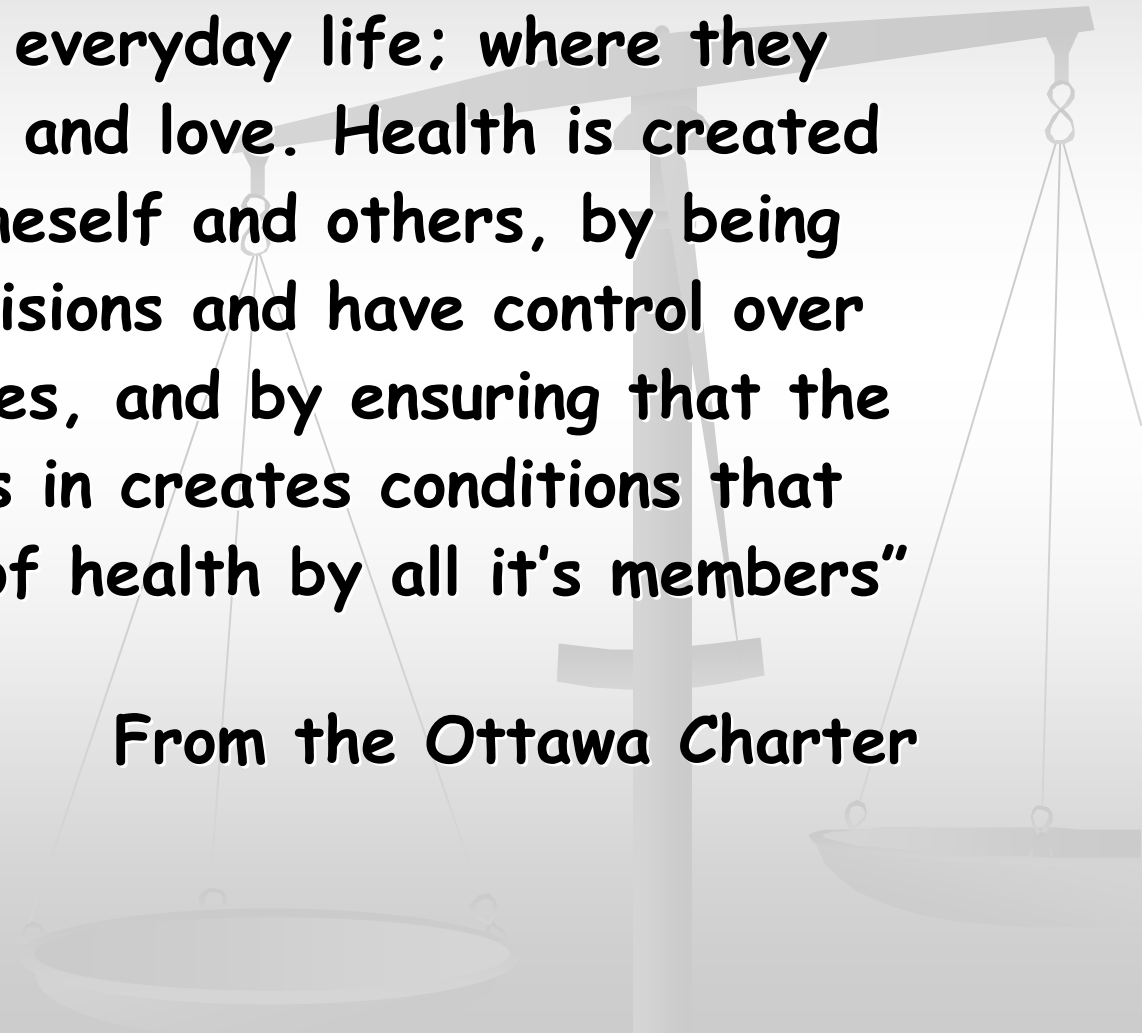




The Great Exercise Jigsaw Puzzle

Applying the Research Relating to
Exercise and Falls Injury Reduction

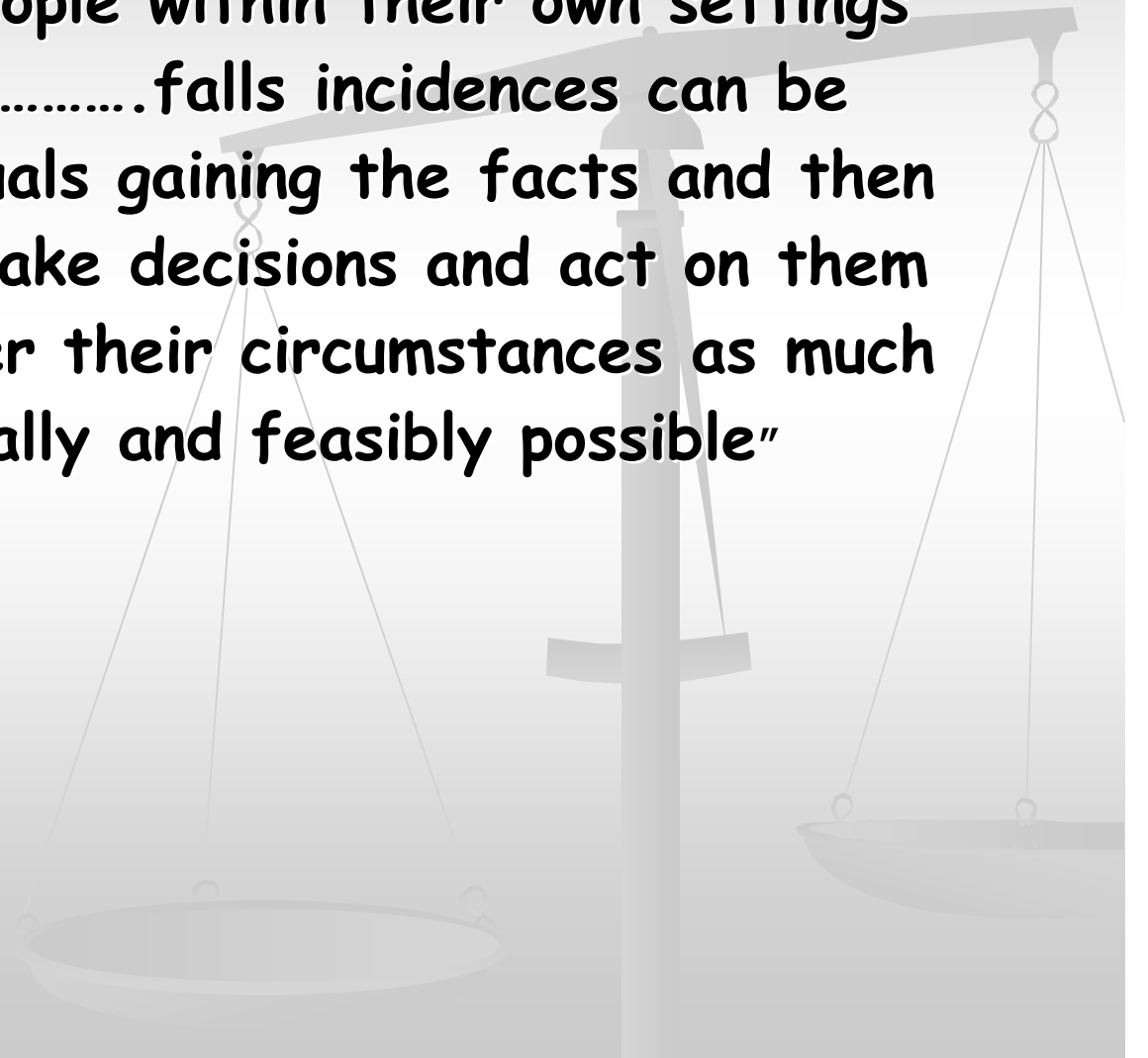
Sally Castell



“Health is created and lived by people within the settings of everyday life; where they learn, work, play and love. Health is created by caring for oneself and others, by being able to take decisions and have control over one’s circumstances, and by ensuring that the society one lives in creates conditions that allow attainment of health by all it’s members”

From the Ottawa Charter

“ Falls occur by people within their own settings of everyday life.....falls incidences can be reduced by individuals gaining the facts and then by being able to make decisions and act on them to have control over their circumstances as much as is realistically and feasibly possible”



