



ABOUT YOUR HOUSE

PREVENTING FALLS ON STAIRS

CE 56

Background

The stairs¹ in your home—the ones you climb up and down every day—can be dangerous. According to the Canadian Institute for Health Information,² between April 1, 2001 and March 31, 2002, a total of 6,224 Canadians fell on or from stairs or steps in their homes and were injured seriously enough to require a hospital visit. More than half of the 6,224 people hospitalized—3,426—were seniors (men and women 65 years or older). When seniors fall, the consequences can be severe and long-lasting.

In January, 2004, *The StarPhoenix*, Saskatoon, reported the story of an 81-year old woman who misstepped when going down a flight of stairs, fell, broke a leg, an arm and a hip—and was trapped in her basement for nine days before help arrived.

In southern Ontario, a 70-year-old woman, walking down one step to a sunken laundry room, missed the step and fell. A strong pain in her right leg kept her on the floor until paramedics arrived. She had pulled

a muscle and for a month after her fall was unable to walk on her own.

Most of the falls on or from stairs can be prevented. Prevention starts by keeping in mind that there are risks when people use stairs. Good planning and simple strategies can help everyone—older people, children, young adults and middle-aged men and women—prevent falls and injuries.

This *About Your House* tells you about some of the ways you can reduce the risk of falling on or from stairs.

Where can you fall?

You can fall anywhere in your house where there are stairs, including the entry stairs, stairs leading to another floor, the back doorstep or steps leading to another room. Falls resulting in serious injuries can occur even with a single step.

Why do people fall?

Professionals who study why people fall on or from stairs say health, environmental and behavioural reasons are contributing factors.

Health factors include eyesight problems, frailty, drowsiness, loss of balance and an inactive lifestyle.

Environmental factors include poor design, construction and maintenance of stairs; nonexistent or dysfunctional handrails; poor lighting; and other visual features of stairs such as the tread³ surfaces.

Behavioural factors include lack of concentration, carrying something while using stairs, unsuitable footwear, unfamiliarity with the stairs (although most stair-related injuries occur on stairs with which the fall victim is familiar—such as those in one's home) and decisions whether or not—and how—to modify or maintain the stairway environment.

What are the consequences of falling on steps or stairs?

Falls on stairs can be a major threat to health, independence and confidence. The physical consequences can be serious, including soft-tissue damage and broken bones—especially hips. Other serious consequences—particularly for older people—can

¹ See "Glossary" and Figures 1 and 2 at the end of this *About Your House*.

² Data from the National Trauma Registry, managed by the Canadian Institute for Health Information, April 2004.

³ See "Glossary" and Figures 1 and 2 at the end of this *About Your House*.

be psychological effects, such as lowered confidence and a loss of a feeling of safety, which might further reduce healthful mobility and activity. Many people never fully recover from the consequences of a fall.

Should you stop using stairs?

Not usually. Your doctor can best advise you if you have special health problems that might limit or even prevent you from using stairs. However, it does mean always being aware that stairs can be risky and knowing how to reduce the risks.

There can be health benefits to using stairs: according to Health Canada’s Stairway to Health Program,⁴ activities like climbing stairs significantly contribute to the 30 minutes of physical activity we all need every day. People who climb stairs every day have stronger legs and more aerobic capacity, allowing them to participate more fully in more activities. Climbing stairs every day can add years to your life, and studies show that the risk of heart

disease and death is lower among people who regularly climb stairs. Stair climbing increases leg power and may be important in helping elderly people reduce the risk of injury from falls.⁵

What can you do to overcome problems with stairs?

There are several ways to reduce the health, environmental and behavioural risks of stairs.

If you feel you have problems related to health factors, such as difficulty going up or down stairs, you should consult an occupational therapist. An occupational therapist can advise you on the most appropriate changes to your home or your behaviour, or both, to meet your own needs. If, following this, you continue to feel you have problems, consult your family doctor.

If you have problems related to health factors which impede you from using stairs, consider the following three options:

1. Installing an elevator or stair lift.
2. Creating a bedroom, bathroom and laundry room on the ground floor (if not already available) so that you can carry out all your daily activities without having to use stairs.
3. Moving to a one-floor house or apartment.

For environmental and behavioural factors, there are many ways to make stairways in your home safer. The tables below provide some ideas to help you improve your safety. First, by making the stairway as safe as possible under the circumstances (modifying the stairway environment) and; second, by modifying the manner in which you use the stairs (modifying your behaviour). Talk about these ideas with your family members, friends, and care providers, and determine which are best for your home, your budget and the way you live.

