Water, Sanitation and Hygiene Standards for Schools in Low-cost Settings

John Adams, Jamie Bartram, Yves Chartier, Jackie Sims

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The cover photographs are: a boy in Nepal (Black, WHO), two girls washing hands in Rwanda (Pirozzi, UNICEF), a girl demonstrating hand washing in a school in Nigeria (Nesbitt, UNICEF), two girls going to a block of toilets in Rwanda (Pirozzi, UNICEF), a child pouring water in a toilet in Egypt (Pirozzi, UNICEF) and a school teacher helping a child with hand washing in Jamaica (Markisz, UNICEF).

Summary

Diseases related to inadequate water, sanitation and hygiene are a huge burden in developing countries. It is estimated that 88% of diarrhoeal disease is caused by unsafe water supply, and inadequate sanitation and hygiene (WHO, 2004c). Many schools serve communities that have a high prevalence of diseases related to inadequate water supply, sanitation and hygiene, and where child malnutrition and other underlying health problems are common.

Schools, particularly those in rural areas, often completely lack drinking-water and sanitation and handwashing facilities; alternatively, where such facilities do exist they are often inadequate in both quality and quantity. Schools with poor water, sanitation and hygiene conditions, and intense levels of person-to-person contact, are high-risk environments for children and staff, and exacerbate children's particular susceptibility to environmental health hazards.

Children's ability to learn may be affected by inadequate water, sanitation and hygiene conditions in several ways. These include helminth infections (which affect hundreds of millions of school-age children), long-term exposure to chemical contaminants in water (e.g. lead and arsenic), diarrhoeal diseases and malaria infections, all of which force many schoolchildren to be absent from school. Poor environmental conditions in the classroom can also make both teaching and learning very difficult.

Girls and boys are likely to be affected in different ways by inadequate water, sanitation and hygiene conditions in schools, and this may contribute to unequal learning opportunities. Sometimes, girls and female teachers are more affected than boys because the lack of sanitary facilities means that they cannot attend school during menstruation.

The international policy environment increasingly reflects these issues. Providing adequate levels of water supply, sanitation and hygiene in schools is of direct relevance to the United Nations (UN) Millennium Development Goals of achieving universal primary education, promoting gender equality and reducing child mortality. It is also supportive of other goals, especially those on major diseases and infant mortality.

At the same time, the UN Millennium Project and the UN Secretary-General have highlighted the importance of rapidly addressing "quick wins"; that is, identifying specifically provision of services to schools and health-care facilities.

Guidelines on water, sanitation and hygiene in schools are widely available, but additional guidance and standards for low-cost settings are needed.

The development and implementation of national policies, guidelines for safe practices, training and promotion of effective messages in a context of healthy schools will decrease the toll taken by inadequate water, sanitation and hygiene.

These guidelines deal specifically with water, sanitation and hygiene, and are designed to be used in schools in low-cost settings in low- and medium-resource countries to:

- assess prevailing situations and plan for required improvements;
- develop and reach essential safety standards as a first goal; and
- support the development and application of national policies.

The guidelines are written for use by education managers and planners, architects, urban planners, water and sanitation technicians, teaching staff, school boards, village education committees, local authorities and similar bodies.

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Acronyms and abbreviations

DPD	N,N-diethyl-p-phenylenediamine
EMIS	education management information system
NTU	nephelometric turbidity unit
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
WASH	water, sanitation and hygiene
WHO	World Health Organization

1 Introduction

1.1 Purpose and scope of these guidelines

These guidelines offer a basis for creating the minimum conditions required for providing schooling in a healthy environment for schoolchildren, teachers and other staff. In the area of water supply, sanitation and hygiene, they can be used to:

- develop specific national standards that are relevant to various types of school in different contexts;
- support national standards and set specific targets at local level;
- assess the situation in existing schools, to evaluate the extent to which those schools may fall short of national standards and local targets;
- plan and carry out any improvements required;
- ensure that the construction of new schools is of acceptable quality; and
- prepare and implement comprehensive and realistic action plans, so that acceptable conditions are maintained.

The guidelines deal specifically with water supply (water quality, quantity and access), hygiene promotion, sanitation (quality and access), control of vector-borne disease, cleaning and waste disposal, and food storage and preparation. They are designed for use in low-cost settings, where simple and affordable measures can significantly improve hygiene and health.

The word "school" is used in this document to include primary and secondary schools, boarding and day schools, rural and urban schools, and public and private schools. The common feature of all schools addressed by this document is that they are constrained by a severe lack of resources for infrastructure development.

1.2 Policy rationale

As discussed in Section 2, provision of adequate water supply, sanitation, hygiene and waste management in schools has a number of positive effects; namely, that:

- the disease burden among children, staff and their families is reduced;
- healthy children in healthy environments learn more effectively;
- there can be greater gender equity in access to education and meeting hygiene-related needs;
- educational opportunities are created to promote safe environments at home and in the community; and
- schoolchildren can learn and practice life-long positive hygiene behaviours.

In spite of these important benefits, levels of water supply, sanitation and hygiene are unacceptable in many schools worldwide. Efforts to increase school enrolment have been successful, but the number of children in schools with inadequate water supply, sanitation and hygiene has also grown. There is strong and growing evidence from many countries of inadequate access to safe water, sanitation and hygiene in schools in resource-scarce settings.

The international policy environment increasingly reflects these issues. Providing adequate levels of water supply, sanitation and hygiene in schools is of direct relevance to the United Nations (UN) Millennium Development Goals on achieving universal primary education, promoting gender equality and reducing child mortality. It is also supportive of other goals, especially those on major diseases and infant mortality. The UN Millennium Project and the UN Secretary-General have also highlighted the importance of rapidly addressing "quick wins" — identifying specifically provision of services to schools and health-care facilities. Targets promoted by Vision 21 include 80% of primary schoolchildren educated about hygiene and all schools equipped with facilities for sanitation and handwashing by 2015 (WSSCC, 2000). Strategy 8 of the Dakar Framework for Action, produced at the World Education Forum in 2000, is to create safe, healthy, inclusive and equitably resourced educational environments (UNESCO, 2000).

Putting policy into practice in this area demands stronger links between professional sectors such as education, health, water supply and sanitation, planning and construction.

1.3 Audience

These guidelines are written for use by education managers and planners, architects, urban planners, water and sanitation technicians, teaching staff, school boards, village education committees, local authorities and similar bodies. These groups are encouraged to work together to set relevant, achievable and sustainable targets for water, sanitation and hygiene in schools.

1.4 School settings

These guidelines are intended for use in resource-scarce situations where simple, robust and affordable solutions are required for providing healthy school environments. They apply to a range of school settings. Two broad types of setting — day schools and boarding schools — illustrate the issues involved in creating adequate conditions of water supply, sanitation and hygiene; both are discussed below.

Day schools

Day schools catering for children of ages 6 to 16 provide academic and, in many cases, recreational activities for children who return home every day, but who may often eat at or near the school. Problems faced by schoolchildren and teachers in this kind of school often include lack of basic water supplies, sanitation and hygiene-enabling facilities; inadequate or hazardous outdoor space; and overcrowded classrooms where there is noise, poor lighting, poor seating, excessive heat or cold, damp and poor indoor-air quality. Funding for improved conditions in schools may be lacking, but there may also be a strong desire and capacity for change among staff, schoolchildren and parents.

Boarding schools

Boarding schools cater for children who, for various reasons, are unable to return home each day. In boarding schools, all meals, sleeping accommodation and washing facilities are provided. It is therefore of critical importance that water, sanitation and hygiene-enabling facilities are adequate. Risks of transmission of communicable disease are raised because of the communal eating, sleeping, sanitation and hygiene arrangements in boarding schools. Nevertheless, it is possible to provide adequate water, sanitation and hygiene conditions for all children.

General

Within each of these broad types of school setting, there is great variation in access to financial, institutional and human resources, and in the existing level of water supply, sanitation and hygiene. The guidelines in this document are intended to help achieve acceptable conditions in all schools, whatever the existing situation and current level of resources. Simple and low-cost measures exist for improving even the worst situations, and they provide the first step towards acceptable long-term conditions.

