objective attempts to set the standard of yearly dilated eye examinations for diabetics to prevent diabetic eye disease. Healthy Michigan 2010 section eight d. addresses diabetes in Michigan. Diabetes mortalities, as an underlying cause, are the sixth leading cause of all mortality in Michigan and the tenth leading cause of years of potential life lost for people below the age of 75. The age adjusted rate for diabetes-related mortalities was 82.3/100,000 population. Diabetes-related mortality rates have been increasing during the past ten years. There has been a 24% increase over the past six years. As the numbers of persons with diabetes has increased, there has not been an increase in the proportion getting the recommended annual dilated eye examinations and foot examinations. Early detection of complications from diabetes, such as blindness can be delayed or even avoided with proper early detection methods. Diabetes is the leading cause of adult blindness. Over half of the cases of blindness can be avoided with annual dilated eye exams, proper care of the eyes, and blood glucose control. Regular eye exams detect early onset of eye problems. If eye problems are not diagnosed until the person notices the problem, much of the damage may have already been done and is irreversible. Increasing the percentage of persons with diabetes who receive an annual eye exam is critical. The percent of dilated eye examinations in Michigan are as follows: 1997 69%, 1998 67%, 1999 73%, 2000 79%, and 2001 65%. Healthy people 2010 goal 5-13 is to increase the proportion of persons with diabetes who have an annual dilated eye examination. Target: 75 percent of the persons with diabetes. U.S. Baseline: 47 percent of adults aged 18 and older with diabetes had an annual dilated eye examination in 1998 (age-adjusted to the 2000 standard population). 2
According to the Healthy Michigan 2010 report, Michigan compares favorably on socioeconomic factors with the rest of the U.S. An estimated 86.2% are high school graduates and of those, nearly one in four (23%) have a college degree or more (US: 84.1%, 25.6%, respectively). In 2002, the estimated per capita personal income in Michigan was $30,222 compared to $30,832 for the U.S., ranking Michigan 18th among all states. Eight out of ten residents are private wage or salaried workers (83.1%) compared to 77.4% in the nation. Nearly one quarter (22.5%) of Michigan’s workers are employed in manufacturing. Between 1993 and 2002, the unemployment rate was at its lowest in 1998 (Michigan: 3.8%, US: 4.2%) and rose to higher levels in 2002 (Michigan: 6.2%; US: 5.8%). The report also indicates that data from the 2002 Michigan Behavioral Risk Factor Surveillance Survey, an annual statewide telephone survey designed to measure lifestyle and other factors associated with mortality and morbidity, indicates that 13.8% of respondents between the ages of 18 and 64 had no public or private healthcare coverage at the time of the survey. Nearly one in five blacks (19.7%) in this age group indicated they had no coverage, a percentage that was significantly higher than among whites (11.9%). Of those with a household income of less than $20,000, over one in three (36.7%) lacked healthcare coverage, nearly one in seven was unable to get medical care some time in the past 12 months, and one in four (24.9%) said they had no personal healthcare provider.²

Hispanics have the highest risk of being uninsured in Michigan (29.4 percent) and nationally (34.9 percent). African-Americans had the sharpest increase in the risk for being uninsured, up from 14.7 percent in 2000 to 18.4 percent in 2001.³ According to
Michigan department of community health diabetes is one of the top ten leading causes of preventable hospitalizations in 2003. Four and half percent of all preventable hospitalizations were due to diabetes. Between 1990 and 2003 the percentage of African Americans in Kent County, the area serviced by CSHS, increased by 1.9%. The Hispanic population increased an astounding 5.1% during the same time period. This is in direct support of our need, as Hispanic and African Americans are at greater risk for diabetic eye disease.


Entry #4: September 11, 2005

Revised working timeline

After approval to work with CSHS and the diabetic exam manual we revise our timeline. Our initial timeline consists of four intervals. We feel that this is still the best set up and that the time intervals are still appropriate for our current program. The dates need to be revised, but our new date goals seem more realistic now that we know the agency and product we are working toward. Brian and I will be taking our second national board exam for licensure in optometry in December. We will be studying for the exam throughout this semester in addition to our internships and service learning program. The completion of this program will be challenging given our schedules and work load. We are motivated to produce a sustainable product within our set time goals, and to exceed any expectations of the agency. We want this program to set an example and to represent our training well. I will be doing my final externship out of Michigan beginning in January. Therefore we have decided to attempt to accomplish the bulk of the service learning program by December.

We will be contacting Ms. Sather to further discuss the format of the manual and to come up with an outline for her approval. Also we will be doing much research in the coming weeks on diabetic eye care. This stage of the program has demonstrated the need for organization and goals in order to keep things moving smoothly and end successfully. The following is our current working timeline.
Working Timeline Edition 2

Student Diabetic Exam Manual

1. Contact established with Cherry Street Health Services, Ms. Sather (August 29)

2. Approval of Diabetic Exam Manual and Cherry Street Health Services by supervisor Dr. Mika. (September 6).

3. Confirmation letter sent to contact Ms. Sather. Set up date to meet/phone conference to discuss further specifics, format, and outline of diabetic exam manual: September 16, 2005.


6. Present final sustainable product: December 23, 2005
Entry #5: October 9-15, 2005

After clarifying details with Ms. Sather we are ready to proceed with data collection and research. We are happy to have a basic outline to work from now. Ms. Sather has provided us in good detail with what she would like to see in the Diabetic Eye Care Manual for Student Interns at Cherry Street Health Services (CSHS). Our ideas and plan are well accepted by her, and that makes us feel pretty good about how things are going.

This is currently a difficult time for both Brian and I as we are preparing to take our optometric licensing board examinations in December, 2005. We will commit most of our free time toward studying and reviewing for our examinations. Prioritization during our fourth year of optometry school is more important that I had expected. We are no longer in classes, and so we have fewer assignments and exams to study for. However, independent study is proving to be very useful and necessary as we are refining our diagnostic and therapeutic skills. Committing appropriate time to each aspect of life is a constant challenge and is constantly changing.

