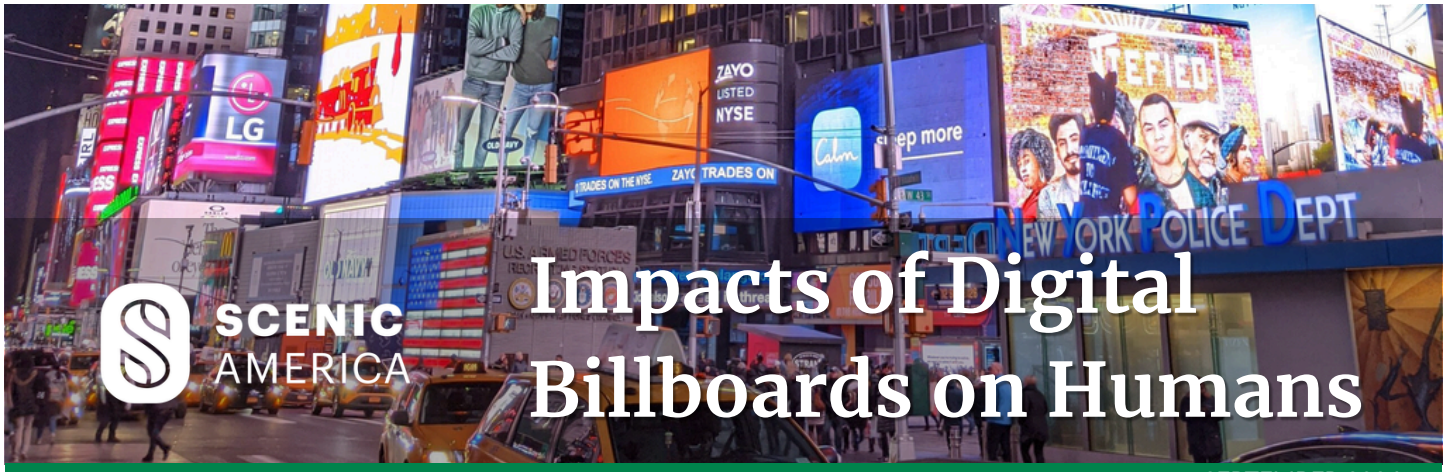


SCENIC AMERICA

Impacts of Digital Billboards on Humans

SEPTEMBER 2026

Digital billboards are rapidly proliferating across America, introducing intense, continuous LED illumination that disrupts the natural rhythms in humans. These high-brightness screens contribute significantly to light pollution, or artificial light at night (ALAN).

A growing body of research links ALAN to serious public health consequences, including sleep disruption, depression, obesity, and increased risk of certain cancers. For communities already burdened by the societal effects of digital billboards, this light pollution represents an underrecognized and largely unregulated public health hazard.

How it Works

The human body depends on the natural cycle of light and dark to regulate biological processes. ALAN disrupts this system through two primary pathways:



Blue light comes from more than just our smartphone screens.

Exposure to blue light from sources outside our homes, including digital billboards, disrupt our natural cycles.

- **Circadian disruption:** The human circadian system governs the timing of sleep, hormone release, metabolism, and immune function. Continuous or irregular light exposure at night shifts these rhythms out of alignment. This shift elevates stress hormones like cortisol, triggers proinflammatory responses in the brain, and increases vulnerability to a cascade of chronic health conditions.

- **Melatonin suppression:** ALAN, particularly the blue-wavelength light characteristic of LED billboards, suppresses melatonin, a hormone critical to sleep regulation, immune function, and cancer suppression. Even low levels of nighttime light exposure can trigger measurable melatonin suppression.

What the Research Shows

Sleep & Mental Health

- **Childhood exposure —** Exposure to ALAN has been associated with increased perceived stress through the hypothalamus-pituitary-adrenal axis, a major hormone system.
- **Adolescent exposure —** Exposure to outdoor ALAN is associated with later bedtimes, shorter sleep duration, and higher rates of mood and anxiety disorders.
- **ALAN in home settings —** is significantly associated with depressive symptoms in elderly populations and reduced sleep quality across age groups.
- **Insomnia and sleep disturbance —** Higher nighttime light exposure is associated with increased risk of insomnia and sleep disturbance, possibly exacerbating symptoms in people with bipolar disorder.

Cancer

- **Increased risk of cancer —** Exposure to light at night has been positively associated with breast cancer, colorectal cancer, and thyroid cancer risk across multiple large-scale studies.

Vision

- **Retinal degeneration —** Prolonged exposure to high-intensity LED light may accelerate retinal degeneration and worsen existing genetic retinal conditions. Cumulative effects from chronic nighttime light exposure represent an emerging area of concern.

Metabolic & Neurological Health

- **Alzheimer's disease —** Higher outdoor ALAN exposure is associated with greater prevalence of Alzheimer's disease — more strongly than alcohol abuse, chronic kidney disease, depression, heart failure, or obesity. The association was strongest in individuals under 65.
- **Increased risk of obesity —** Exposure to ALAN is associated with increased risk of obesity even after controlling for sleep duration, physical activity, and other lifestyle factors.
- **Circadian disruption and stress hormones —** Emerging research links ALAN to increased risk of type 2 diabetes, cardiovascular disease, and cognitive decline through chronic circadian disruption and stress hormone elevation.

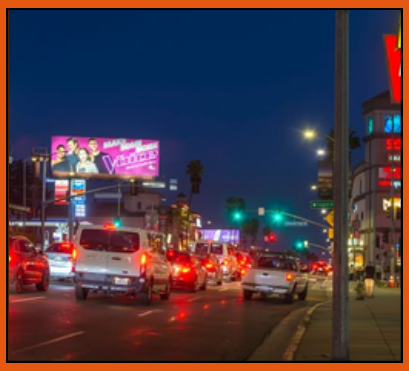
Driver Safety

Digital billboards introduce additional risks on roadways beyond their contribution to light pollution.

29%

increase in crash rates near ditigal billiboards

A review of 27 independent studies found that outdoor advertising signs are designed to grab drivers' attention, diverting it from the roadway and increasing distraction for both drivers and pedestrians.



The distraction digital billboards pose are especially hazardous under challenging driving conditions including:

- Inclement weather
- Complex road layouts
- High speeds
- Sudden traffic shifts

Taking Action

Limiting billboard brightness, requiring nighttime dimming, and restricting new digital billboard permits are practical, proven tools for reducing ALAN exposure in communities. Scenic America is available to provide technical assistance and model policy language.