CE 63h

Accessible Housing by Design—Fire Safety for You and Your Home

UNIVERSAL DESIGN

People who inhabit and visit our houses come in all shapes and sizes, range in age from infants to seniors, and possess various ever-changing abilities and skills. As we grow up, grow old and welcome new people into our homes, our housing needs change. A house that is designed and built to reflect the principles of universal design is safer and more accommodating to everyone who lives in or visits it, regardless of age or physical ability.

The philosophy of universal design is that your home should be comfortable, pleasant, safe, and usable by everyone in the family, be it your children, you or your spouse, aging parents or a relative with a disability. Planning for fire and emergency situations and minimizing the potential for accidents help ensure that your home and family are safe.

MEETING YOUR NEEDS

People are injured or put at risk every year because they have not taken the time to consider what they will do in an emergency. There are many quick and easy steps that you can take to prevent fires in your home. There are also measures you can take to prepare yourself in the event of a fire or emergency.

Unfortunately, according to the Ontario Fire Marshal (2008) people with disabilities and seniors are more likely to be injured in a fire than other members of the population. This is often because they are unable to exit their home quickly or independently, they cannot hear the alarm or they are not prepared with a fire safety plan.

An overview of the key concepts of universal design is provided in "The Principles of Universal Design" text box on page 11.

Bolded terms throughout this fact sheet are defined in the "Glossary" text box on page 10.

It is your responsibility to plan for your personal safety.

Canada

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HOME TO CANADIANS

Consider your needs when confronted with an emergency situation

- Are you able to hear the fire alarm from all rooms in your house?
- Are you aware of what you should do if a fire occurs?
- Do you have appropriate smoke detectors and fire alarms?
- Are you able to evacuate independently?
- Have you made the necessary arrangements if you need assistance to evacuate?
- Do you and all of your family members know what to do in an emergency?
- Have you made a fire safety plan?
- Do you need backup power for an elevator or a ventilator?
- Are you able to communicate easily during an emergency situation?

FIRE SAFETY PLANNING

Talk to your fire department

- Some fire departments maintain a registry of people who require extra assistance in the event of a fire; inquire with your fire department.
- Talk to your fire department about your personal situation and seek assistance in developing your own fire safety plan.
- Talk to your fire department about how best to communicate in an emergency.

Consider your abilities

Consider the abilities of your family members and guests and how these abilities may impact their capacity to communicate and evacuate your home in an emergency. Babies and children rely on adults for their safety. People with temporary disabilities such as broken limbs may not be able to move quickly.

> Are you registered with your fire department? Some fire departments maintain a registry of people who require additional assistance in the event of an emergency.

People who are elderly may become less confident and more easily confused. We all experience changes during our lives, some of which may impact the way our fire safety needs are met.

Install appropriate warning devices

Smoke alarms are necessary features in every home. Your local fire department can advise you on the best types to purchase and where they should be installed.

If you are deaf or hard of hearing, note that smoke and fire alarms are now available with combined audible and visual signals, which will flash a light and make a loud noise. These smoke and fire alarms are suitable for installation

throughout your home. It is advisable to install strobe alarms as they flash more brightly, or use vibrating alarm systems in areas where someone with hearing loss may sleep.

Make your home fire-safe

Your local fire department and provincial Fire Marshal's office have information on how to plan for an emergency situation. Standard advice includes:

- Always having a fire extinguisher readily available.
- Keeping stoves and fireplaces tidy and clean.
- Keeping fire evacuation routes clear of clutter.
- Planning two evacuation routes.
- Refraining from overloading electrical outlets.

If you have an activity limitation or disability, you may need to take the following extra precautions.

If you have low vision or are blind:

- Keep your cooking area well organized and free of clutter.
- Keep your hallways and corridors clear.

If you have a mobility disability:

- Design your kitchen so that you do not have to reach over your stove to turn it on or to reach into the cupboard.
- Install a fire extinguisher where you can easily reach it.
- Install an electrical outlet at the front of the counter for easy access.

If you have a poor memory or a cognitive limitation:

- Keep the telephone number for emergencies (often 9-1-1) or the fire department stored in your telephone.
- Prepare your fire safety plan, write it down and keep it where you can find it in an emergency.

Plan to communicate

It is important to know in advance whom to contact in an emergency situation, and how you are going to contact them. Nearly all areas in Canada are now serviced by 9-1-1 emergency telephone assistance that connects directly with fire, ambulance and police services. However, if you do not have 9-1-1 service, post the emergency telephone numbers for the fire department near the phone.

