

Environmental Health

Bush Book

NThealth | NORTHERN TERRITORY GOVERNMENT

The Northern Territory Government acknowledges the Traditional Owners of the Northern Territory and recognises their continuing cultural and spiritual connections to the lands, waters and communities.

We pay our respects to all Aboriginal and Torres Strait Islander people and their cultures, their Elders past and present, and to future generations.

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What is environmental health?

Environmental health is a branch of public health that focuses on the physical, chemical, biological and social factors that affect people within their surroundings. Establishing and maintaining healthy environments require collaboration between individuals, communities, government, and non-government agencies. This includes the provision of essential infrastructure such as housing, water supply, and wastewater systems, alongside the mitigation of environmental health risks.

There is well-documented evidence of health disparities between Aboriginal and Torres Strait Islander peoples and non-Indigenous Australians, particularly in relation to infectious diseases, chronic illnesses, child health, and life expectancy. Social determinants of health, including poor environmental conditions, contribute significantly to these disparities. Addressing environmental health challenges requires a holistic approach that considers the interconnected nature of these issues.

NT Health

NT Health provides environmental health services in the Northern Territory (NT), from major hubs such as Alice Springs and Darwin, as well as regional offices in Tennant Creek, Katherine, and Nhulunbuy. Outreach services extend to remote areas, ensuring broad access to environmental health programs.

Environmental Health Officers (EHOs) operate under statutory responsibilities delegated by the Chief Health Officer through legislation, including the *Food Act 2004*, *Public and Environmental Health Act 2011*, and *Notifiable Diseases Act 1981*. Additionally, EHOs implement a range of programs to enhance public health infrastructure, promote healthier environments, and improve community health literacy.

Given the challenges in delivering environmental health services across remote NT, a collaborative approach is essential. Key government and non-government agencies working alongside NT Health include Power and Water Corporation (PWC), NT Housing, Regional Councils, NT Environmental Protection Agency (NTEPA), NT Department of Education and Training and Aboriginal Medical Services Northern Territory (AMSANT)

Key environmental health focus areas

1. **Housing:** Addressing health hardware, overcrowding, home hygiene, and pest control.
2. **Water supply management:** Ensuring access to safe and suitable drinking water.
3. **Wastewater management:** Treating and safely disposing of sewage.
4. **Waste management:** Managing litter, illegal dumping, and landfills.
5. **Hygiene promotion:** Encouraging behaviour of practices conducive to disease prevention.
6. **Communicable disease control:** Mitigating bacterial, viral, parasitic, and fungal disease transmission.
7. **Animal health management:** Reducing zoonotic disease risks associated with companion animals.
8. **Food safety and security:** Ensuring food is stored, prepared safely and available.
9. **Environmental exposures:** Addressing risks related to asbestos, heavy metals, and other hazards.
10. **Dust control:** Preventing dust-related diseases and infrastructure damage.
11. **Drainage:** Minimising mosquito-breeding sites and preventing infrastructure damage.

Housing

The correlation between poor housing conditions and increased prevalence of infectious diseases is well established. Addressing housing issues, particularly in remote Aboriginal communities, is central to improving health outcomes. While NT Health does not directly manage housing, it plays a critical role in advocating for improved conditions and supporting relevant programs.

Housing programs

Public housing initiatives in the NT are complex and continually evolving. The NT Community Housing Growth Strategy 2021-2030 provides insight into the challenges and opportunities in housing development. To combat overcrowding, the Northern Territory Government (NTG) has committed to increasing housing supply, expanding on the available rooms in existing properties and improved repairs and maintenance programs.

Key objectives include:

- Increasing housing supply and improving standards.
- Involving Land Councils in governance.
- Ensuring transparency in housing expenditures.
- Maximising local Aboriginal and Torres Strait Islander employment in housing projects.

Repairs and maintenance

Government agencies, contractors, and community-based service providers manage housing repairs and maintenance. Whilst properties will be assessed periodically for maintenance issues, tenants can also report maintenance issues. However assistance may be required to navigate reporting processes.

Repairs are prioritised according to risk:

- **Immediate** - rendered safe within 4 hours of notification

Repairs required due to an immediate safety and/or security failure. Example - dangerous electrical fault or unsecured fitting such as door or window.

- **Urgent** – completed within 5 working days

Repairs required due to a health, safety or security failure and/or where further damage could be expected if action is not taken. Example - burst water services or blocked toilets.

- **Routine** – completed within 10 working days

Repair work that needs to be undertaken to correct a failure and/or fault that is not deemed to be immediate or urgent, but may be inconvenient and could develop into a health, safety or security risk if not corrected promptly. Example - leaking taps, individual parts of a stove not working or leaking toilet cistern.

The Nine Healthy Living Practices

The NTG recognises the importance of the Nine Healthy Living Practices, which identifies key aspects of the living environment that influence health outcomes. These practices are prioritised based on their impact on health:

The Housing for Health program focuses on ensuring housing is safe and residents can undertake nine evidence-based healthy living practices.

1. Washing people

Ensuring there is adequate hot and cold water, taps and drainage.

2. Washing clothes and bedding

Ensuring the laundry tub is functional with provision for a washing machine.

3. Removing wastewater safely

Ensuring toilets and all drains are working.

4. Improving nutrition through the ability to store, prepare and cook food

Ensuring the sink, taps and stove work.

5. Reducing the negative impacts of overcrowding

Ensuring health hardware (e.g. hot water and septic systems) can cope with the number of people living in the house.

6. Reducing the negative effects of animals, vermin or insects

Ensuring adequate insect screening.

