

Falling 201: Contributors, Interventions, and the Gift of Near Misses

3rd Annual Rossmoor Falls Prevention Event
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Terry Hill, MD, FACP
thillmd@pacbell.net



Introduction, *aka* review of Falling 101

- Gravity of the issues
- Causes and interventions: Can you say multi-factorial?

Analyzing one's own falls and near misses with tools from the past 70 years of safety research, *aka* mistakes I have made

- The Swiss cheese model and near misses
- The toil and reward of trying to change my own behavior and awareness

Did I mention that exercise is a good thing?

The bad news:

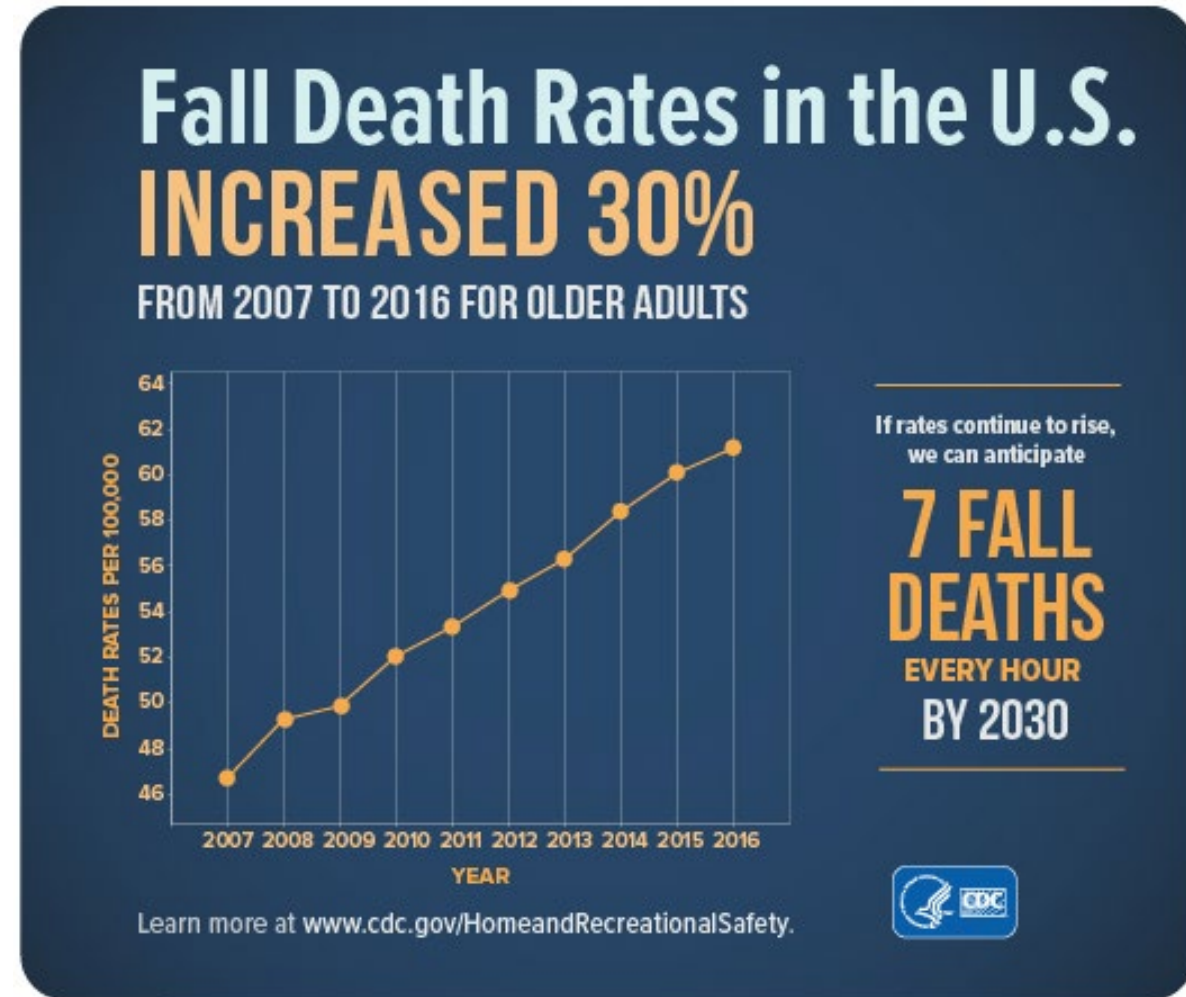
- Falls are frequent and the consequences often serious, e.g., broken bones, hospital, nursing home, death.

Where do they happen?

- Most older adult falls (72%) leading to emergency department visits occurred indoors.
- Outside falls were more frequent among men than women.
- Most falls occurred at home (79%).
- The most common locations were bedroom, bathroom, and stairs.

Moreland BL. A Descriptive Analysis of Location of Older Adult Falls That Resulted in Emergency Department Visits in the United States, 2015.

Am J Lifestyle Med, 2020



Physical activity during the COVID-19 pandemic

AMONG ADULTS AGE 50–80

Moderate or vigorous activity for at least 30 minutes

- 21%** less than once a week
- 51%** one to several times a week
- 28%** every day or nearly every day

Change in physical activity during the pandemic

- 37%** less active
- 13%** more active
- 50%** no change

**Survey conducted in January 2021*



Over one in three older adults reported having a fear of falling.