If you have difficulty dialling the telephone, you may wish to consider purchasing a telephone with memory that allows you to pre-program numbers. Some telephones also have automated voice dialling features that enable you to dial using your voice if the number is programmed into the phone.

> Do you have at least two escape routes to easily exit your home and get a safe distance away to a place where you can call the fire department?

This is an excellent idea for someone with severely limited use of their arms.

Sometimes in an emergency situation, it is more difficult to communicate quickly and efficiently. People who might have difficulties explaining details of an emergency or have speech impairments may need more time and should consider having a pre-recorded emergency message with their name and address. It is always a good idea to plan ahead. Pre-programmed telephones and portable telephones are helpful, as is a **home automation system** that automatically calls the fire department if the smoke alarm is activated. See CMHC's *About Your House: Accessible Housing by Design—Home Automation* for more information.

If your ability to communicate in an emergency situation is limited in any way, it is advisable to discuss your communication needs with your local fire department and your emergency service provider.

Some telephones feature emergency call buttons. People who are hard of hearing should have telephones with sound amplification in all locations of their homes. People who are deaf or have trouble speaking should have a text telephone, a teletypewriter (TTY) or a text messaging system that will enable them to type their message or send a pre-programmed message to the 9-1-1 centre in the event of an emergency. Contact your local fire department to confirm procedures for TTY calls. Call the administrative number, not the emergency number, to inquire.

People with cognitive impairment may benefit from having a phone that allows photographs to be associated with numbers.

Older people who need emergency communication in the event of a fall or emergency should consider obtaining a **personal monitoring system**, whereby they can press a button on a wireless pendant or bracelet to summon help. This is especially useful for older people who live alone.

Note that internet-based VoIP phone systems may not incorporate the ability to call 9-1-1. Also check with your mobile phone provider to confirm if you have access to 9-1-1 services.

Plan your evacuation routes

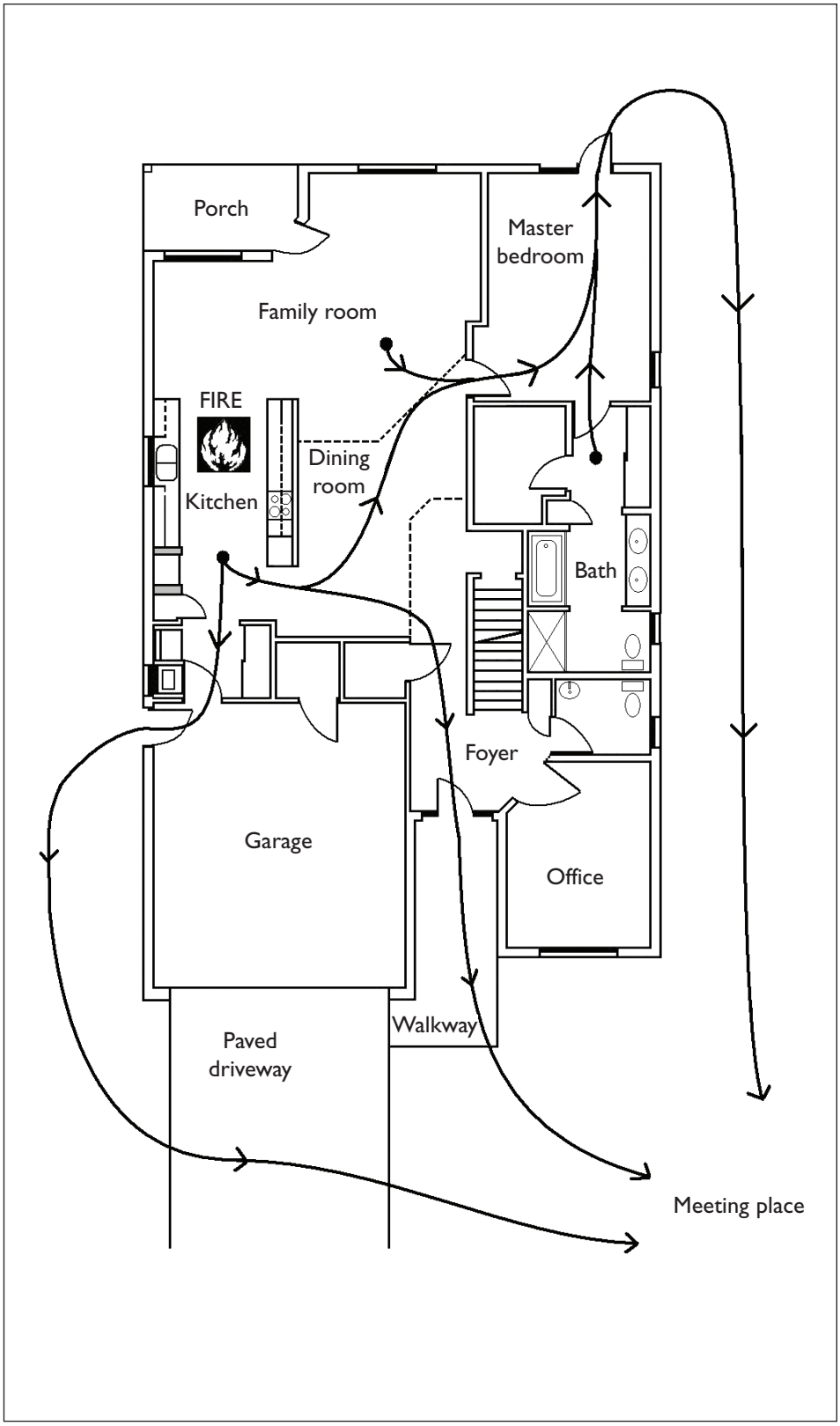
Evacuation is the most common fire safety strategy. It is important to plan your escape routes in advance of an emergency situation. Everyone must leave the home, including people with activity limitations. No single evacuation technique is suitable for everyone: people requiring assistance differ in their needs, capabilities, endurance and tolerance levels. Before there is an emergency, you need to think about your abilities and limitations in terms of your ability to evacuate.

