Public Health Approach to Vision Health and Diabetes

Surveillance, Education, Empowerment

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Silvia Sörensen, PhD
Flaum Eye Institute, Department of Ophthalmology

December 9, 2014
Community Advisory Council
University of Rochester School of Medicine and Dentistry
40 million in US: Vision Threatening Eye Problems
4 Million in US: Poor Vision = $130 billion annually

Curable Causes of Vision Loss

Need for Glasses

1/3 need glasses for distance & almost everyone needs glasses for reading after 50 yrs.

Cataract

Most Common Surgery in the US. By 2020, Cataract will increase from 20.5 million to 30.1 million cases.

Need for Glasses

By 2050:

Glaucoma Triples to 7.3 million

Macular Degeneration
Most Blindness in 65+ yrs.
Doubles to 17.8 million

Diabetic Retinopathy
Most Blindness in Working Age (20-74 yrs.)
Triples to 16 million

Treatable Causes of Vision Loss

Glaucoma

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Vision Loss Risk & Prevention is Known

Risk for Glaucoma
- African American, 40 yrs. +,
- Family History, Eye Injury

Prevention of Vision Loss
- Identify early with dilated
  eye exam by eye doctor and
  treat ‘high’ eye pressure

Risk for Age-Related
Macular Degeneration
- Northern European, 55 yrs. +,
- Family History, Smoker, Low
  intake of certain vegetables

Prevention of Vision Loss
- No Smoking, eating healthy
  for the eyes, regular eye
  exams after age 50.

Risk for Diabetic Retinopathy
- Diabetes with High Blood
  Sugar, Blood Pressure, and
  Cholesterol; More years
  with Diabetes; Smoking;
  Insulin use

Prevention of Vision Loss
- Control Blood Sugar, Blood
  Pressure, and Cholesterol;
- Annual dilated eye exams
  & treating vision threatening
disease saves vision in 95%
of people

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Diabetes is the only Risk Factor Tracked Nationally

Figure 3. Percentage of U.S. Adults Aged ≥20 Years with Diagnosed Diabetes, by County, 2008

Rochester, NY

Monroe County (2012): 12%
City of Rochester (2012): 19%

Data were age adjusted. See Technical Notes for more details.

Monroe County Adult Health Survey, 2012
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Diabetes Pandemic, 50% Inc. by 2030

Diabetes Growth Projections 2012-2030

Diabetes worldwide drug market size $35 billion Expected to grow to $58 billion by 2018


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Diabetes Leads to Vascular Disease

Vision Loss, due to Diabetic Retinopathy (DR) is The Most Feared Complication Among Patients.
State of Annual Dilated Eye Exams in Inner City Rochester

Clinton Family Health Center
Neighborhood Clinic
2013 Diabetic Patient Annual Eye Exam Rate: 38%

RGH Hospital Clinics (2)
2012 Diabetic Patient Annual Eye Exam Rate: 10-20%

Reported US Annual Eye Exam Rate for Diabetic Patients:
50-60% of the insured and 25% of the un- & underinsured
Teleophthalmology Overcomes Barriers for Annual Retinopathy Screening

Barriers to Detecting Retinopathy

- **PCP** not equipped to fully examine undilated eye

Potential Solution – Remote Imaging (Teleophthalmology)

- **Patient** Fear of Drops/Dilation
- **DR Asymptomatic Disease**
- **Additional Cost of Exam and Time**

- **US Eye Doctor** (53K) Supply limited & not well distributed (29.1 M Diabetics – 2012)
- **Lack of Documentation Reaching PCP**

- **FDA Approved Retinal Camera in Primary Care Office**
  Operated by Clinic Staff
  **No Dilation** (Non Mydriatic) Required

- **Eye Specialists at Central Reading Center**
  Evaluate Images
  Report Findings
  - Images Used to Educate Patients
  - **Screening Meets HEDIS Reporting**

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Tele-I-CARE:

Institutional Review Board approved (2012-2015) telemedicine pilot to increase the annual surveillance rate for diabetic retinopathy in Rochester.