Falls - A Multi-Layered Approach

The Bits of the Jigsaw Puzzle

Evidence

Policies

Systems

Strategies

Structures

Settings

Assessments

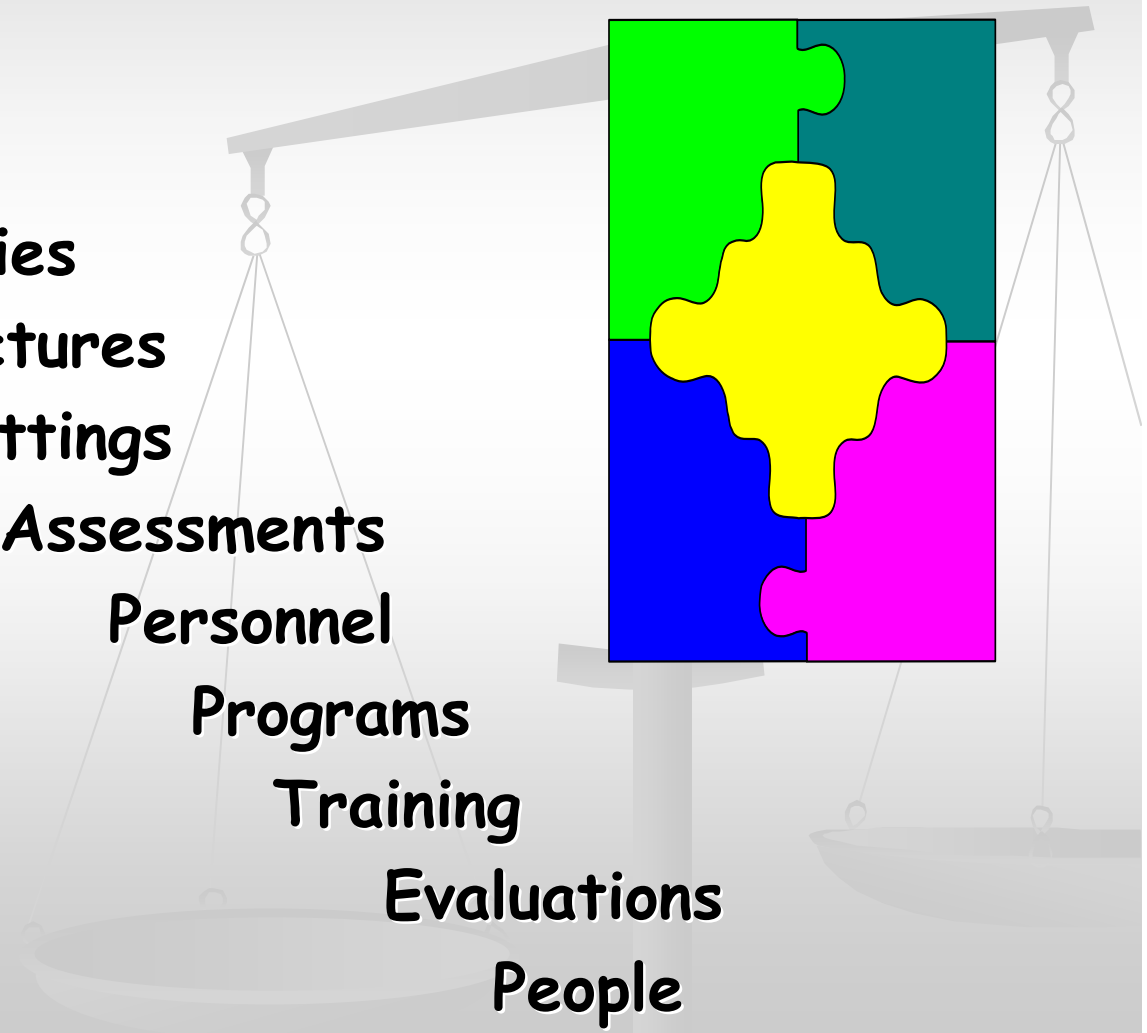
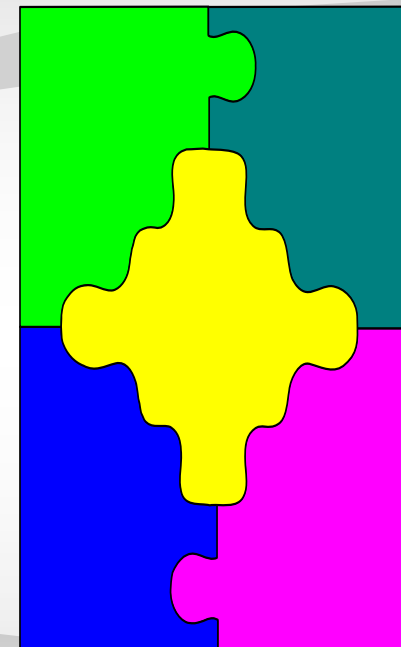
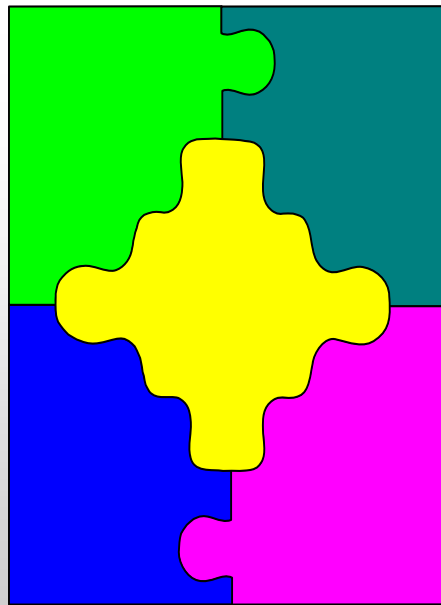
Personnel