Your evacuation strategy should consider whether you live alone, whether there is help close by, whether you live in a home or apartment, and the degree of independence and mobility you have. The evacuation plan should be developed in cooperation with your local fire department, your building manager (if there is one) and your family members, including people with activity limitations.

Having at least two escape routes ensures that you will always be able to get out of your home safely (see Figure 1). The routes should be located away from each other to ensure that at least one is usable in the event of a fire. One should be the main accessible entrance. The other should be an **accessible evacuation route** with elements that meet your individual needs, such as handrails or a ramp.

If you have a residential lift in your home, you should check to see if it can be used in an emergency situation. Also check whether it is possible to operate it with backup power in the event of a power failure. See CMHC's *About Your House* fact sheet *Backup Power for Your Home* for more information.

Many municipalities require two evacuation routes from the home. For someone who uses a wheelchair, that might include the accessible garage entrance and an access route to an exterior deck. Some municipalities do not allow someone who uses a wheelchair to have their bedroom in the basement because there is only one evacuation route available. Check your local municipality or provincial building code requirements.



Drawing by: DesignAble Environment Inc.

Figure 1 Fire evacuation routes

Practise evacuating

Everyone should practise how they will evacuate their home in an emergency situation. It just makes sense. Make it an annual event as family members grow up, get older, and welcome new members.

Discuss all aspects of your **evacuation plan**, including a meeting place outside of your home.

STRATEGIES FOR EVACUATING YOUR HOME

If you are a person with an activity limitation and can walk, but cannot evacuate at the same rate as everyone else, your local fire department may advise you to wait until the majority of people have evacuated and then proceed.

If you are not able to evacuate independently, you should consider how you will obtain assistance. Some possible evacuation strategies are outlined below:

The "buddy system"

The "buddy system" matches an individual with family, friends or neighbours who volunteer to provide assistance in an emergency. Each person should have at least one or two backup "buddies" who will be available in emergency situations.

When there is an emergency situation, it is the responsibility of the person and their buddy to meet at a pre-arranged location. Depending on the nature of the emergency and location of the fire, the fire department or even the buddy may be responsible for assisting in an evacuation.

The "buddy system" is suggested for people with a wide variety of disabilities, as well as seniors and people with agility limitations.

Guiding

If you are elderly or have a slight agility or mobility limitation, or you are blind, you may wish to be guided out of your home or apartment building. If you wish to be guided you should state your preferences to your building manager, buddies or others who may assist you, prior to an emergency situation. Practise this procedure together so that it will be a comfortable and predictable activity in an emergency.