- Telemedicine is the use of medical information exchanged from one site to another via technology to help improve a patient’s health status.

1. Build infrastructure & implement surveillance
2. Increase annual retinal surveillance rate to 80% at 3 FQHCs in inner city Rochester
3. Link eye care and primary care providers
   (EYE CARE IS PRIMARY CARE)
Tele-I-CARE: Regional Collaboration

Established Need & Receptive Clinical Atmosphere

Expertise & Infrastructure in Diabetic Eye care & Population Eye Health Management

Biomedical Photographic Communications Program
Only US Bachelor’s Degree Program teaching Ophthalmic Photography

Image Quality & Technology Development

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Tele-I-CARE: Store and Forward Teleophthalmology Process, Closes the Loop

A. Patient  
1. Intake  
2. Vision Assessment  
3. Photos

B. Primary Care Clinic

C. Flaum Eye Institute Reading Center

D. Image reader (MD, OD)

E. Report Generation

Patient Tracking Surveillance System to ensure that Follow-up Appointments are Made & Kept

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Retinal Ophthalmic Camera
Reading Center Image Management

NORDIC - (L)IIHTT Study

SRS Study

ITED Study

**TELE I CARE Study**

TED01RV Study
## Patient Status

<table>
<thead>
<tr>
<th>Date of Service</th>
<th>Site Location</th>
<th>Patient Name</th>
<th>Medical Record #</th>
<th>Date of Birth</th>
<th>Primary Care Provider</th>
<th>Eye Care Provider</th>
<th>Current Status</th>
<th>Pathology</th>
<th>Recommended Follow-up By</th>
<th>Eye Appt Made</th>
<th>Eye Appt Kept</th>
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<tbody>
<tr>
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<td>R: None-DME, L: None-DME</td>
<td>4 Months: 03/12/2015</td>
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<td>10/09/2014</td>
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<td>R: Qui PDR-DME, L: Mild NPDR-DME</td>
<td>6 Months: 05/11/2015</td>
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<td>10/01/2014</td>
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<td>CFH</td>
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<td>4 Months: 03/12/2015</td>
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<tr>
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<td>6 Months: 05/10/2015</td>
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<td>05/14/2015</td>
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</tbody>
</table>
Report on Eye Surveillance in PCP Office meets HEDIS Metric for Annual Eye Exam

Tele-I-Care Diabetic Retinopathy Surveillance Project

Patient Name: 
Date of Birth: 
Medical Record: 

Right Eye
No Apparent Diabetic Retinopathy
No Apparent Diabetic Macular Edema
Image Quality: Excellent

Left Eye
No Apparent Diabetic Retinopathy
No Apparent Diabetic Macular Edema
Image Quality: Excellent

Other Findings:
Follow up with ophthalmologist for complete dilated eye exam within 4m. Continue to work with primary care team for good blood glucose, pressure, and lipid control. Copy of recommendation sent to your Primary Care Provider. Copy of recommendation sent to your eye care provider and to Dr. Gwen Stems, MD, Department Chief, RGH Ophthalmology.

Reviewed By:
Rajeev Ramchandran
Flaum Eye Institute, URMC
Box 656, 601 Elmwood Ave
Rochester, NY 14642
Date: 11/12/2014

Additional Images

This report documents a limited screening for diabetic retinopathy performed with a retinal camera. All patients undergoing such screening are advised to see an eye care provider for a full eye exam. Tele-I-Care Project is supported by a grant from the Greater Rochester Health Foundation.
Increased Retinopathy Surveillance

Clinton Family Health 2013: 38%
- No Documented Eye Exam 62%
- Annual Eye Exam 38%

Clinton Family Health 2014
- 79% of 828 Total Patients Screened/Examined
- Annual Eye Exam 53%
- Tele-ICARE Screening 26%
- No Documented Eye Exam 21%

Easier Data Access at Neighborhood Clinic

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Screened Population: 1 Year

420 patients, 51% Female, 94% Insured

Age Distribution, Mean: 56, SD: 12 yrs.

