

Comments Concerning Changes in the Standards for Toilets in Coal Mines

May 20, 2003

Mine Safety and Health Administration
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Dear Mr. Nichols:

After reviewing the proposed regulations regarding underground sanitary facilities I do wish to make comment and will be submitting some additional proposals to be considered. It is understood this proposal is intended to meet requirements regarding **The Paper Reduction Act**, which most likely would not receive any response under those circumstances only. Since the language of this proposal also changes the language of the regulations it is believed the proposal is open for comments other than **The Paper Reduction Act**.

It has been noted this proposal would prohibit electronic incinerating toilets due to fire hazards because of spontaneous combustion. The electronic incinerating type of toilet provides the miner with the best protection by greatly reducing exposure to biological hazards. Using an electronic incinerating toilet, body waste is rendered sterile and inert on site. Alternative types and styles mentioned in this proposal would require potential exposure to biological hazards while transporting toilets, containers or sewage holding tanks to the surface for cleaning and/or servicing. It is not believed a U.L. listed electronic toilet would start or promulgate spontaneous combustions. Furthermore spontaneous combustion would be greatly reduced if the toilet were:

Located in an adequate and well rock dusted area.

1. Provided with a fire extinguisher.
2. Located in an area other than the return air course.
3. To be included in the pre-shift and on-shift exam with usage of being included in the exam.
4. To be provided electrical service with an electrical breaker that included a ground fault monitoring system.

Also, if the toilet was strategically located near the section belt conveyor tail, it could have the additional fire protection that is provided for conveyor belts, which includes fire hose and fire sensors.

AA98(9)-COMM-1

If all of the above were to be required for electronic incinerating toilets, the concern for spontaneous combustion would be eliminated. Thus providing the miner with greater protection from biological hazards.

Biological health hazards including those associated with exposure to human feces is a subject and matter that MSHA has distanced itself. In MSHA's HAZ-COM regulations biological hazards are not addressed by choice. One is reminded that the biological hazard associated from exposure to human feces includes diseases. Diseases can be taken home to friends and family and elsewhere. One could not imagine how fast a disease like Severe Acute Respiratory Syndrome (SARS) would spread through the third world sanitary conditions that are found in some coal mines. These factual conditions do exist. To confirm this please review the attached report that was made on December 30, 2002 during a MSHA inspection of underground sanitary facilities. And you are encouraged to review the personal notes taken by the accompanying MSHA inspector also. Both reports parallel in confirming that in its rawest state human feces is allowed to accumulate in underground coal mines under the current MSHA regulations. And due to environmental conditions (dark, damp and the complete absence of sunlight) found in underground coal mines exposure to human feces is probably at its highest potential to cause infectious diseases. Without doubt this is biological health hazard that is extremely unhealthy and exposes coal miners to a wide array of fecal borne pathogens.

I have taken the liberty of attaching several informational sheets (with supporting evidence highlighted in yellow) from the Center of Disease and Control (www.cdc.gov) and elsewhere regarding several diseases that can be contracted by exposure to human feces. According to the attached informational sheets, the following diseases and disorders can be contracted from human feces. The diseases are: **Amebiasis; Cholera; Cryptosporidiosis; Shigellosis; *Helicobacter pylori* Infection (*H. pylori*); E. coli; Viral (Aseptic) Meningitis; Hand, Foot, & Mouth Disease; Hepatitis A Virus; *Mycobacteria*; *Strongyloides stercoralis*; and *Candidia*.** And without doubt, there are many more diseases associated to human feces especially when such feces contain blood. For example, *Hepatitis C*.

Recalling from my personal experience, when a MSHA inspector was questioned whether or not raw human feces found in underground coal mines was a violation due to improper disposal the answer was "No". The reason the answer was "No" was because it would only be a violation if the feces came from a sanitary toilet or holding tank. Therefore, two issues are not understood here. First, it makes no difference whether raw human feces came from a sanitary toilet or not. It still is a biological hazard. Secondly, how can a MSHA inspector tell the difference where the sewage source originated?

I also recall a MSHA inspector telling me that human-feces-exposure levels had not been established for underground coal mines. Therefore, no violation could be issued. Nowhere could it be found in the attached information sheets where an individual has to be exposed to a certain level of human feces in order to contract a disease. It is understood that limited exposure time in any form or fashion can warrant a possible infection, for example exposure to *E.coli*. Someone with poor hygiene practices or a soiled diaper can cause an *E.coli* outbreak in a swimming pool and infect all of the swimmers. Furthermore, human feces were used as a means of biological warfare during the Vietnam War. The North Vietnamese dipped sharpened sticks into human feces, called "pungee sticks", then placed these sticks in the bottom of pitfall foot traps along jungle paths. When a soldier would step into these foot traps the feces coated stick pierced through the boot and punctured the foot, thus causing a very serious infection. Under the current MSHA regulations some coal miners are exposed to and actually work in and around raw, untreated human feces during the course of their working shift. Exposure occurs, but not limited to, when miners comes into direct contact to human feces when:

- Handling materials and supplies that are used in processing coal that have either been drugged through or been in close proximity to human feces, such as timbers and line curtain.

- Handling of mine machinery cables that have either been drugged through or been in close proximity to human feces. For example, shuttle car cables, roof bolting machine cables or/and continuous miner cables.
- Water that has passed through human feces, which could range from a splash to saturation.
- Exposed to mud or debris, which has been contaminated by human feces.
- Exposed to airborne spores generated from human feces.

Inside a coal mine it is not at all uncommon for human feces to have a growth emerging from it. Excluding electrical light, inside of a coal mine it is totally dark. One literally cannot see their hand in front of their face when the cap lamp is turned off. Which would mean: due to the absence of natural light the growth emerging from feces in an underground coal mine would be either bacterial or fungal by nature. Possibly both. All biological organisms are destined to reproduce whether it is a plant, animal or parasite. Elementary biology taught that fungi and bacteria reproduce and spread themselves by airborne spores. Exposure to airborne spores generated from fungal growth on human feces, such as *Candidia*, can be transmitted by means similar to *Anthrax*. It needs to be noted, *Candidia* infections are linked to an array of other disorders including colon cancer

Furthermore, we have no means of adequately washing our hands prior to eating regardless to whatever we may have been exposed to during the working shift. This creates another form of exposure called “fecal-hand-mouth” contamination.

These underground sanitation concerns have been presented to MSHA several different times at several different levels in the MSHA organization. It appears concerns from coal miners who are actually exposed to these biological hazards do not carry the same influence or creditability as an industrial hygienist or a panel of experts far removed from the situation and behind a desk. A letter from J.Davitt McAteer, former assistance secretary of labor for MSHA, to U.S. Sen. Jay Rockefeller, D-WV, dated August 11, 2000 states, “*MSHA considers exposures to human waste to be a significant health risk to coal miners, ...*”. Since a former MSHA director has described this as a health hazard and an MSHA industrial hygienist has found this same health hazard, is this not enough evidence and expert testimony? Or is it necessary to wait and react to a disease outbreak? Do these health hazards fulfill the criteria and meet the requirements for an Emergency Temporary Standard (a proactive position) to be issued by Dave D. Lauriski, the present assistance secretary of labor for MSHA?

MSHA states the following concerning an issuance of an Emergency Temporary Standard, ETS :

Issuance of an ETS is an extraordinary measure provided for by the Mine Act to enable MSHA to “react quickly to grave dangers which threaten miners before those dangers manifest themselves in serious or fatal injuries or illnesses” S. Rept. 181, 95th Cong., 1st Sess. 23 (1977). The language authorizing the issuance of a temporary mandatory standard for these purposes indicates that it is appropriate to address miner exposure to “other hazards,” as well as toxic substances or harmful agents. This broad scope is further indicated in the legislative history, which states that “[t]o exclude any kind of grave danger would contradict the basic purpose of emergency temporary standards ----- protecting the miner from grave danger.”

Therefore, I am suggesting the following proposals in the proposed changes regarding the **Standards for Toilets in Underground Coal Mines**.

1. **II. Background Discussion of Existing Standards. A. Regulatory History.** In this section of the proposal MSHA makes reference to accept all present “approved” sanitary toilets

as long as they are properly maintained. This is not acceptable because the present “approved” underground sanitary toilets at the coal mine where I work are simply not adequate. These particular underground sanitary toilets where I work is nothing more than a family overnight/camping toilet. This unit is expected to serve 20 to 22 individuals in a 24-hour period. And no means are provided to maintain these toilets in a clean sanitary condition after usage. This type of toilet is simply inadequate. Therefore, coal miners use certain parts of the coal mines to urinate and defecate. Under the present MSHA regulations approved does not mean adequate. If it did, why does present MSHA regulations require surface sanitary toilet facilities to be “adequate” and underground sanitary toilet facilities to be “approved”? But yet toilet paper either on the surface or underground has to be “adequate”. Does this mean underground sanitary facilities do not have to be adequate but just approved? **It is being proposed that all underground sanitary facilities shall be adequate and not only be approved by MSHA/NIOSH but also meet OSHA requirements.**

2. In the new proposal, the regulation requirement regarding proper disposal of sewage on the surface has possibly been omitted. This is not acceptable. If this proposal does not state that sewage-holding tank contents (or sewage in general) is not required to be disposed of on the surface, then it will be permissible to make disposal of such underground. For obvious and apparent health reasons human feces should not be located in underground mines. Therefore, the present **§75.1712-10 Underground sanitary facilities; maintenance** should not be omitted. **It is being proposed to retain §75.1712-10 Underground sanitary facilities; maintenance in the new proposals.**

3. **It is being proposed that §75.1712-10 should also meet federal and environmental laws and regulations.**

4. The new proposal does not address the transportation of sewage waste from inside a coal mine to the surface. In order to reduce exposure to biological hazards the new proposal should state sewage and other biological hazards should be transported to the surface in sealed, leak-proof containers and be transported by other means than personnel carriers and/or man-trips. **It is being proposed that all sewage or biological hazards will be transported to the surface in sealed, leak-proof containers and be transported by other means than mobile equipment, which is used, or to be used to transport miners and would include personnel carriers and/or man-trips.**

5. OSHA would require any type of container used to transport or contain human feces to be labeled “**Biological Hazards**”. Since this is self-explanatory this should also be applied to underground coal mines. Plus the present HAZ-COM regulations require all containers to be labeled. It is understood the HAZ-COM regulations do not address biological hazards. But a container is a container regardless of the contents. **Therefore it is being proposed that all containers, which contain human feces or other biological hazards, be labeled in a conspicuous form or fashion that would state “Biological Hazard”.**

6. To reduce possible exposure, all bags or containers that contain human feces or biological hazards should be permanently sealed. **It is being proposed that all bags or containers that contain human feces or other biological hazards be sealed in a permanent fashion.**

7. Many Material Safety Data Sheets require for the hands to be washed after being exposed to the product in use and especially so prior to eating. This is in alignment with the HAZ-COM regulation. Since hand washing is the first line of defense in preventing the spread of germs, then adequate hand-washing facilities are needed. **It is being proposed that adequate sanitary hand washing facilities be provided at all working places and also be located in designated areas which are out by the coal producing areas of the coal mine. Such adequate sanitary**

hand washing facilities shall consist as a minimum (a) hot and cold running water (b) waste water holding tank, (c) adequate supply of sanitary disposable towels, (d) shall be in a secure location, (e) and be maintained with an adequate supply of antimicrobial liquid soap and soap dispenser for hand washing.

