

Steps to safer stairs

A kit for improving stair safety



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Introduction

What's This All About?

We'd like to invite you to join us in Steps to Safer Stairs, a call to make stairs, indoors and out, public and private, safer for senior citizens.

Falls are a real danger for seniors. A combination of declining strength and physical limitations means that one-third of independent seniors take a fall at least once a year. Between 20 and 70 per cent of those falls result in injuries; between 5 per cent and 12 per cent of the injuries are serious.

Falls hurt — and in many ways. In addition to breaks and bruises, seniors who fall may lose confidence. Fear of another tumble and the loss of independence it could bring often cause seniors to withdraw socially and restrict other activities. The odds of an independent senior moving into care are three times as high for those who've had falls as for those who haven't and 40 per cent of admissions to nursing homes are related to falls.

Stairs are a particular hazard; they are involved in 10 to 15 per cent of all falls by seniors. Falls on stairs account for about 10 per cent of all fatal falls in Canada, but 70 per cent of people who die from falling on stairs are 65 years or older.

There's rarely a single cause for a fall. Many seniors, indeed, take the blame on themselves and say they were rushing when they shouldn't have, or they assume falls just have to happen when you're old and frail; the truth is there

are too many hazards in our communities that lead seniors to have these painful falls. Stairs are among the most common of these hazards.

Steps to Safer Stairs is the result of our latest research on preventing falls among senior citizens. The work was funded by the Canadian Institutes of Health Research and led by researchers at the Community Health Research Unit at the University of Ottawa. As part of the study we interviewed more than 500 seniors living independently in the Ottawa-Gatineau area and inspected over 700 staircases both inside their homes and in their communities. The results identified many stair hazards that could increase a seniors' risk of falling.

What hazards are we talking about?

Stairs may be particularly hazardous when they are too high (over 7 inches high) or not deep enough from front to back to comfortably fit an adult foot (less than 11 inches deep). Because we assume that each step in a stairway is going to be the same height, variations in height often lead to trips and falls. Open-backed steps are considered dangerous because light from behind can be distracting and the foot can slip forward. And having too many steps (10 or more) without a landing can lead to fatigue and increase the risk of a fall. While these are structural changes that will require a long-term commitment to change, there are more basic things that can be done with little expense or effort to improve stair safety.

For example, slippery stairs are a problem. Ideally, they should have a non-slip surface that is not too thick — a tightly woven carpet, well secured, improves safety, but deep pile carpets or ragged ones add to danger.

Not having a handrail is also dangerous. Handrails are essential and they need to be a size and shape that makes them easy to grip. Ideally, there should be rails on both sides of a flight of stairs, so they can easily be used.

Lighting is frequently a problem; we are all used to the idea of a gloomy descent into the basement, but poor light and shadows are often cited as reasons for falls. Saving energy with low-wattage bulbs in low-use areas is often recommended these days, but don't try to conserve energy by cutting light to stairs, indoors or out. The consequences could be severe.

Visibility of the stairs can also be improved by putting contrast-colored safety strips on the step edges (at a minimum on the top and bottom step). And, of course, outdoors, snow and ice on stairs are a potential hazard and need to be regularly removed.

How severe is the problem?

We assessed more than 700 residential and 500 community sets of stairs, indoors and out. **At home**, the biggest dangers were inconsistent height and depth. Compounding the problem, uneven steps were marked in less than 2 per cent of cases. Slipperiness was a problem too: 84% of outdoor stairs and 75% of indoor stairs lacked non-slip finishes.

In the community, the biggest outdoor problem was potential slipperiness — 92 per cent of stairways lacked non-slip edging and only half the stairs had a non-slip finish. Indoor community stairways did better on their safety ratings, although their heights and depths often didn't meet the 7-inch-high, 11-inch-deep recommended size and a full 75 per cent of indoor public stairs didn't have non-slip finish. Half had no contrast edging.

What can my organization do?

We urge you to join other groups and organizations who are interested in seniors' health issues to do what you can to tackle this serious safety issue.

Steps to Safer Stairs includes two tools to help identify hazards: "Quick Tips" and "Stairway Safety Checklist". You can use these tools to examine stairs within your own home or organization and/or to share with your members and other organizations. We have also included "Advocacy Tips" to help you should you choose to approach your municipal government, local businesses or landlords. Finally, we have included a brief article "Article: Steps to Safer Stairs" that you are welcome to share with others, including your local media.