1.5 Relation to national standards and codes

These guidelines are intended to support and complement existing national standards and codes, and do not modify or substitute for them (see Section 3.2). Readers should attempt to locate relevant national standards through their nation's ministries of health, education, environment, planning, or natural resources, or from professional bodies and training organizations.

2 Importance of adequate water supply, sanitation and hygiene in schools

2.1 Disease prevention

Diseases related to inadequate water, sanitation and hygiene are a huge burden in developing countries. It is estimated that 88% of diarrhoeal disease is caused by unsafe water supply, and inadequate sanitation and hygiene (WHO, 2004c). Many schools serve communities that have a high prevalence of diseases related to inadequate water supply, sanitation and hygiene (particularly lack of handwashing), and where child malnutrition and other underlying health problems are common. If everyone in the world had access to a regulated piped water supply and sewage connection in their houses, 1863 million days of school attendance would be gained due to less diarrhoeal illness (WHO, 2004c).

Schools, particularly those in rural areas, often completely lack drinking-water and sanitation facilities, or have facilities that are inadequate in both quality and quantity. Schools with poor water, sanitation and hygiene conditions, and intense levels of person-to-person contact are high-risk environments for children and staff, and exacerbate children's particular susceptibility to environmental health hazards.

These guidelines are designed to help strengthen water supply, sanitation and hygiene measures in particular, while recognizing the importance of, and links with, other areas of environmental health, such as air quality and physical safety.

2.2 Learning

Children's ability to learn may be affected in several ways. Firstly, helminth infections, which affect hundreds of millions of school-age children, can impair children's physical development and reduce their cognitive development, through pain and discomfort, competition for nutrients, anaemia, and damage to tissues and organs. Long-term exposure to chemical contaminants in water (e.g. lead and arsenic) may impair learning ability. Diarrhoeal diseases, malaria and helminth infections force many schoolchildren to be absent from school. Poor environmental conditions in the classroom can also make both teaching and learning very difficult. The effect of disease in teachers — impairing performance and increasing absenteeism — also has a direct impact on learning, and teachers' work is made harder by the learning difficulties faced by schoolchildren.

2.3 Gender and disability

Girls and boys, including those with disabilities, are likely to be affected in different ways by inadequate water, sanitation and hygiene conditions in schools, and this may contribute to unequal learning opportunities. For example, lack of adequate, separate private and secure toilets and washing facilities may discourage parents from sending girls to school. In addition, lack of adequate facilities for menstrual hygiene can contribute to girls missing days at school; this can even lead girls to drop out of education altogether at puberty. Toilets that are inaccessible often mean that a disabled child does not eat or drink all day to avoid needing the toilet, leading to health problems and eventually to their dropping out of school altogether.

2.4 The wider community

Children who have adequate water, sanitation and hygiene conditions at school are more able to integrate hygiene education into their daily lives, and can be effective messengers and agents for change in their families and the wider community. Conversely, communities in which schoolchildren are exposed to disease risk because of inadequate water supply, sanitation and hygiene at school are themselves more at risk. Families bear the burden of their children's illness due to bad conditions at school.

2.5 Life-long skills

The hygiene behaviours that children learn at school — made possible through a combination of hygiene education and suitable water, sanitation and hygiene-enabling facilities — are skills that they are likely to maintain as adults and pass on to their own children.

3 Implementation

3.1 Positive policy environment

Positive policies are required at all levels — national, district, local and school — to encourage and facilitate the achievement of appropriate levels of water, sanitation and hygiene in schools. A supportive policy environment should allow stakeholders at district and school level to establish effective governance and management arrangements in order to plan, fund, implement and coordinate improvements.

3.2 Steps in setting and managing standards at national, district and local level

The essential steps in managing standards at national, district and local (school and community) levels are presented in Table 1. The three levels presented in the table are intended as a general illustration of how related activities are required at different levels. The way in which these activities are organized in any given context will depend on country-specific arrangements but, in principle, standards are set at national level and are used at district and local levels to set and work towards specific targets.

Intergovernmental organizations, such as the United Nations Educational, Scientific and Cultural Organization (UNESCO), the United Nations Children's Fund (UNICEF) and the World Health Organization (WHO); and national and international nongovernmental organizations may play an important role at all levels. This should also be taken into account in each country.

Table 1 Essential steps in managing water, sanitation and hygiene standards in schools at national, district and local level

Step	National level	District level	Local levels (school and community)
1	Review existing national policies and ensure that there is a national policy framework that is supportive of improved conditions in schools.	Raise awareness of water, sanitation and hygiene in schools among key stakeholders at district level.	Mobilize support from teachers, schoolchildren, families and other local stakeholders to achieve and sustain a healthy school environment.
2	Ensure that appropriate national bodies exist for setting and monitoring standards.	Ensure that an appropriate body or service exists at district level for overseeing compliance with standards. Try to incorporate all entities and organizations working in the district on water, sanitation and hygiene (WASH) in schools.	Create an appropriate body to oversee the implementation of standards in the school.
3	Review national standards and add to them if needed. Ensure that there is an effective regulatory framework that encourages and supports compliance.	Ensure that the national regulatory framework is reflected in appropriate guidance and support for compliance at district level. Use appropriate guidelines where standards do not exist.	Define a set of targets, policies and procedures for implementing national standards and/or guidelines in a way that reflects local conditions. Define how targets, policies and procedures will be applied.
4	Provide expertise and resources for assessment and planning at national level.	Provide expertise and resources for assessment and planning at local level.	Assess existing conditions, consult local stakeholders (including staff and local community) and plan improvements and new developments.
5	Not applicable	Provide locally appropriate plans and specialist input for new structures and improvements to existing structures.	Plan improvements or new developments required, with specialist technical input if necessary.
6	Promote, provide and/or facilitate funding for national programmes.	Promote for the allocation of funding for planned improvements and new developments.	Guarantee funding for planned improvements and new developments.
7	Monitor developments at national level and promote consistent application of standards in all districts.	Ensure oversight of improvements and new developments to ensure the consistent application of appropriate standards in all schools.	Oversee implementation of planned improvements and new developments.
8	Ensure that water, sanitation and hygiene components are adequately reflected in the education management information system (EMIS) at national level.	Monitor ongoing conditions in all schools and promote remedial action where required.	Monitor ongoing conditions and ensure remedial action where required.
9	Provide training and information materials appropriate to a range of school settings. Ensure appropriate curriculum for teacher training.	Provide appropriate training and information to teachers and school directors and extension agents.	Provide advice and training to staff, schoolchildren and parents.

3.3 Roles, responsibilities and intersectoral linkages at district and local level

This section lists stakeholders at district and local levels, and outlines some of the things they can do to help achieve and maintain adequate water supply, sanitation and hygiene in schools. The list is not exhaustive, and can be added to in any particular context.

- Schoolchildren:
  - Comply with procedures for use and care of water, sanitation and hygiene-enabling facilities.
  - Observe appropriate hygiene measures.
  - Participate in the design and construction process.
  - Play an active role in the cleaning and maintenance of facilities (e.g. through school health clubs).
- Schoolchildren's families:
  - Encourage children to comply with procedures for use and care of water, sanitation and hygiene-enabling facilities at school, and develop positive hygiene behaviours.
  - Support, or participate actively in, parent–teacher associations or similar bodies.
- Teachers:
  - Monitor the state and use of school water, sanitation and hygiene-enabling facilities.
  - Organize the care and maintenance of facilities.
  - Encourage schoolchildren to adopt appropriate behaviours at school and at home through hygiene education.
- School directors or head teachers:
  - Organize the setting of targets for water, sanitation and hygiene at school level.
  - Ensure liaison with education authorities and other authorities at local and district level.
  - Create conditions in which staff are motivated to achieve and maintain targets.
  - Develop and enforce rules when required.
  - Encourage parent–teacher liaison.
- Local or district education authorities:
  - Provide resources and direction for setting, achieving and maintaining targets at school level.
  - Advocate at district or national level for adequate resources.
  - Coordinate with local environmental health services, public works departments and so on to ensure that sufficient technical support is provided.
  - Monitor implementation of water, sanitation and hygiene guidelines in schools as part of the routine monitoring and inspection process.
  - Provide training to teachers, school directors and other school staff.

