WHAT IS DIABETIC RETINOPATHY and RETINOPATHY SCREENING?

Retinopathy is a disease of the retina. The retina is the nerve layer at the back of the eye. It is the part of the eye that "takes pictures" and sends the images from the eye to the brain. Many people with diabetes get retinopathy. This kind of retinopathy is called diabetic retinopathy (retinal disease caused by diabetes).

Diabetic retinopathy can lead to poor vision and even blindness. Frequently, it gets worse over time. At first, the blood vessels in the eye get weak. This can lead to blood and other fluid leaking into the retina from the blood vessels. This is called nonproliferative retinopathy. This is the most common retinopathy. When fluid leaks into the center of the eye it can cause blurry vision. Most people at this stage of nonproliferative retinopathy have no symptoms.

If blood sugar levels stay high, diabetic retinopathy will keep getting worse. New blood vessels grow on the retina. This may sound good but these new blood vessels are weak. They can break open very easily even during sleep. If they break open, blood can leak into the middle part of the eye, in front of the retina, and change vision. This bleeding can also cause scar tissue to form which can pull on the retina and cause the retina to move away from the wall of the eye (retinal detachment). This is called proliferative retinopathy. Sometimes people don't have symptoms until it is too late to treat them. This is why having eye exams regularly is so important. The earlier a problem is detected, the higher the chance of saving a person's eyesight.

Retinopathy can also cause swelling of the macula of the eye. The macula is the middle of the retina which sees details. When the macula swells it can make vision much worse. It can even cause legal blindness. This is called macular edema.

Lions are 'photographers' not diagnosticians. The retinopathy screening process performed by Lions is very simple. 1) One readable image is taken of each eye. 2) The images are sent to a professional for review. 3) Notification is sent advising the participant if their eyes are okay or they will be notified they need to seek care from an eye doctor as soon as possible.

The objective is to achieve the best readable images possible in a timely manner.

SCREENERS

Albeit one (1) person can do retina screening alone this is not an efficient method. Three (3) people are recommended:

1. Photographer: Enters data (name, etc.) into the system & takes the photographs.
2. Assistant: Cleans the camera, helps photographer position participant, and fills out the card that the participant will leave with. The card will include blood screening, vision acuity and indicate the participant has had a retina scan.
3. Lights! - Positioned by the room light switch to turn on and off as needed.

NOTE: These individuals are encouraged to 'switch" jobs during the day in order for everyone to experience all the steps.

ITEMS & EQUIPMENT NEEDED

<table>
<thead>
<tr>
<th>Camera</th>
<th>Lens Cleaner Wipes</th>
<th>Tissues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camera Cords</td>
<td>Forms (Medical Release)</td>
<td>Cover for Lights (opt)</td>
</tr>
<tr>
<td>Chairs</td>
<td>Chair Cushion</td>
<td>Paperwork Trays (opt)</td>
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<tr>
<td>Table (Small is ok)</td>
<td>Pens</td>
<td></td>
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<tr>
<td>Alcohol Wipes</td>
<td>Masking Tape</td>
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</table>
1. Plug the camera into the camera table using the short cord. (Plug into the camera beside the On/Off Switch. Plug into the table on the side)
2. Plug the camera into an electric outlet using the long cord. Cord plugs into the front of the table and into an electric outlet. Tape the cord down with wide masking tape to prevent accidents.

3. Remove the lens cap and store in a safe place to prevent loss.

4. Turn the camera on at the On/Off switch. The camera will require approximately ten (10) minutes warm up.

5. Darken the room as much as possible. Close drapes. Cover any bright computer screens, etc. Better images are achieved in a dark room. However, you must be able to see to enter information via
the camera’s keyboard. If possible, have a helper positioned beside the rooms light switch to assist. Otherwise you will be getting up and down and not using your time productively.

6. Place a chair for the participant and the photographer. A cushion will be helpful to aid shorter individuals in positioning correctly at the camera. Children or short adults may need to stand for photographs. One or more other chairs, away from the camera, for participants to wait while the operator enters data helps keep the camera lens clean!