Falls during the pandemic AMONG ADULTS AGE 50–80



25%
had a fall between
Mar 2020–Jan 2021

AMONG THOSE WHO HAD A FALL...



70%
had an injury

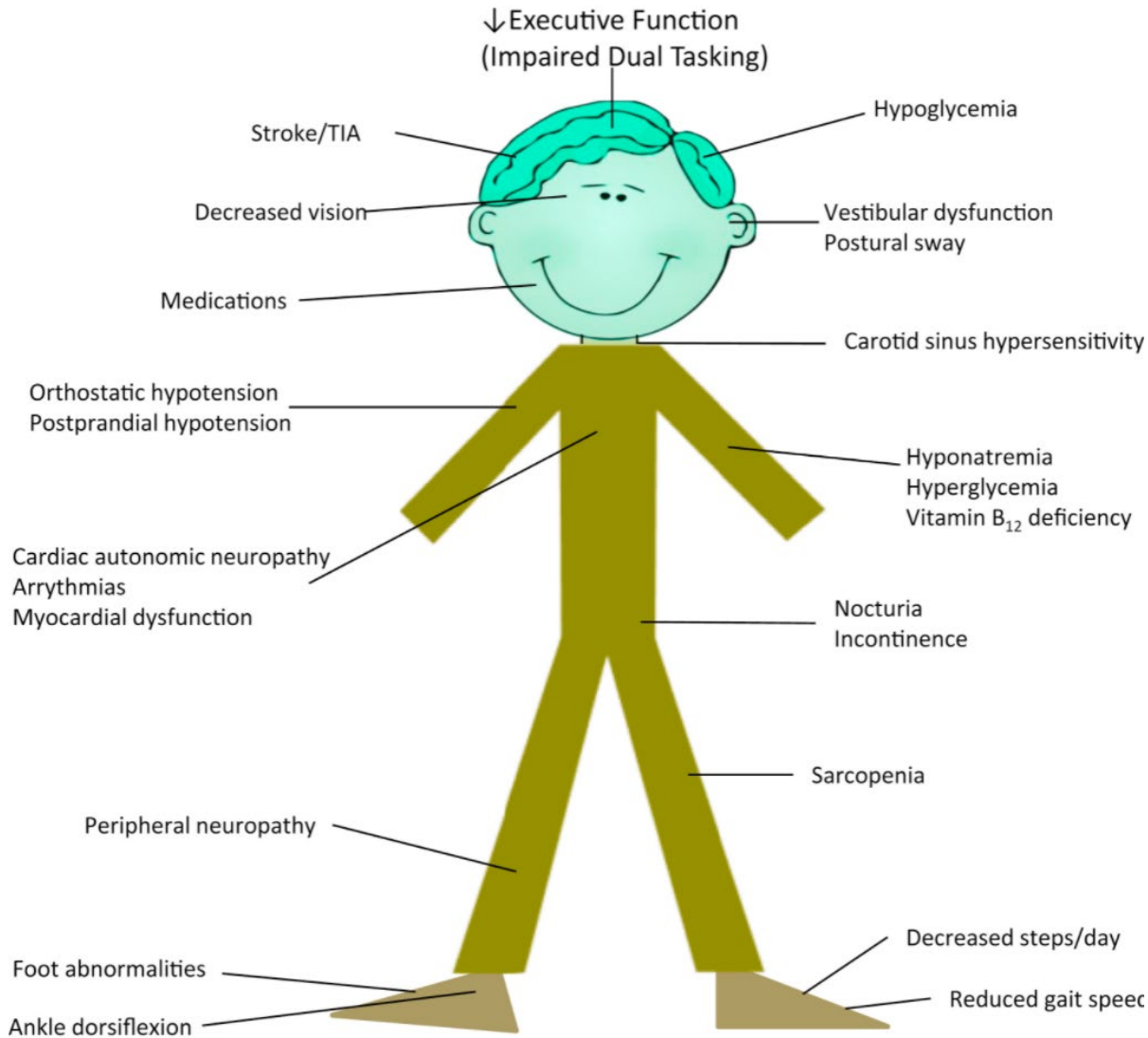


12%
delayed getting
needed
medical care



16%
did not get
needed
medical care

Fall risk increases with age because of physical issues, environmental and situational factors – it's complicated...



But falls are preventable, and the remedy bundles are straightforward!

All include exercise.

Also key are attention to home safety, medications, +/- vision

Yikes, so much can go wrong with my body!

Diagram illustrates potential factors worsened by chronic illness, e.g., diabetes.

Postural Hypotension

Postural hypotension—or orthostatic hypotension—is when your blood pressure drops when you go from lying down to sitting up, or from sitting to standing.

When your blood pressure drops, less blood can go to your organs and muscles. This can make you more likely to fall.



When might symptoms happen?

- When standing or sitting up suddenly
- In the morning when blood pressure is naturally lower
- After a large meal or alcohol
- During exercise
- When straining on the toilet
- When you are ill
- If you become anxious or panicky

What causes postural hypotension?

