USAID HELPED SET UP BASIC HEALTHCARE UNITS LIKE THIS ONE AFTER THE OCTOBER 2005 EARTHQUAKE CUT OFF VILLAGERS FROM DOCTORS AND HOSPITALS. MORE THAN 50,000 PEOPLE HAVE ACCESS TO THE UNITS. PHOTO CREDIT: KAUKAB JHUMRA SMITH, 2006.

SECTOR ENVIRONMENTAL GUIDELINE:
SMALL HEALTHCARE FACILITIES

Partial Update 2024 | Full Update 2009

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ABOUT THIS DOCUMENT AND THE SECTOR ENVIRONMENTAL GUIDELINES

USAID has developed sector-specific environmental and social guidance to support activity design, pre-implementation environmental review (including the identification of potential impacts and the design of mitigation and monitoring measures), and the development of environmental mitigation and monitoring plans. This document presents USAID's Sector Environmental Guidelines – Small Healthcare Facilities. The Sector Environmental Guidelines for all sectors are accessible at USAID's Sector Environmental Guidelines & Resources webpage.

Purpose. The purpose of this document and the *Sector Environmental Guidelines*, overall, is to support environmentally and social sound design and management of common USAID sectoral development activities by providing concise, plain-language information regarding the following:

- The typical, potential adverse impacts of activities in these sectors, including impacts related to environmental, social, and climate change;
- How to prevent or otherwise mitigate these impacts, both in the form of general activity design guidance and specific design, construction, and operating measures;
- How to minimize the vulnerability of activities to climate change, as well as the contributions of activities to climate change;
- How to minimize social impacts and maximize the benefits to beneficiaries and the local community in an equitable manner; and
- More detailed resources for further exploration of these issues.

Environmental Procedures. USAID's mandatory environmental procedures, as described in Automated Directives System (ADS) 204, require that the potential adverse impacts of USAID-funded and managed activities be assessed prior to implementation via the Environmental Impact Assessment (EIA) process defined by Title 22, Code of Federal Regulations (CFR), Part 216 (Reg. 216)1. They also require that the environmental management and mitigation measures identified by this process be written into award documents, implemented over the life of the project, and monitored for compliance and sufficiency.

The procedures are USAID's principal process to ensure environmentally sound design and management of USAID-funded activities and, thus, to protect environmental resources, biodiversity, ecosystems, ecosystem services, and the health and livelihoods of beneficiaries and other affected groups. These procedures strengthen and sustain development outcomes and help safeguard the good name and reputation of USAID.

The *Sector Environmental Guidelines (SEGs)* directly support environmental compliance by providing information essential to assessing the potential impacts of activities and helping identify and design appropriate mitigation and monitoring measures, as necessary and appropriate based on capabilities.

However, the SEGs are not specific to USAID's environmental procedures. They are generally written and are intended to support an EIA of these activities by all actors, regardless of the specific environmental requirements, regulations, or processes that may apply.

Limitations. This document serves as an introductory tool for Agency staff when initiating the

[1] USAID. 1980. Reg. 216 (22 CFR 216). https://www.usaid.gov/environmental-procedures/laws-regulations-policies/22-cfr-216.

design of construction projects. This document is not intended to act as a complete compendium of all potential impacts because site-specific context is critical to determining those impacts. Furthermore, the Guidelines are not a substitute for detailed sources of technical information or design manuals. Users are expected to refer to the accompanying list of references for additional information.

USAID Guidelines Superseded. This Sector Environmental Guideline replaces Sector Environmental Guideline: Small Healthcare Facilities (Partial Update 2014, Last Full Update 2009).

Comments and Corrections. Each sector of these guidelines is a work in progress. Comments, corrections, and suggested additions are welcome. Email: environmentalcompliancesupport@usaid.gov.

Advisory. The Sector Environmental Guidelines are advisory only. They are not official USAID regulatory guidance or policy. Following the practices and approaches outlined in the Sector Environmental Guidelines does not necessarily ensure compliance with USAID environmental procedures or host country environmental requirements.

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ACRONYMS

ADS	Automated Directives Systems
AFOLU	Agriculture, Forestry, and Other Land Use
CDR	Compulsory Displacement and Resettlement
CEEQUAL	The Civil Engineering Environmental Quality Assessment & Award Scheme Manual
CFR	Code of Federal Regulations
CHAS	Contractor Health and Safety Assessment Scheme
CIDA	Canadian International Development Agency
CLEER	Clean Energy Emission Reduction
CRM	Climate Risk Management
DFID	Department for International Development
DREAM	Designs for Risk Evaluation and Management
E&S	Environmental and Social
EA	Environmental Assessment
ECOS	Environmental Compliance Support Contract
EHS	Environment, Health, and Safety
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
EMMP	Environmental Mitigation and Monitoring Plan
EMS	Environmental Management Systems
ENCAP	Environmental Compliance and Management Support
EPA	US Environmental Protection Agency
ESDM	Environmentally Sound Design and Management
ESIA	Environmental and Social Impact Assessment
ESMS	Environmental and Social Management System
ETI	Ethical Trading Initiative
FAR	Federal Acquisition Regulation
FPIC	Free, Prior, and Informed Consent
GCAP	Global Climate Action Partnership
GBV	Gender-based Violence
GHG	Greenhouse Gases
HAI	Hospital-Acquired Infection
IEE	Initial Environmental Examination
IFC	International Finance Corporation
ILO	International Labor Organization
IP	Implementing Partner
IPC	Infection Prevention and Control
IPCC	Intergovernmental Panel on Climate Change

ISO	International Organization for Standardization
ITM	Insecticide-Treated Material
IUCN	International Union for Conservation of Nature
IWMP	Integrated Waste Management Plan
LAP	Livelihoods Action Plan
LEED	Leadership in Energy and Environmental Design
LGBTQI+	Lesbian, Gay, Bisexual, Transgender, Queer, and Intersex
LLINs	Long-lasting Insecticidal Nets
NGOs	Non-governmental Organizations
OECD	Organization for Economic Co-operation and Development
OHS	Occupational Health and Safety
OSHA	Occupational Health and Safety Administration
PPE	Personal Protective Equipment
PRO-IP	USAID's Policy on Promoting the Rights of Indigenous Peoples
RAP	Resettlement Action Plan
SEA	Strategic Environmental Assessment
SEG	Sector Environmental Guideline
SEP	Stakeholder Engagement Plan
SIRS	Social Impact Risk Initial Screening
SMP	Social Management Plan
TMP	Transport Management Plan
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
US EPA	US Environmental Protection Agency
WASH	Water, Sanitation, and Hygiene
WHO	World Health Organization
WHOPES	World Health Organizations Pesticide Evaluation Scheme

SMALL HEALTHCARE FACILITIES

Because many patients already have compromised (or burdened) immune systems, they are at particular risk from poor waste management and deficient biosafety practices that elevate pathogen levels and facilitate patient-to-patient transmission.

PHOTO CREDIT: Jen Antilla. 2008. A health worker in a healthcare facility provides medicine to the mother of a sick child.

1. BRIEF DESCRIPTION OF THE SECTOR

Small-scale healthcare facilities play a vital role in public health and are a key part of integrated community development. The staff at rural health posts (including immunization and reproductive health posts), mobile clinics, and healthcare clinics, are primarily tasked with treating the sick; they are also responsible for disease prevention, health communication, and education and serve as the front line of defense against epidemics such as AIDS, malaria, and cholera. Health services professionals at these facilities provide family planning, nurture child and adult health, prevent disease, cure debilitating illnesses, and alleviate the suffering of the dying.

However, environmentally poor design and management of these facilities can adversely affect patient and community health, countering the very benefits that they intend to deliver.

This guideline describes the mechanisms by which environmental, climate, social, and health risks arise and recommends mitigation and monitoring measures to reduce them and otherwise strengthen project outcomes. It also includes several checklists for environmentally sound design and management (ESDM) and social considerations of small healthcare facilities, as well as climate risk management.

Climate change is an increasingly important priority for the United State Agency for International Development (USAID), the U.S. Government, and other development partners and countries worldwide. One key aspect of effectively addressing the climate crisis requires focusing on adaptation, which is defined as adjustments in natural or human systems in response to actual or expected climate change stresses, which moderate harm or take advantage of beneficial opportunities. Building resilience is a key part of promoting adaptation by working to overcome increasing climate hazards, such as extreme weather conditions, invasive species, and increasing temperatures. Building resilience in the healthcare sector is essential because climate impacts will exacerbate public health challenges, particularly for marginalized communities that are disproportionately vulnerable to climate risks. By planning ahead for climate risks, activity managers can improve development outcomes and the likelihood of long-term success of their projects.

In the context of Environmental Impact Assessments (EIAs), mitigation is the implementation of measures designed to eliminate, reduce, or offset the undesirable effects of a proposed action on the environment.

In the context of climate change, mitigation is an intervention to reduce the sources or enhance the sinks of greenhouse gases in order to limit the magnitude and/or rate of climate change.

The other core aspect of addressing climate change is to reduce, avoid, or sequester greenhouse gas (GHG) emissions, which directly contribute to increased warming of the atmosphere, resulting in changes to the global climate system, and there are multiple options for mitigating GHG emissions in the construction and operation of healthcare facilities. In addition to supporting efforts to mitigate GHG emissions as an objective of program activities, USAID activity managers can also strive to "Do Our Part" by working to minimize the GHG emissions footprint of the activity implementation itself.

SMALL HEALTHCARE FACILITIES

Small healthcare facilities include posts and clinics. Hospitals are generally considered large facilities and are addressed in the Construction SEG.

Health posts are generally one- or two-room facilities and may not be staffed full-time. Staff typically consists of a full- or part-time primary health worker or community birthing attendant.

Services available at health posts typically include the treatment of minor illnesses, minor injuries, and assisted childbirth.

A nurse, doctor, or mobile healthcare team may visit periodically from a larger facility nearby to provide additional services (e.g., childhood immunization, family planning, laboratory diagnostics).

Small healthcare clinics are generally a step up in size from health posts. More importantly, they usually have one or more full-time nurse(s). A healthcare clinic thus can provide services such as childhood immunizations and laboratory analysis. A clinic might have one or two beds for seriously ill or injured patients.

Large health clinics are likely to have a full-time doctor present. Often a large clinic will have beds for seriously ill patients and offer advanced services (surgery, rehabilitation, radiology, and so on). In addition to the doctors present, the clinic will have supporting staff such as nurses, nurse's aides, maintenance workers, and volunteers.

Mobile healthcare clinics are portable units equipped with medical equipment and/or supplies and staffed by healthcare staff that deliver healthcare services in areas where traditional clinics or hospitals are unavailable.

The ESDM of small healthcare facilities:

- Requires attention to the issues of medical waste management, water supply and sanitation, and the environmental aspects of construction, among others. These topics are covered in more detail in separate *Sector Environmental Guidelines*. This guideline responds to the need for guidance that integrates these issues in the specific context of small healthcare facilities. It cannot treat each of the ESDM dimensions in detail, and users are referred to the relevant guidelines for more specific information.

- An integral part of overall good biosafety design and practice is to safeguard patients, staff, visitors, and the community from the heightened risk of infection. Therefore, the checklists and guidance in this guideline extend beyond the strictly environmental aspects of sound design and management.

As in other sectors, reducing environmental and social risks is much easier if potential impacts are identified and addressed early in the facility's design and construction.

This guidance can also be applied to large healthcare clinics and hospitals. However, larger facilities may pose additional environmental and social impacts that are not addressed here, such as the management of radioactive waste or involuntary resettlement (i.e., resettlement of people to minimize the risk of exposure to radioactive waste).

2. POTENTIAL ADVERSE ENVIRONMENTAL AND HEALTH IMPACTS OF SMALL HEALTHCARE FACILITIES

Many—but not all—of the potential environmental impacts and consequent health risks posed by healthcare facilities are associated with healthcare waste management. Healthcare waste includes all waste generated by the health care activities of a healthcare facility. Much of this is nonhazardous (i.e., general waste) and is similar or identical to domestic waste. The remainder is hazardous and includes hypodermic needles, syringes, soiled dressings, body parts and fluids (including blood), diagnostic samples, diapers, laboratory cultures, chemicals, pharmaceuticals, medical devices, and thermometers. These wastes either pose a risk of infection or present chemical hazards. Radioactive materials are also hazardous healthcare waste; however, they are typically not generated by the small healthcare facilities.

The Healthcare Waste SEG[2] provides information on better understanding the healthcare waste stream, its risks, and its management.

How serious are the risks to patients from poor waste management?

While data from Africa are scarce, **iatrogenic** diseases and nosocomial infections are a serious risk to patients in healthcare facilities throughout the world.

Iatrogenic diseases—from the Greek meaning "doctor generated"—are diseases that result purely from a doctor's or nurse's action, behavior, or therapy, especially as a complication of treatment.

Nosocomial infections originate or occur in a hospital or healthcare setting due to a combination of factors–high prevalence of pathogens, high prevalence of compromised hosts, and an efficient mechanism of transmission from patient to patient.

The most common types of nosocomial infections are urinary tract infections, pneumonia, and bacterial infections from surgical incisions.

The key potential environmental and health impacts of small healthcare facilities are described below in Sections 2.1 through 2.4.

2.1 ENVIRONMENTAL CONTAMINATION AND PATIENT, STAFF, AND COMMUNITY EXPOSURE

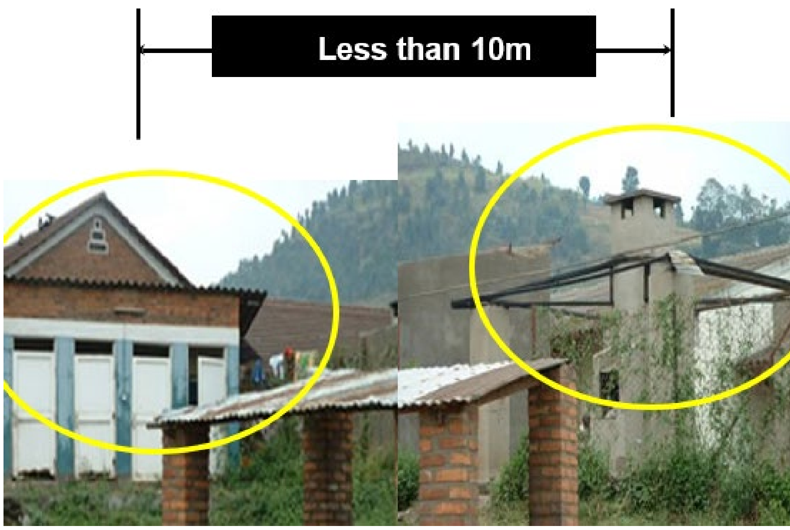
Biological and chemical contamination of groundwater and surface water may result from poorly sited, designed, and managed latrines, septic and wastewater systems, and waste pits. These waste systems can also release GHG emissions, including more potent gases such as methane and nitrous oxide. Contamination can occur through overland flow into surface waters, seepage into groundwater, or by direct disposal into waterways. Three key issues include:

- **Human excreta** from healthcare facilities present particularly high risks for the transmission of "oral-fecal route" diseases between patients or to the community at large. Examples of such diseases include cholera, typhoid, and dysentery. Poorly sited/designed, operated, or maintained sanitary facilities significantly increase the chances of groundwater and surface water contamination and thus the transmission of

[2] USAID. 2019. "Healthcare Waste Sector Environmental Guidelines: Full Technical Update, 2019." https://www.usaid.gov/sites/default/files/2022-05/FINAL_HCW_SEG_508_12.02.19.pdf

such diseases.[3] Human excreta can also emit methane and nitrous oxide GHGs when not properly disposed of.[4]

- **Greywater** is the wastewater from bathing and laundry. Greywater generated by healthcare facilities is likewise of higher risk than that produced from domestic sources. If allowed to seep into bare ground, greywater can contaminate drinking water sources with pathogens and pollutants. Depending on the carbon content, greywater can also produce methane emissions under certain conditions if not treated properly.
- **Pharmaceuticals** pose particular hazards when disposed of without proper precautions. Throughout the world, typical practice has been to dispose of expired pharmaceuticals as non-hazardous waste via latrines or sewers, landfills, or burial pits. Recently, relatively high concentrations of drugs have been found in surface waters that fish, wildlife, and people use. Although the extent of the health hazards presented by these drugs is still unknown, studies have shown that at the concentrations found, they can affect the reproductive cycle of fish and wildlife and can result in birth defects. Effects on human health and reproduction are likely as well.[5]



Poor design facilitates the spread of pathogens.

Unscreened simple pit latrines (at left) and a newly constructed open-air kitchen (at right) are separated by less than 10 meters at this district hospital in East Africa.

Source: Mark Stoughton/ The Cadmus Group

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[3] For more information on the impacts of human excreta on water supply, see the USAID Sector Environmental Guideline: Water Supply and Sanitation, accessible at https://www.usaid.gov/document/sector-environmental-guideline-water-supply-and-sanitation-2017.

[4] Moore, Daniel P., Nathan P. Li, Lars P. Wendt, Sierra R. Castañeda, Mark M. Falinski, Jun-Jie Zhu, Cuihong Song, Jason Ren, and Mark A. Zondlo. 2023. "Underestimation of Sector-Wide Methane Emissions from United States Wastewater Treatment." Environmental Science & Technology 57 (10): 4082-4090. https://pubs.acs.org/doi/full/10.1021/acs.est.2c05373.; see also Doorn, Michiel R. J., and David S. Liles. 1999. "Quantification of Methane Emissions and Discussion of Nitrous Oxide, and Ammonia Emissions from Septic Tanks, Latrines, and Stagnant Open Sweres in the World." U.S. EPA. https://nepis.epa.gov/Exe/ZyNET.exe/40001LAG.txt?ZyActionD=ZyDocument&Client=EPA&Index=1995%20Thru%201999&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&UseQField=&IntQFieldOp=0&ExtQFiel.