8. To ensure the protection from accidental exposure to raw untreated feces the following is being proposed. **It is being proposed, that if the coal seam is above 36 inches in height the chemical toilet as described under "Definitions" 2.21 shall be the mandatory minimum type or style toilet to be used.**

9. As it is with employees who handle/transport chemical hazards, employees who are exposed to biological hazards should be trained. **It is being proposed that employees who handle/transport biological hazards (a) be adequately trained, (b) be mandated to wear adequate personal protective clothing.**

10. Since adequate protective clothing is required for chemicals protection, **it is being proposed as a minimum, protective clothing worn by employees who transport human feces and/or other biological hazards shall be (a) liquid proof, durable and disposal, (b) include adequate eye protection (c) include puncture resistance and liquid proof disposable gloves, and (d) all protective clothing shall be in a sanitary state prior to using.**

11. The use of electronic sanitary facilities shall be permissible. This is probably the best form of disposal of human feces in underground coal mines. It is realized that MSHA opposes this because of fire hazards. If a toilet becomes a fire hazard it will be because the area where the toilet is located was not adequately and well rock dusted. Plus open flames such as torches are permissible in adequate and well rock dusted areas. **It is being proposed electronic sanitary toilet facilities be permissible and be maintained in a secure, adequate and well rock dusted area.**

12. Since §77.208 (c) states (c) Containers holding hazardous materials must be of a type approved for such use by recognized agencies and the HAZ-COM regulations require the same for materials other than biological materials. Therefore, the following proposal is being made. **It is being proposed that all containers that contain human feces or other biological material shall be approved for such use by recognized agencies.**

13. No need to explain the following proposal. **It is being proposed all underground sanitary facilities (a) be maintained in a sanitary condition, (b) be supplied with adequate and suitable cleaning supplies and equipment.**

Respectfully

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Report of MSHA Inspection

Inspection of Underground Sanitary Conditions

Shadrick Mine

MSHA Mine I.D. Number 46-08159

Date: December 30, 2002

Type of Inspection: MSHA AEA

Due to a request for NIOSH to make a Health Hazard Evaluation concerning exposure to human feces at the Shadrick Mine MSHA made this inspection at the suggestion of NIOSH.

Cannelton Industries Inc. Representative: Bill Kell, Shift Foreman**MSHA Representative:** Greg Meikle, Industrial Hygienist**UMWA Representative:** Dwight Siemiaczko, Local Union 8843, Safety Committee

This inspection started at the Rich Hollow Portal surface facilities. Prior to going underground discussion was held concerning sanitary facilities at the Shadrick Mine. Union representative asked whether or not the sanitary toilets located at the Shadrick Mine were "approved" sanitary toilets as mandated by MSHA. The MSHA representative confirmed that the sanitary toilets were approved at this mine site. Union representative noted that no one had been tasked trained on the cleansing of toilets and the transportation of sewage to the surface for disposal. It was not determined whether or not task training was required in this incident. Jimmy Nottingham Safety Director stated the company policy was "if you use, you clean". MSHA representative did request for the Company's written policy for proper disposal of sewage from the Shadrick Mine. Mine management did not produce that requested policy. The sections were inspected in this order: Southwest Mains, Kelly's Creek, Morris Fork and Six-Mile.

Southwest Mains

Section Foreman: Name removed

Arrived at Southwest Mains power center at approximately 5:10 P.M. Found two porta-potties located on top of the section's power center. Both appeared to have never been used and were not found in a state of readiness. The largest porta-potti was a *Porta-Potti 565* with a 6.1 gallon holding tank and the other was smaller. Each toilet contained a bottle of *Aqua-Kem Concentrated Liquid Holding Tank Deodorant*. Did not find any type of sanitizing agent or chemicals nor any type of cleaning utensil that may be required to clean a toilet. These porta-potti were found to be in an approved condition. The section foreman, was asked what was the policy concerning the use and cleaning of porta-potties. He said the person who used the toilet would clean it. When asked what was the policy on "how to clean" a porta-potti he stated the person who used the porta-potti would clean. The user would dump the contents in the return airway. Human feces were found in the return air way off of this section between break through 19 and 20 approximately 130 feet outby spad number 5565. Note: Hourly employees were working in the return air way at the time of this inspection gathering mine belt.

Kelly's Creek

Section Foreman: Name removed

Arrived at the Kelly's Creek power center at approximately 6:42 P.M. Found one porta-potti located beside the section power center. *Porta-Potti 100 Series 155*. It was found to be in an approved condition and did not appear as if it had ever been used. Did not find any cleaning utensils that may be required to clean a toilet nor was the toilet found in a state of readiness. Did find a half of a bottle of 409 Cleaner and a bottle of *Aqua-Kem Concentrated Liquid Holding Tank Deodorant*. When section foreman was asked what was the policy on cleaning the toilet he stated the person who used the toilet would clean it. When the section foreman was asked what was the policy on "how to clean" a porta-potti he stated the person who used the porta-potti would dump the contents in the return airway. Then the user would use paper towels and 409 Cleaner to sanitize the toilet. Human feces were found in the

return airway off of this section. Note: Two hourly employees, Mr. (name removed) and Mr. (name removed) were unaware of any cleaning policy for cleaning sanitary toilets.

Morris Fork

Section Foreman: Name removed

Arrived at the section power center at approximately 8:15 P.M. Found one porta-potti located beside the section power center. Thetford Porta Potti 155, 100 Series with a 2.6 gallon water tanks and a 4.3 gallon holding tank. Also included was a bottle of toilet deodorizer. This toilet appeared as to have never been used. This toilet was found in an approved condition. Did not find any sanitizing agent or chemical or cleaning utensils that may be required to clean a toilet nor was the toilet found in a state of readiness. When the section foreman was asked what was the policy on cleaning a toilet he stated the person who used the toilet would clean it. When section foreman was asked what was the policy on "*how to clean*" a toilet he stated that the user would take the toilet to the continuous miner machine and wash it off with the wash down hose and dump the contents in the return airway. Then upon returning to the section the user would return to the continuous miner machine and rinse the toilet with the wash down hose. Human feces were found in at least 10 areas in the return airway off of this section.

Six-Mile

Section Foreman: Name removed

Arrived at the section power center at approximately 10:00 P.M. Found one porta-potti located on the section power center and it appeared as if it had never been used. Porta-Potti 100 Series 135 Model. Also found a bottle of toilet deodorizer. This porta-potti **was not** found to be in an approved state due to a pipe cap missing off of a drain port. A citation was issued for this. Did not find any sanitizing agent or chemical or cleaning utensils that may be required to clean a toilet nor was the toilet found in a state of readiness. When the section foreman was asked what was the policy on cleaning a toilet he stated the person who used the toilet would clean it. When the section foreman was asked what was the policy on "*how to clean*" a toilet he stated the user would dump the contents of the toilet into a plastic bag and take it to the surface for disposal. Then the user would rinse the toilet out. It was unclear on how the toilet was to be sanitized and what safeguards would be taken to prevent puncturing of the plastic bag while being transported to the surface. Human feces were found in the return air way off of this section in an extremely wet environment with running water near-by. Approximately 20 feet outby spad number 13,335 in Number One Entry and also approximately two breakthroughs lengths inby spad number 13,335.

Overview:

1. Human feces were found in the return airways off of each section.
2. There is no clear direction on how to dispose of the contents from an underground sanitary toilet.
3. There is no clear direction on how to maintain an underground toilet in a sanitary condition.
4. No cleaning utensils were found on none of the sections that may be required to clean a toilet.
5. Outside of a bottle of 409 Cleaner on one coal producing section no sanitizing agents or chemicals were found to sanitize toilets.
6. None of the toilets were found to be in a state of readiness, that is where the holding tank was charged with water.
7. All but one toilet was found to be in an approved state.
8. It could not be found where the manufacturer recommended or even suggested that these porta-potties are designed to be used in a worksite or industrial setting. Whereas, it appears that the manufacture by means of the owners manual and picture icons intends for these toilets to be used in RV's, overnight camping trips or during domestic power outages for personal, family or household purposes.

9. The Company policy requires the user to clean the toilet underground but provides no equipment to clean. Note: Cleaning of sanitary toilets must be done on the surface according to MSHA's regulations. Therefore the Company policy is illegal
10. The Company policy requires the user of such toilets to dispose the contents in the return airway (s). Note: According to MSHA's regulations the contents of sanitary toilets must be disposed of on the surface. Therefore the Company policy is illegal
11. Did not see any means for underground employees to wash their hands using water and soap.
12. Did not see any sanitary towels for the drying of hands after washing for underground employees.
13. Water used to bathe in at surface sanitary facilities does not have to be potable by MSHA's regulations.

Review:

It appears that even though the underground sanitary facilities in question were deemed to be in an "approved" state by MSHA terminology does not necessarily mean these underground sanitary facilities are "adequate". It has been noted that MSHA has established double standards by requiring surface sanitary facilities to be "adequate" as mentioned in **§75:1712 Bath house and toilet facilities** but omitting the requirement for underground sanitary facilities to be adequate. When reviewing **§75:1712-6 Underground sanitary facilities; approved sanitary toilets; installation and maintenance (a)** it is noted that underground toilets have to be "approved" while toilet paper has to be in an "adequate" supply. Therefore MSHA has established that "approved" does not mean "adequate". To support the theory these underground facilities are not adequate, the manufacturer does not even suggest for these toilets to be used in a worksite setting. The size of the holding tanks found on the porta-potties in question confirms they are not physically designed to service 20 to 22 employees in a 24- hour frame. If one underground toilet is allowed to be used to service two working sections as allowed under **§75.1712-6 Underground sanitary facilities; approved sanitary toilets; installation and maintenance (a)** this ratio could increase to 40 to 44 employees in a 24-hour frame. Even though the above-mentioned time frame/usage ratio is not an MSHA requirement but is only used as an indicator that the capacity of these porta-potties cannot satisfy the demand placed upon them. MSHA's requires underground toilets to be cleaned and serviced on the surface when full or at least weekly and the contents to be emptied on the surface. According to the majority of mine management personnel that was interviewed during this inspection, the Company's policy is to clean after each use and the toilets are to be cleaned and serviced underground with the contents of the toilets to be dumped in the return airway(s). Under the Company's policy, the person who uses the underground toilet is the person who cleans the toilet. Suggesting the Company's position is, a toilet needs to be clean and serviced after each use. Therefore, if a toilet is used at an underground working section where only one sanitary toilet is provided that particular working section would have to stop production until another sanitary toilet was provided. In order to achieve this, the user of the toilet would have to take the toilet to the surface immediately for cleaning and service after each use then return the toilet to the working section. In some cases in this particular coal mine, this cycle of using and cleaning a porta-potti would be a two-hour cycle. Since MSHA's regulations requires pumping and cleaning of underground toilets to be done on the surface, any underground cleaning and disposal would be illegal.

