TIPS FOR LOWERING THE TEMPERATURE IN PHARMACIES AND MAINTAINING MEDICATION QUALITY

Pharmacies that serve health clinics located in tropical areas need infrastructure that will help lower their inside air temperature.

It is very important that drugs being stored not reach temperatures above 30°C, remembering that certain drugs must be stored at temperatures below 25°C. Higher temperatures tend to change medication quality, which can harm patients who need the drugs.

This guide provides instruction on how to modify a pharmacy in a simple and inexpensive manner in order to reduce the inside air temperature by up to 4°C.

TIP 1
MONITOR THE TEMPERATURE

You should have an air thermometer that is in good working condition. It can be a mercury, digital, or other type of air thermometer.

Measure the temperature on a daily basis between 12:00 p.m. and 2:00 p.m. Record the date, time, and temperature in a notebook. This way, you will know if your pharmacy maintains appropriate temperature levels.

USAID-funded Strengthening Systems for Improved Access to Pharmaceuticals and Services (SIAPS) is responsible for the content of this material, which does not necessarily reflect the views of USAID or the United States Government.

This document was made possible with support from USAID's Amazon Malaria Initiative (AMI). For more information, visit: http://www.usaidami.org/

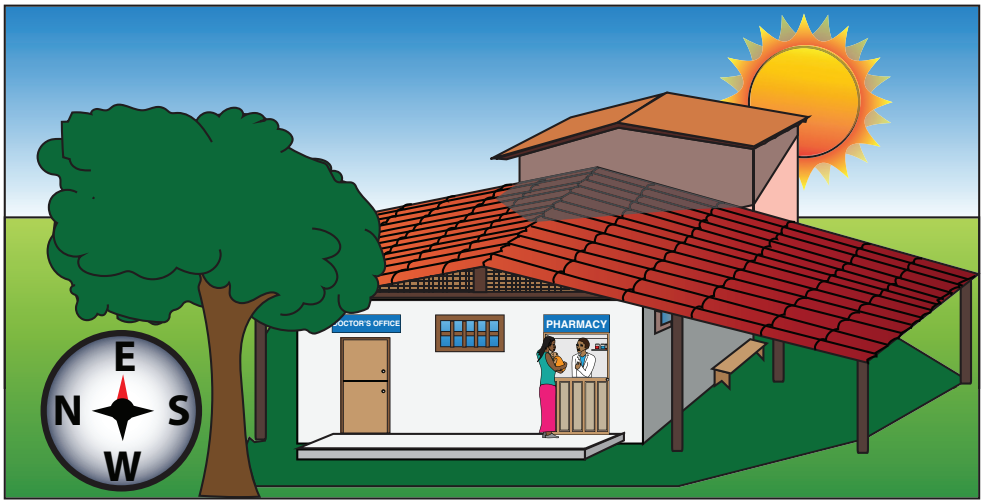
USAID
FROM THE AMERICAN PEOPLE

SIAPS
Systems for Improved Access to Pharmaceuticals and Services

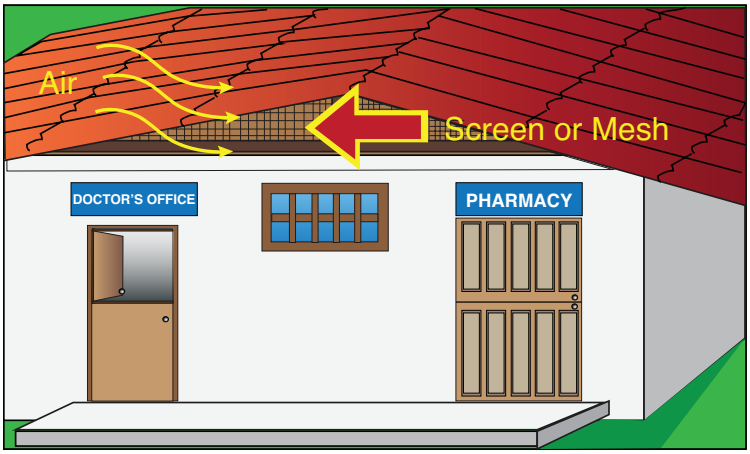
TIP 2
FIND THE BEST LOCATION

Be sure that the pharmacy is located in the coolest spot in the health facility. If it is not, take the necessary steps to move the pharmacy to an area where the sun does not shine directly on the walls.