- The health sector:
  - Provide guidance on the environmental health aspects of school design, construction and maintenance.
  - Monitor environmental health conditions, monitor child health.
  - Provide selected health services (e.g. micronutrient supplements, treatments for helminth infections, hygiene promotion, vaccination campaigns or health inspections).
  - Provide training and advice for teachers, schoolchildren and parents on water, sanitation and hygiene.
- Parent–teacher associations, school governors, school committees and similar bodies:
  - Advocate locally for improvements in school water supply, sanitation and hygiene.
  - Raise funds and help plan improvements with school directors and teachers.
  - Support maintenance of school facilities.
  - Support provision of consumables, such as soap.
- Public works or water and sanitation sector:
  - Ensure correct design and construction of school buildings and sanitary infrastructure.
  - Ensure correct maintenance and training of local school caretakers and maintenance staff.
- Construction and maintenance industry, including local contractors:
  - Provide skilled services for construction, maintenance and repair of school buildings and sanitary infrastructure.

The level of participation described above can only be achieved with sufficient resources at all levels. For example, school directors or head teachers need support from district or local education authorities, who themselves need the staff, transport and operating funds to be able to visit schools, particularly in peripheral or inaccessible areas.

Effective links between different government sectors, and between the public sector, the private sector and local communities are essential. Local intersectoral bodies, such as village or district development committees, may be useful for joint planning, implementing and monitoring of improvements.

3.4 Coordination at the local level

Managing the various and interdependent aspects of water, sanitation and hygiene at the local level requires effective coordination of local stakeholders (see Section 3.3). The local level includes the local community, local government and local representatives of national authorities, as well as the school, with its children, staff and parents. The most appropriate body to provide coordination at local level will depend on the type of school and the degree of involvement of the community, education authorities and local authorities, but this body should include parents, teachers and, where appropriate, schoolchildren. Options include existing structures such as a parent–teacher association or community education committee, or a specific structure such as a school health

committee. It is helpful for this body to create strong links with the local environmental health authority, and to invite relevant officials to its meetings on a regular basis.

Whatever the specific management arrangements put in place, there should be a clearly identified body with authority to carry out Steps 1–9 in Section 3.2, above.

3.5 Using the guidelines to create targets for specific school settings

The eight guidelines set out in Section 4 reflect general principles for the creation of healthy school environments. They can be used, as outlined in the three steps below, to create specific targets appropriate for individual schools or types of school.

1. Review the eight guidelines; these are narrative statements describing the situation to be aimed for and maintained.

2. Identify major areas that require attention in relation to specific guidelines. Consider local conditions that might affect the way in which the guidelines are interpreted in practice. Note that local constraints, such as lack of funding or lack of a suitable water source, should not be taken into consideration at this stage. The aim is first to define appropriate targets required for providing a healthy school environment in a particular setting, then to seek ways to meet those targets, rather than defining limited targets that are insufficient.

3. Use national standards or the indicators under each guideline (or both) to define specific targets, such as the number of users per toilet or the quantity of water required per person per day. The guidance notes provide advice on taking account of local conditions when setting specific targets and on intermediate steps involved in reaching targets.

3.6 Assessment and planning

Once specific targets have been set for a particular school or type of school, they can be used as a checklist to determine how and to what extent the existing situation falls short of the targets. The checklist can be used to identify specific problems that need to be dealt with. Section 5 contains an assessment checklist.

When analysing the reasons for shortfalls, it is important to do so as inclusively as possible, because most solutions will require the participation of all parties concerned: schoolchildren, teachers, head teachers or school directors, maintenance staff and education managers. A useful tool for this analysis is the problem–solution tree (see Box 1). Objectives should be understandable and motivating to all those who will be affected by them, and progress towards achieving objectives should be possible to measure and describe easily and clearly.

Box 1 The problem–solution tree

The problem–solution tree is a simple method for identifying problems, their causes and effects, and then defining objectives for improvement that are achievable and appropriate for the specific conditions of each school. The problem–solution tree is performed as a group activity through the following steps:

1. Discuss any major aspects of the current situation where water supply, sanitation and hygiene targets defined for the school are not met. Write each one in large letters on a small piece of paper (about the size of a postcard).
2. For each major problem, discuss its causes by asking the question "Why?". For each of the contributing problems identified, ask "Why?" again, and so on until root causes for each problem have been revealed and agreed. Write all the contributing problems in large letters on a small piece of paper or postcard and stick them all on a wall, arranged in a way that reflects their relation to each other and to the major problem. This creates the "problem tree".
3. Having developed the problem tree, the next step is to determine the solutions. For each of the contributing problems noted, discuss possible solutions. Check that suggested solutions contribute to solving the major problems identified by asking the question "What?" to identify what will happen if a particular solution is implemented. Some solutions proposed will probably have to be abandoned because they are unrealistic, given current conditions, or because they will not have sufficient impact on the major problems.
4. Once a number of feasible solutions have been agreed, phrase them as objectives. For each objective, the group can then discuss and agree a strategy (i.e. how the objectives can be reached), responsibilities (i.e. who will do what), timing, resources and requirements.

3.7 Phased improvements

Many schools are currently far from achieving acceptable levels of water, sanitation and hygiene, and may have no suitable facilities at all, because they lack resources, skills or adequate institutional support. Achieving appropriate targets will often not be possible in the short term. Therefore, it is necessary to both prioritize required improvements and work in a phased way so that the most urgent problems (or those that can be addressed rapidly) can be identified and targeted immediately, and other changes can subsequently be made in a phased manner. Section 4 provides specific guidelines on intermediate measures for situations where long-term targets cannot be met rapidly.

3.8 Technology choice, operation and maintenance

Maintenance, repair and eventual replacement of water and sanitation facilities need to be taken into account during design and construction phases. As far as possible, facilities should be hardwearing, durable and easy to maintain (i.e. without specialist skills or equipment). Technology should be chosen taking account of local capacities for maintenance and repair. It may be necessary in some cases to choose a lower level of service, to avoid having essential equipment that cannot be repaired when it breaks down. For example, it may be better to keep a protected open well, rather than equip it with a cover slab and pump, if there is no reliable system in place for maintenance and repair of the pump. A cover and pump can be installed at a later date, once a system for maintenance and repair has been developed.

Responsibilities for operation and maintenance should be clearly defined, and appropriate skills provided (see Section 3.9). Maintenance, repair and replacement of facilities should be planned and budgeted for from the beginning of a programme, to improve facilities or build new ones. Some form of local income-generating system may be required if institutional funding is not certain.

3.9 Ongoing monitoring, review and correction

Maintaining acceptable conditions requires ongoing efforts at all levels. The role of the school health committee or equivalent body in ensuring regular monitoring of water, sanitation and hygiene conditions is critical. The local environmental health authority should be a major partner, providing expert monitoring and advice. For example, schools should be included in regular water-quality surveillance and control programmes.

A monitoring system should use a limited set of indicators that can be easily and regularly measured, to identify problems and correct them in a timely way. For example, water shortages at handwashing points may be monitored by teachers or schoolchildren according to an organized schedule, so that action can be taken immediately if there is a problem. If the school is connected to the local water distribution system, the frequency and duration of water shortages may also be recorded, so that the reliability of the water supply can be measured over time.

Forms for record keeping may be developed at school level or district or national level (i.e. through the education management information system) for standardized monitoring reports, to allow data from all schools to be collated and compared.