7. Reducing the health impacts of dust

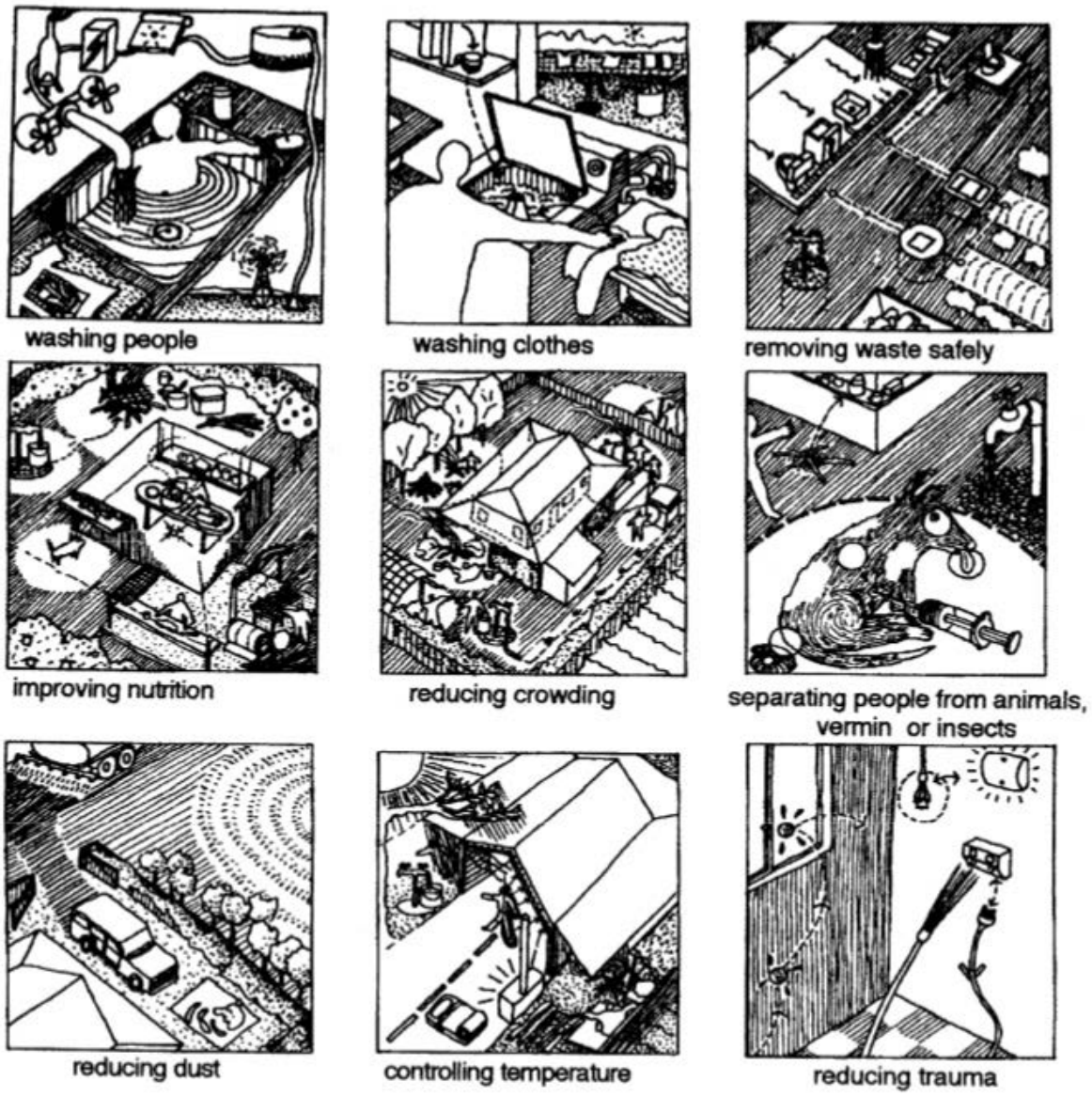
Introducing ways to limit the movement of dust to reduce the risk of respiratory illness.

8. Controlling the temperature of the living environment

Looking at the use of insulation and passive design to reduce health risks, particularly to small children, the sick and elderly.

9. Reducing hazards that cause trauma

Considering aspects of housing that can cause non-life-threatening injury.



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A key factor in implementing these practices is the proper maintenance of health hardware—the physical infrastructure necessary for hygienic and healthy living. This includes access to running water via showers, basins, baths, plumbing, household wastewater treatment systems, and washing machines. Ensuring these components are in good working order enables communities to maintain effective hygiene practices and prevent disease.

Housing for Health Program

The Housing for Health (HFH) initiative, administered by Health Habitat Healthabitat » Environmental Health & Design, aims to improve Aboriginal health by assessing, repairing or replacing essential health hardware, such as plumbing and electrical components, to ensure safe and functional living conditions. This program follows a standardised methodology, including:

- Community selection and project establishment
- Baseline survey and urgent repairs
- Major repairs and follow-up survey
- Second-fix implementation

Key project roles include:

- **Project manager:** Oversees budgeting, staffing, contractors, and community engagement.
- **Team leader:** Manages housing surveys and supports the project manager.
- **Community members:** Play a central role in surveys, providing local knowledge and building community support while gaining skills in health hardware maintenance.

The NTG, Land Councils, and Aboriginal Corporations utilise the HFH initiative as a model for assessing and repairing property maintenance issues across communities, town camps, and homelands.

Community health hardware assessment

Smaller scale projects are available that can assess and address particular health hardware needs for communities without access to community wide repairs and maintenance programs such as the HFH initiative. For example, a rise in skin disease may prompt a targeted review of bathroom and laundry facilities to ensure access to proper hygiene. EHOs can offer guidance on assessment methods and necessary interventions.

It is advisable to report documented maintenance issues to housing service providers and conduct post-surveys to ensure repairs are completed. Briefing providers beforehand is strongly recommended, fosters collaboration and ensures preparedness for increased maintenance requests.

National Indigenous housing and infrastructure guides

- National Indigenous Housing Guide: Provides practical guidance on housing design, construction, and maintenance.
- National Indigenous Infrastructure Guide: Offers a framework for sustainable infrastructure development in remote communities.

Healthy Homes Projects

Tailored Healthy Homes Projects are implemented across NT communities to optimise environmental health outcomes. They typically aim to:

- Strengthen reporting of repairs and maintenance.
- Improve access to cleaning equipment.
- Provide health promotion resources.
- Improve collaboration between community service providers and stakeholders.
- Support healthy homes education.
- Strengthen community wide infrastructure (e.g. laundries).

Pest control

Managing pests such as cockroaches, mice, flies, and mosquitoes is vital for reducing the spread of diseases and promoting overall well-being.

Pest control is an ongoing concern in many communities, requiring a multi-faceted approach, including:

- Ensuring that affordable pest control products are available in local stores.
- Offering educational programs that help tenants reduce pest problems by limiting food access, maintaining cleanliness, and using pest control products properly.

- Implementing routine community-wide pest control initiatives.
- Providing local training and employment opportunities in pest control.

There are opportunities to create training and job prospects for community members in pest control management. For organisations interested in offering employment in pest control, it is important to provide adequate support during the training and mentoring phases. If you are interested in learning more about available training options, contact your local environmental health office.

Infectious disease

Microorganisms, commonly known as germs can cause diseases in humans, animals, and plants. The four main types are bacteria, viruses, fungi, and protozoa. Infections may also result from parasites like roundworms and hookworms, while mites such as scabies can damage the skin, increasing susceptibility to secondary infections.

Germs spread through droplet transmission (coughing or sneezing), airborne transmission (small droplets carried by air currents), and direct contact (person-to-person touch). Transmission can also occur via infected animals or improperly prepared food.

Disease outbreaks commonly referred to environmental health professionals includes gastrointestinal outbreaks, legionella, crusted scabies, elevated blood lead levels (no known source) and melioidosis.

Outbreaks

NT Health has a role in investigating and reducing the impacts of disease outbreaks in accordance with the *Notifiable Diseases Act 1981*, the *Food Act 2004*, and the *Public and Environmental Health Act 2011*. This includes investigating foodborne, waterborne, and environmental outbreaks, conducting site assessments, enforcing exclusion requirements, and implementing infection control measures.

NT Health can provide guidance on potential sources of disease outbreaks, managing situations in specific settings such as childcare centres, aged care facilities, and camps, and ensuring public health safety through proactive surveillance and interventions.