[5] Bavumiragira, Jean Pierre et al. 2022. "Fate and transport of pharmaceuticals in water systems: A processes review." *Science of the Total Environment* 823. https://www.sciencedirect.com/science/article/abs/pii/S0048969722007276; Sanusi, Idris O. et al. 2023. "Occurrence, environmental impact and fate of pharmaceuticals in groundwater and surface water: a critical review." *Environmental Science and Pollution Research* 30: 90595-90614. https://link.springer.com/article/10.1007/s11356-023-28802-4; and Ortuzar, Maite et al. 2022. "Pharmaceutical Pollution in Aquatic Environments: A Concise Review of Environmental Impacts and Bioremediation Systems." *Frontiers in Microbiology* 13. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9087044/.

The spread of pathogens from unsecured infectious waste (e.g., in open waste pits) and from "black water" (waste containing human excrement [e.g., from unscreened pit latrines]) by insect vectors, birds, mice, livestock, and so forth poses a significant threat to public health. These unsanitary conditions create a breeding ground for disease-carrying organisms, leading to increased illness and mortality rates in affected communities. Implementing proper waste management practices, such as using covered waste bins and properly constructed latrines, helps mitigate the spread of pathogens and improve public health.

Other poor waste and facilities management can attract and/or facilitate the breeding of disease vectors. Besides hazardous wastes, clinics generate a variety of solid wastes, including organic materials, papers and packaging, empty containers from cleaning products, and other miscellaneous waste.

These wastes must be collected and properly disposed of to avoid attracting disease vectors and to prevent the contamination of soils, groundwater, and surface water[7].

If water pools or stands (e.g., from a water supply point or greywater discharge, or rainwater runoff in a waste pit), it may provide a breeding medium for vectors transmitting malaria and other waterborne diseases.

Many healthcare facilities include a communal kitchen where meals are prepared for patients and sometimes for staff. Poor kitchen hygiene can attract pests, which may become vectors for disease transmission.

Climate change may lead to shifting distribution of disease vectors resulting from changes in temperatures, precipitation patterns and humidity, and shifts in seasonal timeframes. This shift in distribution could include increased or novel incidence in areas in which vectors have increased or expanded, as well as reduced disease incidence in areas where vector concentrations decline. These potential shifts increase the importance of disease and vector surveillance in alignment with expected changing climate conditions.

Toxic or nuisance air pollution is produced by improperly operated incinerators, open burning of waste, and/or poorly ventilated and designed cooking facilities.

Healthcare waste often has a high plastic content and open burning or poor incineration practices can produce highly toxic smoke due to the burning of plastic. The practice of using old tires for incinerator fuel likewise produces toxic smoke. Burning both plastics and tires can contribute significantly to GHG emissions due to the high carbon content of the materials.[6]

Open or improper disposal of sharps (e.g., used needles, blades, lancets) pose a direct risk of injury and infection, particularly to children, livestock, and wildlife. HIV/AIDS and hepatitis are two serious diseases commonly transmitted by improperly handled sharps.

Because many patients already have compromised (or burdened) immune systems, they are at particular risk from poor waste management and deficient biosafety practices that elevate pathogen levels and facilitate patient-to-patient transmission.

Inadequate infection prevention and control measures can lead to infectious disease outbreaks that spread rapidly within a facility, affecting everyone within the facility. Without appropriate protocols, patients, visitors, and staff are at a higher risk of contracting infections, including:

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[6] Ritchie, Hannah. 2023. "How much of global greenhouse gas emissions come from plastics?" Our World in Data. https://ourworldindata.org/ghg-emissions-plastics.; see also U.S. EPA. 2019. "Documentation for Greenhouse Gas Emission and Energy Factors Used in the Waste Reduction Model (WARM) - Tires." https://www.epa.gov/sites/default/files/2019-06/documents/warm_v15_tires.pdf.

- **Hospital-acquired infections (HAIs):** HAIs, or nosocomial infections, are infections that patients, visitors, or staff get while or soon after receiving health care at a healthcare facility (e.g., COVID-19, Staph infection, Pneumonia).

- **Bloodborne pathogens**: Diseases that can be spread to patients, visitors, or staff through contact with contaminated blood or body fluids at a healthcare facility (e.g., HIV/AIDS, Hepatitis B, Hepatitis C, Ebola).

Patients, visitors, and staff are highly vulnerable to contracting and transmitting infections in the absence of appropriate protocols. This can result in severe health consequences, escalated healthcare costs, and detrimental effects on the healthcare system. The textbox below summarizes several risks due to inadequate infection prevention and control measures.

Infection Prevention and Control (IPC) Risks to Patients, Staff, and Visitors

Poor healthcare waste management: Inadequate waste management can increase the risk of infection for patients, staff, and the community. In addition to waste management, various design and biosafety practices also play a crucial role in reducing the risk of pathogen exposure and infections for patients, staff, and visitors. These issues are not solely environmental concerns but are worth mentioning, as waste management is integral to effective biosafety design and practice within clinical operations.

Lack of sterilization: Inadequate sterilization of facilities and instruments can result in life-threatening complications during surgery and childbirth, posing significant risks.

Inadequate or contaminated water supply: Reliable access to clean water year-round is essential for drinking, laundry, cleaning, sterilization, cooking, and more.

Drinking and sterilization: Poor-quality potable water can lead to increased disease burden and pose a risk to patients, visitors, and clinic staff due to lack of sterilization.[7]

Poor design: Poorly designed facilities with cramped waiting areas, inadequate air circulation, and consistently damp conditions increase mold, bacteria, and other microorganism growth, raising the risk of infection.

Inadequate barriers: Disregarding fences, screens, and bed netting exposes individuals to livestock, birds, and insects, which increases infection risks, especially for patients with weakened immune systems.

Inadequate hand-washing stations: The absence of hand-washing stations for staff, patients, and visitors dramatically heightens the risk of oral-fecal diseases and inter-patient transmission.

2.2 PESTICIDE SPILLS AND EXPOSURES

Healthcare facilities are often sites where bed nets are treated with insecticide and then distributed. Pesticides recommended by the World Health Organization (WHO) for use in insecticide-treated materials (ITMs) are classified by the U.S. Environmental Protection Agency (US EPA) as only "moderately" toxic to humans, and with adequate safety precautions, the risk of adverse effects on bed net users is slight.

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[7] For more information on safe drinking water, see WHO's Guidelines for Drinking-Water Quality (GDWQ), accessible at https://www.who.int/publications/i/item/9789240045064.

However, risks to human health can arise from pesticide storage, use, distribution, and disposal in the quantities used by bed net distribution programs. For example, use of long-lasting insecticidal nets (LLINs) may result in the exposure of lactating women to pesticide residues that may accumulate in breast milk and can be transferred to infants, potentially exceeding acceptable exposure levels.[8]

ITM pesticides are also highly toxic to aquatic organisms. Precautions are necessary to ensure that pesticides used in ITM programs do not contaminate lakes, streams, and other bodies of water.

(For more information on the proper storage and handling of pesticides, refer to the Pesticide Handling section of Table 5).

2.3 ASBESTOS CONTAMINATION AND EXPOSURE

While often not a consideration for construction of new facilities, demolition or upgrading of older clinics may involve contact with asbestos-treated materials. Under no circumstances should asbestos be used in new construction.

Asbestos (a mineral fiber) was commonly used in insulation materials, roof shingles, flooring, millboard, and paint and coating materials. If left undisturbed, these materials do not usually present a health risk. Removing and disposing of asbestos, however, can release asbestos fibers, which in high concentrations can lead to lung cancer, mesothelioma, and asbestosis.[9]

The construction phase typically presents the highest risks from asbestos exposure.[10] However, disposal of asbestos-containing materials in unsecured landfills can expose waste pickers, children, and others to asbestos.

2.4 DEGRADATION OR LOSS OF LOCAL ENVIRONMENTAL RESOURCES FROM POOR CONSTRUCTION OR OPERATING PRACTICES

Environmental impacts during construction are mainly related to sourcing, extraction, and placement of construction materials. Erosion and sedimentation, habitat degradation, GHG emissions associated with construction material production and waste and construction operations, and local deforestation are some of the potential impacts.

In a well-managed construction project, the impacts should be minor if materials sourcing and the disposition of construction debris are handled in an environmentally sensitive manner. For example, local deforestation during construction is caused by intensive local harvesting of timber (for structures) and fuelwood (for workers).[11]

Local deforestation can contribute to more intense flooding; therefore, planners should consider flooding risks and deforestation dynamics when sitting facilities. Additionally, curbing deforestation near healthcare facilities could be beneficial in reducing the risk of flooding that may damage facility infrastructure. Deforestation also directly contributes to GHG emissions and reduced capacity to sequester carbon.

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[8] USAID. 2022b. "Global Initial Environmental Examination for Long Lasting Insecticidal Nets in USAID Humanitarian Assistance." https://ecd.usaid.gov/repository/pdf/53874.pdf.
[9] U.S. EPA. 2024. “Asbestos.” https://www.epa.gov/asbestos.
[10] For more information on asbestos exposure during the construction phase, see the Construction SEG accessible at https://www.usaid.gov/document/sector-environmental-guideline-construction-2017.
[11] For more information on recommended mitigation and monitoring measures, see the Construction SEG accessible at https://www.usaid.gov/document/sector-environmental-guideline-construction-2017.

3. OVERVIEW OF ENVIRONMENTAL BEST PRACTICES IN CLINIC DESIGN

Designs that do not account for local climate conditions (both current conditions and those projected to occur during the anticipated lifespan of the facility) can mean that typical temperature variations and events, such as severe weather, floods, and sand/dust storms, can have significant adverse effects on clinic accessibility and operations.

When considering the building site and design of clinics, the use of natural features should be considered, such as drainage, predominant wind patterns, and shade cover. Also, the potential risks from natural disasters (e.g., earthquakes, floods) should be considered, as well as projected local impacts from climate change. Built facilities that are intended to last for decades need to be designed to withstand exposure to an altered climate

Inappropriate locations within a village or town can make it difficult to keep facilities clean due to airborne dust and particulates from road traffic and can expose staff and patients to unpleasant odors and noise from nearby activities. Inadequate siting in coastal areas and near floodplains, rivers, and wetlands may result in flooding and property damage. These consequences could be exacerbated by climate change-related impacts. However, siting that minimizes exposure to environmental risks may be less convenient for patients to access, and planners must balance the importance of ease of access with environmental risks.

Waste management design, such as latrines and infrastructure/facilities for managing greywater, healthcare wastes (including hazardous and nonhazardous), and normal solid waste, must be an integral part of healthcare facility design.

Typical healthcare waste disposal options are burying on-site, burying off-site at a government-authorized designated landfill, burning on-site, or incinerating on- or off-site. It is important to ensure that healthcare waste pits, latrines, and greywater systems will not contaminate water supplies, that waste pits are not open to insects, birds, and animals, and that healthcare waste storage and disposal areas are secured from any other healthcare facility staff. It is essential to develop an Integrated Waste Management Plan (IWMP) (See the Healthcare Waste SEG) for disposal options and guidance.[12] Consider projected sea levels and groundwater rise due to climate change when designing waste disposal options.

Integrated Waste Management Plan (IWMP)

Suitable waste management facilities are necessary but not sufficient for environmentally sound waste management. Correct utilization of waste management facilities requires a waste management plan that covers all types of hazardous and non-hazardous wastes, including expired pharmaceuticals. The development of an IWMP is required for a project/activity as a part of the mitigation and monitoring measures of the governing Initial Environmental Examination (IEE), Environmental Mitigation and Monitoring Plan (EMMP), or other 22 CFR 216 document(s). Contents and length of the Plan will vary depending on the scale and scope of the project/activity.

Climate change may affect the availability of fresh water in some areas and outbreaks of highly infectious diseases such as cholera or typhoid can place far higher-than-normal demands on a small healthcare facility's water supply and sanitation systems. If these systems are designed only to meet demands, they may be overwhelmed, increasing the risk of nosocomial infections and posing further threats to community health.

[12] For more details on healthcare waste management plans, see the Healthcare Waste SEG, accessible at https://www.usaid.gov/document/sector-environmental-guideline-healthcare-waste-2019.

4. CLIMATE CHANGE CONSIDERATIONS

4.1 BUILDING RESILIENCE AND ADAPTING TO CLIMATE CHANGE

Climate change impacts, such as temperature increases and changes in the frequency, intensity, and duration of extreme events, such as floods, high winds, and tropical storms, can affect small healthcare facilities and medical waste management practices.[13,14,15] Health posts, clinics, mobile facilities, and hospitals designed for decades-long lifespans under existing climate conditions now may face exposure to a potentially altered climate. The design, construction, and operations of healthcare facilities must consider the projected impacts of climate change within the timeframe that the facility is intended to be operational and ensure that the appropriate materials and locations are selected to reduce vulnerability. This is especially important as healthcare facilities are often key community spaces used as safe havens during and after storms and other emergencies and need to be fully operational and able to provide services on a continuous basis during normal times, as well as during emergency periods. Healthcare facilities also need to be prepared to handle an increase in patients (and resulting increases in energy use, water use, and waste) as a result of changing disease vectors, increased cases of heat stroke and malnutrition, and injuries from extreme weather events.

It is therefore important to take climate change into account in the design, construction, and operations of healthcare facilities by including elements designed for adaptation and resilience:

- Adaptation is defined as adjustments in natural or human systems in response to current or expected climate change stresses, which moderate harm or take advantage of beneficial opportunities.
- Resilience is the capacity of a system to function in the face of the stress imposed by climate change and to adapt the system to be better prepared for future climate impacts, respond to them, and evolve into more sustainable and robust systems.

Adapting infrastructure planning, design, construction, operations, and maintenance to climate change involves ensuring that healthcare facilities and the systems that sustain them are able to withstand climate change impacts in order to protect healthcare professionals, staff, patients, and visitors. Healthcare facility designers and project managers must incorporate information on climate from historical records, recent trends, and future projections. The intended operational timeframe of the facility must be considered when building and designing for increased resilience, particularly the timeline of future projections. For example, if a facility is expected to serve people for 20–30 years, medium-term projections should be used so the investment is sustainable for that duration. Note that near-term projections are more reliable and less uncertain than long-term emissions and climate scenarios. In many cases, managing for greater uncertainty rather than specific trends may be more appropriate.

By incorporating climate information and climate risk and resilience considerations into project

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[13] Ebi, Kristie L., Jennifer Vanos, Jane W. Baldwin, Jesse E. Bell, David M. Hondula, Nicole A. Errett, Katie Hayes, and et al. 2021. "Extreme weather and climate change: population health and health system implications." Annual review of public health 42 No. 1, 293-315.

[14] Paterson, Jaclyn, Peter Berry, Kristi Ebi, and Linda Varangu. 2014. "Health care facilities resilient to climate change impacts." International Journal of Environmental Research and Public Health 11 no. 12 13097-13116.

[15] For more information on climate change in relation to medical waste management, refer to the Climate Change section of the Healthcare Waste SEG, accessible at https://www.usaid.gov/document/sector-environmental-guideline-healthcare-waste-2019.

design, project planners can improve the likelihood of the long-term success of their projects. Embedding climate resilience in all elements of implementation and operations of healthcare facilities will enable projects to minimize future losses and damage (and the associated costs) and rebound swiftly following extreme climate events, resulting in better development outcomes.

It is important to ensure that any climate risk management (CRM) measures do not inadvertently increase the vulnerability to climate impacts for certain individuals or communities, resulting in maladaptation, particularly those that are already marginalized. Such adaptation measures that cause negative outcomes can increase the vulnerability of certain communities. For example, waste facilities or sites such as burn pits or incinerators may need to be relocated to avoid the increased risk of flooding. However, if the relocation of these sites puts them in closer proximity to local communities, those communities may now face health risks due to air pollution stemming from waste disposal efforts, ultimately leaving those communities less resilient to climate stressors. Similarly, a community that is displaced to accommodate the construction of a new building or structure that aims to improve climate resilience could potentially suffer economically and lose cultural connections with the land, ultimately leaving that community less resilient to climate stressors.

In the same vein, it is critical to prioritize local engagement and equity at all stages of healthcare facility design, construction, and operations. For example, local actors, such as healthcare facility managers and staff, as well as nearby communities, are well-equipped to understand the local landscape and climate risks as they have likely already experienced some climate impacts in their community. Integrating local and Indigenous knowledge into historical and current climate data collection and climate projections can help improve the local applicability of climate information, and aligning the climate modeling with local knowledge can help better contextualize climate information for local stakeholders. Empowering local and Indigenous leaders to champion CRM for healthcare facility projects is a highly effective method of increasing activity sustainability. Furthermore, healthcare facilities that lack resilience or address resilience without considering equity can create or reinforce climate vulnerabilities, particularly for marginalized populations. Marginalized communities may face disproportionate levels of risk related to climate and healthcare waste management. For example, if a climate-related stressor such as flooding affects healthcare waste management at a facility (e.g., through the contamination of a local water supply), certain patient populations (e.g., older individuals, pregnant women, children) may be more likely to be harmed by the contamination-related flooding impacts.

USAID provides guidance for climate risk management in ADS Reference 201mal: Climate Risk Management for USAID Projects and Activities.[16]

Adapting healthcare facility planning, design, operations, and maintenance to climate change involves ensuring that structures and the systems that sustain them can withstand rising sea levels and increased variability and duration of extreme temperature, wind, and precipitation to protect occupants and allow the facilities to continue serving patients unabated. For example, project managers can examine components that are sensitive to weather (e.g., materials, location) to ensure that they are appropriate for future weather extremes. Project managers can also ensure that the data used to influence design considers extreme weather (e.g., 100-year storm) conditions. This requires research on the likely extent of variability and extreme weather events, as described below.

[16] USAID. 2017. ADS Reference 201MAL: Climate Risk Management for USAID Projects and Activities. Available at https://www.usaid.gov/ads/policy/200/201mal.

Architects and engineers should focus on incorporating climate information from historical records, recent trends, and future projections into their construction designs. The timeframe of each project should reflect the type of investment being made. For example, small clinic construction projects may have shorter lifespans than the construction of a hospital.

It is particularly important for healthcare facilities to consider the vulnerability of their electricity source and build resilient systems that can withstand the projected impacts of climate change. Integrating renewable energy sources—such as solar power—as a primary or backup source may help keep the facility running if electricity is not available through the grid, or if the fossil fuel needed for generators is not available following an extreme weather event. Natural ventilation can be used to maintain systems for infection control in the event of power failure. Reducing fossil fuel use can help prevent many asthma- and disease-causing pollutants from entering the air and water, contributing to improved public health, and can contribute to reductions in GHG emissions, as described in the next subsection. These solutions also help reduce GHG emissions, which are addressed in the subsection that follows.