Assistive and support techniques work well for people who have a mobility or agility limitation, and require the arm of someone for stability. Your assistant may prefer to take your arm providing additional balance and support to you. If you have crutches, a cane or walker, be sure that your guide or assistant brings them along when you evacuate.

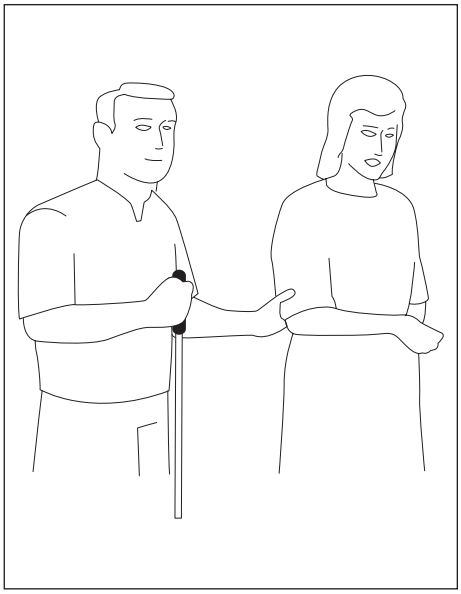


Figure 2 Elbow-guiding technique

If you are blind or visually impaired, good communication about how you wish to be guided is advised. The best method is for you to take the arm of the person guiding you, then you can anticipate and be forewarned of what the next move will be based on their change in position and direction (see Figure 2).

Good communication includes clear verbal directions warning of steps and obstacles, such as "there is a step up."

Using a wheelchair for stair evacuation

If you use a wheelchair and prefer to remain in your wheelchair, this may be the easiest evacuation method. However, this option is not practical with a person who uses a power wheelchair or scooter as it is too heavy and awkward.

If you wish to use your wheelchair as an evacuation device, it is extremely important to practise the technique you will use, and to participate in drills with those who will be assisting you.

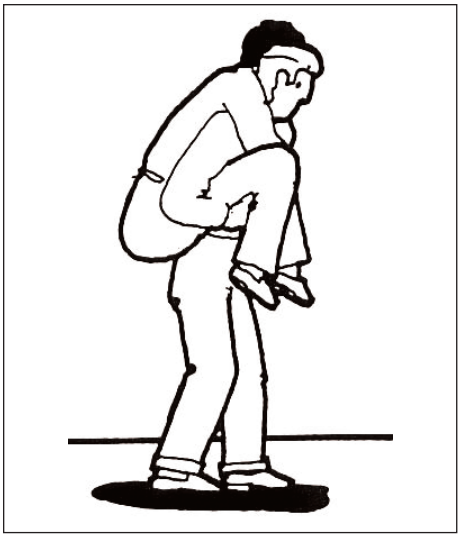
No one should attempt to carry a person on stairs, even as part of a team, unless they are sure that they can hold the weight of the person and the wheelchair. One person should be positioned at the back of the wheelchair and at least one other person should be at the front of the wheelchair. When tilting the wheelchair back, the person at the back should grasp the handles and tip the wheelchair slightly backwards. The person who will be guiding and supporting at the front of the wheelchair should grasp the parts that are securely attached to the main frame (see Figure 3). Good communication between the wheelchair user and the assistants will involve discussing which parts of the wheelchair are the safest parts to grasp as many parts of a wheelchair are removable.

Assistive devices for evacuation

If you have an agility or mobility limitation but do not use a wheelchair, if you do not feel safe using your wheelchair during an evacuation or you use a power wheelchair or scooter, you may need to consider using an assistive device such as a **personal monitoring system** or an evacuation device. Some evacuation devices are designed to be used on stairs.

Evacuation devices are particularly useful for high-rise living and in group home environments. See the "Assistive Devices" section on page 9 for more information.

Figure 3 Using a wheelchair for a stair evacuation



Drawing by: Philip Dion

Figure 4 Piggyback lift carry technique

Drawing by: Philip Dion

Figure 5 Cradle lift carry technique

Transferring and carrying techniques

If you are unable to evacuate independently and do not have access to an assistive evacuation device, the person providing assistance may have to carry you. There are several lifts and carries that can be used.

A one-person assist should be used only in an extreme emergency, as a one-person carry may injure a person with a disability or a person such as a senior who may be more fragile; however, in an emergency it may be the only option available.

The piggyback lift (see Figure 4) is frequently preferred, unless the person to be rescued has no arm strength or is very light and another lift can be accomplished more easily.

