Chapter 8: Clean water, sanitation and vector abatement

SUMMARY POINTS

- Safe, clean drinking water and sanitation facilities are essential to the enjoyment of life and to the right to health. Water and sanitation laws are also fundamental components of a modern public health system.

- Water management laws may impose general duties on local governments and town councils to provide, protect and conserve sources of clean drinking water. Discharging this duty will require a range of supporting powers. These may include the power to enter and acquire land, to access sources of water on just terms, to purchase water rights, to construct reservoirs and water storage tanks, to inspect waterworks and maintain pumping and other equipment, to test water supplies, and to enter into contracts for the supply of water sourced from within or beyond the relevant local government area.

- Health inspectors should be empowered to test water quality and to control or regulate any activities that are reasonably likely to contaminate public water supplies. These powers should extend to the disposal of waste and refuse, including animal remains. Subject to constitutional considerations, governments should consider ways to ensure that the health ministry retains oversight and ultimate responsibility for the provision of clean drinking water.

- Water management and sanitation laws should include duties on landowners and occupiers of premises to ensure adequate drainage of waste and flood water, to dispose of domestic waste appropriately, as well as a general duty not to pollute or contaminate sources of drinking water and water catchment areas.

- Although imposing user fees may help to conserve scarce water supplies, the privatization of water provision services may potentially result in inequitable levels of access or increase disease rates. Governments should only proceed with privatization if this is accompanied by a closely monitored strategy to safeguard access by those who are most disadvantaged. Governments may consider legislation that prohibits the disconnection of water services to private dwellings, or consider pricing policies that only permit user fees to apply for water use that exceeds basic needs.

- In order to plan for future needs, public health laws should authorize governments to collect and analyse data on water resources, take samples, monitor quality and install and remove monitoring equipment.

- Public health laws may set out the kinds of premises that must have water supplies and functioning sanitation facilities that are connected to a sewerage system or septic tank. Public health laws may also authorize health and sanitation inspectors to direct an owner or occupier of premises to install sanitary facilities, to dispose of sewerage and contaminated waste, and to take such actions as are necessary to prevent a wastewater system from causing a risk to public health.

- Public health laws may require local and city governments to install public toilets, washing facilities and associated septic tanks or sewerage systems in public areas where members of the public travel and congregate. These include train and bus stations, sporting facilities and petrol stations.
Governments should consider gender when planning sanitation reforms. Women and girls should have access to clean water and sanitation facilities that protect their health, safety and privacy.

Effective malaria control requires universal access to measures for the prevention, diagnosis and treatment of malaria. Public health laws should mandate vector surveillance and authorize public health authorities to take all such actions as necessary to implement evidence-based control strategies. Key malaria control interventions include providing long-lasting insecticide-treated mosquito nets to high-burden populations, and indoor residual spraying.

Governments should prohibit the marketing, sale and use of oral, artemisinin-based monotherapies and promote the use of artemisinin-based combination therapy for treatment of malaria.

Indoor residual spraying with DDT remains an important intervention for malaria control, in accordance with WHO recommendations and the Stockholm Convention on Persistent Organic Pollutants. WHO has published operational guidelines for safe and effective indoor residual spraying.

Public health laws can support vector control through statutory offences for causing or permitting a nuisance that applies to owners or occupiers of premises.

Public health laws should authorize public health authorities to issue an abatement notice that requires the owner or occupier to take such actions as reasonably necessary to abate or prevent the nuisance. Typically, public health laws authorize local authorities to enter and inspect premises, and to take actions themselves to abate a nuisance when an owner or occupier fails to do so.

8.1 Sanitation and hygiene

The right to safe and clean drinking water and sanitation facilities is a human right that is essential for the full enjoyment of life and all human rights. Access to safe and potable water and adequate sanitation are also underlying determinants of health which form part of the right to the highest attainable standard of health contained in the International Covenant on Economic, Social and Cultural Rights. Between 1990 and 2015, the percentage of the world’s population with access to an improved source of drinking water – such as a protected well, hand pump or public tap – rose from 76% to 91%. Despite this, in 2015, an estimated 663 million people still lacked access to a safe and reliable source of drinking water; nearly half of these people lived in sub-Saharan Africa.