We hope that you will do your part to take "Steps to Safer Stairs". **TOGETHER WE CAN MAKE A DIFFERENCE.**

Yours truly,
Nancy Edwards, Donna Lockett
Principal Investigators, Community Health
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Steps to Safer Stairs

Quick Tips

- ✓ Make sure your stairs are well-lit. This isn't the place to try and save a few pennies on electricity. Use the maximum wattage permitted by the light socket and it's best if stairs have two light switches, one at the top and the second at the bottom.
- ✓ Your handrail should be strong and easy to hold — with a circumference no more than 6.25 inches. And two handrails are always better than one!
- ✓ Try not to carry things up and down stairs, but if you must, keep one hand on the rail. Switching from a laundry basket to a laundry tote bag is one way to make the trip to the washing machine safer! In fact, try a tote bag any time you're tempted to carry something with two hands, so you can keep one hand on the rail while you pull the tote bag behind you.
- ✓ Thick or ragged carpeting spells danger! If you've got a runner, make sure it has short pile and is securely fastened. If you don't have a runner, go for color-contrast safety strips on the edge of the stairs (at a minimum on the top and bottom step) and non-slip paint. There are even colorless non-slip finishes for hardwood stairs.
- ✓ Keep outdoor steps and stairs well-cleared of ice and snow in the winter — and install an outdoor handrail if you haven't got one.
- ✓ Don't rush — take your time and take a good look at the stairs; shadows, unexpectedly short handrails, and uneven steps can all cause distractions or unexpected disruptions and lead to falls.
- ✓ Don't take the stairs in your stocking feet, loose shoes or floppy slippers. And if you wear long skirts, loose trousers or dressing gowns, take extra care on stairs — they're very easy to trip on.
- ✓ Keep exercising. Stairs are an excellent way to get exercise. If you are walking up and down the stairs for exercise, be sure that the stairs are safe. The stair safety checklist can help you determine if your stairs are safe.

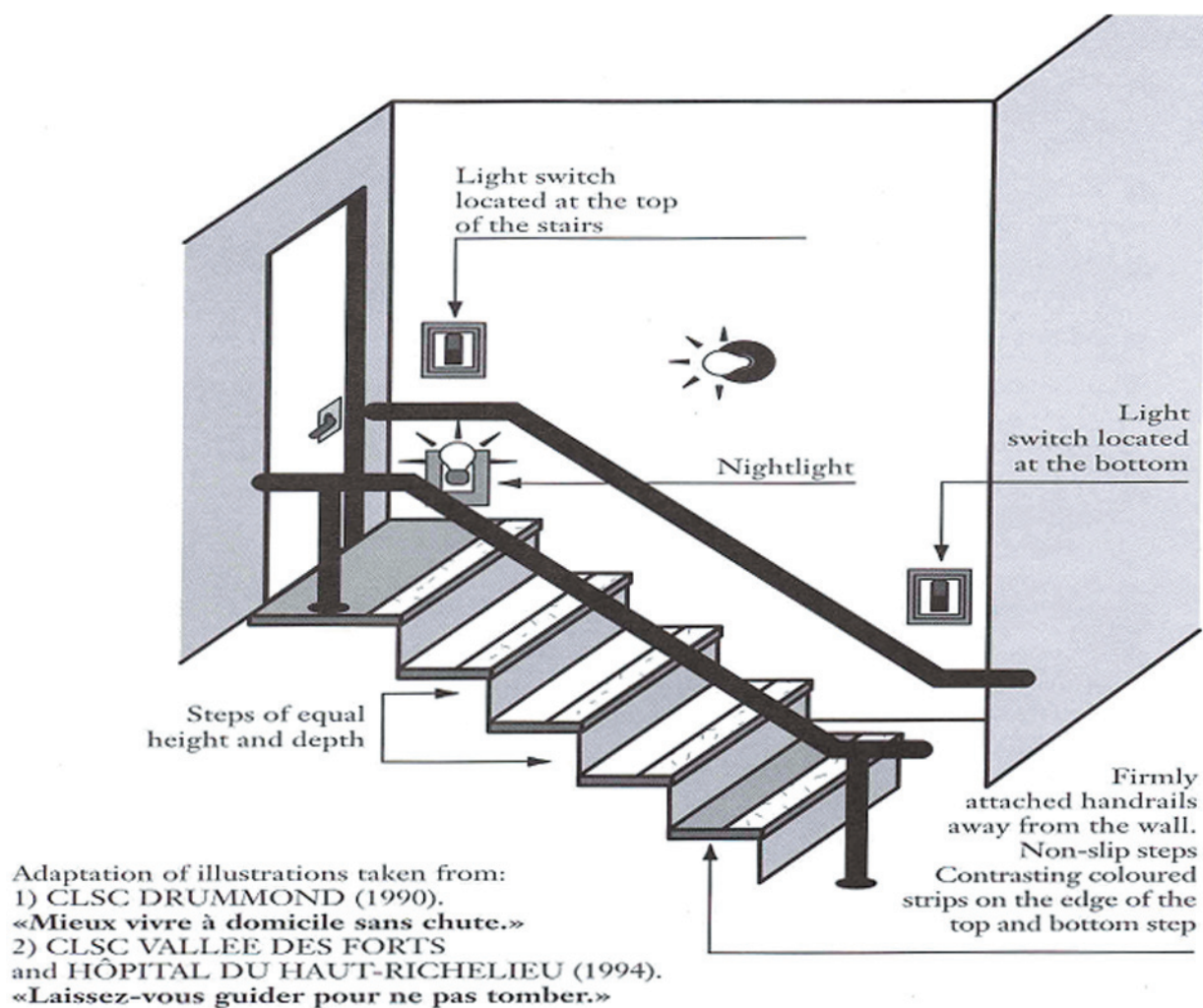
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Steps to Safer Stairs