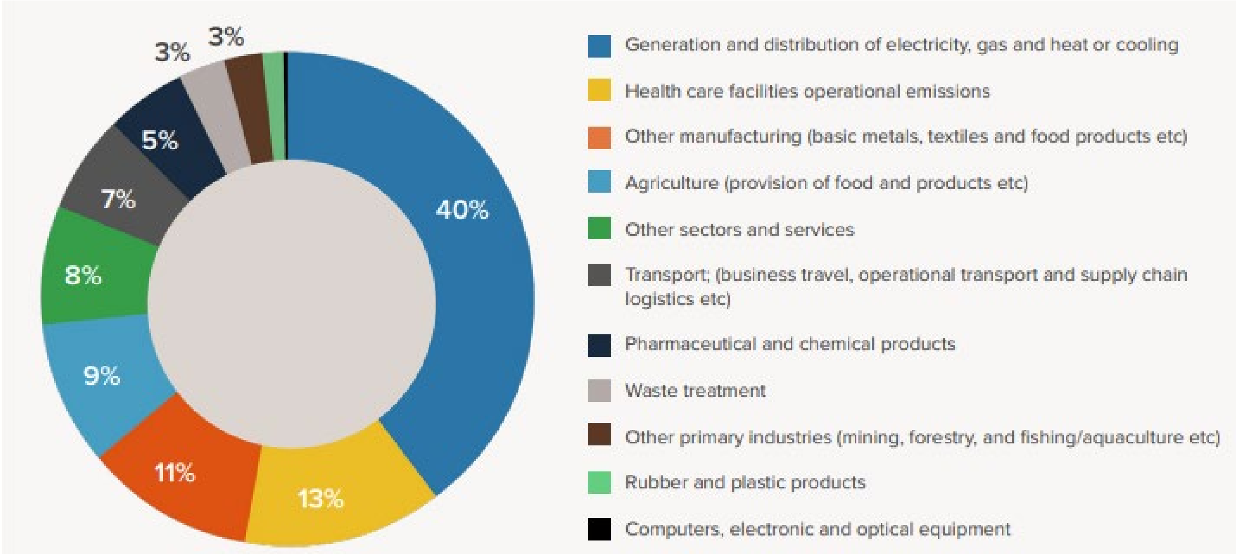
Tools are increasingly available to help decision-makers and project designers pragmatically assess potential climate risks in the face of uncertainty by first screening for climate vulnerabilities through the use of a "decision tree." Further or deeper analysis is performed only as needed, allowing decision-makers to allocate scarce project resources that are proportional to project needs.[17] This aligns with the risk management approach in USAID guidance on climate change.[18]

4.2 REDUCING GREENHOUSE GAS EMISSIONS

As of 2019, healthcare's climate footprint was equivalent to 4.4% of global net emissions (approximately 2 gigatons of carbon dioxide equivalent).[19] This is equivalent to the annual GHG emissions from 535 coal-fired power plants.[20] GHG emissions can come from electricity and fuel consumption; transportation; and product manufacture, use, and disposal, with the majority of emissions in the sector resulting from the production, transport, and disposal of goods and services -. Across all scopes, more than half of the health sector's emissions come from energy use.[21] Figure 1 represents the share of global healthcare emissions split by production sector and includes the operational emissions of healthcare facilities, as well as associated emissions sources.

[17] Ray, Patrick A., and Casey M. Brown. 2015. Confronting Climate Uncertainty in Water Resources Planning and Project Design: The Decision Tree Framework. Washington, DC: World Bank. doi:10.1596/978-1-4648-0477-9.
[18] USAID. 2017. ADS Reference 201MAL: Climate Risk Management for USAID Projects and Activities. Available at https://www.usaid.gov/ads/policy/200/201mal.
[19] Karliner, Jash, Scott Slotterback, R. Boyd, B. Ashby, and K. Steele. 2019. *Health care's climate footprint*. Health Care Without Harm and ARUP.
[20] US EPA. 2024. *Greenhouse Gas Equivalencies Calculator*. https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator.
[21] Karliner, Jash, Scott Slotterback, R. Boyd, B. Ashby, and K. Steele. 2019. *Health care's climate footprint*. Health Care Without Harm and ARUP.

FIGURE 1. GLOBAL HEALTH SECTOR EMISSIONS BY SOURCE[22]



In designing, building, and operating healthcare facilities and managing medical waste, steps should be taken, where feasible, to reduce GHG emissions. The activity should aim not only to reduce emissions immediately but also to support sustained low-emission operations and the use of low-emission technologies and practices through investments that will avoid emissions in the future. This can be done, for example, by using energy-efficient appliances to store medical supplies, powering facilities and equipment with renewable energy, using green building practices and taking advantage of shade and natural ventilation, and siting clinics in places that minimize travel distances for the intended beneficiaries and allow the use of public transportation options.

4.3 INTEGRATED APPROACHES TO BUILDING RESILIENCE AND MITIGATING EMISSIONS

From a risk management perspective, it is less costly to design for the potential direct and indirect impacts of climate change on healthcare facilities and their operations than to continue practicing "business as usual" and have stakeholders risk paying the full cost of damages or risk the loss of healthcare services. Project managers must balance the costs of improving climate resilience, expected investment lifetime, and the potential consequences of climate impacts when deciding how best to manage climate risks. While some cost or lifetime considerations may limit the incentive to address climate risks, effective consideration and management of potential climate impacts, as required by USAID, should limit both current and future risks to projects and the affected community.

For example, design and siting for structures in coastal areas should account for potential changes in daily tidal fluctuations, sea level rise, and storm surges, and appropriate locations should be selected based on these considerations. The same principle applies to construction near floodplains, rivers, and wetlands. In locations where annual average temperatures are rising, the design of buildings, water conveyance structures, and other works should consider

[22] Karliner, Jash, Scott Slotterback, R. Boyd, B. Ashby, and K. Steele. 2019. *Health care's climate footprint*. Health Care Without Harm and ARUP. https://www.arup.com/globalassets/downloads/insights/healthcares-carbon-footprint.pdf.

the need for additional cooling capacity.

As with reducing the risk from climate change impacts, integrating emissions mitigation and climate adaptation into the design, construction, and operation of healthcare facilities can bring about co-benefits. For example:

- Siting new healthcare facilities near locations with multiple transportation options can offer transit redundancy for patients during extreme weather events that may make some forms of transportation inaccessible. Siting facilities near public transit options can also encourage mass transit use and decrease emissions from personal vehicles when commuting to or from the facility. In addition, it will help address equity issues in terms of access to healthcare facilities for marginalized communities.

- Upgrading water, sanitation, and hygiene (WASH) systems to be climate-resilient[23] can help patients have access to safe and reliable drinking water, as well as water needed for clinical procedures, during both flooding and drought conditions. This is essential for ensuring water for sanitation purposes in a healthcare setting.

- Increasing renewable and back-up energy options for healthcare facilities can both avoid GHG emissions that would have resulted from fossil fuel-based power sources and increase resilience to extreme weather events that threaten the energy supply.

- Designing facilities with high-quality insulation can reduce the need for heating and cooling during extreme weather events, as well as reducing heating and cooling costs during normal operations, improving patient comfort, and reducing energy use and reliance on coolants, which have significantly high global warming potential per ton of gas emitted.

- Incorporating sustainable and effective waste management practices can prevent pollution in the event of extreme weather events, as well as help reduce methane emissions.[24]

- Planning ahead for adaptation with flexible floor plans in the event of extreme weather conditions or environmental hazards that may result in a sudden influx of patients in higher volumes.

- As relevant, develop a decommissioning plan that considers climate risks, both for the workers involved in the decommissioning activity and for the site and materials, as well as emissions considerations.

USAID requires considering and managing climate risks for all projects and activities as part of the CRM process. Table 1 describes the climate risks that may affect activities involving healthcare facilities, along with some potential risk management options. These measures are general suggestions; therefore, the specific characteristics of each project should be considered before its implementation. See the "Design, Construction, Operations, and Maintenance Guidance" section for additional mitigation options, as well as the USAID Healthcare Waste SEG and Construction SEG. Refer to ADS Reference 201mal Climate Risk Management for

[23] For more information on climate resilience in WASH systems, see the Water Supply and Sanitation SEG, accessible at https://www.usaid.gov/document/sector-environmental-guideline-construction-2017.
[24] For more information on climate risks and adaptation measures for healthcare waste, see the Healthcare Waste SEG, accessible at https://www.usaid.gov/document/sector-environmental-guideline-healthcare-waste-2019.

USAID Projects and Activities for additional guidance.

USAID requires mitigating GHG emissions from healthcare facility activities. Table 2 provides additional information on the impacts of different clinic elements. Tools for estimating GHG emissions are provided at the bottom of the table. Refer to the “Design, Construction, Operations, and Maintenance Guidance” section for activities that can mitigate GHG emissions across clinic elements.

Note: The use of asbestos, pesticide handling (insecticide-treated bed nets), clinic functionality, and security measures in healthcare facilities does not directly generate GHG emissions per se, but all can contribute emissions indirectly (e.g., such as resulting from asbestos removal, transport of bed nets or security personnel).

TABLE 1. CLIMATE RISK MANAGEMENT FOR HEALTHCARE FACILITY ACTIVITIES

CLIMATE STRESSORS	CLIMATE RISKS	RISK MANAGEMENT MEASURES
Increasing incidence and/or severity of storms (intense rainfall and high wind events)	• Damage to transportation services (e.g., ambulances), energy systems, WASH resources/facilities, communications, waste facilities, and clinic equipment/infrastructure, disrupting the construction and operations of healthcare facilities. • Damage to or blocked transportation routes, disrupting the delivery of input materials and travel for workers during construction and operations phases, as well as patient transport, delivery of clinic supplies (e.g., patient food, pharmaceuticals), and waste pick-up. • Physical safety threats from extreme weather events resulting in increased patient load and resulting resource strain.	• Site selection for the facility, as well as internal sites (e.g., for latrines, waste storage/disposal), needs to consider the likelihood of climate impacts on the specific location in question, with consideration of both current conditions and projected conditions in the future. • Develop and deliver training and skill-building activities to help build the capacity of construction partners, facility managers, and staff in advancing climate-smart construction and operations. • Invest in renewable energy and battery storage systems to promote consistent energy supply in the face of variable weather and extreme events, and to reduce GHG emissions in facility operations. • Set robust engineering design and construction material standards that can withstand increasingly variable weather and extreme events. • Promote integrated, long-term urban and comprehensive planning processes and building codes that recognize and account for climate risks, as well as opportunities for risk mitigation and GHG emissions reduction.
Increasing incidence and/or severity of extreme events (e.g., flooding, landslides, wildfires)	• Damage to transportation services (e.g., ambulances), energy systems, WASH resources/facilities, communications, waste facilities, and clinic equipment/infrastructure, disrupting the construction and operations of healthcare facilities.	

CLIMATE STRESSORS	CLIMATE RISKS	RISK MANAGEMENT MEASURES
	• Damage to or blocked transportation routes, disrupting the delivery of input materials and travel for workers during construction and operations phases, as well as patient transport, delivery of clinic supplies (e.g., patient food, pharmaceuticals), and waste pick-up. • Inundation of healthcare waste sites/facilities releasing contaminants to waterways, land, and occupied areas. • Flooding may result in the contamination of soil/water in surrounding areas and standing water that serves as a breeding ground for water and vector-borne diseases, resulting in negative impacts to public health, increased patient load, and resulting resource strain. • Physical safety threats from extreme weather events resulting in increased patient load and resulting resource strain.	• Adopt adaptation options to protect construction workers and healthcare facility staff and patients (e.g., water or cooling stations and mosquito netting). • Partner with local leaders and indigenous groups (as relevant) to better understand existing climate risks and have local actors lead climate action and adaptation. • Promote integrated watershed management, rainfall capture, and water efficiency practices, such as rain barrels or green infrastructure, to build resiliency to decreased water availability and drought. • Use early warning systems for high temperatures and extreme weather events to allow proactive preparation for staff and patients. • Identify alternative routes for the delivery of supplies and waste pick-up during extreme weather events. • Increase financial and technical resources to support more frequent maintenance and repairs. • Identify and use reliable sources of climate indicators (e.g., temperature, humidity, precipitation) and near-term forecasts to inform facility operations and schedule maintenance. If reliable climate data is hard to locate or access, consider implementing on-site monitoring of climate indicators (e.g., precipitation gauges) to inform facility operations and schedule maintenance. • As relevant, develop a decommissioning plan that considers climate risks, both for the workers involved in the decommissioning activity and for
Increasing air temperatures and incidence and/or severity of extreme heat	• Hotter conditions could result in impacts on worker/community health (e.g., heat stress and vector-borne disease) and increased costs and resources to address these impacts. • Temperature fluctuations can increase energy demand and strain energy systems, potentially adding operations costs (also contributing to higher GHG emissions). • Damage to paved roads, rail, and other transportation routes from excess heat, disrupting delivery of clinic supplies (e.g., patient food, pharmaceuticals) and travel for workers/patients.	

CLIMATE STRESSORS	CLIMATE RISKS	RISK MANAGEMENT MEASURES
	• Odor around waste storage areas and facilities.	the site and materials.[25]
Increasing incidence and/or severity of drought	• Reduced access to water for construction, patient care, and clinical procedures, disrupting operations and potentially adding costs. • Damage to facility foundations and structures due to soil cracking and subsidence in areas with clay soils. • Public health risks due to the increased risk of groundwater contamination and malnutrition related to reduced food security, resulting in increased patient load and resulting resource strain.	
Sea level rise	• Damage to transportation services (e.g., ambulances), energy systems, WASH resources and facilities, communications, waste facilities, and clinic equipment and infrastructure, disrupting the construction and operations of healthcare facilities. • Damage to or blocked transportation routes, disrupting the delivery of input materials and travel for workers during the construction and operations phases, as well as patient transport, delivery of clinic supplies (e.g., patient food, pharmaceuticals), and waste pick-up. • Inundation of healthcare waste sites and facilities, releasing contaminants to waterways, land, and	

[25] Adopt relevant measures provided in the USAID Healthcare Waste SEG and Construction SEG for additional climate risk management options, accessible at https://www.usaid.gov/document/sector-environmental-guideline-construction-2017.

CLIMATE STRESSORS	CLIMATE RISKS	RISK MANAGEMENT MEASURES
	occupied areas. • Flooding, which can result in the contamination of soil and water in surrounding areas and standing water that serves as a breeding ground for water and vector-borne diseases, resulting in negative impacts to public health, increased patient load, and resulting resource strain.	

TABLE 2. MITIGATING GHG EMISSIONS FROM HEALTHCARE FACILITIES

GHG EMISSIONS SOURCES	EMISSIONS MITIGATION OPTIONS
Location/Siting	
• GHG emissions associated with land use changes (such as released soil organic carbon and reduced carbon sequestration capabilities), especially if vegetation or forest clearing or burning takes place. • GHG emissions associated with staff and client transportation to the facility site (i.e., fuel combustion from vehicle use). • GHG emissions from the transportation of mobile clinics. • Land use change emissions associated with the reduction of green cover and the disruption to natural systems and forests during the temporary siting of mobile clinics.	• Use electric vehicles for staff and client transportation to reduce emissions. • Avoid deforestation and the removal of vegetation whenever possible, including burning, and engage in revegetation and composting or properly dispose of vegetation whenever practical. • Use sustainable transport modes for mobile clinics, such as buses, rail, barges, and electric vehicles, if available.
Construction Materials, Management, and Siting	
• GHG emissions associated with the fossil fuel combustion used for material production and transportation to the construction site. • GHG emissions associated with construction operations, including fossil fuel combustion by vehicles and equipment.	• Utilize materials with lower GHG content. • Engage with material suppliers to understand the upstream GHG emissions associated with material production. • Source materials locally to reduce transportation energy requirements and costs. • Use sustainable transportation modes, such as buses, rail, barges, and electric vehicles, if available. • Minimize the idling time of construction equipment. • Mitigate construction phase and infrastructure end-of-life waste by

GHG EMISSIONS SOURCES	EMISSIONS MITIGATION OPTIONS
	recycling and designing for the reuse of components.
Sanitation	
• Methane emissions produced via anaerobic digestion of organic matter in latrine pits and septic sewage tanks.[26, 27] • GHG emissions associated with fuel combustion and land clearing for latrine construction. • GHG emissions associated with the production of materials used for latrines.	• Source materials locally to reduce transportation energy requirements and costs. • Design and construct waste-to-energy facilities to maximize energy efficiency and minimize emissions.
Solid and Gaseous Waste Disposal	
• GHG emissions associated with fuel combustion to transport waste to disposal sites. • GHG emissions associated with the incineration of waste, if applicable. • GHG emissions associated with the waste disposal method (i.e., GHG emissions from the incineration of waste, methane emissions from landfill waste, and GHG emissions associated with the energy used to recycle waste materials). • Nitrous oxide and fluorinated gas emissions from anesthetics.	• Use electric vehicles for waste transportation to reduce emissions where available. • Generate and recover biogas through anaerobic digestion or landfill gas capture, which can be used for electricity, heat generation, as transport fuel, and sold as a fuel. • Design energy-efficient waste management facilities. • If energy generation at landfills is not viable, flare landfill gases to prevent methane release. • Adopt waste anesthetic capture systems to reduce emissions from anesthesia use.
Wastewater Disposal	
• GHG emissions associated with fuel combustion to pump or transport wastewater to treatment sites. • GHG emissions associated with wastewater treatment and energy use. • Methane emissions from the breakdown of organic contents in wastewater under anaerobic conditions.	• Power water disposal systems with renewable energy, where possible, and utilize electric vehicles for water transport. • Implement efficient water management approaches to reduce leaks and save water, thereby reducing energy use and its corresponding emissions. • Embrace a circular economy approach to water management, by recycling wastewater and producing energy on-

[26] Reid, MC, K. Guan, F. Wagner, and DL Mauzerall. 2014. "Global methane emissions from pit latrines." *Environmental Science & Technology* 48 (15). doi:10.1021/es501549h.
[27] Doorn, M., Liles, D., Thorneloe, S. (2000). Quantification of methane emissions from latrines, septic tanks, and stagnant, open sewers in the world. In: van Ham, J., Baede, A.P.M., Meyer, L.A., Ybema, R. (eds) Non-CO2 Greenhouse Gases: Scientific Understanding, Control and Implementation. Springer, Dordrecht. https://doi.org/10.1007/978-94-015-9343-4_4.