MSHA's position is, "*There is no violation.*" Which is true to the letter of the law but not necessarily to the spirit of the law. Due to the fact that MSHA does not have a "law" they have proven to be reluctant to address the issue. Even though Congress empowered MSHA to protect the miner's safety and **health**. The issue is a health hazard. For any entity, organization or agency to suggest that exposure to human feces is not a health hazard, especially in an underground coal mine, is absolutely mind-boggling. Since it is a known fact that exposure to human feces can introduce a multitude of diseases. The question arises as to why does MSHA have to have their own law in order to make corrections? Wouldn't medical and biological evidence suffice in this case?

MSHA does not require toilet facilities for workers who work out-by the face area. And since the Company does not allow underground employee's to come to the surface just to use the sanitary facilities and MSHA does not require toilets for out-by employee's that leaves only one option for the out-by employee. That option is to use the return airways for toilet facilities. In this case, the miner is forced to use the return airways for toilet facilities. This situation will happen even with each required underground toilet facilities in such mines being approved by MSHA. This supports the fact that MSHA approved sanitary facilities may exist but so does the exposure to human feces.

It should not be expected for a coal miner to use toilet facilities that are not adequate nor should it be expected for a coal miner to be denied sanitary facilities. If mine management will not allow the miner to come to the surface to use a toilet facility it is doubtful if such miner would be allowed to come to the surface to clean a toilet. Here again the miner has no choice except to use the return airways for toilet facilities.

The Company's position is "We are abiding by the law." In this case merely abiding by the law is not protecting the worker from a health hazard. Mine management has been made well aware of the health hazard associated to exposure to human feces. This awareness has been in the form of verbal comments, bulletin board posting of informational sheets concerning the diseases that can be caught from human feces and by means of the findings from Unions' Safety Committees inspections. Mine management is shielding its responsibility to provide a safe and healthy work place by declaring "compliance". By the same token, mine management has been negligent in addressing this health issue.

This health hazard issue could easily be corrected **if**:

1. MSHA would require for underground sanitary facilities to be adequate as they do for the surface facilities.
2. MSHA would require adequate sanitary facilities for all underground miners and not just those who work within 500 feet of the working section face.
3. MSHA would require adequate underground sanitary facilities to include hand washing facilities as they do for the surface facilities.
4. The Company would act in a more responsible manner and provide its' employees with a more healthier work place by supplying adequate sanitary facilities for all underground employees.
5. Educating all parties involved of the health hazards associated to human feces.

Special Consideration:

Are we dealing with an antiquated regulation here? The regulations that govern sanitary facilities in underground coal mines are over 30 years old. It is understandable; it could be possible that the type of underground sanitary facilities, which were found during this inspection, were "top of the line" on December 30, 1970. Over the past three decades improvements have been made regarding the disposal of human waste. It is common to find outside toilets at construction sites and at large outdoor public gatherings such as fairs and festivals that are Occupational Safety and Health Administration (OSHA) approved. And this OSHA approval is based on the number of uses during a certain time frame. Also, electronic toilets are now available which will transform fecal matter into a harmless ash. These improvements are for a good cause. During the past 30 years bacteria has become more resistance to anti-bacterial drugs. Thus creating new strains of bacteria. We also have new diseases such as AIDS, SARS, and Legionnaires' Disease that have formed over the last 30 years also. Therefore, bringing the proper disposal of human feces and the protection from exposure to human feces to a higher level of urgency. Furthermore, at this particular mine site one employee has been diagnosed and tested positive

for a fungal infection called Candidiasis with several other employees having the same type of skin disorder. According to the Center for Diseases Control and Prevention, Candidiasis is only found in only 8 per 100,000. At this mine site, there appears to be several cases of Candidiasis per 200 or less underground employees. A Material Safety Data Sheets referring to Candidiasis indicates the following:

1. Candida source is human feces, worldwide.
2. Candida prefers a dark environment.
3. Candida prefers a damp environment.
4. Candida prefers an alkaline environment.

These four conditions were found in the Shadrick coal mine.

Candidiasia causes a symptom called the “Leaky Gut Syndrome”

- Leaky Gut Syndrome can possibly be a triggering mechanism for colon and liver cancer.
- Over the past few years colon cancer or colon/liver cancer has affected at least five employees at this mine site. Two of which has ended in death.

This inspection has a flip side to it. Yes it is true, that 80% of the underground sanitary facilities, which were inspected, were found to be an “approved” state by MSHA’s regulations. And the Company overall was in compliance with the exception of one underground sanitary facility which could not be sealed. But the exposure to human feces still exists in this underground coal mine as well as in others coal mines. And it is believed the reason this exposure still exists is because MSHA has no law and the Company has shown negligence towards its employees by shielding their responsibility to provide a safe and healthy workplace with and under the word “compliance”.

Conclusion:

Until MSHA includes underground sanitary facilities to be adequate and underground sanitary facilities to included hand washing facilities, exposure to human feces at this mine site will continue. Hopefully, this inspection and report will initiate someone in a higher authority to become pro-active in correcting this health hazard rather than reactive to a disease out break.

This report was compiled by Dwight Siemiaczko, United Mine Workers of America, Local Union 8843 Safety Committee.

If anyone wishes to see the notes the MSHA inspector recorded during this investigation, they must contact MSHA and request those notes under the Freedom of Information Act.

Disease Caused by Environmental mycobacteria

- MOTT organisms generally cause opportunistic infections
- Person to person transfer does not take place
- MOTT organisms are generally resistant to drugs used for treatment of Tuberculosis
- Combinations of 5 or 6 agents may have to be used

Mycobacterium avium-intracellulare Complex (MAI or MAC)

- Infection is infrequent in immunocompetent individuals, but in the USA disseminated infection is the most common bacterial infection in AIDS patients
- Transmission is from environmental sources
- Any organ may be involved and diagnosis depends on culturing the organism from the blood or tissues
- For initial therapy of *M. avium* and *M. intracellulare* infection: clarithromycin or azithromycin plus ethambutol. Other useful drugs are clofazimine, rifabutin, fluoroquinolones and amikacin. Therapy may have to be continued for life

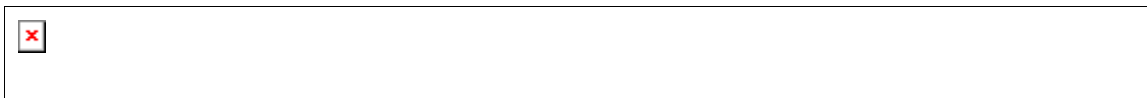
Mycobacterium kansasii

- Can produce lung and systemic disease that is identical to tuberculosis
- Can infect old tuberculous lung lesions
- Treatment of *M. kansasii* infections: combinations of RIF, INH, and ethambutol; surgical resection may be needed

Mycobacterium ulcerans

- Believed to be the third most common mycobacterial infection in humans
- Causes [Buruli Ulcer](#)
- Occurs widely throughout West Africa
- Treatment with antibiotics is unsuccessful. Current treatment is surgical excision requiring long hospitalizations.

***M. scrofulaceum*, *M. marinum*, and *M. fortuitum-chelonae* Complex organisms may also cause disease**



Strongyloides stercoralis

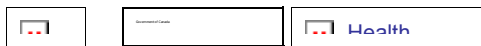
Strongyloides stercoralis is an unusual "parasite" in that it has both free-living and parasitic life cycles. In the parasitic life cycle, female worms are found in the superficial tissues of the human small intestine; there are apparently no parasitic males. The female worms produce larvae parthenogenically (without

fertilization), and the larvae are passed in the host's feces. The presence of nematode larvae in a fecal sample is characteristic of strongyloidiasis. Once passed in the feces, some of the larvae develop into "free-living" larvae, while others develop into "parasitic" larvae. The "free-living" larvae will complete their development in the soil and mature into free-living males and females. The free-living males and females mate, produce more larvae, and (as above) some of these larvae will develop into "free-living" larvae, while other will develop into "parasitic larvae." As one might imagine, this free-living life cycle constitutes an important reservoir for human infections.

The "parasitic" larvae infect the human host by penetrating the skin (like the [hookworms](#)). The larvae migrate to the lungs, via the circulatory system, penetrate the alveoli into the small bronchioles, and they are "coughed up" and swallowed. Once they return to the small intestine, the larvae mature into parasitic females.

S. stercoralis also infects humans via a mechanism called "autoinfection." Under some circumstances, such as chronic constipation, larvae produced by the parasitic females will remain in the intestinal tract long enough to develop into infective stages. Such larvae will penetrate the tissues of the intestinal tract and develop as if they had penetrated the skin. Autoinfection can also occur when larvae remain on and penetrate the perianal skin. Autoinfection often leads to very high worm burdens in humans ([view diagram of the life cycle](#)).

Since the parasitic females live in the superficial tissues of the small intestine, and can be present in high numbers, they can cause significant pathology.