Stairway Safety Checklist

How do you know if a set of stairs is safe? Here's a form that will help you do a quick check. The more times you answer yes, the better. Some 'no' answers will point to changes you can make to increase safety, such as adding non-slip paint or brighter lights; some may highlight dangers that may be more difficult and costly to fix (it's hard to change the height or depth of a step). At least being aware of the hazard may help people take more care.

The attached picture highlights safe stair features.



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Stairway Safety Checklist

Safe Stairs	Yes	No
Are the steps no more than 7 inches high and consistent in height?		
Are the steps at least 11 inches deep and consistent in depth?		
Are the stairs closed at the back so your foot can't slip through?		
Are carpets or runners low-pile?		
Are carpets or runners securely fastened?		
Do all doors open away from the steps, not over them?		
Do stair edges have a non-slip finish?		
Visibility and Lighting	Yes	No
Are the edges of the stairs marked with a contrasting strip of color (at a minimum on the top and bottom step)?		
Are the stairs well lit, with at least two light switches?		
Are the light bulbs the strongest wattage allowed in the fixtures?		
Handrails	Yes	No
Is there a handrail?		
Are there (even safer) two handrails?		
Do the handrails extend uninterrupted the full length of the stairs?		
Is the circumference of the handrails 6.25 inches or smaller?		
Are the handrails securely fastened?		

Steps to Safer Stairs

Advocacy Tips

Whether you're trying to get safer stairs by approaching city council, the community centre or your spouse and family, you need to be prepared to make an effective case for change. Advocacy — trying to influence the people with power to support your concern — need not be a battle, or even confrontational. It's hard to imagine anyone opposing the idea of safer stairs. Your job is to let them know why it should be done, how it can be done, and what particular problems you want them to address.

Get your facts in order

We've attached an article about the hazards stairs represent for seniors, as well as a stair safety checklist. They are essential background for increasing the changes in stairs. Make a few notes of our top findings on seniors and falls before you approach anyone, and get to know these facts well enough to talk comfortably about them.

Broaden Your Base of Support

Look for support from others who would benefit. People with children would probably like less-slippery stairs in the community centre, and better lighting is safer for everyone; ask a local women's group to support you on that issue.

Have Solutions Ready

It's important to remember that asking people to make stairs safer isn't enough: you should always be able to offer solutions. You could use the stair safety checklist to prepare a list of deficiencies — but it would probably be even more effective to do the review with a representative of the group you're trying to influence. A joint effort to identify problems will take away the element of blame and bring in a sense of collaboration.

Make a Presentation

Ask for time with the group, or a representative of it, to make your presentation. Make a display board of photographs showing the problems with the stairs you're talking about. When it's your turn to speak:

- Tell them who you are and why you're speaking out for safer stairs;
- Outline how stairs can put seniors at risk and why it matters to your audience;
- Keep it short, and make definite recommendations, such as "Please install a second handrail and non-slip contrast marking on the edges of the steps."

We've included a one-page 'quick tips for stair safety' piece for you to leave with the group when you've done your presentation. Add your contact names and numbers.

Keep Going Back

Don't expect overnight change. Often it's long after an idea is planted that action is taken. While some changes, like improving lighting or installing a handrail can be easily attended to, changes that require major structural work or the permission of building owners or landlords may take longer. In the meantime, a caution sign should be posted so that those who use the stairs will be reminded to use them more cautiously. For example, you could suggest a notice to remind people to "PLEASE USE THE HANDRAIL!" Be prepared to welcome an incremental approach. New handrails and non-slip paint are best, but contrast marking is worth doing on its own. If you keep asking for changes, when your target audience is ready to move they'll turn to you for help.