GHG EMISSIONS SOURCES	EMISSIONS MITIGATION OPTIONS
	site, thus reducing emissions. Promote the adoption of solar-powered water systems to reduce emissions, especially when compared with diesel-powered water systems.
Water Supply	
• GHG emissions associated with the energy used to pump water from the source to the facility's location. • GHG emissions associated with the energy and materials used to build and maintain water supply pipes and systems.	• Implement efficient water management approaches to reduce leaks and save water, thereby reducing energy use and its corresponding emissions. • Embrace a circular economy approach to water • management by recycling wastewater and producing energy on-site, thus reducing emissions. Promote the adoption of solar-powered water systems to reduce emissions, especially when compared with diesel-powered water systems. • Adopt preventative maintenance practices to avoid unnecessary reconstruction and energy-intensive large-scale repairs to water supply infrastructure.
Biosafety and Infectious Disease Control	
• GHG emissions associated with the production and disposal of personal protective equipment (PPE). • GHG emissions associated with the energy used to autoclave instruments.	• Use renewable energy to power autoclave equipment. • Seek to manage waste at the source location (i.e., applying the *proximity principle*, or the idea that waste should be managed as close as possible to where it was generated to minimize the environmental impacts from waste transport) and avoid the export of large quantities of waste and recyclables.[28]
Kitchen Management	
• GHG emissions associated with fuel combustion by kitchen equipment (e.g., stoves). • Life cycle GHG emissions associated with food production, especially for meat and dairy products, particularly from cows, pigs, lambs, and goats. • GHG emissions associated with kitchen and food waste disposal and transportation.	• Utilize materials with lower GHG content. • Source materials locally to reduce transportation energy requirements and costs. • Source food that generates lower, or no, GHG emissions to produce.

[28] See the Solid Waste SEG for an in-depth discussion of the proximity principle, and other waste management principles, accessible at https://www.usaid.gov/document/sector-environmental-guideline-solid-waste-2018

GHG EMISSIONS SOURCES	EMISSIONS MITIGATION OPTIONS
	• Promote water conservation.
Laboratory Management	
• GHG emissions produced from energy use for laboratory equipment (i.e., fossil fuel or electricity consumption).	• Use renewable energy and seek low carbon supplies in order to reduce emissions.
Electricity Supply	
• GHG emissions associated with the production of the electricity used by the clinic.	• Use renewable energy and seek low carbon supplies in order to reduce emissions.
Estimation Tools	
Note: To effectively use the tools below, it will be necessary to collect data regarding the various types of activities listed above. For example, these data can include records (or realistic estimates) of the land area and type of land and vegetation affected by construction activities, the volume and type of fuel consumed and the type of vehicle used for transportation, the distance that materials or people are transported, the types of materials used in construction, the volume and type of waste and wastewater generated, the amount of electricity used (such as reported on electric bills in kilowatt-hours), and in cases other than electricity use, the type of energy or fuel used (e.g., such as in facility operations, the use of appliances, cooking, food production).	
• USAID's Clean Energy Emission Reduction (CLEER) Tool can be used to estimate the emissions that would be avoided as a result of renewable energy used to power facilities or equipment, as well as energy efficiency, including projected avoided emissions to 2050 (see https://www.cleertool.org/). • The 2019 Refinement to the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories, Volume 5: Waste, Chapter 6: Wastewater Treatment and Discharge, can be used to estimate emissions from wastewater treatment and discharge (see https://www.ipcc-nggip.iges.or.jp/public/2019rf/pdf/5_Volume5/19R_V5_6_Ch06_Wastewater.pdf).	• The GHG Protocol's GHG Emissions Calculation Tool can be used to estimate potential emissions (and avoided emissions) resulting from use of vehicles, refrigeration and air conditioning equipment, and other emissions sources (see https://ghgprotocol.org/calculation-tools-and-guidance). • US EPA's Simplified GHG Emissions Calculator is an additional resource for considering GHG emissions from stationary combustion, vehicles, refrigeration and air conditioning, fire suppression, electricity use, waste, and other emissions sources, although it was developed for US domestic use (see https://www.epa.gov/climateleadership/simplified-ghg-emissions-calculator). • US EPA's State Inventory and Projection Tool provides an additional resource for considering how to estimate methane emissions from wastewater, although it was developed for U.S. domestic use (see

GHG EMISSIONS SOURCES	EMISSIONS MITIGATION OPTIONS
	https://www.epa.gov/statelocalenergy/download-state-inventory-and-projection-tool).

5. SOCIAL IMPACTS

The potential exists for adverse and unintended negative social impacts as a result of healthcare facility projects. USAID is committed to integrating stakeholders' voices, concerns, perspectives, and values as a form of acquiring feedback and input on a proposed project to identify potential social impacts early on and make sound decisions during the design and planning phase. As indicated in the adjacent textbox, per ADS 201, USAID requires an initial screen of potential social impacts.

USAID's visions, policies, and strategies call for a participatory process that safeguards against doing harm to its beneficiaries. This process includes ensuring meaningful stakeholder engagement from government, communities, and individuals to assure that USAID's international development efforts benefit all members of society, particularly marginalized and underrepresented groups and/or people in vulnerable situations.

SOCIAL IMPACT RISK INITIAL SCREENING (SIRS) TOOL

Per the June 2024 update to ADS Chapter 201 Program Cycle Operational Policy, USAID design teams must conduct an initial screening of the social impact of their Activities and Programs using the Social Impact Risk Initial Screening and Diagnostic Tools (ADS 201mbf).[29] The Social Impact Risk Initial Screening (SIRS)[30] Tool is intended to help USAID design teams plan for, mitigate, and monitor potential adverse social impacts from USAID Activities and Programs. The Tool consists of 10 questions designed to kickstart mandatory analytical thinking about a variety of different potential adverse social impacts and help identify when additional social safeguarding is needed. Additional social safeguarding may include redesigning Activity/Program components or concepts, identifying social impact mitigation measures, or conducting additional analyses, such as a Social Impact Assessment. When filling out the Tool, design teams should only check "no" when they are highly certain that there is no potential for an adverse impact. The complexity of the process for completing the Tool will vary based on the severity of social impacts posed by the Activity/Program.

Stakeholder engagement is critical for ensuring that USAID maintains accountability to program participants by ensuring the active participation of local communities, developing mitigation measures that include participants' voices, as well as ensuring that affected individuals and communities can communicate their concerns through USAID's Accountability Mechanism.[31] Given the importance of stakeholder engagement for fostering a successful project, the project may benefit from sustaining this engagement throughout the entire project life.

Just as environmental compliance measures under 22 Code of Federal Regulations (CFR) 216[32] seeks to avoid, minimize, and mitigate impacts, including with healthcare facility projects, social impacts should be assessed to determine whether there has been a change from baseline conditions for individuals and communities resulting from a USAID project. Furthermore, there may be pre-existing adverse conditions in a local community prior to a USAID-funded activity, which should be taken into consideration to maximize benefit sharing so

[29] USAID. 2024. "Social Impact Risk Initial Screening and Diagnostic Tools. A Mandatory Reference for ADS Chapter 201." https://www.usaid.gov/sites/default/files/2024-05/201mbf_051424.pdf.
[30] ibid.
[31] The USAID Social, Economic, and Environmental Accountability Mechanism (SEE-AM) is expected to be formally launched in summer 2024. The SEE-AM offers communities and project participants to report adverse social, economic, or environmental impacts caused by USAID-funded activities. Complaints and questions can be submitted to disclosures@usaid.gov.
[32] USAID. 1980. "Reg. 216 (22 CFR 216)." https://www.usaid.gov/environmental-procedures/laws-regulations-policies/22-cfr-216.

that proposed USAID-funded activities minimize unintended social consequences, such as impacts on a person's livelihood, economic activities, traditional vocations, land or property rights, access to natural resources, culture and customs, and health and well-being.

5.1 KEY SOCIAL IMPACTS

This section is organized according to the principles presented in USAID's Voluntary Social Impacts Principles Framework.[33] The Voluntary Social Impact Principles Framework encompasses nine principles for considering and assessing potential social risks and social impacts across USAID programs, projects, and activities**.** Table 3 summarizes the nine principles. For additional information on the nine Principles see the USAID Voluntary Social Impact Principles Framework. The subsequent sections present an illustrative list of potential social impacts pertaining to healthcare facility projects that Missions and/or Implementing Partners (IPs) should consider.

TABLE 3: USAID SOCIAL IMPACT PRINCIPLES

PRINCIPLE		DESCRIPTION
1	Indigenous Peoples	Indigenous Peoples are a distinct cultural, linguistic, and social group with historical continuity, collective attachment to surrounding natural resources, and/or commitment to maintaining ancestral systems. Specific actions are required of USAID programs involving Indigenous Peoples.
2	Cultural Heritage	Cultural heritage is part of every culture and is found all over the world. It includes archaeological sites, historic buildings, artifacts, and natural environments inherited from past generations as well as intangible knowledge and practices. Working in areas with cultural heritage or on cultural heritage projects can have consequences beyond just destruction of an important resource and can also offer potential means of positively engaging with communities.
3	Land Tenure, Displacement, and Resettlement	Land tenure is associated with acquiring and managing rights to land. Land use change may lead to compulsory displacement and resettlement (CDR), and/or the loss of access and/or use of land and natural resources, which should be avoided and minimized to reduce social impacts on affected landholders, tenants, community members, and pastoralists, among other groups. Failure to account for, and respect, the land and resource rights of local community members can cause costly delays, work stoppages, protests, and, in some cases, violence. USAID may face legal actions and suffer financial, brand, or reputational harm.
4	Health, Well-being, and Safety	Health, Well-being, and Safety is safeguarding against potential physical, psycho-social, and health impacts among project staff, program participants, and communities where AID actions are implemented. Individual USAID actions must account for potential occupational health and safety risks, as well as potential uneven socio-economic gains across affected communities/program participants, to avoid unintended consequences.

[33] USAID. 2024. "Voluntary Social Impact Principles Framework." https://www.usaid.gov/environmental-procedures/environmental-compliance-esdm-program-cycle/social-impact-assessment.

PRINCIPLE		DESCRIPTION
5	Working with Security Personnel	Cognizance of the unique challenges involved in engaging security personnel, working with security personnel prioritizes a rights-based approach to ensure respect for, and safety of, individuals and local communities. Without transparent and accountable oversight of rule of law, the risks of potential human rights violations increase.
6	Conflict Dynamics	Attentiveness to the operational context in relation to past and present conflicts as well as sensitivity around the role that a USAID action has in shaping the conflict landscape. Poor understanding of conflict dynamics increases the possibility of contributing to or exacerbating conflict.
7	Inclusive Development	Inclusive development is an equitable development approach built on the understanding that every individual and community, of all diverse identities and experiences, is instrumental in the transformation of their own societies, which means providing them with the opportunity to be included, express their voices, and exercise their rights in activities and public decisions that impact their lives. Inclusion is key to aid effectiveness. Nondiscrimination is the basic foundation of USAID's inclusive development approach.
8	Environmental Justice	Environmental justice (EJ) is the fair treatment and meaningful engagement throughout the project life cycle of marginalized and underrepresented groups and/or people in vulnerable situations, with respect to environmental and/or health impacts and implementation and enforcement of environmental laws. It includes the protection of marginalized and underrepresented groups that may face enhanced vulnerability due to environmental harms caused by any action or activity. Marginalized and underrepresented groups and/or people in vulnerable situations may include (but are not limited to): Indigenous Peoples, lesbian, gay, bisexual, transgender, queer, and intersex (LGBTQI+) persons, persons with disabilities, children and other youth, older persons, women, low-income populations, and all disadvantaged and marginalized communities across race, color, gender, or national origin.
9	Labor	The Labor principle focuses on advancing worker empowerment, rights, and labor standards through programming, policies, and partnerships to advance sustainable development outcomes. USAID recognizes the high risk of labor abuses that may result from programming, and, thus, USAID works to establish and strengthen labor protections (including social protections) that align with internationally recognized worker rights. This principle includes the promotion of safe and healthy work environments; respecting the principles of freedom of association and collective bargaining; the elimination of forced labor and the worst forms of child labor; and the protection from discrimination at work.

5.1.1 HEALTH, WELL-BEING AND SAFETY

Specific choices around project design and implementation invariably have the potential to influence health, well-being, and safety. Assessing and managing potential social impacts related to health, well-being, and safety is multilayered and requires careful and sustained effort.[34] The healthcare facilities themselves may present risks to public health unless clinic staff are appropriately trained in and carry out infection prevention and control practices. Facility-acquired infections, known as nosocomial infections, may lead to unintended consequences to the local community and may be fatal. In some settings, these infections are a leading cause of death.[35]

Public safety risks may also arise, depending on the healthcare facility project being proposed, which should be taken into consideration. For example, safety considerations should be considered in facility siting decisions. Constructing a facility in an area that lacks good security or which is distant from many patients' homes may lead to increased risks of violence targeted at patients, with women and girls often being at greater risk.

USAID has a guideline to ascertain the potential social impacts to health, well-being, and safety[36] and there are also international best practices, such as International Finance Corporation (IFC) Performance Standard 4: Community Health, Safety, and Security,[37] which may be followed.

5.1.2 CONFLICT DYNAMICS

USAID's projects are often implemented in fragile or conflict-affected environments. USAID's work encompasses investments in conflict prevention and mitigation, stabilization, and peace building, parallel to investments in other sectors. Understanding conflict dynamics and how a healthcare facility project affects or is being affected by these dynamics is an essential component of being conflict aware and conflict sensitive.[38] For example, local communities may have a heightened awareness of the distribution of resources, as well as the roles and responsibilities of the people involved in the distribution of those resources, and a proposed healthcare facility project may exacerbate the underlying conflict dynamics. There may be historical grievances that become known due to proposing a healthcare facility project that is perceived to benefit or exclude one group of people over the other, which may exacerbate local tensions. Therefore, conflict dynamics at the site level should be assessed and thoroughly understood during the design phase by means of engaging stakeholders in a participatory approach. Further resources and guidance on conflict dynamics may be found in the footnote.[39]

[34] IFC. 2012. *Performance Standard 4: Community Health, Safety, and Security*. IFC, World Bank Group. https://www.ifc.org/content/dam/ifc/doc/2010/2012-ifc-performance-standard-4-en.pdf.

[35] Haque M, McKimm J, Sartelli M, Dhingra S, Labricciosa FM, Islam S, Jahan D, Nusrat T, Chowdhury TS, Coccolini F, Iskandar K, Catena F, Charan J. "Strategies to Prevent Healthcare-Associated Infections: A Narrative Overview." *Risk Manag Healthc Policy*. 2020 Sep 28;13:1765-1780. doi: 10.2147/RMHP.S269315. PMID: 33061710; PMCID: PMC7532064.

[36] USAID. 2024. "Voluntary Social Impact Principles Framework." https://www.usaid.gov/environmental-procedures/environmental-compliance-esdm-program-cycle/social-impact-assessment.

[37] IFC. 2012. *Performance Standard 4: Community Health, Safety, and Security*. IFC, World Bank Group. https://www.ifc.org/content/dam/ifc/doc/2010/2012-ifc-performance-standard-4-en.pdf.

[38] USAID. 2024. "Voluntary Social Impact Principles Framework." https://www.usaid.gov/environmental-procedures/environmental-compliance-esdm-program-cycle/social-impact-assessment.

[39] USAID. n.d. *Technical Publications on Conflict Management and Mitigation*. Accessed 2024. https://www.usaid.gov/conflict-violence-prevention/technical-publications.

5.1.3 ENVIRONMENTAL JUSTICE

Meaningful stakeholder engagement entails

- People from diverse social groups are provided with an opportunity to participate in decisions about activities that may affect their environment, livelihoods, well-being, and/or health;
- The public's contribution can influence the agency's decision;
- Community views, perspectives, and concerns will be considered in the decision-making process; and
- Decision makers will seek out and facilitate the stakeholder engagement process with potentially affected people[40]

Environmental justice (EJ) is the fair treatment and meaningful stakeholder engagement throughout the project life cycle of all project-affected persons, particularly marginalized and underrepresented groups and/or people in vulnerable situations with respect to environmental and/or health impacts, and implementation and enforcement of environmental laws. It includes the protection of potentially marginalized and underrepresented groups that may face enhanced vulnerability due to environmental harms caused by any action or activity. It also includes equitable access to environmental benefits and/or ecosystem services that a project may enhance. Marginalized and underrepresented groups and/or people in vulnerable situations may include (but are not limited to): IPs, LGBTQI+ persons, persons with disabilities, children and other youth, older persons, women, low-income populations, and all disadvantaged and marginalized communities across race, color, gender, or national origin.[41]

The main objective is to provide a framework for assessing adverse environmental and social impacts of USAID programs on marginalized and underrepresented groups and/or people in vulnerable situations and to provide guidance to USAID staff and Ips on identifying and stakeholder engagement with marginalized and underrepresented groups and/or people in vulnerable situations.

For example, healthcare facility projects, a potential EJ concern may be the placement of burn pits and incinerators for healthcare waste. Exposure to toxins from burn pits and incinerators may cause health issues and may disproportionately affect marginalized and underrepresented groups and/or people in vulnerable situations as they may be inequitably affected by a project. See the Healthcare Waste SEG for additional information. Further guidance on EJ is available in the USAID Voluntary Social Impact Principles Framework.[42]

5.1.4 LABOR

Healthcare facility projects involve workers. Each project implementer should be aware of the International Labor Organization's (ILO) conventions[43] that the host country has signed.