7. Determine where you will place "incoming" paperwork from the Diabetes Screeners.

8. Determine where you will store completed forms.

9. Set-up cleaning supplies near the camera.

   A. Cleaning the chin and forehead rest - You will need 'isopropyl alcohol wipes' to clean the entire area where the participant places their chin and forehead after each participant. Use only isopropyl alcohol. Other cleaning agents may include an oxidizing agent that will damage the surfaces.

   B. Cleaning the camera lens - You will need "Lens Cleaners" to clean the camera lens. The lens should be cleaned by using a small hand pump air blower, to blow away dust. Only if really needed, for instance due to the presence of a fingerprint, the front lens should be cleaned using ONLY photographic lens cleaning wipes. Other chemicals will damage the lens.

   C. Cleaning the Touch Screen Panel - The touch screen panel should be cleaned only with a cloth damped in water. Do not use alcohol or detergents to clean the touch screen as these may damage the film covering the panel.

Any talking at all after the participant is positioned at the camera is likely to leave tiny droplets on the lens which will appear as 'spots' in the photographs.

PRE-WORK: DIABETIC (BLOOD) SCREENING, VISION TEST & PAPERWORK

Keep in mind Retina Screening is associated with grant dollars. There is a good reason for every question on the forms. The forms must be filled out completely. A participant must receive a blood sugar screening prior to retina screening. Eyes will also be tested, at this point, using an eye chart.
WHO SHOULD PROCEED FROM BLOOD SUGAR SCREENING TO RETINA SCREENING?

ALL DIabetics
ALL PRE-DIABETICS
ALL A1C>5.7
ALL HIGH BLOOD SUGAR ABOVE NORMAL LEVELS

Participants with blood sugar in the diabetic or pre-diabetic blood sugar ranges will be asked to fill out a MEDICAL CONSENT RELEASE FORM and continue to retina screening. Note: It is not uncommon for a participant to know they are diabetic or pre-diabetic and be taking medication to control blood sugar levels. These individuals should continue from blood screening to retina screening.

CAMERA OPERATOR -- TAKING THE PHOTOS

1. Ask the participant to have a seat while you prepare to take photographs.

2. Review the paperwork for completeness. If any information is missing ask the participant to fill it in.
A complete address including city, state and zip code is needed. CHECK TO MAKE SURE EMAIL ADDRESS IS READABLE. Make sure the eye test (paper chart) was done. If not, send the participant back to the blood screeners for eye test. Enter LAST NAME, FIRST NAME, BIRTHDATE & GENDER into the camera's keyboard. (Code is left as is)

3. Double check (proofread) entries. Then click on save.

4. Make sure the chin rest and forehead rest area have been wiped with alcohol wipes.

5. Away from the camera ---explain to the participant how they need to be positioned at the camera and inform them how the process will work.

   a) the test is non-invasive, in particular the system will never touch your eye and you will only see a flash of light when a photograph is taken;

   b) find a comfortable position, keeping the chin and forehead firmly pressed against the rests;

   c) please do not TALK after you are in position. If you need to respond to a question please do so with a "closed mouth" sound (examples: "Uh huh" or "Unt uh"). If asked if you need to be higher or lower please indicate by pointing up or down.

   d) at the beginning of each test, the unit will move around to find your pupil: this is absolutely normal;

   e) when the test starts look straight in front of you and when a small green circle becomes visible anywhere within the field look steady at it;

   f) open your eyes wide so that eyelids do not interfere and try to not blink during the test;

   g) please do not move during the test;

   h) if you follow these instructions the acquisition of a single photo will take less than 30 seconds.

Note: For participants with hair that may fall in front of their eyes ask them to please push their hair back away from their eyes. One hair will make a significant line in the photo as will a rogue eyelash! Talking by the participant after they begin positioning will cause spots on the image. As much as possible, try not to engage in two-way conversation.

6. Position the participant at the camera and adjust as needed.
   a) The camera table height is adjusted with the switch on the side of the table.
   b) The chin level is adjusted with a keyboard "Chinrest UP" and "Chinrest DOWN" keys.

7. GREEN LIGHT -- The START button is only enabled if the chin rest is engaged. If the participant is not properly positioned on the chin rest, the START button will not be enabled and it will not be possible to start the photo acquisition process. If you do not see a green light the participant is not in the right position. Adjust as needed.
8. START! Push the "start" key. From this point the camera will do the work!