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—	—	—	—	—

[\[Material Safety Data Sheets - Index\]](#)

MATERIAL SAFETY DATA SHEET - INFECTIOUS SUBSTANCES

SECTION I - INFECTIOUS AGENT

NAME: *Candida albicans*

SYNONYM OR CROSS REFERENCE: Candidiasis, Thrush, Moniliasis

CHARACTERISTICS: Oval, budding yeast, produces pseudohyphae in culture and in tissues and exudates

SECTION II - HEALTH HAZARD

PATHOGENICITY: Mycosis of superficial layers of skin or mucous membranes (oral thrush, vulvovaginitis, paronychia, onychomycosis, intertrigo); ulcers or pseudomembranes in esophagus, gastrointestinal tract or bladder; hematogenous dissemination may produce lesions in kidney, spleen, lung, liver, prosthetic cardiac valve, eye, meninges, brain

EPIDEMIOLOGY: Worldwide

HOST RANGE: Humans

x
MSDS

INFECTIOUS DOSE: Unknown

MODE OF TRANSMISSION: Endogenous spread (part of normal human flora); by contact with excretions of mouth, skin, and feces from patients or carriers; from mother to infant during childbirth; disseminated candidiasis may originate from mucosal lesions, unsterile narcotic injections, catheters

INCUBATION PERIOD: Variable

COMMUNICABILITY: Communicable for duration of lesions

SECTION III - DISSEMINATION

RESERVOIR: Humans (normal human flora)

ZOONOSIS: None

VECTORS: None

SECTION IV - VIABILITY

DRUG SUSCEPTIBILITY: Sensitive to nystatin, clotrimazole, ketoconazole, fluconazole, amphotericin B for invasive candidiasis

DRUG RESISTANCE: Resistant strains have been described for all the above antifungal drugs

SUSCEPTIBILITY TO DISINFECTANTS: Sensitive to 1% sodium hypochlorite, 2% glutaraldehyde, formaldehyde; only moderately sensitive to 70% ethanol (phenolic may be substituted)

PHYSICAL INACTIVATION: Inactivated by moist heat (121°C for at least 15 min)

SURVIVAL OUTSIDE HOST: Survives outside of host, especially in moist, dark areas

SECTION V - MEDICAL

SURVEILLANCE: Monitor for symptoms; microscopic demonstration of pseudohyphae and/or yeast cells in infected tissue or fluid; confirmation by culture

FIRST AID/TREATMENT: Administer antibiotic therapy as required

IMMUNIZATION: None

PROPHYLAXIS: None

SECTION VI - LABORATORY HAZARDS

LABORATORY-ACQUIRED INFECTIONS: 2 reported laboratory-acquired infections with *Candida*

SOURCES/SPECIMENS: Sputum, bronchial washings, stool, urine, mucosal surfaces, skin or wound exudates, CSF, blood

PRIMARY HAZARDS: Accidental parenteral inoculation, exposure of mucous membranes to droplets and aerosols, ingestion

SPECIAL HAZARDS: None

SECTION VII - RECOMMENDED PRECAUTIONS

CONTAINMENT REQUIREMENTS: Biosafety level 2 practices, containment equipment and facilities for the manipulation of this organism

PROTECTIVE CLOTHING: Laboratory coat; gloves when contact with infectious materials is unavoidable

OTHER PRECAUTIONS: None

SECTION VIII - HANDLING INFORMATION

SPILLS: Allow aerosols to settle; wearing protective clothing, gently cover spill with absorbent paper towel and apply 1% sodium hypochlorite, starting at perimeter and working towards the centre; allow sufficient contact time (30 min) before clean up

DISPOSAL: Decontaminate before disposal; steam sterilization, chemical disinfection, incineration

STORAGE: In sealed containers that are appropriately labelled

SECTION IX - MISCELLANEOUS INFORMATION

Date prepared: November 1999

Prepared by: Office of Laboratory Security, PPHB

Although the information, opinions and recommendations contained in this Material Safety Data Sheet are compiled from sources believed to be reliable, we accept no responsibility for the accuracy, sufficiency, or reliability or for any loss or injury resulting from the use of the information. Newly discovered hazards are frequent and this information may not be completely up to date.

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[\[Material Safety Data Sheets - Index\]](#)



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[Important Notices](#)

[\[Français\]](#) [\[Contact Us\]](#) [\[Help\]](#) [\[Search\]](#) [\[Canada Site\]](#)
[\[PPHB Home\]](#) [\[Centres\]](#) [\[Publications\]](#) [\[Guidelines\]](#) [\[A-Z Index\]](#)
[\[Child Health\]](#) [\[Adult Health\]](#) [\[Seniors Health\]](#) [\[Laboratories\]](#) [\[Surveillance\]](#)

[Centers for Disease Control and Prevention](#)

[CDC Home](#)

[Parasitic Disease Information](#)

[Search](#)

[Health Topics](#)

[Alphabetical Listing](#) | [Travel](#)

[DPD Logo](#)

[Fact Sheet](#)

Amebiasis (am-e-BI-a-sis)

What is amebiasis?

Amebiasis is a disease caused by a one-celled parasite called *Entamoeba histolytica* (ent-a-ME-ba his-to-LI-ti-ka).

Who is at risk for amebiasis?

Although anyone can have this disease, it is most common in people who live in developing countries that have poor sanitary conditions. In the United States, amebiasis is most often found in immigrants from developing countries. It also is found in people who have traveled to developing countries and in people who live in institutions that have poor sanitary conditions. Men who have sex with men can become infected and can get sick from the infection, but they often do not have symptoms.

How can I become infected with *E. histolytica*?

- By putting anything into your mouth that has touched the stool of a person who is infected with *E. histolytica*.
- By swallowing something, such as water or food, that is contaminated with *E. histolytica*.
- By touching and bringing to your mouth cysts (eggs) picked up from surfaces that are contaminated with *E. histolytica*.

What are the symptoms of amebiasis?

On average, about one in 10 people who are infected with *E. histolytica* becomes sick from the infection. The symptoms often are quite mild and can include loose stools, stomach pain, and stomach cramping. Amebic dysentery is a severe form of amebiasis associated with stomach pain, bloody stools, and fever. Rarely, *E. histolytica* invades the liver and forms an abscess. Even less commonly, it spreads to other parts of the body, such as the lungs or brain.

If I swallowed *E. histolytica*, how quickly would I become sick?

Usually 1 to 4 weeks later but sometimes more quickly or more slowly.

What should I do if I think I have amebiasis?

See your health care provider.

How is amebiasis diagnosed?

Your health care provider will ask you to submit stool samples. Because *E. histolytica* is not always found in every stool sample, you may be asked to submit several stool samples from several different days.

Diagnosis of amebiasis can be very difficult. One problem is that other parasites and cells can look very similar to *E. histolytica* when seen under a microscope. Therefore, sometimes people

are told that they are infected with *E. histolytica* even though they are not. *Entamoeba histolytica* and another amoeba, *Entamoeba dispar*, which is about 10 times more common, look the same when seen under a microscope. Unlike infection with *E. histolytica*, which sometimes makes people sick, infection with *E. dispar* never makes people sick and therefore does not need to be treated.

If you have been told that you are infected with *E. histolytica* but you are feeling fine, you might be infected with *E. dispar* instead. Unfortunately, most laboratories do not yet have the tests that can tell whether a person is infected with *E. histolytica* or with *E. dispar*. Until these tests become more widely available, it usually is best to assume that the parasite is *E. histolytica*.

A blood test is also available. However, the test is recommended only when your health care provider thinks that your infection has invaded the wall of the intestine (gut) or some other organ of your body, such as the liver. One problem is that the blood test may still be positive if you had amebiasis in the past, even if you are no longer infected now.

How is amebiasis treated?

Several antibiotics are available to treat amebiasis. Treatment must be prescribed by a physician. You will be treated with only one antibiotic if your *E. histolytica* infection has **not** made you sick. You probably will be treated with two antibiotics (first one and then the other) if your infection **has** made you sick.

I am going to travel to a country that has poor sanitary conditions. What should I eat and drink there so I will NOT become infected with *E. histolytica* or other such germs?

- Drink only bottled or boiled (for 1 minute) water or carbonated (bubbly) drinks in cans or bottles. Do **not** drink fountain drinks or any drinks with ice cubes. Another way to make water safe is by filtering it through an "absolute 1 micron or less" filter **and** dissolving iodine tablets in the filtered water. "Absolute 1 micron" filters can be found in camping/outdoor supply stores.
- Do **not** eat fresh fruit or vegetables that you did not peel yourself.
- Do **not** eat or drink milk, cheese, or dairy products that may not have been pasteurized.
- Do **not** eat or drink anything sold by street vendors.

Should I be concerned about spreading infection to the rest of my household?

Yes. However, the risk of spreading infection is low if the infected person is treated with antibiotics and practices good personal

hygiene. This includes thorough hand washing with soap and water after using the toilet, after changing diapers, and before handling food.

For more information:

Ravdin JI. Amebiasis. Clin Infect Dis 1995;20:1453-66.

This fact sheet is for information only and is not meant to be used for self-diagnosis or as a substitute for consultation with a health care provider. If you have any questions about the disease described above or think that you may have a parasitic infection, consult a health care provider.



[Top](#)

[Home](#) | [Professional Info](#) | [Public Info](#)
[About DPD](#) | [Recent Publications](#) | [DPD Search](#)

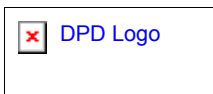
[CDC Home](#) | [CDC Search](#) | [CDC Health Topics A-Z](#)

This page last reviewed March 2001

[Centers for Disease Control and Prevention](#)
[National Center for Infectious Diseases](#)
[Division of Parasitic Diseases](#)

	CDC Home	Search	Health Topics

[Alphabetical Listing](#) | [Travel](#)



Cryptosporidiosis

(krip-toe-spo-rid-ee-oh-sis)

What is *Cryptosporidium*?

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Cryptosporidiosis (krip-toe-spo-rid-e-o-sis), is a diarrheal disease caused by a microscopic parasite, *Cryptosporidium parvum*. It can live in the intestine of humans and animals and is passed in the stool of an infected person or animal. Both the disease and the parasite are also known as "Crypto." The parasite is protected by an outer shell that allows it to survive outside the body for long periods of time and makes it very resistant to chlorine disinfection. During the past two decades, Crypto has become recognized as one of the most common causes of waterborne disease (drinking and recreational) in humans in the United States. The parasite is found in every region of the United States and throughout the world.

What are the symptoms of Crypto?

Symptoms include diarrhea, loose or watery stool, stomach cramps, upset stomach, and a slight fever. Some people have no symptoms.

How long after infection do symptoms appear?

Symptoms generally begin 2-10 days after being infected.

How long will symptoms last?

In persons with average immune systems, symptoms usually last about 2 weeks; the symptoms may go in cycles in which you may seem to get better for a few days, then feel worse, before the illness ends.

How is Crypto spread?

Crypto lives in the intestine of infected humans or animals. Millions of Crypto can be released in a bowel movement from an infected human or animal. You can become infected after accidentally swallowing the parasite. Crypto may be found in soil, food, water, or surfaces that have been contaminated with the feces from infected humans or animals. Crypto is not spread by contact with blood. Crypto can be spread:

- By putting something in your mouth or accidentally swallowing something that has come in contact with the stool of a person or animal infected with Crypto.
- By swallowing recreational water contaminated with Crypto. Recreational water is water in swimming pools, hot tubs, jacuzzis, fountains, lakes, rivers, springs, ponds, or streams that can be contaminated with sewage or feces from humans or animals. Note: Crypto is chlorine resistant and can live for days in pools.
- By eating uncooked food contaminated with Crypto. Thoroughly wash with uncontaminated water all vegetables and fruits you plan to eat raw. See below for information on making water safe.

- By accidentally swallowing Crypto picked up from surfaces (such as toys, bathroom fixtures, changing tables, diaper pails) contaminated with stool from an infected person.

I have been diagnosed with Crypto. Should I worry about spreading infection to others?

Yes, Crypto can be very contagious. Follow these guidelines to avoid spreading Crypto to others.

- Wash your hands with soap and water after using the toilet, changing diapers, and before eating or preparing food.
- Avoid swimming in recreational water (pools, hot tubs, lakes or rivers, the ocean, etc.) if you have Crypto and for at least 2 weeks after diarrhea stops. You can pass Crypto in your stool and contaminate water for several weeks after your symptoms have ended. This has resulted in many outbreaks of Crypto among recreational water users. Note: you are not protected in a chlorinated pool because Crypto is chlorine resistant and can live for days in pools.
- Avoid fecal exposure during sex.