Choose a place where the pharmacy would be next to a multistory building or a tall tree that can provide shade and prevent the roof from becoming too hot. It is important that the pharmacy be located near the doctor's office or exam rooms, so that it is easy for patients to find. Keep in mind that the ideal space for a pharmacy should consist of concrete walls and roof, high windows, and a suspended ceiling.



TIP 3
INSTALL A SUSPENDED CEILING



The best material for the roof of the pharmacy is concrete. Roofs made out of metal or plastic help to drain the rain, but they trap heat inside. If heat builds up, a solution would be to install a suspended ceiling so that the warm air can dissipate. This is very simple to do:

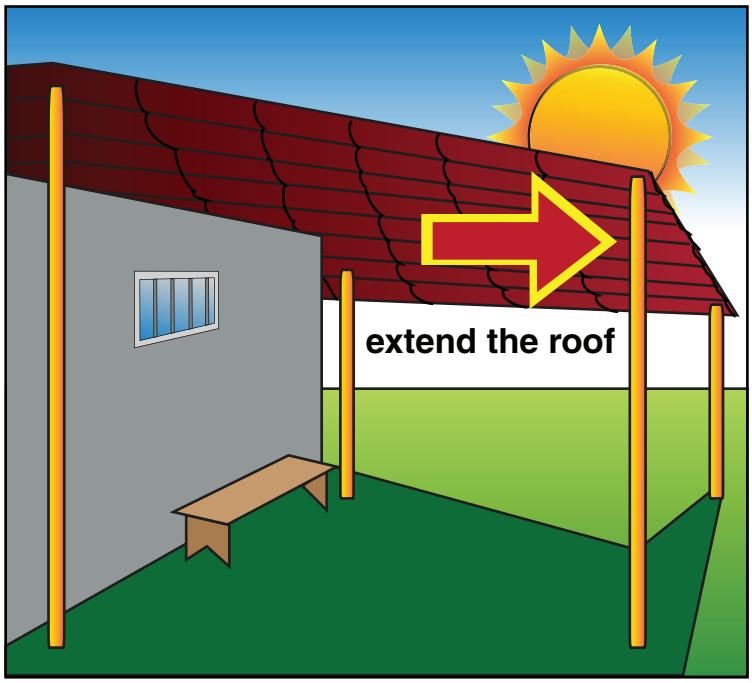
- Assemble a lattice or frame with wooden slats or wire and cover the frame with wooden planks or aluminum sheets* that are flame retardant. Aluminum sheets are highly heat resistant, fairly cheap, and easy to move and install.
- The frame should be situated 10 cm (about 3.9 inches) from the roof.
- Both ends of the suspended ceiling should be open to allow air to circulate; nevertheless, the openings between the suspended ceiling and the roof should be covered with netting or a plastic mesh to prevent pests from entering.

**Material: Harvifoil/Flamestop is a radiant heat barrier with reflectivity of 95% and an emissivity of 5%, reducing the heat flow between 70% and 80%. For more information visit http://www.flamestop.com/data_sheets.html*

TIP 4
PROTECT EXTERIOR WALLS FROM DIRECT SUNLIGHT

Providing the walls with shade is a good alternative to limit direct sunlight hitting the pharmacy walls.