Programs

Training

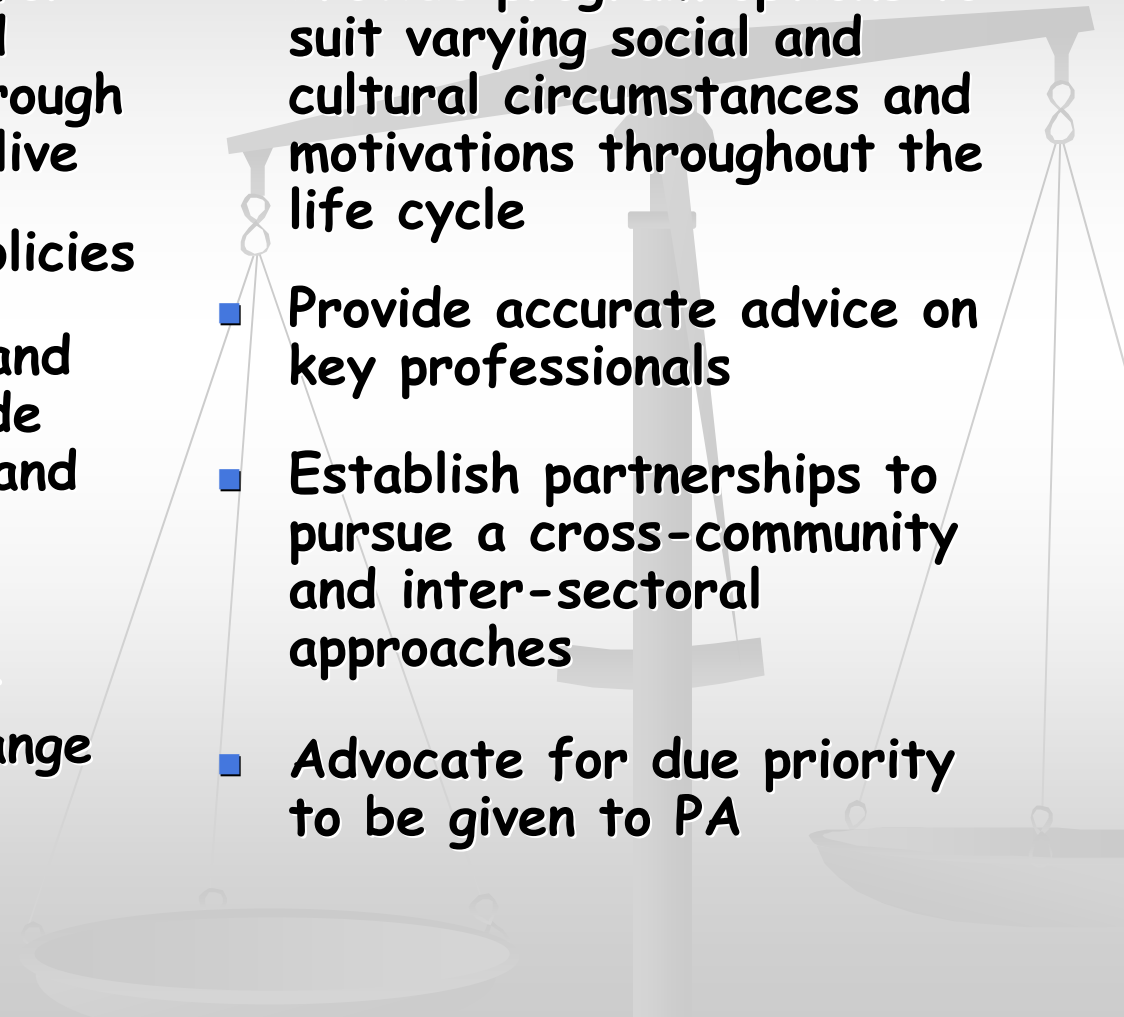
Evaluations

People



Physical Activity & Falls Prevention

The Big Picture - A Multi-strategy Approach

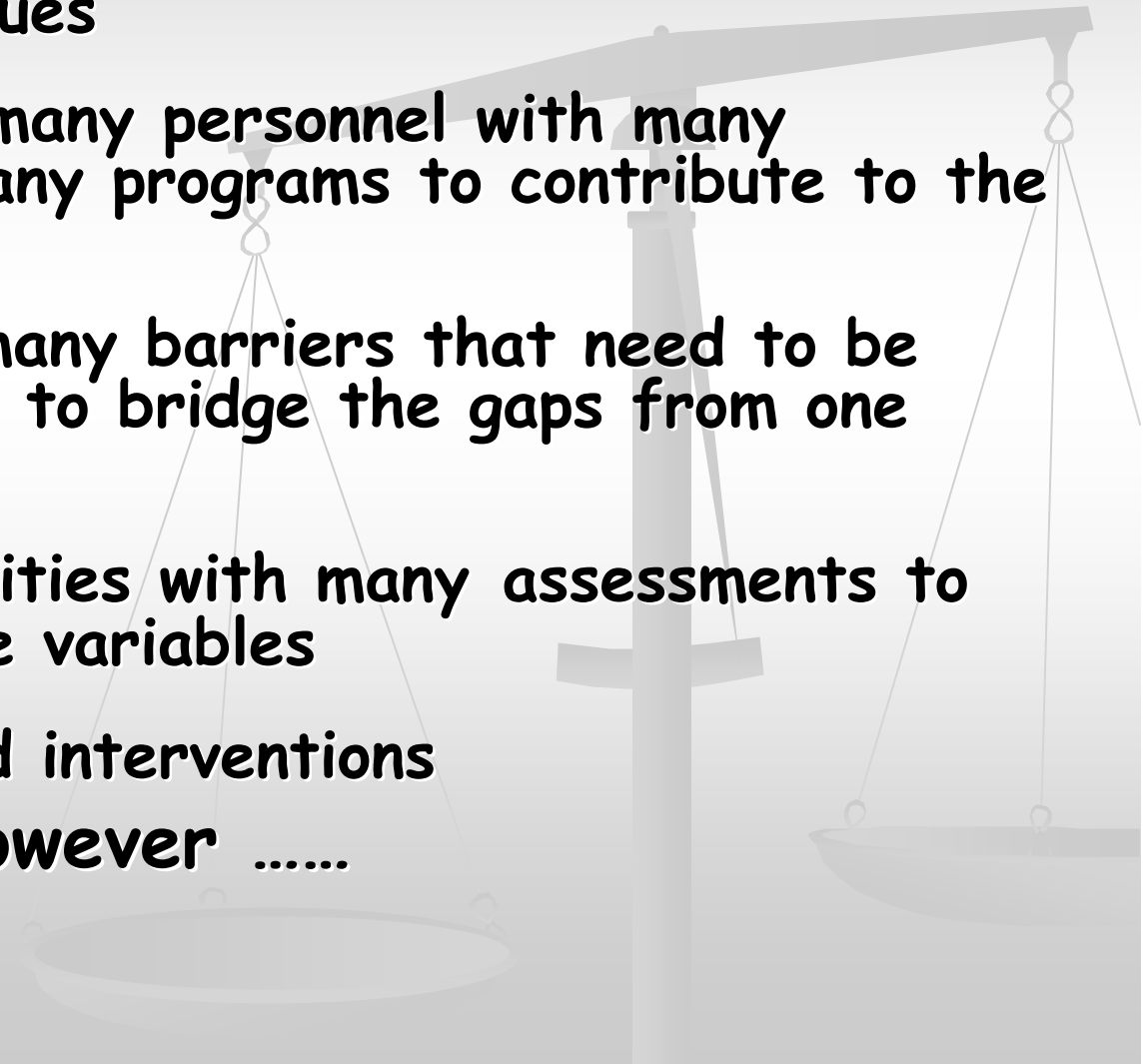
- 
- Advocate and provide for supportive physical and social environments through settings where people live
 - Build 'active' public policies
 - Promote the benefits and need for PA and provide access to information and life skills to enable participation
 - Focus on the different levels of behaviour change and tailor programs accordingly
 - Provide program options to suit varying social and cultural circumstances and motivations throughout the life cycle
 - Provide accurate advice on key professionals
 - Establish partnerships to pursue a cross-community and inter-sectoral approaches
 - Advocate for due priority to be given to PA

Falls Prevention Strategies

Multi-component strategies

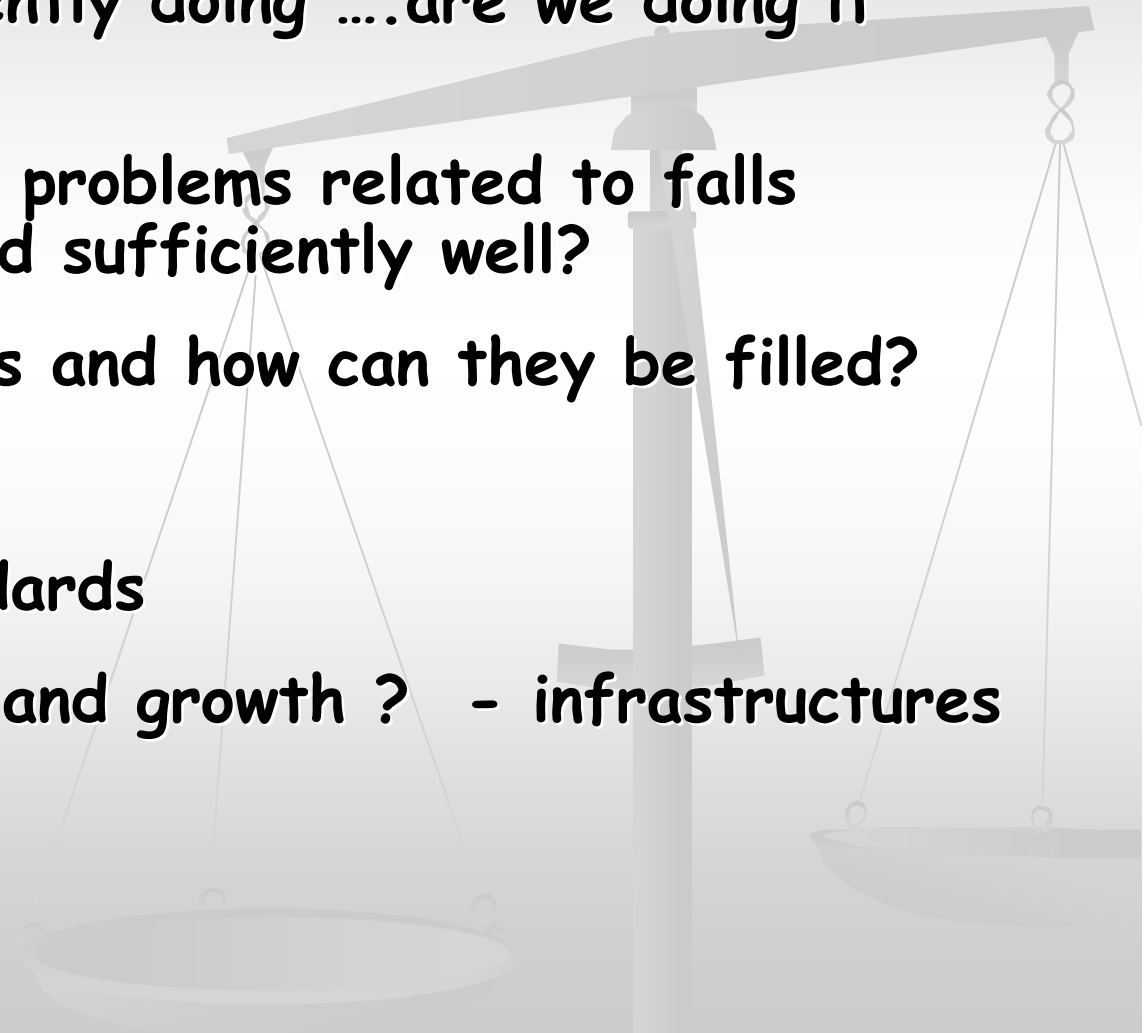
- Comprehensive clinical assessments (with follow up)
- Exercise -tailored including gait, strength & balance components
- Medication management
- Referrals to health care providers for treatment of chronic conditions
- Vision assessment & improved vision
- Falls risk education
- Osteoporosis prevention & treatment
- Nutrition - calcium & vitamin D supplementation
- Hip protectors
- Environment modifications