In 2015, around one in three of the global population lacked access to sanitation facilities. In 47 countries, fewer than 50% of the population had access to improved sanitation, and open defecation was still practiced by more than 900 million people. Lack of hygiene and access to clean drinking water, including inadequate management of water distribution systems, are significant causes of avoidable mortality. Unequal levels of access to these services are also significant causes of health inequalities. Improving access to adequate sanitation and clean drinking water are
foundational strategies for reducing health inequalities and for fulfilling the right to health (Box 8.1).  

Box 8.1: Clean drinking water and sanitation: foundations of a modern public health system

- Faecal-oral transmission of disease, caused by unsafe water and inadequate sanitation, are the primary drivers of diarrhoeal diseases – the second leading cause of death in children under five, killing around 760 000 children annually.  
- Contaminated water and poor sanitation cause a range of other diseases that affect millions of people each year, including cholera, hepatitis A, fluorosis, dracunculiasis, intestinal worms, malaria, schistosomiasis, trachoma, arsenic poisoning and typhoid fever.

In 2008, ministers and heads of delegations responsible for health, sanitation and water programmes in 32 African countries signed the eThekwini Declaration, aspiring to commit at least 0.5% of gross domestic product to new budget lines created expressly for improved sanitation and hygiene development. In 2010, the United Nations General Assembly called on States to provide financial resources, capacity-building and technology transfer, particularly to developing countries, in order to scale up the provision of clean, accessible and affordable drinking water and sanitation for all. In 2015, the General Assembly adopted the goal of ensuring the “availability and sustainable management of water and hygiene for all”, as part of the Sustainable Development Goals (SDGs). This goal is supported by six technical targets relating to drinking water, sanitation and hygiene, wastewater management, water efficiency, integrated resource management and protection of aquatic ecosystems. (Box 8.2) Since the right to health encompasses safe and potable water, and adequate sanitation, governments must also consider the availability, accessibility, acceptability and quality of these services (see Section 1.2). Investment in infrastructure to improve access to water and sanitation should also be accompanied by education about hygiene. For example, handwashing with soap is a powerful public health intervention that has been estimated to reduce diarrhoea by around 48%.

Box 8.2: Goals and targets for clean drinking water and sanitation in the Sustainable Development Goals

Goal 6: Ensure availability and sustainable management of water and sanitation for all

Targets for Goal 6:
- 6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all.
- 6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.
- 6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.
- 6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure
sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity.

- 6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate.
- 6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.
- 6.a By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies.
- 6.b Support and strengthen the participation of local communities in improving water and sanitation management.

(a) Clean water supplies

Public health laws in relation to clean water should address three key areas: water management, sanitation facilities and water contaminants. Water management laws may impose general duties on local governments and town councils to provide sources of clean drinking water, to carry out water assessments in order to identify, protect and conserve drinking water catchment areas and to mitigate potential sources of contamination. The duty to provide a sufficient supply of clean water requires planning and monitoring by local authorities on an ongoing basis, due to the impact of population growth and changing land-use patterns as well as the impact of agriculture on traditional sources of water supplies. In order to discharge this duty effectively, local governments and town councils may require a range of additional powers. These may include the power to enter and acquire land, to access sources of water on just terms, to purchase water rights, to construct reservoirs and water storage tanks, to inspect water management facilities, to maintain pumping and other equipment, to test water supplies, and to enter into contracts for the supply of water sourced from within or beyond their local government area.

Where resource constraints prevent the construction of public storage tanks, governments may encourage point-of-use water treatment and safe storage through education and funding strategies. Low-cost and effective treatments include boiling, solar disinfection (exposing clear containers of water to sunlight for at least six hours), ceramic or biosand filtration systems, and use of sodium hypochlorite or chlorinated isocyanurates. Laws can encourage self-sufficiency in water supplies by requiring landowners to collect, store and conserve rainwater (Box 8.3). Governments can encourage compliance by subsidizing water storage containers and chemicals for water purification.
Box 8.3: Regulating the quality of drinking water: an example from Belize

Public Health Act

Section 52. Surface drains. Every Town Council may, and when required by the Director of Health Services shall, construct and maintain in proper order in convenient places drains for the removal of surface and floodwater and for the proper drainage of swamplands situated within its jurisdiction.

Section 53. Draining of houses and lots, etc.

(1) Where any lot, house or premises is without a drain sufficient for the effectual drainage of flood water or domestic wastewater a Medical Officer of Health may by written notice require the owner or occupier of the lot, house or premises within a reasonable time therein specified to make a drain or drains emptying, in the case of flood water, into any public drain, and in the case of domestic wastewater, emptying into such sump or pit or place as a Medical Officer of Health may direct.