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[40] USAID. 2024. "Voluntary Social Impact Principles Framework." https://www.usaid.gov/environmental-procedures/environmental-compliance-esdm-program-cycle/social-impact-assessment.
[41] Ibid.
[42] Ibid.
[43] As per IFC Performance Standard 2 (IFC. 2012. "Performance Standard 2: Labor and Working Conditions, Section 1: Purpose of this Policy." https://www.ifc.org/content/dam/ifc/doc/2010/2012-ifc-performance-standard-2-en.pdf.) , this Performances Standard recognizes that "the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers and must respect several International Labor Organization (ILO) Conventions (ILO. n.d. "International Labour Organization Conventions." https://normlex.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12000:0::NO) , including ILO Convention 87 on Freedom of Association and Protection of the Right to Organize; ILO Convention 98 on the Right to Organize and Collective Bargaining; ILO Convention 29 on Forced Labor; ILO Convention 105 on the Abolition of Forced

Adherence to ILO's core labor standards is essential. The ILO core labor standards address freedom of association, collective bargaining, abolition of forced labor and the worst forms of child labor, minimum age, equal remuneration, discrimination, and the protection of children and young persons. Even for countries that do not adopt one or more standards, they are fundamental to the protection of the workforce. Please refer to guidance in the footnote.[44]

Furthermore, workers in the healthcare facilities sector are exposed to many occupational hazards, including infections such as tuberculosis and HIV, physical hazards such as heavy lifting and unsafe patient handling, hazardous chemicals, and more.[45] The exposure to occupational health hazards may be exacerbated by "healthcare worker shortages, lack of supportive supervision, poor building design and maintenance, lack of hygiene facilities and supplies," and so forth.[46] Please refer to further guidance in the footnote.[47]

5.2 OTHER SOCIAL CONSIDERATIONS

5.2.1 THE ROLE OF STAKEHOLDER ENGAGEMENT

Stakeholder engagement provides a systematic approach to Missions and Implementing Partners to acquire stakeholders' input, information, feedback, local and traditional knowledge, local perspectives, and concerns early on, during the design and planning phase, well before the assessment of the social impacts phase, as well as should be sustained throughout the entire project life cycle.[48] Stakeholders may be groups or individuals from the private or public sector, as well as individuals who may be considered an affected party along with those who may have interests in a project or the ability to influence its outcome, either positively or

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Labor; ILO Convention 138 on Minimum Age (of Employment); ILO Convention 182 on the Worst Forms of Child Labor; ILO Convention 100 on Equal Remuneration; ILO Convention 111 on Discrimination (Employment and Occupation);".; UNOCHR. 1990. "United Nations Convention on the Protection of the Rights of all Migrant Workers and Members of their Families." https://www.ohchr.org/en/instruments-mechanisms/instruments/international-convention-protection-rights-all-migrant-workers. and; UNOHCR. 1989. "Convention on the Rights of the Child." https://www.ohchr.org/en/instruments-mechanisms/instruments/convention-rights-child

[44] ILO. 2011. "Convention 189: Domestic Workers Convention." https://normlex.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_ILO_CODE:C189.; Rainforest Action Network. 2017. "Workers' Rights and Environment Justice."https://www.ran.org/issue/workers-rights-and-environmentaljustice/#:~:text=Workers%20are%20exploited%2C%20exposed%20to,care%2C%20food%2C%20and%20education..; The White House. 2023. "Memorandum on Advancing Worker Empowerment, Rights, and High Labor Standards Globally." https://www.whitehouse.gov/briefing-room/presidential-actions/2023/11/16/memorandum-on-advancing-worker-empowerment-rights-and-high-labor-standards-globally/.; United Nations. 2023. "Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all." https://sdgs.un.org/goals/goal8.; USAID. 2023. "ADS Chapter 225: Program Principles for Trade and Investment Activities and the "Impact on U.S. Jobs" and "Workers' Rights"." https://www.usaid.gov/about-us/agency-policy/series-200/225.

[45] ILO and WHO. 2022. "Caring for those who Care: Guide for the Development and Implementation of Occupational Health and Safety Programmes for Health Workers." https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---sector/documents/publication/wcms_837585.pdf.

[46] ILO and WHO. 2022. "Caring for those who Care: Guide for the Development and Implementation of Occupational Health and Safety Programmes for Health Workers." https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---sector/documents/publication/wcms_837585.pdf.

[47] ILO. 1981. "Protocol 155 - Protocol of 2022 to the Occupational Safety and Health Convention." https://normlex.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_INSTRUMENT_ID:312338.

[48] USAID. 2022. "Community Engagement Guide." https://www.climatelinks.org/sites/default/files/asset/document/2022-04/5a.%201_Community%20Engagement%20Reference%20Guide_30Mar22_508.pdf.

negatively. Members of civil society organizations may also be considered such as youth groups, church groups, or women's clubs. Special attention should be paid to marginalized and underrepresented groups and/or people in vulnerable situations because they may be inequitably affected by a project.

Stakeholder mapping, engagement, and consultation are key steps in the planning process of healthcare facilities projects and will also be crucial in identifying opportunities for the inclusion of marginalized and underrepresented groups and/or people in vulnerable situations.[49] Stakeholder engagement should be a broad, inclusive, and continuous process. The benefit of beginning the stakeholder engagement process early on and sustaining it throughout the entire project life cycle is that it may allow for the co-creation[50] of positive benefits, for example identifying mitigation measures regarding the social impacts based on traditional knowledge from local community members, through adaptive management. Information on best practices for stakeholder engagement is available in the USAID document entitled Environmental Compliance Factsheet: Stakeholder Engagement in the Environmental and Social Impact Assessment (ESIA) Process.[51]

5.2.2 LOCAL COMMUNITY

When planning and designing healthcare facilities projects, the local community in which the project will be embedded should be assessed. This assessment may be addressed prior to assessing potential social impacts by means of undertaking a desktop review of the characteristics of the community, such as demographics; socioeconomic composition; and political, institutional, and legal frameworks, as well as through field visits and stakeholder engagement. Although the particulars of identifying social impacts for healthcare facility projects depends on the site location, and local context, undertaking stakeholder engagement early on is necessary to improve the understanding of how the proposed project may affect the local community. If stakeholders in a local community voice concerns regarding potential negative social impacts due to a proposed project, the social impacts may be assessed, and mitigation and monitoring measures designed. Management measures should be commensurate with the degree of the identified adverse social impacts. In cases where social impacts from project activities are deemed to adversely affect the lands, rights, and livelihoods of individuals and communities, implementation of the project should be reconsidered (i.e., potentially ended). If/when the project is under implementation, the local community is adversely impacted, implementation of the project may need to be curtailed until adequate management measures have been designed and implemented to mitigate the identified impacts.

[49] USAID. 2016. "Environmental Compliance Factsheet: Stakeholder Engagement in the Environmental and Social Impact Assessment (ESIA) Process." https://www.usaid.gov/sites/default/files/2022-05/Stakeholder_Engagement_052016.pdf.

[50] USAID defines co-creation as a process that "brings people together to collectively design solutions to specific development challenges. Time limited and participatory, partners, potential implementers, and end-users define a problem collaboratively, identify new and existing solutions, build consensus around action, and refine plans to move forward with program and projects." For additional information see https://www.usaid.gov/co-creation-usaid.

[51] USAID. 2016. "Environmental Compliance Factsheet: Stakeholder Engagement in the Environmental and Social Impact Assessment (ESIA) Process." https://www.usaid.gov/sites/default/files/2022-05/Stakeholder_Engagement_052016.pdf.

5.2.3 GENDER EQUALITY

Many social impacts are gender differentiated and can affect men and women in different ways. USAID seeks to support gender equality with the following goals: (1) improve the lives of people by advancing gender equality; (2) empower women and girls to participate fully in, and equally benefit from, the development of their societies on the same basis as men; and (3) secure equal economic, social, cultural, civil, and political rights regardless of gender. USAID policy requires that a Gender Analysis "be integrated in strategic planning, project design and approval, procurement processes, and measurement and evaluation" as part of ADS 205: Integrating Gender Equality and Women's Empowerment in USAID's Program Cycle, which seeks to integrate gender and equality into the program cycle.[52]

Special attention must be paid to how healthcare facility projects may affect women and girls. Gender Analysis[53] "is a systematic analytical process used to identify, understand, and describe gender differences and the relevance of gender roles and power dynamics in a specific context." Such analysis[54] typically involves examining the differential impact of development policies and programs on women and men and may include the collection of sex-disaggregated or gender-sensitive data. Gender Analysis examines the "different roles, rights, and opportunities of men and women and relations between them. It also identifies disparities, examines why such disparities exist, determines whether they are a potential impediment to achieving results, and looks at how they can be addressed."[55] Furthermore, there may be gender divisions in the decision-making process that may influence how the placement of the project may be proposed.

Disparate gender impacts on healthcare facility projects may involve imbalances in stakeholder input, decision making, employment opportunities, and monetary compensation for project impacts. A Gender Analysis helps to identify gender disparities in the community early on. Because USAID projects require stakeholder engagement and consultation as part of the process of identifying, avoiding, and mitigating adverse social impacts, it is increasingly important to be aware of gender-based barriers to public participation. In these cases, stakeholder engagement and consultations may need to occur in a gender sensitive manner, for instance by having separate venues for men and women. To acquire input and feedback from women, a combination of methods may be undertaken (such as interviews and focus groups). For, instance semi-structured interviews or women-only focus groups may be conducted with women in a safe space such as an individuals' home or place of worship. Providing a space in which to obtain women's perspectives may shed light on a potential gender division in decision making and consultation, and in turn could impact siting and benefit sharing.

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[52] USAID. 2023. "ADS Chapter 205: Integrating Gender Equality and Women's Empowerment in USAID's Program Cycle." https://www.usaid.gov/about-us/agency-policy/series-200/205#:~:text=USAID%20has%20adopted%20several%20comprehensive,fully%20exercise%20their%20rights%2C%20determine.

[53] USAID. 2023. "2023 Gender Equality and Women's Empowerment Policy." https://www.usaid.gov/document/2023-gender-equality-and-womens-empowerment-policy.

[54] USAID. 2011. "Tips for Conducting a Gender Analysis at the Activity or Project Level." https://pdf.usaid.gov/pdf_docs/PDACX964.pdf.

[55] USAID. 2023. "2023 Gender Equality and Women's Empowerment Policy." https://www.usaid.gov/document/2023-gender-equality-and-womens-empowerment-policy.

5.2.4 INDUCED SETTLEMENT AND IN-MIGRATION

> The addition of a new healthcare facility project in a local community may cause induced settlement and in-migration, which, in turn, may potentially lead to other social impacts, such as higher real estate prices, housing shortages, increased traffic congestion, and a higher incidence of traffic accidents, as well as the overcrowding of local schools.

Healthcare facilities are usually constructed in response to an existing need. However, as a critical social service, they (along with roads and schools) may induce settlement and in-migration, placing additional demands on the local community. This effect is largely beyond the control of healthcare facility project proponents. However, project proponents may want to discuss likely settlement trends with district or town planners—both to help the healthcare sector plan for a growing population and to help planners provide for this from environmental management and social services perspectives. For more guidance on project-induced in-migration, see the footnote.[56]

TABLE 4. SUMMARY OF POTENTIAL SOCIAL IMPACTS, MITIGATION MEASURES AND MONITORING MEASURES FOR HEALTHCARE FACILITIES

SOCIAL IMPACT	MITIGATION MEASURES	MONITORING MEASURES
Labor – Increased exposure to health and safety hazards in a local healthcare facility Healthcare facility workers are exposed to several health and safety hazards. They may experience exposure to infection, heavy lifting, and hazardous chemicals, which may be due to, for example, poorly developed or enforced national occupational labor standards.	• Follow the guidance as per ILO 155[57]. • Set up a Stakeholder Engagement Plan (SEP) early on during the project cycle. • Conduct safety trainings for workers. • Educate healthcare workers and build awareness of prevention measures related to the various infections and illnesses that can be contracted at healthcare facilities. • Provide proper personal protective equipment (PPE) for hospital workers. • Identify host country laws and regulations and/or international laws or regulations	• Review the SEP periodically. • Keep a log of incidents pertaining to chemical exposures, accidents, illnesses, infections, and so forth. • Keep records of trainings on labor safety. • Keep a log of all hospital workers that have access to and use PPE. • Conduct reviews to monitor occupational health and safety precautions.

56 IFC. 2009. "A Handbook for Addressing Project-Induced In-Migration." https://documents1.worldbank.org/curated/en/415141468176677099/pdf/626310PUB0Proj00Box0361488B0PUBLIC0.pdf.

57 ILO. 1981. "Protocol 155 - Protocol of 2022 to the Occupational Safety and Health Convention." https://normlex.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_INSTRUMENT_ID:312338.

SOCIAL IMPACT	MITIGATION MEASURES	MONITORING MEASURES
	regarding labor safety. • If the situation arises that local law is inadequate, follow the standards according to USAID guidance.	
Health, Well-Being, and Safety – Impacts on health, well-being, and safety due to nosocomial infections Patients served by the healthcare facility project may be exposed to nosocomial infection, which is an infection unintentionally contracted from the healthcare facility.	• Draft a Stakeholder Engagement Plan (SEP) early on during the project. • Educate healthcare workers on nosocomial infection and preventable measures by conducting workshops and trainings. • Build capacity for community health services and health education. • Conduct trainings on measures to prevent nosocomial infection.	• Review the Stakeholder Engagement Plan (SEP) periodically throughout the project life cycle. • Keep a log on the number of nosocomial infections. • Keep records on health, well-being, and safety workshops and trainings.
Gender Equality – Low numbers of female patients seeking medical treatment and low participation of females in classes on sex education and family planning at a local healthcare facility The lack of separation between male and female patients in a healthcare facility may lead to lower rates of treatment of women because social norms in some cultures advocate for a separation. A healthcare facility may lack a separate space for health education programs, including for reproductive health, which may disproportionately reduce the willingness of women to take advantage of such services.	• Establish a stakeholder engagement plan (SEP). • Conduct a Gender Analysis to integrate a gender-sensitive approach to the SEP. • Undertake a Gender Analysis and follow the guidance per the Gender Equality and Women's Empowerment Policy. • Separate patient waiting areas from the examination area by a solid wall. • Provide a door that can be closed. • Ensure that examination rooms are private with either doors or curtains to allow for privacy during visits. • Designate locations for health education, sex education, counseling	• Review the SEP periodically and integrate feedback from women on an ongoing basis. • Keep records on the number of women patients who have been treated at the local healthcare facility. • Keep records on the number of women participants attending classes and capacity-building workshops on sex education and family planning. • Promptly review and address grievances and complaints that may have arisen.

SOCIAL IMPACT	MITIGATION MEASURES	MONITORING MEASURES
	sessions, and family planning services that allow for adequate privacy.[58] • Set up a grievance and redress mechanism.	
Environmental Justice – Exposure to pollution from burn pits and incinerators Marginalized and underrepresented groups and/or people in vulnerable situations may experience disproportionately high levels of pollution exposure from burn pits and incinerators from healthcare facilities. Burn pits and incinerators used for burning healthcare waste can emit pollution that can lead to increased health risks for those living nearby. Environmental injustice can occur due to the placement of the burn pits and incinerators.	• Establish a Stakeholder Engagement Plan (SEP). • Conduct stakeholder engagement at the beginning of the project life cycle and sustain throughout the project Ensure that protections for marginalized and underrepresented groups and/or people in vulnerable situations are upheld to ensure environmental justice. • Evaluate demographic and geographic data to ensure that proposed healthcare facility projects are sited such that social and ethnic minority groups are not exposed to pollution. • Procurement provisions require incinerators and burn pits to be placed at a safe distance from nearby homes and provide proper waste management. • Explore safer waste management procedures that cause less pollution.	• Review the SEP periodically. • Conduct spot auditing where feasible. • Review demographic and geographic data for significant changes in community composition to understand which groups are most at risk. • Keep a log of updates to waste management plans. Review waste management plans of healthcare waste periodically. • Keep a log on and report instances of illnesses contracted from the pollution from burn pits and incinerators and review public health data.
Conflict Dynamics – Increased social conflict in the local community In some situations, choices around small healthcare facility construction (e.g., siting, stakeholder engagement, hiring and contracting) can exacerbate	• Establish a Stakeholder Engagement Plan (SEP) and undertake stakeholder engagement at the beginning of the project and throughout its lifetime. • Undertake an analysis of local conflict	• Review the SEP periodically. • Continue to conduct stakeholder engagement throughout the project life cycle by using a mixed-methods approach, such as village meetings or

[58] United Nations Department of Economic and Social Affairs, Population Division (2022). World Family Planning 2022: Meeting the changing needs for family planning: Contraceptive use by age and method.

SOCIAL IMPACT	MITIGATION MEASURES	MONITORING MEASURES
existing or generate new conflicts within communities.	dynamics and follow guidance from USAID resources. See the footnote.[59] • Consult with community leaders, government officials, members of civil society, women's groups, church groups, NGOs, and community-based organizations (among other stakeholders) to understand existing conflicts and tensions. • Ensure social inclusion, especially for marginalized and underrepresented groups and/or people in vulnerable situations. • Conduct workshops on conflict resolution.	community surveys, with a focus on marginalized and underrepresented groups and/or people in vulnerable situations. • Keep records on participants who have attended the workshops on conflict resolution. • Keep records on the number of social conflict incidents.

[59] USAID. n.d. *Technical Publications on Conflict Management and Mitigation*. Accessed 2024. https://www.usaid.gov/conflict-violence-prevention/technical-publications.

6. DESIGN, CONSTRUCTION, OPERATIONS, AND MAINTENANCE GUIDANCE

This section contains design, construction, and operations guidance organized in three tables, as summarized below:

- **Environmental elements.** Table 5 addresses facility siting, construction materials and management, asbestos, sanitation, waste disposal, wastewater disposal, and pesticide handling.
- **Mixed elements.** Table 6 addresses elements that are not exclusively environmental but have strong environmental dimensions: water supply, biosafety and infectious disease control, kitchen management, and laboratory management.
- **Non-environmental elements.** Table 7 addresses clinic functionality, security, and electricity supply.

As noted in the introduction to this guidance, **environmentally sound design and operation** of small healthcare facilities are an integral part of overall good practice for this sector. Therefore, mixed and non-environmental elements of small healthcare facility design, construction, operations, and maintenance that are closely linked to environmental elements are addressed in this section.

