



# Fecal Matter in the Air – What do we know?

March 2004

A Collaborative Effort of USACHPPM and AFIOH



There has been some concern among soldiers in several camps in SW Asia, particularly in Afghanistan, that there are high levels of “fecal matter” in the air, that soldiers are breathing this in, and that it could cause some kind of health effect. This fact sheet provides information regarding fecal matter – what it really is, what “high levels” mean, and what health effects are possible from breathing it in.

## Summary points:

- The makeup of airborne particles of dust and sand varies around the world, and may have both “organic” (from living things) and “inorganic” (mineral) parts.
- Exposure to high levels of particles of dust and sand in the air will occur at times in your deployment location, and can lead to eye and nasal irritation and some respiratory health concerns (such as phlegm or a tight chest).
- As in many areas of the world, some fecal matter could be in the air as part of windblown dust, but itself is unlikely to cause illness.

## What is in fecal matter?

Fecal matter or “stool” is simply bodily waste left over from digestion in humans or animals. It can be odorous and unpleasant, but actually contains mostly water, undigested food residue or fiber (similar to rotten vegetables), salts, gas and bacteria. Most of the bacteria in fecal matter are “good bacteria” that help digest the food. However, a sick animal or human can harbor harmful bacteria, viruses, or parasites (e.g. worms) and pass them in their stool. Also, animals and humans that are not outwardly sick can still carry these illness-causing organisms called “pathogens,” and excrete them into the environment. When they are excreted, they then become available for other people/animals to contact and perhaps become ill. However, many factors play a role in whether this will happen.

The illness-causing organisms in feces survive best in the warm moist environment found inside the body. When feces are excreted, the harsh environment outside the body limits how long illness-causing organisms in the feces can survive. High air temperature, low humidity and strong ultraviolet light in sunshine are especially deadly to these organisms. Fresh stool will have the greatest number of these types of living organisms. As the stool gets older and dries out, there will be fewer, if any.

## Can coming into contact with fecal matter make me sick?

The most likely way to become ill from stool is if you swallow it. This most commonly happens when people accidentally touch fresh stool, and then handle food

that they are eating or put their fingers in or around their mouth. Illness-causing organisms from stool can enter water supplies and be swallowed. Disease can also spread directly from one ill person to another (e.g. through contact with dirty hands). Fresh stool is wet and heavy and is unlikely to become airborne and breathed in, unless it is done purposefully (e.g. sprayed). Older, dried or drying stool can become airborne because of wind, by intentionally mixing it in order to help it dry or turn into compost, or even by spraying it on fields for fertilizer (as “sludge”). However, as stool gets older and dries, any illness-causing organisms immediately begin to die. Illness-causing organisms in stool die even more rapidly when they are made airborne, because they are more vulnerable to heat, the rays of sunlight, and low humidity.

Breathing in airborne dust, even if it contains old, dried stool is unlikely to lead to illness. Studies have been done near sewage treatment plants or where sludge or compost is spread, sprayed or mixed, and therefore mechanically “thrown into the air”. These study results showed that live organisms from such sources cannot usually be measured beyond a few hundred meters from the source. Even organisms that were not in the original stool, but that grew in the aging stool/compost (e.g. fungi) were not measured beyond a few hundred meters from the source. Communities around these sources have been studied and they do not show increased illness. Even workers who directly handle sewage, compost or sludge are unlikely to become ill from breathing them in, except under rare, extreme circumstances.

## Can breathing in fecal matter make me sick?

One may wonder if there are any other ways of becoming ill from fecal matter, other than getting ill with a virus, bacteria, parasite, or fungus already present in the stool. It is possible for someone to react to organic matter that is in the air. “Organic matter” is a broad category that includes dried fecal matter, as well as other matter from living or formerly living things, such as plants, animals, or bacteria. Other than irritation from the dust, the body can react with an immune reaction. The most common immune reaction to organic matter is allergy (such as allergy to pollen or dust mites). Most people are aware of how an allergy can make them feel – itchy watery eyes, nasal congestion, or a tight chest.

