Health and Safety Issues of an Aging Workforce

Speaker:
Nellie J. Brown, MS, CIH
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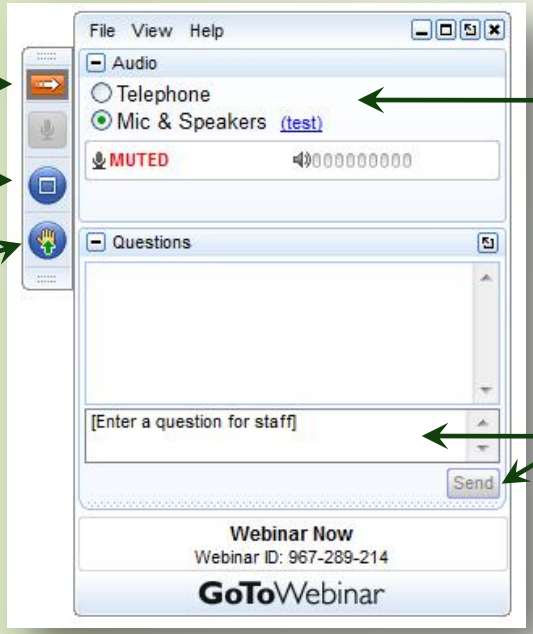

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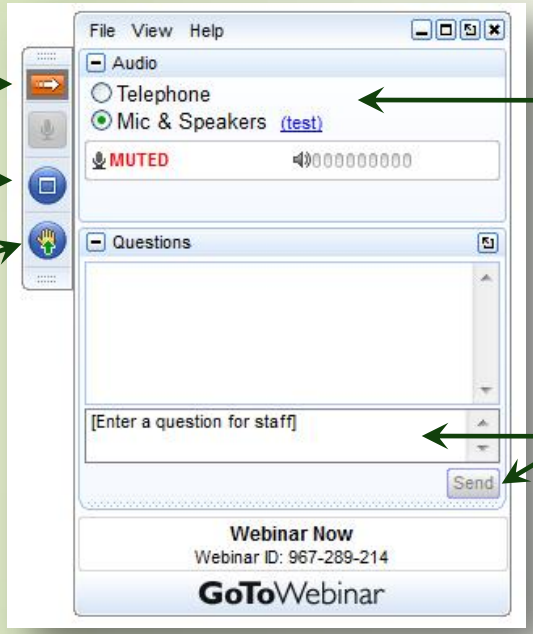

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Nellie Brown, MS, CIH

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Cornell University
School of Industrial and Labor Relations

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"My bones are getting softer, but my arteries are getting harder so it balances out."

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We Will Explore…

- What do we mean by an “aging workforce”?
- Normal aging processes
- Impact of aging in the work environment
- Strategies for the workplace to minimize risk and vulnerability

National Academy of Sciences. 2004. *Health and safety needs of older workers.* Committee on the Health and Safety Needs of Older Workers. David H. Wegman and James P. McGee, editors. National Academies Press. Washington, DC.

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“40 Is the New 30”

- In 1800, 25% of males would survive to age 60. A 60-year-old was considered elderly.
- Today, more than 90% of males will live to age 60.
- Because of life expectancy changes in the last 150 years, it is misleading to compare today’s 40-year-old with people who were 40 a century ago.

Source: Sanderson, W. et al. 2008. Rethinking age and aging. *Population Bulletin 63(4):* 1-18.

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What Do We Mean by an "Aging Workforce"?

- United States has 93 million people of age 45+.
- This is 44% of the civilian, non-institutionalized population over the age of 15.
- By the year 2050, it is projected there will be 170 million people 45+, representing 53% of the population.
- Since the life expectancy of women exceeds that of men and the number of women exceeds the number of men at all age groups, the percentage of the population who are women age 45+ is expected to grow faster than that of men.

National Academy of Sciences. 2004. *Health and safety needs of older workers.* Committee on the Health and Safety Needs of Older Workers. David H. Wegman and James P. McGee, editors. National Academies Press. Washington, DC.

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What Do We Mean by an "Aging Workforce"?

- In 2004, the median age of the American workforce was 40.3 (the highest ever). The number of workers 45 and older has doubled since 1950.
- Workers more than55 years of age is the fastest growing group in the workforce.
- As the baby boomers age at work and leave for retirement, they are followed by a substantially smaller younger generation.

Source: Silverstein, M. 2008. Meeting the challenges of an aging workforce. *AJIM 51*: 269-280.

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It's an Aging World

- By 2040, the number of people worldwide who will be 65 or older is projected at 1.3 billion – about 14% of the world population.

- This affects all countries, but especially the developed nations (76% of projected world total) – which is more than double that of the developing countries.

- This has implications for providers of care, including health care.

Source: Silverstein, M. 2008. Meeting the challenges of an aging workforce. *AJIM 51*: 269-280.

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What Do We Mean by an "Aging Workforce"?

- For the first time in US history, there are four generations in the workforce.
- Average age by industry:
  - Construction: 40.4 years old
  - Nurses: 47 years old (39% are 45 years or older)
    - ***What is the average age in your workplace?***

Source: Healthy Aging for a Sustainable Workforce Conference. Feb 17-18, 2009. National Labor College. Silver Spring, MD. Conference Report.

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What Do We Mean by an "Aging Workforce"?

- All workers are aging, but those that are older continue to grow as a proportion of the working population.

- As the available-worker population changes, many employers have jobs for which they want to attract and retain more experienced workers.