(2) A Medical Officer of Health may require any such drain or drains to be of such material, construction and size and to be laid at such level and with such fall as may appear to [him or her] to be necessary and proper and may require any sump to be of a size and type approved by the Director of Health Services.

(3) If such notice is not complied with the Medical Officer of Health may after the time specified in the notice do the work required and may recover in a summary manner the expenses incurred by [him or her] in so doing from the owner, or may declare the same to be private improvement expenses.

Section 54. Public Tanks. Every Town Council may, and when required by the Minister shall, construct and maintain tanks and reservoirs for the storage of rain or fresh water as may be necessary, and may sell the water so stored or permit the free use thereof.

Section 55. By-laws regulating issue of water. Every Town Council may make by-laws for regulating the issue of water from any tank or reservoir under its charge.

Section 61. Dwelling houses to be provided with tanks.

(1) Every owner of a dwelling-house, the roof of which is not a thatched one, shall erect and maintain in good order a tank or tanks in connection with the dwelling-house, for the storage of rain water, and in respect of every new building to be used as a dwelling-house erected on or after the coming into force of this Act, the tank or tanks shall be capable of storing not less than five gallons of water for each square foot of floor space contained within such dwelling-house.

(2) No tank required to be maintained under this section shall be deemed to be in good order-

(a) If it is not connected by suitable pipes to gutters attached to a sufficient surface of roof or platform exposed to the weather or if such gutters or pipes are not in good order; or

(b) If the tank is not fitted with apparatus for draining off water there from without waste; or

(c) If the tank is not watertight; or

(d) If the tank is not provided with a suitable covered or screened opening for conveniently inspecting and repairing the inlet and outlet, and for cleaning.

Section 63. Inspection of premises and receptacles for water. Any health officer may from time to

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time with or without assistance enter into, visit and inspect for the purposes of sections 60 to 63 inclusive all or any premises, tanks and receptacles for water.

Water management and sanitation laws may impose additional duties on landowners and occupiers of premises. These may include the duty to ensure adequate drainage of waste and flood water (thereby minimizing standing water, an optimal breeding ground for mosquitoes), to dispose of domestic waste appropriately, as well as a general duty not to pollute or contaminate sources of drinking water and water catchment areas.

Local councils may vary in their financial and administrative capacity to manage the supply of clean drinking water and to enforce water laws. Subject to the constitutional division of powers in each country, government officials considering the revision of public health laws may consider ways of ensuring that the health ministry shares some oversight and responsibility for the provision of clean drinking water, in order to ensure universal access to disadvantaged groups.

Factors that may contribute to poor coverage of clean water services include lack of capital for the infrastructure investments that are needed for the distribution and management of water, as well as inefficient management and lack of accountability on the part of governing agencies. When countries struggle with water scarcity problems, governments often face pressure to privatize water systems to discourage wasteful use. While attaching user fees to water may conserve supplies and prevent wasteful use, in some circumstances privatization may result in inequitable access or increase disease rates. When considering the privatization of water services, governments should carefully weigh the potential risks of privatization, and ensure that any privatization of supplies is accompanied by a closely monitored strategy to safeguard access. After privatization led to price increases in the United Kingdom, increasing numbers of households were disconnected from water lines after failing to make payments. In response to growing public health concerns, the government passed legislation prohibiting disconnection or the use of limiting devices to reduce use for non-payment reasons. Governments can also establish financing schemes to support investment in the provision of clean water to low-income communities, or impose pricing standards that only permit user fees for water use that exceeds basic needs.

In order to ensure the ongoing quality and sufficiency of drinking water, and to plan for future needs, governments need information about the volume, flow and quality of water sources. Public health laws should therefore authorize governments to collect and analyse water resources data, to take samples, and to construct, install, repair and remove recording and monitoring equipment (Box 8.4).

Box 8.4: Laws authorizing the monitoring and investigation of water supplies: an example from Australia

Water Act (Northern Territory)

Section 34. Water resources investigation

To enable effective planning for water resource development and environmental protection, it is the duty of the [Controller of water resources] to ensure as far as possible that a continuous program for the assessment of water resources of the Territory is carried out, including the investigation,
collection, collation and analysis of data concerning the occurrence, volume, flow, characteristics, quality, flood potential and use of water resources, and for that purpose the Controller may:

(a) systematically gauge stream flow, record climatic data and monitor groundwater levels;
(b) construct, operate, repair, maintain, alter and remove gauging, recording and monitoring stations and investigation and monitoring bores;
(c) sample and analyse water and waste.

