ANSI/IES RP-28-20

Illuminating ENGINEERING SOCIETY

RECOMMENDED PRACTICE: LIGHTING AND THE VISUAL ENVIRONMENT FOR OLDER ADULTS AND THE VISUALLY IMPAIRED

AN AMERICAN NATIONAL STANDARD

Approved American National Standard ANSI

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Publication of this Standard has been approved by IES. Suggestions for revisions should be directed to IES.

Prepared by
The IES Lighting for the Aged and Partially Sighted Committee

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Prepared by the IES Aged and Partially Sighted Lighting Committee

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Foreword

This Foreword is not part of ANSI/IES RP-28-20. It is provided for informational purposes only.

This Recommended Practice (RP) does not provide general lighting information that is included in other IES documents. If the reader does not already have this information, it may be obtained as needed from the following IES Standards:

The Lighting Science Series:

- *ANSI/IES LS-1-20, Lighting Science: Nomenclature and Definitions for Illuminating Engineering*
- *ANSI/IES LS-2-20, Lighting Science: Concepts and Language of Lighting*
- *ANSI/IES LS-3-20, Lighting Science: Physics and Optics of Radiant Power*
- *ANSI/IES LS-4-20, Lighting Science: Photometry – The Measurement of Light*
- *ANSI/IES LS-5-20, Lighting Science: Color*
- *ANSI/IES LS-6-20, Lighting Science: Calculation of Light and Its Effects*
- *ANSI/IES LS-7-20, Lighting Science: Vision – Eye and Brain*
- *ANSI/IES LS-8-20, Lighting Science: Vision – Perceptions and Performance*

The Lighting Practice Series:

- *ANSI/IES LP-1-20, Lighting Practice: Designing Quality Lighting for People and Buildings*
- *ANSI/IES LP-2-20, Lighting Practice: Designing Quality Lighting for People in Outdoor Environments*
- *ANSI/IES LP-3-20, Lighting Practice: Designing and Specifying Daylighting for Buildings*
- *ANSI/IES LP-4-20, Lighting Practice: Electric Light Sources – Properties, Selection, and Specification*
- *ANSI/IES LP-6-20, Lighting Practice: Lighting Control Systems – Properties, Selection, and Specification*
- *ANSI/IES LP-7-20, Lighting Practice: The Lighting Design and Construction Process*
- *ANSI/IES LP-8-20, Lighting Practice: The Commissioning Process Applied to Lighting and Control Systems*
- *ANSI/IES LP-9-20, Lighting Practice: Upgrading Lighting Systems in Commercial and Industrial Facilities*
- *ANSI/IES LP-10-20, Lighting Practice: Sustainable Lighting – An Introduction to the Environmental Impacts of Lighting*
- *ANSI/IES LP-11-20, Lighting Practice: Environmental Considera-tions for Outdoor Lighting*

1.0 Introduction and Scope

1.1 Introduction

Older adults represent the fastest growing segment of the population with over 49 million Americans over 65.[1] With over 10,000 Baby Boomers turning 65 everyday, ANSI/IES RP-28-20 has been expanded to include areas beyond housing and senior care facilities, such as offices, hospitality, healthcare, commercial spaces, and places of assembly. The over 40 population represents approximately 89 million people and of those 63 percent have vision problems.[2] However, there is a prevalence of low vision in the general senior population, which increases dramatically after the age of 70 (see **Figure 1-1**).