COMMUNICATION: It is important to communicate during the process. Most important is to instruct the participant to KEEP THEIR EYES WIDE OPEN when you see the focus line center on the pupil because the photo is about to be taken! Second in importance is telling the participant when to blink between photographs.

Discussion Suggestions
1. You will observe a red light while the camera looks for your right eye.
2. The camera is centering on your right pupil.
3. Keep your eyes wide open - the camera is ready to photograph your right eye.
4. Between photos now - Blink! Blink! Blink!
5. You are seeing the red light again. The camera is repositioning to your left eye.
6. The camera is centering on your left pupil.
7. Keep your eyes wide open - the camera is ready to photograph your left eye.
8. That’s it. Please relax while I review the photos.
If, for some reasons, the automated eye search fails, a message shows up. Reasons for failure include: improper participant positioning, participant not fixating steadily, participant moving the head and/or the gaze during eye search. If any of the above situations applies, try to fix the cause (re-position the participant, instruct her/him to steadily fixate at the target and/or to not move) BEFORE proceeding with manual alignment.

MANUAL ALIGNMENT: Use the UP / DOWN / LEFT / RIGHT buttons to adjust the optical head position and align the participant’s eye to the instrument front lens. As soon as the eye is detected the automated procedure will resume.

Failure of automatic eye search
Manual Alignment

9. Images: After the second eye, images will appear on the screen.

REVIEWING THE PHOTOS

1. Look at the photographs. Photos are not being read. They are being reviewed to ensure a high quality photo has been taken.
a. A high quality photo shows blood vessels. A high quality photo is not too light or too dark. A high quality photo has no "dirty lens" or hair line marks. You may notice a bright spot in the photo. This is normal. It is the optic nerve.

Retinal image acquired by the DRS

2. If photos of both eyes are high quality, press the "Send for Grading" key.

3. If the photo(s) of one or both eyes are not high quality DELETE the unacceptable photo by moving it to the Trash Can located at the top of the screen and retake the photo. Do not send low quality photos for grading. This is a waste of money.

   a. What if a clear photo cannot be taken?

      1. If you can get a clear photo of one eye but it is impossible to get a clear photo of the second eye, this may indicate a problem with the second eye. Send the good photo and the best photo you can obtain of the second eye for grading.

      2. If you cannot get a clear photo of either eye, sending the photos for grading is a waste of time and money. Advise the participant that you are unable to get clear photos and that they need to see an eye doctor as soon as possible. NOTE THIS ON THEIR FORM.
**COMPLETING THE PROCESS**

1. Remind the participant they will hear results in about a week. Normal screenings will receive a post card. Participants with abnormal results will receive an email.

2. Thank the participant for allowing Lions to test their eyes.

3. Store the participants forms.

**SYSTEM SHUTDOWN**

To shut down the system go to the startup screen, participant list or participant record screen and click on the power off button. Wait for the progress bar to completely roll back. A *message on the screen will inform you when it is safe to turn off the main switch.*

Always put the cap back on the front lens. Do not leave the front lens uncovered when not in use.

**HOW TO UPLOAD PHOTOGRAPHS**

1. The camera must be turned on and warmed up.

2. Go to Administration Mode Signal (In the middle of the keyboard)

3. Go to Wi-Fi and assure the Wi-Fi you are connecting to is available and connect.

   a) Note: This may take a few minutes.

b) Depending on the Wi-Fi connection and the number of images it may take a short while for the upload to complete.

c) Go to EKN to ensure photo upload completed.

d) To shut down the system click on the power off button. Wait for the progress bar to completely roll back. A *message on the screen will inform you when it is safe to turn off the main switch.*

Always put the cap back on the front lens. Do not leave the front lens uncovered when not in use.

**ALTERNATIVE TO UPLOADING PICTURES**

If you do not have Wi-Fi available or do not wish to upload photos for another reason, simply turn the camera off. Photos that were tagged "Send for Grading" will be stored on the camera to be retrieved at a later time.

**STORING THE CAMERA & MISCELLANEOUS NOTES**

1. Remember to replace the lens cap.
2. Secure cords carefully.
3. Pack and load!
4. Do not store the camera in direct sunlight or in a hot area.
5. Do not attach stickers, etc. to the camera or camera table.

That's it !!! Congratulations and Good Luck !

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