(b) Sanitation facilities

Laws that regulate the provision and maintenance of sanitation systems, including toilets and washing facilities, make a vital contribution to public health infrastructure by minimizing faecal-oral transmission of disease. The WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation has provided guidance on the range of facilities that provide a basic level of health protection. An important component of protecting water supplies is to specify the kinds of premises, including hotels and lodging houses, workplaces, schools, homes and building sites, that must have functioning toilets or sanitation facilities connected to a sewerage system or septic tank. Public health laws may also authorize health and sanitation inspectors to direct an owner or occupier of premises to install sanitary facilities, to dispose of sewerage and contaminated waste, and to take such actions as are necessary to prevent a wastewater system from causing a risk to public health (Box 8.5).

For example, the Public and Environmental Health Regulations of the Northern Territory, in Australia, authorize the Chief Health Officer to direct an owner or occupier of premises to install sanitary facilities within a specified period, and create an offence for failure to do so. The Chief Health Officer may also give directions about the management or disposal of “biosolids, septage, or sludge”, as defined in the regulations. Box 8.5 illustrates the power of the Chief Health Officer to give directions to an owner or occupier of premises in order to ensure that a wastewater system does not create a risk to public health.

Box 8.5: Power to give directions in relation to wastewater systems: an example from Australia

Public and Environmental Health Regulations, Northern Territory, Australia

Section 89 CHO [Chief Health Officer] may give directions

(1) This regulation applies if the CHO has reasonable grounds to believe that a wastewater system at a place is causing, or is likely to cause, a serious public health risk.

(2) The CHO may direct an owner or occupier of a place to do any thing the CHO considers reasonably necessary to prevent the wastewater system from causing, or continuing to be, a serious public health risk.

(3) A person commits an offence if the person:
(a) is an owner or occupier of the place; and
Where resource constraints prevent the construction of a sanitary facility in every place of accommodation, the law may instead provide for public or shared facilities until the State develops the capacity to provide sanitary services in every dwelling. Governments considering law reform may require local government authorities and city councils to plan for the provision of public toilets, washing facilities and associated septic tanks or sewerage systems in public areas where members of the public travel and congregate. These include train and bus stations, sporting facilities and petrol stations. As noted above, hand washing is an important strategy for avoiding diarrhoea; governments may consider funding education programmes on hygiene and subsidizing the provision of soap for poor populations.29

Access to improved sanitation can increase productivity by minimizing absences from work and school as a result of faecal-oral transmission of disease. Sanitation facilities must be acceptable to the communities they are intended to serve (see Section 1.2). For example, sanitation reforms may be more effective where public health laws require schools and workplaces to install separate facilities for men and women, since women and girls are less likely to use these facilities when doing so compromises their safety or privacy.30 Belize’s public health law empowers the health ministry to require an employer or school to provide separate facilities for men and women (Box 8.6).

Box 8.6: Providing for sanitation facilities for both sexes: an example from Belize

Public Health Act31
Section 23. Schools and factories to be provided with privies for both sexes

(1) Where it appears to the Director of Health Services, that any house or building is used or intended to be used as a factory or school by persons of both sexes he may if he thinks fit by written notice require the owner or occupier to construct a sufficient number of water-closets, earth-closets or privies, for the separate use of each sex within a time specified therein.

A fundamental principle of public health is that sources of water intended for drinking, bathing and washing by humans should be protected and separated from drains and run-off, floodwater and watercourses potentially contaminated by animals. In addition to waterborne diseases caused by inadequate sanitation, poisoning and illness can also occur when groundwater is contaminated with industrial waste, fertilizers and pesticides. Public health laws should empower health inspectors to test water quality and to control or regulate any activities that are reasonably likely to contaminate public water supplies. These powers should extend to the disposal of waste and refuse, including animal remains. With due regard to religious beliefs and customs, human burials should be restricted to cemeteries that are safe from scavenging and physically separated from water courses.
Modern public health laws often create general offences that cover different kinds of actions that may contaminate watercourses and sources of drinking water, causing environmental harm or a risk to human health.