Tables 5 through 7 provide concise guidance and references for more detailed assistance. These references include the **siting, design, and operations checklists** at the end of this chapter. Checklists are provided for latrines, hand-washing stations, potable water wells, burn pits, hazardous waste storage areas, and overall operations and maintenance.

TABLE 5. ENVIRONMENTAL RISK MITIGATION MEASURES

Note: Many of the problems listed in the table below may be affected by climate change or may affect the climate. The associated mitigation measures may be particularly helpful for increasing adaptive capacity, or for decreasing sensitivity or exposure to potential climate changes.

CLINIC ELEMENT	TO AVOID ADVERSE IMPACTS, ASK …	MITIGATION MEASURES	REFERENCES FOR FURTHER GUIDANCE
Location/Siting	• Is terrain sloping? Is the terrain vulnerable to landslides due to the slope, lack of vegetation, and/or exposure to heavy precipitation? • Does water pool anywhere in the clinic grounds? How might climate change affect the terrain and water accumulation? • Will the site be located near schools or in high-density habitats? • Where does water drain? How might water drainage be affected by climate change? • Does the site have any trees for shade cover? • What are the seasonal temperature norms? Does the area have a rainy season, windy season, cold season, etc.? How are temperatures and seasons expected to change due to climate change? • What are the natural hazard risks (e.g., earthquake, landslide, flooding)? • How are weather-related risks expected to change due to climate change? • Does the location have special cultural or aesthetic value to the local community?	• Select a location with access to safe drinking water; consider how climate change may affect water supplies in the future. • Avoid locations that pose a greater risk of exposure to impacts affecting children and the general population. • Consider climate risks (e.g., floods, drought, wildfires) and the proximity to centralized waste disposal facilities when siting healthcare facilities. • Avoid locations that require an extensive amount of vegetation and/or forest clearing. If a location requires land clearing, avoid burning, if possible, and properly dispose of vegetation. • Select a location that has multiple transportation options for staff and clients, especially lower emission transportation options, such as trains or other public transit. • Avoid siting in a wetland or next to a river, stream, or lake. Leave a 50-meter-wide strip to prevent erosion around riparian zones. • Retain and plant native trees around the facility to add more shade in hot climates, sequester GHG emissions, and protect against wind and dust storms. Consider how climate change may affect planted trees. • Include a high roof, porches, and large windows with shutters for buildings in hot climates and in areas that are expected to get hotter due to climate change. • Construct gutters and concrete aprons around buildings to prevent rainwater damage and soil erosion around buildings. • Construct soak pits and canals to prevent stagnant water from pooling around clinic grounds and receiving	• USAID Sector Environmental Guideline: Water and Sanitation • USAID Sector Environmental Guideline: Construction • USAID Sector Environmental Guideline: Healthcare Waste

CLINIC ELEMENT	TO AVOID ADVERSE IMPACTS, ASK …	MITIGATION MEASURES	REFERENCES FOR FURTHER GUIDANCE
	• Will the site be located in or near protected areas or in the vicinity or inside Indigenous communities? • Will climate change increase the vulnerability or importance of these areas? • Will construction encourage population in-migration/settlement? • Will the proposed site be exposed to any new or more severe weather shocks as a result of climate change? • Where do patients live? Will patients be able to easily access the facility? Will the location of the facility make it difficult for marginalized and underrepresented groups and/or people in vulnerable situations to access treatment?	greywater. • Upgrade roads to allow facility access during rainy seasons using techniques to minimize soil erosion and the creation of multiple tracks on unpaved roads. • Assess normal wind patterns and site the clinic upwind of latrines and the burn pit. Burn pits should be sited away from settlements and people; if a burn pit is being constructed in an urban area, a smokestack should be constructed to mitigate health hazards. • Meet with town/village planners to discuss likely settlement trends so that they are better able to anticipate future environmental management and social services needs. • Consider the need for structures that can be used as refuge or community gathering places in times of disaster, and ways to design or site the clinic in order to facilitate that role. • Consider and plan for climate impacts, such as increased temperatures that could affect worker health.	
Construction Materials and Management	• How will the contractor prevent soil erosion during and after construction? • Consider how soil erosion may increase over time due to severe events associated with climate change. • How will the contractor prevent the pollution of surface water and groundwater during construction? Consider how climate change may change precipitation patterns. • How will the contractor dispose of construction waste? • Will construction contribute to deforestation or forest degradation? • Can local building materials be utilized without adverse impacts? • Is it possible to select local	• Minimize the size of cleared areas. Limit earth moving to dry seasons. • Use locally available materials for construction in order to reduce maintenance costs and transportation-related emissions, except where such materials may be taken from protected areas or their extraction may create significant adverse impacts on the local environment. • Engage with materials suppliers to understand the upstream GHG emissions associated with the production of materials. Choose materials with lower embodied emissions whenever practical. • Choose materials and design tactics that will avoid emissions and increase the infrastructure's lifespan. • Backfill borrow pits when no longer needed to prevent the accumulation of standing water. • Minimize the idling time of construction equipment. • Dispose of construction waste in controlled dumps with provisions for groundwater and surface water protections.	• USAID Sector Environmental Guideline: *Construction*

CLINIC ELEMENT	TO AVOID ADVERSE IMPACTS, ASK …	MITIGATION MEASURES	REFERENCES FOR FURTHER GUIDANCE
	construction materials, or construction materials that have been sourced in a way that reduces GHG emissions?	• Revegetate with native grasses and shrubs to stabilize soil after construction has been completed. • Avoid building in forested areas. Where deforestation is unavoidable, invest in reforestation or the protection of nearby forested areas. • Provide potable water, and appropriate sanitary and solid waste disposal facilities for use by construction workers. • Set robust engineering design and construction materials standards that can withstand increasingly variable weather and extreme events. • Adopt adaptation options to protect construction workers based on local climate risks (e.g., water or cooling stations, mosquito netting). Ensure that construction workers have frequent breaks. • Protect construction materials when not in use (e.g., cover with a tarp) to prevent runoff during heavy precipitation events or excess dust during heatwaves and drought).	
Asbestos	• Does the clinic contain any asbestos-containing materials? • Can asbestos-containing materials be safely contained and/or left undisturbed by construction or other activities? • How can asbestos-containing materials be disposed of in a safe manner?	• Label and leave undamaged materials alone. To the extent possible, prevent them from being damaged, disturbed, or touched. • Periodically inspect for damage or deterioration. • Check with local health, environmental, or other appropriate officials to learn about proper handling and disposal procedures and the availability of secured disposal sites. • Seal asbestos-containing materials in place by covering with a layer of primer and paint, or a layer of polyvinyl chloride (PVC) adhesive. • If asbestos-containing materials must be removed, determine the availability of local expertise in asbestos removal and disposal, and request on-site assistance. • Thoroughly soak material with water containing a few drops of detergent before removing or disturbing asbestos-containing materials. • Never break removed material into small pieces. This could release asbestos fibers into the air. Asbestos pipe	• Consumer Product Safety Commission, U.S. EPA, and the American Lung Association, Asbestos in the Home • Worker's Health Centre, Asbestos Removal Fact Sheet • USAID Sector Environmental Guideline: *Construction*

CLINIC ELEMENT	TO AVOID ADVERSE IMPACTS, ASK …	MITIGATION MEASURES	REFERENCES FOR FURTHER GUIDANCE
		insulation is typically installed in preformed blocks and should be removed in complete pieces. • After removal, clean the area well with wet mops, wet rags, sponges, or HEPA (high-efficiency particulate air [filter]) vacuum cleaners. Wetting helps reduce the chance of spreading asbestos fibers in the air. • The worksite should be visually free of dust and debris. • All asbestos-containing materials, disposable equipment, and clothing used on the job must be placed in sealed, leakproof, and labeled plastic bags. • Dispose of all asbestos-containing materials in sealed, lined bins or a leak-proof container.	
Sanitation	• Where will toilets/latrines be sited? How might climate impacts such as increased precipitation or severe storms inform the siting of toilets/latrines? • How might changes in precipitation associated with climate change affect the availability of fresh water? • How can toilets/latrines be designed to meet the needs of all patients?	• Construct improved latrines. • Include hand-washing stations located close to latrines. • Provide separate facilities for clinic staff. • Teach basic sanitation and hygiene practices to clinic patients and their family members. • Ensure effective maintenance and minimize leakage and losses. • Power sanitation systems with renewable energy, where possible. • Promote water conservation. Where possible, use hand-washing equipment that automatically stops water flow after a short-period of time in order to reduce excessive water use. • Adopt efficient plans and designs, including the use of nature-based solutions for runoff and drainage. • Ensure that latrine siting considers near- and long-term climate change impacts, such as changes in extreme precipitation events and the increased likelihood of flooding. • Invest in integrated water management or water storage to ensure the availability of fresh water, particularly in consideration of climate risks (e.g., drought). • Ensure that latrine siting/design makes it easy for persons with disabilities or limited mobility to use them (avoiding steep grades and provide a clear path from the healthcare facility).	• Latrine siting and design checklist (in this guideline) • Hand-washing station siting and design checklist (in this guideline) • USAID Sector Environmental Guideline: Water and Sanitation for discussion on latrine siting, sizing, design, construction, and management

CLINIC ELEMENT	TO AVOID ADVERSE IMPACTS, ASK …	MITIGATION MEASURES	REFERENCES FOR FURTHER GUIDANCE
		• Ensure that latrine siting/design meets the needs of women and girls, including constructing separate latrines by gender, installing lockable doors, and providing appropriate disposal facilities for menstrual hygiene products.	
Waste Disposal	• How will the facility handle healthcare waste? • Will the facility generate hazardous waste? If so, how will they handle it? • How will the facility handle solid waste? • How will the facility handle expired medications? • Is climate change expected to bring an increase in storms, flooding, wildfires, or other impacts in waste storage areas?	• Site waste storage and disposal areas away from main clinic buildings. • Establish a system of source separation: provide clearly labeled buckets for sharps, non-hazardous waste, disposable hazardous waste (dressings, tissue), and non-disposable hazardous materials (sheets, towels). • Boil recyclable hazardous waste. • Incinerate non-recyclable hazardous waste, sharps, and expired pharmaceuticals. • Emissions from the open burning of waste should be managed through the prevention of fires by avoiding the stockpiling of large volumes of flammable materials (e.g., recyclables, wood, paper and plastic bales, tires). Waste gas collection systems (with strict pollution control technology) are also effective at reducing the risk of fires, producing energy for use on-site, and reducing incineration-related GHG emissions. • Reduce dust generation at exposed areas (i.e., waste stockpiles) by covering exposed areas of ground/stockpiles to prevent windborne dust or dampen with water. • Do not use incinerators and burn pits for the storage of hazardous materials. (See USAID Sector Environmental Guideline: Healthcare Waste for the definition of hazardous materials.) • Avoid the storage of hazardous material on the floor by storing hazardous waste on shelves or in elevated drums in a location that is well-protected from the elements. • Store hazardous waste in a dedicated, concrete-lined area that is surrounded by a berm to prevent spills from escaping. • Screen burn pits to reduce disease transmission by insects, birds, and mammals.	• Hazardous Waste Storage Area Siting and Design Checklist (in the Small Healthcare Facility Sector Environment Guide) • Burn pit siting and design checklist (in this guideline) • USAID Sector Environmental Guideline: Healthcare Waste for detailed discussion and further guidance • T. Grayling, Guidelines for Safe Disposal of Unwanted Pharmaceuticals In and After Emergencies for guidance on the disposal of expired medication • S. Batterman, Assessment of Small-Scale Incinerators for Health Care Waste for guidance on incinerator design

CLINIC ELEMENT	TO AVOID ADVERSE IMPACTS, ASK …	MITIGATION MEASURES	REFERENCES FOR FURTHER GUIDANCE
		• Cover burn residue in pit with soil after each burn. • Fence the area around burn pits to prevent access by animals, children, and others. • Include/locate fences to serve as a wind barrier to prevent unburned or partially burned materials from blowing out of the pit. • Site or relocate waste storage and disposal facilities (e.g., incinerators, placenta pits) to minimize the impact from climate risks (e.g., flooding, wildfires, extreme rainfall). • Schedule more frequent healthcare waste collection in response to weather forecasts to avoid the impact on waste from flooding and/or high winds. • Ensure that a variety of waste disposal technologies are available (as feasible) to safely disinfect, neutralize, and contain waste (such as autoclaving) should certain options become compromised. • Train the healthcare workforce on waste stream hazards (including chemical safety) for better management and monitoring during climate-related extreme weather events. • Provide workers who handle medical waste with appropriate personal protective equipment (PPE).	
Wastewater Disposal	• How much greywater will be produced in a given day or week? • Can wastewater be disposed of in a local sewer system? • Can burn pits be used for disposal? Is climate change expected to bring an increase in strong winds? • Will the volume of water create pooling? • Will the water be treated before it is disposed of? • Who will be in charge of disposal?	• Where possible, dispose of greywater in public sewer systems. • Greywater should never be allowed to mix with surface water or to pool and stagnate (e.g., in clay-lined burn pits or bare ground behind the facility). • Site greywater soak pits 3 meters away from vegetation and 30 meters away from groundwater sources. • Ensure that bottom of the soak pit is at least 1 meter above the water table during the wettest period and 1 meter above impermeable layers of soil. • Promote water conservation. • If possible, recycle wastewater on-site to reduce emissions and water supply needs. • Site or relocate (if possible) wastewater storage/treatment facilities to avoid overflow due to	• USAID Sector Environmental Guideline: WASH for discussion of soak pit construction • USAID Sector Environmental Guideline: Healthcare Waste

CLINIC ELEMENT	TO AVOID ADVERSE IMPACTS, ASK …	MITIGATION MEASURES	REFERENCES FOR FURTHER GUIDANCE
		flooding. Consider and plan for climate impacts.	
Pesticide Handling (insecticide-treated bed nets)	• Will the facility have a bed net treatment and distribution program? • Will climate change affect the range and incidence of disease vectors and the need for these types of programs? • Is the facility located near a fishing area?	• Identify specific staff who will be responsible for storage, treatment, and disposal. No other staff members should be involved in these activities. • Train staff in the safe handling of these pesticides, the disposal of waste, and the cleanup of spills. Impermeable gloves and face protection should be worn by anyone handling concentrated solutions and by persons treating bed nets. • Minimize the effects of inhaling solvent vapors by treating nets in a well-ventilated area and using shallow basins for dipping so that the vapors can escape. The best approach to this problem is to choose water-based formulations. • Ensure that insecticide is safely transported and stored away from foodstuffs and accidental access by untrained persons and children. • Provide materials for and operating procedures for cleaning up spills. • Provide facilities and operating procedures for disposing of excess insecticide solution, as needed. • Leftover solution, if all the solution is not absorbed by the net, should be dumped into a safely sited latrine or garbage pit. Similarly, empty liquid pesticide containers should be rinsed before disposal, and the rinse water disposed of properly. • Empty containers should always be cleaned out, as far as practicable, before disposal; If possible, they should then be disposed of according to the United Nations Food and Agriculture Organization's recommendations. • As long as they are not heavily contaminated, cardboard and fiberboard containers should be burned by fire in the open (except those contaminated with phenoxy acid herbicides). (Note: Any burning should be upwind.) • Heavily contaminated material and all other containers should be rendered unusable and sent to a central location for disposal by the national authority.	• USAID Sector Environmental Guideline: Safer Pesticide Use • B. Hirsch et al., Programmatic Environmental Assessment for Insecticide-Treated Materials in USAID Activities in Sub-Saharan Africa for guidance on ITN issues • World Health Organizations Pesticide Evaluation Scheme (WHOPES) for additional links and guidance about appropriate ITN insecticide use and handling

CLINIC ELEMENT	TO AVOID ADVERSE IMPACTS, ASK …	MITIGATION MEASURES	REFERENCES FOR FURTHER GUIDANCE
		• Glass containers should be broken and plastic or metal containers punctured or crushed. Containers can then be buried in an isolated area at least 50 centimeters below ground. • Train staff in the appropriate emergency response in the case of pesticide poisoning and ensure that certain treatment facilities have soap and water and medical charcoal available. • Provide training for patients on the appropriate use of ITNs to reduce the risk that they are inappropriately used for fishing.	

TABLE 6. DESIGN, CONSTRUCTION, OPERATIONS, AND MAINTENANCE GUIDANCE—MIXED ELEMENTS

These elements are not exclusively environmental but have strong environmental dimensions.

CLINIC ELEMENT	KEY QUESTIONS	GUIDANCE	REFERENCES FOR FURTHER GUIDANCE
Water Supply	• How much water is required for clinic operations? • What are the available water sources? How do they vary seasonally in quantity? How do they vary seasonally in quality? How might they vary in quality and quantity in the near and medium term as a result of climate change? • How will regular water quality testing (e.g., coliform bacteria, nitrates, arsenic, heavy metals) be managed? • How will water source(s) be kept clean?	• Healthcare facilities should have dedicated water sources (e.g., well, water tower, rainwater collection cistern) that are not shared with communities or schools and that are not in areas that may be damaged or inaccessible due to climate change impacts. Water sources should provide adequate water under projected climate conditions. • Locate well upstream (upgradient) from the hazardous waste pit or storage areas, solid waste disposal area, and latrines. • For clean well water, ensure that the water table is at least 3 meters below ground level during all seasons; above this level, the water quality is typically equal to that of surface water. • Construct an apron around the well, covering at least a 1.5-meter radius extending from the well opening. • Construct a channel around the apron that diverts the wastewater to a soakaway pit that is at least 10 meters from the apron. • Add a well cover and pump to prevent the contamination of well water. • Where possible, power the water distribution system (i.e., pumps) with renewable energy. • Bury surface pipes, wherever possible, to avoid damage from vehicles, animals, or community members who may be tempted to "hack" into the water supply. • Where a pump is not feasible, use only one rope and bucket suspended from the wellhead to collect water. • Disinfect the well with a 1% chlorine solution before first use and test for coliform bacteria every month to ensure water quality.	• Sphere Handbook • USAID Sector Environmental Guideline: Water and Sanitation
Biosafety and Infectious Disease	• How will equipment and instruments be sterilized? • How will treatment areas be	• Install screens in windows and place curtains over doorways to control insects and other pests. • Use universal precautions to protect patients and staff.	