Article

Steps to Safer Stairs

Stairs. As we age, they can change from being a part of our house as benign as the walls and roof to a lurking threat. Outdoors, they cease being part of the landscape and become at the least a challenge, and at worst a booby trap. It's one of the many ways life changes with age; stairs can be very dangerous for senior citizens.

Falls in general are a problem for seniors. A combination of declining strength, and a variety of physical limitations means that one in three seniors who live independently take a fall at least once a year. Between 20 and 70 per cent of those falls result in injuries; between 5 per cent and 12 per cent of the injuries are serious.

Stairs are a particular hazard; they are involved in 10 to 15 per cent of all falls by seniors. Falls on stairs account for about 10 per cent of all fatal falls in Canada, but 70 per cent of people who die from falling on stairs are 65 years or older.

Falls hurts — and in many ways. In addition to breaks and bruises, seniors who fall lose confidence. Fear of another tumble and the loss of independence it could bring often causes seniors to withdraw socially and restrict other activities. The odds of an independent senior moving into care are three times as high for those who've had falls as for those

who haven't and 40 per cent of admissions to nursing homes are related to falls.

Many seniors blame themselves for falls. However, there's rarely a single cause for a fall. Certainly, health problems are part of the problem. Older adults may have problems with walking, balance, strength and vision. They may exercise less, and that's another characteristic of people who fall. Some bad habits also come into play: going downstairs in stocking feet or sloppy slippers is dangerous for anyone. Rushing, not paying attention, not using a handrail when available, all increase the risk of falling.

But very often, the problem is the stairs themselves — or their environment. There are well-established proportions for safe stairs, suggesting the need for deep treads and standard heights (stairs that are at least 11 inches deep and no more than 7 inches high are considered ideal). Stairs that do not have those dimensions, or that are inconsistent in depth or height, increase the risk of stumbling and falling.

Stairs can be slippery, too. Ideally, they should have a contrast-colored safety strip on the edge, to make it clear where the steps are and make it harder to misstep in any case (at a minimum on the top and bottom step). Open-backed steps are considered dangerous

(light from behind can be distracting and the foot can slip forward). A tightly woven carpet, well secured, improves safety, but deep pile carpets or ragged ones add to danger.

Handrails are essential and they need to be small enough to be firmly gripped. Ideally, there should be rails on both sides of a flight of stairs, but the most important thing is to hang on. Bad falls may result when someone carrying something in both hands, like a laundry basket, misses a step and flies right to the bottom. (A stout canvas shopping bag can substitute for a basket, and leave one hand free for the rail).

Lighting is frequently a problem; we are all used to the idea of a gloomy descent into the basement, but poor light and shadows are often cited as reasons for falls. Saving energy with low-wattage bulbs in low-use areas is often recommended these days, but don't try to conserve energy by cutting light to stairs, indoors or out. The consequences could be severe.

Outdoors, it's important to keep steps clear of snow and ice, to keep them in good repair, to make sure there are handrails and safe proportions. Indoors or out, landings every seven to ten steps can prevent excessive fatigue and help ensure that if there is a fall, it won't be too far.

In reality, studies show that most stairway accidents are caused by perceptual errors triggered by flawed design or construction, such as variations in the height of steps, or handrails that are shorter than the flight, (suggesting there are no more stairs).

Despite this apparently long list of dangers, many researchers think safe use of stairs helps seniors maintain their health, including their muscle strength and strong bones. Rather than trying to eliminate or avoid stairs, seniors will benefit more from efforts to make stairs safe and ensure they're used properly.

Bibliography

Aminzadeh, F. (1996). Stair falls among seniors: Hazards, safety recommendations, and building codes. CHRU Publication No. DP96-2: Ottawa Carleton Health Dept., Ottawa.

Archea, J., Collins, B., & Stahl, F. (1979). Guidelines for stair safety. Vol. Series 120. Washington, DC: U.S. Government Printing Office.

Archea, J.C. (1985). Environmental factors associated with stair accidents by the elderly. *Clinical Geriatric Med*, 1, 555-569.

Archea, J.C. (1985). Environmental factors associated with stair accidents by the elderly. *Clinical Geriatric Medicine*, 1, 555-569.

Campbell, A.J., Borrie, M.J., & Spears, G.F. (1989). Risk factors for falls in a community-based prospective study of people 70 years and older. *Journal of Gerontology*, 44 (4), M112-117.