I am enjoying the subject of diabetes as our focus. Diabetic eye disease is very serious now in our population and is only going to become more prevalent in the future. As we compile our material I believe this manual is going to be very helpful to the student interns at CSHS.

Diabetes mellitus is a chronic disease with long-term macrovascular and microvascular complications. The main complications of diabetes include nephropathy, neuropathy,
and retinopathy. Diabetes is the leading cause of death, disability, and blindness in the United States for the population segment of 20 to 74 years of age.\textsuperscript{[1]} According to the "Diabetes Control and Complications Trial Research Group", intensive treatment to maintain blood glucose concentrations close to the normal range has been shown to decrease the risk of development of diabetic retinopathy by 76 percent.\textsuperscript{[1]}

The Diabetic Retinopathy Study (DRS), Early Treatment Diabetic Retinopathy Study (ETDRS), and Diabetic Retinopathy Vitrectomy Study (DRVS) all demonstrate that early referral for eye care and efficient management decrease the incidence and severity of vision loss related to diabetes.

Appiah, Ganthier, and Watkins demonstrate in "Delayed diagnosis of diabetic retinopathy in black and Hispanic patients with diabetes mellitus" the importance of efficient diabetic eye care. Early referral is most important to the population we are concentrating on, lower socioeconomic groups primarily composed of African American and Hispanic patients. At the initial diagnosis of diabetes 37.3 percent of African American and 42.9 percent of Hispanic patients have significant diabetic retinopathy. \textsuperscript{[2]}

We are including the American Optometric Association guidelines to diabetic eye disease in the manual as one of our primary resources for standards of care. The guidelines are devised from numerous research reports on diabetes and diabetic eye disease. The following is a laundry list of the major studies crucial to our standards of care for treatment and management of diabetic eye disease:

The "Diabetic Retinopathy Study Research Group" is composed of numerous reports on the diagnosis, treatment, and management of diabetic eye disease. Included in the reports are risk factors for severe visual loss in diabetic retinopathy, revised definitions of the Airlie House classification of diabetic retinopathy, and numerous reports on photocoagulation treatment and therapy for diabetic retinopathy.\[4-12\]

The "Early Treatment Diabetic Retinopathy Study Research Group" is composed of multiple studies on photocoagulation for diabetic macular edema and retinopathy (when to use, where to use, what type of laser to use, etc.). The ETDRS as it is known also researches the best ways of identifying and grading diabetic retinopathy and diabetic macular edema by looking at ophthalmoscopy, fundus photography, and fluorescein angiograms. In addition the ETDRS also assesses the effects of Aspirin on diabetic eye disease. The ETDRS reviews the pars plana vitrectomy procedure in the early treatment of retinopathy as well.\[13-35\]

The "Diabetic Retinopathy Vitrectomy Study Research Group" further researches vitrectomy for treating diabetic retinopathy including severe vitreous hemorrhage and proliferative diabetic retinopathy. The study also follows the two-year course of visual
acuity in severe proliferative diabetic retinopathy.1[36-40]

The "Diabetes Control and Complications Trial Research Group" demonstrates the effectiveness of glycemic control in preventing diabetic eye disease. The study includes analysis of retinopathy with intensive versus conventional treatment for diabetes, analysis of the relationship of glycemic exposure to the risk of progression of retinopathy, and demonstrates the lifetime benefits and costs of therapy as practiced in the study.1,1[41-45]

"The Wisconsin epidemiologic study of diabetic retinopathy" researched the prevalence and risk of diabetic retinopathy when age at diagnosis is 30 years or less, and 30 years or more.1[46-48]


17. Early Treatment Diabetic Retinopathy Study Research Group. Case reports to


Entry #6: November 27, 2005

Our research is coming along at a steady pace. We are approaching the optometric board examination date very quickly now. I have been committing most of my time to studying and will likely continue to do so until I have completed the exam in the first week of December.

I have been concentrating on refining our table of contents (our active outline). The order of the contents is very important because we want things to be as accessible as possible for the interns. Second and third year optometry interns are very much concentrated on technique and practicing examination procedures. Examinations tend to take more time for that reason, and so having a very easy to use, straightforward diabetic eye care reference manual should prove helpful. Also, our format options are quite vast at this time. Many examination guides are in PDF format, and I am considering using PDF for our manual. This will provide Ms. Sather and CSHS with an electronic form of the manual to that they can reproduce it as needed. PDF also allows for encryption. I am not sure how important it is for our specific product to be protected from editing. This product is meant to educate after all, and I do not want there to be any barriers to that aspect of the manual. That being said I do feel that there are benefits to encryption in regard to this as fulfilling a requirement academically. I will be researching PDF and other formats in the future and refining my skills with ADOBE before we finalize anything.
Table of Contents

1. Patient Education
Two sided patient education hand out

   English Version

   Spanish Version

Side One: Definitions: Diabetes, Diabetic Eye Disease.

Side two: Referral sources for diabetic patients in the Grand Rapids area. (Mental Health, Nutritionist, Diabetic Education Specialist, Low Vision Clinic, Commission for the Blind).

2. Diabetic Eye Examination Forms and Codes

Diabetic Exam Form

Diabetic ICD/CPT codes

Extended Ophthalmoscopy Form

Referral Forms/Physician Update form

3. Reference and Referral Sources

Patient reference and referral database.

Optometric references and referral sources for student interns

4. Diabetic Eye Exam Reference Material for Student Interns

Diabetic Eye Care Quick facts and Definitions

Blood Work Statistics

5. Standards of Care

American Optometric Association

American Diabetes Association

Supplemental Reference -2005 Diabetic Fact Sheet
Brian is working on specific diabetic exam forms. He is referencing numerous sources in an attempt to produce a very efficient format. Again efficiency and accessibility are important in any eye exam, but especially for the student interns. Brian is planning to work with the optometrist at CSHS full time on this. I am pleased with his progress to date.