Am I at risk for severe disease?

Although Crypto can infect all people, some groups are more likely to develop more serious illness. Young children and pregnant women may be more susceptible to the dehydration resulting from diarrhea and should drink plenty of fluids while ill.

If you have a severely weakened immune system, you are at risk for more serious disease. Your symptoms may be more severe and could lead to serious or life-threatening illness. Examples of persons with weakened immune systems include those with HIV/AIDS; cancer and transplant patients who are taking certain immunosuppressive drugs; and those with inherited diseases that affect the immune system. If you have a severely weakened immune system, consult with your health care provider for additional guidance. You can also call the CDC AIDS HOTLINE toll-free at 1-800-342-2437. Ask for more information on Cryptosporidiosis, or go to the CDC fact sheet Preventing Cryptosporidiosis: [A Guide for People with Compromised Immune System](#)

What should I do if I think I have Crypto?

See your health care provider.

How is a Crypto infection diagnosed?

Your health care provider will ask you to submit stool samples to see if you are infected. Because testing for Crypto can be difficult, you may be asked to submit several stool specimens

over several days. Because tests for Crypto are not routinely done in most laboratories, your health care provider should specifically request testing for the parasite.

What is the treatment for Crypto?

There is no effective treatment. Most people with a healthy immune system will recover on their own. If you have diarrhea, drink plenty of fluids to prevent dehydration. Rapid loss of fluids because of diarrhea can be life-threatening in babies; parents should consult their health care provider about fluid replacement therapy options for babies. Antidiarrheal medicine may help slow down diarrhea, but consult with your health care provider before taking it.

People who are in poor health or who have a weakened immune system are at higher risk for more severe and more prolonged illness. For persons with AIDS, anti-retroviral therapy that improves immune status will also decrease or eliminate symptoms of Crypto. However, Crypto is usually not cured and may come back if the immune status worsens. See your health care provider to discuss anti-retroviral therapy used to improve immune status.

How can I prevent Crypto?

Practice good hygiene.

1. Wash hands thoroughly with soap and water
 - a. Wash hands after using the toilet and before handling or eating food (especially for persons with diarrhea).
 - b. Wash hands after every diaper change, especially if you work with diaper-aged children, even if you are wearing gloves.
2. Protect others by not swimming if experiencing diarrhea (essential for children in diapers).

Avoid water that might be contaminated.

1. Avoid swallowing recreational water. [Click here for information on recreational water illnesses.](#)
2. Avoid drinking untreated water from shallow wells, lakes, rivers, springs, ponds, and streams.
3. Avoid drinking untreated water during community-wide outbreaks of disease caused by contaminated drinking water. In the United States, nationally distributed brands of bottled or canned carbonated soft drinks are safe to drink. Commercially packaged noncarbonated soft drinks and fruit juices that do not require refrigeration until after they are opened (for example, those that can be stored unrefrigerated on grocery shelves) also are safe. [Click here to find out how to choose bottled water that is also safe to drink.](#)

4. Avoid using ice or drinking untreated water when traveling in countries where the water supply might be unsafe.
5. If you are unable to avoid drinking or using water that might be contaminated, then treat the water yourself by: Heating the water to a rolling boil for at least 1 minute.

OR

Using a filter that has an absolute pore size of at least 1 micron or one that has been NSF-rated for "cyst removal."
[Click here for information on choosing a water filter.](#)

Do not rely on chemical disinfection of Crypto because it is highly resistant to inactivation by chlorine or iodine.

Avoid food that might be contaminated.

1. Wash and/or peel all raw vegetables and fruits before eating.
2. Use uncontaminated water to wash all food that is to be eaten raw.
3. Avoid eating uncooked foods when traveling in countries with minimal water treatment and sanitation systems.

Avoid fecal exposure during sex.

This fact sheet is for information only and is not meant to be used for self-diagnosis or as a substitute for consultation with a health care provider. If you have any questions about the disease described above or think that you may have a parasitic infection, consult a health care provider.








[Top](#)

[Home](#) | [Professional Info](#) | [Public Info](#)
[About DPD](#) | [Recent Publications](#) | [DPD Search](#)

[CDC Home](#) | [CDC Search](#) | [CDC Health Topics A-Z](#)

This page last reviewed May 2001

[Centers for Disease Control and Prevention](#)
[National Center for Infectious Diseases](#)
[Division of Parasitic Diseases](#)

 Centers for Disease Control and Prevention	 CDC Home	 Case	 Health Topics
 DBMD Disease Information			

Shigellosis

 Navigation bar

Clinical Features	Watery or bloody diarrhea, abdominal pain, fever, and malaise.
Etiologic Agent	Four species of <i>Shigella</i> : <i>boydii</i> , <i>dysenteriae</i> , <i>flexneri</i> , and <i>sonnei</i> .
Incidence	Approximately 14,000 laboratory confirmed cases of shigellosis and an estimated 448,240 total cases (mostly due to <i>S. sonnei</i>) occur in the United States each year. In the developing world, <i>S. flexneri</i> predominates. Epidemics of <i>S. dysenteriae</i> type 1 have occurred in Africa and Central America with case fatality rates of 5-15%.
Sequelae	Reiter's syndrome is a late complication of <i>S. flexneri</i> infection, especially in persons with the genetic marker HLA-B27. Hemolytic-uremic syndrome can occur after <i>S. dysenteriae</i> type 1 infection. Convulsions may occur in children, but the mechanism has not been established.
Transmission	A small inoculum (10 to 200 organisms) is sufficient to cause infection. As a result, person-to-person spread can easily occur by the fecal-oral route and occurs more commonly than transmission by food and water. Large foodborne outbreaks have occurred.
Risk Groups	In the United States, groups at increased risk of shigellosis include children in child-care centers and persons in custodial institutions, where personal hygiene is difficult to maintain; Native Americans; orthodox Jews; international travelers; men who have sex with men; and those in homes with inadequate water for handwashing.
Surveillance	All reported cases are laboratory-confirmed in states or at CDC.
Trends	Modest decrease in cases since 1995.
Challenges	Increasing resistance to available antimicrobial agents among isolates acquired domestically and abroad; absence of effective vaccines; modifying handwashing behavior to

control prolonged community-wide outbreaks; identifying targeted prevention measures in high-risk groups (e.g., Native Americans, Orthodox Jews, men who have sex with men).

Opportunities A major initiative to strengthen laboratory, epidemiologic, and public health capacity to detect and respond to epidemic *S.dysenteriae* type 1 in southern Africa could be duplicated in other regions at risk. Partnerships with local health departments and communities may lead to investigations of transmission and new prevention materials. Subtyping of *S. sonnei* by pulsed field gel electrophoresis can improve outbreak detection and control.

December 2002

[Disease Listing](#) | [General Information](#) | [Technical Information](#) | [Additional Information](#)

[Accessibility](#) | [Privacy Policy Notice](#) | [FOIA](#)

[CDC Home](#) | [Search](#) | [Health Topics A-Z](#)

This page last reviewed March 7, 2003

[Centers for Disease Control and Prevention](#)
[National Center for Infectious Diseases](#)
[Division of Bacterial and Mycotic Diseases](#)

[See the menu in Español/Spanish](#)

Menu

- [Good News - A Cure for Ulcers!](#)
- [H. pylori Fact Sheet for Health Care](#)

[CDC Home](#) | [Search](#) | [Health Topics](#)

Division of Bacterial and Mycotic Diseases
***Helicobacter pylori* and**
Peptic Ulcer Disease

This FAQ is available for viewing and printing in pdf format.
[H. pylori Fact Sheet for Health Care Providers](#) [38.2 KB]

- [What is H. pylori?](#)
- [How common is H. pylori?](#)

Providers

- [Economic Impact of Ulcers](#)
- [History of Ulcer Diagnosis and Treatment](#)
- [H. pylori: The Key to Cure for Most Ulcers](#)
- [H. pylori Myth Sheet](#)
- [Members of the CDC H. pylori Partnership](#)
- [Television and Radio Public Service Announcements](#)
- [Education Materials Order Form](#)

- [What illnesses does *H. pylori* cause?](#)
- [What are the symptoms of ulcers?](#)
- [Who should be tested and treated for *H. pylori*?](#)
- [How is *H. pylori* infection diagnosed?](#)
- [What are the treatment regimens used for *H. pylori*?](#)
- [FDA-Approved Treatment Options](#)
- [Are there any long-term consequences of *H. pylori* infection?](#)
- [How do people get infected with *H. pylori*?](#)
- [What can people do to prevent *H. pylori* infection?](#)
- [What is the CDC doing to prevent *H. pylori* infection?](#)
- [How can I get more information about *H. pylori*?](#)

What is *H. pylori*?

Helicobacter pylori (*H. pylori*) is a spiral-shaped bacterium that is found in the gastric mucous layer or adherent to the epithelial lining of the stomach. *H. pylori* causes more than 90% of duodenal ulcers and up to 80% of gastric ulcers. Before 1982, when this bacterium was discovered, spicy food, acid, stress, and lifestyle were considered the major causes of ulcers. The majority of patients were given long-term medications, such as H2 blockers, and more recently, proton pump inhibitors, without a chance for permanent cure. These medications relieve ulcer-related symptoms, heal gastric mucosal inflammation, and may heal the ulcer, but they do NOT treat the infection. When acid suppression is removed, the majority of ulcers, particularly those caused by *H. pylori*, recur. Since we now know that most ulcers are caused by *H. pylori*, appropriate antibiotic regimens can successfully eradicate the infection in most patients, with complete resolution of mucosal inflammation and a minimal chance for recurrence of ulcers.

How common is *H. pylori* infection?

Approximately two-thirds of the world's population is infected with *H. pylori*. In the United States, *H. pylori* is more prevalent among older adults, African Americans, Hispanics, and lower socioeconomic groups.

What illnesses does *H. pylori* cause?

Most persons who are infected with *H. pylori* never suffer any symptoms related to the infection; however, *H. pylori* causes chronic active, chronic persistent, and atrophic gastritis in adults and children. Infection with *H. pylori* also causes duodenal and gastric ulcers. Infected persons have a 2- to 6-fold increased risk of developing gastric cancer and mucosal-associated-lymphoid-type (MALT) lymphoma compared with their uninfected counterparts. The role of *H. pylori* in non-ulcer dyspepsia remains unclear.