I. Preventing falls by modifying the stairway environment

What causes people to fall?	Strategies to prevent falls
Steps that are difficult to see, especially to distinguish one step from another.	<ul style="list-style-type: none"> • Avoid visually distracting patterns on the treads. • Mark nosings⁶ permanently (not with tape) if they can’t be clearly seen. Paint a contrasting colour stripe on the nosing of each tread. A painted stripe works very well and looks good even on carpet. • Improve lighting (see below).

⁴ <http://www.hc-sc.gc.ca/pphb-dgspst/sth-evs/english/index.htm>

⁵ Allied Dunbar Survey, 1992.

⁶ See “Glossary” and Figure 2 at the end of this *About Your House*.

I. Preventing falls by modifying the stairway environment (cont'd)

What causes people to fall?		Strategies to prevent falls
Poor lighting that causes people to misjudge presence and exact location of each step.		<ul style="list-style-type: none"> • Improve lighting on steps and stairs. Stairs should not have lower illumination than adjacent areas. • Use lighting that makes tread nosings distinctly visible and does not cause glare or strong shadows. • Install a light switch at both the bottom and the top of the stairs. • Provide low-intensity, night lighting of stairs that does not need to be switched on.
Step geometry	Steep, with high risers ⁷ and/or short treads	<ul style="list-style-type: none"> • Keep tread coverings thin and tightly affixed to maximize usable tread size. This will usually require removing cushioning under carpets on steps. Soft treads, especially when short and with a large rounding at the nosing, should be avoided. • If you are renovating the stairs in your current home, or building a new home that has stairs, consider the relationship between the rise, the run and the tread.⁸ Professionals that study stairs advise that a rise not higher than 178 mm (7 inches) with a run not shorter than 279 mm (11 inches) provide increased comfort and safety.⁹
	Non-uniform—an especially common cause of missteps and falls	<ul style="list-style-type: none"> • Sight along the nosings to confirm that they line up exactly. If they do not, consider partial or complete rebuilding of the steps to make them of uniform size and height. This is very important!
	Winding or curved stairs	<ul style="list-style-type: none"> • Provide handrails on each side of the stairway, especially where the stairway includes combinations of rectangular and tapered treads which require users to move from larger to smaller tread depths, depending on where one walks on the stair width.

⁷ See “Glossary” and Figure 2 at the end of this *About Your House*.

⁸ See “Glossary” and Figure 2 at the end of this *About Your House*.

⁹ The National Building Code of Canada permits a maximum (200 mm) and a minimum (125 mm) rise; a maximum (355 mm) and a minimum (210 mm) run; and a maximum (355 mm) and a minimum (235 mm) tread depth; as well as a minimum headroom of 1.95 m along the length of the stairway in homes. There are cost and design implications of different step geometries which you should always discuss with your builder or renovator, and local building code authority.

I. Preventing falls by modifying the stairway environment (cont'd)

What causes people to fall?		Strategies to prevent falls
Treads that are slippery or in poor condition.		<ul style="list-style-type: none"> • Use a slip-resistant, rough finish on treads that are subject to wetting. Generally for interior stairs, any surface material acceptable for normal floors will work on treads in terms of required slip resistance. • Repair or replace tread surfaces. • Fasten tread coverings securely. The covering should be tight against the nosing. Resilient safety tread coverings must be carefully installed and maintained because they tend to crack at the nosing and become an additional hazard.
Loose rugs		<ul style="list-style-type: none"> • Do not place loose rugs on steps, or at the top or bottom of stairways.
Handrails	Missing or dysfunctional	<ul style="list-style-type: none"> • Handrails are strongly recommended regardless of the number of steps. Where possible, install functional handrails on both sides of stairs. • If there are existing handrails which are decorative but not functional, these should be augmented or replaced by functional handrails. • Position handrails at about adult elbow height; 900–965 mm (35 1/2 -38 inches) works well for older adults who use the handrail for support. • An adult should be able to wrap his or her hand around—and underneath—the handrails. If you wrap a measuring tape around the railing, it should measure less than 160 mm (6 1/4 inches) for adult hands; 100 mm (4 inches) works well for children’s hands. • Extend the handrails, without a break, the full length of the stairs, and beyond the top and bottom of the stairs (see Figure 1). • Ensure handrails have a tactile indicator that warns users that the stair is coming to the end. • Make sure the handrails are easy to see, even in low light or at night.
	Loose or broken	<ul style="list-style-type: none"> • Attach handrails securely to walls and posts. You should be able to put your entire weight on the handrail without damaging the handrail, the wall or the post. • Repair loose or broken handrails.