Postural hypotension can be caused by or linked to:

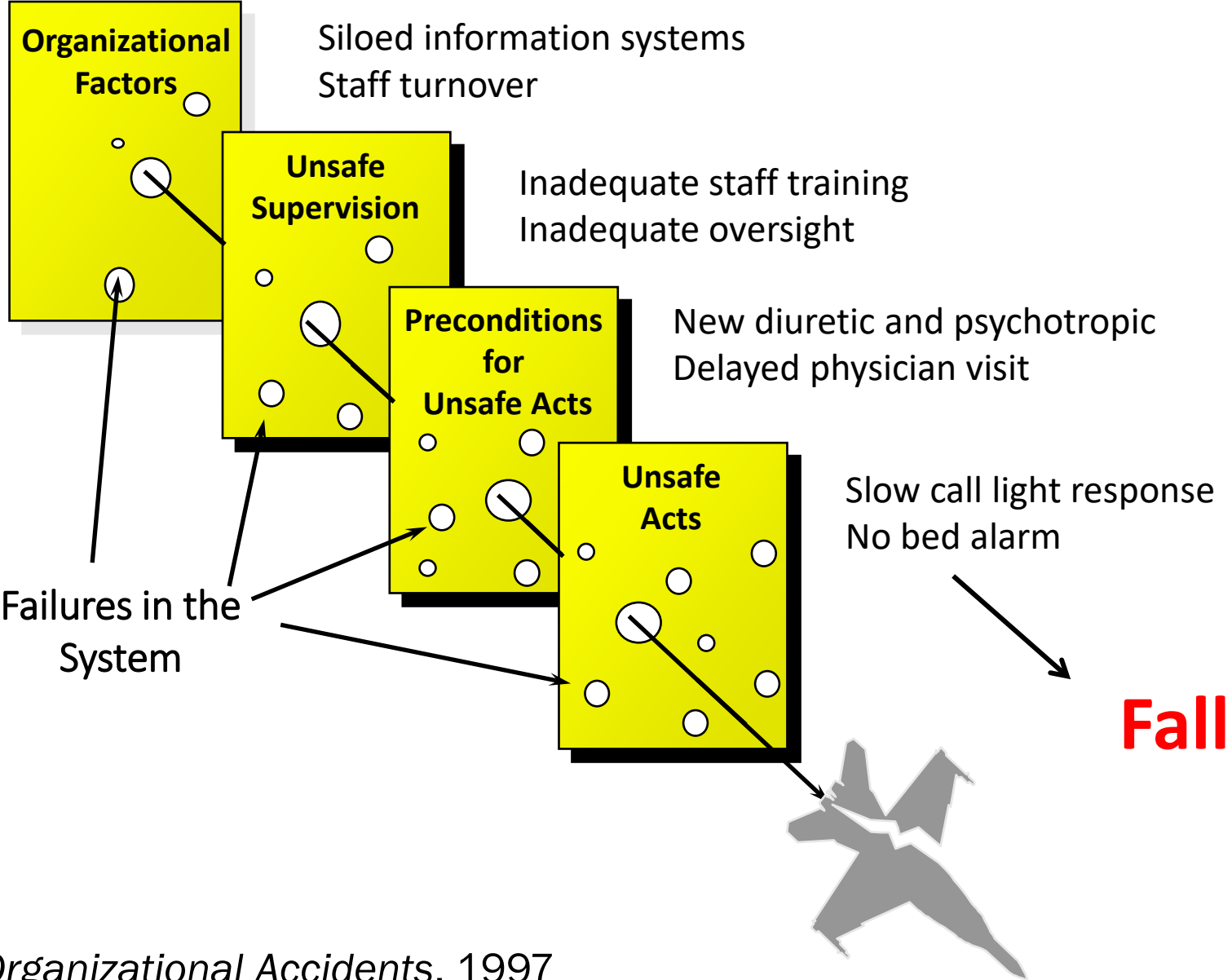
- High blood pressure
- Diabetes, heart failure, atherosclerosis, or hardening of the arteries
- Taking some diuretics, antidepressants, or medicines to lower blood pressure
- Neurological conditions like Parkinson's disease and some types of dementia
- Dehydration
- Vitamin B12 deficiency or anemia
- Alcoholism
- Prolonged bed rest

What can I do to manage my postural hypotension?

- Tell your healthcare provider about any symptoms.
- Ask if any of your medicines should be reduced or stopped.
- Get out of bed slowly. First sit up, sit on the side of the bed, then stand up.
- Take your time when changing position, such as when getting up from a chair.
- Try to sit down when washing, showering, dressing, or working in the kitchen.
- Exercise gently before getting up (move your feet up and down and clench and unclench your hands) or after standing (march in place).
- Make sure you have something to hold on to when you stand up.
- Do not walk if you feel dizzy.
- Drink 6-8 glasses of water or low-calorie drinks each day—unless you have been told to limit your fluid intake.
- Avoid taking very hot baths or showers.
- Try sleeping with extra pillows to raise your head.