What are the symptoms of ulcers?**Related Contents**

- [Foodborne and Diarrheal Diseases Branch](#)
- [DBMD Disease Listing - *H. pylori*](#)
- [CDC Morbidity and Mortality Weekly Report \(MMWR\)](#)

Approximately 25 million Americans suffer from peptic ulcer disease at some point in their lifetime. Each year there are 500,000 to 850,000 new cases of peptic ulcer disease and more than one million ulcer-related hospitalizations. The most common ulcer symptom is gnawing or burning pain in the epigastrium. This pain typically occurs when the stomach is empty, between meals and in the early morning hours, but it can also occur at other times. It may last from minutes to hours and may be relieved by eating or by taking antacids. Less common ulcer symptoms include nausea, vomiting, and loss of appetite. Bleeding can also occur; prolonged bleeding may cause anemia leading to weakness and fatigue. If bleeding is heavy, hematemesis, hematochezia, or melena may occur.

Who should be tested and treated for *H. pylori* ?

Persons with active gastric or duodenal ulcers or documented history of ulcers should be tested for *H. pylori*, and if found to be infected, they should be treated. To date, there has been no conclusive evidence that treatment of *H. pylori* infection in patients with non-ulcer dyspepsia is warranted. Testing for and treatment of *H. pylori* infection are recommended following resection of early gastric cancer and for low-grade gastric MALT lymphoma. Retesting after treatment may be prudent for patients with bleeding or otherwise complicated peptic ulcer disease. Treatment recommendations for children have not been formulated. Pediatric patients who require extensive diagnostic work-ups for abdominal symptoms should be evaluated by a specialist.

How is *H. pylori* infection diagnosed?

Several methods may be used to diagnose *H. pylori* infection. Serological tests that measure specific *H. pylori* IgG antibodies can determine if a person has been infected. The sensitivity and specificity of these assays range from 80% to 95% depending upon the assay used. Another diagnostic method is the breath test. In this test, the patient is given either ¹³C- or ¹⁴C-labeled urea to drink. *H. pylori* metabolizes the urea rapidly, and the labeled carbon is absorbed. This labeled carbon can then be measured as CO₂ in the patient's expired breath to determine whether *H. pylori* is present. The sensitivity and specificity of the breath test ranges from 94% to 98%. Upper esophagogastroduodenal endoscopy is considered the reference method of diagnosis. During endoscopy, biopsy specimens of the stomach and duodenum are obtained and the diagnosis of *H. pylori* can be made by several methods: The biopsy urease test - a colorimetric test based on the ability of *H. pylori* to produce urease; it provides rapid testing at the time of biopsy. Histologic identification of organisms - considered the gold standard of diagnostic tests. Culture of biopsy specimens for *H. pylori*, which requires an experienced laboratory and is necessary when antimicrobial susceptibility testing is desired.

What are the treatment regimens used for *H. pylori* eradication?

Therapy for *H. pylori* infection consists of 10 days to 2 weeks of one or two effective antibiotics, such as amoxicillin, tetracycline (not to be used for children <12 yrs.), metronidazole, or clarithromycin, plus either ranitidine bismuth citrate, bismuth subsalicylate, or a proton pump inhibitor. Acid suppression by the H2 blocker or proton pump inhibitor in conjunction with the antibiotics helps alleviate ulcer-related symptoms (i.e., abdominal pain, nausea), helps heal gastric mucosal inflammation, and may enhance efficacy of the antibiotics against *H. pylori* at the gastric mucosal surface. Currently, eight *H. pylori* treatment regimens are approved by the Food and Drug Administration (FDA) (Table 1); however, several other combinations have been used successfully. Antibiotic resistance and patient noncompliance are the two major reasons for treatment failure. Eradication rates of the eight FDA-approved regimens range from 61% to 94% depending on the regimen used. Overall, triple therapy regimens have shown better eradication rates than dual therapy. Longer length of treatment (14 days versus 10 days) results in better eradication rates.

FDA-Approved Treatment Options

FDA-approved treatment options	
□	Omeprazole 40 mg QD + clarithromycin 500 mg TID x 2 wks, then omeprazole 20 mg QD x 2 wks
	-OR-
	Ranitidine bismuth citrate (RBC) 400 mg BID + clarithromycin 500 mg TID x 2 wks, then RBC 400 mg BID x 2 wks
	-OR-
	Bismuth subsalicylate (Pepto Bismol®) 525 mg QID + metronidazole 250 mg QID + tetracycline 500 mg QID* x 2 wks + H2 receptor antagonist therapy as directed x 4 wks
	-OR-
	Lansoprazole 30 mg BID + amoxicillin 1 g BID + clarithromycin 500 mg TID x 10 days
	-OR-
	Lansoprazole 30 mg TID + amoxicillin 1 g TID x 2 wks**
	-OR-

Rantidine bismuth citrate 400 mg BID + clarithromycin 500 mg BID x 2 wks, then RBC 400 mg BID x 2 wks

-OR-

Omeprazole 20 mg BID + clarithromycin 500 mg BID + amoxicillin 1 g BID x 10 days

-OR-

Lansoprazole 30 mg BID + clarithromycin 500 mg BID + amoxicillin 1 g BID x 10 days

*Although not FDA approved, amoxicillin has been substituted for tetracycline for patients for whom tetracycline is not recommended.

**This dual therapy regimen has restrictive labeling. It is indicated for patients who are either allergic or intolerant to clarithromycin or for infections with known or suspected resistance to clarithromycin.

Are there any long-term consequences of *H. pylori* infection?

Recent studies have shown an association between long-term infection with *H. pylori* and the development of gastric cancer. Gastric cancer is the second most common cancer worldwide; it is most common in countries such as Colombia and China, where *H. pylori* infects over half the population in early childhood. In the United States, where *H. pylori* is less common in young people, gastric cancer rates have decreased since the 1930s.

How do people get infected with *H. pylori*?

It is not known how *H. pylori* is transmitted or why some patients become symptomatic while others do not. The bacteria are most likely spread from person to person through fecal-oral or oral-oral routes. Possible environmental reservoirs include contaminated water sources. Iatrogenic spread through contaminated endoscopes has been documented but can be prevented by proper cleaning of equipment.

What can people do to prevent *H. pylori* infection?

Since the source of *H. pylori* is not yet known, recommendations for avoiding infection have not been made. In general, it is always wise for persons to wash hands thoroughly, to eat food that has been properly prepared, and to drink water from a safe, clean source.

What is the Centers for Disease Control and Prevention (CDC)

doing to prevent *H. pylori* infection?

CDC, with partners in other government agencies, academic institutions, and industry, is conducting a national education campaign to inform health care providers and consumers of the link between *H. pylori* and stomach and duodenal ulcers. CDC is also working with partners to study routes of transmission and possible prevention measures, and to establish an antimicrobial resistance surveillance system to monitor the changes in resistance among *H. pylori* strains in the United States.

How can I get more information about *H. pylori*?

1. NIH Consensus Development Conference. *Helicobacter pylori* in peptic ulcer disease. JAMA 272:65-69, 1994.
2. Soll, AH. Medical treatment of peptic ulcer disease. Practice guidelines. [Review]. JAMA 275:622-629, 1996. [published erratum appears in JAMA 1996 May 1;275:1314].
3. Hunt, RH. *Helicobacter pylori*: from theory to practice. Proceedings of a symposium. Am J Med 1996; 100 (5A) supplement.
4. The American Gastroenterological Association, American Digestive Health Foundation, 7910 Woodmont Avenue, 7th floor, Bethesda, MD 20814, (301) 654-2055 telephone, (301) 654-5920 fax.
5. The National Digestive Diseases Information Clearinghouse, National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health, 2 Information Way, Bethesda, MD 20892-3570, (301) 654-3810 telephone.
6. Hunt RH, Thompson ABR. Canadian *Helicobacter pylori* Consensus Conference. Can J. Gastroenterol 1998, 12(1):31-41.
7. European *Helicobacter pylori* Study Group. Current European concepts in the management of *H. pylori* infection. The Maastricht Consensus. Gut 1997; 41, 8-13.



For further information, contact:

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[CDC Home](#) | [Search](#) | [Health Topics A-Z](#)

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 Centers for Disease Control and Prevention	<input type="text" value="CDC Home"/>  DBMD Disease Information logo with link to complete disease listing	<input type="button" value="Search"/>
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Escherichia coli O157:H7



Frequently Asked Questions

- [What is *Escherichia coli* O157:H7?](#)
- [How is *E. coli* O157:H7 spread?](#)
- [What illness does *E. coli* O157:H7 cause?](#)
- [How is *E. coli* O157:H7 infection diagnosed?](#)
- [How is the illness treated?](#)
- [What are the long term consequences of infection?](#)
- [What can be done to prevent the infection?](#)
- [What can you do to prevent *E. coli* O157:H7 infection?](#)

Escherichia coli O157:H7 is an emerging cause of foodborne illness. An estimated 73,000 cases of infection and 61 deaths occur in the United States each year. Infection often leads to bloody diarrhea and occasionally to kidney failure. Most illness has been associated with eating undercooked, contaminated ground beef. Person-to-person contact in families and child care centers is also an important mode of transmission. Infection can also occur after drinking raw milk and after swimming in or drinking contaminated water.

Consumers can prevent *E. coli* O157:H7 infection by thoroughly cooking ground beef, avoiding unpasteurized milk, and washing hands carefully. Because the organism lives in the intestines of healthy cattle, preventive measures on cattle farming during meat processing are being investigated.

What is *Escherichia coli* O157:H7?

E. coli O157:H7 is one of hundreds of strains of the bacterium *Escherichia coli*. Although most harmless and live in the intestines of healthy humans and animals, this strain produces a powerful toxin and can cause severe illness.

E. coli O157:H7 was first recognized as a cause of illness in 1982 during an outbreak of severe diarrhea; the outbreak was traced to contaminated hamburgers. Since then, most infections have come from eating undercooked ground beef.

The combination of letters and numbers in the name of the bacterium refers to the specific marker on its surface and distinguishes it from other types of *E. coli*.

How is *E. coli* O157:H7 spread?

The organism can be found on a small number of cattle farms and can live in the intestines of healthy cattle. Meat can become contaminated during slaughter, and organisms can be thoroughly mixed into ground meat when it is ground. Bacteria present on the cow's udders or on equipment may get into raw milk.

Eating meat, especially ground beef, that has not been cooked sufficiently to kill *E. coli* O157:H7 can cause infection. Contaminated meat looks and smells normal. Although the number of organisms needed to cause disease is not known, it is suspected to be very small.

Among other known sources of infection are consumption of sprouts, lettuce, salami, unpasteurized juice, and swimming in or drinking sewage-contaminated water.

Bacteria in diarrheal stools of infected persons can be passed from one person to another if good handwashing habits are inadequate.

This is particularly likely among toddlers who are not toilet trained. Family members and playmates of these children are at high risk of becoming infected.

Young children typically shed the organism in their feces for a week or two after their illness resolves. Older children rarely carry the organism without symptoms.

What illness does *E. coli* O157:H7 cause?

E. coli O157:H7 infection often causes severe bloody diarrhea and abdominal cramps; sometimes infection causes nonbloody diarrhea or no symptoms. Usually little or no fever is present, and the illness resolves in 5 to 10 days.