Key notification pathways are as follows:

1. Unconfirmed public reports:

Reports from the public/organisation that may indicate a potential outbreak.

2. Single cases referred by the NT Centre for Disease Control (CDC):

Individual cases that are referred for investigation.

3. Outbreaks referred by the CDC:

When the CDC identifies outbreaks requiring the involvement of Environmental Health Services (EHS).

Surveillance and Response

Staying Healthy – Preventing infectious diseases in early childhood education and care services.

NT Health – Timeout Poster

Gastrointestinal outbreaks

Gastrointestinal outbreaks are common but generally preventable through vaccination, good hygiene and food preparation and appropriate cleaning.

Environmental health and the CDC work together to assist vulnerable groups such as childcare centres and aged care facilities to implement preventative public health measures and a coordinated response to an outbreak cluster. Public health measures in response to an outbreak include exclusion periods, additional cleaning, increased hand washing and the use of personal protective equipment.

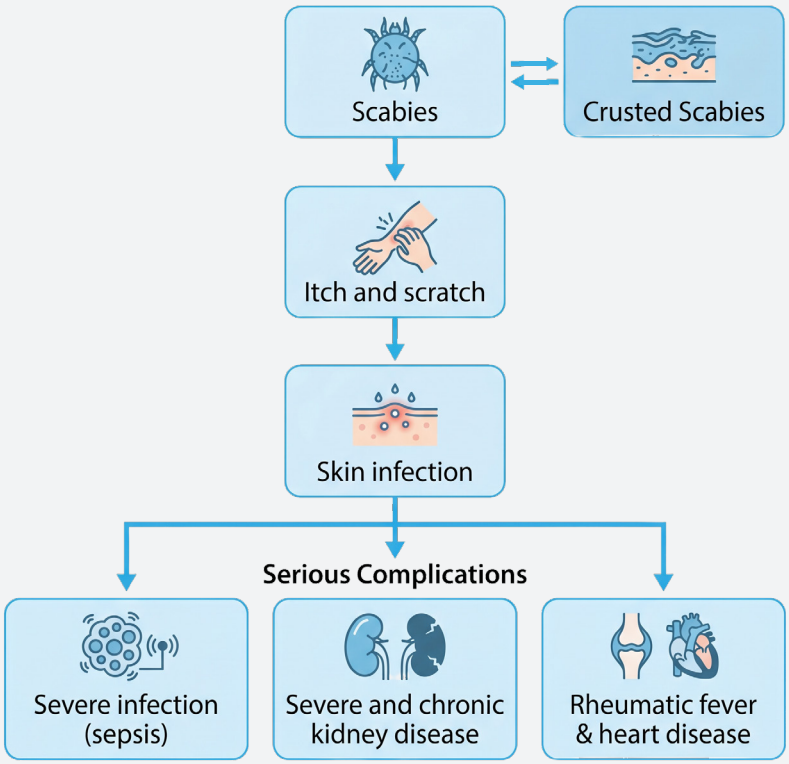
Further information on responding to gastrointestinal outbreaks can be sourced from your local EHO or through the Australian Government Staying Healthy – Preventing infectious diseases in early childhood education and care services.

Skin health

The importance of maintaining healthy skin cannot be understated. Our skin is the body's largest organ, and plays key roles in regulating body temperature, protecting internal organs from injury, and acting as the first line of defense against disease and infection.

Scabies is an infectious disease of the skin that is caused by microscopic mites called Sarcoptes scabiei. Scabies and skin infections have been documented as being at endemic proportions across communities in the NT[1]. Scabies are extremely itchy, and scratching at the skin can cause open sores and skin infections. The main germ contributing to skin infections in the Northern Territory is Group A Streptococcus[2] (GAS). GAS infections of the skin have been linked to Acute Post-Streptococcal Glomerulonephritis (APSGN), Acute Rheumatic Fever (ARF) and Rheumatic Heart Disease (RHD)[3].

Scabies causes 50–70% of childhood skin infections in remote NT communities. Treating and preventing scabies reduces skin infections and lowers APSGN, ARF, and RHD rates.



Reducing skin disease and related illness

Reducing skin disease and related illness

Due to the serious health impacts of scabies, One Disease is calling for action to eliminate it at individual, household, community, and regional levels.

At the personal and household levels, effective treatment involves three key steps:

1. **Treat the person** – Apply topical creams like Lyclear from head to toe and consider Ivermectin.
2. **Treat the household/family simultaneously** – This prevents skin-to-skin transmission.
3. **Repeat treatment in one week** – This kills newly hatched mites.

Maintaining scabies-free households is crucial for eliminating scabies in the community. This requires treating all household members and close contacts together to break the transmission cycle.

Recurrent infestations can be complex, often requiring a case management approach. Undetected crusted scabies cases are a major source of transmission, and poorly managed cases significantly contribute to ongoing spread. Identifying and properly treating these cases is essential.

Education and environmental factors

- Educate families about scabies, treatment, and regular skin checks (One Disease Storytelling).
- Scabies mites die at temperatures above 50°C. If available, wash clothes and linen in a hot wash or use a hot dryer. Without access to hot washing, seal items in a black garbage bag and leave in direct sunlight for 3–8 days.
- Ensure households have functioning health hardware to support healthy living practices.

Healthy skin days/campaigns – local/regional

Healthy skin days are well documented across the Top End to reduce the rates of scabies and skin infections. Healthy skin days provide a practical opportunity to work together across the community to treat and prevent scabies and skin infections, by treating EVERYONE in the community at the same time.

Healthy skin days focus on:

- Community involvement and inter-agency collaboration.
- Health information and education campaign.
- Community wide household screening and treatment for scabies, with recalls for follow up.
- Treating everyone to protect each other.
- Maintenance of scabies free zones

Key considerations when planning community wide healthy skin days include:

- Cultural safety.
- Engagement, consultation and co-design.
- Story telling driven by local workers and champions.
- Home visiting to improve access.
- Whole of family – peer educators.
- Challenge normalisation of scabies and skin infection.
- Coordination of services and partners.

The NT CDC healthy skin program offers templates and guidance for community-wide screening and treatment. Additional resources are available on the One Disease website, including *Walking Together, Working Together*—an educational film featuring insights from health workers in Kakadu and Arnhem Land. The film reflects One Disease's approach and emphasises the principle of *Indigenous Health in Indigenous Hands*.

Health hygiene and promotion

Hygiene promotion in communities is carried out by various government and community organisations. While programs differ, they all focus on encouraging individuals, especially children, to adopt consistent behaviours that reduce the spread of infectious diseases.



