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

Screening Proportion by Group
(any type of screening)

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>Referral Proportions (telemedicine exams only)</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage of Retinopathy (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>74.1</td>
<td>71.3</td>
<td>73.9</td>
<td>70.7</td>
<td>65.1</td>
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<tr>
<td>NDR</td>
<td>15.1</td>
<td>16.1</td>
<td>15.1</td>
<td>15.2</td>
<td>16.2</td>
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<tr>
<td>Macular NDR</td>
<td>1.1</td>
<td>1.3</td>
<td>1.6</td>
<td>1.8</td>
<td>1.2</td>
</tr>
<tr>
<td>PDR</td>
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<td>0.7</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
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<tr>
<td>History of Diabetes (%)</td>
<td>8.6</td>
<td>9.1</td>
<td>9.4</td>
<td>9.6</td>
<td>9.8</td>
</tr>
<tr>
<td>Number of Referrals (%)</td>
<td>20.2</td>
<td>22.6</td>
<td>37.7</td>
<td>40.4</td>
<td>43.6</td>
</tr>
<tr>
<td>Presync</td>
<td>20.4</td>
<td>23.1</td>
<td>23.1</td>
<td>21.6</td>
<td>22.8</td>
</tr>
<tr>
<td>History to Determine (%)</td>
<td>22.4</td>
<td>20.0</td>
<td>19.3</td>
<td>21.6</td>
<td>17.6</td>
</tr>
</tbody>
</table>

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- The majority of patients did not need to be referred for follow-up with an eye care provider

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