The Swiss cheese model and analysis of near misses

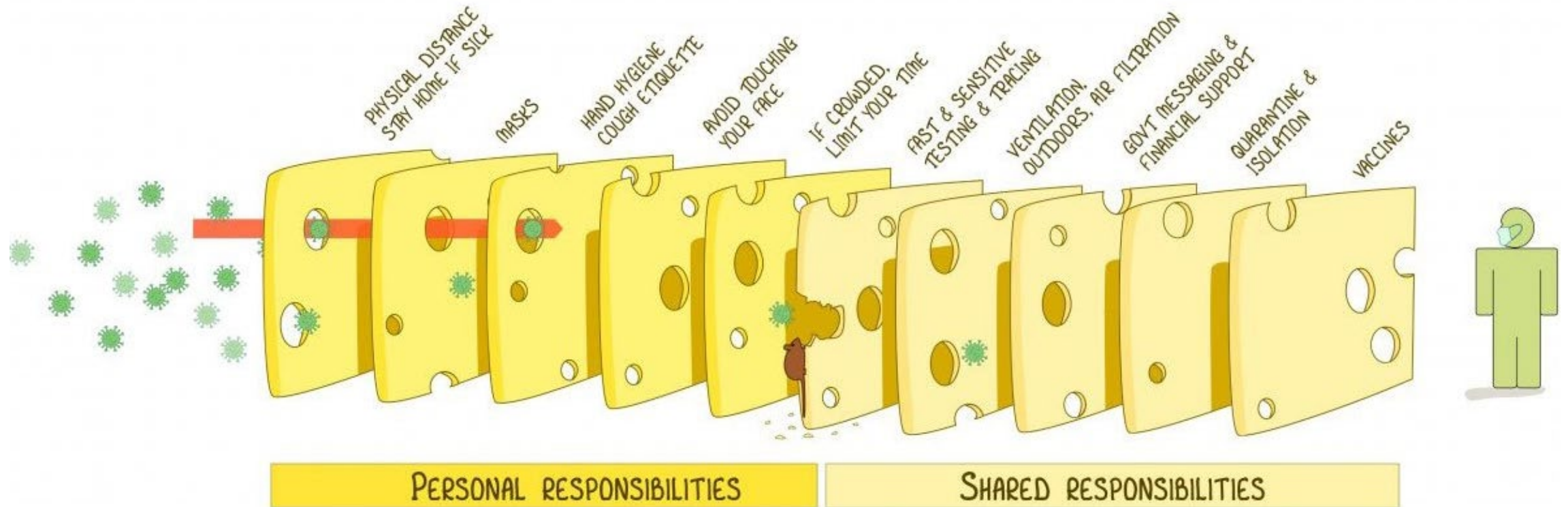
“Swiss cheese” model of falls in nursing homes (borrowed from naval aviation)



James Reason,
Managing the Risk of Organizational Accidents, 1997

THE SWISS CHEESE RESPIRATORY VIRUS PANDEMIC DEFENCE

RECOGNISING THAT NO SINGLE INTERVENTION IS PERFECT AT PREVENTING SPREAD



EACH INTERVENTION (LAYER) HAS IMPERFECTIONS (HOLES).
MULTIPLE LAYERS IMPROVE SUCCESS.

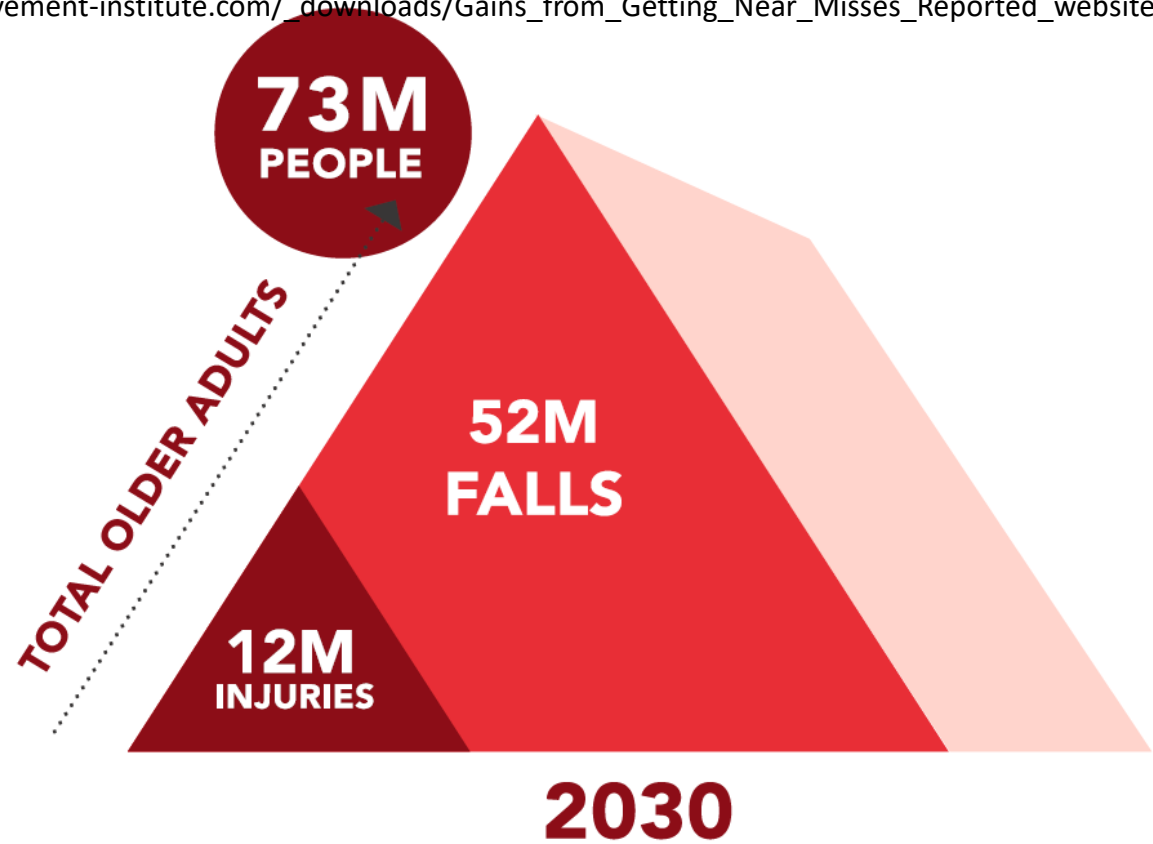
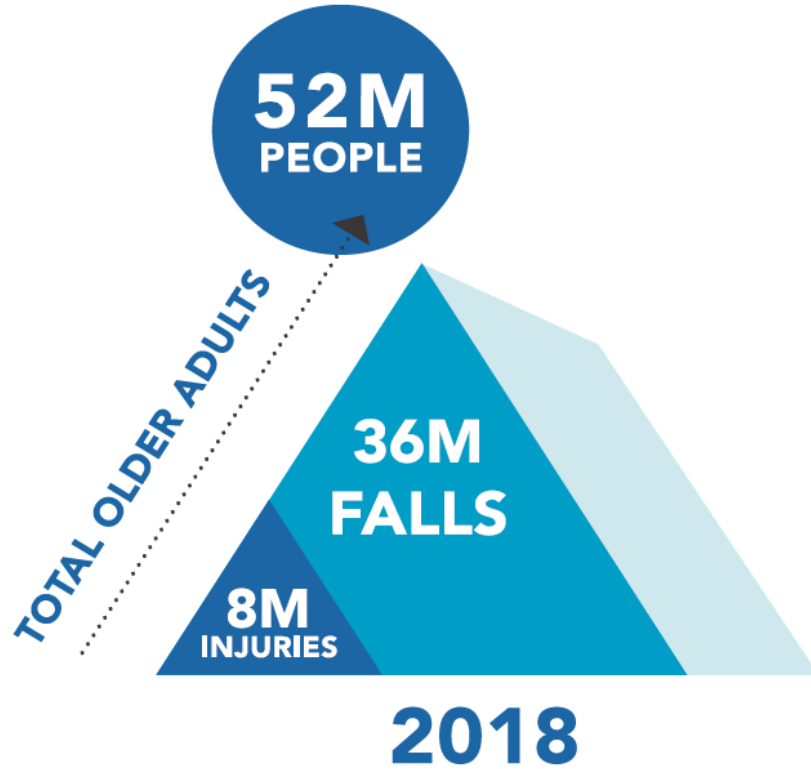
<https://www.pslhub.org/learn/coronavirus-covid19/tips/the-swiss-cheese-respiratory-virus-pandemic-defence-r3379/>