Source: Healthy Aging for a Sustainable Workforce Conference. Feb 17-18, 2009. National Labor College. Silver Spring, MD. Conference Report.

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The Healthy Aging for Workers Conference (2009) Resulted in the Following Findings:

- US workers are living longer than ever before and many are staying in the workforce past age 55.

- The current economic crisis puts great pressure on workers' families and their retirement plans, often forcing older workers to postpone retirement and stay longer in the workforce.

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What Do We Mean by an "Aging Workforce"?

- In some ways, older workers are the most skilled and productive employees, but in other ways, they are the most vulnerable.

- Many people will keep working past the traditional retirement age of 65 – perhaps even 25 – 30 years.

- Some are normal changes of aging, while others are age-dependent increases in the likelihood of developing conditions, such as coronary artery disease.

Source: Silverstein, M. 2008. Meeting the challenges of an aging workforce. *AJIM 51*: 269-280.

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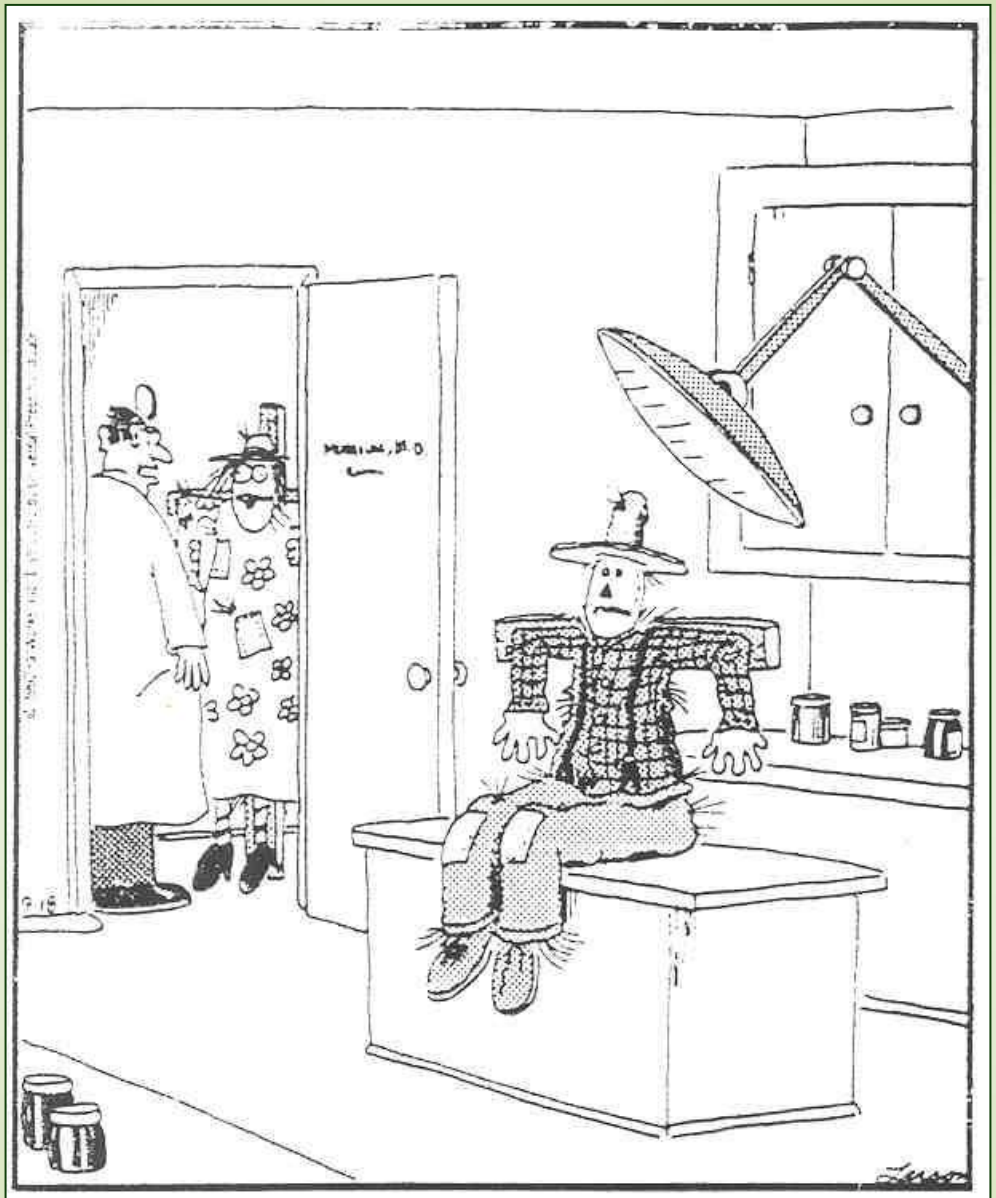

"It's not good, ma'am. . . . He's got field mice."

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Inevitable, Yet Our Productivity and Performance Can Stay High

Declines/decreases in:

- Brain cell connections
- Spatial abilities
- Problem-solving
- Processing of complex stimuli
- Performing simultaneous tasks or holding multiple items in working memory
- Muscle mass
- Bone density
- Pulmonary oxygen uptake
- Exercise capacity
- Visual acuity
- Resistance to heat and cold stress

Source: Silverstein, M. 2008. Meeting the challenges of an aging workforce. *AJIM 51*: 269-280.

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Inevitable, Yet Our Productivity and Performance Can Stay High

After all…

- Most jobs don't require performance at full capacity, even if older people work closer to their limits than younger workers.
- While various capabilities decline with age, there is considerable variability between individuals.

