



# Improving Design of Buildings for People with Low Vision

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By

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# Introduction

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- Background
- What is Low Vision?
- Who is Affected?
- How can Accommodations be Improved?
- What is Needed?

# Background (1)

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- Through 20 years of post-occupancy evaluations, leadership in the development of federal standards, and personal insight, Vijay K. Gupta , P.E., Chief Mechanical Engineer at GSA (retired), recognized that a gap existed in guidance for design and operations of buildings for persons with low vision.
- Based on this recognition, Vijay supported NIBS in initiating work on this issue in 2009, a workshop was held in Sep 2010, and a NIBS Committee on Low Vision Design was established in November 2011.
- Website for Workshop and LV Design materials:
  - <http://files.nibs.org>; (User = lowvision; Password = lowvision)

# Background (2)

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- Several other organizations are working on specific issues regarding low vision lighting and interior design, but NIBS may be unique in its overall approach to improvements in design, construction, and operations of high performance buildings that accommodate low vision as well as normally sighted persons.
- Current building codes, standards, and regulations do not address accommodations for persons with low vision.
- Reductions in building energy use are being mandated, which can compromise health and safety of occupants with low vision.

# What is Low Vision? (1)

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Generally, *Low Vision* means:

*Chronic visual impairments that cause functional limitations or disability*

In this definition:

- Chronic means that low vision cannot be corrected with medical or surgical interventions or refractive error corrections.
- Visual Impairment means loss of visual acuity, loss of contrast sensitivity, loss of peripheral vision, or the occurrence of central blind spots.
- Functional Limitations means increased difficulty with reading, mobility, visual motor activities, or interpreting visual information.
- Disability means unable to perform usual or customary daily activities.

From NIBS Workshop Keynote address by  
Robert Massof, Ph.D., Director of Lions Vision  
Research and Rehabilitation Center, Johns  
Hopkins University School of Medicine.

# What is Low Vision? (2)

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Technically, low vision is defined in terms of loss of visual acuity but in clinical practice low vision includes disabling visual impairments such as loss of visual field or contrast sensitivity.

- The technical definitions of loss of visual acuity quantitatively distinguish between legal blindness and low vision.
- The Architectural Barriers Act of 1968 (ABA) and the Americans with Disabilities Act of 1990 (ADA) require accommodations for legally blind persons but not for persons with low vision.
- There is a dearth of codes and standards that provide guidance for the design, construction, and operations of facilities that people with low vision occupy.



# What is Low Vision? (3)

Technical Definitions of Low Vision and Legal Blindness in Terms of Visual Acuity in “better seeing eye.”

Entity	Low Vision	Legal Blindness
World Health Organization	$> 20/60$ but $< 20/200$	$\geq 20/400$
Social Security Act	-----	$\geq 20/100$ (previously $> 20/200$ )
Medicare (using ICD-9-CM codes)	<u>Mild Low Vision:</u> $> 20/40$ but $\leq 20/60$ (not paid)	-----
	<u>Moderate Low Vision:</u> $> 20/60$ but $< 20/200$ , or $< 20/60$ if blind spots exist	-----
	<u>Severe Low Vision:</u> $\geq 20/200$ , which qualifies as legal blindness per Social Security Act.	

# Who is Affected? (1)

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- About 17 million people in the US have vision problems.
  - About 4.5 million have low vision problems.
  - Low vision problems are primarily age-related or disease-related (e.g., macula degeneration, glaucoma, diabetic retinopathy).
  - Most people with low vision have not received skills-training such as orientation to the environment, trailing or self-protective techniques, or braille.



# Who is Affected? (2)

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- Prevalence of low vision in US is projected to increase linearly by about 33% during the next 15 years, primarily due to an aging population.
- Incidence (number of new cases of low vision per year) is likely to accelerate during this same period.
- Difference is that the number of new low vision cases is almost the same as the number of deaths in this population.
- Average age of person with low vision is 70 years.

From NIBS Workshop, Robert Massof, Ph.D., Director of Lions Vision Research and Rehabilitation Center, Johns Hopkins University School of Medicine.

# How can Accommodations be Improved? (1)

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- Measurable criteria are needed for accountability of building designers and operators, clinicians, and other health care professionals (contrast, glare, brightness, and color) .
- Criteria for public and private spaces need to be adjusted for low vision population.

# How can Accommodations be Improved? (2)

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- Designs should focus on safety (fall prevention) and health (visual and biological/circadian provisions), not just code compliance.
- Energy savings and cost-effectiveness should be considered as consequences , not primary objectives, of design and operations:
  - Health and safety should not be compromised.

# What is Needed?

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- Development of evidence-based guidelines for accommodation of the low vision population:
  - Knowledge gaps exist in data that could correlate the perceptions of persons with low vision to the physical characteristics of the spaces they occupy.
- Interactions of building community with health care and public health providers.
- A standardized methodology for validating and verifying the performance of buildings that accommodate the low vision population.

# Conclusions

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- Improving designs and operations to accommodate the low vision occupants will enhance the performances of buildings for all occupants.
- Advocacy and support of these advancements are needed.
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# Questions?

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