I look forward to being able to put forth more time on this after taking the board exam. I expect things to start to come together nicely and very quickly following the first of the year.
Entry #7: December 29, 2005

Our board exams complete, Brian and I are ready to push forward with the Diabetic Exam Manual. We have taken some time to replenish our spirits after the grueling task of our board exams, and enjoyed some time off from clinic to spend with family over the holidays. Both of us are now about to begin the third of three internships during our fourth year. I will be moving to the Washington D.C. area for the next four months to complete my internship at the National Naval Medical Center. This will prove to be a challenge in our communication with one another, Ms Sather, and Dr. Mika. However, at this point we both agree that we can complete the requirements via email, fax, and phone communication. This is our last physical meeting as a partnership, I will miss my friend and colleague as it is a pleasure working with him.

Our most recent advancements include further delegation of specific aspects of the manual. We will compile research and development material and make appropriate adjustments to our table of contents. I think that we are making good progress and it is nice to see what is likely our final format and table of contents in front of us. Again Ms. Sather is proving to be very easy to work with. We are sending her an update along with the revised table of contents, and timeline.
Our timeline is now as follows:

Student Diabetic Exam Manual

1. Contact established with Cherry Street Health Services Kathy Sather (August 29)

2. Approval of Diabetic Exam Manual and Cherry Street Health Services by supervisor Rene Mika. (September6).

3. Confirmation letter sent to contact Kathy Sather. Set up date to meet/phone conference to discuss further specifics, format, and outline of diabetic exam manual: September 16, 2005.


Armed with our specific assignments in hand we are ready to move forward further toward completion of the manual. I will likely take some time to get acclimated to my new home, city, and clinic. I am looking forward to experiencing Washington D.C.
Entry #8: January 30, 2006

Happy New Year.

I am officially living in Maryland now and working at the National Naval Hospital. Things have gotten off to a slow start here and I am questioning the quality of my internship. I hope to keep a good attitude throughout and continue my independent study.

Now that we are settled at our new internships Brian and I have been working hard toward completing the diabetic exam manual.

We have conversed several times on the phone, and also emailed each other. I find that our communication has not dwindled in anyway, and we are making adequate progress. Brian is working with the optometrists at his internship (a Veterans Hospital where he sees diabetic patients on a daily basis) on different formats of diabetic examination forms. I am pleased with what he has shown me thus far. I have created patient education handouts. I used patient education handouts from a Diabetes Month packet put together by the American Optometric Association. I was able to obtain this information through the AOA web site and requested it be sent via USPS to me. It has served as a valuable resource and my primary reference for the patient education handouts in our project. It is a challenge to keep medical and scientific jargon to a minimum. We are trying to keep things simple and minimal, yet get important points of information across. Also, many of the patients at CSHS only speak and understand Spanish. I have used a free online service to convert the materials to Spanish. I plan to have a translator review them before final publication. I took four years of Spanish in high school, and if you don’t use it you loose it applies to me! I am also in the process of completing quick reference materials
for the student interns. We want these materials to be very accessible and easy to use. I will be referencing several sources for statistics (primarily the American Optometric Association's clinical guidelines for diabetic eye exams tables and charts as they are already in an easily accessible format), and I am using my own clinical judgment and experience to help me format the material in an easy to use way.¹ Clinical blood work statistics were referenced from a very useful article in Review of Optometry, “Optometric Study Center: September 2005 The New Fundamentals of Diabetes. As the public health crisis of diabetes grows, optometrists must accept their necessary role on the diabetes health-care team.”, by A. Paul Chous, O.D.²

We should have a good rough draft to present to Kathy Sather and Dr. Mika with in a few days. I am excited to see things come together. I anticipate a positive response, but am willing to work toward refinements that need to be made.


Entry #9: February 28, 2006

The decision to use PDF formatting for the manual has proven a difficult one. Many of the files were transformed from the original layout when converted to PDF. This presented a big problem with the eye exam forms and the patient education forms. Much of my time has been spent on converting all of the files to PDF and compiling them into one main file. This has been very time consuming and inefficient, and ultimately has set us back by a couple of weeks. I am frustrated to say the least. I sent the file to Dr. Mika for review and it did email just fine. PDF files are great, but for this particular project I do not think it is going to work out. Although we are acting as optometric consultants in this project, knowing how to use the appropriate media is proving to be essential. I think I will stick to what we know and are efficient at using, Microsoft Word, for the final presentation. Dr. Mika has given us a positive review of the rough draft, and I hope to make the appropriate formatting refinements in the next week in order to have the final draft ready soon. Dr. Mika has also reminded us of our over all goals. We have gotten very concentrated on the product, the diabetic eye care manual for the past couple of months. She has reminded us that this is a service learning project and that we need to continue to concentrate equally on our research, reference, and reflection journals. Brian and I will both concentrate most of our efforts on editing our journals, and being sure that we have cited and referenced our work well.
Entry #10: March 14, 2006

I feel disconnected from our community agency at this time. We have not sufficiently communicated with Ms. Sather our contact with CSHS. If we had this experience to do over, I would communicate with her on a more regular basis. I know that we are completing the project as discussed with Ms. Sather, and I am still confident that she will be pleased with the final outcome. We have attempted to stick to the most recent timeline goals. However, we are about 1 month behind our last update to Ms. Sather. Brian and I have discussed these issues in several emails and phone conversations the past couple of days. We are both ready to be done with the project as part of our optometric education requirements. We are in agreement that we will focus our energy for the next week on completing the project to the agreed upon specifications and requirements that we set with our faculty advisor Dr. Mika. If I were to do things again, I would reference our initial goals and our abstract on a more regular basis to stay focused on the central issue in the project, service learning.

Regarding the diabetic eye care manual, I have converted the bulk of it into a Microsoft Word file. It is much more organized and flows efficiently for the student intern's use. Had I not attempted to use the PDF format, I believe we would be a month ahead of where we are. I have learned through this experience not to spend time on something that may not work efficiently even though the final outcome potentially has a more appealing appearance. Brian and I have discussed the format of the manual and how we will present it to CSHS. We will use a three ring binder and have the files printed so that a hard copy is presentable. A CD with the main files will be included in the back of the
binder for future printings as needed. Findings will be presented to our supervising faculty member Dr. Mika, to the director of the optometric clinic at CSHS, and to the contact at CSHS for diabetic care Ms. Sather in the form of a "Diabetic Eye Care Manual for Student Interns". The manual consists of Microsoft Word and Adobe PDF files. It is composed in an organized outline for ease of use.