Exercise & Falls Overview

- Multiple strategies and recommendations related to falls prevention issues
 - Multiple settings; many personnel with many different skills; many programs to contribute to the big picture
 - Many issues with many barriers that need to be addressed in order to bridge the gaps from one setting to another
 - Many levels of abilities with many assessments to accommodate these variables
 - Many programs and interventions
- However
- 

Questions

(From the exercise perspective)

- What we are currently doing ...are we doing it right / well ?
 - Are the issues and problems related to falls reduction addressed sufficiently well?
 - Are there still gaps and how can they be filled?
 - Guidelines?
 - Training? - standards
 - Sufficient support and growth ? - infrastructures / personnel etc.
- 

Exercise Evidence

Goals of Management.....

Maintain muscle strength, endurance, balance

Level 1

- **Progressive resistance training** effective to increase strength & some functional outcomes
- **Endurance training** increases functional capacity.
FITT still needs further investigation
- **Tai chi** - improves balance and postural control, positive effect on FOF and postural control
- **Falls specific interventions** - multi-disciplinary, multi-factorial, health/ environmental risk factor screening and intervention - risk assessment; education/ awareness ;equipment check, labels or bracelets for high risk; alarms

Exercise Evidence

Level 2

- **Balance training** .- Specific to level of function which is to be achieved - Static and dynamic balance (gait training) required
 - * Sitting balance exercises insufficient
- **Individual tailored programs** including strength, balance and functional retraining increases mobility & reduces use of assistive devices
- **Group exercises** - strength, balance, aerobic and functional activities improves mobility and function
- **Falls specific interventions** multi-disciplinary, multi-factorial, health/ environmental risk factor screening and intervention - risk assessment; education & awareness; equipment check in residential care - staff education; gait training & appropriate use of assistive devices; review of medication etc.

Gaps between Research and Practice

The evidence should be able to be translated from research into practice but

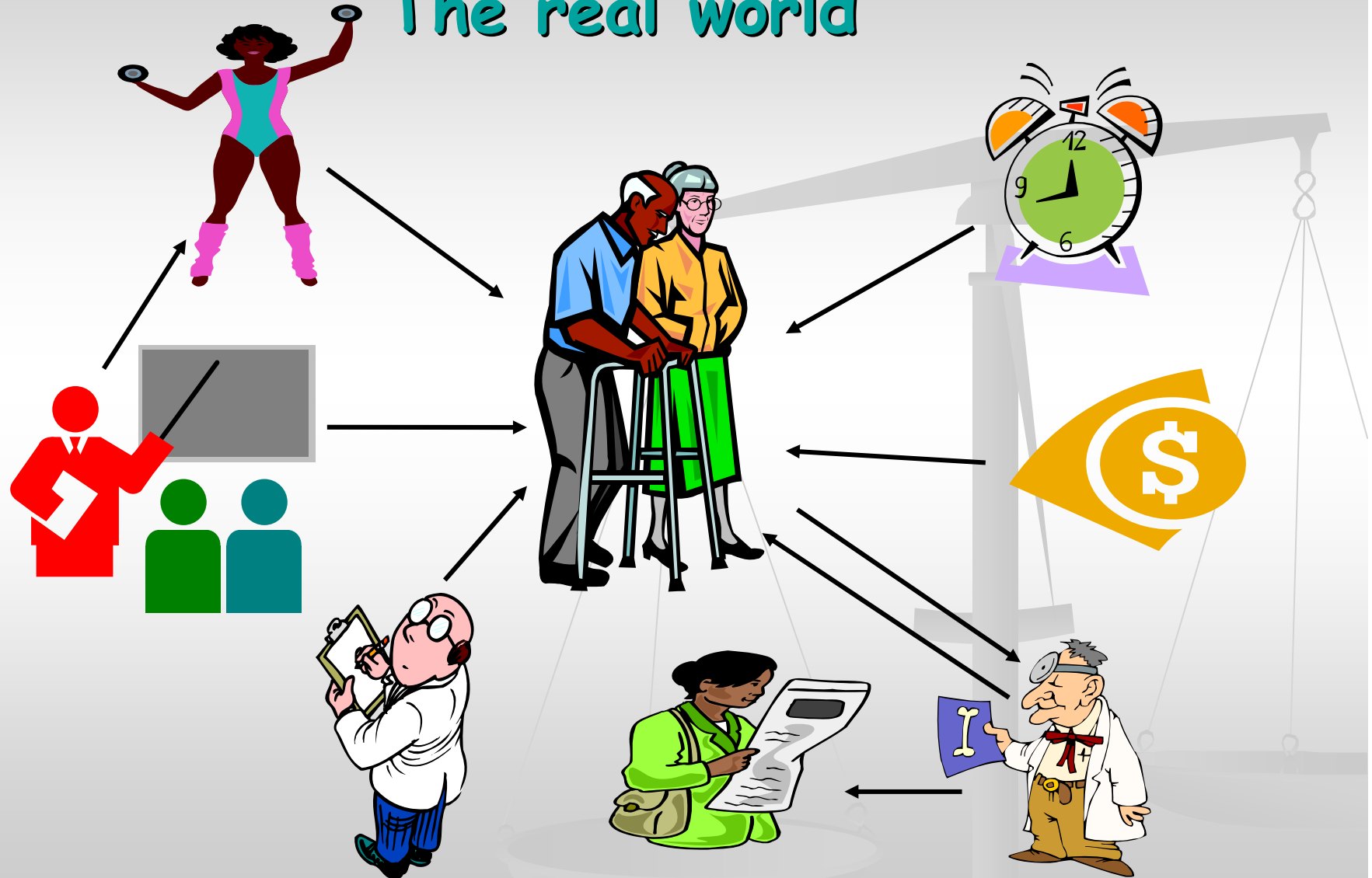
- * Few interventions are consistently or poorly implemented in applied settings ("the real world")
- * More demonstrations are needed of how to effectively implement research in typical settings and locations
- * Greater attention is needed towards documentation of efficacy and effectiveness of interventions relating to reach, adoption, implementation and maintenance (RE-AIM)

Excerpts from Why don't we see more translation of Health Promotion Research into practice?

Rethinking the Efficacy-to-Effectiveness Transition
AM j Public Health. 2003; 93: 1261-1267