2. Preventing falls by modifying your behaviour

What causes people to fall?	Strategies to prevent falls
Overstepping stair treads (the most common misstep on home stairs) or twisting your feet or body on relatively short treads or windings stairways.	<ul style="list-style-type: none"> • Be cautious, deliberate and not rushed. • Hold on to the handrails.
Rushing, especially on steep, curved or cramped stairs.	<ul style="list-style-type: none"> • Take time and be extra cautious especially where there is a transition between angled, shorter treads on winding stairways and rectangular treads.
Wearing loose slippers or other footwear.	<ul style="list-style-type: none"> • Always wear shoes or slippers that fit properly and that have a non-slip sole.
Unintended use of stairs in your home, for example, by vulnerable users, such as small children or older persons with dementia.	<ul style="list-style-type: none"> • Secure gates, at top and bottom of stair flights, to prevent unintended use of the stairs.
Unfamiliarity with the environment. For example, visiting a relative or friend's home where there is one or more steps between floors that are at slightly different levels.	<ul style="list-style-type: none"> • Take extra time when using an unfamiliar stairway and be especially wary of all places where changes of floor level are possible—especially with only one or two steps in settings that are visually distracting.
Lack of attention. For example, when going down stairs, some people fall at the second last step because they think they have already reached the bottom of the stairs.	<ul style="list-style-type: none"> • Avoid being distracted when using a stairway. • Make sure that your perception of the stairway is accurate, especially in beginning or ending your use of a stairway.
Poor or impaired vision	<ul style="list-style-type: none"> • Remove your reading glasses when you climb up or down stairs. • If you have prescription eyeglasses for distance vision, always wear them when using the stairs. • Take extra care when wearing bifocal or progressive eyeglasses. Adjust the position of your glasses or your head so you can see the stairs clearly.
Unnecessary use of stairs, especially under difficult circumstances (for example, rushing up or down stairs to answer the telephone, go to the toilet or answer the doorbell).	<ul style="list-style-type: none"> • Take your time when using the stairs, particularly when going down the stairs. • Install a telephone on each floor or carry a cellular telephone. • Install a bathroom on each floor. • Install an intercom system which you can use from anywhere in your home.

2. Preventing falls by modifying your behaviour (cont'd)

What causes people to fall?	Strategies to prevent falls
Side effects of medication or alcohol	<ul style="list-style-type: none"> • Make sure you know the effects of medicines. If a medicine can cause dizziness, for example, be extra careful using the stairs. • Even one beer, glass of wine or other alcoholic beverage can affect your balance and perception: be extra careful on stairs if you've had a drink.
Not using lights.	<ul style="list-style-type: none"> • If the stairs are darker than surrounding areas, switch on stair lights.
Not holding the handrails.	<ul style="list-style-type: none"> • When walking up or down stairs, always hold the handrails, or have at least one hand within easy reach of a handrail.
Carrying objects on the stairs.	<ul style="list-style-type: none"> • Never carry objects, such as large laundry baskets, on stairs, especially if they require use of both hands or block your view of the steps. Instead, consider for example using a laundry bag that can be carried in one hand, dragged—or thrown—down the stairs. • One hand should always be left free to hold on to a handrail—and for some more vulnerable stair users, both hands should always be available for handrail use, especially when going down stairs.
Cleaning the stairs without taking proper precautions.	<ul style="list-style-type: none"> • Use small, lightweight tools or equipment such as a hand-held, cordless vacuum cleaner and always keep one hand on, or available for, the handrail. • If you polish uncarpeted stairs, always use non-glare, non-skid wax. • If necessary, have someone else clean the stairs.
Leaving, or storing, objects on steps or landings (an important problem that is easily avoided).	<ul style="list-style-type: none"> • Do not place any objects on steps, and make sure that any objects on landings do not distract or obstruct.

A well-lighted stairway with solid handrails on both sides and extending beyond the top and bottom of the stairs, together with visually prominent steps, is safer and easier to use, particularly for people with poor balance or vision.