We have also decided on the final presentation format for our service learning portfolio. Again we will use a three ring binder and have all files printed in hard copy for presentation. We will include a CD again with the files on it for future reference as needed. We will further edit the order and presentation of each aspect of the project in the portfolio this week. Included will be our initial abstract, timelines, phone script, reference, research, and reflection journals, and the diabetic eye care manual.
**Final Journal and Reflections**

This project directly ties in with our requirements in obtaining a doctorate of optometry degree in that we are researching a condition, Diabetic Eye Disease, which we will be treating and managing on a daily basis as optometrists. In addition to obtaining an in-depth review of diabetic eye disease, this project provides us with extensive experience in professional communication with multiple aspects of healthcare, including optometry. We as medical health care providers need experience interacting with all aspects of the health care arena. A project such as this provides opportunity to interact with multiple individuals and organizations to gain multiple experiences.

My service contributions could be improved with better communication with my supervising faculty as well as the community agency, CSHS. In review, I might choose a project or site that required more interaction. Our project became very independent, and did not require much physical interaction with the agency.

This experience has given me confidence that I am an optometric specialist, and that I can contribute not only through eye examinations, but also through research, community involvement, and writing to the health care community. Health care is a 'team sport'. All aspects of the health care arena need to better communicate with each other to provide the best care. We have contributed a product that will allow student interns to better provide diabetic patients with exceptional eye care. The diabetic eye care manual will act as a guide for student interns to better communicate with patients, other eye care providers, and other health care providers.
This project has challenged me in many ways. My ability to professionally communicate has been put to the test. Each individual contributing to this program was in a different city or state throughout, and email, phone, and fax communication was relied upon heavily. Nothing beats personal contact. At times I felt disconnected from the project, my partner, and especially my supervising faculty and community agency. Had I communicated better I feel the project would have been completed more efficiently. That being said I am pleased with the overall outcome and experience. At this time we have no evidence to indicate one way or another that our project is making any impact. However, because we produced a manual specific to student interns such as ourselves, I am confident that it will be used often as a reference resource if nothing else. The most valuable lesson I have learned through this program is to not be afraid of community involvement. I have been reluctant to take a role in organizations, community agencies, and volunteer projects in the past. This project has provided me with the opportunity to realize the benefits of playing an active role in my community health care arena.
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     Spanish Version
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       (Mental Health, Nutritionist, Diabetic Education Specialist, Low Vision
       Clinic, Commission for the Blind).

2. Diabetic Eye Examination Forms and Codes
   • Diabetic Exam Form
   • Extended Ophthalmoscopy Form
   • Supplemental Test Form
   • Diabetic ICD/CPT codes
   • Extended Ophthalmoscopy instruction

3. Reference and Referral Sources
   • Patient reference and referral database.
   • Optometric references and referral sources for student interns

4. Diabetic Eye Exam Reference Material for Student Interns
   • Diabetic Eye Care Quick facts and Definitions
   • Blood Work Statistics

5. Standards of Care
   • Supplemental Reference -2005 Diabetic Fact Sheet
   • American Optometric Association
   • American Diabetes Association
Patient Education

• Two sided patient education hand out
  English Version
  Spanish Version

  o Side One: Definitions: Diabetes, Diabetic Eye Disease.

  o Side two: Referral sources for diabetic patients in the Grand Rapids area. (Mental Health, Nutritionist, Diabetic Education Specialist, Low Vision Clinic, Commission for the Blind).
What is diabetes?

Diabetes is a group of diseases.

Diabetes means you have high blood sugar, or blood glucose. Blood sugar elevates due to a defect in insulin production, insulin action or both. Insulin is a chemical produced in your body’s pancreas. It is necessary for your cells to receive energy in the form of blood sugar (glucose) from the food you eat.

Types of diabetes:

Type 1 (Juvenile-onset diabetes)
Effects children and young adults—need a dose of insulin to maintain blood sugar.

Type 2 (Adult-onset diabetes)
The cells in the body cannot use insulin properly. Associated with older age, obesity, family history, physical inactivity and race/ethnicity.

Are you at risk for diabetes?

Type 2 diabetes is on the rise among younger people (under 20) among Native American, African American and Hispanic populations.

How do you know if diabetes is affecting your eyes?

You may not have any symptoms so it is important to receive eye care regularly. Things that may indicate diabetic eye disease are blurred vision, floaters (shadows in the vision that move) and flashing lights.

What do eye doctors see inside your eyes?

Diabetes is the leading cause of new cases of blindness among adults 20-74 years old.

Optometrists evaluate the health of blood vessels inside the eye. Diabetes can cause diabetic retinopathy. This means that the blood vessels inside the eye are damaged and may be leaking blood and other fluids. The retina, the tissue that provides you with vision, inside the eye may not get the nutrients needed to stay healthy. New, weak, blood vessels form and leak more blood and fluid. Swelling of the macula, the area of the eye that gives detail vision, can lead to vision loss.

Normal Eye

![Normal Eye](image1)

Human retina

*Fig. 1. Human retina as seen through an opthalmoscope.*

Diabetic Eye Disease

![Diabetic Eye Disease](image2)
**Diabetes**

What can you do to prevent diabetic eye disease and vision loss?

1. Keep blood sugar levels under tight control.
2. Get a Hemoglobin A1C test every 3 months from your primary care physician.
3. Control high blood pressure.
4. Quit smoking.
5. Maintain a healthy diet and exercise regularly.
6. Obtain a comprehensive dilated eye exam on a yearly basis. Eye drops are used to make the pupils larger, and allow for a better view of blood vessels, nerves, and retina inside your eye.
7. See your optometrist if:
   - Your vision becomes blurry
   - You feel eye pressure
   - You see spots or floaters.
   - Straight lines do not look straight.
   - Your side vision is reduced.
   - Your eyes stay red.
   - You see double.
   - You have trouble seeing books or signs.