Ian M Mackay, virologydownunder.com. Based on the Swiss Cheese Model of Accident Causation by James T Reason, 1990

Ian M Mackay
VIROLOGYDOWNUNDER.COM
WITH THANKS TO JODY LANARD, KATHERINE ARDEN & THE UNI OF QL
BASED ON THE SWISS CHEESE MODEL OF ACCIDENT CAUSATION, BY JAMES T REASON, 1990
VERSION 3.
UPDATE: 24OCT202

“There are probably about 100 near misses for every ~~accident~~ *fall*. Learning from near misses is much, much ~~cheaper~~ *less painful* than learning from ~~accidents~~ *falls*...”

www.process-improvement-institute.com/downloads/Gains_from_Getting_Near_Misses_Reported_website.pdf



Centers for Disease Control and Prevention
National Center for Injury Prevention and Control

STEADI Stopping Elderly Accidents, Deaths & Injuries

Check Your Risk for Falling

Circle “Yes” or “No” for each statement below			Why it matters
Yes (2)	No (0)	I have fallen in the past year.	People who have fallen once are likely to fall again.
Yes (2)	No (0)	I use or have been advised to use a cane or walker to get around safely.	People who have been advised to use a cane or walker may already be more likely to fall.
Yes (1)	No (0)	Sometimes I feel unsteady when I am walking.	Unsteadiness or needing support while walking are signs of poor balance.
Yes (1)	No (0)	I steady myself by holding onto furniture when walking at home.	This is also a sign of poor balance.
Yes (1)	No (0)	I am worried about falling.	People who are worried about falling are more likely to fall.
Yes (1)	No (0)	I need to push with my hands to stand up from a chair.	This is a sign of weak leg muscles, a major reason for falling.
Yes (1)	No (0)	I have some trouble stepping up onto a curb.	This is also a sign of weak leg muscles.
Yes (1)	No (0)	I often have to rush to the toilet.	Rushing to the bathroom, especially at night, increases your chance of falling.
Yes (1)	No (0)	I have lost some feeling in my feet.	Numbness in your feet can cause stumbles and lead to falls.
Yes (1)	No (0)	I take medicine that sometimes makes me feel light-headed or more tired than usual.	Side effects from medicines can sometimes increase your chance of falling.
Yes (1)	No (0)	I take medicine to help me sleep or improve my mood.	These medicines can sometimes increase your chance of falling.
Yes (1)	No (0)	I often feel sad or depressed.	Symptoms of depression, such as not feeling well or feeling slowed down, are linked to falls.
Total		Add up the number of points for each “yes” answer. If you scored 4 points or more, you may be at risk for falling.	

This checklist was developed by the Greater Los Angeles VA Geriatric Research Education Clinical Center and affiliates and is a validated fall risk self-assessment tool (Rubenstein et al. J Safety Res; 2011; 42(6)493-499). Adapted with permission of the authors.

