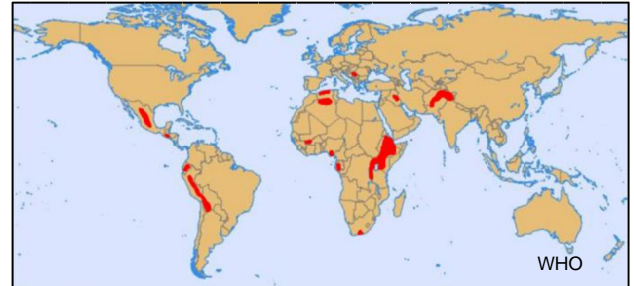


Just the Facts...

*Louse-borne typhus is a rickettsial disease in the typhus fever group caused by the bacterial pathogen *Rickettsia prowazekii*. The disease is transmitted to humans mainly through the infective feces of the human body louse, *Pediculus humanus corporis* De Geer. The disease goes by many names including epidemic typhus, old world typhus, European typhus, ship fever, jail fever, camp fever, war fever and classic typhus fever. The name typhus comes from the greek word "typhos", meaning smoke, cloud or stupor arising from fever. The disease can be debilitating and lead to death without medical treatment. Historically, as many as 30 million cases of louse-borne typhus resulted in over 3 million deaths in areas of eastern Europe and Russia during World War I. A milder recurrence of the symptoms, known as Brill-Zinsser disease, may occur years or even decades after the initial infection.*

Where Is Louse-Borne Typhus Found?

Louse-borne typhus has a world-wide distribution but is endemic to the cooler, mountainous regions of Mexico, Central and South America, Africa, Asia and the Middle East. The disease is typically found in individuals with poor hygiene who wear the same clothing continuously. Situations where large numbers of people are crowded into unsanitary living conditions, such as those found in refugee camps after natural disasters or wars, and around individuals who are homeless or living in poverty represent high risk situations. Several thousand cases of louse-borne typhus are reported annually from the mountainous areas of eastern Africa. Recent cases in the United States and Europe have been reported but are rare.



Distribution. *Rickettsia prowazekii*, the bacterial agent of louse-borne typhus, has a worldwide distribution but is endemic to the cool, mountainous regions of Mexico, Central and South America, Africa, Asia and the Middle East.



Photo: John T. Crissey, MD



Photo: University of Florida

How Is Louse-Borne Typhus Transmitted?

The most common method of transmission of louse-borne typhus is through the infective feces of human body lice. Unlike other rickettsial diseases, humans are the primary reservoir for the infective bacteria. Body lice become infected with *R. prowazekii* when they feed on an infected human. Body lice are usually transferred between humans either through direct contact or through an infested persons clothing or bedding material. Humans become infected when they crush infected body lice or rub the infective feces into the bite site, wounds or mucous membranes of the body. The dried feces of body lice may remain infective for up to a year after being deposited. In the United States, individuals can also contract the bacteria if they come in close contact with flying squirrels, their ectoparasites, or their nests.

What Are Human Body Lice and What Do They Look Like?

Human body lice are insects that use piercing, sucking mouthparts to feed on human blood. Body lice are classified under the insect Order Phthiraptera, Suborder Anoplura, Family Pediculidae. Body lice cannot jump and do not have wings. Adult human body lice are small, around 1/8 inch in length, golden yellow in color and have hook-like claws for legs which are adapted for holding tightly onto fibers and hairs. Their eggs, called "nits", are about 1 mm in length, cream colored and are usually found in clusters attached to clothing fibers.

What Is the Life Cycle of the Human Body Louse?

The eggs of human body lice usually take 5 to 10 days to hatch. Cool temperatures can delay hatching up to 30 days. The eggs hatch into nymphs which immediately begin feeding on the blood of their human host. Body lice are often found crawling on the clothing and bedding material of the host. These insects only come in contact with the host's skin when they want to

feed. Body lice usually feed every 3 to 6 hours, and have a preference for the tender areas of skin found under the arms and around the waist. Body lice nymphs will shed their skin three times over the next 8 to 28 days in order to reach reproductive maturity as an adult. The adult female body louse can lay between 5 to 8 eggs per day, and as many as 300 eggs in her lifetime. Adult body lice can live up to 30 days on a host. They will usually die within 10 days if separated from their host or unable to feed.

Lifestages of the Human Body Louse.

Top: The eggs or nits of the human body louse are small, about the size of a thread knot, cream colored and usually found attached in clusters along the seams of clothing and bedding material.
Bottom: Adults of the human body louse, the primary vector of *Rickettsia prowazekii*.

What Are the Symptoms of Louse-Borne Typhus?

