**Purpose**
- Indigenous communities such as Inuit villages have significant disparities in health and access to services compared to settler populations.
- Literature on eye health and services among Inuit is dated and limited.
- In Nunavik (Quebec, Canada), no data are available on refractive error or on utilization of eye health services.

**Objectives**
- To describe the prevalence of ametropias and risk of refractive amblyopia among Nunavik Inuit.
- To describe the uptake of eye health services and treatment of uncorrected refractive error among Nunavik Inuit.

**Methods**
- Retrospective cohort using electronic records from the government-contracted mobile eye health team travelling to all 14 villages of Nunavik.
- Comparative analysis using data from the Canadian Community Health Survey (CCHS).

**Definitions of ametropias and risk of refractive amblyopia**
- **Myopia**
  - Children (age < 17): Spherical equivalent power ≤ -0.50 diopter
  - Adults (age ≥ 18): Spherical equivalent power ≤ -0.50 diopter
- **Hyperopia**
  - Children (age < 17): Spherical equivalent power ≥ +2.0 diopter
  - Adults (age ≥ 18): Spherical equivalent power ≥ +2.0 diopter
- **Asthigmatism**
  - Cylindrical power ≤ 0.50 diopter
- **Anisometropia**
  - Equivalent sphere power difference ≥ 1.00 D between both eyes
- **Presbyopia (alone)**
  - Any prescribed addition (≥ 35 years old), without other distance ametropia

**Risk of refractive amblyopia**
- Myopic amblyopia: Either eye with myopic myopic meridian power ≤ -2.00 D
- Hyperopic amblyopia: Both eyes with sphere power ≥ +3.00 D
- Astigmatic amblyopia (regular): Both eyes with cylinder power ≥ 1.50 D (axes 10 to 170 or 80 to 100)
- Astigmatic amblyopia (oblique): Both eyes with cylinder power ≥ 1.00 D (axes 11 to 79 or 101 to 169)
- Anisometropic amblyopia: Equivalent sphere power difference ≥ 1.00 D between both eyes

**STUDY POPULATION**
- 6341 participants
  - 29,714 examinations
  - 48% of census population (2016)
- **Sex**: 60.3% female (n = 3823)
- **Age**: median 27.0 (IQR 30.0)
  - 32.3% (n = 2048) school aged (5 – 19 years old)
  - 14.1% (n = 891) were within the amblyogenic period (0 – 9 years old)

**RESULTS**

**Prevalence of ametropias**

<table>
<thead>
<tr>
<th>Ametropia</th>
<th>Crude prevalence %</th>
<th>Weighted prevalence for sex and age (%)</th>
<th>Confidence interval (95%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myopia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age &lt; 17</td>
<td>43.1</td>
<td>34.0</td>
<td>32.3 – 35.8</td>
</tr>
<tr>
<td>Age ≥ 18</td>
<td>52.4</td>
<td>54.0</td>
<td>52.6 – 55.5</td>
</tr>
<tr>
<td>Hyperopia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age &lt; 17</td>
<td>11.2</td>
<td>14.5</td>
<td>12.8 – 16.3</td>
</tr>
<tr>
<td>Age ≥ 18</td>
<td>20.0</td>
<td>18.7</td>
<td>17.6 – 19.7</td>
</tr>
<tr>
<td>Astigmatism</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age &lt; 17</td>
<td>25.7</td>
<td>26.4</td>
<td>24.3 – 28.5</td>
</tr>
<tr>
<td>Age ≥ 18</td>
<td>47.6</td>
<td>47.7</td>
<td>46.2 – 49.2</td>
</tr>
<tr>
<td>Anisometropia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age &lt; 17</td>
<td>7.6</td>
<td>8.6</td>
<td>7.2 – 9.9</td>
</tr>
<tr>
<td>Age ≥ 18</td>
<td>7.6</td>
<td>7.3</td>
<td>6.6 – 8.1</td>
</tr>
<tr>
<td>Presbyopia (alone)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age &lt; 17</td>
<td>30.0</td>
<td>28.9</td>
<td>28.9 – 31.0</td>
</tr>
<tr>
<td>Age ≥ 18</td>
<td>30.0</td>
<td>28.9</td>
<td>28.9 – 31.0</td>
</tr>
</tbody>
</table>

**Uptake of eye examinations**

- In 2014, 34.9% of participants had an eye examination by the eye care team.
- 41.4% of the Quebec population (p < 0.001).
- 41.6% of the Canadian population (p < 0.001) (CCHS 2010).
- 81.5% (n = 1711) had at least 1 examination within the last 5 years of study period.
- 48.2% (n = 3059) of participants had >1 examination during study period.