Community Service Issues

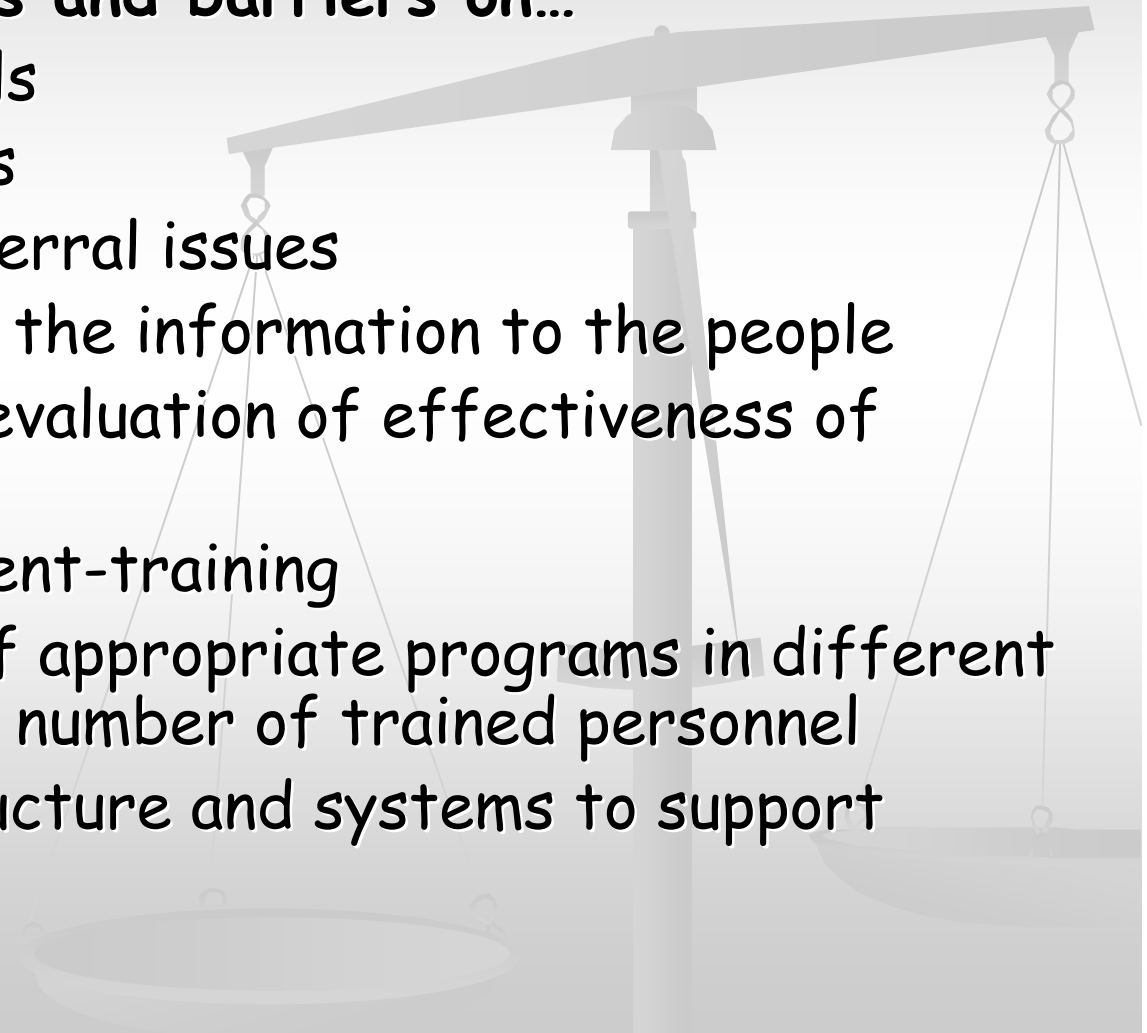
"The real world"



Community Service Issues

“The real world ”

In the big health picture - many different priorities therefore limitations and barriers on...

- Time & staffing levels
 - Budgetary allowances
 - GP & health care referral issues
 - Reaching & providing the information to the people
 - Lack of feedback & evaluation of effectiveness of interventions
 - Staff skill development-training
 - Access & provision of appropriate programs in different settings with limited number of trained personnel
 - Inadequate infrastructure and systems to support research translation
- 

Program Selection



Many different exercise and training programs developed mainly from research; different focus & elements for different target groups; conducted by different professionals organisations

The Big Questions

Which prescription

? Protection and reducing falls risks

? Rehabilitation and prevention of further falls

Which program for which target group ?

What assessments to use ?

What exercise personnel to provide the programs etc. ?

Program levels - group and individual?

Differences



Settings

- **Acute Care** - Hospital - base
- **Community** - fit (40 -60 baby boomers), early retirement(65-75) and frail (75+)
- **Residential / supported care**

Target Groups

Level 1

- Very fit, healthy, active and independent

Level 2

- Average fitness level / moderately healthy managing normal daily activities

Level 3

- Lower fitness levels -frailer with multiple health / activity issues and limited capacities

Assessments at Different Levels

(Based from the Nagi Model)

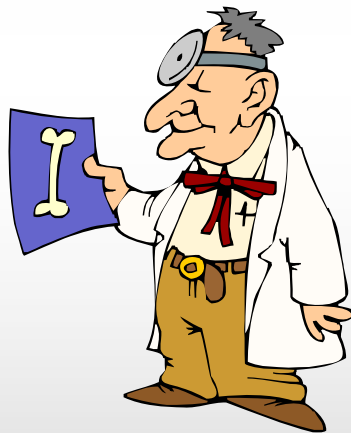
Physical activity level & health status

Functional ability - Difficulty in task performance

Impairment - IAL Dependence

Disability ADL Dependence

Cognitive decline → High fall risk



Screening & Assessments

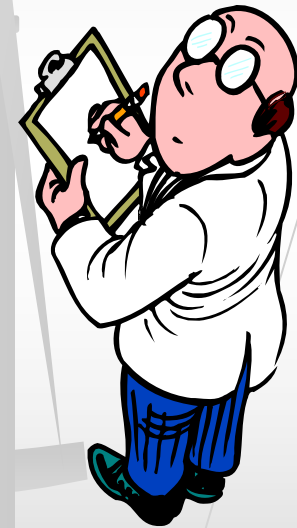
Many measures for falls, the choice is dependent on the setting, level of ability of target group etc.

Examples :

- PPA - Physiology profile assessment - Lord
- Simple PPA - GP assessment - Tiedeman
- FRAT pack
- 3 - gait / mobility/ efficacy - Tinetti
- Senior fitness test
- * Berg & FAB balance scales
- ABC confidence scale

And many more!!

The level of risk is not the same for all people especially older adults with changes over time, ongoing and different assessments often need to be undertaken



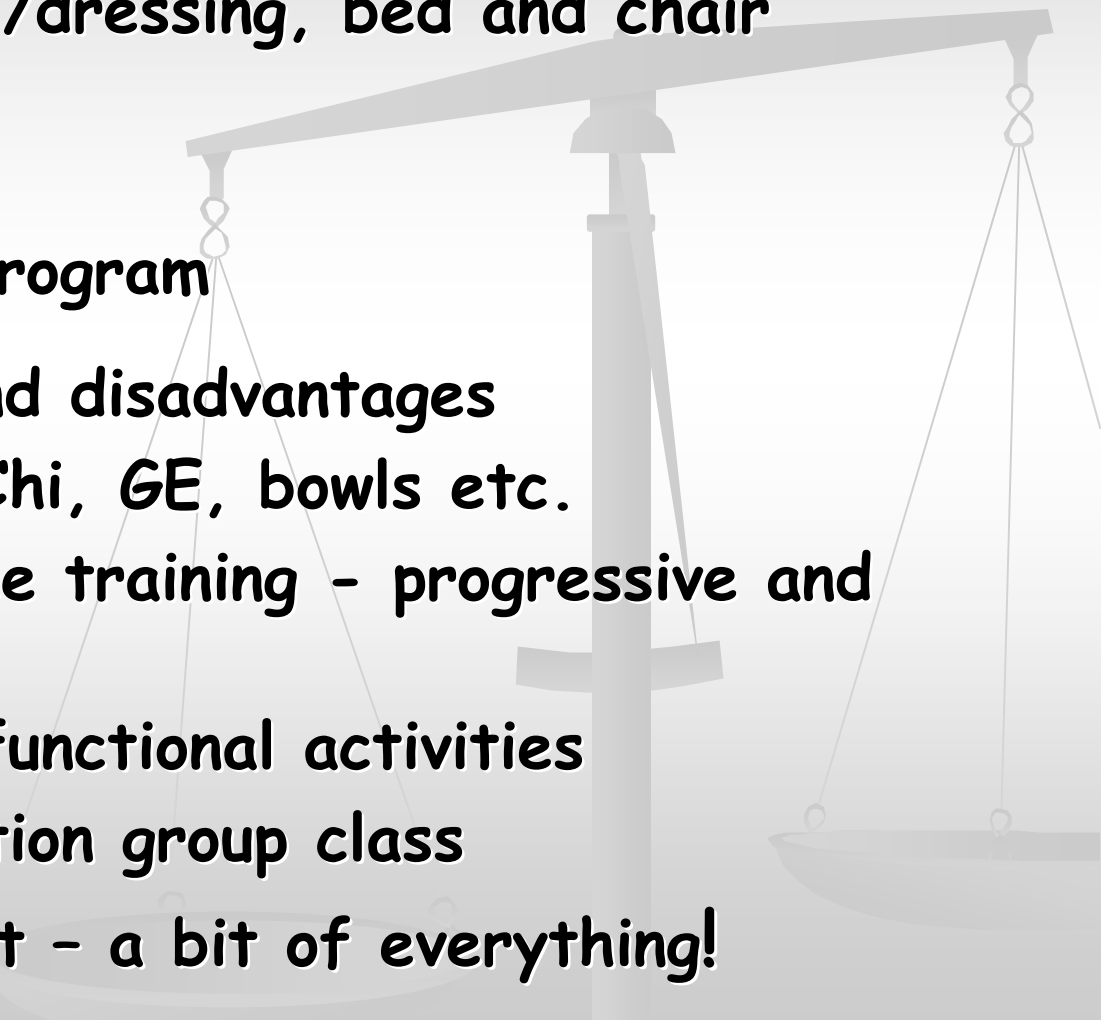
Program Options

Individual - advantages and disadvantages

- Incidental - shower /dressing, bed and chair exercises
- Home program
- Individual tailored program

Group - advantages and disadvantages

- Group classes, Tai Chi, GE, bowls etc.
- Strength and balance training - progressive and specific
- Circuits comprising functional activities
- Specific falls reduction group class
- The great mixing pot - a bit of everything!