There can be another type of immune reaction to parts of organic matter if it is breathed into the lungs in very high amounts. In very high amounts, breathing in organic matter can sometimes make a person feel ill like the flu, with fever, achiness, irritation of the eyes, nose and

lungs, and a tight chest. However, it is only under extreme conditions where organic matter can cause this type of immune reaction. Organic matter would have to be a large part of dust (e.g. being “thrown into the air” by mechanical processes like turning hay or compost, cleaning livestock facilities or aeration of sewage at treatment plants), there would need to be a great many dust particles in the air, and the exposed person would have to be close enough to the source to breathe this extreme concentration. Those at highest risk would include farmers and sewage treatment workers close to these sources. Even studies of these populations do not show any consistent illness from breathing in this type of matter except under extreme circumstances; in addition, these types of workers would wear masks for protection.

#### **What about burning feces for energy?**

In some parts of the world, including Southwest Asia, local people may burn dried animal feces (dung patties) for fuel to heat the house or cook food. This is a common practice that has endured for millennia. Burning dung patty smoke releases into the air various gases, dust particles, and some organic chemicals, similar to burning wood smoke or cigarette smoke. These can all contribute to the smog/air pollution in an area, and any potential health effects when the smoke is breathed in would be similar. High air pollution level can cause symptoms like irritated lungs, eyes and nasal passages.

#### **What kind of environment would make it easy for organic matter like fecal matter to get into the air?**

In a particular region, the “ambient” or naturally occurring levels of organic matter in the air is more dependent on the type of soil and common sources of airborne materials – e.g. burning coal or wood, or car emissions. Some soils are more organic than others, especially when they are moist and fertile for farming, or when fertilizer/manure is purposely applied. Sand and sandy soil is mostly inorganic matter (minerals).

The level of organic matter in the air can vary by many factors, in all parts of the world, including the U.S. It is rare to find information on how much organic, as opposed to

inorganic matter is in the air in different locations, or to find information on what kind of disease-causing organisms (e.g. harmful bacteria) might be in the air or dust from one location to another. Therefore it is very difficult to say that one location, or country, has a higher level of organic matter, or feces, in the air than another country. Measurements are possible, but without comparisons, you don’t know what to make of the information. As there is no known medical threat from airborne stool, other than near obvious sources as discussed above, such measurements are not part of routine environmental assessments, including those at military operational sites.

#### **What can I do to protect myself?**

Because less developed countries may present more opportunities to contact disease-causing materials (e.g., less developed sanitation, more people potentially ill with these bacteria, viruses or parasites), it is important that good personal hygiene be practiced in order to protect yourself. It is well known that frequent hand-washing and other simple hygienic techniques for personal hygiene as well as food and sanitation, go a long way in preventing disease. Preventive medicine personnel on every installation are also involved in protecting the service member by setting up good public health practices and enforcing them. When circumstances warrant, when conditions are extremely bad, or when the service member is very concerned, a dust mask of some type can provide some protection. Local preventive medicine or occupational/environmental medicine personnel can assist in appropriate use and proper fitting of such masks.

#### **Summary points:**

- The makeup of airborne particles of dust and sand varies around the world, and may have both “organic” (from living things) and “inorganic” (mineral) parts.
- Exposure to high levels of particles of dust and sand in the air can occur in your deployment location, and can lead to eye and nasal irritation and some respiratory health concerns (such as phlegm or a tight chest).
- As in many areas of the world, some fecal matter could be in the air as part of windblown dust, but itself is unlikely to cause illness.

#### **For more information, please contact:**

##### **U.S. Army Center for Health Promotion & Preventive Medicine (USACHPPM):**

Liaison Officer, Camp Doha: DSN 438-8067  
Main: 1-800-222-9698  
<http://chppm-www.apgea.army.mil>  
Deployment environmental sampling and risk assessment:  
410-436-7282/ 6096  
General medical information: 410-436-2714

##### **Navy Environmental Health Center (NEHC):**

Phone: 757-953-0700  
<http://www-nehc.med.navy.mil>  
General medical information: 757-953-0778

##### **Air Force Institute of Occupational Health (AFIOH):**

Phone: 1-888-232-ESOH (3764)  
<http://starview.brooks.af.mil/afioh/>  
General medical information: 210-536-1788

##### **Deployment Health Clinical Center (DHCC):**

Phone: 866-559-1627  
<http://www.pdhealth.mil/>

##### **Department of Veterans Affairs:**

<http://www.va.gov/environagents>