Who can you talk to for help with diabetes?

**TENDON:** Sandra A. Parker, RD, CDE
parkersa@trinity-health.org (800) 472-3175
www.diabetesinmichigan.org/tendon

**Diabetic Education Specialist:**
- Kent County Metropolitan Hospital
  Metro Health – Breton Plaza
  1925 Breton Rd., SE
  Grand Rapids, MI 49506 (616-252-4787)

**Nutritionist:**
Preventive Health Inc. (616) 336-9944

**Commission for the blind:**
1-800-292-4200

**Mental Health Care:**
- Adult Support Group Spectrum Health, Marywood
  2023 E. Fulton
  Grand Rapids, MI 49506 (616) 391-9199
- Catherine’s Care Center: Diabetes Support Group
  224 Carrier NE
  Grand Rapids, MI 49505 (616) 784-7629

- Juvenile Diabetes Foundation
  4362 Cascade Road SE, Suite 116
  Grand Rapids, MI 49546
  (616) 957-1838

**Low Vision Specialist:**
Association for the Blind and Visually Impaired 1-800-466-8084

**Normal Vision:**

**Vision with Diabetic Retinopathy:**
¿Cuál es diabetes?
La diabetes es un grupo de enfermedades. Diabete significa que usted tiene la azucar en la sangre elevada. La azucar en la sangre se eleva debido a un defecto en la produccion de insulina, la accion de esta, o ambas. Insulina es un producto quimico producido en el Pancreas de su cuerpo. Es necesario que su cuerpo reciba energia en forma de glucosa (azucar en la sangre) de los alimentos que usted come.

Tipos de diabetes

Tipo 1 (diabetes [comienzos] Juvenil)
Afecta a los niños y adoscentes – es necesaria una dosis de insulina para mantener el nivel de azucar en la sangre.

Tipo 2 (Diabetes [comienzos] Adulto)
(Las celulas del cuerpo no pueden usar la insulina apropiadamente. Es asociada a edad avanzada, obesidad, a antecedentes familiares, inactividad

Corre usted riesgos de diabetes?
Diabetes tipo 2 esta subiendo en numeros entre los jovenes (menores de 20), entre Americanos nativos y la poblacion Afro-americana e hispana.

Como usted sabe si la diabetes le esta afectando sus ojos?
Puede ser que no tenga sintomas, por so es importante recibir cuidados para los ojos regularmente. Indicios de ojos diabeticos son: vision borrosa, flotadores (pequeñas sombras en la vision que se mueven) y destellos de luz.

Que ven los doctores dentro del ojo?
La diabetes es la causa principal de nuevos casos de ceguera entre adultos de 20 a 74 años de edad. Los oculistas evaluan la salud de los vasos sanguineos. La diabete puede causar retinopatia diabetica. Esto significa que los vasos sanguineos dentro del ojo estan dañado y puede escaparse sangre y otros liquidos. La retina, el tejido fino que le prove la vision, no consigue la nutricion necesaria para mantenerse saludable. Nuevos y debiles vasos sanguineos se forman dejando escapar mas sangre y liquido. La hinchazon de la Macula (el area del ojo de vision mas detallada) puede conducir a la perdida completa de la vision.
Diabetes

¿Qué puede usted hacer para prevenir enfermedad de ojo y pérdida diabéticas de la visión?

1. Niveles de azúcar de sangre de la subsistencia bajo control apretado.
2. Consiga a prueba de la hemoglobina A1C cada 3 meses de usted médico primario del cuidado.
3. Controle la tensión arterial alta.
4. Pare el fumar.
5. Mantenga una dieta y un ejercicio sanos regularmente.
6. Obtenga un examen dilatado comprensivo del ojo sobre una base anual. Un examen dilatado del ojo significa que el optometra pone gotas del ojo en su ojo para hacer la pupila grande. Esto permite que el optometra mejore la visión los vasos sanguíneos, los nervios, y la retina dentro de su ojo.

Vea a su optometra si: Su visión llega a ser blurry, usted siente la presión en sus ojos. Usted ve puntos o los flotadores. Las líneas rectas no miran derecho. Se reduce su visión lateral. Sus ojos permanecen rojos. Usted ve el doble. Usted tiene apuro que ve los libros o las muestras.

¿Quién puede usted hablar con para la ayuda con diabetes?

TENDON: Sandra A. Parker, RD, CDE parkersa@trinity-health.org (800) 472-3175
www.diabetesinmichigan.org/tendon

Especialista Diabético De la Educación:
- Kent County Metropolitan Hospital
  Metro Health – Breton Plaza 1925
  Breton Rd., SE Grand Rapids, MI 49506 (616-252-4787)

Nutricionista:
Preventive Health Inc (616) 336-9944

Comisión para la persiana:
1-800-292-4200

Cuidado médico Mental:
- Adult Support Group Spectrum
  Health, Marywood
  2023 E. Fulton Grand Rapids, MI 49506 (616) 391-9199
- Catherine’s Care Center: Diabetes Support Group 224 Carrier NE
  Grand Rapids, MI 49505 (616) 784-7629
- Juvenile Diabetes Foundation 4362
  Cascade Road SE, Suite 116
  Grand Rapids, MI 49546 (616) 957-1838

Especialista Bajo De la Visión:
Association for the Blind and Visually Impaired 1-800-466-8084

Visión normal:

Visión con Retinopathy diabético:
2.