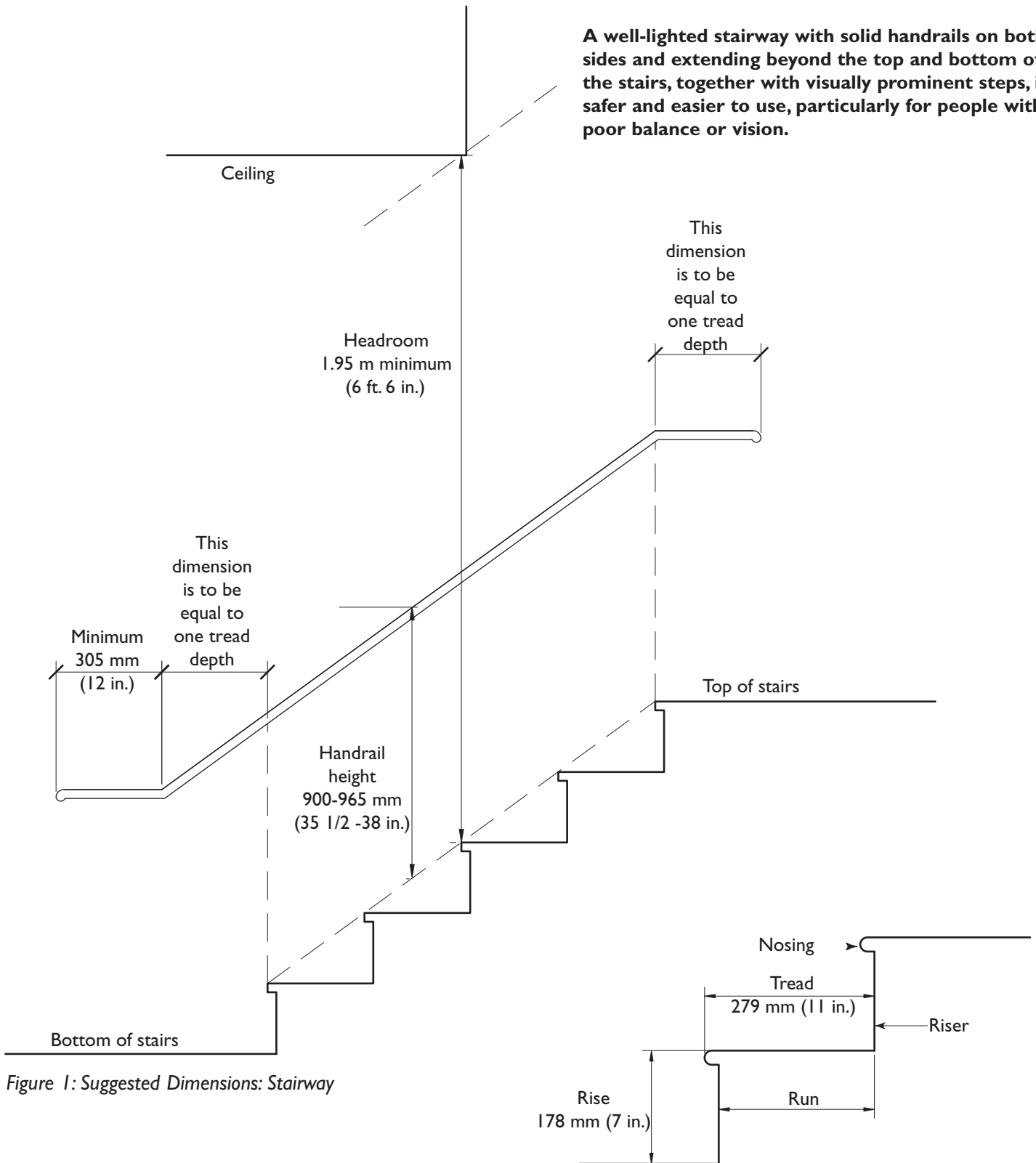


Figure 1: Suggested Dimensions: Stairway

Figure 2: Suggested dimensions: Step

Glossary

Flight—A flight in a stairway is a set of steps.

Handrail—A handrail is a railing intended for grasping by the hand and located parallel to, and usually at the side of, the stair. A functional handrail serves several purposes including providing visual indicator of the stair, assistance with normal balance and—most critically—the only reliable means to arrest a misstep and fall.

Headroom—Headroom is the vertical distance from the outer edge of the nosing line to the underside of the ceiling above.

