**Eye Banking and Corneal Transplantation Backgrounder**
**Cornea Blindness and its Causes**

The cornea is the clear part of the eye covering the iris and pupil; it lets light into the eye, permitting sight. Corneal blindness is a visual impairment that occurs when the cornea becomes clouded, scarred, or misshapen. This condition may be the result of injury, infection or diseases that cause corneal scarring, which can lead to functional blindness. Diseases affecting the cornea are a major cause of blindness worldwide, second only to cataracts. It is estimated that there are currently 45 million people worldwide who are blind in both eyes, and 6 to 8 million blind due to corneal disease.

Infectious conditions such as trachoma and corneal ulcer are common in the developing world, whereas noninfectious causes like corneal dystrophies (inherited diseases) and pseudophakic bullous keratopathy (painful swelling of the cornea occurring after cataract surgery) are more common causes of corneal blindness in developed countries. Keratoconus, a progressive thinning of the cornea, is the most common corneal dystrophy in the U.S., affecting one in every 2,000 Americans. And the herpes virus is the most common cause of corneal ulcer in developed countries.

While the need for corneas is generally met in the U.S., it is not the case in much of the developing world, where blindness can be a death sentence. Ninety percent of the 10 million people suffering from curable cornea blindness live in developing countries. In some areas of Africa, nearly 90% of the total blindness is due to corneal pathology.

About Corneal Transplantation
Corneal transplantation is not a new procedure. The first successful transplant took place in 1905 by Eduard Zirm. Corneal transplantation is performed routinely, with more than 42,000 in the United States each year. Hundreds of thousands more are helped through cornea-based research into cures for blinding diseases. Due to the generous eye donors many advances in eye surgery have been developed, including the new type of surgery called the Descemet's Stripping Endothelial Keratoplasty (DSEK).

Corneal transplantation, which replaces damaged tissue on the eye's clear top surface, also is known as keratoplasty, penetrating keratoplasty (PK) or corneal graft. A graft replaces central corneal tissue, damaged due to disease or eye injury, with healthy corneal tissue procured from an eye bank. With a success rate of more than 95 percent, most people undergoing a cornea transplant can expect a good outcome, but graft rejection can occur. Medical management of graft rejection, however, can lead to healthy graft survival in most cases.

A new version of corneal transplant, known as Descemet's Stripping Endothelial Keratoplasty (DSEK), also has been introduced as a new surgical method that uses only a very thin portion of the cornea for transplant. The American Academy of Ophthalmology (AAO) in 2009 endorsed DSEK as superior to the more conventional full-thickness corneal transplant procedure (penetrating keratoplasty) for better vision outcomes and stability, as well as fewer risk factors. The reason for the improved

outcomes is because the surgical technique requires fewer sutures which help the eye maintain its shape thus not causing adverse side effects such as astigmatism. It should be noted that while this new procedure helps many individuals that suffer from corneal diseases, it cannot resolve all disease types, such as keratoconus.

**Eye Banking**

The first eye bank opened in 1944 in New York City. Since that time eye banks have been retrieving, storing, evaluating, processing and distributing ocular tissue to corneal surgeons for transplant and use in other procedures such as reconstruction.

Modern eye banks have grown to become sophisticated medical facilities ensuring the highest quality tissue possible for the public. Highly trained eye bank personnel travel to medical facilities, such as hospitals, to surgically recover the ocular tissue. The tissue recovered is just the cornea, which looks like a contact lens. The tissue is stored in special media to preserve the tissue and reduce any bacteria.

An eye bank must work very quickly to make the donation happen. The corneal tissue needs to be preserved within 12 hours of death and transplanted within a few days. Once the tissue is recovered the eye bank staff must conduct a complete evaluation of the tissue and ensure that the donor is suitable and is free from communicable diseases.

In the past few years, eye banks have also had to learn how to prepare the tissue for surgeries including DSEK by isolating cellular layers of the cornea to be transplanted with a device called a microkeratome, which shaves the layers of the cornea to obtain the specific layer required for the surgical procedure. Some eye banks, including SightLife, also prepare tissue using a laser similar to those used in LASIK procedures.

Eye banks are all non-profit entities and 100% of the eye banks in the United States are part of the Eye Bank Association of America, which accredits them. The Eye Bank Association of America was formed in 1961 and began accrediting eye banks in 1980.

**About SightLife**

Founded in 1969, SightLife is the only non-profit global health organization and eye bank solely focused on eliminating corneal blindness in the U.S. and around the world. Driven by an entrepreneurial spirit, the organization leverages innovative technologies and best business practices to transform lives and unlock life’s possibilities for the corneal blind. SightLife works in partnership with surgeons and health organizations in more than 30 countries. Together with its global partners, SightLife provided 17,309 corneas for transplant in 2013. For more information, visit www.SightLife.org.

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