Diabetic Eye Examination Forms and Codes

- Diabetic Exam Form
- Extended Ophthalmoscopy Form and Instructions
- Supplemental Test Form
- Diabetic ICD/CPT codes
- Extended Ophthalmoscopy Instruction
**Diabetic Eye Exam Form**

**History:** NIDDM /IDDM ______ years  HbA1c __________ x ______ days/months
Blood Sugar- none, qd, bid, tid, qid, q______  FamHx
PCP name/address
Meds (Actos Amaryl Aprida Avandia Avandamet Byetta Diabinese Diet Fortamet Glucophage Glucotrol Glucovance Humalog Humulin Insulin Lantus Micronase Novolin Novolog Orinase Prandin Precose Starlix Symlin)

**MedHx:** ___________________________________
**OcHx:** ___________________________________
**OcMeds:**

**CC:** __________________________  **HPI:**
VA: 6m  PH  40cm  EOM: FROM Other
OD \ \ \ \  CF: FTFC OD/OS Other
OS \ \ \ \  Pupils: ERRL APD +/- Other
OU \ \ \ \  Verg/Accomm: _______________________
cc/sc cc/sc cc/sc

**Habitual Rx:**

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**Retinoscopy:**

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**Gonioscopy:**

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<tr>
<td>Iris</td>
<td>clear OD/OS/OU NVI</td>
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**Diagnostic Drops:**
Benoxinate HCl/Fluorescein 0.4%/0.25%
Cyclopentolate  0.5%, 1.0%, 2.0%
Proparacaine/Tetracaine 0.5%
Tropicamide 0.5%, 1.0%
Phenylepherine  2.5%, 10%
Other _______

IOP: applanation/NCT  OD____ OS____  Time ________
Examination: SUPPLEMENTARY

Patient Name:
Patient Date:

Extended Ophthalmoscopy (92225, 92226):
☐ 78D Lens ☐ 90D Lens ☐ 20D Lens ☐ 2.2D Lens ☐ 3-Mirror ☐ Scleral depression

OD
Interpretation and Report

OS
Interpretation and Report

Signature: ____________________________ Date: / / 
Examination: SUPPLEMENTARY TESTS

Gonioscopy (92020):
Interpretation and Report
OD:
OS:
Visual Fields (92081, 92082, 92083):
Interpretation and Report
OD:
OS:
Patient Date
Fundus Photography (92250): □ 35mm □ 35mm/Stereo □ Polaroid □ Digital
Interpretation and Report
OD:
OS:
External Ocular Photography (92285): □ 35mm □ 35mm/Stereo □ Polaroid □ Digital
Interpretation and Report
OD:
OS:
Scanning Computerized Ophthalmic Diagnostic Imaging (SCODI) (92135):
□ RTA □ HRT □ OCT □ GDX
Interpretation and Report
OD:
OS:
Pachymetry (0025T):
Interpretation and Report
OD:
OS:

Signature: ____________________________ ____________________________ Date: / /
ICD-9 codes
(Effective October 01, 2005).

**New for 2006 diabetic retinopathy codes**

362.01 Diabetic Retinopathy NOS (used to be Nonproliferative retinopathy (background))
362.02 Proliferative Diabetic Retinopathy
362.03 Nonproliferative Diabetic Retinopathy NOS
362.04 Mild Nonproliferative Diabetic Retinopathy
362.05 Moderate Nonproliferative Diabetic Retinopathy
362.06 Severe Nonproliferative Diabetic Retinopathy
362.07 Diabetic Macular Edema

251.8 is no longer Steroid Induced Diabetes

**Diabetes diagnosis codes**

250.00 DM II ctrld w/o complications
250.01 DM I ctrld w/o complications
250.02 DM II unctrl w/o complications
250.03 DM I unctrl w/o complications
250.50 DM II ctrld w/ complications
250.51 DM I ctrld w/ complications
250.52 DM II unctrl w/ complications
250.53 DM I unctrl w/ complications
251.6 ___ DM w/ neurologic manifestations

**Ophthalmic Complications**

367.81 Transient Refractive change
362.02 Proliferative Retinopathy
362.04 Mild NPDR
362.05 Moderate NPDR
362.06 Severe NPDR
362.07 Diabetic Macular Edema
364.42 Rubeosis Iridis
366.41 Diabetic Cataract
365.44 Glaucoma associated with
378.51 Paralysis CN-III, partial
378.52 Paralysis CN-III, total
378.54 Paralysis CN-VI
378.53 Paralysis CN-IV

648. ___ Gestational -.83 ante -.84 post-partum DM
648. ___ Complicated Pregnancy -.03 ante-.04 post-
Extended Ophthalmoscopy

Indications and Limitations of Coverage and/or Medical Necessity:
The slit lamp examination, including Hruby lens, hand held lens and contact lens examinations of macula, indirect, as well as, direct ophthalmoscopy for fundus examination are part of the Evaluation and Management service. These services are not reimbursed separately and should not be billed in addition to the E & M service.

Ophthalmoscopy extended (92225) and subsequent (92226) are considered to be reasonable and necessary services for evaluation of tumors of the retina and choroid (the tumor may be too peripheral for an accurate photograph), retinal tears, detachments, hemorrhages, exudative detachments and retinal defects without detachment as well as other ocular defects when the patient's medical record meets the documentation requirements set forth in this policy. These codes are reserved for the meticulous evaluation of the eye and detailed documentation of a severe ophthalmologic problem when photography is not adequate or appropriate.

Frequency for providing these services depends upon the medical necessity in each patient and this, of course, relates to the diagnosis. A serious retinal condition must exist, or be suspected, based on routine ophthalmoscopy which requires further detailed study.

In all instances extended ophthalmoscopy must be medically necessary. It must add information not available from the standard evaluation services and/or information that will demonstrably affect the treatment plan. It is not medically necessary, for example, to confirm information already available by other means.