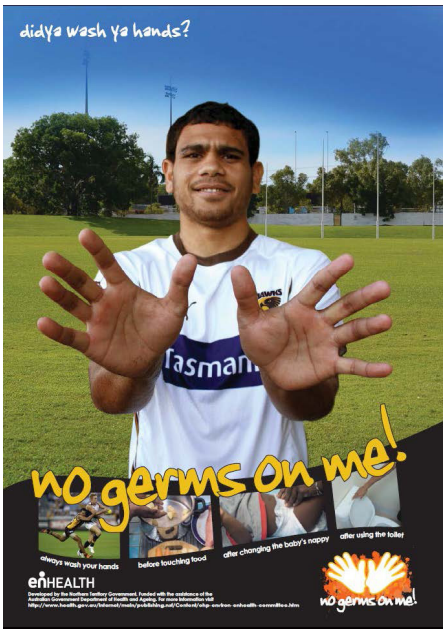
Figure 1 - Milpa's Six Steps to Stop Germs (The University of Melbourne)

Environmental health – NT Health focus on promoting hand hygiene, as well as assessing the health hardware in early education facilities. 'Regular hand washing with soap is the most cost-effective way of preventing the spread of infections in both the home and the workplace.'[1] Environmental health also acknowledges and supports projects in the home to improve health hardware.

Environmental health can provide hygiene promotion sessions on request or assist community organisations or Government Departments to implement their own program. Environmental health hygiene sessions are provided using a flexible approach, incorporating the 'no germs on me' campaign and promotional activities. Further details on the 'no germs on me' campaign including health promotion educational tools and activities, campaign videos and posters can be found at the Healthinfonet and Menzies School of Health Research and NTG or by contacting our team.

[1] No germs on me, Hygiene Promotion Kit User Guide, Enhealth







Gerry the germ lightbox

Environmental health has successfully utilised 'Gerry the germ' with a UV light box as an interactive tool to promote effective handwashing techniques. It's designed to be used with UV disclosing cream or powder to demonstrate proper hand washing technique and highlights the risk of cross-contamination. Kits of supportive equipment can be found through several suppliers around Australia.

Equipment required:

- 'Gerry the germ' with UV light box and/or portable UV light
- UV cream
- Hand washing sink and/or large plastic water container with a tap and bucket to capture water
- Soap
- Paper towel





How to use 'Gerry the germ' for handwashing demonstration

1. Explain germ theory

- Germs are tiny microorganisms that can only be seen under a microscope.
- They live on our bodies and can spread easily from person to person, especially through hand contact.
- Some germs can cause illness, making proper hand hygiene essential.

2. Emphasise the importance of hand washing

- Washing the body, face and especially hands, helps reduce the spread of germs.
- Proper hand washing can lower the risk of sickness caused by germs (bacteria and viruses).

Request participants to name the times hand washing is especially important (toilet use, after changing baby's nappy, after playing, prior to eating).

3. Demonstrate how to properly wash hands

- Show the correct hand washing steps, including scrubbing between fingers, under nails, and rinsing thoroughly.
- Highlight that the use of soap and rubbing of hands should be for approximately 20 seconds. An example can be the time taken to sing the happy birthday song.
- In the absence of paper towel, participants are encouraged to shake hands dry instead of using cloths etc. to dry their hands.



4. Apply UV cream for hands-on learning

- Give each student a small squirt of UV cream and instruct them to rub it over their hands as if applying hand lotion.

5. View "germs" under the UV light

- Have students examine their unwashed hands under the UV light, explaining that the glowing areas represent pretend germs.

6. Show the effects of ineffective handwashing

- Ask students to wash their hands quickly or 'slackly' using only water, without rubbing them together.
- Allow them to check their hands under the UV light again to see the areas still "contaminated."

7. Identify hard-to-clean areas

- Explain that germs often remain in places like between fingers, under nails, and around rings.

8. Encourage proper hand washing and compare results

- Have students wash their hands correctly using soap and water.
- Let them view their hands again under the UV light and compare the difference.
- Reinforce how proper handwashing removes germs effectively.

The Gerry the germ light box and UV cream can also be used to demonstrate germ transmission.

How to demonstrate germ transmission:

1. Prepare the object

- Apply UV cream generously to an object, such as a ball, plastic food model, or commonly touched surface.

2. Pass the object around

- Have students take turns holding or passing the object to one another, simulating everyday interactions.

3. Check for "infection"

- Ask students to examine their hands under the UV light to see if they have been "infected" with the glowing germs.

4. Discuss the results

- Explain how germs spread through touching contaminated surfaces and objects.
- Reinforce the importance of washing hands after handling shared items, before eating, and after using the restroom.

5. Encourage proper handwashing

- Have students wash their hands properly with soap and water.
- Allow them to check again under the UV light to see the difference.

This activity provides a visual and interactive way to teach students how easily germs transfer and why good hygiene practices matter.



While originally designed for use with children, the Gerry the germ light box has effectively been used to show adults how to wash their hands properly. It is a fun way of teaching everybody about the importance of routine hand washing.

Water supply management

The Power and Water Corporation (PWC) manages the water supply for 73 major communities through an extensive water-monitoring program. A community Essential Services Officer (ESO), typically under the oversight of the Regional Council, administers this program.

In contrast, Homelands are generally not serviced by PWC. Instead, they fall under the responsibility of the Housing Service Provider, which reports to the Department of Housing, Local Governement and Community Development. These communities face challenges including outdated water infrastructure, limited or absent water treatment systems, and basic water monitoring practices, which all contribute to difficulties in maintaining a safe and consistent water supply.

Water monitoring

Water monitoring programs ensure that water supplies meet the **Australian Drinking Water Guidelines 2011** (ADWG) by tracking key indicators:

- **Microbiological:** The presence of disease-causing organisms.
- **Chemical Parameters:** Substances that can affect human health if their concentrations exceed certain levels.
- **Physical Parameters:** Water should be free from suspended materials like clay or silt, and ideally be clear, colourless, well-aerated, and free of unpleasant tastes or odours.

Note: All groundwater contains various dissolved salts (minerals) from rainwater and the chemical breakdown of rocks. While high concentrations of some of these salts (such as chloride, sulphate, iron, and magnesium) can affect the taste and appearance of water, they typically do not pose health risks.

If a water supply fails to meet microbiological guidelines, NT Health may issue a boil water alert for affected communities, towns and homelands until the systems are repaired and the water is confirmed as safe. This often happens after a significant system failure during emergencies or disaster events such as power outages following a cyclone.

Supply and risks

Community water supplies are primarily sourced from groundwater through bores, although surface water from rivers may also be used. Water sources that are considered high-risk, as shown in the figure below, require treatment to ensure they are safe for human consumption.