3.10 Staff requirements and training

Staff and schoolchildren routinely perform many of the activities that are important for creating healthy school environments; they do this as they use and care for classrooms, outdoor space, toilets and so on. One important decision that has to be made about maintenance of facilities is whether or not schoolchildren should be responsible for cleaning toilets and other sanitary facilities. The benefits of involving schoolchildren include cost saving, encouraging schoolchildren to use facilities cleanly and demonstrating important hygiene skills. However, great care must be taken to ensure that such an arrangement works effectively in practice, without exposing schoolchildren to disease risk, placing an unfair burden on one group of children in particular or having the task viewed as a punishment, which will cause negativity.

Water supply, sanitation and hygiene should be given a central place in the training and supervision of all teachers, because they provide role models for schoolchildren and are largely responsible for encouraging the participation of schoolchildren in maintaining a healthy school environment. In addition, the subject should be included in the curriculum for subjects such as biology and social science.

Head teachers or school directors have an important role to play through their work with teachers and other staff, schoolchildren, parents and local authorities. They should be made aware of the importance of water, sanitation and hygiene in schools, and given guidance and support so that they can promote the development and maintenance of a healthy school environment.

In some schools there may be other staff, such as cleaners and kitchen staff, who are specifically responsible for maintaining healthy conditions. In their training and management, they should be made strongly aware of the importance of their role and should have the ability to apply basic principles of hygiene to their daily work.

3.11 Hygiene behaviour

Many children learn some of their most important hygiene skills at school, and for many this is where they are introduced to hygiene practices that may not be promoted or possible in the home. Teachers can be effective advocates for hygiene, through hygiene education and through acting as role models for schoolchildren. Contacts between the school and homes — for example, through parent–teacher meetings — should be used to link hygiene promotion at school and in the home.

However, good hygiene behaviour and the effectiveness of hygiene promotion in schools are severely limited where water supply and sanitation facilities are inadequate or nonexistent. Teachers cannot credibly convey the importance of handwashing if there is no water or soap in the school, or promote the proper use of toilets if they themselves avoid their use because the toilets are dirty or unsafe.

Overall, it is important to achieve a balance between hygiene education and ensuring that environmental health conditions are enabling and acceptable. Both education and the appropriate conditions are needed for effective health promotion.

More broadly, health should be promoted in all aspects of the school environment and activities. Adequate water supply, sanitation and hygiene are crucial foundations of this goal.

4 Guidelines

4.1 Introduction

This document is intended to be used as a basis for setting standards at national level. The guidelines, indicators and guidance notes in this section are intended to be used — together with existing national standards and guidelines — for creating standards, policies and procedures to be used in each school.

Guidelines

Each guideline is in the form of a statement that describes the situation to be aimed for and maintained.

Indicators

Each guideline is specified by a set of indicators that can be used as benchmark values for the following activities:

- assessing existing situations;
- planning new facilities or improvements to existing ones;
- monitoring progress; and
- monitoring ongoing maintenance of facilities.

The indicators provide benchmarks that reflect current understanding of appropriate levels of service required to create and maintain healthy school environments. They were adapted from a number of documents that guide practice in schools and other relevant settings; the main documents from which they were drawn are presented in the Bibliography. Specialist technical terms are explained in the Glossary. The indicators should be adapted to take into account national standards, local conditions and current practices. They mostly concern results; for example, the quantity of water available or the ratio of schoolchildren to toilets.

Guidance notes

The guidance notes provide advice on applying each guideline and set of indicators; they also highlight important aspects to be considered when setting priorities for action. They are numbered according to the indicators to which they refer.

Additional information on assessment, implementation and monitoring can be found in WHO (1997b), UNICEF (1998) and Zomerplaag & Mooijman (2005).

The guidelines and indicators are designed to help set targets for creating adequate conditions for the long term. Box 2 shows basic measures that can be taken as a temporary measure to protect health, until adequate long-term conditions are provided.

Box 2 Essential short-term measures required to protect health in schools

1. Provide basic sanitation facilities (with separate facilities for boys and girls) that enable schoolchildren and staff to go to the toilet without contaminating the school grounds or resources such as water supplies. This may entail measures as basic as digging temporary pit toilets, or defining separate defecation and urination areas outside the school, and rotating those areas to avoid a rapid build up of contamination.

   Note: the risk of transmission of soil-based helminths increases with the use of defecation fields. Use of shoes or sandals helps to provide protection from hookworm infections.
2. Provide water and soap (or ash) for handwashing after going to the toilet and before handling food. This may be achieved using simple and economical equipment, such as a pitcher of water and a basin.
3. Provide safe drinking-water from a protected groundwater source (spring, well or borehole), or from a treated supply, and keep it safe until it is drunk. Untreated water from unprotected sources can be made safer by simple means such as boiling or filtering, or by using simple household water treatment systems (e.g. locally available chlorine solution). Schoolchildren and staff may have to bring water from home if the school does not have a safe water source nearby.
4. Fence the school grounds so that a clean environment can be maintained. Fencing may be made cheaply with local materials.
5. Plan and implement improvements so that adequate conditions for the long term can be achieved as soon as possible.
6. Promote hygiene to increase children's understanding of the importance of hygiene and a clean school environment.

4.2 Guidelines

Guideline 1 Water quality

Water for drinking, cooking, personal hygiene, cleaning and laundry is safe for the purpose intended.

Indicators for Guideline 1

1. Microbiological quality of drinking-water.
   Escherichia coli or thermotolerant coliform bacteria are not detectable in any 100-ml sample.

2. Treatment of drinking-water.
   Drinking-water from unprotected sources is treated to ensure microbiological safety.

3. Chemical and radiological quality of drinking-water.
   Water meets WHO *Guidelines for drinking-water quality* (WHO, 2004b) or national standards concerning chemical and radiological parameters.

4. Acceptability of drinking-water.
   There are no tastes, odours or colours that would discourage consumption of the water.

5. Water for other purposes.
   Water that is not of drinking-water quality is used only for cleaning, laundry and sanitation.

Guidance notes for Guideline 1

1. Microbiological quality of drinking-water

Microbiological quality is of overriding importance. The water supplied must be free of pathogens and protected from contamination inside the school itself. Drinking-water supplied to schools should meet national standards and follow WHO drinking-water quality guidelines (WHO, 2004b). In practice, this means that the water supply should be from a protected groundwater source — for example, a dug well, a borehole or a spring — or should be disinfected if it is from a surface water source (see Indicator 2). Rainwater may be acceptable without disinfection if the rainwater catchment surface, guttering and storage tank are correctly operated, maintained and cleaned.

The local environmental health authority should be involved in monitoring the microbiological quality of the water in the school, as part of a routine surveillance and control programme (WHO, 1997a).

2. Treatment of drinking-water

Disinfection with chlorine is the most appropriate way of ensuring microbiological safety in most low-cost settings. Bleaching powder, liquid bleach, chlorine tablets and other sources of chlorine may be used, depending on local availability. At least 30 minutes' contact time should be allowed after the chlorine is added to the water before the water is drunk, to ensure adequate disinfection. The free chlorine residual (i.e. the free form of chlorine remaining in the water after the contact time) should be between 0.5 and 1.0 mg/l (WHO, 2004b). Free chlorine residual can be measured with simple equipment (e.g. a colour comparator and diethyl-p-phenylenediamine [DPD] tablets).

Effective disinfection requires that the water has a low turbidity. Ideally, median turbidity should be below 1 nephelometric turbidity unit (NTU) (WHO, 1997a). However, 5 NTU is the minimum turbidity measurable with simple equipment (i.e. a turbidity tube), so this level may be used in practice. If turbidity exceeds 5 NTU, then the water should be treated to remove suspended matter before disinfection, by sedimentation (with or without coagulation and flocculation) or filtration.

Filtration with ceramic candle filters and other technologies that can be used on a small scale may be appropriate for treatment of water in schools that are not connected to piped supplies. Filtration can also be used in facilities that are connected to piped supplies whose quality is not consistently satisfactory (WHO, 2002).

