has become rare, thanks to effective combination antiretroviral therapy (drug cocktails). The HIV positive people who may be at risk for MAC are those with CD4+ counts below 50 and those who are not taking anti-HIV drugs.

### Symptoms

The symptoms of MAC can include fever, weight loss, night sweats, watery diarrhea, crampy abdominal pain, weakness and fatigue.

MAC bacteria are slow-growing, so these symptoms may be very mild at first, and it can take several weeks, even months, before someone feels really ill.

### Diagnosis

Because the symptoms of MAC are common to many infections, lab tests are performed to confirm the diagnosis.

- Samples of blood, sputum or stool can be stained to show the bacteria. Staining can confirm that the bacteria belong to the *Mycobacteria* family, but it cannot distinguish between the types that cause MAC and other kinds of mycobacteria, including the type that causes tuberculosis.
- The bacteria found in blood, sputum or stool samples can be grown in cultures in the lab so that they can be definitively identified. It may take four to six weeks to get the results from cultures.
- Small samples of tissue from the liver or bone marrow can be removed for staining and culturing. Although biopsies are highly accurate tests, they are invasive and painful procedures and the benefits should be carefully weighed against the risks.



- A blood or tissue sample can be tested by polymerase chain reaction (PCR). Results can confirm MAC in days, even hours, but this test may not be widely available.

## Prevention

MAC is a life-threatening illness — its symptoms are debilitating and it is difficult to treat. The best way to prevent MAC is to keep your CD4+ count well above 50 cells. An effective cocktail of anti-HIV drugs can help control the virus and keep the CD4+ count above 50.

HIV positive people with very low CD4+ counts should consider taking preventive medication. The drugs commonly used to prevent MAC are:

- 500 mg clarithromycin (sold as Biaxin) taken twice a day, or
- 1,200 mg azithromycin (sold as Zithromax) taken once a week, or
- 300 mg rifabutin (sold as Mycobutin) taken once a day.

Preventive medication should be taken as long as the CD4+ count is below 50. Recent studies suggest that it is safe for patients to stop their medication if their CD4+ counts rise and remain above 50 cells on two separate tests.

## Treatment

Because of the seriousness of the disease, doctors often begin treatment as soon as they suspect MAC (based on the patient's symptoms and early test results), instead of waiting a month or so for the final results of blood cultures. Combination therapy using three antibiotic drugs is recommended because MAC bacteria are difficult to treat and they can quickly become resistant to the effects of one drug alone.

The most commonly used combinations are:

1. clarithromycin OR azithromycin, *plus*
2. ethambutol, *with or without*
3. rifabutin.

The choice of which combination to take is based on the person's overall health, the extent of their symptoms, and known allergies or drug sensitivities. If, after four weeks of treatment, there is little or no improvement in symptoms, repeat blood cultures may be done. If MAC is still present in the blood, usually the doctor will change the combination of drugs.

Although treatment for MAC can clear the infection from the blood, it may not completely remove the bacteria from the body. As a result, experts used to recommend that treatment be lifelong, to prevent the bacteria from spreading back into the blood.

However, since effective drug cocktails can control HIV and raise CD4+ counts, recent studies suggest that it may be safe for some patients to stop maintenance therapy after six months if they are using a new combination of anti-HIV cocktail.

## Credits

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## Disclaimer

**Decisions about particular medical treatments should always be made in consultation with a qualified medical practitioner knowledgeable about HIV-related illness and the treatments in question.**

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