National Trends in Delivery of Health and Long-Term Care

Implications for Safety Codes & Standards

Guidelines for Design and Construction of Long-Term Residential Health, Care, Support and Related Facilities

Eunice Noell-Waggoner, IES, LC.
Center of Design for an Aging Society
Portland, OR
Proposed Changes to the Guidelines

- **Lighting**
  - Includes daylight & electric light
  - Light Reflective Values of Ceiling & Walls
  - Light Levels: ANSI/IES RP-28 Table 2 (Already included)

- **Surface Characteristics**
  - Contrast: Define elements in the built environment
  - Avoid reflective surfaces on floors & walls

- **Lighting Controls**
  - Light on when needed – off when not needed
Nursing Home Residents Compared to (age matched) Community Dwellers

- 13 - 15 Times greater Visual Impairment

- Visual Impairment not given as reason for NH placement

Our Eyes Change as We Age
Normal Age-Related Vision Changes

- Less Light Enters the Eye
  - 60-years of age receive only 1/3 the light on the retina
- Difficult to Adjust to Changes in Brightness (Adaptation)
- Loss of Contrast Sensitivity
Comparing those 20 years of age to those 60 years of age:
50% of those 60 y/a would require 2.3 times as much contrast
95% of those 60 y/a would require 5.5 times as much contrast
Dark Adaptation:
Ability to adjust from bright to dim

- Delayed response time between normal lighting and emergency lighting is an issue.

Fig. 2  Dark adaptation as a function of age [after McFarland et al, 1960].
Distribution of Low Vision by Age

Mean 72
Median 76
SD 16
Eye Diseases: More Prevalent in Older Adults

- **Cataracts** (50% @ Ages 65 – 75) (70% over Age 75)
- **Glaucoma** (3% @ Age 65 - Caucasians), (10% @ Age 65 – African-Americans)
  - Increases with Age
- **Macular Degeneration** (33% @ Age 75)
  - Foremost cause of Blindness for those over the age of sixty
- **Diabetic Retinopathy** (40% of those with Diabetes)
Age-Related Eye Diseases Compared to Normal Vision

Courtesy: National Eye Institute, NIH
Age-Related Cataracts

Courtesy: National Eye Institute, NIH
Glaucoma

Courtesy: National Eye Institute, NIH
Age-Related Macular Degeneration

Courtesy: National Eye Institute, NIH
These Vision Changes Require

- Increase of lighting levels
- Uniform Lighting
- Elimination of Glare
- Greater contrast to define the visual environment
Implication of Age-Related Vision Loss

- Falls/Fractures Increase 200%
- Limited Mobility
- Loss of Contrast Sensitivity
  - Limits Independence
- Reduced Ability to See Fine Detail
Challenging Environments

Dim Light – No Contrast

Glare and Confusing Shadows
Challenging Environments

- Exit with Reflected Glare
- Glare is Blinding for Older Eyes
- No Contrast between Furniture & Floor
GLARE BOMB!!!

- Bug Eye Exit Lighting
  - Should not be allowed
  - Creates Disability Glare
  - Blinds the senior
Senior Friendly Exit Signs
Contrast increases visibility

Emergency Egress Stairs – No Contrast

Entry Stair with Contrast Still Visible in shadow
Reflective & Transparent Vertical Surfaces are Dangerous
Problems with the Energy Code?

- Some officials ignore NFPA standards, due to the Energy Code.

- ASHRAE 90.1 (Pending Proposal)
  - Higher Lighting Power Density (LPD) for Senior Care Environments (See handout)
  - ASHRAE 90.1 Already exempts facilities that serve the visually impaired or older people. The higher LPD would replace this exemption.
Recommendations

- All Standard setting organizations state similar requirements (FGI, IES, NFPA)
- NFPA: Prohibit Unit Equipment (Bug eyes)
  - The glare from these units is blinding to older eyes
- NFPA: Include Value Contrast in Standards
  - Stairways
    - Contrast between Tread, Nosing, and Skirting
  - Corridors
    - Contrast between Walls, Floors, Doors
  - Furniture in Corridor
    - Contrast between Floor & Walls
Questions?