

Public Health Implications of Uncollected Waste

Fact Sheet

1. Why does waste pose a risk to human health?

Household waste generally contains a large proportion of organic material that is a source of nutrition for a variety of organisms, ranging from bacteria and fungi, through arthropods, to animals (mainly rodents), that may pose health risks for communities. In addition, there may be chemical and other hazards, such as sharp objects and broken glass. Burning of garbage produces additional potential health risks. While most bacteria and fungi in garbage will be non-pathogens (i.e., saprophytes, spoilage organisms), disease-related organisms may be in certain discarded items, e.g. human and animal faeces, infected secretions and fluids (sputum, pus, blood) and dead animals. Immunocompromised persons may be at risk from opportunistic environmental organisms that would normally be harmless. Infants living in unhygienic conditions, which include the presence of garbage, animals and birds in the family home, have a higher risk of bacterial diarrhoea.¹ People that pick through garbage for recyclable material for a living, have more frequent diarrhoea and dermatitis than controls, as well as higher prevalences of low haemoglobin, poor oral health, and signs of chronic lung disease.²

2. What micro-organisms are associated with waste?

Waste that contains human excreta, (e.g. babies' nappies or urine-contaminated linen, or animal excreta), or food processing residue (e.g. chicken carcasses, uncooked animal products) may contain small numbers of bacteria, viruses or parasites that are infectious to humans. Persons can get infected directly (through handling or touching waste) or indirectly (when a person comes into contact with an insect or animal or object that has become contaminated with the micro-organisms). The table below summarises the diseases caused by these organisms.

Organism (Disease name)	Nature of waste/source	Incubation period (infectious dose)	Nature of diseases implicated
<i>Shigella</i> species (Shigellosis)	Human faeces	Usually 1-3 days; range: 12-96 hours, up to 1 week (10-100 organisms)	Diarrhoea (dysentery), vomiting, fever, nausea,
<i>Salmonella</i> species (Salmonellosis)	Domestic and wild animals (hide, fur, feathers, scales, offal, faeces), raw poultry, human faeces	6-12 hours, usually 12-36 hrs	Diarrhoea, abdominal pains, fever, nausea and often vomiting
<i>Campylobacter</i> species (Campylobac- teriosis)	Bird and animal faeces, offal, raw poultry	2-5 days usually, range 1- 10 days	Diarrhoea with bloody stools, fever, abdominal pain, nausea, vomiting; sometimes prolonged or relapsing
<i>Salmonella</i> Typhi (Typhoid fever)	Human faeces	Usually 8-14 days, range: 3-60 days	Typhoid fever (high fever, headache and malaise, abdominal symptoms)
Pathogenic <i>E.</i> <i>coli</i>	Human and animal (cattle, sheep, goats and others) faeces	2-10 days, median: 3-4 days	Diarrhoea (non-bloody to bloody stools), abdominal cramps

Rotaviruses, norovirus, calicivirus, astrovirus, etc	Human faeces	24-72 hours	Vomiting, diarrhoea and fever
Hepatitis A virus	Human stools (faeces) of persons with active disease	28-30 days average, Ranges:15-50 days	fever, fatigue, loss of appetite, nausea, diarrhoea and jaundice, mild flu-like symptoms
Hepatitis E virus	Human stools (faeces), blood	Range: 15-64 days	Similar to Hepatitis A above
<i>Toxoplasma gondii</i> (Toxoplasmosis)	Matter contaminated with cat faeces	10-23 days	Resembles infectious mononucleosis with fever, lymphadenopathy and lymphocytosis; main danger is in pregnancy, with risk of congenital disease transmission
<i>Leptospira</i> species (Leptospirosis)	Urine or tissues of infected animals, (rats, rodents and livestock)	5-14 days, range: 2-30 days	Mild influenza-like illness, or severe meningitis/ meningoencephalitis, pulmonary haemorrhage or Weil's syndrome (jaundice, multi-organ failure)
<i>Toxocara canis</i> , <i>T. cati</i> (Toxocariasis, visceral & ocular larva migrans)	Matter contaminated with dog and cat faeces	Weeks to months	Fever, hepatomegaly, hyperglobulinaemia, wheezing, fever; eye damage that may result in blindness

3. What are risks associated with increased numbers of insects breeding on accumulated waste?

Cockroaches, flies and other insects breed in uncollected waste because of increased availability of food. These insects become contaminated with the micro-organisms listed above that are present in the waste. When insects walk on food, or land on person's skin they can transfer the micro-organisms to persons' skin or mucous membrane or gastro-intestinal tract, and disease may occur. When food becomes contaminated with bacteria that are not pathogenic to humans, the food may go 'off' more rapidly (food spoilage). The table below shows the insects that are associated with accumulated waste.