3. Chemical and radiological quality of drinking-water

Chemical constituents in groundwater supplies (e.g. arsenic, fluoride and nitrates) may be present in excess of guideline levels, and it may not be possible, in the short term, to remove them or to find an alternative source of water. In circumstances where WHO drinking-water quality guidelines or national standards for chemical and radiological parameters cannot be met immediately, an assessment should be made of the risks caused

to schoolchildren and staff, given the levels of contamination, the length of exposure and the degree of susceptibility of individuals (WHO, 2004c). Children of all ages, particularly younger ones, are more susceptible than adults to the harmful effects of chemical contaminants (EEA/WHO, 2002).

4. Acceptability of drinking-water

The taste and odour of drinking-water need to be acceptable to schoolchildren and staff, otherwise they may not drink enough, or may drink water from other, unprotected sources, which could be harmful to their health.

5. Water for other purposes

Water used for sanitation, laundry and cleaning floors and other surfaces need not be of such high quality as drinking-water. However, water for handwashing and bathing and dishwashing should be of drinking-water quality, particularly if there are no specific drinking-water points. All water used for food preparation and washing utensils should be of drinking-water quality.

If water below drinking-water quality is used for certain purposes, it should be in separate, clearly marked containers or distribution systems, and necessary measures should be taken to ensure that the drinking-water supply cannot be contaminated by the lower-quality supply.

Guideline 2 Water quantity

Sufficient water is available at all times for drinking, personal hygiene, food preparation, cleaning and laundry.

Indicators for Guideline 2

1. Basic quantities of water required.

Day schools	5 litres per person per day for all schoolchildren and staff
Boarding schools	20 litres per person per day for all residential schoolchildren and staff
Nonresidential schoolchildren and staff	5 litres per person per day

2. Additional quantities of water required.
   The following should be added to the basic quantities as necessary. Figures given are for day schools. They should be doubled for boarding schools.

Flushing toilets	10–20 litres per person per day for conventional flushing toilets
Pour-flush toilets	1.5–3.0 litres per person per day
Anal washing	1–2 litres per person per day

Guidance notes for Guideline 2

1. Basic quantities of water required

The guideline figures given above include water used for drinking, hand hygiene, cleaning and, where appropriate, food preparation and laundry (WFP/UNESCO/WHO, 1999). The figures should be used for planning and design of water-supply systems. The actual quantities of water required will depend on a number of factors, such as climate, availability and type of water-use facilities, and local water-use practices.

Drinking-water should be available throughout the school day, and children encouraged to drink it, because even minor dehydration reduces children's ability to concentrate, and may damage their health in the long term. Many children walk long distances to school, often after having carried out household chores, and they may arrive at school thirsty.

In schools without a safe drinking-water supply, children and staff may have to carry their drinking-water with them to school.

2. Additional quantities of water required

The additional water quantities required for sanitation need to be adjusted for local conditions, including the exact type of toilets used (including the use of urinals), prevalent practices, and the length of time that children and staff actually spend in school.

Guideline 3 Water facilities and access to water

Sufficient water-collection points and water-use facilities are available in the school to allow convenient access to, and use of, water for drinking, personal hygiene, food preparation, cleaning and laundry.

Indicators for Guideline 3

1. A reliable water point, with soap or a suitable alternative, is available at all the critical points within the school, particularly in toilets and kitchens.

2. A reliable drinking-water point is accessible for staff and schoolchildren, including those with disabilities, at all times.

3. One shower is available for 20 users in boarding schools (users include schoolchildren and residential staff). Separate showers, or separate showering times, are designated for staff and schoolchildren, and separate showers or times are designated for boys and girls. At least one shower should be accessible for females with disabilities and one for males with disabilities.

4. Laundry facilities, with soap or detergent and hot water or chlorine solution (or both), are provided in boarding schools.

Guidance notes for Guideline 3

1. A reliable water point is available

Basic hygiene measures taken by staff and schoolchildren — handwashing in particular — should not be compromised by lack of water or lack of access to handwashing basins or suitable alternatives (WFP/UNESCO/WHO, 1999). If soap is not available, then schoolchildren should be encouraged to wash their hands with water and a small amount of wood ash (although this should be avoided if it is likely to block the drainage system).

Water points should be sufficiently close and at a suitable height for users to encourage them to use water as often as required. Staff toilets and schoolchildren's toilets should be located next to handwashing points that have adequate drainage. Children should also be encouraged to wash their faces to help to prevent eye diseases. A water point close to the classrooms may be useful for this (Zomerplaag & Mooijman, 2005).

Simple and low-cost handwashing points can be made in various ways, including the following (WHO, 1997b):

- a pitcher of water and a basin (one person can pour the water for another to wash their hands; the wastewater falls into the basin);
- a small tank (e.g. an oil drum) fitted with a tap, set on a stand and filled using a bucket, with a small soakaway or a basin under the tap to catch the wastewater; and
- a "tippy-tap" made from a hollow gourd or plastic bottle that is hung on a rope and that pours a small stream of water when it is tipped.

2. A reliable drinking-water point is accessible at all times

If possible, all water provided to the school should be of drinking-water quality. Drinking-water should be provided at clearly marked points, separately from water provided for handwashing and other purposes, even if it is from the same supply. Drinking-water may be provided from a piped water system or via a covered container with a tap where there is no piped supply.

3. Sufficient showers are available

If the age range of schoolchildren is more than three or four years, separate showers or showering times may need to be designated for younger and older children.

Showers may be simple cubicles made from local materials, with stone or brick on the floor to provide a clean and draining surface. Users bring water to the cubicle in a bucket and use a large cup to pour it over themselves (or over the small child they are washing). The closer the water point, the larger the quantity of water that is used for hygiene.

Showers can be made accessible for users with disabilities in a number of different ways (Jones & Reed, 2005).

Guideline 4 Hygiene promotion

Correct use and maintenance of water and sanitation facilities is ensured through sustained hygiene promotion. Water and sanitation facilities are used as resources for improved hygiene behaviours.

Indicators for Guideline 4

1. Hygiene education is included in the school curriculum.

2. Positive hygiene behaviours, including correct use and maintenance of facilities, are systematically promoted among staff and schoolchildren.

3. Facilities and resources enable staff and schoolchildren to practice behaviours that control disease transmission in an easy and timely way.

Guidance notes for Guideline 4

1. Hygiene education is provided

Hygiene education should be a core part of teacher training; refresher training should be carried out regularly to sustain knowledge and awareness.

Hygiene education, using a variety of participatory and other learning methods, should enable schoolchildren to develop the knowledge, attitudes and life skills they need for adopting and maintaining healthy lifestyles, particularly with respect to water, sanitation and hygiene (WHO, 2003a).

2. Positive hygiene behaviours are systematically promoted

A healthy school environment and appropriate use of water supply, sanitation and hygiene facilities should be promoted systematically through the application of clear regulations and the participation of staff, schoolchildren and parents in planning and managing facilities and the school environment.

One of the most important hygiene behaviours to promote among schoolchildren is handwashing with water and soap (or ash) — at least before eating and after using the toilet. As with other hygiene behaviours, such as correct use of toilets, this often requires helping younger schoolchildren and monitoring older ones to ensure that they perform the activity correctly and consistently.

In many situations, schoolchildren may be required to carry out activities such as cleaning toilets, carrying water to or within the school, and collecting solid waste. These activities should be organized fairly and transparently (e.g. with a publicly-displayed roster that does not discriminate between boys and girls, or between schoolchildren from particular social or ethnic groups), within the limits of schoolchildren's age and ability. These activities should not be used as a punishment.

Schoolchildren are heavily influenced by the example set by school staff — their teachers in particular — who should provide positive role models by consistently demonstrating appropriate hygiene behaviours.

3. Facilities and resources enable control of disease transmission

Staff and schoolchildren should not be expected to adopt behaviours that are inconvenient, uncomfortable or impractical. For example, staff cannot be expected to set a good example to schoolchildren if they cannot wash their hands after using the toilet because there is no water.