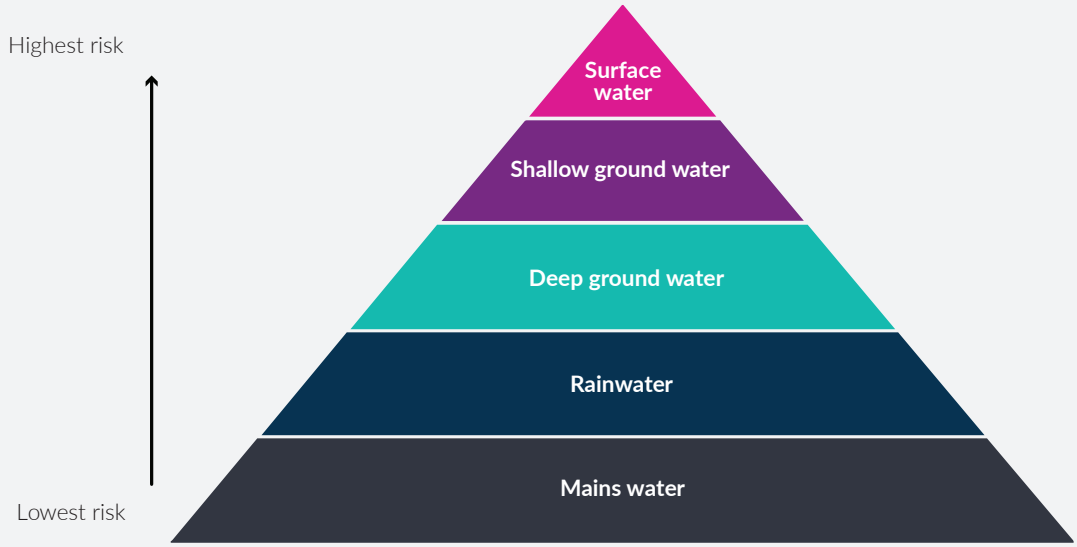


Figure 2: The risk hierarchy for water sources used in private drinking water

Water supplies as seen by communities

When working with community members in managing their water supplies, several factors should be considered:

- **Limited knowledge of water management:** Many communities have limited understanding of water treatment processes.
- **Aboriginal and Torres Strait Islander views on microbiological risks:** Aboriginal and Torres Strait Islander communities may have a different understanding of microbiological risks (such as bacteria and viruses) compared to Western scientific perspectives.
- **Cultural connection to water:** Communities often have a strong cultural connection to their water sources and take great pride in the water that has sustained them for generations.
- **PWC's water conservation efforts:** The PWC is actively promoting water conservation through initiatives like the 'It's Our Water' campaign.

- **Challenges in groundwater recharge:** Recharging groundwater supplies across the NT and globally is becoming increasingly difficult due to reduced rainfall and rising water demand.

Wastewater management

The management of wastewater also referred to as sewage, effluent or black water, is critical to protecting public health due to the high concentration of disease-causing germs and parasites.

The method of wastewater management across the 73 major communities in the NT.

Primary treatment wastewater systems (septic tanks) are used for 15 of these communities.

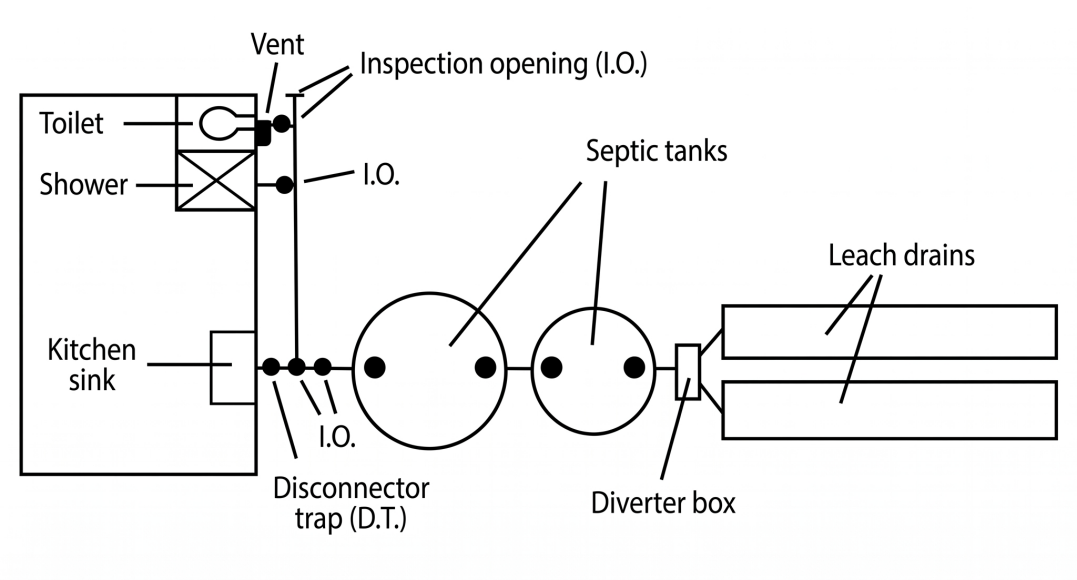


Figure 3: Onsite Waste management system (Enhealth – Environmental Health Practitioner Manual)

A combination of primary treatment systems and a combined effluent discharge (CED) is used in 3 communities, with the remaining 54 communities relying on community effluent disposal and wastewater tertiary treatment with stabilisation ponds.

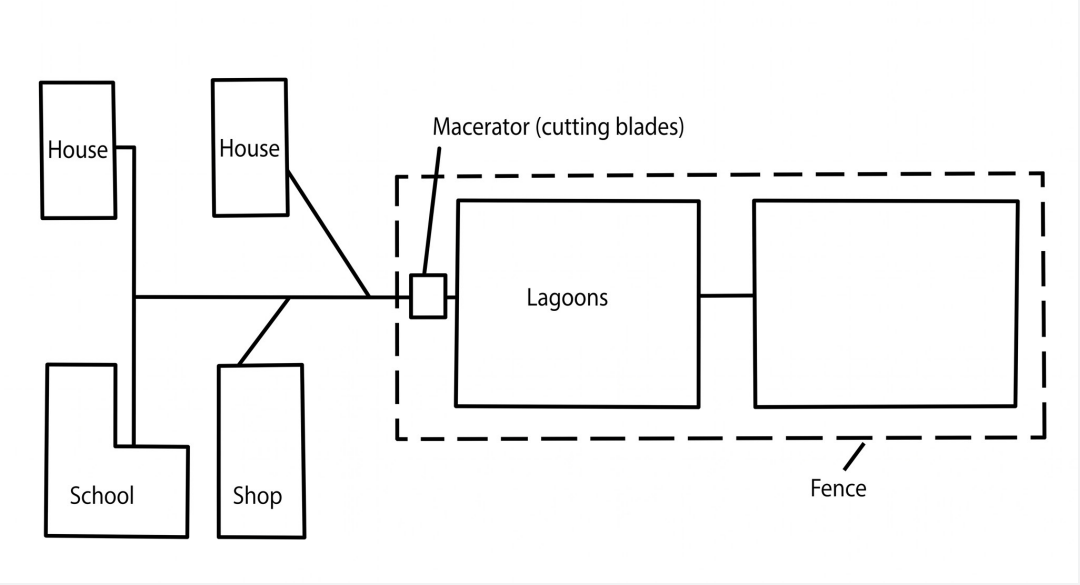


Figure 4: Community Effluent Disposal (Enhealth – Environmental Health Practitioner Manual)

Stabilisation ponds treat wastewater through natural processes involving algae and bacteria. They are well suited for warmer climates, offering a cost-effective and low-maintenance solution for waste treatment. Effluent from stabilisation ponds is either discharged via evaporation, evaporation and irrigation (usually spray irrigation within a fenced area), or into a waterway. If the effluent is discharged into a waterway, it must comply with the *Water Act 1992* and requires a Wastewater Discharge Licence issued by the NT Environmental Protection Authority (NTEPA).