The following major criteria must be met:
• A serious retinal condition is present based on ophthalmoscopy, which requires further study, such as the detailed study of pre-retinal membrane, a retinal tear detachment, a suspected retinal tear with sudden onset of symptomatic floaters or vitreous hemorrhage.
• Another diagnostic technique in addition to routine direct and indirect ophthalmoscopy is necessary and documented; for example 360° scleral depressions, fundus contact lens or 90-diopter lens.
Coding Information:

Bill Type Code: 999x

Revenue Codes: 99999

CPT/HCPCS Codes:
92225         Special eye exam, initial
92226         Special eye exam, subsequent

Does the "CPT 30% Coding Rule" Apply? Yes

ICD-9 Codes that Support Medical Necessity:
The use of these ICD-9 codes does not abrogate the requirement that medical necessity be documented in the patient's record.
190.5         Malignant neoplasm of the retina
190.6         Malignant neoplasm of the choroid
250.50-250.53 Diabetes with ophthalmic manifestations (to be used only when billing diagnosis codes 362.01, 362.02, or 365.44) (01/26/2004)
360.00-360.04 Purulent endophthalmitis
360.11        Sympathetic uveitis
360.12        Panuveitis
360.13        Parasitic endophthalmitis NOS
360.19        Phacoanaphylactic endophthalmitis
360.21        Progressive high (degenerative) myopia
360.23        Siderosis
360.24        Chalcosis
360.30        Hypotony of eye, unspecified
360.50        Retained (old) intraocular foreign body, magnetic, unspecified
360.52        Retained (old) intraocular foreign body, magnetic, in iris or ciliary body
360.54        Retained (old) intraocular foreign body, magnetic, in vitreous
360.60        Retained (old) intraocular foreign body, nonmagnetic, unspecified
360.64        Retained (old) intraocular foreign body, nonmagnetic, in vitreous
360.65        Retained (old) intraocular foreign body, nonmagnetic, in posterior wall
361.00-361.07 Retinal detachment with retinal defect
361.10-361.19 Retinoschisis and retinal cysts
361.2         Serous retinal detachment
361.30-361.33 Retinal defects without detachment
361.81        Traction detachment of retina
362.01-362.02 Diabetic retinopathy
362.10-362.18 Other background retinopathy and retinal vascular changes
362.21-362.29 Other proliferative retinopathy
362.30-362.37 Retinal vascular occlusion
Separation of retinal layers
Degeneration of macula and posterior pole
Peripheral retinal degeneration
Hereditary retinal dystrophies
Retinal hemorrhage
Retinal exudates and deposits
Retinal edema
Retinal ischemia
Focal chorioretinitis and focal retinochoroiditis
Disseminated chorioretinitis and disseminated retinochoroiditis
Other and unspecified forms of chorioretinitis /retinochoroiditis
Choroidal degenerations
Hereditary choroidal dystrophies
Choroidal hemorrhage and rupture
Choroidal detachment
Acute and subacute iridocyclitis, unspecified
Vogt-Koyanagi syndrome
Borderline glaucoma (glaucoma suspect)
Open-angle glaucoma
Primary angle-closure glaucoma
Corticosteroid-induced glaucoma
Glaucoma associated with congenital anomalies, dystrophies, and systemic syndromes
Glaucoma associated with disorders of the lens
Glaucoma associated with other ocular disorders
Hypersecretion glaucoma
Glaucoma with increased episcleral venous pressure
Aqueous misdirection (10/01/2002)
Sudden visual loss
Transient visual loss
Retained (old) foreign body following penetrating wound of orbit
Posterior scleritis
Disorders of vitreous body
Open wound of eyeball
Contusion of eye and adnexa

Diagnoses that Support Medical Necessity: N/A

ICD-9 Codes that DO NOT Support Medical Necessity:
Any diagnosis code that is not listed in the "ICD-9 Codes that Support Medical Necessity" section of this policy.

General Information:

Documentation Requirements:
- Although an Evaluation and Management code is allowable on the same date of service as 92225 or 92226, the medical record must reflect documentation of medical necessity for
the billing of each code. Without such evidence, the claim will be denied as not being medically necessary

• The technique and findings of the extended ophthalmoscopy must be documented, including a three-dimensional representation or an extended colored retinal drawing. Sketches and templates are not acceptable. The documentation of follow-up services (92226) must include an assessment of the change from previous examinations.

• Documentation supporting the medical necessity of this item, such as ICD-9 codes, must be submitted with each claim. Claims submitted without such evidence will be denied as not being medically necessary.
Reference and Referral Sources

- Patient reference and referral database.
- Optometric referral sources for student interns
Help for Diabetics in Grand Rapids, MI

Organizations
1. Greater Michigan American Dietetic Association (616)458-9341
2. TENDON Diabetes Outreach Network (800)472-3175
3. Kent County Health Department (616)336-3030
4. Kent County Family Independence Agency (616)247-6000

Aging
1. State of Michigan Aging Services Program-Kent County (616)456-5664
2. First Call for Help (800)887-1107
3. Gerontology Network (616)456-6135
4. Health Improvement for Seniors (616)336-3037
5. Safe Call Home Monitoring (616)365-8618
6. Salvation Army (616)452-3133
7. Senior Neighbors Centers (616)459-6019

Dental Care
1. Kent County Health Department (616)336-3030
2. Dr. Richard Barecki-River Valley Dental (616)363-5677
3. Baxter Dental Clinic (616)456-5310
4. Cherry Street Services (616)235-7289
5. Clinica Santa Maria of St. Mary’s Health Clinic (616)913-8400
6. Dent-U-Center (616)534-5602
7. Grand Rapids Community Dental Clinic (616)234-4237

Diabetes Education
1. Metropolitan Hospital (616)252-4787
2. Saint Mary’s Mercy Medical Center (616)752-6079
3. Spectrum Health Diabetes Services (616)391-9199

Nutrition
1. American Diatetic Association (800)877-1600
2. Preventive Health Inc. (616)336-9944

Multi Cultural/Ethnic Resources
1. Hispanic Center of West Michigan (616)742-0200
2. Latin American Services (616)336-4000
3. Native American Community Services (616)458-3601
4. Sheldon Complex (616)336-4000

Foot Care
1. Spectrum Health “For Seniors Only” Foot Care Program (616)744-7599
Financial/Basic Needs Assistance
1. Access (616)774-2175
2. Baxter Community Center (616)456-8593
3. Byron Community Ministry (616)878-6000
4. First Call for Help (800)887-1107
5. Native American Community Services (877)482-3601
6. Salvation Army (616)452-3133
7. Second Mile House at Cascade Christian Church (616)949-1360
8. Veterans Affairs-Kent County (616)365-9575