Symptoms start to appear 7 to 14 days after the initial infection with *R. prowazekii* and often include a sudden high fever (105oF or 40oC), severe headaches, chills, photophobia, confusion, vomiting, pain and stiffness in the muscles and joints. Four to five days after the onset of symptoms, the patient may exhibit a dark-red rash of elevated spots around the waist and shoulders. The rash may spread to the rest of the body except for the face, palms of the hands and soles of the feet. The course of the disease is rapid and the fever drops after about 12 to 14 days, followed by rapid recovery or death. Mortality without medical treatment varies, but may be as high as 50 to 70 percent in severe epidemics.

What Is Brill-Zinsser Disease?

Brill-Zinsser disease is a recurrent form of louse-borne typhus occurring many years or even decades after the initial infection. In the United States it is most commonly seen in those who were exposed to the *R. prowazekii* bacteria during World War II. The clinical course of the disease is similar to louse-borne typhus but is often milder and recovery is much faster. The skin rash is rarely seen. Diagnosis is made on the basis of a fever with unknown origin and a history of previous exposure to louse-borne typhus.

How Is Louse-Borne Typhus Diagnosed?

A blood test is the primary method used for diagnosis of *R. prowazekii*. Contact your preventive medicine personnel or your primary care physician about getting tested.

How is Louse-Borne Typhus Treated?

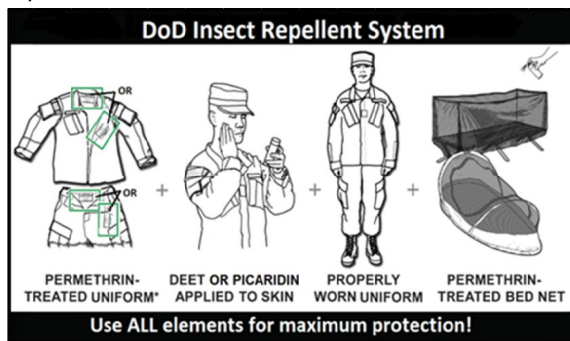
Treatment for the disease requires supportive care and the administration of appropriate antibiotics. Doxycycline is the drug of choice, however tetracycline, chloramphenicol and azithromycin are also effective for treating the disease. Currently, no licensed vaccines for the prevention of rickettsial infections are commercially available in the United States.




What Can Be Done to Control Infestations of Human Body Lice?

Thoroughly laundering infested clothes and rigorous personal hygiene can control body lice infestations. Wash infested clothing, bedding and personal items separately in hot water, 130o F or hotter, for at least 15 minutes. Items should then be dried in a clothes dryer on the "high heat" cycle, for at least 20 minutes to insure that body lice and their eggs are killed. Infested individuals should also take long, hot soapy showers to remove any remaining lice and to prevent re-infestation.

How Can I Protect Myself Against Body Lice That Transmit Louse-Borne Typhus?

Avoid sharing clothing or bedding materials. Periodically check your clothing for lice and their eggs. When practical, remove and wash clothing frequently. Regular bathing with antibacterial soaps can prevent bacterial infections. For optimum protection against body lice, soldiers should utilize the **DOD INSECT REPELLENT SYSTEM**. In addition to the proper wear of the military field uniform (sleeves rolled down, undershirt tucked into pants, pant cuffs tucked into boots), this system includes the concurrent use of both skin and clothing repellents:



-  Standard military skin repellent: 33% **DEET** lotion, long-acting formulation, one application lasts up to 12 hours or more, **NSN 6840-01-284-3982**.
-  Standard military clothing repellents: either IDA (impregnation kit), 40% **permethrin**, one application lasts the life of the uniform (approx. 50 washes), **NSN 6840-01-345-0237**; or aerosol spray, 0.5% **permethrin**, one application lasts through 5-6 washes, **NSN 6840-01-278-1336**. Factory permethrin-treated uniforms are also available via contract [Contact the Armed Forces Pest Management Board (AFPMB) for details, CM (301) 295-7476].
-  Flame-Resistant Army Combat Uniforms (FR ACU's) cannot be treated by service members with the standard military clothing repellent (permethrin). Use of other elements of the DOD Insect Repellent System should be emphasized to reduce soldier exposure to diseases transmitted by human body lice.

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Use of trademarked name does not imply endorsement by the U.S. Army but is intended only to assist in identification of a specific product.
For more information please consult the APHC website - <http://phc.amedd.army.mil>



Signs of Disease. Louse-borne typhus produces a dark-red rash of elevated spots several days after the initial infection. The rash may begin around the trunk and shoulders and spread to the other parts of the body. The above pictures show what the rash looks like on both light and dark skin.