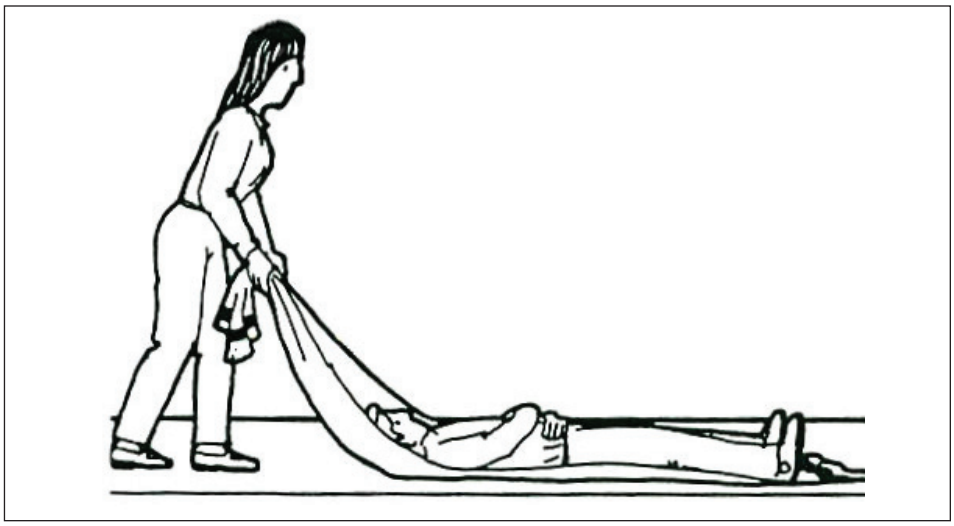
The cradle lift (see Figure 5) is preferred for small or light persons and while it is often favoured in an emergency evacuation, it can be difficult and risky for the rescuer.

The blanket drag (see Figure 6) is easy to do in apartments and homes that are on one level. It is simple to do and requires only a blanket. The rescuer positions the person on a blanket and pulls the person along the floor surface.

LIVING IN HIGH-RISES

Work with building managers

Most provincial or municipal fire codes require that high-rise buildings have fire safety plans. These plans generally require that building managers note any residents with disabilities or activity limitations that might affect them in the event of a fire or emergency situation.



Drawing by: Philip Dion

Figure 6 Blanket drag evacuation technique

If you live in an apartment building and have an activity limitation that would prevent you from evacuating independently or if you require some assistance, contact your building manager to devise an evacuation plan that is specific to your needs and abilities. After devising your plan, make sure you practise it with building staff and any buddies who may be part of the plan. This will ensure that you are able to have the assistance that you need, when you need it.

> Does your building manager know whether you need assistance and how to provide it during an emergency?

Protect in place

The "Protect in place" strategy specifies that occupants stay in their building during an emergency. They may utilize an area of refuge or a safe holding area, or if their apartment is appropriately fire-rated, they may be directed to stay in their unit. Some fire departments advise residents, both with and without disabilities, to stay in their unit if they live in a high-rise building until they are notified that evacuation should take place. It is always important to discuss this option with the fire department.

Areas of refuge

Areas of refuge or areas of rescue assistance are fire-rated areas where a person, unable to evacuate independently, can safely wait for assistance. The area of refuge is required by some building codes, which stipulate that it be served by an exit or firefighters' elevator, marked with the International Symbol of Access (this is the symbol widely used to identify accessible parking spaces), and equipped with a communication system.

Balconies are sometimes considered acceptable areas of refuge.

Elevators

One strategy that should be considered when living in a high-rise apartment building is the use of the safe elevator. While signs are posted advising against the use of the elevator in the event of an emergency, some fire safety plans include using the elevator under the supervision of firefighters.

Firefighter elevators have special features, such as a separate elevator shaft with increased protection from fire, smoke, water and loss of power. This option should be discussed with the building manager in conjunction with the fire department.

ASSISTIVE DEVICES

Technical aids and assistive devices for people with activity limitations are designed to assist people in an emergency and to ensure their evacuation is as quick, safe, and easy as possible.

For people who are deaf or have a hearing impairment, technical aids such as pagers, strobe alarms, pillow shakers, and integrated notification systems ensure they are made aware of fire alarms and evacuation instructions.

For people with mobility impairments, devices such as evacuation chairs and portable ramps are available to assist with evacuations.

For information on some home automation devices that can be used for fire safety, please see CMHC's *About Your House: Accessible Housing by Design—Home Automation* fact sheet.