Appropriate facilities should be provided for menstrual hygiene for female teachers and older girls. Depending on the type of sanitary protection used and the prevailing cultural practices, facilities could include such things as a private place to wash and dry cloth, waste baskets to throw away sanitary pads, and water inside toilet cubicles for cleaning. This is most important to encourage teachers and older girls to attend school, even when they are menstruating. Toilets should be separate and provide total privacy.

Where improvements to facilities are required at the school, their planning and construction can be used as an effective tool for hygiene education.

Guideline 5 Toilets

Sufficient, accessible, private, secure, clean and culturally appropriate toilets are provided for schoolchildren and staff.

Indicators for Guideline 5

1. Sufficient toilets are available — one per 25 girls and one for female staff; one toilet plus one urinal (or 50 cm of urinal wall) per 50 boys, and one for male staff.

2. Toilets are easily accessible to all, including staff and children with disabilities — no more than 30 m from all users. Male and female toilets are completely separated.

3. Toilets provide privacy and security.

4. Toilets are appropriate to local cultural and social conditions, are age and gender appropriate and accessible for children with disabilities or suffering from chronic diseases (i.e. toilets are child friendly).

5. Toilets are hygienic to use and easy to clean.

6. Toilets have convenient handwashing facilities close by.

7. A cleaning and maintenance routine is in operation, and ensures that clean and functioning toilets are available at all times.

Guidance notes for Guideline 5

1. Sufficient toilets are available

The number of toilets and urinals required for each school depends on the numbers of children and staff (WFP/UNESCO/WHO, 1999), but also on when the schoolchildren and staff have access to the toilets. If access to toilets is restricted to break times, then peak demand could be high, particularly if all the classes have breaks at the same time (Zomerplaag & Mooijman, 2005).

Urinals for girls and women, as well as for boys and men, have been used with success in some countries (e.g. see DeGabriele, Keast & Msukwa, 2004). They are quicker and cheaper to build than toilets, they reduce the smells in toilets and they are easy for young children to use.

Boys' and girls' facilities should be in separate toilet blocks, or toilet areas separated by solid walls (not lightweight partitions) and should have separate entrances. Doors should reach down to floor level.

It may be appropriate to provide separate toilets for staff and schoolchildren, particularly where special toilets are provided for young children (Zomerplaag & Mooijman, 2005).

At least one toilet cubicle should be accessible for staff and children with disabilities, preferably one for females and one for males. This includes level or ramped access, a wide door and sufficient space inside for a wheelchair user or helper to manoeuvre, and the provision of support structures such as a handrail and a toilet seat (for further details, see Jones & Reed, 2005).

If the school has no formal toilet facilities, it is probably best to improve the existing system (e.g. defecation fields) and continue using that system until a sufficient number of toilets are available to provide accessible and hygienic facilities for everyone. If just one or two pit latrines are provided for a whole school, the area around them is likely to rapidly become contaminated, and the pits to fill in a short time. Defecation areas can be improved by using shallow trench latrines rather than open defecation, providing correct drainage to avoid contaminating the nearby environment, and setting up a rotation system (Harvey, Baghri & Reed, 2002).

2. Toilets are easily accessible to all

In principle, toilets should be as close as possible to classrooms and playing areas, to ensure that they can be used conveniently and safely. Entrances should be positioned to provide maximum privacy in entering and leaving a toilet block. In preschool facilities, toilets may need to be adjacent to the childcare space, because young children frequently need supervision when going to the toilet.

The location of toilets should also take into account the need to minimize odours (taking account of prevailing winds) and avoid contamination of water supplies and food. Particular care should be taken when siting latrines and septic tanks with soakaway pits or infiltration trenches. All latrines and infiltration systems should be located at least 30 m from any groundwater source, and at least 1.5 m above the groundwater table (Franceys, Pickford & Reed, 1992).

3. Toilets provide privacy and security

To minimize the risk of violence, including sexual violence, and to ensure sufficient privacy, toilets should be carefully located, and they and their access routes should be lit if they are used at night. They should be lockable from the inside (to protect people while using them) but should be left unlocked when not in use, to ensure they are always accessible.

4. Toilets are appropriate to local cultural and social conditions, and to users

The cultural and social conditions prevalent in the community to which the schoolchildren belong should be taken into account in the design and siting of toilets. Segregation of boys' and girls' toilets is something that parents often require.

Younger children may require toilets of different dimensions than do older children and adults, and specific features need to be taken into account to make the toilets easy and comfortable to use (Zomerplaag & Mooijman, 2005). For example, the squatting hole in a pit latrine may need to be smaller, and footrests may need to be closer together for younger children.

Toilets should be safe and secure for use by children. Care must be taken to ensure that slabs are properly constructed and fitted, and that squat holes are not too large and there is no risk to children in using them.

5. Toilets are hygienic to use and easy to clean

Toilets should be designed and built so that they are hygienic to use and do not become centres for disease transmission. Surfaces that may be soiled should be of smooth, waterproof and hardwearing material that can be cleaned with water and is resistant to cleaning products.

In terms of cleaning, the slab is the most important part of a toilet; it should be made of concrete or some other hardwearing and smooth material. Other parts of the toilet, such as the superstructure, can be made with cheaper local materials.

The design of the toilet should include measures to minimize odours, and control the breeding of flies and mosquitoes.

Some schools may have gardens that can be used for teaching and for food production. In such cases, it might be beneficial to use composting or dehydrating toilets (EcoSan toilets), so that human wastes can eventually be used as fertilizer, and to demonstrate this appropriate technology (see Winblad & Simpson-Hébert, 2004). In this situation, local environmental health staff should advise on how to use composting or dehydrating toilets without creating health risks.

6. Toilets have convenient handwashing facilities close by

A toilet is not complete without a handwashing point with soap, water and adequate drainage. All toilet designs should include convenient handwashing facilities so that handwashing after using the toilet can become a routine activity for schoolchildren and teachers. Effective handwashing facilities may be built at little cost, with locally available materials (WHO, 1997b) (see Guideline 3).

7. A cleaning and maintenance routine is in operation

Toilets should be cleaned whenever they are dirty, and at least once per day, with a disinfectant being used on all exposed surfaces. Strong disinfectants should not be used in large quantities, because this is unnecessary, expensive, potentially dangerous, and may damage the sanitation system. If no disinfectant is available, plain cold water should be used with a brush to remove visible soiling. Cleaning toilets should not be viewed as a form of punishment.

Guideline 6 Control of vector-borne disease

Schoolchildren, staff and visitors are protected from disease vectors.

Indicators for Guideline 6

1. The density of vectors in the school is minimized.

2. Schoolchildren and staff are protected from potentially disease-transmitting vectors.

3. Vectors are prevented from contact with schoolchildren and staff or substances infected with related vector-borne diseases.

Guidance notes for Guideline 6

1. Density of vectors in school is minimized

Appropriate and effective methods for reducing vector numbers depend on the type of vector, the location and number or size of breeding sites, vector habits (including places and times of vector resting, feeding and biting), and chemical resistance of specific vector populations (Rozendaal, 1997). The local ministry of health should be consulted for guidance on this information.

Basic environmental control methods — such as proper disposal of excreta, food hygiene, drainage, solid-waste disposal and routine cutting back of vegetation — should be the basis of any strategy. New schools should be located, if possible, to avoid local disease-vector risks (WHO, 1997b).

Mosquitoes and flies can effectively be excluded from buildings by covering opening windows with fly-screen and fitting self-closing doors to the outside. Resting sites for mosquitoes inside buildings should be minimized, where possible, by the use of smooth finishes (WHO, 2003b).

The use of chemical controls, such as residual insecticide spraying, in and around the school requires specialist advice, which should be available from the local environmental health authority (Rozendaal, 1997).

2. Schoolchildren and staff are protected from potentially disease-transmitting vectors

Schoolchildren and staff may be protected from certain vectors through the use of repellents or barriers (e.g. food storage being covered to prevent contamination by rats and flies, or — in boarding schools — insecticide-treated bednets against mosquitoes).