Race*

Hispanic Ethnicity*

Primary Language*

*<0.05

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Project has led to Center for Community Healthy Supported Education Research

1. Develop Digital Diabetes Education that:
   - Incorporates Personal Retinal Photos
   - Presents Risk for Vision Loss
   - Reviews Diabetes Self Management and Monitoring

2. Small Randomized Trial to test feasibility and response to an education module using and not using personal eye photos and setting individualized goals for diet, exercise and monitoring blood sugar.

3. Goal is to increase motivation and improve diabetes self management.

January 2015 - Finalizing Protocol for IRB Submission

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Sugar Control Prevents Body Damage

Every point decrease in HbA$_{1c}$ (measure of sugar in blood) (Ex: A drop from 9 to 8%) reduces your risk of Eye, Kidney, and Nerve Disease by 35%


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Recommendations for Follow-up:

Make an appointment to see your eye doctor within the next 3 months. If you do not have an eye doctor, tell your primary care doctor and he/she will help refer you.

VISION TEST RESULTS

<table>
<thead>
<tr>
<th>Right Eye</th>
<th>Left Eye</th>
</tr>
</thead>
<tbody>
<tr>
<td>20/40</td>
<td>20/30</td>
</tr>
</tbody>
</table>

Normal | Legal to Drive | Low Vision | Legally Blind

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Diabetic Retinopathy: YES
Edema (Swelling): YES

Your risk of vision loss based on the level of damage to your retina from Diabetes (retinopathy) is HIGH.
### LEFT EYE – RETINA PHOTO

![Retina Photo]

### LEFT EYE – RISK OF VISION LOSS

Your risk of vision loss based on the level of damage to your retina from Diabetes (retinopathy) is **HIGH**

<table>
<thead>
<tr>
<th>Diabetic Retinopathy</th>
<th><strong>YES</strong></th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edema (Swelling)</td>
<td><strong>YES</strong></td>
<td>NO</td>
</tr>
</tbody>
</table>

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KNOW YOUR RISK FOR DR

Stop Diabetes from causing damage to your eyes. KEEP TRACK OF YOUR **ABCs**:

A1c (Blood Sugar Level)
Blood Pressure
Cholesterol (LDL = Bad Cholesterol)

Use these charts to check your risk for DR.

Please ask your primary doctor what levels are right for you.

---

**Diabetic Retinopathy Risk vs. HbA1C**

- LOW
- MEDIUM
- HIGH

**Diabetic Retinopathy Risk vs. BP**

- LOW
- MEDIUM
- HIGH

**Diabetic Retinopathy Risk vs. LDL**

- LOW
- MEDIUM
- HIGH

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Next Step: Sustainability

Dependent on:

- Geographic Location – State Mandates, NYS Gov. recently signed Telehealth Coverage Law for January 1, 2016
- Mix of Payers responsible for Population
  November 2014 – Discussion with Excellus to support program
- Priorities of Primary Care – Medical Homes – PCP practices show interest.
- *Business Model of Local Health System - ACOs
- *Accessing Data to Determine where the need is for increasing eye exam rates.
  – Sources: Insurers, FLHSA, ACOs
- *Making Vision and Eye Health a Public Health Priority

* Looking for partners to help with these objectives.
# Current Fee For Service Codes