CLINIC ELEMENT	KEY QUESTIONS	GUIDANCE	REFERENCES FOR FURTHER GUIDANCE
Control	cleaned and sterilized? • What protections will staff and patients need against the spread of disease? • What protections will be necessary during significant disease outbreaks (e.g., cholera epidemic, typhoid, meningitis outbreak, malaria high seasons)? • What disease outbreaks may become more common as a result of climate change?	• Wash all surgical instruments with soap and water, then autoclave where feasible. • Autoclave instruments daily (a minimum requirement). Hot air sterilizers should be replaced by autoclaves. • If only autoclaving once per day, wash and immerse instruments in chlorine bleach for 30 minutes before next use. • Where autoclaving is not feasible, boil all instruments prior to reuse. • Translate autoclave instructions into the local language. Clean floors and surfaces daily with chlorinated bleach. • Provide gloves and protective wear for cleaning staff and train all staff in the proper handling of chlorine bleach. • Establish a disease surveillance system by recording the diagnosis of every patient seen in the clinic to gain an idea about general disease trends, which diseases predominate in the community, and for early detection of outbreaks/epidemics of disease in order to reduce their impact. • Provide weather and climate forecasts to help identify possible areas at risk and gather appropriate medical supplies. • Create an emergency outbreak plan that identifies a site for makeshift beds and plans for emergency toilet facilities. Keep a separate store of medicines and supplies reserved for emergency situations. • Where possible, power autoclave, sterilizers, and other cleaning equipment with renewable energy. Ensure that autoclave and sterilizer equipment are energy efficient. • Source personal protective equipment that is reusable, recyclable, or biodegradable, when possible.	
Kitchen Management	• Will the facility provide meals (e.g., to patients, as part of child nutrition programs, for staff, others)? • If not, does the facility have a designated space for family members to prepare meals for	• Locate the kitchen in an area that is not visited by patients and is away from the latrines and close to the well. • Construct windows for ventilation and lighting, and screen windows to reduce flies and other insects. • Design entries to prevent access by insects, rats, and	

CLINIC ELEMENT	KEY QUESTIONS	GUIDANCE	REFERENCES FOR FURTHER GUIDANCE
	patients? • How will kitchens control pests? • What type of stove is in the kitchen? What fuel is supplied for the stove?	mice. • Remove all kitchen waste from the facility daily and dispose of waste in an area that is separate from the storage location for hazardous wastes. • Prevent food waste by reducing spoilage, oversupply, and overconsumption. • Ensure that food waste is properly disposed of by separating it from landfill and recycling waste streams; compost it where possible. • When possible, use kitchen equipment powered by electricity or natural gas rather than diesel, coal, or biomass. • Consider sourcing local food and introducing more plant-based food options. • Identify alternative schedules/transportation routes for food and kitchen supply deliveries to avoid delays due to climate change impacts (e.g., flooding, heavy rain, wildfires). • Use energy-efficient stoves (e.g., improved cookstoves) and electric stoves if available, to reduce fuel consumption and improve indoor air quality. • Plant a windbreak of plant species around the clinic that produces good fuel for cookstoves. Consult the local community about preferred plant species.	
Laboratory Management	• Will the facility have a laboratory? • What tasks will the laboratory need to carry out?	• Ensure that laboratory safety requirements are posted and understood by all staff. • Ensure that laboratories are energy efficient and, where possible, use energy-efficient or renewable laboratory equipment.	• WHO Laboratory Biosafety Manual for guidance on laboratory design and operations

TABLE 7. DESIGN, CONSTRUCTION, OPERATIONS, AND MAINTENANCE GUIDANCE—OTHER ELEMENTS

CLINIC ELEMENT	KEY QUESTIONS	GUIDANCE	REFERENCES FOR FURTHER GUIDANCE
Clinic Functionality	• How can you minimize congestion and thereby minimize patient-to-patient disease transmission? • What services will be offered? • How many staff will be working there? Is there adequate secured space for their personal belongings? • Are there cultural requirements for the separate treatment of male and female patients? • Will the facility accommodate overnight patients? • Will there be separate wards/treatment areas for special needs patients (e.g., HIV/AIDS, TB)? • Does the facility have adequate and separate space for: ○ Health education programs? ○ If applicable, sex education, family planning, and counseling programs? ○ Patient waiting? ○ Storage? • Will the facility support a mobile health team?	• Design each building to allow easy cleaning and sterilization. • Separate patient waiting areas from the examination area with a solid wall. • Provide a door that can be closed. • Ensure that examination rooms are private, with either closable doors or curtains to allow for privacy during visits. • Provide suitable ventilation and natural lighting for examination rooms. • Provide at least one secured space for nursing staff and volunteers to store belongings in large clinics. • Provide training for staff about patient privacy and the confidentiality of records. • Build the capacity of staff to advance climate-smart operations and understand the connections between climate change and public health risks that could result in increased patient load. • Use early warning systems for high temperatures and extreme weather events to allow proactive preparation. • Include adequate, discrete locations for health education, sex education, counseling sessions, and family planning services. • If meals will not be prepared in a central kitchen for patients, add a designated space for family members to cook. • Include amenities such as a radio to increase the likelihood of staff retention. • Provide a separate and safe play/waiting area for accompanying well children to minimize their exposure to disease while their parents or siblings are being treated.	
Security	• How will the clinic prevent unauthorized access to the facilities (human and animal)?	• Build a wall or fence around the clinic to prevent animals, children, and others from wandering into buildings.	

CLINIC ELEMENT	KEY QUESTIONS	GUIDANCE	REFERENCES FOR FURTHER GUIDANCE
	• How will the clinic secure medicines and medical equipment against theft? • How will the clinic secure key infrastructure (e.g., solar panels, radio, computers) against theft?	• Provide secured storage cabinets and secured storerooms for medicines and medical equipment. • Install metal gratings or bars over storeroom windows. Consider hiring a security guard.	
Electricity Supply	• What are the clinic's power requirements? • How will the clinic ensure the reliability of the power supply?	• Install electric lighting in treatment rooms and maternity facilities. • Seek to access on-grid or off-grid electricity supply from renewable energy sources where available. Use off-grid, small-scale solar panel and battery storage systems to supply electricity in rural areas. • Install back-up power sources for clinics that rely on municipal power supply or generation from sources that may be affected by climate and weather impacts. If available, battery storage can provide a zero- or low-emissions alternative to generators. • Consider installation of an inverter, which can manage inputs from the power grid, a generator, and alternative energy sources as local availability and priorities dictate. • Use compression-type refrigerators and ice pack freezers for cold-chain programs. • Provide electricity for radios as an amenity for clinic staff (photovoltaic or hand-crank devices may be appropriate for rural areas). • Ensure that the siting of energy systems considers climate risks (e.g., flooding, wildfires).	• A. Jimenez and K. Olson, Renewable Energy for Rural Health Clinics for information about clinics' power requirements and renewable energy supply options

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USAID. 2023. "2023 Gender Equality and Women's Empowerment Policy." https://www.usaid.gov/sites/default/files/2023-03/2023_Gender%20Policy_508.pdf.

USAID. 2023. "ADS Chapter 205: Integrating Gender Equality and Women's Empowerment in USAID's Program Cycle." https://www.usaid.gov/sites/default/files/2023-04/205_1.pdf.

USAID. 2023. "ADS Chapter 225: Program Principles for Trade and Investment Activities and the "Impact on U.S. Jobs" and "Workers' Rights"." https://www.usaid.gov/about-us/agency-policy/series-200/225.

USAID. 2017. "ADS Reference 201MAL: Climate RIsk Management for USAID Projects and Activities." https://www.usaid.gov/ads/policy/200/201mal.

USAID. 2022. "Community Engagement Guide." https://www.climatelinks.org/sites/default/files/asset/document/2022-04/5a.%201_Community%20Engagement%20Reference%20Guide_30Mar22_508.pdf.

USAID. 2016. "Environmental Compliance Factsheet: Stakeholder Engagement in the Environmental and Social Impact Assessment (ESIA) Process." https://www.usaid.gov/sites/default/files/2022-05/Stakeholder_Engagement_052016.pdf.

USAID. 1980. "Reg. 216 (22 CFR 216)." https://www.usaid.gov/environmental-procedures/laws-regulations-policies/22-cfr-216.

USAID. 2024. "Social Impact Risk Initial Screening and Diagnostic Tools. A Mandatory Reference for ADS Chapter 201." https://www.usaid.gov/sites/default/files/2024-05/201mbf_051424.pdf. .

USAID. n.d. *Technical Publications on Conflict Management and Mitigation.* Accessed 2024. https://www.usaid.gov/conflict-violence-prevention/technical-publications.

USAID. 2011. "Tips for Conducting a Gender Analysis at the Activity or Project Level: Additional Help for ADS Chapter 201." https://pdf.usaid.gov/pdf_docs/PDACX964.pdf.

USAID. 2024. "Voluntary Social Impact Principles Framework." https://www.usaid.gov/environmental-procedures/environmental-compliance-esdm-program-cycle/social-impact-assessment.

8. ADDITIONAL RESOURCES

8.1 OTHER USAID SMALL-SCALE GUIDELINES

A number of the issues summarized in this guidance are treated in more detail in other chapters of the *Sector Environmental Guidelines*. Refer to these specific guidelines listed below for detailed information on specific issues:

- Small-Scale Construction
- Healthcare Waste: Generation, Handling, Treatment, and Disposal
- Pest Management
- Water and Sanitation

8.2 ADDITIONAL REFERENCES AND SUGGESTED RESOURCES

- Consumer Product Safety commission, US EPA, and American Lung Association, *Asbestos in the Home* https://www.cpsc.gov/safety-education/safety-guides/home/asbestos-home#:~:text=The%20mere%20presence%20of%20asbestos%20in%20a%20home,IN%20GOOD%20CONDITION%20IS%20TO%20LEAVE%20IT%20ALONE%21.

- Batterman, S. *Findings on an Assessment of Small-Scale Incinerators for Health Care Waste*. WHO. Geneva, Switzerland. 2004. https://iris.who.int/handle/10665/68775.

- *Environmentally Responsible Management of Health Care Waste With a Focus on Immunization Waste*. Washington, DC. 2002. https://www.academia.edu/11712105/Environmentally_Responsible_Management_of_Health_Care_Waste_With_a_Focus_on_Immunization_Waste.

  The document was prepared by Health Care Without Harm (HCWH), a coalition of international NGOs, scientists, and medical professionals, who advocate for safe handling, treatment, and disposal of medical waste. HCWH works to discourage antiquated approaches to waste management that produce harmful environmental and public health impacts and replace them with innovative thinking and approaches that make the best use of technology and management skills to solve this problem.

- Grayling, T. *Guidelines for Safe Disposal of Unwanted Pharmaceuticals In and After Emergencies*. WHO. Geneva, Switzerland. 1999. https://iris.who.int/bitstream/handle/10665/42238/WHO_EDM_PAR_99.2.pdf?sequence=1

  These guidelines provide advice on the implementation of safe disposal of unusable pharmaceuticals in emergencies and in countries in transition where official assistance and advice may not be available. A number of methods for safe disposal of pharmaceuticals are described. These are methods that involve minimal risk to public health and the environment and include those suitable for countries with limited resources and equipment. The adoption of the guidelines by ministries of health, environment, and other relevant ministries, and their practical application, will contribute to the safe and economical elimination of stockpiles of unusable pharmaceuticals.

- Health Care Without Harm. *Waste Management*. https://us.noharm.org/waste-management.

- Hirsch, B., Ritchie, Hannah. 2023. "How much of global greenhouse gas emissions come from plastics?" Our World in Data. https://ourworldindata.org/ghg-emissions-plastics.

- Jimenez, A. and K. Olson. *Renewable Energy for Rural Health Clinics*. National Renewable Energy Laboratory. Golden, Colorado. 1998. http://www.greenstar.org/NREL%20Solar%20Health.pdf.

  The National Renewable Energy Laboratory's Village Power Program has commissioned this guidebook to help communicate the appropriate role of renewables in providing rural healthcare services. It combines technical analysis and practical design, deployment, and training experience with renewables as a serious option for electrifying rural healthcare clinics. It is useful for renewable energy practitioners in defining the parameters for designing and deploying their products for healthcare clinics' needs.

- Kevens, RM, J Edwards, C Richards, T Horan, R Gaynes, D Pollock, and D Cardo. "Estimating Health Care-Associated Infections and Deaths in U.S. Hospitals, 2002." *Public Health Reports*. March–April 2007 Volume 122 pp 160–166. Available at https://pubmed.ncbi.nlm.nih.gov/17357358/.

- OSHA, Asbestos Removal Fact Sheet, https://www.osha.gov/sites/default/files/publications/OSHA3507.pdf

- Pruss, A, E. Giroult, and P. Rushbrook (Eds). *Safe Management of Wastes from Health-Care Activities*. ISBN 92 4 154525 9. WHO, Geneva. 1999. https://www.who.int/publications/i/item/9789241548564.

  This handbook is a comprehensive, user-friendly guide for practical management of healthcare waste in local facilities. It provides guidelines for the responsible national and local administrators and offers globally relevant advice on the management of healthcare waste.

- Sehulster LM, Chinn RYW, Arduino MJ, Carpenter J, Donlan R, Ashford D, Besser R. Fields B, McNeil MM, Whitney C, Wong S, Juranek D, Cleveland J. Guidelines for environmental infection control in health-care facilities. Recommendations from CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC). Chicago IL; American Society for Healthcare Engineering/American Hospital Association; 2004. https://www.cdc.gov/infection-control/media/pdfs/Guideline-Environmental-H.pdf.

  This is an environmental infection-control guideline that reviews and reaffirms strategies for the prevention of environmentally mediated infections, particularly among healthcare workers and immuno-compromised patients. The recommendations are evidence-based whenever possible. The contributors to this guideline reviewed predominantly English-language articles identified from MEDLINE literature searches, bibliographies from published articles, and infection-control textbooks.

- The Sphere Project. Humanitarian Charter and Minimum Standards in Disaster Response: Minimum Standards in Water Supply, Sanitation, and Hygiene Promotion. Geneva, Switzerland. 2004. http://www.sphereproject.org/handbook/.

  This chapter is divided into six main sections: Hygiene Promotion, Water Supply, Excreta Disposal, Vector Control, Solid Waste Management, and Drainage. Each contains the following:

- *The minimum standards*: These are qualitative in nature and specify the minimum levels to be attained in the provision of water and sanitation responses.
- *Key indicators*: These are "signals" that show whether the standard has been attained. They provide a way of measuring and communicating the impact, or result, of programs, as well as the process or methods used. The indicators may be qualitative or quantitative.
- *Guidance notes*: These include specific points to consider when applying the standard and indicators in different situations, guidance on tackling practical difficulties, and advice on priority issues. They may also include critical issues related to the standard or indicators, and describe dilemmas, controversies, or gaps in current knowledge.

- WHO. *Laboratory Biosafety Manual (3rd edition)*. ISBN 92 4 154650 6. Geneva, Switzerland. 2004 https://www.who.int/publications/i/item/9241546506.

  For more than 20 years, since it was first published in 1983, the *Laboratory Biosafety Manual* has provided practical guidance on biosafety techniques for use in laboratories at all levels. Laboratory biosecurity concepts are introduced, and the latest regulations for the transport of infectious substances are reflected. Materials on safety in healthcare laboratories, previously published elsewhere by WHO, have also been incorporated into the third edition.

- WHO. *Management of Solid Health-Care Waste at Primary Health-Care Centres: A Decision-Making Guide*. ISBN 92 4 159274 5. Geneva, Switzerland. 2005. https://iris.who.int/bitstream/handle/10665/43123/9241592745.pdf?sequence=1.

  This document is to provide guidance for selecting the most appropriate options for safely managing solid waste generated at primary healthcare centers in developing countries. The main tool in this guide consists of six decision trees aimed at assisting the user in identifying appropriate waste management methods. The guide takes into consideration the most relevant local conditions, the safety of workers and the general public, and environmental criteria.

- WHO, Pesticide Evaluation Scheme. https://www.drdarrinlew.us/pesticides/the-who-pesticide-evaluation-scheme.html#:~:text=The%20WHO%20Pesticide%20Evaluation%20Scheme%20%28WHOPES%29%2C%20set%20up,evaluation%20of%20pesticides%20intended%20for%20public%20health%20use.

  Excerpt from the website: "The WHO *Pesticide Evaluation Scheme (WHOPES)* was set up in 1960. WHOPES promotes and coordinates the testing and evaluation of pesticides for public health. It functions through the participation of representatives of governments, manufacturers of pesticides and pesticide application equipment, WHO Collaborating Centers and research institutions, and other WHO programs, notably the International Program on Chemical Safety.

  In its present form, WHOPES comprises a four-phase evaluation and testing program, studying the safety, efficacy, and operational acceptability of public health pesticides and developing specifications for quality control and international trade.

WHO recommends pesticides for use in insecticide-treated materials (ITM). https://www.who.int/news/item/14-03-2023-who-publishes-recommendations-on-two-new-types-of-insecticide-treated-nets.

8.3 CLIMATE CHANGE-SPECIFIC

Note: USAID's Center for Climate-Positive Development in the Bureau for Resilience, Environment, and Food Security can provide support on the climate change aspects of this guideline. Email: eei.climate@usaid.gov.

- USAID 2020. ADS 204. https://www.usaid.gov/about-us/agency-policy/series-200/204.
- USAID 2020. Climate Risk Screening and Management Tools- Health Annex. https://www.climatelinks.org/sites/default/files/asset/document/2022-03/Health%20Annex%2002-28-20.pdf.
- USAID 2022. ADS 201. https://www.usaid.gov/sites/default/files/2023-05/201.pdf.
- USAID 2022. Climate Change Impacts on Human Health and The Health Sector. https://www.usaid.gov/global-health/health-systems-innovation/health-systems/resources/climate-change-impacts.
- USAID. 2007. Adapting to Climate Variability and Change: A Guidance Manual for Development Planning. http://pdf.usaid.gov/pdf_docs/PNADJ990.pdf.
- USAID. 2009. Adapting to Coastal Climate Change: A Guidebook for Development Planners. https://www.climatelinks.org/resources/adapting-coastal-climate-change-guidebook-development-planners.