Common public health challenges associated with stabilisation ponds:

- Ensuring access to the ponds is restricted by fencing and locked gate
- Managing weeds to reduce mosquito breeding
- Proper sizing of ponds to accommodate community growth and heavy rainfall
- Unmanaged overflows
- Ensuring irrigation areas operate as designed

Homelands/outstations

A small number of larger homelands have community effluent systems with ponds, but the majority of homelands rely on onsite wastewater systems, including septic systems and pit toilets. Pit toilets are one of the most basic forms of sewage treatment and disposal, commonly used in remote areas of the NT where installing a wastewater management system (WMS) is not feasible. The pit serves as a receptacle, where human waste is slowly decomposed through natural drying.

However, there are limitations to these toilets, including unpleasant odours, lack of water for hand washing, and the need to cap and dig a new pit once the existing one is full.

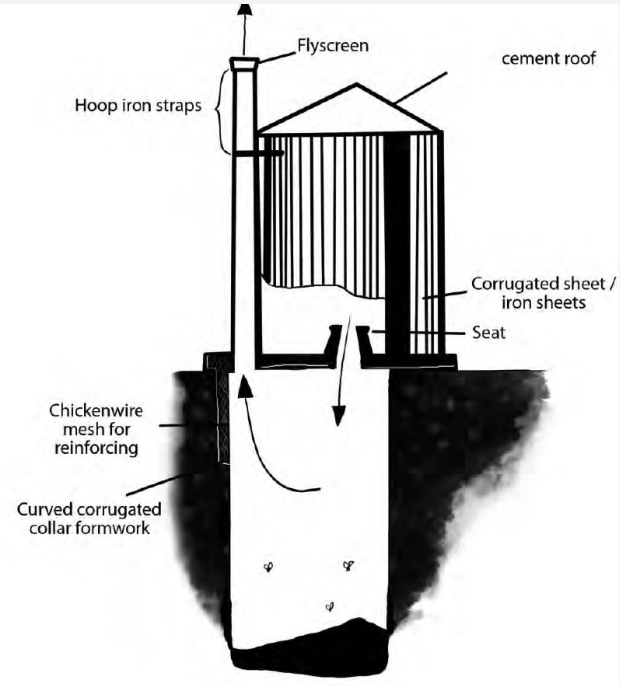


Figure 5: Pit Toilet (Enhealth – Environmental Health Practitioner Manual)

Septic systems treat effluent in primary tanks before it is disposed of through absorption trenches or subsurface disposal. These systems require minimal maintenance, with the only major requirement being desludging every 2-5 years.

Wastewater management regulation

Detailed information on the installation and management of wastewater management systems in the NT can be found on the NT website Wastewater Management.

If you want to install a WMS in the NT, you must comply with the technical requirements of the code of practice for wastewater management.

Failing wastewater management systems

Wastewater can contain high levels of bacteria, so it must be handled with caution. Signs that a wastewater system may be failing include pooling water, soggy ground, or the unexpected growth of weeds, grass or shrubs in areas that are typically dry.

Community effluent overflows

PWC is required to notify both the NTEPA and NT Health in the event of a sewage overflow. Overflows typically occur due to blockages or pump failures. These overflows should be reported to the ESO and/or PWC/NTEPA. Alternatively, environmental health can be informed of the issue and follow up with the appropriate authorities.

When an overflow happens, the affected area must be restricted, and proper signage should be put in place to prevent public contact. The size and location of the overflow will determine whether the area needs to be neutralised. Builders' lime may be applied to help neutralise odours and minimise environmental impact. If the area presents a public health risk, disinfection with chemicals may be necessary.

Waste management

Responsible agency

Waste management is a key responsibility of Regional Councils. They employ staff to collect waste, typically 1-2 times per week, using waste trucks, trailers, or ute. Regular waste removal helps keep communities clean. The effectiveness of waste collection depends on the proper maintenance of vehicles and waste infrastructure, including household bins. In many communities, installing bin stands has proven beneficial, as they help prevent bins from being damaged or knocked over by animals such as dogs and pigs.

Litter management

Littering remains a persistent issue that is challenging to resolve. Some strategies to address this include:

- Placing bins in convenient locations and ensuring they are emptied regularly (e.g. outside community stores and takeaway shops).

- Organising community clean-up days or weeks, offering incentives like prizes for the cleanest yards, which could be awarded during a community sausage sizzle.
- Encouraging businesses to take responsibility for cleaning the areas around their operations.
- Focusing on education, particularly in schools, to raise awareness about the importance of keeping the community clean.

Dumping

Dumping is a significant challenge in remote communities. Some strategies to reduce dumping include:

- Ensuring that the road to the landfill is well-maintained and accessible year-round. If this is not feasible, consider setting up a transfer station that is easily accessible.
- Quickly removing dumped rubbish to discourage further dumping.
- Installing "No dumping" signage in both English and the local language.
- Using cameras to monitor and capture instances of illegal dumping, particularly when the waste is commercial or extensive.

Landfill management

Regional Councils or Homeland Service Providers typically oversee landfill management. Landfills that serve communities with more than 1,000 people must be licensed by the NTEPA under the *Waste Management and Pollution Control Act*. Before obtaining an NTEPA license, a land use license must be secured from the relevant Land Council.

The primary role of environmental health in landfill management is to minimise practices that pose health risks. This includes preventing exposure to hazardous waste materials, such as chemicals, paints, poisons, medical waste, vehicle batteries, septage, waste oils, gas bottles, fire extinguishers, tyres, and asbestos—whether through direct contact or inhalation.

Environmental health also plays a key educational role, helping Regional Councils effectively manage these facilities. Best practice for managing landfills in remote communities focuses on limiting community access to primary disposal pits or cells and providing designated drop-off bays instead. This system encourages waste separation, reduces the risk of injuries, and helps prevent fires, all of which lower the chances of exposure to hazardous substances.

For further information including regional landfill manuals/guides contact environmental health.

Food safety and security

Food safety involves handling, preparing, and storing food in ways that minimise the risk of foodborne illness. The principles of food safety are designed to prevent contamination and avoid food poisoning. Key practices include:

- Regularly washing hands and maintaining good personal hygiene.
- Thoroughly cleaning and sanitising all surfaces, equipment, and utensils.
- Properly storing, chilling, cooking, and reheating food according to the correct temperature, environment, and equipment.
- Keeping raw and cooked foods separate during preparation and storage.
- Using safe water for food preparation.
- Implementing effective pest control measures.
- Being aware of food allergies and intolerances.

Regulation and standards

NT Health employs EHOs as Authorised Officers under the *NT Food Act 2004*. One of their key responsibilities is to ensure that food produced for commercial purposes is processed, stored, prepared, and sold safely and hygienically.