What were you jumping hurdles for, Uncle Brick?

Because I used to jump them, and people like to do what they used to do, even after they've stopped being able to do it....





And then there was my patient...

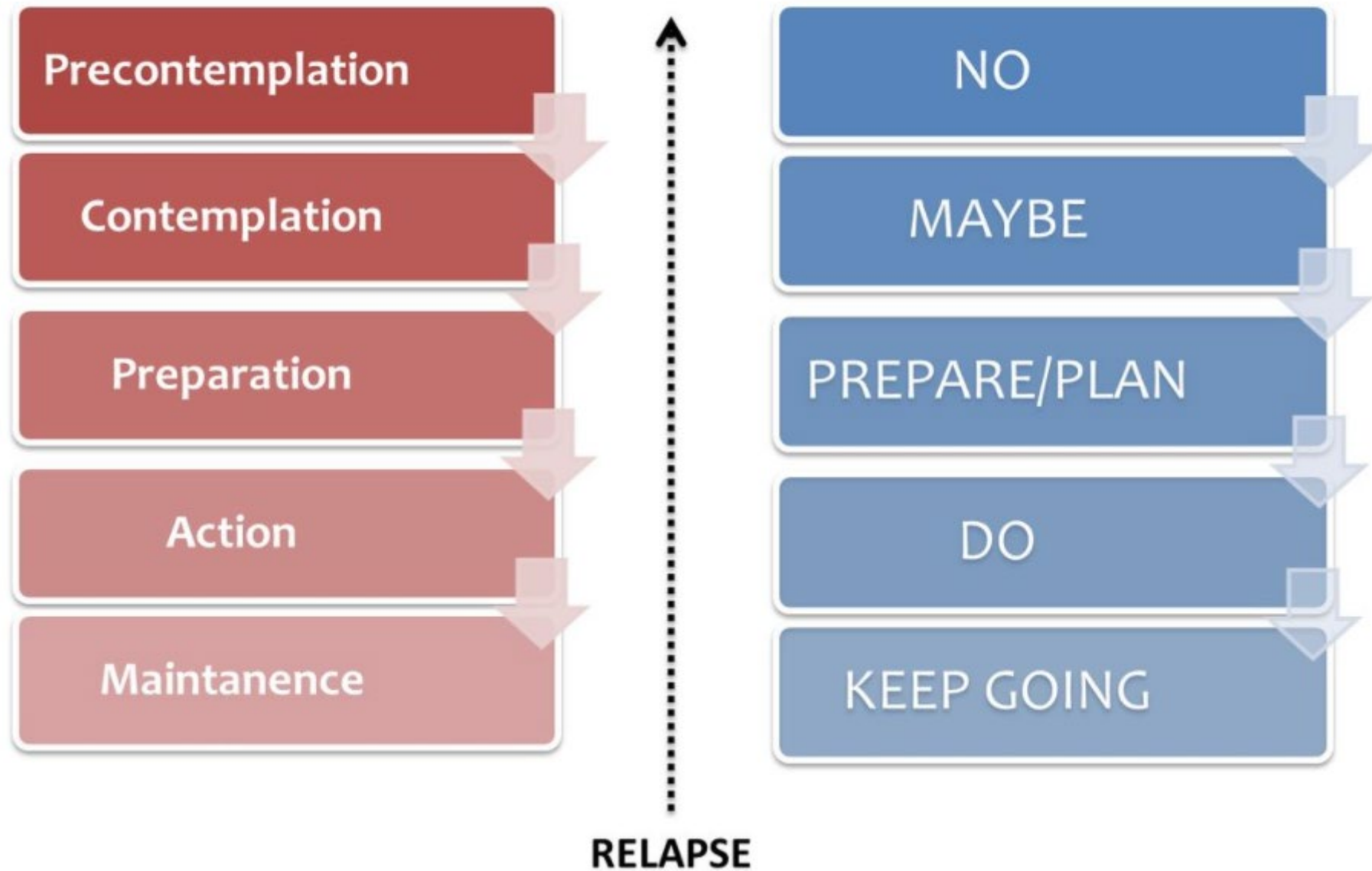
An 88 year-old former model and fashion designer who refused hypertension medications in spite of several strokes.

And, in spite of several falls, she insisted on wearing high heels at the nursing home....