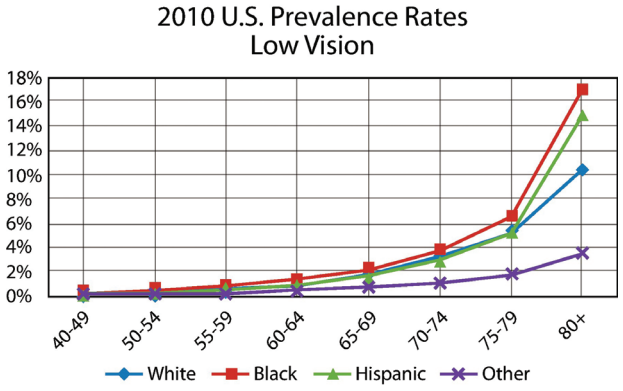

Figure 1-1. 2010 U.S. Age-specific prevalence rates for low vision by age, and race or ethnicity. (Graphic based on original by NEI [National Eye Institute] Low Vision, 20102)

Low vision is defined as vision impairment that is worse than 20/60 in the better eye, which cannot be correctable medically, surgically or with conventional eye glasses.[3] People rely on a supportive visual environment to maximize their independence and safety. Whereas people with mobility impairments are easily identified

by their use of assistive devices, i.e., wheelchairs, canes or walkers, persons with low vision do not typically use assistive devices or trailing techniques. Sensory loss is common to the aging process; however, perception problems are not easily recognized by others.

1.2 Scope

As the workforce ages the need for lighting guidance becomes more of a concern. It seems clear that the Baby Boomer generation (born in the years 1946 through 1964) will see aging very differently from their parents. They will take their current life styles and modify them slightly but will expect to continue contributing to society and be visible in day-to-day life. This group will represent more than one in four Americans.

It should also be noted that according to the World Health Organization, the entire world, with a few exceptions, is aging, and governments are not prepared for the growth of the older adult population or how to care for them. A brief search of several industrialized countries determined that there are few regulations addressing senior vision and lighting needs and prior editions of IES RP-28 have been reported the document of choice by designers when seeking guidance in how to provide adequate light and meet the visual environmental needs for older adults in all settings.

The IES Aged and Partially Sighted Committee has worked to make this current Recommended Practice document inclusive of current research and design practice for the above population to help them maintain a quality of life into their third age. Loss of independence has been identified as the greatest fear of aging, so today's senior will be looking for answers to maximize their aging vision.

Current codes and standards are based on the needs of younger people. Steps have already been taken to begin the transition to recognizing the needs of older people. Of major importance to achieving higher lighting levels while still complying with energy restraints is the adoption of ASHRAE/IES Standard 90.1-2013 and its subsequent updates. Work by this committee's members along with the ANSI/ASHRAE/IES Lighting Subcommittee has succeeded in getting the lighting levels described in **Table A-1** (see **Annex A**) adopted as an accepted compliance method for licensed senior living communities. This acknowledgement that senior populations have a high incidence of vision impairment and therefore require higher lighting levels was achieved by extensive investigations of 10 senior living environments. This research showed that the lighting levels in this document are being followed in the test buildings and that a higher lighting power density (LPD) was justified to meet the needs of those with vision impairment.

It should be recognized that the Americans with Disabilities Act 2010 (ADA) and the Architectural Barriers Act inadequately accommodate the needs of people who are blind and especially those with low vision.[4] The ADA includes Braille, but people who develop low vision later in life may not know Braille. This document is intended to increase the designers' understanding of age-related vision loss and the importance of their design decisions that could affect the safety and independence of this growing sector of the population.

This edition has a section devoted to light for human health (see **Section 6 Light for Health**), including vitamin D synthesis and circadian rhythms. Recent research has identified the special cells in the human retina that receive and transmit specific wavelengths of short (blue) visible light (450 to 500 nm) to the suprachiasmatic nucleus (SCN) in the hypothalamus, which controls human circadian rhythm.[5] The fact that a large number of older adults experience circadian rhythm disturbances, underscores the importance of understanding and addressing this critical bodily function. Circadian rhythm entrainment and vision may be equally important elements for safety and quality of life for older adults and the low vision population. Circadian disruption has been tied to numerous serious diseases, such as cancer, diabetes, high blood pressure, and much more.

In recent years, much has changed in many fields affecting senior living. In lighting, the biggest game change has been the introduction of LEDs and the rapid adoption by the general public and design professionals. The unique qualities of LED technology have allowed some long sought after lighting solutions to be easier and simpler. It is now possible to change