

## Carbon dioxide and moist in daycares

This fact sheet was completed by Healthy Indoor Environment in January 2023. Any kind of copying, distribution and other use is highly desirable and can be done freely with source acknowledgement. As our knowledge bank is constantly updated, you should check regularly for a newer version at: [www.healthyindoorenvironment.org](http://www.healthyindoorenvironment.org)

### Pollution sources

In daycares, pollution with carbon dioxide and moisture typically comes from four sources:

- 1) Children and the staff (carbon dioxide and moist).
- 2) Cooking (carbon dioxide and moist).
- 3) Washing the floor and drying clothes (moist)
- 4) Penetration of water from outside (humidity/moist).

Carbon dioxide and moist are not in themselves harmful to your health. But a high content of carbon dioxide in the indoor environment is a sign of poor air quality in the daycare, which increases the risk of headaches, fatigue, and difficulties in concentrating. High humidity increases the risk of both mould and house dust mites (particularly in the nap area), which can cause severe allergic reactions. House dust mites particularly pose a problem in the beddings. Aeration and sensible habits can often reduce the content of carbon dioxide and humidity levels in the daycare.

It must be emphasized that moist and carbon dioxide are rarely a problem in newer buildings with mechanical ventilation. Here, however, dry air (especially in the winter) can cause mucosal irritations, damage on wooden furniture, and it may be necessary to turn down the ventilation system and dry damp/wet clothes in the rooms to keep up humidity levels during the winter season.

In energy-renovated daycares, special care must be taken to ensure that moisture problems do not arise, as air exchange is often lower after renovation due to sealing. The risk of moisture problems is also high in buildings where the temperature is not the same in all rooms, or where thermal bridges give rise to local condensation on walls.

Long-lasting steamy windows and earthy/musty smells in cupboards/closets or rooms are signs of moisture problems. Dark spots on wallpaper (in corners, windowsills and behind furniture on exterior walls) can be mould and must always be removed e.g., with Hysan, Protoxskimmel, Rodalon or chlorine (pay attention to possible discolouration).

### Measurements

It is always a good idea to **buy an electronic hygrometer with a thermometer**. It costs 15-30 euros, and then you can monitor the humidity level in the room. The humidity should be 25-45 percent in the winter and not exceed 65 percent during summer. However, you must be aware that the hygrometer only measures the humidity where it is placed. If you place furniture against exterior walls, there is a risk of increased moisture behind the furniture, which can result in mould that can contaminate the entire room with spores. The hygrometer cannot measure this if it is placed elsewhere.

It is also a good idea to **buy an indoor (carbon dioxide) CO<sub>2</sub> sensor**. Simple ones cost some 30 euros and then you can monitor the CO<sub>2</sub> content in the rooms and nap areas yourself.

The good thing about measuring is that you can investigate for yourselves what effectively removes CO<sub>2</sub> and moisture in the rooms and nap areas, and what fits your everyday life and habits at the daycare: how much does it help if you aerate with draughts several times a day - or if you leave ventilation dampers in windows/doors open?

## **1) People**

We all exhale carbon dioxide and water vapor when breathing, just as we release water vapour when sweating. A person typically releases around 2 litres of water per day by exhaling and sweating. Although the children are only in the daycare during the day, it adds up to a lot of water per room per day. That moist must be removed from the room by aeration to avoid moisture problems.

Aerate with a draught (open all windows) preferably for 5 minutes 3-5 times a day (early morning, midmorning, and early afternoon) - turn off the radiators meanwhile to minimise heat loss. If there are ventilation dampers in doors and windows, they should be open and regularly cleaned from dust, pollen, etc. It is advisable to leave the windows ajar and keep a low temperature in the nap area when the children are sleeping, but close the window when naptime is finished during winter and turn on the heating to avoid a constant lower temperature in the nap area than in other rooms as this can increase the humidity and risk of mould and house dust mites.

Leave doors open between the rooms in the daycare during the day and maintain the same temperature in all rooms.

## **2) Cooking**

Cooking releases carbon dioxide and large amounts of water vapour.

Always use lids on pots and a powerful cooker hood running on the high setting with an outside exhaust discharge (a recirculation hood does not reduce the amount of carbon dioxide or humidity levels) - always use the toaster under the cooker hood on the high setting. Do not use tabletop ovens and cupboard ovens that are not under a cooker hood. Start the cooker hood 5 min. before you start cooking and let it run for 10 min. after you finished cooking (new cooker hoods with timers make this easy). Buy a low-noise cooker hood, if necessary, with an external motor if the cooker hood is too noisy. If you cannot get a cooker hood with an outside discharge, always open the window in the kitchen as much as possible while cooking. Remember to clean the filters in the cooker hood often to maintain efficiency.

Always close the door to connecting rooms when you are cooking, so that cooking fumes do not disperse to the rest of the daycare.

## **3) Washing the floor and drying clothes**

Washing floors and drying clothes increases humidity levels.

Never wash the floor with an excess of water and always aerate with a draught for 5 minutes after washing the floor. Remember to measure the humidity level in wardrobes or drying rooms where the childrens' wet clothes are hung to dry.

#### **4) Water penetration from outside**

Water in the daycare's construction, due to water damage, downpour or moist, as well as high levels of ground water around the foundation, can cause mould both on and inside the walls. In these cases, you should always get help from professionals.

Dehumidifiers are often necessary after water damages but are a symptomatic treatment that does not prevent the sources of moist mentioned above from causing problems.

#### **Have measurements made**

We can help with measurements and assessments of the indoor environment, and solution options to get a better indoor environment. Contact the Head of secretariat Kaare Press-Kristensen: kaare@godtindeklima.nu / tel. (+45) 22 81 10 27.

**More on indoor air pollution and solutions:**

**[www.healthyindoorenvironment.org](http://www.healthyindoorenvironment.org)**