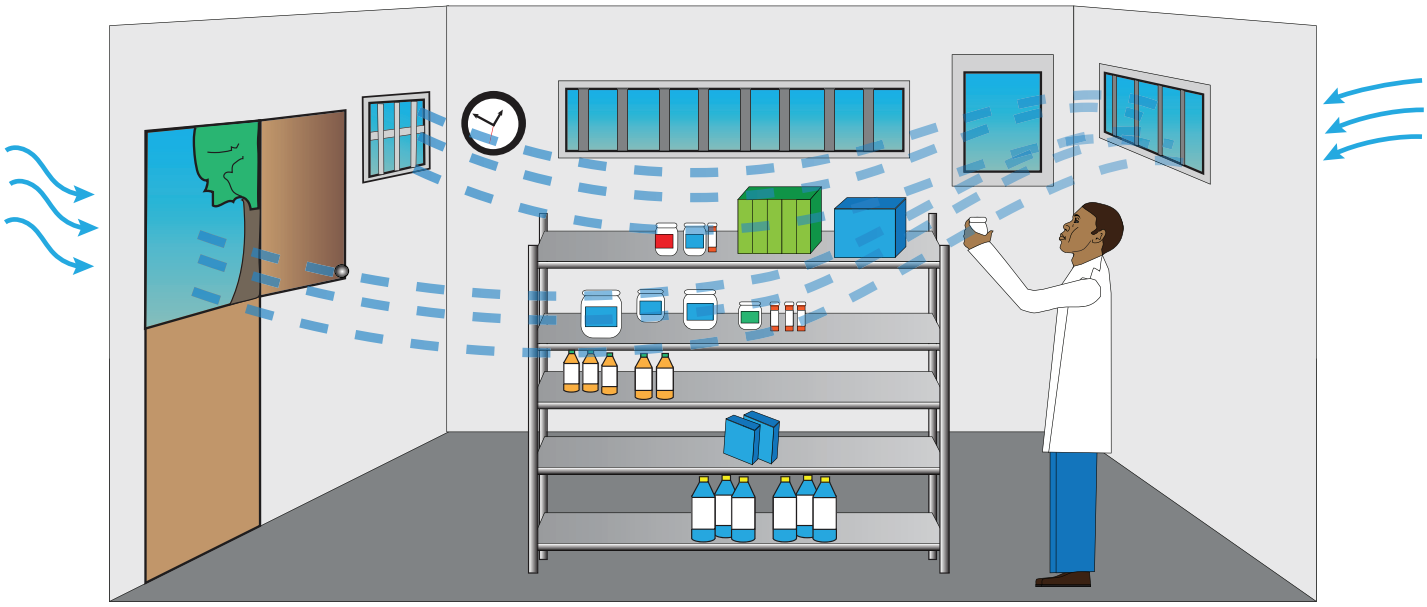
- Plant trees with tall trunks, wide branches, and dense foliage surrounding the pharmacy; this simultaneously provides shade and allows for air circulation.
- Extend the roof so that the majority of the outside walls are in the shade. The awning will not only provide shade, but it will also protect outer walls from the rain.
- Use latex paint or synthetic enamel to paint the outer walls white or any other light color. This will allow the walls to reflect the light.



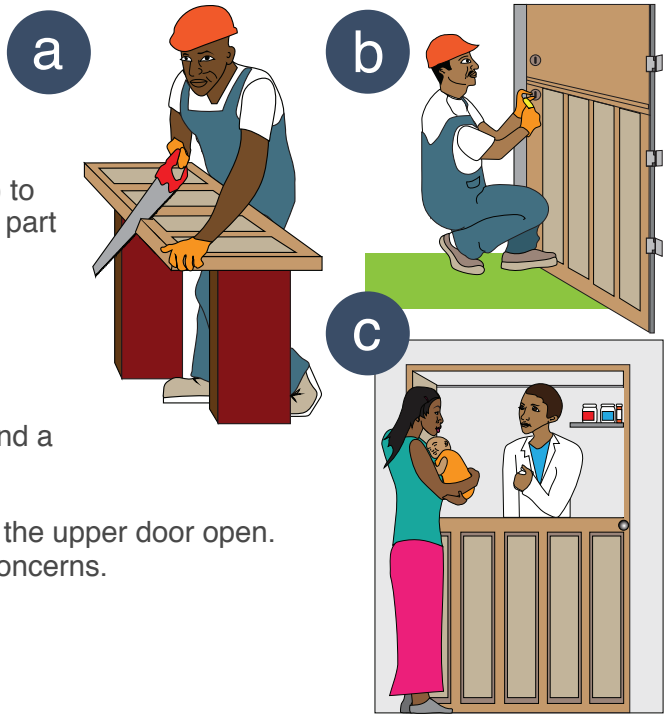
TIP 5
ENSURE APPROPRIATE VENTILATION AND LIGHTING

If your pharmacy does not have air-conditioning, it should have windows to allow for air circulation and provide natural light.