In some persons, particularly children under 5 years of age and the elderly, the infection can also cause a complication called hemolytic uremic syndrome, in which the red blood cells are destroyed and kidneys fail. About 2%-7% of infections lead to this complication. In the United States, hemolytic uremic syndrome is the principal cause of acute kidney failure in children, and most cases of hemolytic uremic syndrome are caused by *E. coli* O157:H7.

syndrome are caused by *E. coli* O157:H7.

How is *E. coli* O157:H7 infection diagnosed?

Infection with *E. coli* O157:H7 is diagnosed by detecting the bacterium in the stool. Most labor culture stool do not test for *E. coli* O157:H7, so it is important to request that the stool specimen on sorbitol-MacConkey (SMAC) agar for this organism. All persons who suddenly have diarrhea with blood should get their stool tested for *E. coli* O157:H7.

How is the illness treated?

Most persons recover without antibiotics or other specific treatment in 5-10 days. There is no evidence that antibiotics improve the course of disease, and it is thought that treatment with some antibiotics precipitate kidney complications. Antidiarrheal agents, such as loperamide (Imodium), should be avoided.

Hemolytic uremic syndrome is a life-threatening condition usually treated in an intensive care unit. Transfusions and kidney dialysis are often required. With intensive care, the death rate for hemolytic uremic syndrome is 3%-5%.

What are the long-term consequences of infection?

Persons who only have diarrhea usually recover completely.

About one-third of persons with hemolytic uremic syndrome have abnormal kidney function months later, and a few require long-term dialysis. Another 8% of persons with hemolytic uremic syndrome have other lifelong complications, such as high blood pressure, seizures, blindness, paralysis, and the need to have part of their bowel removed.

What can be done to prevent the infection?

E. coli O157:H7 will continue to be an important public health concern as long as it contaminates meat. Preventive measures may reduce the number of cattle that carry it and the contamination of meat during slaughter and grinding. Research into such prevention measures is just beginning.

What can you do to prevent *E. coli* O157:H7 infection?

Cook all ground beef and hamburger thoroughly. Because ground beef can turn brown before the bacteria are killed, use a digital instant-read meat thermometer to ensure thorough cooking. Ground beef should be cooked until a thermometer inserted into several parts of the patty, including the center, reaches 160°F (71°C).

thickest part, reads at least 160° F. Persons who cook ground beef without using a thermometer decrease their risk of illness by not eating ground beef patties that are still pink in the middle.

If you are served an undercooked hamburger or other ground beef product in a restaurant, send further cooking. You may want to ask for a new bun and a clean plate, too.

Avoid spreading harmful bacteria in your kitchen. Keep raw meat separate from ready-to-eat foods, hands, counters, and utensils with hot soapy water after they touch raw meat. Never place cooked hamburgers or ground beef on the unwashed plate that held raw patties. Wash meat thermometers between tests of patties that require further cooking.

Drink only pasteurized milk, juice, or cider. Commercial juice with an extended shelf-life that is at room temperature (e.g. juice in cardboard boxes, vacuum sealed juice in glass containers) has been pasteurized, although this is generally not indicated on the label. Juice concentrates are also heated sufficiently to kill pathogens.

Wash fruits and vegetables thoroughly, especially those that will not be cooked. Children under age 5, immunocompromised persons, and the elderly should avoid eating alfalfa sprouts until they can be assured. Methods to decontaminate alfalfa seeds and sprouts are being investigated.

Drink municipal water that has been treated with chlorine or other effective disinfectants.

Avoid swallowing lake or pool water while swimming. [See more information about this.](#)

Make sure that persons with diarrhea, especially children, wash their hands carefully with soap and water to reduce the risk of spreading infection, and that persons wash hands after changing diapers. Anyone with a diarrheal illness should avoid swimming in public pools or lakes, sharing with others, and preparing food for others.

For more information about reducing your risk of foodborne illness, visit the US Department of Agriculture's Food Safety and Inspection Service website at: <http://www.fsis.usda.gov> or the National Center for Food Safety Education at: For more advice on cooking ground beef, visit the U.S. Department of Agriculture web site at: <http://www.fsis.usda.gov/OA/topics/gb.htm>

[Disease Listing](#) | [General Information](#) | [Technical Information](#) | [Additional Information](#)

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[CDC Home](#) | [Search](#) | [Health Topics A-Z](#)

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[Division of Bacterial and Mycotic Diseases](#)

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	<input checked="" type="checkbox"/> Respiratory and Enteric Viruses Branch		
	<input type="checkbox"/> News and Events		

Site Contents

Viral (Aseptic) Meningitis

>>>>

Surveillance Programs

- NREVSS
- [Global Laboratory Network for Measles Surveillance](#)
- Disease Information
 - [Viral Gastroenteritis](#)
 - [Rotavirus](#)
 - [Norovirus](#)
 - [Non-Polio Enterovirus](#)
 - [Viral Meningitis](#)
 - [Hand Food and Mouth Disease](#)
 - [Parvovirus B19 \(Fifth Disease\)](#)
 - [B19 and Pregnancy](#)
 - [Adenovirus](#)
 - [Human Parainfluenza](#)
 - [Respiratory Syncytial Virus](#)

What is meningitis?

Meningitis is an illness in which there is inflammation of the tissues that cover the brain and spinal cord. Viral or aseptic meningitis, which is the most common type, is caused by an infection with one of several types of viruses. Meningitis can also be caused by infections with several types of bacteria or fungi.

What are the symptoms of meningitis?

The symptoms of meningitis may not be the same for every person. The more common symptoms are fever, severe headache, stiff neck, bright lights hurt the eyes, drowsiness or confusion, and nausea and vomiting. In babies, the symptoms are more difficult to identify. They may include fever, fretfulness or irritability, difficulty in awakening the baby, or the baby refuses to eat.

Is viral meningitis a serious disease?

Viral (aseptic) meningitis is serious but rarely fatal in persons with normal immune systems. Usually, the symptoms last from 7 to 10 days and the person recovers completely. Bacterial meningitis, on the other hand, can be very serious and result in disability or death if not treated promptly. Often, the symptoms of viral meningitis and bacterial meningitis are the same. For this reason, if you think you or your child has meningitis, see your doctor as soon as possible.

What causes viral meningitis?

Many different viruses can cause meningitis. About 90% of cases of viral meningitis are caused by members of a group of viruses known as enteroviruses, such as coxsackieviruses and echoviruses. Herpesviruses and the mumps virus can also cause viral meningitis.

How is viral meningitis diagnosed?

Viral meningitis is usually diagnosed by laboratory tests of spinal fluid obtained with a spinal tap. It can also be diagnosed

by tests that identify the virus in specimens collected from the patient, but these tests are not usually done.

How is viral meningitis treated?

No specific treatment for viral meningitis exists at this time. Most patients recover completely on their own, and doctors often will recommend bed rest, plenty of fluids, and medicine to relieve fever and headache.

Can I get viral meningitis if I'm around someone who has it?

The viruses that cause viral meningitis are contagious. Enteroviruses, for example, are very common during the summer and early fall, and many people are exposed to them. However, most infected persons either have no symptoms or develop only a cold or rash with low-grade fever. Typically, fewer than 1 of every 1000 persons infected actually develop meningitis. Therefore, if you are around someone who has viral meningitis, you have a moderate chance of becoming infected, but a very small chance of developing meningitis.

How is the virus spread?

Enteroviruses, the most common cause of viral meningitis, are most often spread through direct contact with respiratory secretions (e.g., saliva, sputum, or nasal mucus) of an infected person. This usually happens by shaking hands with an infected person or touching something they have handled, and then rubbing your own nose, mouth or eyes. The virus can also be found in the stool of persons who are infected. The virus is spread through this route mainly among small children who are not yet toilet trained. It can also be spread this way to adults changing the diapers of an infected infant. The incubation period for enteroviruses is usually between 3 and 7 days from the time you are infected until you develop symptoms. You can usually spread the virus to someone else beginning about 3 days after you are infected until about 10 days after you develop symptoms.

How can I reduce my chances of becoming infected?

Because most persons who are infected with enteroviruses do not become sick, it can be difficult to prevent the spread of the virus. If you are in contact with someone who has viral meningitis, however, the most effective method of prevention is to wash your hands thoroughly and often. In institutional settings such as child care centers, washing objects and surfaces with a dilute bleach solution (made by mixing 1 capful of chlorine-containing household bleach with 1 gallon water) can be a very effective way to inactivate the virus.

For further information, please contact the Respiratory and

Enteric Viruses Branch, National Center for Infectious Diseases,
at 404-639-3607 (telephone) or 404-639-4960 (facsimile).

[Top of Page](#)

[Home](#) | [Links](#) | [Contact Us](#)

[CDC Home](#) | [Search](#) | [Health Topics A-Z](#)

This page last reviewed August 20, 2001

[Respiratory and Enteric Viruses Branch](#)
[Division of Viral and Rickettsial Diseases](#)
[National Center for Infectious Diseases](#)
[Centers for Disease Control and Prevention](#)

[Privacy Policy](#) | [Accessibility](#)

Centers for Disease Control and Prevention

CDC Home

Search

Health Topics

Respiratory and Enteric Viruses Branch

Notified Diseases

Site Contents

Surveillance Programs

- [NREVSS](#)
- [Global Laboratory Network for Measles Surveillance](#)

Disease Information

- [Viral Gastroenteritis](#)
 - [Rotavirus](#)
 - [Norovirus](#)
- [Non-Polio Enterovirus](#)
 - [Viral Meningitis](#)
 - [Hand Food and Mouth Disease](#)
- [Parvovirus B19 \(Fifth Disease\)](#)
 - [B19 and Pregnancy](#)

Hand, Foot, & Mouth Disease

What is hand, foot, and mouth disease?

Hand, foot, and mouth disease (HFMD) is a common illness of infants and children. It is characterized by fever, sores in the mouth, and a rash with blisters. HFMD begins with a mild fever, poor appetite, malaise ("feeling sick"), and frequently a sore throat. One or 2 days after the fever begins, sores develop in the mouth. They begin as small red spots that blister and then often become ulcers. They are usually located on the tongue, gums, and inside of the cheeks. The skin rash develops over 1 to 2 days with flat or raised red spots, some with blisters. The rash does not itch, and it is usually located on the palms of the hands and soles of the feet. It may also appear on the buttocks. A person with HFMD may have only the rash or the mouth ulcers.

Is HFMD the same as foot-and-mouth disease?

Related

- [Foot-and-Mouth Disease Information for Travelers](#) (March 20, 2001)

FMD is commonly confused with hand, foot, and mouth disease (HFMD); although the names are similar, the diseases are not related. For information on FMD, please visit the Information for Travelers on CDC's Traveler's Health website.

- [Adenovirus](#)
- [Human](#)
- [Parainfluenza](#)
- [Respiratory](#)
- [Syncytial Virus](#)

No. HFMD is a different disease than foot-and-mouth disease of cattle, sheep, and swine. Although the names are similar, the two diseases are not related at all and are caused by different viruses.