Source: Silverstein, M. 2008. Meeting the challenges of an aging workforce. *AJIM 51*: 269-280.

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Older Workers Are More Productive

- The changes associated with age (such as increased experience) may actually enhance capabilities and performance at work.
- We can compensate for age-related losses with strategies and skills related to experience and expertise (or move into work that matches our competence).
- Experience, work ethic, or accommodations may be responsible.

Source: Silverstein, M. 2008. Meeting the challenges of an aging workforce. *AJIM 51*: 269-280.

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Total Injury Rates Are Actually Lower Amongst Older Workers

- No published research concludes that a decline in capabilities with aging impacts safety performance.

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Aging Can Bring an Issue of Severity, Not Frequency

Age	Median Days Away from Work
14-15	2
16-19	4
20-24	5
25-34	6
35-44	9
45-54	11
55-64	12
65+	14

Source: USBLS.2013. Median days away from work for non-fatal workplace injuries and illnesses, 2012.

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Aging Can Bring an Issue of Severity, Not Frequency

- The literature has not been consistent on this.

- Older workers (older than 55) do not necessarily have more severe injuries or more lost work time or adverse outcomes (i.e. non-fatal injuries).

Probably because…

- There are more fractures from falls.
- There are more strains and sprains.
- There is longer recuperation.

Source: Silverstein, M. 2008. Meeting the challenges of an aging workforce. *AJIM 51*: 269-280.

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Aging Can Bring an Issue of Severity, Not Frequency

But fatality rates are higher…

- Workers older than 65 have nearly 3 – 7 times the fatality rate of those aged 16 to 64.

- Especially for machine-related deaths and for falls

Source: Silverstein, M. 2008. Meeting the challenges of an aging workforce. *AJIM 51*: 269-280.

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Aging Can Bring an Issue of Severity, Not Frequency

For falls to the same level leading to days away from work:

- All workers: 2/3
- 65 years & older: 4/5

Source: Healthy Aging for a Sustainable Workforce Conference. Feb 17-18, 2009. National Labor College. Silver Spring, MD. Conference Report.

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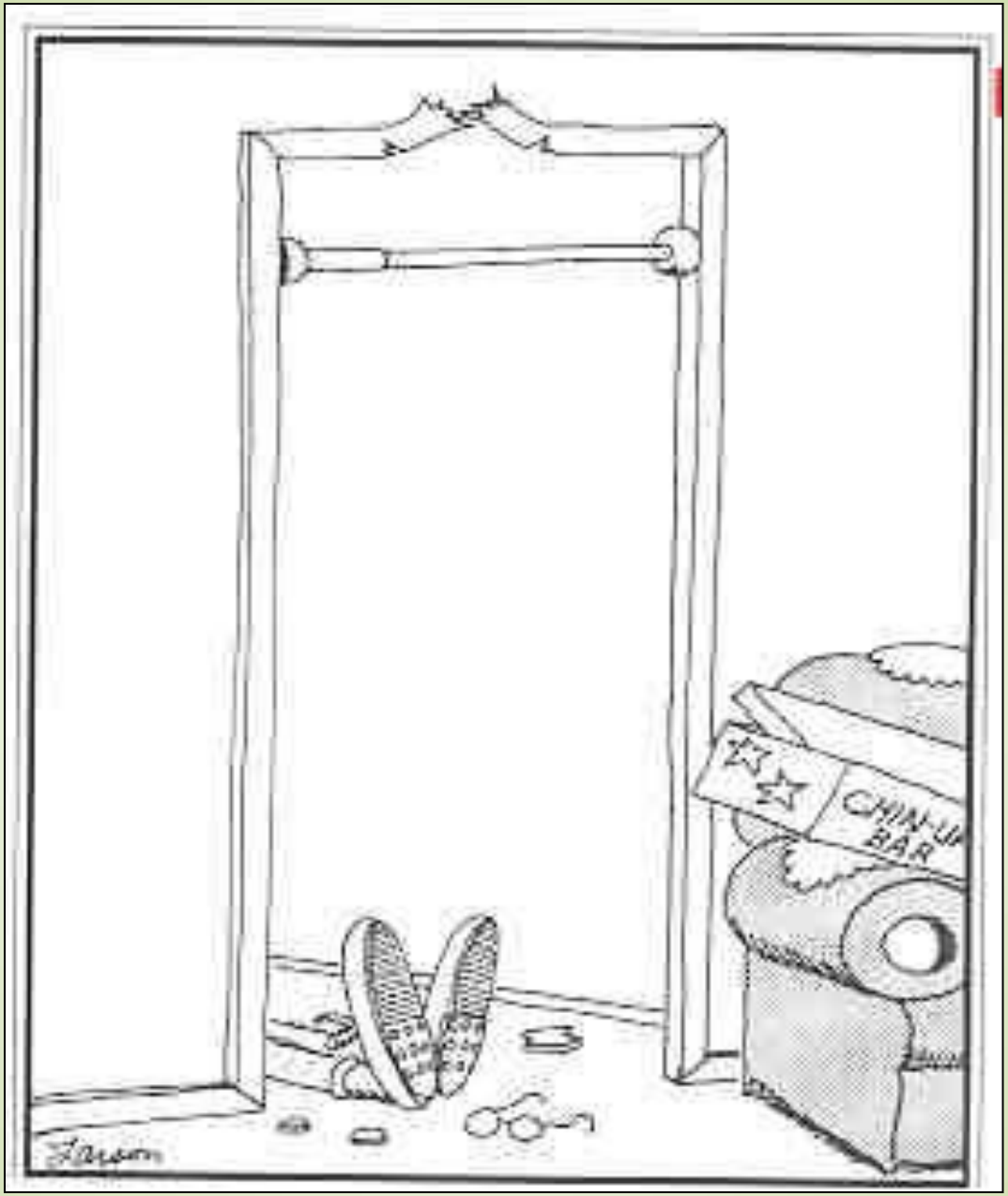