3. Disease treatment

Schoolchildren and staff with vector-borne diseases such as malaria, lassa fever and typhus should be identified and treated rapidly. They should not attend school during the infectious period so that the related vectors do not transmit the disease from them to other people in the school. In addition, regular inspections should be carried out to detect and treat body lice and fleas.

The school premises and, to the extent possible, the immediate surroundings of the school, should be kept free of faecal material to prevent flies and other mechanical vectors from carrying pathogens (WHO, 1997b).

Guideline 7 Cleaning and waste disposal

The school environment is kept clean and safe.

Indicators for Guideline 7

1. Classrooms and other teaching areas are regularly cleaned, to minimize dust and moulds.

2. Outside and inside areas are maintained free of sharp objects and other physical hazards.

3. Solid waste is collected from classrooms, kitchens and offices daily and is disposed of safely.

4. Wastewater is disposed of quickly and safely.

Guidance notes for Guideline 7

1. Classrooms and other teaching areas are regularly cleaned

Dust and moulds contribute to infectious respiratory disease, asthma and allergies; therefore, regular, correct cleaning of school premises is important for health (WHO, 2003b).

For cleaning of floors and walls, wet mopping with hot water and detergent, if available, is recommended, rather than sweeping. Floors and other washed surfaces should be made of a suitable nonporous material that is resistant to repeated washing with hot water and detergents. If this is not possible, then daily sweeping should be carried out.

2. Outside and inside areas are free of sharp objects

Schoolchildren and staff should not be exposed to unnecessary risk of injury during the time they spend in the school. This can be avoided by promoting proper disposal of solid waste in the school, regularly cleaning all inside and outside areas of the school, and monitoring and reporting on broken furniture, window glass and so on. Doing this means that temporary or permanent repairs can be made rapidly (WHO, 1997b).

3. Solid waste is collected and disposed of safely

Most solid waste produced in schools is nonhazardous and can be collected, stored if needed and then either disposed of in the municipal waste-collection system, or burned or buried in a suitable location onsite. If waste is burned in or near the school grounds, this should only be undertaken when the schoolchildren are absent (WHO, 2003b).

Waste produced in school laboratories should be managed by a qualified laboratory technician or teacher according to national or international guidelines. It should not be mixed with waste from offices and classrooms (WHO, 2003b).

4. Wastewater is disposed of quickly and safely

Schools may produce wastewater from one or more of the following: handwashing points, flushing toilets, showers, kitchens, laundries and laboratories.

If the school is connected to a properly built and functioning sewer system, this is the most appropriate wastewater disposal option. In other situations, soakaway pits or

infiltration trenches should be used. These should be equipped with grease traps, which should be checked weekly, and cleaned (if necessary) to ensure that the systems operate correctly. All systems that infiltrate wastewater into the ground must be sited so as to avoid contaminating groundwater. There must be at least 1.5 m between the bottom of the infiltration system and the groundwater table, and the system should be at least 30 m from any groundwater source (Harvey, Baghri & Reed, 2002).

All wastewater drainage systems should be covered, to avoid the risks of disease-vector breeding and direct contamination.

Wastewater (excluding wastewater from toilets) may be used to water a school garden, provided it is done in a way that does not create health risks. Local environmental health staff should be asked to advise on use of wastewater.

Guideline 8 Food storage and preparation

Food for schoolchildren and staff is stored and prepared so as to minimize the risk of disease transmission.

The information in the indicators and guidance notes for Guideline 8 is drawn from WHO (WHO, 2001; 2004a).

Indicators for Guideline 8

1. Food is handled and prepared with utmost cleanliness (hand are washed before preparing food).

2. Contact between raw foodstuffs and cooked food is avoided.

3. Food is cooked thoroughly.

4. Food is kept at safe temperatures.

5. Safe water and safe raw ingredients are used.

Guidance notes for Guideline 8

1. Food is handled and prepared with utmost cleanliness

Food handlers must wash their hands after using the toilet and whenever they start work, change tasks, or return after an interruption. Soap and water should be available at all times during food preparation and handling, to ensure that handwashing is convenient.

Food handlers should be trained in basic food safety.

If kitchen staff and carers have colds, influenza, diarrhoea, vomiting or throat and skin infections, or have suffered from diarrhoea and vomiting within the last 48 hours, they should not handle food unless it is packaged. All infections should be reported, and sick staff should not be penalised for reporting infections.

Eating utensils should be washed with hot water and detergent immediately after each use, and then air dried. The sooner utensils are cleaned, the easier they are to wash. Drying cloths should not be used, as they can spread contamination.

Food-preparation premises should be kept meticulously clean. Surfaces used for food preparation should be washed with detergent and safe water and then rinsed, or wiped with a clean cloth that is washed frequently. Scraps of food should be disposed of rapidly, because they are potential reservoirs for bacteria, and can attract insects and rodents. Refuse should be kept in covered bins and disposed of quickly and safely. See Guideline 7.

Food should be protected from insects, rodents and other animals, which frequently carry pathogenic organisms and are a potential source of contamination of food. See Guideline 6.

In many situations, schoolchildren bring food with them from home to school. In these cases, the school hygiene committee or equivalent should work with the families of the schoolchildren to ensure that food is prepared hygienically and that they avoid foods that carry a high risk if stored at ambient temperature.

Food sold to children by street vendors or in cafes may be unsafe. School authorities should seek local solutions to protect schoolchildren from disease from this source. Measures may include:

- discouraging children from buying from such vendors; and
- prohibiting vendors from selling food near schools, or encouraging and monitoring improvements in vendors' food hygiene.

2. Contact between raw foodstuffs and cooked food is avoided

Separate equipment and utensils (e.g. knives and cutting boards) should be used for handling raw foods or they should be washed and sanitized in between use.

Food should be stored in containers to avoid contact between raw and prepared foods.

It is particularly important to separate raw meat, poultry and seafood from other foods.

3. Food is cooked thoroughly

All parts of foods cooked must reach 70 °C to kill dangerous microorganisms. To ensure this, soups and stews should be brought to boiling, and meat should be heated until juices are clear, not pink.

Cooked food must be reheated thoroughly to steaming hot all the way through.

4. Food is kept at safe temperatures

Cooked food to be served should be kept hot (more than 60 °C) before serving.

Cooked food and perishable food should not be left at room temperature for more than 2 hours, and should be prepared or supplied fresh each day. All food should be kept covered to protect it from flies and dust.

5. Safe water and safe raw ingredients are used

Only safe water should be used for food preparation, handwashing and cleaning. For specification of safe water, see Guideline 1.

Fruits and vegetables should be washed with safe water. If there is any doubt about the cleanliness of raw fruit and vegetables, they should be peeled just before serving, or cooked.

Nonperishable foods should be stored safely in a closed, dry, well-ventilated store, and protected from rodents and insects. They should not be stored in the same room as pesticides, disinfectants or any other toxic chemicals. Containers that have previously held toxic chemicals should not be used for storing foodstuffs.

Bought food should not be used beyond its expiry date.

5 Assessment checklist

5.1 Water supply, sanitation and hygiene in schools

A checklist is given below with a set of assessment questions for each of the guidelines presented in Section 4. The numbers in the checklist relate to the guidance notes given under each guideline.

The checklist is intended to be used to measure the extent to which the guidelines are followed and to identify areas for action. In answering the questions in the checklist, users may find it helpful to read the qualitative and quantitative indicators under the relevant guideline. Questions may be answered with a "yes", a "no" or a "not applicable". A "no" answer to any question should alert the assessor to remedial action required, either in the design and construction of facilities or their operation and maintenance. Guidance on action to take can be found in the guidance notes under each guideline in Section 4.

Guideline 1 Water quality

Water for drinking, cooking, personal hygiene, cleaning and laundry is safe for the purpose intended.

