Light Pollution's Medical Effects (Sept. 2011)

Excessive light is a problem for everyone, not just amateur astronomers.

Most folks reading this article are well aware of the many problems associated with light pollution, such as energy waste, sky glow, and environmental impact. But not many people know about the burgeoning growth of research that demonstrates direct human-health issues related to excess light. In fact, health effects might ultimately be the most important reason to control light pollution. The energy wasted by excessive lighting is produced mainly by burning fossil fuels, leading directly to air pollution that causes higher asthma rates and increased respiratory problems for people with lung disease and other medical issues.

Glare is the most common health safety problem resulting from poorly designed outdoor lighting. You have probably noticed poor vision stemming from glare on a dirty windshield. Over time calcifications build up in the lenses of our eyes, which eventually develop into a cataract. These calcifications and other lens and eye imperfections scatter light in a similar fashion to a dirty windshield. This effect grows more severe with age, and it's the primary reason why elderly people have a difficult time driving at night near poorly designed streetlights. Most people with this problem are not even aware that glare is the main cause of their poor night vision, and that they could drive more safely if streetlights were properly designed. Recognizing this fact, the American Medical Association (AMA) adopted a resolution in 2009 urging full shielding for all public street lighting.

A hot new area of research is how night light disrupts our circadian rhythm. Numerous papers over the past 15 years have led medical researchers to conclude that night light increases the incidence of certain cancers, most notably breast cancer. In fact, researchers now estimate that up to 30% of breast cancers may be due to light at night suppressing circadian rhythm. The research basis for this conclusion has become so compelling that the World Health Organization recently declared circadian-rhythm disruption to be a class 2A carcinogen — placing it on the same level of severity as the effects of tobacco smoke on lung cancer.

The biochemical mechanism for this problem has been thoroughly researched and is thought to result from the suppression of melatonin production by the pineal gland in the center of our brain. This gland produces melatonin while we sleep. Repeated exposure to light at night markedly suppresses melatonin production. Previous research has shown that this hormone helps the immune system suppress the development of several types of cancers.

As an elected member of the AMA's Council of Science and Public Health, I have asked the world's five foremost researchers on this subject to help me draft a review paper to summarize these important studies. This report should be available to the public within a year, and I hope it will help governments adopt sensible and rational lighting policies.

***Mario Motta, M.D.**, is a cardiologist at the North Shore Medical Center in Salem, Massachusetts, and a recent president of the Massachusetts Medical Society. A devoted amateur astronomer, he authored the article about building his dream observatory in the May 2011 issue of Sky & Telescope (page 32). To watch a video of Dr. Motta discussing light pollution, visit SkyandTelescope.com/Motta.*