  The guidance provides information to assist planners and stakeholders as they cope with a changing climate throughout the program cycle.
- AGC of America. 2023. How the Construction Industry is Navigating Climate Change. https://www.aon.com/en/insights/articles/how-the-construction-industry-is-navigating-climate-change
- U.S. Green Building Council. http://www.usgbc.org/.
- Leadership in Energy and Environmental Design (LEED). https://www.leedonline.com/irj/servlet/prt/portal/prtroot/com.sap.portal.navigation.portallauncher.anonymous.
- International Association for Impact Assessment (IAIA). FasTips #3. February 2013. Climate Smart Decisions. https://iaia.org/pdf/special-publications/fast-tips/Fastips_3%20Climate%20Smart%20Decisions.pdf.
- National Institute of Building Sciences. Whole Building Design Guide. 2013. Passive Solar Heating. https://wbdg.org/resources/passive-solar-heating.
- World Health Organization. Health Care Without Harm. Discussion Draft. Healthy Hospitals, Healthy Planet, Healthy People: Addressing Climate Change in Health Care Settings. 2009. https://www.who.int/docs/default-source/climate-change/healthy-hospitals-

healthy-planet-healthy-people.pdf?sfvrsn=8b337cee_1.

- Lomas, K. J., and J. Yingchun. Resilience of Naturally Ventilated Buildings to Climate Change: Advanced Natural Ventilation and Hospital Wards. Science v. 41, 6. 629-653. 2009. https://www.sciencedirect.com/science/article/abs/pii/S0378778809000036.
- Health Care Without Harm. Arup. Health Care's Climate Footprint, How the Health Sector Contributes to the Global Climate Crisis and Opportunities for Action. 2019. https://academic.oup.com/eurpub/article/30/Supplement_5/ckaa165.843/5914601.
- WHO. Safe Management of Wastes from Health-Care Activities. 2014. https://www.who.int/publications/i/item/9789241548564.
- WHO. 2020. WHO Guidance for Climate Resilient and Environmentally Sustainable Health Care Facilities. https://www.who.int/publications/i/item/9789240012226.

8.4 DOCUMENTOS DISPONIBLES EN ESPAÑOL

- Guias sobre medio ambiente salud y seguridad para la instalaciones de atencion sanitaria. *Corporación Financiera Internacional*. 30 Abril 2007. https://documents1.worldbank.org/curated/en/333321496116094304/pdf/115328-WP-SPANISH-Health-Care-Facilities-PUBLIC.pdf.

8.5 DOCUMENTS DISPONIBLE EN FRANCAIS

- Directives environnementales, sanitaires et sécuritaires pour les établissements. Société financière internationale. Avril 2007. https://documents1.worldbank.org/curated/en/578331496115824531/pdf/115328-WP-FRENCH-Health-Care-Facilities-PUBLIC.pdf.

8.6 SITING, DESIGN, AND OPERATIONS CHECKLISTS

The checklists in this section provide more detailed guidance on key issues, supplementing the tables in the "Design, Construction, Operations, and Maintenance Guidance" section. Included are checklists for *latrines, hand-washing stations, potable water wells, burn pits, hazardous waste storage areas, and overall operations and maintenance*.

TABLE 8. LATRINE SITING AND DESIGN CHECKLIST

SITING AND DESIGN CONSIDERATIONS	YES	NO	DON'T KNOW	COMMENT
Soil Type 1. Is the soil permeable (does the soil allow water to drain away)? 2. Is the soil stable enough to support the latrine?				Certain soils, such as clay, do not allow liquids to leach out of the pit. This results in solids and liquids accumulating in the latrine pit, causing it to fill faster. Pit latrines are not suitable for impermeable soils. Choose a different location with permeable soil or select a different type of latrine. Latrines built on unstable soils will need a foundation or frame to give the structure stability. These latrines should be designed with a long life in mind (5+ years).
Rocky Soils 1. Are there rocks at depth that will make it difficult to dig? 2. Are there boulders or fissures?				Identify an alternative location to construct the facility—this will likely be at the same site. If boulders can be avoided from the outset, time and money will be saved.
Water Table Characteristics 1. What is the depth of the water table? 2. Does it fluctuate seasonally? 3. Will climate change affect the water table? If so, in what way(s)?				Ask community representatives, especially elders, about seasonal conditions and historical trends. In flooded or high water table environments, it may be necessary to build elevated toilets or septic tanks to contain excreta. Also see the "On-site sanitation in areas with a high groundwater table" http://www.lboro.ac.uk/well/resources/fact-sheets/fact-sheets-htm/lcsahgt.htm.
Latrines 1. How far is the latrine site from the clinic buildings?				Latrines should be within a convenient distance to encourage use yet situated at a safe enough distance to reduce odors and the potential spread of disease. Wind direction may vary seasonally, so the ideal location should take this into account. However, latrines should be no more than 50 meters from the clinic buildings.
2. Has the responsibility for cleaning the latrines been clearly established?				Dump ash or other cover material into the latrine regularly to reduce odors and flies. Ensure that latrine and septic system maintenance is conducted semi-regularly to reduce leaks and GHG emissions (methane).

TABLE 9. HAND-WASHING STATION SITING AND DESIGN CHECKLIST

SITING AND DESIGN CONSIDERATIONS	YES	NO	DON'T KNOW	COMMENT
1. Are the stations close enough to the latrines to encourage use?				Locate stations close to latrines to encourage use.
2. Are the hand-washing stations near the well/pump?				Hand-washing stations should be located away from pumps and wells. People should not look at the well as an option for washing. Using the water pump after using the latrine or being in contact with biological hazards will increase the risk of spreading disease.
3. Is a hand-washing station located by the hazardous (medical waste) waste storage area?				It is important to have a wash station located near the hazardous waste storage area so that staff members transporting the waste can wash after their duties. The wash station should only be used by the staff member transporting the waste, and this staff member should not use the same station as those using the latrines.
4. Will hygiene signs be posted to promote good hygiene?				Signs and posters should be posted in the latrine, near the hand-washing stations, and throughout the clinic to remind individuals to practice good hygiene. Signs should be bright and highly visible and should address patients, visitors, and staff. The signs should be easy to understand and have appropriate pictures and wording.
5. Are there stations for both children and adults?				Stations should be installed that are of the proper height to encourage use by both children and adults. Stations for children need to be short enough so that younger children can reach them.
6. Are the stations in a location prone to flooding, high winds, wildfire, or other climate risks?				The location of hand-washing stations should consider current and future projections of climate risk.

TABLE 10. WELL SITING AND DESIGN CHECKLIST (FOR POTABLE WATER SUPPLY)

SITING AND DESIGN CONSIDERATIONS	YES	NO	DON'T KNOW	COMMENT
1. Is the well site located upstream/upgradient of: ● Hazardous Material Storage Area ● Burn Pit ● Latrines ● Clinic ● Greywater Disposal (soakaways)				Water wells should be located and designed by competent engineers who should ensure that the location is safe, flow is adequate for the facility, and water quality testing is conducted prior to construction. In addition, the engineer, along with hospital staff, should design an environmental management plan that includes water quality testing and identifies a responsible party to conduct testing (see no. 7 below). Where possible, power water pumps with renewable energy.
2. Is the well conveniently located for healthcare staff, but not for patients?				The well should only be used by clinic staff; patient and community use may result in contamination and the spread of disease.
3. Will the well meet the water requirements for the clinic, even under changing climate conditions?				Estimates are 5 liters/day for outpatients and 50 liters/day for in-patients. Staff will also likely use 5 liters/day. Estimates could be higher for areas experiencing heat stress or other situations that could increase water demand. Additional water will be needed for cleaning, washing, laundry, kitchen, and laboratory. Consider water availability under both the current and projected climates.
4. Will there be a significant draw on this well in comparison with the available resource?				A large draw can have an impact on groundwater and, in some cases, surface water. A large draw could result in unforeseen contamination or damage to the pump and well.
5. Will the community have access to the well?				The community should not have access to the well; use of the well should be restricted to clinic use only.
6. Has responsibility for well and pump maintenance been determined?				Maintenance of wells and pumps is critical. If a pump breaks, it should be repaired as soon as possible to prevent staff from getting water at alternative locations.
7. Has a plan for water quality testing and maintenance been determined?				Water quality must be tested for bacteriological contaminants at least monthly. Regular chlorination or any other form of disinfection is recommended to ensure daily water quality, even for capped, pumped wells and boreholes.
8. Are there opportunities to improve or promote rainfall capture or water efficiency practices to build resilience to decreased water availability and/or drought?				It is critical to plan for water supply redundancies to prevent gaps in healthcare services related to lack of water resources.

TABLE 11. HAZARDOUS WASTE STORAGE AREA SITING AND DESIGN CHECKLIST

SITING AND DESIGN CONSIDERATIONS	YES	NO	DON'T KNOW	COMMENT
1. Will hazardous waste be treated and buried on-site?				A hazardous waste storage area should be located in close proximity to the burn pit or incinerator but should be in a location to ensure that hazardous material will not ignite from the burn pit or incinerator operations.
2. Will the storage area be secure?				The storage area should not be accessible to waste pickers, children, or other non-staff. Windows, if any, should not be accessible from ground level. The facility should be locked, and only those with responsibility for handling hazardous waste should have access to the key.
3. Will the storage area be clearly marked?				Signs and posters should be used to make people aware of the location and purpose of the area.
4. Will the storage area have enough capacity? • Will the waste be treated on-site? • Will waste be shipped off-site? If so, how often?				As a rule of thumb, on-site hazardous waste storage should be sufficient for 1 month's accumulation. This provides reserve capacity in the event of, for example, incinerator breakdown or shutdown of the primary disposal site. Satellite waste storage capacity within the clinic and lab should be less than half of the total capacity of the main storage area.
5. Will chemical and biological wastes be stored in the same area?				If so, they should be clearly labeled and placed in different locations in the storage area. Allow for appropriate ventilation. Some chemicals may pose a health or explosion risk if indoor air concentrations exceed threshold limits. (See the International Program on Chemical Safety, http://www.inchem.org/.)
6. Have seasonal wind directions been considered?				Wind directions during all seasons need to be reviewed to ensure that fumes from the storage area will not be carried into any building on-site or in the local area.
7. Will the storage area be contained so that leaks or spills will be prevented from contaminating nearby water and land?				Waste storage area should have a concrete berm to contain leaks or spills. The facility should be constructed downgradient from waterways and at least 50 meters away from any wetland or waterway.
8. Will protective equipment and training be provided?				The storage area should have a sink WITH soap, and depending on the waste to be stored, mask, glove, shower, and other protective clothing and equipment. Only a limited number of staff should be allowed to enter the facility and they should receive training on hazardous waste management, including regular training updates.
9. Is the storage area safe from flooding, high winds, wildfires, and other climate risks?				The storage area should be sited with the consideration of climate risks to avoid impacts and damage to the storage area, potentially leading to contamination.

8.7 BURN PIT SITING AND DESIGN CHECKLIST

Note that *incinerators* are environmentally preferable to burn pits, and advances in appropriate-technology incinerators make high-temperature incineration feasible for small-scale facilities in many cases. However, proper incinerator operation and maintenance is critical to good incinerator performance. If an incinerator is to be constructed or installed, a competent engineer with expertise in this field should be consulted. For an overview of incinerator technologies, see USAID *Sector Environmental Guideline: Healthcare Waste*.

If a burn pit is to be used, see USAID *Sector Environmental Guideline: Healthcare Waste* to help determine what type of waste will be burned.

TABLE 12. HAZARDOUS WASTE STORAGE AREA SITING AND DESIGN CHECKLIST

SITING AND DESIGN CONSIDERATIONS	YES	NO	DON'T KNOW	COMMENT
1. Will the site be located near the hazardous waste storage area?				If the pit will be used to burn hazardous waste, the burn pit should be located near the hazardous waste storage area to allow for easy treatment. However, some hazardous and general waste should never be burned. Prior to deciding what type of waste may be burned in the burn pit, ensure that a chemical engineer or similar specialty is consulted.
2. Can the site potentially affect groundwater or surface water?				If the location of the pit could lead to contamination of groundwater, the pit should be lined (usually with clay) or relocated. The pit should have a windbreak and roof to prevent rain or wind from disbursing the pit contents.
3. Could the burn pit cause poor or dangerous air quality for the surrounding community and the healthcare facility's patients?				If possible, the pit should be located so that prevailing winds pull the fumes away from patients and the community. Burns should be undertaken at times of the day when air movement is away from population centers and the healthcare facility. Only materials that will not create hazardous fumes should be burned. If possible, energy recovery from incineration (with strict pollution control technology) should be adopted.
4. Does the site allow for an ash or other cover material storage area?				An area close to the burn pit should be dedicated to storing cover material. Cover material can also be used to reduce odors and insects in latrines.
5. Does the burn pit have sufficient capacity?				See also S. Batterman, *Assessment of Small-Scale Incinerators for Health Care Waste*.
6. Is the burn pit secured against unauthorized access?				Consider constructing a fence around the pit and placing danger signs.
7. Does the burn pit have a maintenance plan?				Ensure that a maintenance plan is prepared with the participation of the facility staff.

8.8 OPERATIONS AND MAINTENANCE CHECKLIST

Use this operations and maintenance checklist (revised for the specific facility) to ensure that facility guidelines are adhered to. Appropriate parts of the checklist should be incorporated into and used in conjunction with a healthcare facility's routine program of quality assessment and assurance and should be made available for healthcare facility staff to review.

TABLE 13. HAZARDOUS WASTE STORAGE AREA SITING AND DESIGN CHECKLIST

PLANNING FOR OPERATIONS AND MAINTENANCE	COMMENT
1. Create an emergency response plan and train staff annually for handling disease outbreaks	
2. Create a waste management plan (including safe disposal of expired or unused pharmaceuticals) and train staff annually	See "Minimum elements of a complete waste management program" in USAID Sector Environmental Guideline: Healthcare Waste.
3. Create a plan and train staff annually in safe clean-up of chemical spills and hazardous wastes.	
4. Create a plan and train staff annually for chemical/pesticide poisoning.	
5. Create a plan and train staff annually in the safe use of chemicals for bed net treatment programs.	
DAILY CLEANING AND MAINTENANCE	**COMMENT**
6. Sweep clinic buildings, latrines, laboratories, kitchens, and verandas.	
7. Clean and disinfect clinic floors, sinks, and surfaces.	
8. Dust furniture with a clean cloth.	
9. Remove spider webs, birds' nests, and wasp nests from walls and rafters.	
10. Water trees, shrubs, gardens, and live fencing at the roots in the evening for maximum water retention.	
11. Wedge doors and shutters securely to prevent wind damage to walls and door frames.	
12. Empty all waste bins (including bins in latrines and kitchens) daily and remove full sharps containers to waste sorting areas.	
13. Inspect incinerators and burn pits for unburned wastes.	Incinerators and burn pits must never be used for the storage of hazardous materials.
14. Clean and disinfect latrines and hand-washing stations.	
15. Clean all surgical instruments with soap and water; autoclave daily (or more frequently, depending on the clinic's needs).	If autoclaving only once per day, wash and immerse instruments in a chlorine bleach for 30 minutes before the next use.
16. Add ash from kitchen fires to latrine pits to control odor.	If autoclaving is not feasible, boil all instruments prior to reuse.
17. Disinfect water supply systems (including storage tanks) with 1% chlorine solution.	
18. Inspect storage areas and waste storage areas to ensure that no trash or water is in the area.	Store waste and supplies on shelves in elevated drums in a location that is well-protected from the elements.

	Line storage areas for insecticides and hazardous materials and waste with concrete and surround the area with an earthen berm to control potential spills.
19. Inspect storage areas and waste storage areas to ensure that materials for cleaning up spills are available.	
20. Ensure that soap, bleach, and medical charcoal are available in storage facilities and treatment areas.	
REGULAR PREVENTATIVE MAINTENANCE	**COMMENT**
21. Build low embankments around clinic buildings (including latrines) to protect foundations.	
22. Weed clinic grounds regularly.	
23. Wash walls and furniture each month.	
24. Channel runoff from gutters into rainwater harvesting basins or soak pits.	
25. Grease hinges, doorknobs, and locks on all doors.	
26. Clean gutters, funnels, screens, and drains.	
27. Repair screens over windows in clinic buildings, latrines, and kitchens immediately.	
28. Inspect security bars or gratings over windows monthly and repair damage immediately.	
29. Inspect secured storage cabinets and locks on secured storerooms monthly and repair damage immediately.	
30. Inspect furniture for cracks and broken supports.	
31. Inspect waste storage areas and repair fencing and windbreaks.	
32. Plant live fencing around clinic grounds to prevent animals, children, and others from wandering in buildings.	
33. Plant native trees around the facility to add more shade in hot climates, and protect against wind and dust storms.	
34. Test the water supply for bacterial contamination at least monthly.	
35. Inspect water supply pumps, tanks, and pipes for leaks and cracks.	
36. Regularly inspect emergency medicines and supplies for spoilage, expired medications, and loss of supplies.	
37. Boil recyclable hazardous waste before reusing.	
38. Incinerate non-recyclable hazardous waste, sharps, and expired pharmaceuticals.	If using a burn pit, bury burn residue under a layer of soil after every burn.
39. Clean pesticide/chemical containers before disposal.	See instructions in Table 5 for safe disposal of pesticide storage containers.
PERIODIC/ANNUAL MAINTENANCE	**COMMENT**
40. Repair cracks in building walls, floors, and roofs.	
41. Repair cracks, walls, or fencing around the clinic.	
42. Repair holes and gaps in roofing material.	
43. Repair or replace broken equipment (e.g., beds, chairs, desks, cabinets, shelves).	
44. Repair gutters, funnels, and screens before the start of the rainy season.	
45. Repaint cracked or chipped walls and furniture.	
46. Repair water supply pumps immediately.	
47. Apply anti-termite treatment according to manufacturer's	

instructions.	
48. Provide gloves and protective wear for cleaning staff and train all staff in the proper handling of chlorine bleach.	
49. Inspect clinic grounds after every rainstorm to identify areas of water pooling.	