What causes HFMD?

Several different viruses cause HFMD. The most common cause is coxsackievirus A16; sometimes, enterovirus 71 or other strains of enteroviruses cause HFMD. The enterovirus group includes polioviruses, coxsackieviruses, and echoviruses.

Is HFMD serious? Usually not. HFMD caused by coxsackievirus A16 infection is a mild disease and nearly all patients recover without medical treatment in 7 to 10 days. There are no common complications. Rarely, this illness may be associated with "aseptic" or viral meningitis, in which the person has fever, headache, stiff neck, or back pain, and may need to be hospitalized for a few days. Another cause of HFMD, EV71 may also cause viral meningitis and, rarely, more serious diseases, such as encephalitis, or a poliomyelitis-like paralysis. EV71 encephalitis may be fatal. Cases of fatal encephalitis occurred during outbreaks of HFMD in Malaysia in 1997 and in Taiwan, 1998.

Is it contagious?

Yes, HFMD is moderately contagious. Infection is spread from person to person by direct contact with nose and throat discharges or the stool of infected persons. A person is most contagious during the first week of the illness. HFMD is not transmitted to or from pets or other animals.

How soon will someone become ill after getting infected?

The usual period from infection to onset of symptoms is 3 to 7 days. Fever is often the first symptom of HFMD.

Who is at risk for HFMD?

HFMD occurs mainly in children under 10 years old, but adults may also be at risk. Everyone is susceptible to infection. Infection results in immunity to the specific virus, but a second episode may occur following infection with a different member of the enterovirus group.

When and where does HFMD occur?

Individual cases and outbreaks of HFMD occur worldwide, more frequently in summer and early autumn. In the recent past, major outbreaks of HFMD attributable to enterovirus 71 have been reported in some South East Asian countries (Malaysia in 1997, Taiwan, 1998).

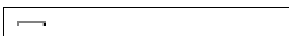
How is HFMD diagnosed?

HFMD is one of many infections that result in mouth sores. Another common cause is oral herpesvirus infection, which produces an inflammation of the mouth and gums (sometimes called stomatitis). Usually, the physician can distinguish between HFMD and other causes of mouth sores based on the age of the patient, the pattern of symptoms reported by the patient or parent, and the appearance of the rash and sores on examination. A throat swab or stool specimen may be sent to a laboratory to determine which enterovirus caused the illness. Since the testing often takes 2 to 4 weeks to obtain a final answer, the physician usually does not order these tests.

How is HFMD treated? Can it be prevented?

No specific treatment is available for this or other enterovirus infections. Symptomatic treatment is given to provide relief from fever, aches, or pain from the mouth ulcers. Preventive measures include frequent handwashing, especially after diaper changes; disinfection of contaminated surfaces by household cleaners (such as diluted bleach solution made by mixing 1 capful of household bleach containing chlorine with 1 gallon water), and washing soiled articles of clothing. Children are often excluded from child care programs, schools, or other group settings during the first few days of the illness. These measures may reduce the spread of infection, but they will not completely interrupt it.

For further information, please contact the Respiratory and Enteric Viruses Branch, National Center for Infectious Diseases, at 404-639-3607 (telephone) or 404-639-4960 (facsimile).



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Trichuriasis

[*Trichuris trichiura*]

Causal

Life

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Clinical

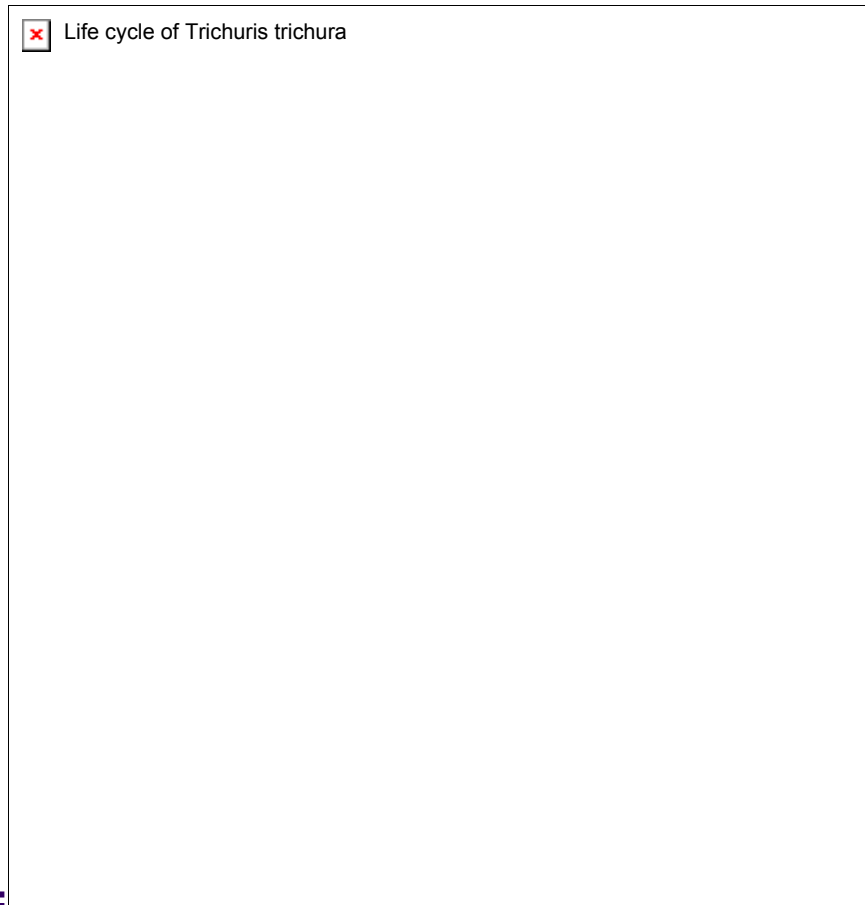
Laboral

Treatm

Causal Agent:

The nematode (roundworm) *Trichuris trichiura*, also called the human whipworm.

Life cycle of *Trichuris trichiura*



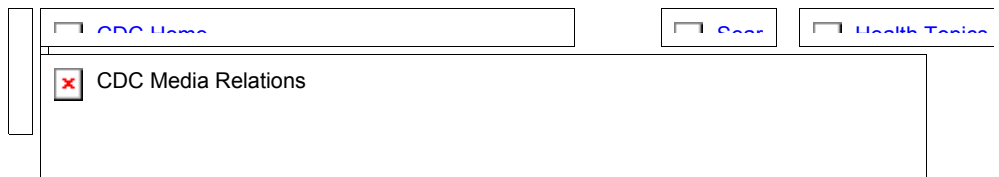
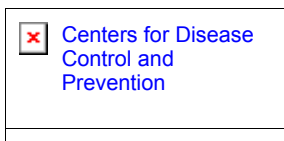
Life Cycle:

The unembryonated eggs are passed with the stool . In the soil, the eggs develop into a 2-cell stage , an advanced cleavage stage , and then they embryonate ; eggs become infective in 15 to 30 days. After ingestion (soil-contaminated hands or food), the eggs hatch in the small intestine, and release larvae that mature and establish themselves as adults in the colon . The adult worms (approximately 4 cm in length) live in the cecum and ascending colon. The adult worms are fixed in that location, with the anterior portions threaded into the mucosa. The females begin to oviposit 60 to 70 days after infection. Female worms in the cecum shed between 3,000 and 20,000 eggs per day. The life span of the adults is about 1 year.

Geographic Distribution:

The third most common round worm of humans. Worldwide, with infections

more frequent in areas with tropical weather and poor sanitation practices, and among children. It is estimated that 800 million people are infected worldwide. Trichuriasis occurs in the southern United States.



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Fact Sheet

Hand Hygiene Guidelines Fact Sheet

- Improved adherence to hand hygiene (i.e. hand washing)

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- [On-Line Publications](#)
- [Image Library](#)
- [Press Releases](#)
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- [Health Statistics](#)
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or use of alcohol-based hand rubs) has been shown to terminate outbreaks in health care facilities, to reduce transmission of antimicrobial resistant organisms (e.g. methicillin resistant staphylococcus aureus) and reduce overall infection rates.

- CDC is releasing guidelines to improve adherence to hand hygiene in health care settings. In addition to traditional handwashing with soap and water, CDC is recommending the use of alcohol-based handrubs by health care personnel for patient care because they address some of the obstacles that health care professionals face when taking care of patients.
- Handwashing with soap and water remains a sensible strategy for hand hygiene in non-health care settings and is recommended by CDC and other experts.
- When health care personnel's hands are visibly soiled, they should wash with soap and water.
- The use of gloves does not eliminate the need for hand hygiene. Likewise, the use of hand hygiene does not eliminate the need for gloves. Gloves reduce hand contamination by 70 percent to 80 percent, prevent cross-contamination and protect patients and health care personnel from infection. Handrubs should be used before and after each patient just as gloves should be changed before and after each patient.
- When using an alcohol-based handrub, apply product to palm of one hand and rub hands together, covering all surfaces of hands and fingers, until hands are dry. Note that the volume needed to reduce the number of bacteria on hands varies by product.
- Alcohol-based handrubs significantly reduce the number of microorganisms on skin, are fast acting and cause less skin irritation.
- Health care personnel should avoid wearing artificial nails and keep natural nails less than one quarter of an inch long if they care for patients at high risk of acquiring infections (e.g. Patients in intensive care units or in transplant units)
- When evaluating hand hygiene products for potential use in health care facilities, administrators or product selection committees should consider the relative efficacy of antiseptic agents against various pathogens and the acceptability of hand hygiene products by

personnel. Characteristics of a product that can affect acceptance and therefore usage include its smell, consistency, color and the effect of dryness on hands.

- As part of these recommendations, CDC is asking health care facilities to develop and implement a system for measuring improvements in adherence to these hand hygiene recommendations. Some of the suggested performance indicators include: periodic monitoring of hand hygiene adherence and providing feedback to personnel regarding their performance, monitoring the volume of alcohol-based handrub used/1000 patient days, monitoring adherence to policies dealing with wearing artificial nails and focused assessment of the adequacy of health care personnel hand hygiene when outbreaks of infection occur.
- Allergic contact dermatitis due to alcohol hand rubs is very uncommon. However, with increasing use of such products by health care personnel, it is likely that true allergic reactions to such products will occasionally be encountered.
- Alcohol-based hand rubs take less time to use than traditional hand washing. In an eight-hour shift, an estimated one hour of an ICU nurse's time will be saved by using an alcohol-based handrub.
- These guidelines should not be construed to legalize product claims that are not allowed by an FDA product approval by FDA's Over-the-Counter Drug Review. The recommendations are not intended to apply to consumer use of the products discussed.

###

CDC protects people's health and safety by preventing and controlling diseases and injuries; enhances health decisions by providing credible information on critical health issues; and promotes healthy living through strong partnerships with local, national, and international organizations.

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