Insect	Lifespan	Diseases of importance	Comments
Cockroaches (<i>Blattella orientalis</i> and <i>Periplaneta americanis</i>)	Egg to adult ~ 7 to 10 days. Adult life span = can live for up to one year	Mechanical vectors of disease: <ul style="list-style-type: none"> • <i>E. histolytica</i> • <i>G. intestinalis</i> • <i>S. aureus</i> • <i>K. pneumoniae</i> • <i>S. typhi</i> 	Thrives in anthropogenic waste. Once infestation sets in, difficult to control due to high levels of insecticide resistance. Adult are extremely long lived
Ants (Formicoidea)	Life stage length is species dependent Species are nomadic and will move into waste areas		Nuisance Risk of bites if aggravated Damage to structures due to nest construction
Dermestids (Dermestidae) "skin beetles; hide beetles; carpet beetle spp."	Life stage length is species dependent Larvae and adults can live for substantial amounts of time (months)	<ul style="list-style-type: none"> • Contact dermatitis 	Contact dermatitis Can move into surrounding areas and buildings and become pests
Houseflies (Muscidae) Blue and Green Bottle flies (<i>Lucilia</i> spp. <i>Chrysomya</i> spp. <i>Calliphora</i> spp.) Fleshflies (Sarcophagidae)	Eggs to adult ~ 10 to 14 days depending on the species Adults are long lived and lifespan is extended by access to food sources	Mechanical vectors of diseases listed above, commonly: typhoid fever, shigellosis, salmonellosis and <i>E. coli</i> Can cause myiasis - invasion of living organisms both animal and human by maggots (fly larvae).	All the listed genera are commonly occurring insects and are closely associated with humans due to their usage of human waste as a food source and breeding sites. They have high nuisance value. Increased waste always results in a parallel increase in fly populations.

4. What are the risks associated with rodent infestation?

Rodents are associated with additional, specific health risks to humans. These include injury from rodent bites and bite-associated infections, human infections related to rodent excretions and secretions, human disease caused by vector-borne diseases transmitted by rodent fleas, ticks and mites, and human parasitic infection from rodent parasites. These conditions are listed in the table below:

Organism (Disease name)	Mode of transmission to persons	Incubation period (infectious dose)	Nature of diseases implicated
<i>Staphylococcus aureus</i>	Normal bacteria on human skin that contaminates bite wounds	Usually 1-3 days	Cellulitis
<i>Pasteurella</i> species	Animal bites or licks; environmental contamination from diseased/dead carcasses, respiratory tract exposure can lead to infection	Usually occurring within 24 hours of the bite	Cellulitis, if untreated, complications range from pneumonia to osteomyelitis, brain abscess or endocarditis; Epiglottitis; synovitis, arthritis
<i>Streptobacillus moniliformis</i> (rat bite fever)	Human infections result either from rodent bites (rat bite fever) or contaminated milk or other foods (Haverhill fever).	Usually 3-10 days, range: 2 day -3 weeks	The most common manifestations of infection are arthralgia, fever, headache, vomiting, and rash; endocarditis occurs as a rare complication
<i>Leptospira interrogans</i> (leptospirosis)	Direct contact with rodent urine or through handling live or dead rodents	See table above	See table above
<i>Salmonella</i> species	Handling live or dead rodents, or through a rodent bite, or direct contact with rodent faeces	See table above	See table above
<i>Rickettsia conorii/africae</i> (Tick bite fever)	Tick bite by ixodid (hard) ticks, contamination of broken skin/mucous membrane with crushed tissues, faeces of ticks	Range from 2-21 days	Fever, nausea, headache, and myalgia are common; skin rashes. Older patients at risk for severe or fatal disease if untreated
<i>Rickettsia typhi</i> (Murine typhus)	Infected rat fleas that defaecate <i>Rickettsiae</i> which contaminate skin lesion; inhalation of flea faeces	1–2 weeks	Clinical presentation of rickettsial diseases ranges from a mild, non-specific febrile syndrome to a life-threatening fatal condition. Murine typhus usually present with a febrile illness with rash similar to epidemic typhus but milder
<i>Rickettsia akari</i> (Rickettsialpox)	Bite of the house mouse mite or by contamination of broken skin/mucous membrane with faeces of infected mites	Range from 6-15 days	Acute febrile illness with skin lesion on bite site associated with lymphadenopathy, fever, vesicular skin rash,
<i>Yersinia pestis</i> (plague)	Bite by infectious rat fleas, handling of infected animals (rodents, rabbits, wild carnivores and domestic cats)	Range from 1-7days	Could present as bubonic septicemic and/or pneumonic plague with fever, chills, malaise, myalgia, nausea, prostration, sore throat and headache
<i>Bartonella</i> spp. (Bartonellosis or cat scratch disease)	Scratch or bite of domestic or feral cats, dogs and rodents; flea and louse bites	Usually 16-22 days, occasionally 3-4 months	Skin and liver vascular lesions, esp. in HIV-infected people; relapsing febrile illness ; endocarditis

5. Are there any other health risks posed by waste?

Additional risks include direct injury from the waste itself – such as glass, tin cans or sharp objects present in waste. When waste is burnt as a means of disposal, accidental burns may occur. The smoke may lead to respiratory and eye irritation, and may exacerbate chronic lung disease. Burning of waste may lead to uncontrolled fires and damage to property and persons. In the longer term, if the garbage accumulation continues, there may emerge other risks, such as increased numbers of feral dogs and cats that may attack people, and environmental (soil, water) contamination with toxic chemical and heavy metal leachates. Mercury levels above recommended limits have been ascribed to burning of unregulated garbage dumps and household rubbish in Mexico, amongst other potential exposures.³ In Cameroon, open garbage dumps have been blamed for increasing the risk of rabies, because they attract stray dogs.⁴

Selected references

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