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Maintaining Work Ability, Safety, and High Performance in an Aging Workforce

How We Age -- Workplace Strategies

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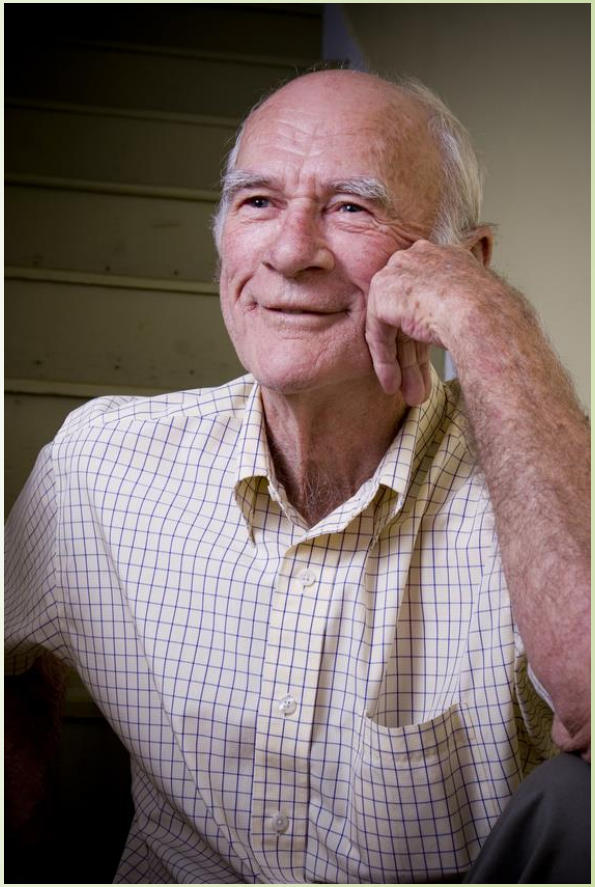
Normal Aging Processes: Strength and Endurance

- Basic strength peaks at 30; declines thereafter.
- Decline is more rapid after 60, regardless of our overall physical condition.
- Fatigue happens faster and rest/sleep may be insufficient for recovery.



Source: Silverstein, M. 2008. Meeting the challenges of an aging workforce. *AJIM 51*: 269-280.

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Normal Aging Processes: Strength and Endurance

- Cumulative fatigue effect of shift work is less tolerated by older workers; decreased alertness becomes more prevalent.

- Inability to tolerate shiftwork increases with age, even for permanent night staff; typically begins about 40 – 45 years of age.

Source: Silverstein, M. 2008. Meeting the challenges of an aging workforce. *AJIM 51*: 269-280.

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Strategies for: Strength and Endurance

General methods of workplace ergonomics of fitting the workplace to the worker:

- Stop lifting, lowering, and carrying: replace with push, pull, and slide
- Substitute mechanical for manual strength.
- Reduce highly repetitive tasks.
- Allow adequate recovery/rest time.
- Reduce static and stressful postures.
- Job rotation

Source: Silverstein, M. 2008. Meeting the challenges of an aging workforce. *AJIM 51*: 269-280.

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Strategies for: Strength and Endurance

If these are not sufficient, as a last choice:

- Provide alternative job assignment and retraining, especially if a worker's physical capacity is so reduced that modest strength or endurance is impossible.

Source: Silverstein, M. 2008. Meeting the challenges of an aging workforce. *AJIM 51*: 269-280.

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Strategies for: Strength and Endurance

- This can be improved with strength training.
- Walking/weight bearing exercises are crucial as we age.

Source: Silverstein, M. 2008. Meeting the challenges of an aging workforce. *AJIM 51*: 269-280.

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Exercise – "If you don't use it, you lose it."

- Exercise sends the body a message: "I'm using this, so keep maintaining it."
- Exercise changes the chemistry of the muscles so that fat is burned more efficiently and tissue is stimulated to grow and repair (rather than age and decay).
- While any exercise is valuable, some types of exercise are more efficient than others for achieving specific health goals.

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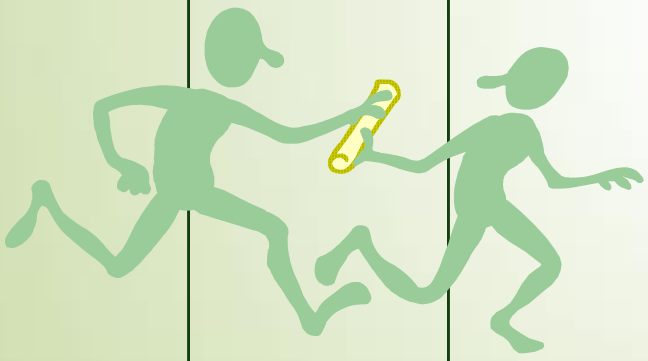
Exercise

Types	Oxygen	Energy	Benefits	How to do it
• Aerobic	• Yes	• Sugar and fat	• Improves heart endurance • Reduces body fat • Increases lean mass (muscle) • Reduces stress	• Use big muscles of the lower body • Use a comfortable pace that doesn't get you out of breath • Do a steady and nonstop workout for warm-up time + 12 minutes



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Exercise

Types	Oxygen	Energy Source	Benefits	How to do it
• Non-aerobic (or anaerobic)	• Little oxygen required	• Sugar	• Muscle and bone growth and strength	• Lift weight (your own or separate weights)

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Exercise

- Increase your physical activity.
- Benchmark yourself: check your body fat level and your measurements – rather than just your body weight.