### 8.2 Vector abatement

Vector control measures aim to reduce the transmission of disease by reducing the number of animals and insects that act as vectors for disease transmission, or by reducing interactions between animal and disease vectors, and people. Vector-borne diseases, such as malaria, are preventable and curable, and yet malaria caused more than 580,000 deaths in 2013, mostly among African children (Box 8.7). This section focuses on mosquito and rodent control, although region-specific health threats may also require attention to vectors such as cockroaches, or sand and tsetse flies.

**Box 8.7: Progress in malaria control**

- In 2015 there were an estimated 214 million new cases of malaria, and 438,000 deaths. Although the estimated malaria mortality rate has fallen by 60% since 2000, a child still dies from malaria every two minutes.

- In recent years, a number of countries have been certified as malaria-free. These include the United Arab Emirates (2007), Morocco (2010), Turkmenistan (2010) and Armenia (2012). Nevertheless, in 2015, 95 countries and territories had cases of malaria transmission.

- In the WHO African Region, between 2000 and 2015, malaria mortality declined by 48%. Nevertheless, in 2015, most cases of malaria (88%), and most deaths (90%) still occurred in this region. The longer lifespan and stronger tendency of African mosquito species to bite humans explains why around 90% of malaria deaths occur in this region.

**(a) Malaria and other mosquito-borne diseases**

WHO’s Global Technical Strategy for Malaria 2016–2030 encourages countries to move towards malaria-free status by adopting a strategy based on three pillars. The first pillar involves universal access to measures for the prevention, diagnosis and treatment of malaria. This means universal coverage of malaria control interventions for all populations at risk, including indoor residual spraying (IRS), and the distribution of long-lasting insecticide-treated nets (LLINs) in high-burden areas. IRS and LLINs are the “two core, broadly-applicable vector control interventions” for effective malaria control. Better outcomes have been achieved when LLINs are distributed for free or at subsidized cost. In areas with seasonal transmission patterns, distribution of LLINs should be focused on areas at highest risk due to climatic conditions or lack of access to health services. Public education on LLINs is critical to reduce improper and sporadic use (or no use at all), re-selling, improper washing practices, and/or failure to replace damaged nets. IRS is also an effective means of vector control in areas where the majority of the population sleeps and rests indoors and where a high percentage of homes have spray-able surfaces. In areas where this is not the case, other strategies include larviciding (where vectors breed in permanent or semi-permanent bodies of...
water), environmental management, window screens and area spraying during peak vector activity time.

Effective vector control should be complemented by preventive courses of antimalarial medication for the most vulnerable groups (including pregnant women and infants), universal diagnostic testing for all suspected cases, and quality-assured treatment of all confirmed cases. In order to prevent drug resistance, the World Health Assembly has urged Member States to cease progressively the provision in both the public and private sectors of oral, artemisinin-based monotherapies and to promote the use of artemisinin-based combination therapy. The WHO strategy urges regulatory authorities to ensure that artemisinin-based monotherapies are removed from health facilities, pharmacies and the private market.

The second pillar of WHO’s malaria strategy involves accelerating efforts towards malaria-free status and elimination of malaria in low-transmission settings. This includes strengthening the epidemiological surveillance of malaria, with compulsory notification of all confirmed cases (see Chapter 9), and a ban on the sale of over-the-counter antimalarial medicines to prevent inappropriate use. The elimination of malaria requires a multisectoral approach, with renewed political commitment and enhanced regional collaboration. The third pillar involves upgrading malaria surveillance within all national and subnational malaria strategies, and investing in health information systems to support surveillance.

The Roll Back Malaria Partnership, hosted by WHO between 1998 and 2015, is made up of more than 500 partners including malaria-endemic countries, OECD donor countries, multilateral development partners, foundations, the private sector, nongovernmental organizations and researchers. Since 2013, these efforts have been strengthened by the Multisectoral Action Framework for Malaria, which recognizes that malaria is a symptom of low levels of human development, and aims to accelerate malaria control by integrating it within strategies for social and economic development. Financing plays an important role in the Multisectoral Action Framework, including the provision of financial support for the costs of malaria interventions incurred directly by households.