<table>
<thead>
<tr>
<th>CPT</th>
<th>Description</th>
<th>Fee</th>
<th>Covered By</th>
<th>Notes</th>
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<tbody>
<tr>
<td>92250 Global</td>
<td>Retinal Photography With Interpretation</td>
<td>$40 - $100</td>
<td>Most Major PPP Carriers</td>
<td>Coverage depends on DR level and region</td>
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<tr>
<td>(Technical +</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professional)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>92227</td>
<td>Remote imaging for detection of retinal disease</td>
<td>$11 - $19</td>
<td>Most plans</td>
<td>Applies to PCP interpretation of images</td>
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<tr>
<td>92228 Global</td>
<td>Remote imaging of active retinal disease</td>
<td>$31 - $38</td>
<td>Most plans</td>
<td>Must have pre-existing DR</td>
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<tr>
<td>(Technical +</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professional)</td>
<td></td>
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<tr>
<td>92014 SE</td>
<td>Ophthalmological service, established patient</td>
<td>$60</td>
<td>Hawaii Med-Quest</td>
<td>Extra payment above FQHC PPS</td>
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<tr>
<td>HCPCS S0625 &amp;</td>
<td>Retinal exams for patients with diabetes</td>
<td>$0</td>
<td>Not covered by Medicare</td>
<td>May be used to document procedure</td>
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<tr>
<td>S3000</td>
<td></td>
<td></td>
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</table>
Need to identify clinics in need and tackle Annual Eye Exam for our population immediately!!!
Translating Work For At Risk Seniors
Tele-ICARE for Seniors

• Extension of Diabetic Eye & Vision Health Surveillance for at risk older adult population.

• National Institute on Aging & American Geriatric Society supported feasibility study to assess vision and eye health in two Senior Living Communities
A Preventive Problem Solving Intervention Older Adults with Macular Degeneration:

Silvia Sörensen, PhD
Departments of Ophthalmology and Psychiatry
Age-related Macular Degeneration
Depression and Low Vision

Rates of depression:
2 - 5 X greater in older adults with low vision than in sighted older adults.

WHY?

• reduced ability to engage in valued and enjoyable activities (mediator)
• greater likelihood of social isolation
• Everyday tasks and mobility
Preventive Problem Solving

First 4 weeks: current problems
Last 4 weeks: future problems

1. Define a future problem you are concerned about
2. Set realistic goals to approach the problem
   (including gathering information, making decisions)
3. Brainstorm various solutions
   (where to get information, how to make a decision)
4. Pros and Cons of Solutions
5. Choose the most feasible solution(s)
6. Determine a plan of action: and assign as Homework.
7. Evaluate the Outcome at next visit
Testing the Intervention: RCT

Preventive Problem Solving Intervention (PREPSI)

OR

Life Review and Resource Information

4-week Education
8-week In-home Training
Decision Making and Concrete Planning: PREPSI vs Control

Note: T1=Pretest, T2, T3=during intervention, T4=post-intervention, T5=6-month follow-up, T6= 12-month follow-up
Treatment effect moderated by Age x gender $F(2,504) = 3.08, p<.05$)

Women

Men

TX-ES_{men} = .47 SD
TX-ES_{women} = .24 SD
NEXT STEPS

• Adapt the intervention to Diabetic Retinopathy and other diseases
• Implement this intervention in the context of eye care and low vision rehabilitation at ABVI and FEI
• Make it sustainable
  • Greater Rochester Health Foundation
  • National Institute on Aging
  • Dialogue with Excellus and other Payers
Integrated Population Health Approach
Global Teleophthalmology
Diabetic Screening Programs:
100 million with DR of 300 million with DM

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Annual Eye screening rates are now 90%+
Diabetic Retinopathy is no longer the leading cause of blindness in the UK.
Traditional Siloed Care

Subspecialty Ophthalmology, Eye Institutes
General Ophthalmology (Surgical)
Medical Ophthalmology/Optometry
Optical Shop

Sub-specialty Care & Tertiary Hospitals
Specialty Care, Community Hospital &
Ambulatory Primary Care

Ophthalmic Care

Medical Care

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Integrated Population Based Care Management to Achieve Synergistic Health Promotion

Ophthalmic Care

Super-Specialty Care

Subspecialty Care

Primary Care

Screening

Education

Empowering Prevention

Primary Care

Super-Specialty Care

Subspecialty Care

Medical Care

Improving Eye Care in Primary Care Settings

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No Mention of Vision Health as Public Health Priority on Monroe County Department of Health Website