Emergency Drug Program for Seniors
1. Latin American Services (616)336-4017
2. Senior Neighbors, Inc. (616)459-6019
3. United Methodist Community House (616)241-1645

Rehabilitation/Mobility/Amputations
1. Arthritis Foundation (616)949-9938
2. Center for Independent Living (616)949-1100
3. Creative Prosthetics and Orthotics, Inc. (616)459-1122
4. Easter Seal Society of Michigan, Inc. (800)292-2729
5. Equipment Connection/Kenney Foundation (800)237-3422
6. First Call for Help (800)887-1107
7. John Geers, amputee (emotional support) (616)457-0352
8. Michigan Department of Career Development/ Michigan Rehabilitation Services (616)242-6450

Support Groups
1. American Diabetes Association (800)232-3472
2. Adult Support Group (616)391-9199
3. Catherine’s Care Center (616)784-7629
4. Juvenile Diabetes Foundation (616)957-1838

Transportation
1. American Red Cross (616)456-8661
2. Fish for My People (616)774-2045
3. Go Bus (616)245-3555

Visually Impaired
1. Association for the Blind and Visually Impaired (800)466-8084
2. Baxter Community Center-Eye Clinic (616)456-5310
3. Metropolitan Hospital Eye Clinic Breton Health Center (616)252-4330
4. Michigan Commission for the Blind (800)292-4200
5. The Sight Seer (616)235-0020
6. Welcome Homes for the Visually Impaired Community (616)363-9088
Referral Sources for student interns

**Vitreo-Retinal Associates**
3350 Eagle Park Dr NE # 105, Grand Rapids, MI
(616) 285-1200

**Grand Rapids Ophthalmology**
Michigan Street Center
426 Michigan, N.E.
Grand Rapids, MI 49503
(South off Michigan Street)
616-949-2600
4.

Diabetic Eye Exam Reference Material for Student Interns

- Diabetic Eye Care Quick facts and Definitions
- Blood Work Statistics
Glossary

**Diabetes mellitus (DM)** A group of metabolic disorders characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both.

- **Type 1 diabetes** The result of cell-mediated autoimmune destruction of the beta cells of the pancreas, formerly referred to as insulin dependent diabetes mellitus (IDDM).

- **Type 2 diabetes** A disease in which individuals can produce insulin but have cellular resistance to it, formerly referred to as non-insulin dependent diabetes mellitus (NIDDM)

**Diabetic cataract** A rapidly forming, sometimes reversible, bilateral cataract associated with diabetes mellitus.

**Diabetic papillopathy** A noninflammatory edema of the optic nerve head associated with diabetes mellitus.

**High-risk proliferative diabetic retinopathy** New vessels on or within 1 disc diameter of the optic nerve head greater than approximately 1/4 to 1/3 of the disc, or new vessels on or within 1 disc diameter of the optic nerve head less than 1/4 to 1/3 the disc area when accompanied by vitreous and/or preretinal hemorrhage, or new vessels elsewhere in the retina greater than 1/2 the size of the disc area.

**Intraretinal hemorrhage** A radially striated hemorrhage in the inner layers of the retina, especially in the nerve fiber layer (flame-shaped hemorrhage).

**Intraretinal microvascular abnormality (IRMA)** An abnormality that represents either new vessel growth within the retina or pre-existing vessels with endothelial cell proliferation.

**Macular edema (ME)** Collection of intraretinal fluid in the macular portion of the retina, with or without lipid exudates, and with or without cystoid changes.
Clinically significant macular edema (CSME) The case when there is retinal thickening at or within 500 microns of the center of the macular and/or hard exudates within 500 microns of the center of the macula associated with retinal thickening of the adjacent area of the retina and/or a zone or zones of retinal thickening 1 disc area in size, any part of which is within 1 disc diameter of the center of the macula.

Microaneurysm (Ma) As to the eye, a focal retinal capillary dilation.

Neovascularization Growth of abnormal new blood vessels.

Papilledema Noninflammatory edema of the optic nerve head from various causes, such as increased intracranial pressure, orbital tumor, or blood dyscrasias.

Proliferative diabetic retinopathy (PDR) A type of retinopathy associated with diabetes mellitus, characterized by proliferation of connective tissue and the formation of new blood vessels in the retina, and by hemorrhages into the vitreous.

Retinal hypoxia A deficiency of oxygen supply to the retinal tissue.

Rubeosis iridis Noninflammatory neovascularization of the iris occurring in diabetes mellitus, characterized by numerous, small intertwining blood vessels which anastomose near the sphincter region to give the appearance of a reddish ring near the border of the pupil. The vessels may extend from the root of the iris to the filtration angle to cause peripheral vascular synechiae and secondary glaucoma.

Venous beading (VB) A fragmented appearance of the bloodstream in the retinal veins subsequent to retinal artery occlusion.
Sources:


Figure 1
Optometric Management of the Patient
With Undiagnosed Diabetes: A Brief Flowchart

Patient assessment

Suspect undiagnosed diabetes

No ocular manifestations

Request fasting blood glucose or refer

Fasting blood glucose <110 mg/dl

Schedule followup eye examination

Fasting blood glucose 110-126 mg/dl

Retest fasting blood glucose

Refer to physician for evaluation

Fasting blood glucose ≥126 mg/dl

Non-proliferative retinopathy

Manage or refer per Guideline

Non-retinal abnormality

Proliferative retinopathy

Refer to physician for treatment of diabetes

Schedule followup eye examination
Figure 2
Optometric Management of the Patient
With Diagnosed Diabetes Mellitus: A Brief Flowchart

Patient assessment

Patient known to have

No ocular manifestations

Schedule follow-up eye examination

Counsel patient regarding risk for ocular manifestations

Communicate with physician treating parent's diabetes

No retinal manifestations

Manage or refer per Guideline

Non-proliferative retinopathy

Communicate with physician treating patient's diabetes

Proliferative retinopathy

Diabetic macular edema