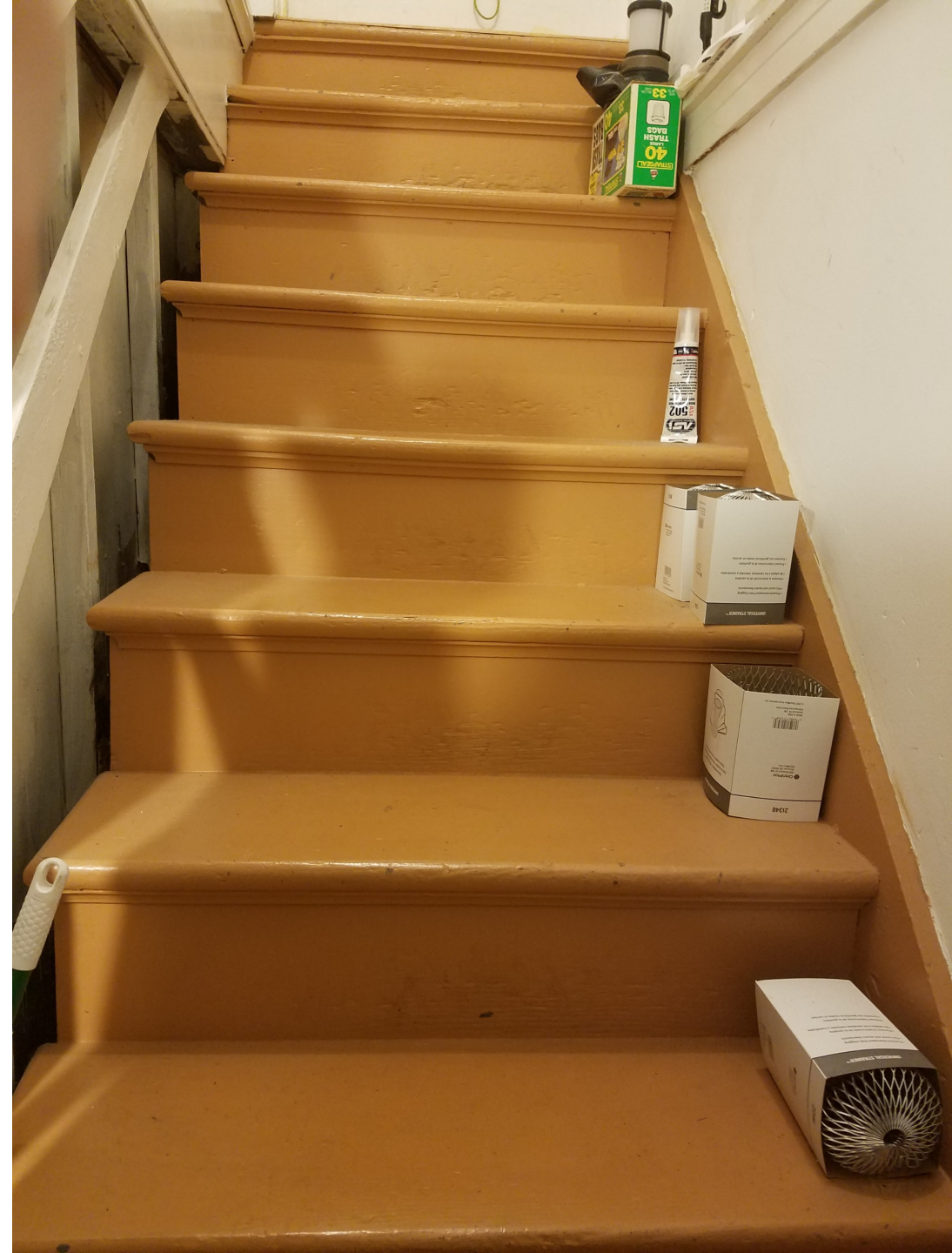
The toil and reward of trying to change my own behavior and awareness

Transtheoretical Model

Stages of change



Starting with stairs, where
I've had the most near misses





What could possibly go wrong?

Underfoot is not a beguiling word for older adults



The New York Review

On Breaking One's Neck

Arnold Relman

A doctor's near-death experience and what it reveals about
the US medical care system

February 6, 2014 issue

Ten days after my ninetieth birthday.... I was hurrying down the stairs to meet a cab that was waiting to take my son to the airport. ... Neglecting to use the stair lift, I lost my balance and pitched forward.... I heard a loud crack as my head hit the floor....

Yes, showers are safer than tubs, and grab bars are *de rigueur*...

- The highest number of bathroom injuries occur in or around the tub or shower.
- The injury rate increases with age and is higher for women than men.

CDC: Nonfatal bathroom injuries among persons aged ≥ 15 years-- United States, 2008. *MMWR*, Jun 10, 2011.

But when I'm at my sister's, I use her clawfoot tub (and situational awareness).

- Resilience is related to the capacity for recognizing the problem and making a safe decision in adverse conditions.

Morel G et al. Articulating the differences between safety and resilience: the decision-making process of professional sea-fishing skippers. *Human Factors* 50.1 (2008): 1-16.



Are falls more likely at work or in the kitchen?



Distraction versus situational awareness (resilience)



It's not just young people who do this!