Food businesses are required to register and comply with national food safety standards. These standards establish the rules for:

- Food handling
- Transport and storage
- Maintenance of premises and equipment

For more information go to the regulations and food safety standards.

Food poisoning

Food has the potential to cause food poisoning if not properly processed, stored, or handled. Certain types of food, known as high-risk foods, are more susceptible to bacterial growth and multiplication. High-risk foods include meat, poultry, dairy products, eggs, smallgoods, seafood, cooked rice and pasta, prepared salads, cut fruits, and ready-to-eat foods (e.g., sandwiches).

Some foods can be contaminated before they are handled, such as those grown in soil or exposed to dirty water, or those that become contaminated during processing, transport, or storage.

Food poisoning can occur at home or when eating out, such as at takeaway stores. Symptoms typically appear within 1 - 72 hours after consumption and may include:

- Diarrhoea
- Vomiting
- Nausea
- Fever
- Stomach cramps

Food poisoning can be particularly dangerous for young children, the elderly, pregnant women, and people with weakened immune systems. If symptoms are severe, seek medical attention immediately. For concerns, contact your local environmental health office to report the illness.

Preventing food poisoning

Temperature control during food preparation, storage, and transport

Bacteria need time to multiply to dangerous levels that can cause illness. The optimal temperature for bacterial growth, known as the “danger zone,” ranges from 5°C to 60°C. To keep food safe, chilled food should be kept at 5°C or colder, while hot foods should be held at 60°C or hotter.

Any high-risk food that has been left in the temperature danger zone for more than 4 hours should be discarded.

Food handling practices

Safe food handling practices, such as frequent handwashing, are essential. Wash your hands often when working with food and drinks. The most effective method is scrubbing hands for at least 20 seconds with warm running water and soap. Afterward, rinse and dry your hands with clean paper towels.

Avoiding cross-contamination

Cross-contamination occurs when bacteria from one food, your hands, or a contact surface are transferred to another food or surface. Prevent this by regularly washing hands, keeping raw and ready-to-eat foods separate, and thoroughly cleaning and drying cutting boards, knives, pans, and utensils after each use.

Food service to vulnerable populations

Premises that provide food services to vulnerable individuals are also required to implement Food Standard 3.3.1, including the requirements to maintain a Food Safety Program. This includes:

- Hospitals
- Aged care facilities
- Childcare facilities
- Renal dialysis units

EHOs regularly inspect these premises to ensure they meet the requirements of the *Food Act*.

Resources and training

The following resources offer additional information on food safety:
NTG Food Safety and Regulations webpage

The Food Safety Information council webpage. The Food Safety Information Council Ltd is a health promotion charity and serves as the national advocate for science-based, consumer-focused food safety information in Australia.

Free online food safety training is available through I'm Alert nt.imalert.com.au.

Animal management

Companion animals, particularly dogs, play a significant role in community life. They offer companionship, enhance safety, assist with hunting, and are deeply embedded in Aboriginal and Torres Strait Islander cultural practices, such as Dreaming and kinship systems. Cats are also becoming increasingly popular pets in many communities.

While dogs and cats are integral to community life, managing them can be challenging due to limited access to veterinary services and essential animal health products, such as anti-parasitic medications and proper care supplies.

Without effective animal management programs, free-roaming dog and cat populations can grow out of control, leading to various issues:

- Animals knock over bins in search of food, scattering rubbish throughout the community.
- They fight over resources, disturbing people's sleep and creating noise at night.
- Overpopulation may exceed the community's ability to meet the animals' nutritional needs, causing malnutrition and illness. These animals may then venture outside the community to hunt native wildlife or livestock.
- Poor animal health and welfare can lead to an increased risk of zoonotic diseases (diseases that can transfer from animals to humans).
- As dogs compete for territories, they become territorial, sometimes resulting in bites and serious injuries. This can make people afraid to walk, jog, or ride around the community, limiting their ability to exercise.
- The community may feel frustrated or ashamed of the ongoing problems caused by the animals. Seeing poor animal health and welfare on a daily basis can hinder empathy and negatively affect the mental well-being of community members.

Effective animal management programs result in a raft of benefits for people, pets and the environment:

Benefits	Pets	People	Other Animals
Health and well-being	Live long, healthy lives	Benefit from the protective mental health effects of the human-animal bond	Are safe from hunting by dogs and cats
Spread of germs	Are less likely to spread germs	Are safer from diseases transmitted by dogs and cats	Don't get diseases spread by dogs and cats
Roaming	Are less likely to roam	Are not restricted in their ability to exercise or move safely around communities	Dingoes are protected from crossbreeding with domestic dogs
Injuries and welfare	Have fewer injuries and welfare issues	Are safer from animal attacks	
Value and care	Are more valued and better cared for	Sleep better without pets' night noises	
Resource competition	Don't have to compete or fight for resources	Don't have to clean up rubbish from dogs knocking over bins	

In Queensland and Western Australia, remote community animal management programs are managed by Local Government Authorities (LGAs) or EHOs, supported by public health funding from the Department of Health. In contrast, the NT lacks dedicated funding for these programs, resulting in varying implementations across the region. When such programs do exist in remote NT communities, they are usually funded and managed by LGAs.

Animal Management in Rural and Remote Indigenous Communities (AMRRIC), a national not-for-profit organisation based in Darwin, plays a crucial role in supporting LGAs, Aboriginal organisations, and other stakeholders with companion animal management. With well-established relationships with communities, government agencies, and non-government organisations

across the NT, AMRRIC is a valuable point of contact for inquiries related to animal health and management.

AMRRIC recommends that remote community animal management programs include:

1. **Animal population control, health, and welfare services:** Focus on controlling companion animal populations, preventing zoonotic diseases, and providing animal welfare treatments.
2. **Community-endorsed animal management policies or by-laws:** Ensure community safety and amenity through clearly defined policies and regulations.
3. **Education:** Promote responsible pet ownership and encourage adherence to animal welfare legislation and community-endorsed policies.
4. **Regular monitoring and evaluation:** Assess the effectiveness of the program and ensure it meets its objectives.

AMRRIC's online resource, Delivering Animal Health and Management Programs in Remote Indigenous Communities- An Environmental Health Practitioner's Guide is a comprehensive guide to planning and implementing companion animal health and management programs.

With proper training and support, most components of animal management programs can and should be delivered by local staff.

Legislation

Unlike other Australian jurisdictions, the NT currently lacks companion animal management legislation. The *Local Government Act 2019* grants Regional Councils the authority to implement by-laws for companion animal management, though only some urban and town councils have done so, with few examples in remote communities.

Animal welfare is legislated separately in the NT. All animal owners/carers have a legal duty of care for their animals, and the NTG's Animal Welfare Branch is responsible for enforcing animal welfare laws.

Dust control

Many remote communities face dust issues, primarily due to unsealed roads and surfaces. Dust can cause health problems like eye disease, respiratory issues, and skin infections, while also reducing the lifespan and efficiency of health equipment, such as washing machines and solar hot water systems.

