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- [Entertainment](#)
- [Events](#)
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## **Ballast water testing program to prevent spread of disease a failure, study finds**

By **Laura Stackhouse** | [Industry](#) | Wed, 14 Jan 2015 - 16:00 GMT

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Over the past 10 years, 95% of tests on the bacteria removal from ships' ballast water have proven invalid - meaning that new protocols need to be created before ballast water regulations come into place



According to a new study published in the [Marine Pollution Bulletin](#), an international testing program meant to stop the spread of diseases in ships' ballast water is a failure.

Tests of bacteria removal from ships' ballast water is designed so treatment systems are guaranteed to pass, whether they actually work or not.

Ballast water is carried on ships to maintain proper buoyancy, but contains millions of organisms including human pathogens, which can be introduced into the world in ballast discharges. Shipboard treatment equipment designed to remove these organisms is tested and certified under a program created by the UN's [International Maritime Organisation](#) in 2004, which includes tests for the removal or killing of target microbes that are indicators of bacteria that cause human disease.

The report reveals that the past 10 years of tests have been run with test water that contained no target microprobes, which meant it was impossible for the treatment equipment to fail. Director of the Centre for Research on Aquatic Bio-invasions and lead author of the study, Dr. Andrew Cohen said: "The equipment being tested would have passed the microbe tests even if it hadn't been turned on."

Approximately 95 percent of tests that took place between 2004 and 2013 were invalid. In nearly two-thirds of the tests there were no detachable target microbes in the test water before treatment.

The fact that the tests are defective means that they have provided no information on the ability of the treatment systems to prevent the transport and release of bacteria that cause human disease. The report concludes that in some case the treatment used may make things worse by removing small organisms that eat bacteria, for example. This removal could cause ballast tanks to turn into bacteria incubators.

There is a large amount of evidence to suggest that ballast water spreads human pathogens. In the 1990s ballast water introduced a strain of pandemic cholera into U.S. waters and contaminated fish and oysters, and likely introduced the strain into South America, where it killed over 10,000 people.

“Since treatment is our main defense against spreading diseases in ballast water, failing to test the treatment equipment may have serious consequences,” says Dr Cohen.

Further analyses of the bacteria found in ballast water have raised additional concerns. Dr Fred Dobbs, a marine microbiologist at Old Dominion University and the co-author of the paper said: "Dozens of species of pathogenic bacteria have been identified in ballast water. Our previous work showed that antibiotic-resistant bacteria are also found in ballast water. Since resistance genes can be transferred from one bacterium to another, putting pathogenic bacteria and resistant bacteria together in a ballast tank risks the creation of new and dangerous strains. If ballast treatment isn't effective, these strains could be released into the environment."

The authors of the study say that new, effective test protocols are needed, and that the current approved treatment systems will need to be re-tested. “U.S. and international agencies [need to] act quickly to develop the protocols and require the new tests” to allow the new systems to not cause delays to the ballast discharge regulations coming into place.

Treatment equipment is estimated to cost around \$1 million per ship, and up to \$8 - \$12 million for larger ships. The shipping industry is expected to spend \$70 billion globally on ballast water treatment equipment over the next 10 years.

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