Canada Safety Council. (1991). Fatal accidental falls, by age and sex. Ottawa.

Carson, D., Archea, S., Margulis, S., & Carson, F. (1978). Safety on stairs. Washington DC: National Bureau of Standards.

Graafmans, W.C., Ooms, M.E., Hofstee, M.A., Bezemer, P.D., Bouter, L.M., & Lips, P. (1996). Falls in the elderly: A prospective study of risk factors and risk profiles. *American Journal of Epidemiology*, 143 (11), 1129-1136.

Hale, W.A., Delaney, M.J., Mc Gaghie, & W.C. (1992). Characteristics and predictors of falls in elderly patients. *The Journal of Family Practice*, 34 (5), 577-581.

Health Canada. (1999). Statistical Report on the Health of Canadians (No. H39-467/1999E). Ottawa: Minister of Supply and Services.

Hemenway, D., Solnick, S.J., Koeck, C., & Kytir, J. (1994). The incidence of stairway injuries in Austria. *Accident, Analysis, & Prevention*, 26, 675-679.

Kellogg International Work Group on the Prevention of Falls by Elderly. (1987). The

prevention of falls in later life. *Danish Medical Bulletin*, 34 (4), 1-24.

Lord, S.R., Ward, J.A., Williams, P., & Anstey, K.J. (1993). An epidemiological study of falls in older community-dwelling women: The Randwick falls and fracture study. *Australian Journal of Public Health*, 17 (3), 240-245.

National Safety Council. (1994). *Accident facts, 1994 Edition*. Itasca, IL: National Safety Council.

Nevitt, M.C., Cummings, S.R., & Hudes, E.S. (1991). Risk factors for injurious falls: A prospective study. *Journal of Gerontology*, 46 (5), M164-170.

Nevitt, M.C., Cummings, S.R., Kidd, S., & Black, D. (1989). Risk factors for recurrent nonsyncopal falls. *Journal of American Medical Association*, 261 (18), 2663-2668.

O'Loughlin, J., Robitaille, Y., Boivin, J.F., & Suissa, S. (1993). Incidence and risk factors for falls and injurious falls among the community living elderly. *American Journal of Epidemiology*, 137, 342-54.

Pauls, J.L. (1991). Safety standards, requirements, and litigation in relation to building use and safety, especially from falls involving stairs. *Safety Science* 14, 125-154.

Pauls, J. (1999) Pauls' Checklist for Stair Safety. Report of Adult Injury Management (AIM) Conference (Eds). E.M. Gallagher, V. Scott, & M. Mills, (p.52). University of Victoria. B.C.

Shipp, K.M., & Branch, L.G. (1999). The physical environment as a determinant of the health status of older people. *Canadian Journal on Aging*, 18 (3), 313-327.

Sjorgen, H., & Bjornstig, U. (1991). Injuries among the elderly in the home environment. *Journal of Aging and Health*, 3, 107-125.

Smith, D.W., Brett, A.W., Straker, J.K., Snell, J., Jackson, F.W., & Ulmer, M.E. (1994). A study of stairs in the housing of independent-living elderly people. *International Journal on Aging and Human Development*, 39, 247-256.

Startzell, J.K., Owens, D.A., Mulfinger, L.M., & Cavanagh, P.R. (2000). Stair negotiation in older people: A review. *Journal of the American Gerontological Society*, 48, 567-580.

Svanstrom, L. (1973). Falls on stairs: an epidemiological study. Lund Sweden: Department of Social and Preventive Medicine and Architecture, Lund Institute of Technology.

Templer, J., Mullet, G.M., Archea, J., & Margulis, S.T. (1978). An analysis of the behavior of stair users. (NBSIR 78-1554). Washington, D.C.: National Bureau of Standards.

Templer, J. 1992. The staircase: studies of hazards, falls and safer design. The MIT Press Massachusetts Institute of Technology, Cambridge: Massachusetts.

Templer, J., & Archea, J. (1983). Stairway design for reducing fall injuries in industry. Georgia Institute of Technology, Pedestrian Research Lab.

Tinetti, M.E., Doucette, J., Claus, E., & Marottoli, R. (1995). Risk factors for serious injury during falls by older persons in the community. *Journal of American Geriatric Society*, 43 (11), 1214-1221.

Webber, G.M. (1985). Accidental falls on stairs in England and Wales: A study of time trends and fatalities. *Journal of Occupational Accidents*, 7, 83-99.

Wyatt, J.P., Beard, D., & Busuttil, A. (1999). Fata falls down stairs. *Injury*, 30 (1), 31-34.