- Install windows as high as possible on the wall.
- Make sure windows are installed on opposite walls, from north to south, so that air can flow easily.
- If construction only allows for windows on one wall, then they should be installed opposite the door.
- Replace the window glass with fine metal or plastic mesh to prevent dust and pests from entering.
- Make sure pharmacy supplies are kept far away from the window to prevent theft.
- Reinforce the windows with iron bars or wooden panels for added security.



TIP 6
MODIFY THE DOOR

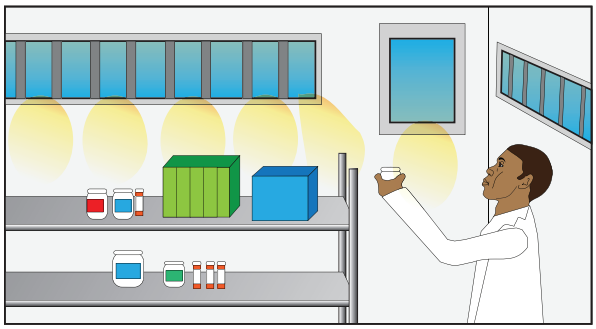


If your pharmacy does not have air-conditioning, use the door for ventilation. You can use half doors ("Dutch doors") to provide ventilation while ensuring proper security. The top part can be open while the bottom half remains closed:

- Remove the door from the door frame.
- Saw it in half and convert it into two doors.
- Place both doors in the door frame and use two hinges and a lock for each door, then attach them to the doorjambs.

During patient care hours, keep the lower door closed and the upper door open. This allows for increased air circulation with fewer safety concerns.

TIP 7
TAKE ADVANTAGE OF NATURAL LIGHT



Make the most of natural light. Artificial lighting produces extra heat and increases the pharmacy's costs.

- With the right doors and windows, you will be able to significantly increase the amount of light inside pharmacies.
- Paint the inside of the pharmacy white or a light color so that you will increase the amount of light and reduce the amount of energy consumption.

TIP 8
KEEP THE PHARMACY ORGANIZED

The shelves and pharmacy equipment should be organized in a way that facilitates air flow and allows workers to move about easily.

- Place the shelves at a 90 degree angle to the window so that the sun does not shine directly on the medicines.
- Do not block the windows with shelves or other pharmacy equipment.
- If you need to arrange the shelves or other pharmacy equipment next to the walls, place them at least 20 cm (8 inches) from the wall, and nail a wire or cable to the shelves to attach them to the wall in order to avoid any accidents.

References

Arévalo, T. 2010. Arquitectura bioclimática en la selva alta. Revista digital apuntes de arquitectura. http://apuntes-dearquitecturadigital.blogspot.com/2010/05/arquitetura-bioclimatica-en-selva-alta.html Accessed on March 21, 2013.

Espinoza, H, Barillas, E. 2012. Temperature Reduction in Pharmaceutical Storage Areas in Madre de Dios (Peru), Using Low-Cost Technology. Success story submitted to the U.S. Agency for International Development by Systems for Improved Access to Pharmaceuticals and Services (SIAPS). Arlington, USA: Management Sciences for Health. http://siapsprogram.org/publication/altview/reduccion-de-la-temperatura-de-los-almacenes-de-medicamentos-en-madre-de-dios-peru-utilizando-tecnologia-de-bajo-costo/English/ Accessed on March 4, 2014.

Hyde, R. (Ed.) 2008. Bioclimatic Housing: Innovative Designs for Warm Climates. New York, USA and Ozon, UK: Earthscan.

Management Sciences for Health. 2002. Medicine supply chain management: selection, purchasing, distribution and utilization of pharmaceutical products, second edition. In collaboration with WHO, PAHO and PAHEF. Boston, USA: Management Sciences for Health.

World Health Organization. 2003. Guide to Good Storage Practices for Pharmaceuticals. WHO Technical Report Series, No. 908, Annex 9. Geneva, Switzerland: World Health Organization.