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Normal Aging Processes: Loss of Balance

- Many workers older than 50 begin to have problems with balance …risking injuries from trips and falls.

- Also, a decline in control of posture and stability (balance) can lead to back problems. Weak abdominal muscles and lack of regular exercise can lead to spinal instability and back pain.

Source: Silverstein, M. 2008. Meeting the challenges of an aging workforce. *AJIM 51*: 269-280.

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Strategies for: Loss of Balance

- Include handrails along travel routes
- Improve housekeeping to reduce clutter
- Use slip-resistant walking surfaces
- Repair uneven or wet floors
- Use color-contrast between stairway risers and treads

Source: Silverstein, M. 2008. Meeting the challenges of an aging workforce. *AJIM 51*: 269-280.

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Normal Aging Processes: Vision

Aging can bring:

- Pathology: macular degeneration, glaucoma, cataracts
- Loss of ability to focus on near objects
- Diminished color discrimination
- Diminished depth perception
- Transitions from light to dark or dark to light are harder.
- Difficulty distinguishing items with low contrast.
- Night driving is more difficult.

Source: Silverstein, M. 2008. Meeting the challenges of an aging workforce. *AJIM 51*: 269-280.

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Strategies for: Vision

- Use additional general lighting (50%).
- Use 3x lighting intensity for task lights to improve contrast and details.
- Place task lights to side and front of worker to reduce shadows.
- Use high-luminance fluorescent fixtures to enhance color discrimination.

Source: Silverstein, M. 2008. Meeting the challenges of an aging workforce. *AJIM 51*: 269-280.

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Strategies for: Vision

- Avoid clutter or distractions in the visual field.
- From one area to another, make light changes gradual.
- Use large video displays.
- Increase color contrast on machines and edges.
- Use bright or contrasting colors on critical machine parts.

Source: Silverstein, M. 2008. Meeting the challenges of an aging workforce. *AJIM 51*: 269-280.

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Normal Aging Processes: Hearing

- **Difficulty in:**
  - understanding conversations
  - tuning out background noises
  - detecting low intensity sound
  - locating source of sounds
  - discriminating sounds when multiple noise sources are occurring
- **Increase in incidence of vertigo**
- **Noise-induced hearing loss**

Source: Silverstein, M. 2008. Meeting the challenges of an aging workforce. *AJIM 51*: 269-280.

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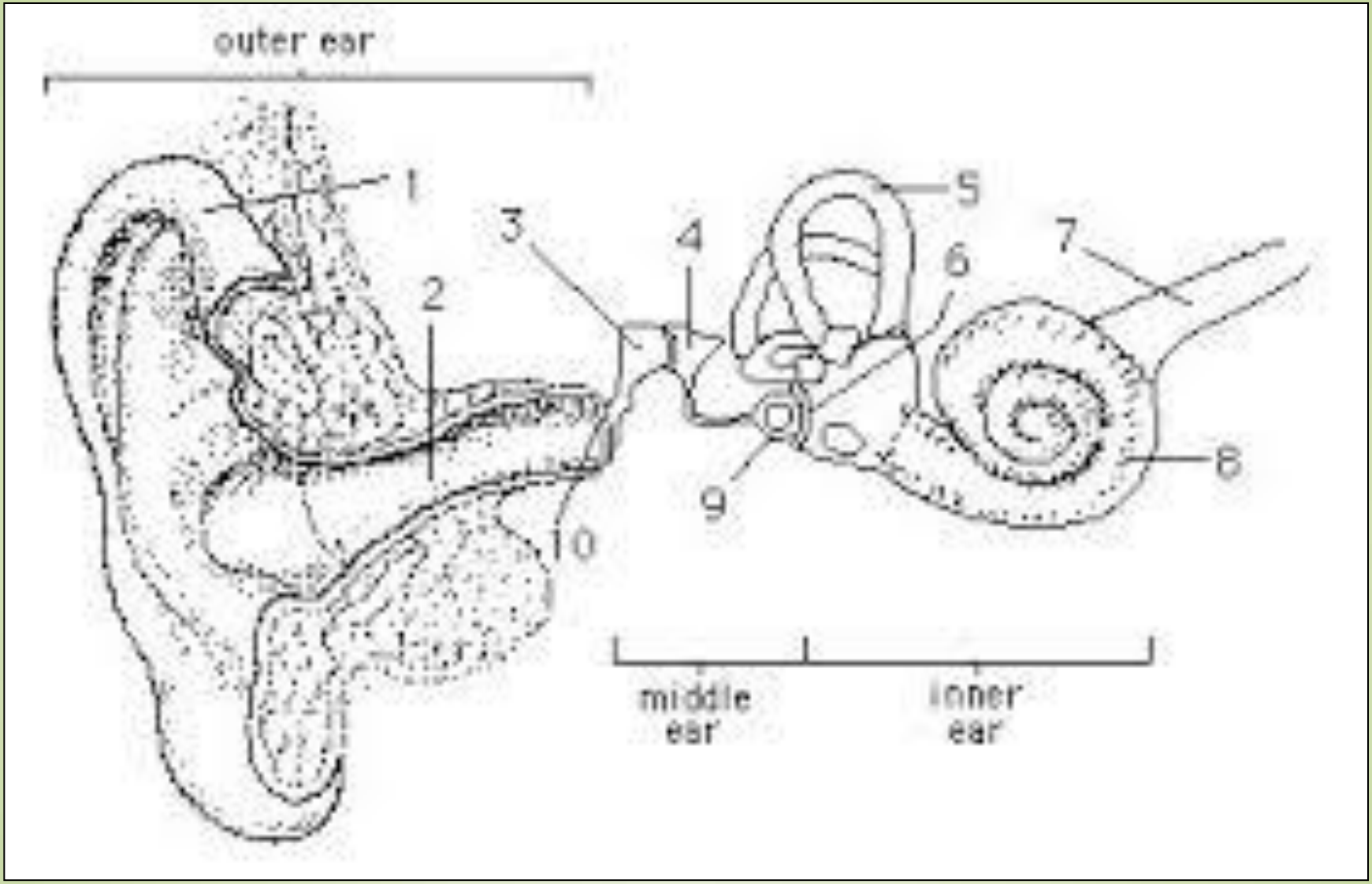
Normal Aging Processes: Hearing