**Risk of refractive amblyopia**
- 5.9% of patients aged 0 – 9 were diagnosed with an ametropia consistent with a risk of developing refractive amblyopia.

**Frequency of eye examinations**

<table>
<thead>
<tr>
<th>Examinations (n)</th>
<th>Person-years</th>
<th>Rate</th>
<th>Frequency of eye examination (years, [95% CI])</th>
<th>Recommended frequency (years)</th>
<th>Study vs. recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Ages</td>
<td>19,844</td>
<td>7099</td>
<td>0.25</td>
<td>4 (4.0 – 4.0)</td>
<td>p &lt; 0.001</td>
</tr>
<tr>
<td>5 – 19</td>
<td>5188</td>
<td>7.0</td>
<td>0.21</td>
<td>4.8 (4.8 – 5.0)</td>
<td>1</td>
</tr>
<tr>
<td>20 – 29</td>
<td>6587</td>
<td>56.6</td>
<td>0.26</td>
<td>3.7 (3.6 – 3.8)</td>
<td>2</td>
</tr>
<tr>
<td>40 – 64</td>
<td>6272</td>
<td>71.1</td>
<td>0.26</td>
<td>3.7 (3.6 – 3.8)</td>
<td>2</td>
</tr>
<tr>
<td>≥ 65</td>
<td>1530</td>
<td>28.9</td>
<td>0.41</td>
<td>2.4 (2.3 – 2.6)</td>
<td>1</td>
</tr>
</tbody>
</table>

**Acquisition of spectacles**

- In the last year of the study period, 74% (n = 1,964) of patients who were prescribed spectacles proceeded to purchasing them.
- Median order intention time: 0 (IQR 0, skewness 3.3).
- Median time to purchase: 21 days (IQR 247, skewness 2.7).

**DISCUSSION**

**Ametropias and risk of refractive amblyopia**
- **Myopia**
  - Myopia is an important burden (46.5%).
  - Worldwide estimated pooled prevalence (EPP): 26.5% (SE ≤ -0.50 D).
  - Other Canadian Indigenous population: 8%.
  - Other Canadian non-Indigenous population: 13.6% – 42.4%.
  - Chinese-Canadian population: 22.4 – 64.1%.
- **Astigmatism**, especially in adults (47.7%) is a significant burden.
- Similar to adult worldwide EPP 45.6%.
- 5.9% of children at risk of refractive amblyopia.
- Universal school-based screening program to start in 2020.

**Uptake of eye health services**
- Prescribed spectacles are usually ordered and received timely within a few weeks.
- Frequency of eye examinations is low and inferior to recommendations.
- Especially true for school-aged children (5 – 19): 4.8 years.
- Potential improvements.
  - School-based screening with paid spectacles (2020).
  - Culturally-appropriate eye health promotion campaigns.

**Limitations**
- Clinical vs. population based sample.
- Study population excludes patients accessing eye care out of Nunavik.
- No data on cycloplegia.

**TAKE HOME MESSAGE**

- **Nunavik Inuit**
  - Significant burden of disease in refractive error.
  - Lower utilization of eye health services than Canadian population.
  - Lower frequency of examinations vs. recommendations.

- Most patients needling spectacles proceed to ordering them and obtain them within a few weeks.

- Eye care services should be optimized, especially for school-aged children.

**References**

**Acknowledgments**
- Canadian Association of Optometrists (CAO) for funding.
- Ocular Reeves Daniel for access to data.
- F Hoffman-La Roche for assistance with graphics.

*Presented at the 2019 annual meeting of the AAO.*