Public health law can support national programmes to control mosquito-borne illnesses in several important ways. For example, legislation can mandate vector surveillance and the provision of public education programmes, and give local health authorities a clear mandate to take all such actions as are necessary to fully implement national malaria control strategies. There may be benefits in incorporating environmental management strategies directly into public health regulations, and including a requirement for provincial health officers to educate local populations about vector control requirements. Provincial health officers should have a duty to report annually in an independent manner, and to issue reports at other times as necessary.

Despite its effectiveness in malaria control, some countries may face pressure to reduce IRS in order to eliminate the use of DDT. DDT is a closely regulated and cost-effective insecticide that has been controversial in malarial control efforts. The Stockholm Convention on Persistent Organic Pollutants expressly allows the use of DDT for disease control purposes (subject to reporting to the Secretariat). In some countries, the replacement of DDT with other insecticides has compromised malaria control programmes. Following a risk assessment, WHO published an updated position...
statement that confirms the necessity of the use of DDT, in accordance with the requirements of the Convention and WHO recommendations (Box 8.8). WHO has published operational guidance for IRS programmes. Governments should consider adopting national standards for safe storage and use of pesticides in IRS and incorporating these within public health legislation, including the use of warning labels on insecticides, childproof dispenser designs, by creating offences for leakage and misuse of pesticides, and by mandating the reporting of DDT use to the Secretariat of the Stockholm Convention.

Box 8.8: WHO’s position statement on the use of DDT in malaria control

Indoor residual spraying (IRS) using DDT is an important intervention for malaria control. From 12 insecticides recommended by WHO for IRS, DDT has the longest residual efficacy against malaria when sprayed on walls and ceilings (6–12 months). WHO’s position statement concludes:

DDT is still needed and used for disease vector control simply because there is no alternative of both equivalent efficacy and operational feasibility, especially for high-transmission areas. The reduction and ultimate elimination of the use of DDT for public health must be supported technically and financially. It is essential that adequate resources and technical support are rapidly allocated to countries so that they can adopt appropriate measures for sound management of pesticides in general and of DDT in particular. There is also an urgent need to develop alternative products and methods, not only to reduce reliance on DDT and to achieve its ultimate elimination, but also to sustain effective malaria vector control.

For dengue control, WHO encourages national control programmes based on environmental management strategies and insecticides. Public health laws should provide a clear mandate for the development of national strategies, and for locally led surveillance, monitoring and enforcement of regulatory requirements. These include requirements to ensure that water storage containers are covered and cleaned regularly, that large waste items (such as used tires) are disposed of, and avoidance of the use of hollow building materials (such as bamboo). Improving the delivery of potable water (e.g. through installation of piped water systems) will reduce reliance on storage bins and thus reduce potential vector breeding grounds. Chemical control strategies may also be incorporated into dengue control programmes. WHO has recommended substituting the use of DDT with organophosphate insecticides for dengue control, and has issued guidelines for the safe use of pesticides. Incorporating controls for safe use into national public health laws or regulations improves clarity around the specific standards that public health officers should implement and enforce in order to discharge their mandate in this area.

(b) Rodent control

Rodents are vectors for the transmission of disease, particularly in urban or overcrowded areas. Rodent control measures include improving environmental sanitation practices, securing the storage of food, grain and animal feed, washing dishes and removing food scraps, removing household rubbish and waste, and removing deceased animals from areas near living spaces. In emergency situations, use of rodenticides may be necessary to control outbreaks. Rodenticides should be
targeted narrowly towards areas of greatest infestation, which can be identified through use of traps. As with the chemical control strategies discussed above, public health law should require adherence to stringent safety guidelines.

Public health law has a long history of using environmental management strategies to reduce diseases transmitted by rodents. These include strict compliance with (and auditing of) food storage and hygiene requirements in food establishments, as well as contractual requirements in landlord-tenant laws to remove waste and to keep premises free of vermin. Due to their flexibility, most public health statutes include nuisance abatement provisions authorizing public health officers to inspect premises and to order owners or occupiers of premises to take such actions as are reasonably necessary to reduce the health risks posed by rats or other vectors. A public nuisance may be broadly defined to include any act or omission that is harmful or that is likely to be harmful to the public’s health, and also includes acts or omissions that may jeopardize a public good, such as a potable water supply, that is needed to maintain public health.