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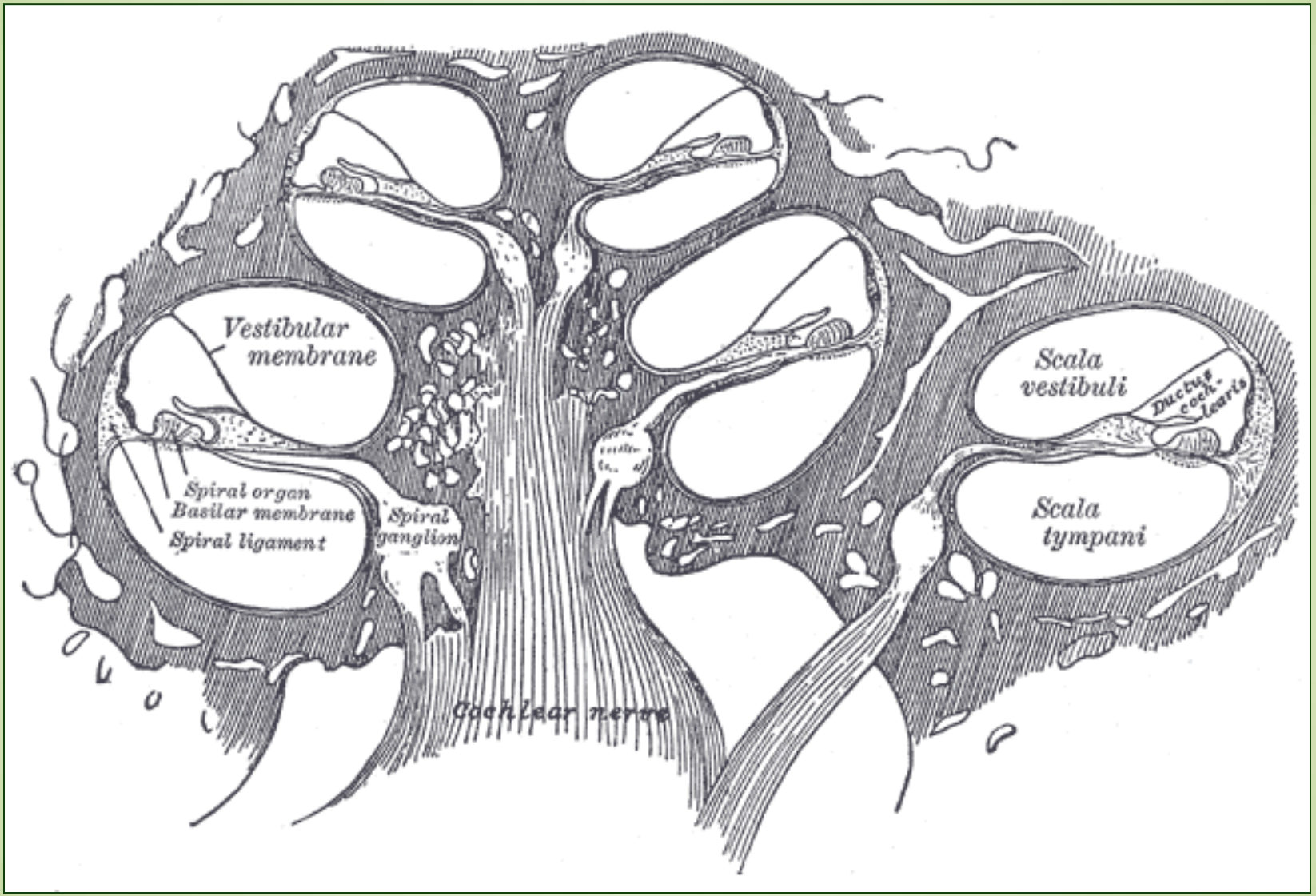
Normal Aging Processes: Hearing



Source: Wikipedia. 2013.

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Always Protect Your Hearing

- Recent research appears to indicate that noise is more hazardous to your health than previously believed.
- Hearing loss is **permanent.**

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Always Protect Your Hearing

- After hearing loud noise, we tend to recover our hearing sensitivity back to its original threshold – this has been assumed to mean that damage has been reversed.

- Very loud noise can cause hair cells to become swollen leading to hair cell death or cilia damage – producing permanent hearing loss.