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<table>
<thead>
<tr>
<th>Monroe County Indicators For Tracking Public Health Priority Areas</th>
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<tr>
<td><strong>Indicator</strong></td>
</tr>
<tr>
<td>ACCESS TO QUALITY HEALTH CARE</td>
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<tr>
<td>% of adults with health care coverage ¹</td>
</tr>
<tr>
<td>Map of adults with health insurance</td>
</tr>
<tr>
<td>% of adults with regular health care providers ¹</td>
</tr>
<tr>
<td>Map of adults with regular health care providers</td>
</tr>
<tr>
<td>% of adults who have seen a dentist in the past year ¹</td>
</tr>
<tr>
<td>Map of % of adults with a dental visit in the last year</td>
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<tr>
<td>Early stage cancer diagnosis²</td>
</tr>
<tr>
<td>Breast</td>
</tr>
<tr>
<td>Cervical</td>
</tr>
<tr>
<td>Colorectal</td>
</tr>
<tr>
<td>CANCER SCREENING</td>
</tr>
<tr>
<td>TOBACCO USE</td>
</tr>
<tr>
<td>% cigarette smoking in adolescents ³ (past month)</td>
</tr>
<tr>
<td>% cigarette smoking in adults ¹</td>
</tr>
<tr>
<td>Map of Adults who are current smokers</td>
</tr>
</tbody>
</table>
CDC Supporting National Vision Surveillance System

Centers for Disease Control and Prevention

National Center for Chronic Disease Prevention and Health Promotion Extramural Research Program Office

Establish a Vision and Eye Health Surveillance System for the Nation
RFA-DP-15-004
Application Due Date: 02/20/2015
Goal: Creating a Population Integrated System of Care Focused

Where We Provide

• Surveillance
• Prevention
• Education
• Care
• Support

To Screen, Educate and Empower Populations and Achieve and Maintain Health
Integrated Eye Care System for Upstate NY

Financial Models – Fee for Service and Risk Based Contracting

System oversight and sub-specialty center
Regional Ophthalmology and subspecialty outreach
Optometry
Optical shops
Community Engagement

Referrals

Specialty Medical/Surgical Care Providers
ACOs
Care Mgrs
Medical Homes
Primary Care Providers, Emergency Rooms, Urgent Care

Diabetes
Retinopathy
Cataract
Glaucoma
Metric: Annual Eye Exam

No or Undiagnosed Eye Disease

Refraction
Strabismus
Pediatric
Inherited Disease

AMD
Glaucoma
Cataract

Horizontal Integration – PCP/ED Office Screening/Care

Risk Analysis, Public Health, Epidemiology

Matching Acuity with Level of Care
Eye Care Vertical Integration

Eye Care is Primary Care and a Public Health Priority

Population

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Thank You

Research Team

Rochester Area Tele-ICARE Team:

Vanessa M. Desmore, Health Project Coordinator
Elizabeth Czirr, MS, Data Manager and PhD Candidate
Jyothi Purushotham, BS – Health Project Coordinator
Silvia Sörensen, Ph.D., Dept. of Psychiatry
William S. Fischer, MS, Director of Flaum Reading Center
Christye Sisson, MS, Chair of Biomedical Photographic Com. Program, RIT
Gwen K. Sterns, Chief of Ophthalmology at RGHS
Physicians and Staff of Clinton Family Health, RGHS OPD and Twig Clinics

Residents and Medical Students:

Katherine Fallano, MD, Max Reber, Tatiana Deveney, Lauryn Chris
Disclosure and Funding

- No Financial Disclosures

- Volunteer (Unpaid) grader for EyePACS (UC Berkeley) teleophthalmology service

- Tele-ICARE (Rochester Area Teleophthalmology Program) Funded by the Greater Rochester Health Foundation

- Improving population eye health: A pilot study on personalized health education for high-risk diabetic patients Funded by the Center for Community Health