The Tribal Vision Project
Evaluating the Effectiveness of Telemedicine for Providing Diabetic Retinopathy Screening Exams & Identifying Variables Associated with Adherence to Annual Eye Exams

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Overview
• Project Background
• Study Methods & Design
• Results
• Conclusions
• Future Directions

Background: Diabetic Retinopathy
• Diabetic retinopathy (DR) is the leading cause of blindness in U.S. adults aged 20-74.
• Diabetes and diabetic retinopathy disproportionately affect the American Indian and Alaska Native population
• DR is usually asymptomatic in the early stages
• Early diagnosis and treatment can reduce the likelihood of severe vision loss by 90%
• Approximately half of those diagnosed with diabetes obtain annual eye exams.

Background: Tribal Vision Project
• Original study designed to determine prevalence of visual impairment, blindness, and various eye diseases
• The most recent study aimed to
  • Evaluate the long-term effectiveness of telemedicine to increase the proportion of participants screened for diabetic retinopathy
  • Identify the health belief factors associated with adherence to annual diabetic eye exams
  • Determine whether the telemedicine system is cost-effectiveness when compared to traditional surveillance
• Expanded on previous research by using a randomized controlled trial (RCT) design and assessing long-term follow-up

Study Methods & Design
• RCT with staged intervention
  • Provider Group (Traditional Surveillance)
    • Visited local eye care providers
    • Exam results sent to research team via postcard, fax, or online entry
  • Camera Group (Telemedicine)
    • Participants imaged at primary care clinic
    • Also encouraged to visit local eye care providers
    • After 2 years, all participants were offered screening with telemedicine
  • Participants recruited from two tribal health clinics

Study Methods & Design (continued)
• Camera Group
  • Teleretinal imaging with a nonmydriatic camera
  • Images uploaded to database
  • Viewed and evaluated at Devers Eye Institute
  • Results sent back to study staff via email within 48 hours
Results: Demographics

Participants
- 567 patients with diabetes
- 296 (52%) Camera Group
- 271 (48%) Provider Group

Race/Ethnicity
- 50% reported AI/AN heritage
- 72% reported a non-white race/ethnicity

Age: $M = 51$ years (range 20-79)

Sex: 52% female; 48% male

Diabetes: $M = 9.5$ years since diagnosis

Blood Glucose: $M = 8.3\%$ HbA1c

Results: Long-Term Follow-Up

Proportion Screened by Group and Exam Type

Results: CADEES

- Adherence
  - self-reported, dilated eye exam in the past 12 months

- Health belief items associated with adherence:
  - Whether insurance covered most of exam cost
  - Whether there were general barriers to getting an exam
  - Whether obtaining the exam was a top priority
  - Whether eye disease can be seen with an exam

- Demographic variables associated with adherence:
  - Longer duration of diabetes
  - Having insurance coverage
  - Lower blood glucose levels

Conclusions

- Long-Term Follow-Up
  - During the first two years of the study, the proportion of those screened for retinopathy was significantly higher in the camera group
  - Most participants did not have levels of diabetic retinopathy requiring referral to an eye care provider

- CADEES
  - Researchers and clinicians may be able to improve adherence by:
    (1) counseling newly diagnosed patients, as well as those with uncontrolled blood sugar, on the importance of annual eye exams, and
    (2) discussing perceived barriers and misconceptions
Future Directions

- Evaluate cost savings/effectiveness
- Dissemination
- Evaluate new technology
- Continue work on the CADEES
- Use teleretinal imaging as a tool to educate patients

Thank You

- Research Partners
  - Hunter Health Clinic
  - Yellowhawk Tribal Health Center
  - Oregon Prevention Research Center

- Funding Agencies
  - Centers for Disease Control and Prevention
  - National Institutes of Health/National Eye Institute
  - Legacy Good Samaritan Foundation

Questions

Resources

- Diabetes & Diabetic Retinopathy

- Tribal Vision Project: Telemedicine
  - Comparing the effectiveness of telemedicine and traditional surveillance in providing diabetic retinopathy screening examinations: a randomized controlled trial

  - Predicting Adherence to Diabetic Eye Examinations: Development of the Compliance with Annual Diabetic Eye Exams Survey

Results: Referral

<table>
<thead>
<tr>
<th>Stage of Retinopathy (%)</th>
<th>Year 1 (n=136)</th>
<th>Year 2 (n=148)</th>
<th>Year 3 (n=200)</th>
<th>Year 4 (n=200)</th>
<th>Year 5 (n=200)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>74.3</td>
<td>71.5</td>
<td>71.0</td>
<td>70.7</td>
<td>65.3</td>
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<tr>
<td>ME/DME (&lt;DME)</td>
<td>13.4</td>
<td>16.7</td>
<td>13.1</td>
<td>9.6</td>
<td>16.9</td>
</tr>
<tr>
<td>Macular DME (~DME)</td>
<td>8.0</td>
<td>9.1</td>
<td>8.3</td>
<td>11.1</td>
<td>8.9</td>
</tr>
<tr>
<td>Macular DME (~DME)</td>
<td>3.1</td>
<td>4.0</td>
<td>4.9</td>
<td>3.2</td>
<td>3.1</td>
</tr>
</tbody>
</table>

- Referral Proportions (telemedicine exams only)
- The majority of patients did not need to be referred for follow-up with an eye care provider

Referring Referral (%) 84.2  36.2  33.4  31.0  29.8