Kujawa, S. F. et al. 2009. Adding insult to injury: cochlear nerve degeneration after "temporary" noise-induced hearing loss. *J. Neuroscience 29(45):* 14077-14085. c

Always Protect Your Hearing

- Studies in animals indicate that, even when the sensory hair cells in the cochlea are intact, there can be a loss of ganglion nerve terminals to the cochlear nerve.

- Nerve degeneration processes are set in motion which continue after the noise stops (and can progress for years), and may result in:

  - permanent threshold shift
  - tinnitus
  - perception anomalies, such as understanding speech against a noisy background

Strategies for: Hearing

- Reduce noise generally; use sound dampening to reduce background noise.
- Redundant warnings: such as flashing warning lights, not just sound.
- Cell phones with vibration.

Source: Silverstein, M. 2008. Meeting the challenges of an aging workforce. *AJIM 51*: 269-280.

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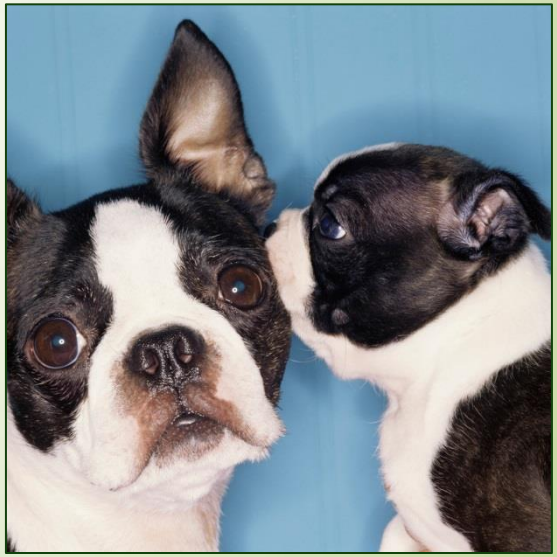
Strategies for: Hearing

- Reduced speech rate and elimination of speech compression on automated systems, such as voicemail.
- Have volume-adjustable communications equipment, including telephone amplifying devices.
- Implement a Hearing Conservation Program.



Source: Silverstein, M. 2008. Meeting the challenges of an aging workforce. *AJIM 51*: 269-280.

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Hearing Conservation Program

- Must be administered if employee noise exposures equal or exceed an 8-hour TWA of 85 dBA.
  - Monitoring: area monitoring, personal monitoring, audiometric testing
  - Hearing protection
  - Training
  - Access to information and training materials
  - Recordkeeping

Normal Aging Processes: Thermal Stress

- Less tolerance of heat stress, especially if heart or kidney risk factors; less perception of hot work surfaces
- Make sure the body is kept warm enough in cold environments.
- Implement/review your workplace's heat alert program and cold stress program (especially for wind chill).

Bernard, T. E. 1996. "Thermal stress," in: Plog, B. A. et al. *Fundamentals of industrial hygiene.* National Safety Council. Itasca, IL.
USDHHS. 1986. *Criteria for a recommended standard … occupational exposure to hot environments.* Superintendent of Documents. U.S. Government Printing Office. Washington, DC. 20402.
ACGIH. 1999. *TLVs and BEIs: Threshold limit values for chemical substances and physical agents; Biological exposure indices.* American Conference of Governmental Industrial Hygienists. Cincinnati, OH.

Normal Aging Processes: Memory

- Intelligence **does not** decrease with age.
- Short term memory is impaired, along with retrieval of information (long-term memory).
- Training, practice, and experience can improve performance – even resulting in older workers outperforming younger ones.

Source: Silverstein, M. 2008. Meeting the challenges of an aging workforce. *AJIM 51*: 269-280.

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Normal Aging Processes: Memory

- Memory has been studied in laboratory settings.

- It is unclear exactly how workers are affected in a real-life work setting because our behavior is influenced by…

  - our habits: memory for procedural skills is relatively well-maintained with age.

  - our surroundings— these provide reminders.

Source: Silverstein, M. 2008. Meeting the challenges of an aging workforce. *AJIM 51*: 269-280.

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Strategies for: Memory

We can exploit our **habits** and **surroundings:**

- by using signage and "cheat sheets."
- with "external memory" – such as making a "to-do" list

"The palest ink is more reliable
than the most powerful memory."
– Confucius

Source: Silverstein, M. 2008. Meeting the challenges of an aging workforce. *AJIM 51*: 269-280.

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Strategies for: New Skill Development

- Provide opportunities for practice and time to develop familiarity.
- Break up training into smaller chunks – this produces better transfer into long-term memory.
- Use frequent, hands-on refreshers.
- Relate to past learning experiences; use stories, group exercises, encourage worker storytelling; use pictures and audio narration for computer-based training—overall, use Multiple Intelligences Theory.
- Get enough sleep.

Source: Silverstein, M. 2008. Meeting the challenges of an aging workforce. *AJIM 51*: 269-280.
Gardner, H. 1999. *Intelligence reframed: multiple intelligences for the 21st century.* Basic Books. NY.
Gardner, H. 1993. *Frames of mind: the theory of multiple intelligences.* Basic Books. NY.
Wallen, E. S. et al. 2006. Computer-based training for safety: comparing methods with older and younger workers. *Journal of Safety Research 37*: 461-467.