Strategies to control dust include:

- Supporting the development of a community environment strategy or environmental health plan focused on dust reduction.
- Promoting the link between plant growth and reduced dust levels for improved environmental health.
- Encouraging projects that minimise the impact of livestock, dogs, vehicles, and heavy equipment in generating dust.
- Providing education on the health risks associated with dust.
- Supporting the creation of community reserves and parks.

Vector management

The NT is home to over 100 species of mosquitoes, but only about 20 species are considered pests or pose health risks. These mosquitoes thrive in a variety of habitats, and some are capable of transmitting serious diseases to both humans and animals.

Mosquito-borne diseases in the NT

Mosquitoes in the NT have been known to spread the following diseases:

- Kunjin virus
- Japanese encephalitis virus (JEV)
- Murray valley encephalitis virus (MVE)
- Ross river virus
- Barmah forest virus

Efforts to prevent the establishment of Dengue-carrying mosquitoes have been successful, with all recorded incursions controlled and eliminated.

NT Health Medical Entomology works with the Department of Environment, Parks and Water Security, EHOs and local government to monitor, surveil and control insects that can affect human health, particularly mosquitoes and biting midges.

Personal protection

Mosquito breeding habitats in the NT

Upper high tide areas near creeks, low-lying regions, and salt marsh habitats are prime breeding grounds for the northern salt marsh mosquito (Aedes vigilax) and other pest mosquito species.

Peak activity period

- Late dry season to early wet season (in tropical regions).
- Most prevalent 1–2 weeks after the highest tides of the month or following heavy rainfall.

Regular monitoring and targeted control measures are essential to reduce mosquito populations and minimise the risk of mosquito-borne diseases.

Other areas of high mosquito activity are seasonally flooded areas associated with rivers or drainage lines, flooded coastal swamps, extensive reed swamps and lagoons, ill-defined or poorly draining creeks, extensive irrigation areas, and wastewater disposal facilities.

Personal protection

Screening

- Staying inside insect-screened housing at night reduces exposure to mosquito bites.
- Challenges include overcrowding and damaged screens in some communities.
- Mosquito nets can be an effective alternative, especially in unscreened housing or outdoor sleeping areas.

Insect-proof clothing

- Wear light-coloured, tightly woven clothing that covers as much skin as possible.
- Protection is essential when near salt marshes, mangroves, freshwater swamps, or within 1-2 km of large wetlands.

Repellents

Recommended repellents:

- DEET-based repellents (Diethyl-toluamide)—most effective.
- Picaridin-based repellents—good protection.
- Oil of lemon eucalyptus (PMD) products—effective alternative.

Application guidelines:

- Gels, creams, and liquids last longer than aerosol sprays.
- Protection lasts 1-4 hours, depending on the product and environmental conditions.
- Alcohol-based aerosols provide only one hour of protection in tropical areas—reapply as needed.
- Low-irritant products contain lower concentrations and may require more frequent application.

- Avoid applying repellents over large areas of children's skin, especially those with DEET concentrations above 20%. Choose products labelled safe for kids.
- Apply repellents to clothing to prevent mosquito penetration through open weave or tight-fitting clothes.
- Space repellents, including automated insecticide dispensers, mosquito coils, and repellent devices, provide additional protection.

Mosquito control measures

Indoor control

- Use handheld pyrethrin aerosols to knock down mosquitoes inside screened areas or homes.
- Ensure the aerosol is safe for indoor use near people and food.

Large-scale outdoor control

Short-term mosquito population reduction can be achieved with:

- Portable foggers, industrial fog generators, or backpack misters using maldison, bioresmethrin, or pyrethrum-based insecticides.
- Treatments are most effective during peak mosquito activity—late evening and early night.
- Requires good access, open vegetation, and light wind conditions directed towards mosquito habitats.

Outdoor residual sprays containing bifenthrin or alpha-cypermethrin can provide up to four weeks of protection in high-use areas (e.g. patios).

Reducing mosquito breeding sites

Prevent water collection in containers such as:

- Used tyres, drums, buckets, and other receptacles exposed to rainfall.
- Eliminating stagnant water sources reduces local mosquito populations around households.

Emergency management

Environmental health primarily operates in the recovery phase of emergencies. In the NT, emergencies frequently involve flooding, cyclones and heat related events. Environmental health also plays a vital role in endemic and pandemic responses under the direction of the Chief Health Officer.

During and after an emergency, environmental health provides support in the following areas:

- Public health information
- Infectious disease management
- Safe drinking water guidance
- Wastewater management
- Food safety
- Vector and vermin control
- Evacuation centre setup
- Solid waste management
- Hazardous waste and materials management
- Public health compliance

Environmental health exposures

Chemical, biological and physical substances in the environment can have an impact on our health. The impact will be determined by factors including what the substance is, the exposure time and frequency, exposure pathway and the health of the person exposed.

Lead exposure

Lead is a metal with no known biological benefits to humans. It occurs naturally in the environment in both its pure form and various compounds. Trace amounts are commonly found in food and water supplies, resulting in near-universal background exposure. However, in Australia and worldwide, efforts to reduce lead exposure—such as removing lead from petrol, house paints, and other consumer products—have significantly lowered human exposure levels.

Lead enters the body primarily through inhalation of contaminated air or ingestion of lead particles, while skin absorption is minimal. Exposure to elevated levels of lead can lead to neurodevelopmental issues in children and a range of cardiovascular, renal, neurological, and hematological disorders in individuals of all ages. Children and pregnant women are especially vulnerable, and iron deficiency is known to increase lead absorption.

Common sources of lead exposure in communities include lead-based ammunition, fishing sinkers, car batteries, soldering materials, and volatile substances such as aviation fuels. Industrial sources, particularly in the mining sector, can also contribute to exposure among workers. These occupational exposures should be managed by the organisation's Workplace Health and Safety (WHS) team. Cases where blood lead levels exceed established thresholds or where acute lead poisoning is identified, must be referred to NT WorkSafe (NT WorkSafe website).

Depending on blood lead concentration, treatment may include chelation therapy, though minimising and restricting exposure remains the most effective strategy for reducing elevated lead levels.

Asbestos

Asbestos is a naturally occurring mineral fibre that was commonly used in various building materials from the 1940s to the 1980s. It is classified into two types: friable asbestos, which contains a high proportion of loose fibres, and non-friable asbestos, which is solid and rigid. Asbestos exposure is linked to serious respiratory diseases that typically develop years after exposure.

Due to its widespread historical use, some level of asbestos exposure is a reality in many environments. However, exposure to friable asbestos or activities that may release fibres from solid asbestos materials should be strictly avoided unless proper personal protective equipment is used.
Older community buildings are likely to contain asbestos. If present, it should be labelled, remain undamaged with intact paint, and be recorded in an asbestos register. Additionally, legacy asbestos dump sites may exist, particularly in communities affected by cyclones. If you discover suspected asbestos, do not disturb it—contact the relevant authority for guidance.

For more detailed information, visit Asbestos in the NT.


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