Landing—A landing is a platform between flights, or at the end, of a stairway.

Nosing—The nosing is the front or leading edge of a stair tread. In most home stairs, it projects over the tread below.

Riser—The riser is the vertical component of a step. There are two types of risers: closed risers (where the back vertical portion of the step is solid) and open risers (where the back vertical portion of the step is open). Closed risers are preferable because they prevent visual distractions.

Rise—The rise is the vertical height of a step.

Run—The run is the horizontal distance measured from riser to riser.

Stair—A stair is a change of elevation consisting of one or more risers or steps.

Stairway—A stairway includes stairs, landings and handrails.

Tread—The tread is the horizontal part of a step.

CMHC publications and programs

Publications for seniors

Maintaining Seniors' Independence Through Home Adaptations: A Self-Assessment Guide (order no. 61087)

This guide identifies the types of difficulties seniors can experience in their homes and describes adaptations to overcome these difficulties. Checklists are provided to help seniors assess their own needs. Each checklist deals with an activity in the home, such as getting in and out of the home, using the bathroom, and doing the laundry. The guide will be of interest to seniors, their family members, and caregivers.

Maintaining Seniors Independence Through Home Adaptations (order no. 61769)

This is a video for seniors, their family members and other caregivers, on how a senior's home can be adapted to increase comfort and safety. Health professionals and consultants present a wide range of adaptation ideas to enhance independence—most of them are simple and inexpensive. (34 minutes)

At Home with Alzheimer's Disease: Useful Adaptations to the Home Environment (order no. 60849)

This publication describes a variety of practical and low-cost physical adaptations that can be made to a private house or apartment to address the needs of persons with Alzheimer's Disease and their caregivers.

Assistance Programs*

You may be eligible for government assistance with the costs of some of the modifications to the stairway environment under the following programs.

HASI – Home Adaptations for Seniors Independence Program

This program helps homeowners and landlords pay for minor home adaptations to extend the time that low-income seniors can live in their own homes independently. Low-income eligible seniors with age-related disabilities can obtain assistance in the form of a forgivable loan up to \$3,500 (as of May 2005) for minor adaptations that meet their needs.

RRAP– Residential Rehabilitation Assistance Program

This program provides financial assistance for low-income households to help bring substandard housing up to minimum health and safety levels, make homes physically barrier-free and accessible for persons with disabilities, and convert non-residential properties into affordable rental housing.

RRAP-D – Residential Rehabilitation Assistance Program for Persons with Disabilities

If your home requires extensive modifications, such as widening doorways and increasing space for wheelchair maneuvering, you may qualify for financial assistance under this program. RRAP-D offers financial assistance to homeowners and landlords to undertake accessibility work to modify dwellings occupied or intended for occupancy by low-income persons with disabilities.

* In some parts of the country, funding for these or similar programs is provided jointly by the government of Canada and the provincial or territorial government. In such cases, the provincial or territorial housing agency may be responsible for the delivery of these programs. Program variations may also exist in these jurisdictions.

Acknowledgments

CMHC thanks the following people for their valuable contribution to this publication:

Cassandra R. Linton, MSc, Senior Analyst, Trauma Clinical Registries of the Canadian Institute for Health Information

Dr. Donna Lockett, PhD, Community Health Research Unit, University of Ottawa, Ont.

Dr. Elaine M. Gallagher, RN, Professor, School of Nursing, University of Victoria, B.C.

Jake Pauls of Jake Pauls Consulting Services in Building Use and Safety, Silver Spring, Maryland, U.S.A.

Dr. Vicky Scott, RN, Senior Adviser on Falls Prevention, British Columbia Injury Prevention Unit and Ministry of Health Services.

Research Manager:

Luis Rodriguez, Policy and Research Division, CMHC

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.

Free Publications

Your Guide to Renting a Home

Available online

Home Buying Step by Step

Order No. 60946

Condominium Buyers' Guide

Order No. 63100

©2004, Canada Mortgage and Housing Corporation
Printed in Canada
Produced by CMHC
Revised 2005

23-06-05

Although this information product reflects housing experts' current knowledge, it is provided for general information purposes only. Any reliance or action taken based on the information, materials and techniques described are the responsibility of the user. Readers are advised to consult appropriate professional resources to determine what is safe and suitable in their particular case. Canada Mortgage and Housing Corporation assumes no responsibility for any consequence arising from use of the information, materials and techniques described.