Programs, Programs, Programs

Fall Reduction Community Examples

- "No Falls" - Victoria
 - "Steady Steps"- Queensland
 - "Upright and Active"-NSW
 - "Stepping On"- NSW
 - "Stay on Your Feet" - NSW; Western Australia & Canada
 - "Stepping out" - NSW
 - "Better Balance" - South Australia
 - Fallproof - America - (Program & training)
- 

More Programs!

Strength Training Examples

- Staying Active Staying Strong
- Living longer - Living Stronger
- Lift for Life

Individual Home Examples

- Ottago
- Staying Active - Staying Safe

Residential care*

- Staying Active - Staying Safe

Older Adult Community Program organisation examples

- PRYME Movers -YMCA - Canberra
- Healthy Lifestyle / - SHARE / WAVES / Active over 50's- NSW
- Active Ageing - SA
- COTA - all states

And many more...

Can links between programs & levels be made?

Falls & Exercise Selection

There are multiple exercise recommendations, research evidence, choices and programs to select from but..

**One Program Does Not and
Will Not Suit All**

A variety of appropriate exercise programs are needed to reduce fall risk and associated fall related injuries

Program Choice



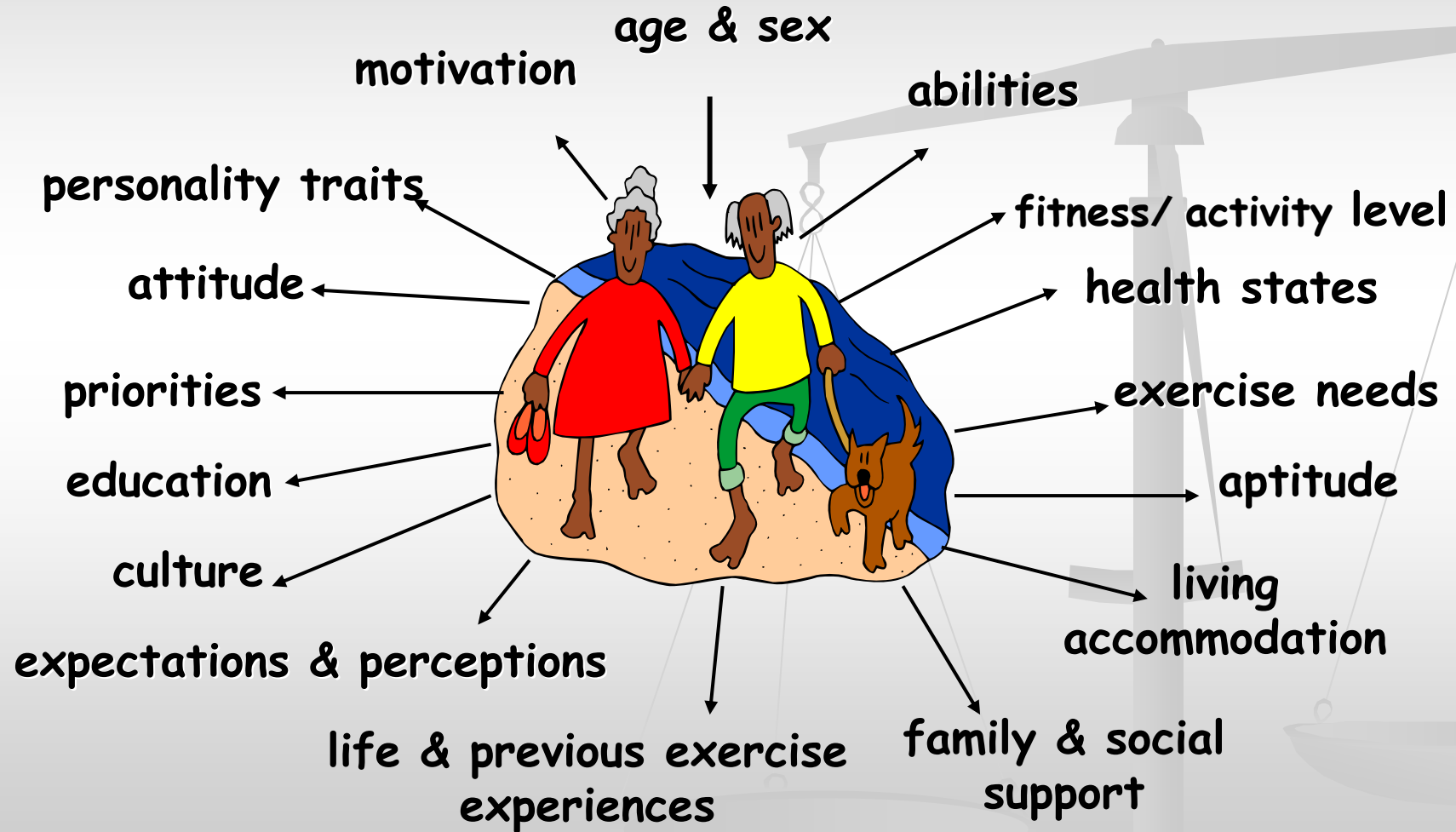
- Some programs may need to be very specific to the identified falls deficits and tailored to suit the individuals level of ability whilst others can be more general dependent on health state, fitness level and lifestyle
- Key issues to consider are that strategies and programs need to be in context, accessible, relevant, flexible and realistic with the major goal being an ongoing life-long involvement in appropriate PA

