The precise measures of gastritis, duodenitis, peptic ulcer and duodenal ulcer is unknown. But you can safely say that these conditions are most common among all diseases of the gastrointestinal tract. Usually they are detected when a person is forced to go to the hospital with serious complaints or dangerous complications.

Early diagnosis allows preventing possible hardships of the process even before the onset of ulcers. The most modern and optimal is the non-invasive methodology of the spectrometry of exhaled air, implemented in the construction of the Health Monitor device.
Based on the regular reports provided by prevention and treatment facilities, the situation for peptic ulcer is:

- The average incidence in Russia is about 120 cases per 100 thousand of the population
- City dwellers become ill 4-5 times more frequently than rural residents
- Male patients of working age prevail
- The course of a disease is chronic with seasonal exacerbations in spring and autumn
- The duodenum is affected 4 times more often than the stomach
- The annual economic damage caused by these diseases are estimated to be more than 25 billion US dollars.

Despite the improvement of medical care peptic ulcer still has a certain percentage among the causes of human mortality. The death of patients is caused not by ulcer itself, but its complications like gastrointestinal bleeding and malignancy (degeneration into a malignant tumor).

### Course of a disease

For now it is proven that Helicobacter pylori play a huge role in damaging mucous membranes of the stomach and duodenum. They produce a number of substances that weaken the protective barriers of the body.

When bacterization reaches a certain level, individual for each person, the inflammation of the gastric mucosa and/or duodenum originates. Immune-competent cells begin to migrate to the focus of inflammation, thereby intensifying inflammatory process. Against this background, the glands that synthesize protective mucus die and processes of tissue damage are activated.

In the place of the most active inflammation the mucous membrane dies to the full thickness and an ulcer is formed. It takes several days or weeks for its development from the onset of gastritis or duodenitis and it all depends on the characteristics of each case of the disease.

The scheme of therapy includes at least three or four drugs of different directions. The average duration of one course is three weeks. It is necessary to follow a strict diet. Unfortunately it is not always possible to fully restore the damaged mucosa.

### Is endoscopy crucial?

Traditional methods are imperfect. A skilled doctor can only suspect gastritis or ulcer on the basis of complaints, interview and examination. After this the patient should be referred to the endoscopist for FEGDS (fiberoptic esophagastroduodenoscopy).
The method allows examining the mucous membranes of the stomach and duodenum to see inflammation and ulcer. But it is not without its flaws:

- Complex equipment that requires expensive maintenance is required
- Non-compliance with rules for processing endoscopes leads to the fact that healthy people become infected with Helicobacter during the procedure
- FEGDS can not be used for children, spinal patients, and for patients with certain types of allergies
- Not suitable for screening
- The procedure causes some discomfort, takes a lot of time and does not allow evaluating the activity of Helicobacter pylori infection.

Therefore, sometimes it is required to take biological material from a focus of a disease, microscopize it and plate it on nutrient solution. This procedure must be repeated several times during the course of treatment (a decrease in H. pylori population to convince eradication).

**Non-invasive tests**

Analysis of the exhaled air helps to get rid a person of FEGDS. The bottom line is that Helicobacter cells break up the urea into ammonia and carbon dioxide with the help of a specific enzyme called urease.

These metabolic products are secreted through the lungs and can be detected in the air that the patient exhales.

To administer a classic urease test it is required to drink urea labeled with a radioactive isotope of carbon (13C). By its content in the mixture of exhaled gases (CO2), it is possible to make conclusions about the activity of urease: the more isotope and the faster it appears, the more aggressive Helicobacter pylori invasion is.

The first devices for detecting increased concentrations of ammonia or estimating urease activity occupied a very large amount of space, and the samples were very time consuming. Still their results were often erroneous.
The latest development of the XXI century is the Health Monitor device, which provides the same data, but only in less time, with less financial costs and without the use of radioactive substances.

The principle of operation is based on recording spectral lines of ammonia and carbon in the exhaled air. Advantages of the device can not be overestimated:

- Compact dimensions: it is possible to carry out diagnostics in any room
- A radioactive carbon isotope is not needed for the test.
- It’s enough just to breathe into the individual mouthpiece to figure out the result
- Data analysis requires only about 3 minutes.
- Low price of one test
- Ideal for mass screening and monitoring the effectiveness of peptic ulcer treatment
- The sensitivity of the device is 99% and the specificity is 98%
- Modern software makes it possible to store received data, easily exchange it and use it for later analysis
- The device is easily integrated into any computer network of any scale

Thanks to such opportunities, the Health Monitor allows identifying people infected with Helicobacter before the development of ulcerative processes. And for those who are ill it is problem-free method to monitor the effectiveness of therapeutic measures.