AMD and their vision loss consequences—the “wet” form, where abnormal blood vessels develop under the retina that leak fluid and cause central vision loss, and the “dry” form, where protein deposits called “drusen” develop and the retina degenerates or slowly thins out, resulting in a slow progression to vision loss.

Dr. Chew identified the non-modifiable risk factors—that is, factors that individuals cannot control—for developing AMD as increasing age, family history, and ethnicity (more prevalent in a fair-skinned individual). Modifiable risk factors affected by lifestyle include cigarette smoking, high blood pressure, elevated cholesterol levels, increased body mass/obesity, sun exposure, and oxidative stress. She focused on the role of nutrition, as she has been involved in the NEI-funded Age-Related Eye Disease Study (AREDS) study, both AREDS1 and AREDS2, where she serves as study chair.

AREDS1 studied the impact of antioxidants and the trace element zinc on the development of advanced AMD and cataract in patients, as animal studies and human epidemiological studies suggested a link. AREDS1 found that individuals at high risk of developing advanced stages of AMD lowered their risk by about 25 percent when treated with a high dose combination of vitamin C, vitamin E, beta-carotene, and zinc (with copper). There were other dietary data from AREDS1 which suggested that individuals who ate fish or leafy green vegetables, such as spinach, kale and collard greens, had a reduced risk of the advanced form of AMD.

Since such AREDS1 data were part of an “observational” evaluation and not a clinical trial, the results could have been affected by unknown factors that might influence the patient’s disease course, for example, persons with better economic or social status who may have better access to healthcare and may take better care of themselves.

Consequently, in 2006, NEI decided to conduct AREDS2, a randomized clinical trial investigating the impact of high doses of xanthophylls (lutein and zeaxanthin found in leafy green vegetables, such as kale) and/or omega-3 polyunsaturated fatty acids (such as DHA and EPA found in fish) in further reducing AMD progression. Study results are expected in 2013.

Dr. Chew emphasized the public health impact of AREDS results to date. “If the 8 million Americans currently at high risk for AMD took the appropriate nutritional supplements, more than 300,000 could be saved from advanced AMD in the next five years.” She added that AREDS has been a breakthrough study in many ways, as its database is included in NIH’s database of Genotypes and Phenotypes (dbGaP) and is also being combined with data from tens of thousands of individuals from around the world under the NEI-funded International AMD Gene Consortium to better understand the genetic basis and progression of the disease.

NEI’s leadership in basic and translational research into AMD has led NIH Director Dr. Francis Collins to report to Congress that, “Twenty years ago, we could do little to prevent or treat AMD. Today, because of new treatments and procedures based in part on NIH research, 1.3 million Americans at risk for severe vision loss over the next five years can receive potentially sight-saving therapies.”