	Design and construction	Operation and maintenance
1	• Is water from a safe source (free from faecal contamination)? • Is water protected from contamination during transport from the source and in the school?	• Is the safety of the water source monitored regularly? • Is the quality of the water supplied to the school monitored regularly? • Are water storage, distribution and use facilities at the school adequately maintained to avoid contaminating the water?
2	• If necessary, can water be treated at the school?	• If water is treated at the school, is the treatment process operated effectively? • Are there sufficient supplies and adequately trained staff to carry out treatment?
3	• Does the water supply meet WHO guidelines or national standards regarding chemical or radiological parameters?	• If necessary, are measures in place to avoid overexposure of susceptible children to chemical contaminants?
4	• Is water acceptable (smell, taste, appearance)?	• If the water is not acceptable to some or all the schoolchildren and staff, do they use a safe alternative supply of drinking-water?
5	• Is the school water supply designed and built so that low-quality water cannot enter the drinking-water supply and cannot be drunk?	• Are procedures for protecting drinking-water in the school followed consistently?

Guideline 2 Water quantity

Sufficient water is available at all times for drinking, personal hygiene, food preparation, cleaning and laundry.

	Design and construction	Operation and maintenance
1	• Does the water supply have the capacity required? • Is there a suitable alternative supply in case of need?	• Is sufficient water available at all times for all needs? • Is the water supply operated and maintained to prevent wastage?

Guideline 3 Water facilities and access to water

Sufficient water-collection points and water-use facilities are available in the school to allow convenient access to, and use of, water for drinking, personal hygiene, food preparation, cleaning and laundry.

	Design and construction	Operation and maintenance
1	• Are there sufficient water points in the right places for all needs (drinking-water, handwashing, anal cleansing, washing and cleaning)?	• Is water accessible where needed at all times? • Is there always soap or a suitable alternative at handwashing points?
2	• Are there sufficient, clearly identified, safe drinking-water points? • Are there water points for disabled staff and children?	• Are drinking-water points properly used and adequately maintained? • Are water points for disabled staff and children accessible, properly used and adequately maintained?
3	• In boarding schools, are there sufficient showers or other places for body washing?	• Are showers properly used and adequately maintained?
4	• In boarding schools, are there sufficient laundry facilities?	• Are laundry facilities properly used and adequately maintained?

Guideline 4 Hygiene promotion

Correct use and maintenance of water and sanitation facilities is ensured through sustained hygiene promotion. Water and sanitation facilities are used as resources for improved hygiene behaviours.

	Design and construction	Operation and maintenance
1	• Is hygiene education part of the school curriculum? • Are staff trained in providing hygiene education?	• Is hygiene education actually provided? • Are hygiene-education methods used effectively?
2	• Is responsibility for promoting hygiene in the school identified clearly and supported?	• Is hygiene promoted systematically? • Do schoolchildren participate actively in maintaining hygiene? • Do staff provide positive role models for hygiene behaviours?
3	• Are school facilities designed to be easily and hygienically used and maintained? • Do school children know how to use the facilities correctly?	• Are school facilities maintained so as to be easy to use hygienically? • Have the children been shown how to correctly use the toilet and water point, and how to wash their hands correctly?

Guideline 5 Toilets

Sufficient, accessible, private, secure, clean and culturally appropriate toilets are provided for schoolchildren and staff.

	Design and construction	Operation and maintenance
1	• Are there sufficient toilets at the school for girls, boys and teachers? • Are there separated blocks?	• Are there sufficient toilets actually in use?
2	• Are the toilets situated in the right place?	• Are access paths kept in good condition?
3	• Do the toilets provide privacy and security? • Are they safe to use?	• Are there working locks on the toilet doors and lighting?
4	• Are the toilets appropriate to local culture and social conditions, gender and age of the children? • Are they appropriate and accessible for children with a disability? • Is there one accessible toilet cubicle for disabled females and one for disabled males?	• Are the toilets being used properly? • Are there sufficient toilets for use by males, females and children with disabilities?
5	• Are the toilets hygienic to use and easy to clean?	• Is anal cleansing material available at all times? • Are the toilets clean and without too much smell? • Are flies and other insects controlled?
6	• Are there handwashing facilities close by?	• Is there water and soap available?
7	• Is there a cleaning and maintenance plan?	• Is there an effective cleaning and maintenance routine in operation?

Guideline 6 Control of vector-borne disease

Schoolchildren, staff and visitors are protected from disease vectors.

	Design and construction	Operation and maintenance
1	• Is the site for the school protected from disease vectors? • Are school buildings designed and built to exclude disease vectors?	• Are local vector-breeding sites avoided or controlled? • Are inbuilt protective measures used effectively and maintained? • Are barriers and/or repellents used to reduce exposure to vectors?
2		• Are schoolchildren and staff with vector-borne diseases kept at home and treated rapidly? • Are there regular inspections to detect and treat body lice and fleas? • Are the school grounds kept free from faecal matter? • Is excess vegetation cut back regularly?

Guideline 7 Cleaning and waste disposal

The school environment is kept clean and safe.

	Design and construction	Operation and maintenance
1	• Are floors smooth and easy to clean? • Are buildings designed and built to avoid damp and moulds?	• Are teaching areas cleaned regularly? • Are teaching areas clean?
2	• Are buildings designed and built to minimize physical hazards?	• Are the school premises free from sharp objects and other physical hazards?
3	• Are there adequate bins and other equipment for managing solid waste?	• Is solid waste collected daily and disposed of safely? • Is hazardous waste managed appropriately?
4	• Is the wastewater drainage system correctly designed and built?	• Is the wastewater drainage system used correctly and maintained?

Guideline 8 Food storage and preparation

Food for schoolchildren and staff is stored and prepared so as to minimize the risk of disease transmission.

	Design and construction	Operation and maintenance
1	• Are food storage and preparation areas designed and built so as to be easy to keep clean? • Is there a handwashing station in the kitchen area?	• Do food handlers wash their hands when necessary? • Are food storage and preparation areas kept clean? • Are food storage and preparation areas protected from insects and rodents? • Is water accessible where needed, at all times?
2	• Are there facilities and equipment provided for preventing contact between cooked and raw foodstuffs?	• Is contact between raw foodstuffs and cooked foods prevented?
3	• Are cooking facilities adequate for heating food sufficiently?	• Is food cooked thoroughly?
4	• If cooked food is stored, is there a refrigerator at the school for this?	• Is food kept at safe temperatures?
5	• If dry foods are stored at the school, is the store appropriate?	• Are only safe water and ingredients used?

Glossary

Coagulation–flocculation	The lumping of particles in water that results in the settling of impurities. It may be induced by coagulants (e.g. lime alum and iron salts). Flocculation in water and wastewater treatment is the agglomeration or clustering of colloidal and finely divided suspended matter after coagulation by gentle stirring (by either mechanical or hydraulic mean), such that they can be separated from water or wastewater.
Colour comparator (or colour-match comparator)	Equipment used to measure a chemical parameter (e.g. chlorine levels in water) by adding a specific reagent (e.g. DPD) to the sample and comparing the colour obtained with a colour scale.
Disinfection	A process of removing or deactivating microorganisms without complete sterilization.
DPD (N,N-diethyl-p-phenylenediamine)	A reagent used for determining chlorine levels in water by colour comparison.
Infiltration trench	A shallow trench, containing gravel and a porous pipe that enables water to percolate into the soil over a larger area, and therefore with a greater infiltration capacity, than a soakaway pit.
Sedimentation	The act or process of depositing sediment from suspension in water. The term also refers to the process whereby solids settle (by gravity) out of wastewater during treatment.
Soakaway pit or soakpit	A simple excavation in the ground, either lined or filled with stones, that allows water to percolate into the surrounding soil.
Thermotolerant coliform bacteria or faecal coliforms	In relation to water-quality indicators, bacteria in the coliform group able to form colonies at 44 °C. Typically, most thermotolerant bacteria are of the species *Escherichia coli*, which are always derived from faeces.
Turbidity	Cloudiness in water caused by particles in suspension, which makes chemical disinfection of the water less effective. Turbidity is commonly measured in nephelometric turbidity units (NTU), and can be determined visually using simple equipment.

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