Public nuisance laws are a critically important public health tool, and can be framed in both general and specific ways. In many countries, nuisance laws give a wide range of examples to illustrate the broad coverage of the concept of a public health nuisance. For example, Jamaica’s Public Health (Nuisance) Regulations create an offence for causing or permitting a nuisance that applies to owners or occupiers of premises. The regulations authorize public health authorities to issue an abatement notice that requires the owner or occupier to take such actions as reasonably necessary to abate or prevent the nuisance. The schedules include a list of examples that are included within the concept of a nuisance (Box 8.9). Typically, public health laws authorize local authorities to enter and inspect premises, and to take actions themselves to abate a nuisance when an owner or occupier fails to do so.

Box 8.9: Using public health nuisance laws for vector control: an example from Jamaica

<table>
<thead>
<tr>
<th>Public Health (Nuisance) Regulations 1995</th>
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<tbody>
<tr>
<td><strong>Section 3(1)</strong> No person shall cause or permit a nuisance on any premises owned or occupied by him.</td>
</tr>
<tr>
<td><strong>(2)</strong> No person shall cause a nuisance on any premises or aid and abet any other person to cause or permit a nuisance on any premises.</td>
</tr>
<tr>
<td><strong>Section 4(1)</strong> A Medical Officer (Health), a Public Health Inspector or any person authorized by the Minister in writing in that behalf (hereinafter referred to as an “authorized person”) or a Local Board may, on becoming aware of the existence of a nuisance on any premises, serve on the owner or occupier of the premises or on the person causing or permitting the nuisance, a notice in writing in the form set out in the Second Schedule requiring the owner, occupier, or person-</td>
</tr>
<tr>
<td>(a) to abate the nuisance within such reasonable time not being more than thirty days, as may be specified in the notice;</td>
</tr>
<tr>
<td>(b) to perform such act as the Medical Officer (Health), the Public Health Inspector, an authorized person or Local Board considers to be reasonably required to abate or prevent the recurrence of the nuisance.</td>
</tr>
<tr>
<td><strong>(2)</strong> Where a person, without reasonable cause, fails to comply with the requirements specified in the notice under paragraph (1), the Medical Officer (Health), the Public Health Inspector or authorized</td>
</tr>
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</table>
person shall make a report in writing to the Local Board and the Local Board may authorize in writing any person to enter upon the premises and do such things as are necessary to abate or prevent a recurrence of the nuisance.

First Schedule
Nuisances
1–(1) A building or structure which, because of structural defects or insanitary conditions, is or is likely to become a health hazard.

(2) Any premises or other place which because of insanitary conditions is or is likely to become a health hazard.

2. An accumulation or deposit of solid waste of human or animal excreta.

3. Dust, smoke, fumes, gases or effluvia emitting from any manufacturing process or caused by the carrying on of any trade or business or otherwise by the action of any person.

4–(1) Any animal which is kept in such a manner as to become hazardous to health.

(2) The carcass of any animal which is not buried or destroyed within twenty-four hours of the animal's dying.

5. A tree, bush or structure which interferes with the flow of air or the letting in of sunlight into any building or premises.

6–(1). The lack of water or a water supply system.

(2) A water supply system that is not maintained in a sanitary condition.

(3) The running to waste of water from a tap, pipe or pump or from any other device from which water is obtained.

(4) The accumulation of stagnant water.

7. Any sanitary convenience which is so designed, located or kept which is or is likely to become a health hazard.

8. The infestation of flies, fleas, cockroaches, lice, rats, mosquitoes, mosquito larvae and other vermin on any premises.

9. Excess vegetation or overgrowth of bush on any building, land or structure which harbours or is likely to harbour vermin.

10–(1) The discharge of any sewage, industrial waste or any other noxious matter into the sea or any watercourse or onto any land.

(2) In paragraph (1) “watercourse” includes any river, stream, creek, canal, drain, natural channel or any permanent and defined course for water or flood-water.

11. Offensive smells. including the emission of noxious fumes, gases or powerful smells, as a result of agricultural, domestic or industrial processes or otherwise.
REFERENCES

16 Classen TF. Scaling up household water treatment among low-income populations. Geneva: World Health Organization; 2009:1
19 Public Health Act 2000 (Belize) part IV.

1 All references were accessed on 1 May 2016.


23 Water Industry Act 1999 (UK) c 9 ss. 1, 2.


27 Public and Environmental Health Regulations (Northern Territory) (Australia) s. 72 (http://www5.austlii.edu.au/au/legis/nt/consol_reg/paehr400).


31 Public Health Act 2000 (Belize) part IV s. 23.