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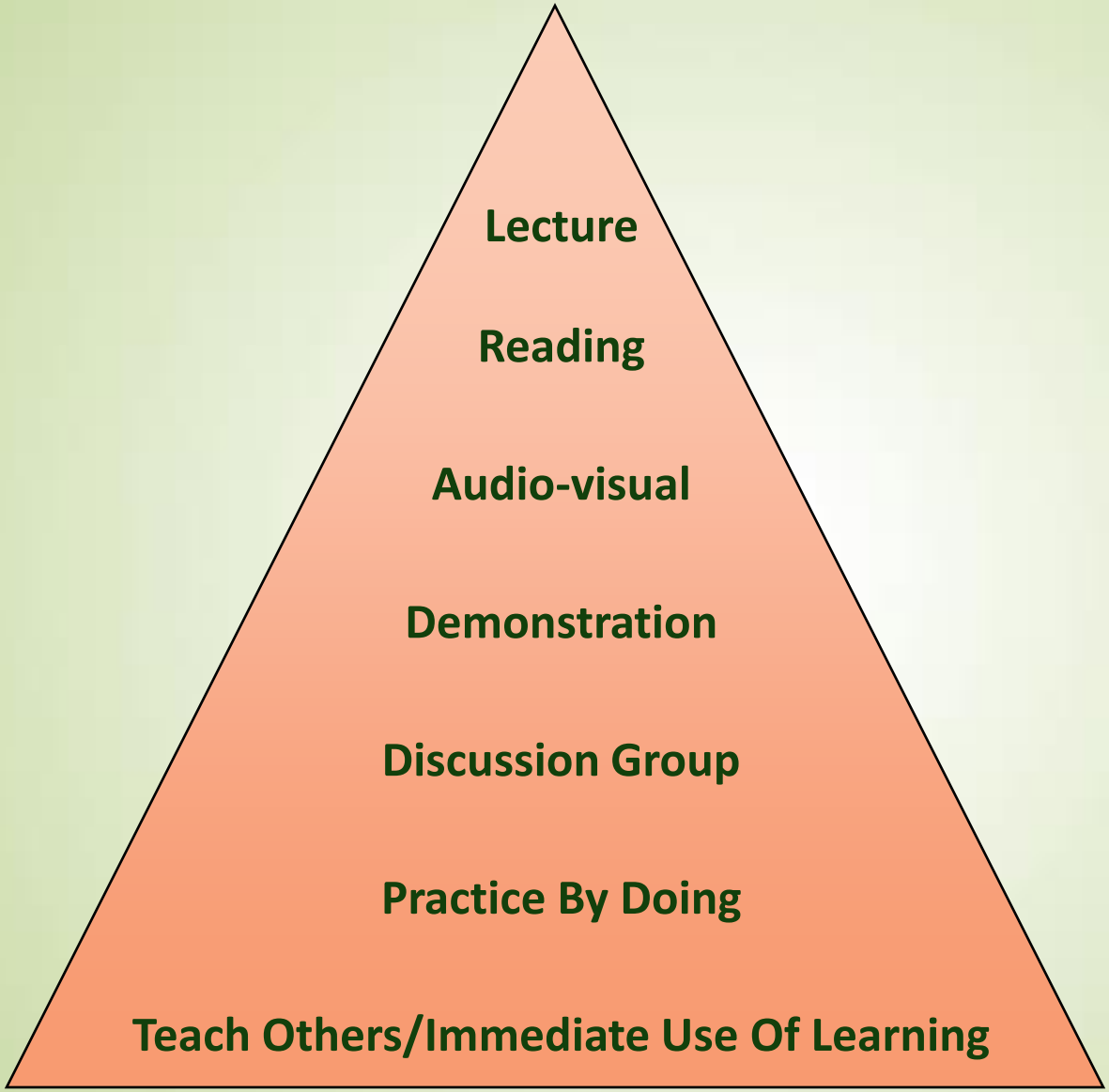
The Learning Pyramid



	Average Retention Rate
Lecture	5%
Reading	10%
Audio-visual	20%
Demonstration	30%
Discussion Group	50%
Practice By Doing	75%
Teach Others/Immediate Use Of Learning	90%

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"Multiple Intelligences"

as defined by Howard Gardner

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We Need Sleep
for the Brain to Perform Housekeeping

- By removing potentially neurotoxic waste products that accumulate when we're awake
- This cleaning process is believed to be what makes sleep feel restorative.
- Discovery of this process is the first experimental evidence of sleep's basic purpose— sleep is for recovery, for cleaning up. This requires a lot of energy and can't be done while we're awake and we need this energy to process sensory information.

Sources: Xie, L. et al. 2013. Sleep drives metabolite clearance from the adult brain. *Science 342:* 373 – 377.
Underwood, E. 2013. Sleep: the brain's housekeeper. *Science 342:* 301.
Lliff, J. J. et al. 2012. A paravascular pathway facilitates CSF flow through the brain parenchyma and the clearance of interstitial solutes, including amyloid beta.
Science Translational Medicine 4(147): 1-11.

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During REM Portions of Sleep, We…

- Form neural networks or memory traces to hold memories in the brain
- Perform intensive random firing of older neural networks to retain memory
- Organize ideas into neural networks to more efficiently connect new learning to older information
- Replenish the brain's supply of neurotransmitters, essential for learning and memory

Source: Maas, J. B. et al. 1998.
Power sleep: the revolutionary program that prepares your mind for peak performance. Villard Books. New York.

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Target Policy to Help Maintain Work Ability as Workers Age, Including Attention to:

- Quality and safety of the work environment
- Public and private insurance designed to encourage prevention and wellness
- Flexible work arrangements to achieve work-life balance
- Social context of work (commuting, family, appropriate technology, etc.)

Source: Healthy Aging for a Sustainable Workforce Conference.
Feb 17-18, 2009. National Labor College. Silver Spring, MD. Conference Report.

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