**Exercise &
Background
Factors Relating
to
Workplace
Application**

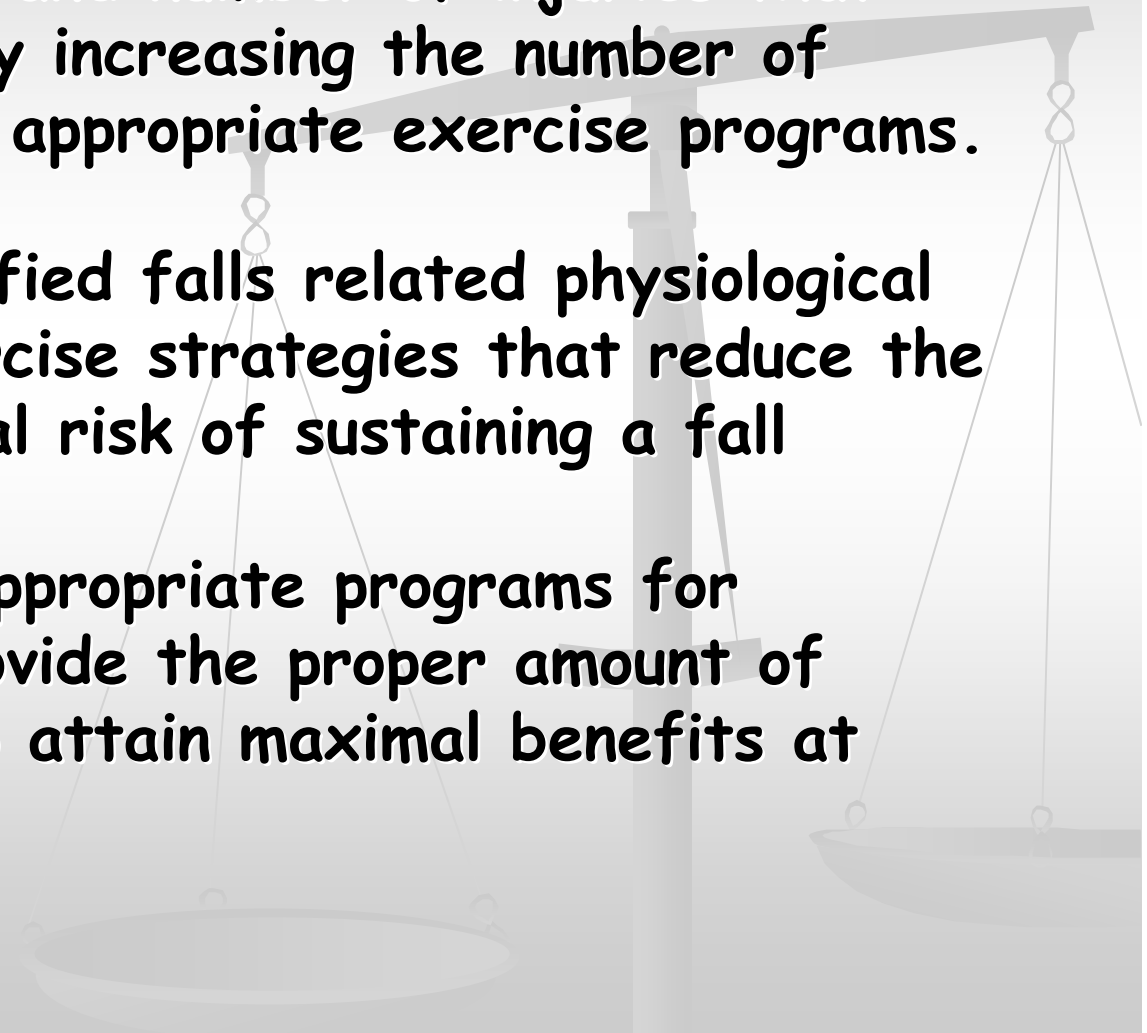


Participant Background

The older adult considerations - many variables



Overall Exercise Program Aims

- Reduce the impact and number of injuries that result from falls by increasing the number of people undertaking appropriate exercise programs.
 - Improve the identified falls related physiological problems with exercise strategies that reduce the individuals' potential risk of sustaining a fall
 - Design & provide appropriate programs for individuals that provide the proper amount of physical activity to attain maximal benefits at lowest risk
- 

Effectiveness & Practical Application Challenges

- Getting the basics/ facts - Background information, assessments and screening etc.
- Providing the programs - content / choices / level etc.
 - Awareness & Education
 - Daily functional application
- Extra training and skills requirements
- Motivation and continual upgrade challenges
 - Teaching & leading skills.
 - Variety - pairs; groups; circuits etc.
 - Use of equipment
- Demonstration of end results -
 - Documentation evaluation and review effectiveness to share with others



Background Planning Issues



- Safety; roles and responsibility (work parameters)
- Training (needs/ upgrades/ support)
- Community awareness, education and promotion
- Environmental issues
- Access and availability - cost/transport etc.
- Leadership, teaching and communication
- Program sustainability
- Maintaining motivation (participants and leaders)
- Variety - Grading/Recreation/Equipment use
- * Health related behaviour modification *
- Social / community/ organizational support

Exercise Planning

Programs need to be evidence based (as far as possible) & in context with the participants fitness levels, conditions, abilities and interests to be most effective and sustainable

- Simple
- Structured
- Systematic
- Effective
- Relevant
- Appropriate
- Challenging
- Safe
- Progressive
- Graded
- Specific
- Realistic
- Tailored
- Motivating

Multiple Systems contribute to Balance



- The Musculo skeletal components
- The Neuromuscular components
- The Somatosensory system - provides information about our spatial location and movements of the body relative to the support surface
- The Vestibular system - determines whether the world or we are moving
- The Visual system - provides information about the outside environment
- The Cognitive system changes eg. Depression / dementia

Falls risk increase.... A systematic physical decline.....

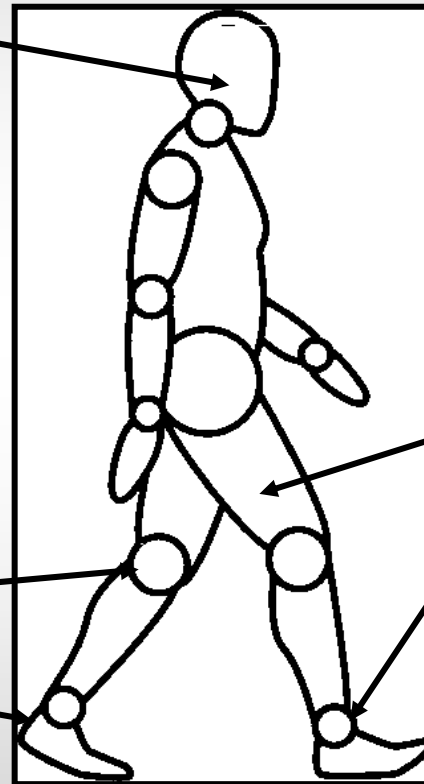
"as the number of intrinsic system problems exceed the critical threshold of function, ability to accomplish daily tasks is compromised"

Movement Pattern Changes

Subtle changes occur in balance and the gait cycle
some are due to a mixture of ...

Cognitive changes
& Confidence levels

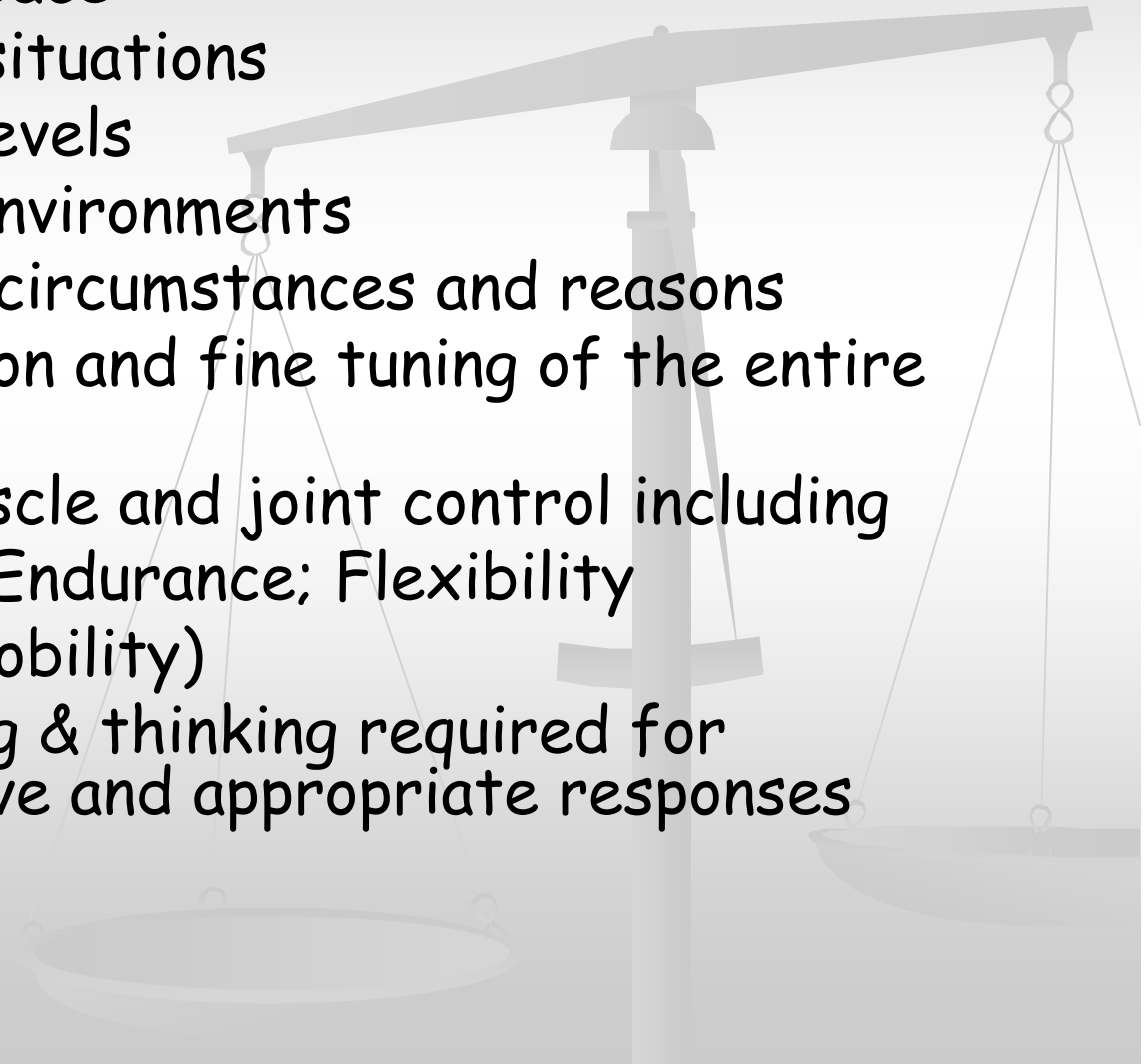
Sensory changes
*vision, vestibular,
kinaesthetic
pain*



Muscle weakness
*(ankle, knee, hip, trunk
-inactivity & chronic
conditions)*

*"A fusion of motor, sensory & cognitive activity to create directed,
safe locomotion"*