Why distraction is bad and situational awareness is good





Sidewalks



Shadows



Measureless
chasms

Image A



Image B

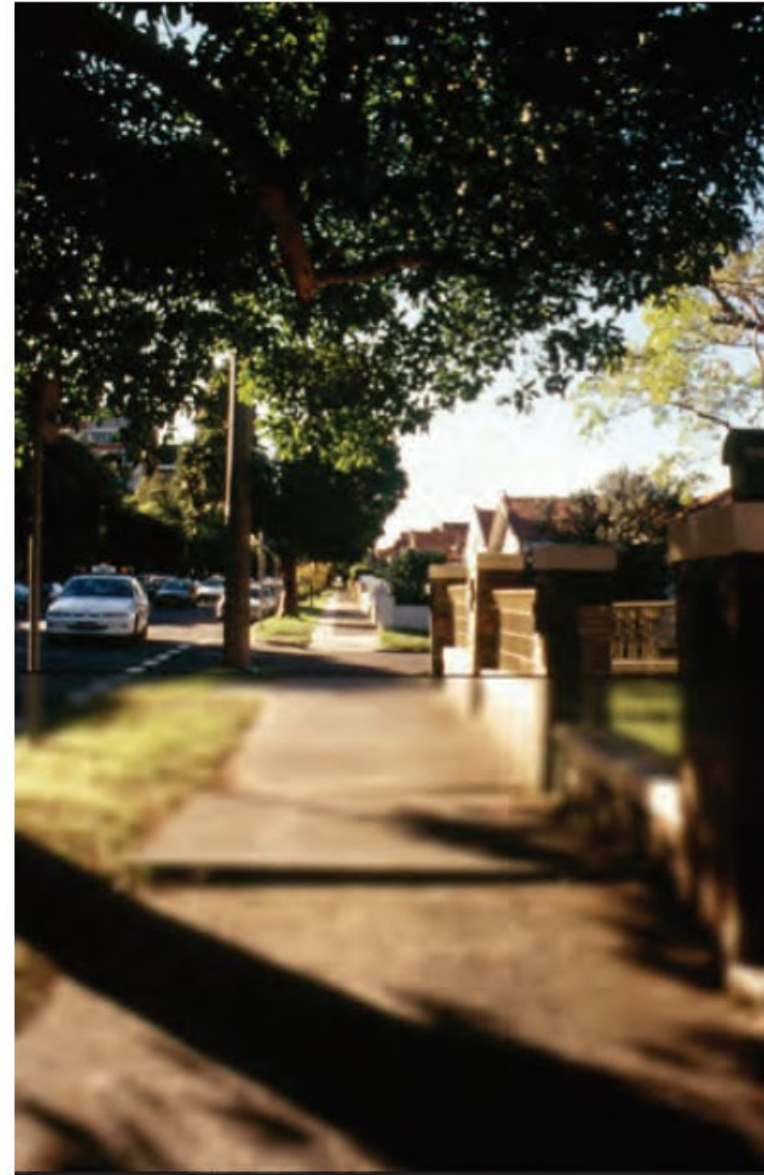


Figure C. Simulated view of street scenes as viewed through single lens distance glasses and bifocal glasses. The footpath misalignment (the commonest reported environmental factor involved in outdoor falls) is clearly seen in Image A but blurred in Image B.

a) Seen through distance glasses



b) Seen through bifocal glasses



- Optometrists fitted older adults who use multifocal lenses with single lens distance glasses to wear outdoors.
- Falls were decreased 40 percent among participants who regularly took part in outdoor activities.

https://www.cdc.gov/homeandrecreationalafety/pdf/falls/cdc_falls_compendium-2015-a.pdf

Mats don't slip in our house, night lights are hard to come by



Did I mention that exercise is a good thing?

Did I mention that exercise is a good thing?

Physically active adults have a 35% lower risk of cognitive decline and 18% lower risk of dementia

Institute of Medicine. *Cognitive aging: Progress in understanding and opportunities for action*. 2015.

Benefits of regular physical activity

Reduces the risk of dying prematurely

Reduces the risk of dying from heart disease

Reduces the risk of stroke

Reduces the risk of developing diabetes

Reduces the risk of developing high blood pressure

Helps reduce blood pressure in people who already have high blood pressure

Reduces the risk of developing colon cancer

Reduces feelings of depression and anxiety

Helps control weight

Helps build and maintain healthy bones, muscles, and joints

Helps older adults become stronger and better able to move about without falling

Promotes psychological wellbeing

Quick Tip: Test Your Exercise Intensity

When you're being active, try talking: if you're breathing hard but can still have a conversation easily, it's moderate-intensity activity. If you can only say a few words before you have to take a breath, it's vigorous-intensity activity.

Examples of moderate physical activity

Washing and waxing a car for 45-60 minutes
Washing windows or floors for 45-60 minutes
Playing volleyball for 45 minutes
Playing touch football for 30-45 minutes
Gardening for 30-45 minutes
Wheeling self in wheelchair for 30-40 minutes
Walking 1 3/4 miles in 35 minutes (20 min/mile)
Basketball (shooting baskets) for 30 minutes
Bicycling 5 miles in 30 minutes
Dancing fast (social) for 30 minutes
Pushing a stroller 1.5 miles in 30 minutes
Raking leaves for 30 minutes
Walking 2 miles in 30 minutes (15 min/mile)
Water aerobics for 30 minutes
Swimming laps for 20 minutes
Wheelchair basketball for 20 minutes
Basketball (playing a game) for 15-20 minutes
Bicycling 4 miles in 15 minutes
Jumping rope for 15 minutes
Running 1.5 miles in 15 min (10 min/mile)
Shoveling snow for 15 minutes
Stairwalking for 15 minutes

Less vigorous,
more time



More vigorous,
less time

Terry's note to self: When I retire, I'm going to practice tai chi

- “Exercise programmes that reduce falls primarily involve balance and functional exercises.”*
- “In at-risk adults and older adults, tai chi practice may reduce the rate of falls and injury-related falls over the short term (<12 months) by approximately 43% and 50%, respectively.”**
- “Tai chi is effective at improving the balance ability of adults over 60 years of age.”***

*Sherrington C, et al. Exercise for preventing falls in older people living in the community. Cochrane Database of Systematic Reviews 2019, Issue 1.

**Lomas-Vega R et al. Tai Chi for Risk of Falls. A Meta-analysis. J Am Geriatr Soc. Sept 2017.

***Wang L et al. Optimal exercise parameters of tai chi for balance performance in older adults: A meta-analysis. J Am Geriatr Soc. Mar 2021.