Glossary

Accessible evacuation route: a route that is accessible and easy to use for people with activity limitations. It is flat, stable and has no stairs or steps.

Evacuation plan: a plan for an emergency situation that you have practised to ensure your safety and which has at least two egress routes.

Home automation system: a system that can be used to control certain elements of your home environment including: lighting, mechanical systems, home security, entry systems, appliances, telephones, computer systems and safety systems.

Personal monitoring system: a system which enables a user to notify an emergency monitoring company or emergency contact person of their emergency situation through the use of a one-touch button pendant or wrist band.

ADDITIONAL RESOURCES

Books

Betty Dion Enterprises Ltd. (2004). *Fire Safety for People with Disabilities—A Public Educator's Guide*. Ottawa, ON, Canada: Canadian Paraplegic Association.

Province of Ontario. (2007). *Emergency Preparedness Guide for People with Disabilities/ Special Needs*. ON, Canada: Queen's Printer for Ontario. Retrieved December 15, 2009 from http://www.redcross.ca/cmslib/general/emergency_preparedness_guideforpeople_with_disabilities_special_needs.pdf

Richardson, K. (n. d.). *Fire Safety in High-Rise Apartment Buildings*. Ottawa, ON, Canada: Ontario Association of Architects and CMHC. Retrieved December 15, 2009 from http://www.cmhc.ca/en/inpr/bude/himu/coedar/upload/Fire-Safety-in-High-Rise-Apartment-Buildings.pdf

Websites

CMHC—Emergencies (May 2010)
http://www.cmhc-schl.gc.ca/en/co/maho/em/index.cfm

Fire Marshal's Public Fire Safety Council (May 2010)
www.firesafetycouncil.com

National Fire Protection Association (May 2010)
www.nfpa.org
Enter "People with disabilities" in the search box.

Office of the Fire Marshal of Ontario—Provincial/State Level Fire Regulatory Organizations (May 2010)
http://www.ofm.gov.on.ca/english/resources/firelink/page1.asp

U.S. Fire Administration—Fire Safety for People with Disabilities (May 2010)
http://www.usfa.dhs.gov/citizens/disability/

The Principles of Universal Design

Universal design is defined as:

"The design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design."

The concept is an evolving design philosophy.

Principle 1: Equitable use

This principle focuses on providing equitable access for everyone in an integrated and dignified manner. It implies that the design is appealing to everyone and provides an equal level of safety for all users.

Principle 2: Flexibility in use

This principle implies that the design of the house or product has been developed considering a wide range of individual preferences and abilities throughout the life cycle of the occupants.

Principle 3: Simple and intuitive

The layout and design of the home and devices should be easy to understand, regardless of the user's experience or cognitive ability. This principle requires that design elements be simple and work intuitively.

Principle 4: Perceptible information

The provision of information using a combination of different modes, whether using visual, audible or tactile methods, will ensure that everyone is able to use the elements of the home safely and effectively. Principle 4 encourages the provision of information through all of our senses—sight, hearing and touch—when interacting with our home environment.

Principle 5: Tolerance for error

This principle incorporates a tolerance for error, minimizing the potential for unintended results. This implies design considerations that include fail-safe features and gives thought to how all users may use the space or product safely.

Principle 6: Low physical effort

This principle deals with limiting the strength, stamina and dexterity required to access spaces or use controls and products.

Principle 7: Size and space for approach and use

This principle focuses on the amount of room needed to access space, equipment and controls. This includes designing for the appropriate size and space so that all family members and visitors can safely reach, see and operate all elements of the home.

To find more *About Your House* fact sheets plus a wide variety of information products, visit our website at www.cmhc.ca. You can also reach us by telephone at 1-800-668-2642 or by fax at 1-800-245-9274.

Priced Publications

FlexHousing™: Homes that Adapt to Life's Changes	*Order No. 60945*
FlexHousing™: The Professional's Guide	*Order No. 61844*
Healthy Housing™ Renovation Planner	*Order No. 60957*

Free Publications

Design Options for Barrier-Free and Adaptable Housing	*Order No. 63909*
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Fire Safety	*Order No. 65050*
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Preventing Falls on Stairs	*Order No. 63637*
Research Highlight *fact sheets*	
Measuring the Effort Needed to Climb Access Ramps in a Manual Wheelchair	*Order No. 63916*

Printed in Canada
Produced by CMHC 18-10-10

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