Changes in Body Control

- When stationary
 - Moving through space
 - In different situations
 - At different levels
 - In different environments
 - For different circumstances and reasons
- Involving co-ordination and fine tuning of the entire body
- a. Variables in muscle and joint control including
Speed ; Power; Endurance; Flexibility
(stability and mobility)
 - b. Good processing & thinking required for
efficient, effective and appropriate responses
& reactions
- 

Basic Strength Exercise Components

Improving muscular / body control

Increase and maintain
muscle mass, power, strength and endurance.....
Lower limb strength mainly

Increase and maintain
joint stability
(and mobility)

Maintain bone strength

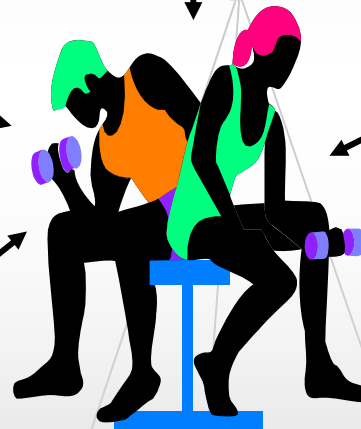
Reduce the
problems associated
with osteoporosis

Practice functional
applications
eg. Sit to stand,
pushing & pulling
activities

Core stability & strength

Postural correction and alignment

Improve stamina and general fitness,
to make everyday activities easier to do



Basic Balance Exercise Components

Work on the fundamental and fine movements

C of G control including
body sway &
weight transference training

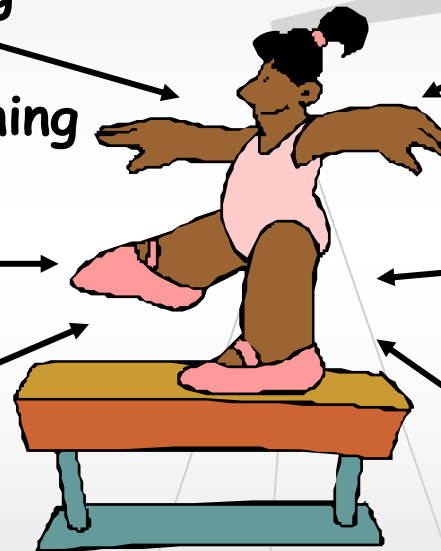
Postural strategies

Reaction time and
co- ordination

Re-educate muscle
timing & movement
patterns

Somatosensory
stimulation &
challenges

Improve gait & motor
control



Progress with task and environment challenges

Provide variety, stimulation and ongoing challenges

Promoting Functional Health (Changing Health Related Behaviour)

“Individual adapted behaviour change is critical to facilitate a long term physical activity lifestyle.....”

The process includes a series of complex variables including personal, social, programmatic, environmental and related factors as well as medical factors which need to be addressed collectively “

ACSM / AHA Updated recommendations for Adults 2007

Program Uptake & Continuation

Example ...

A 12 week strength and balance program will only be effective if

- Maximal input and all sessions attended
- Exercise undertaken as prescribed, progressed and then continue after completion of course ...

Comments / observations

Initial enthusiasm ... Maximal effect over the 3 months intervention and then a drop off ...

? Lack of interest/ support / infrastructure/ cost / minimal results or benefits/ adverse event

Stages of Change

Many theories/ models - many stages
many barriers

1. Initial step - reason and decision to start exercising eg. insight / event
2. Interim - developing habit to be active eg. fun, friends, function
3. Long term adherence - eg. active life



Applying the Research into Practice

Exercise & Falls Injury Reduction

Help bridge the gap.....when planning and undertaking programs consider the "big picture" in relation to exercise access (falls prevention focus) that is able to accommodate the overall community with factors pertaining to.....

- Reach
- Efficiency / Effectiveness
- (Ways of) Adoption
- (Ways of) Implementation
- (Ways of) Maintenance

"Think globally - Act locally"

Principles based from RE - AIM- R McKenzie .

Program evaluation unit School of Population Health. University of Melbourne

Exercise & Falls Prevention

- ✓ Develop good infra structures and support mechanisms
- ✓ Raise awareness & provide relevant information continually to the entire community concerning injury prevention issues
- ✓ Provide the appropriate **training, leadership, support and skills application** where ever needed
- ✓ Assist the **community and individual's** in what ever appropriate way possible to apply the acquired **knowledge and skills**
- ✓ Work on **ongoing evaluation** initiatives to measure effectiveness & reach

FinallyEnsure that there are the means for **ongoing support & quality control** to sustain any effective falls prevention initiatives

Final Comments

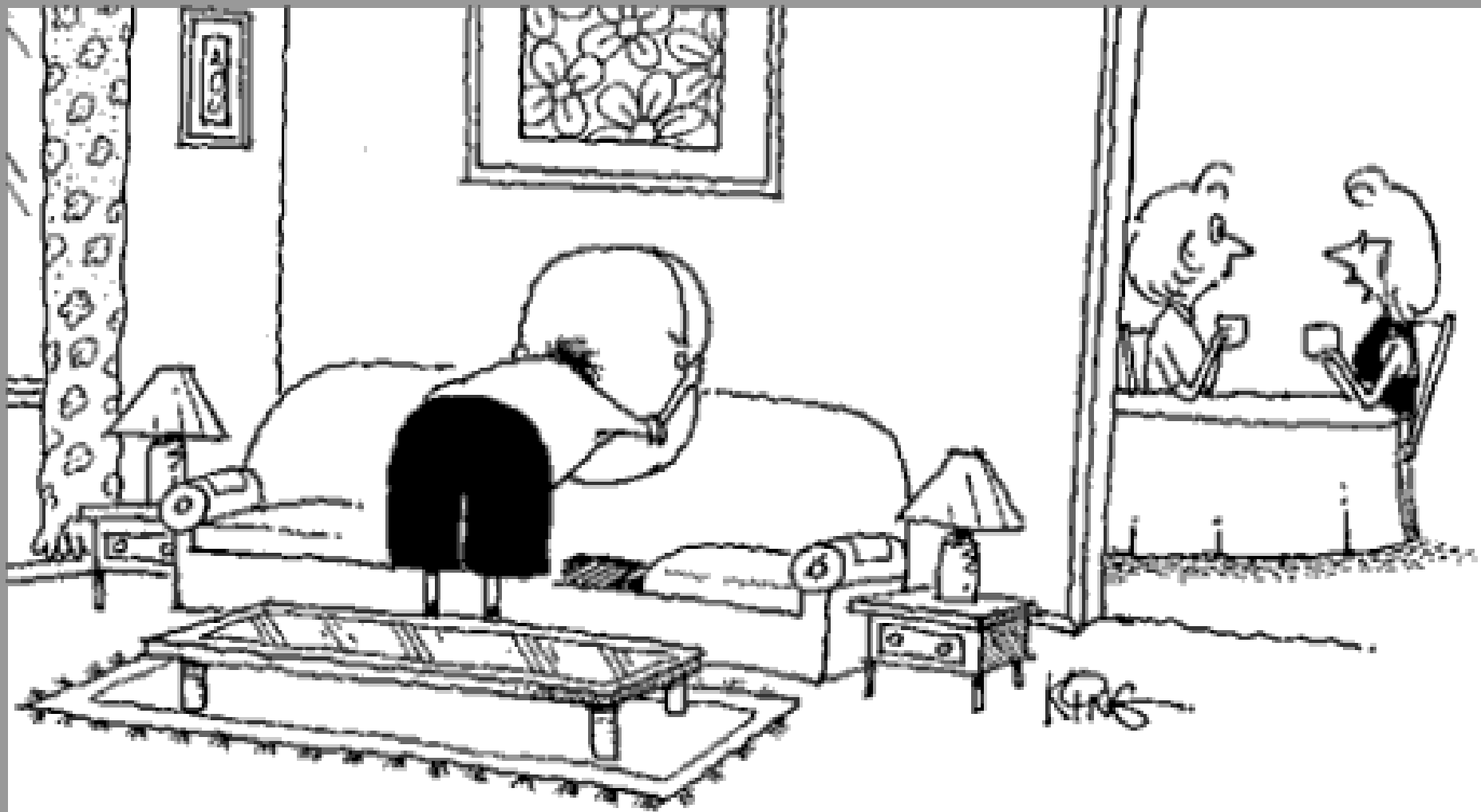


“Because of their low functional status and high incidence of chronic disease, there is no segment of the population that can benefit more from exercise than the elderly”

American College of Sports Medicine Exercise training for the Elderly

“Emphasis should be placed on factors that result in permanent lifestyle change to encourage a lifetime of physical activity.” Pollock M., Gaesser

“Those at the lowest level of a condition have the most to gain”



The doctor said he needed more activity. So I hide his T.V. remote three times a week.