

EYE HEALTH SERVICES AND REFRACTIVE ERROR AMONG NUNAVIK INUIT

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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
- Study period: February 2006 – December 2018
- 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 ≤ -0.5 diopter
	Adults (age ≥ 18)	Spherical equivalent power < -0.5 diopter
Hyperopia	Children (age <17)	Spherical equivalent power $\geq +2.0$ diopter
	Adults (age ≥ 18)	Spherical equivalent power $\geq +0.5$ diopter
Astigmatism	Cylindrical power < -0.5 diopter	
Anisometropia	Equivalent sphere 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 most myopic meridian power ≤ -2.00 D
	Hyperopic amblyopia	Both eyes with sphere power $\geq +3.00$ 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

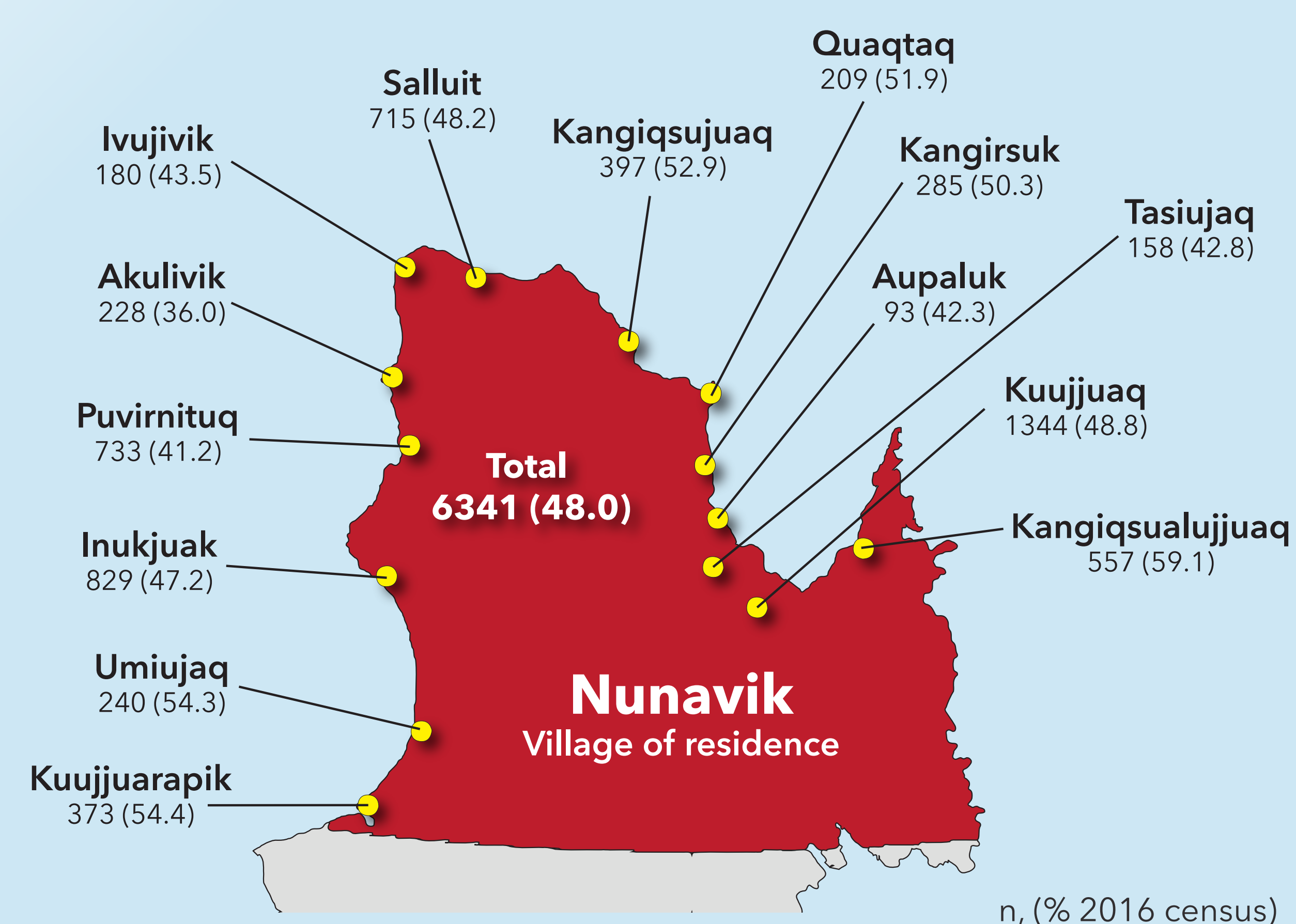
6341 participants

- 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

	Crude prevalence %	Weighted prevalence for sex and age (%)	Confidence interval (95%)
Myopia		46.5	45.3 – 47.6
Age < 17	43.1	34.0	32.3 – 35.8
Age ≥ 18	52.4	54.0	52.6 – 55.5
Hyperopia		17.1	16.2 – 18.1
Age < 17	11.2	14.5	12.8 – 16.3
Age ≥ 18	20.0	18.7	17.6 – 19.7
Astigmatism		39.6	38.4 – 40.8
Age < 17	25.7	26.4	24.3 – 28.5
Age ≥ 18	47.6	47.7	46.2 – 49.2
Anisometropia		7.8	7.1 – 8.5
Age < 17	7.6	8.6	7.2 – 9.9
Age ≥ 18	7.6	7.3	6.6 – 8.1
Presbyopia (alone)		30.0	28.9 – 31.0

Frequency of eye examinations

	Examinations (n)	Person-years*	Rate	Frequency of eye examination (years, [95% CI])	Recommended frequency (years) ¹	Study vs. recommended
All Ages	19 844	79 006	0.25	4 (4.0 – 4.0)		
5 – 19	5188	7.0 – 8.5	0.21	4.8 (4.8 – 5.0)	1	p < 0.001
20 – 39	6567	56.6 – 59.0	0.26	3.8 (3.7 – 4.0)	2.5	p < 0.001
40 – 64	6272	7.1 – 8.5	0.27	3.7 (3.6 – 3.8)	2	p < 0.001
≥ 65	1530	28.9 – 31.0	0.41	2.4 (2.3 – 2.6)	1	p < 0.001

Acquisition of spectacles

- In the last year of the study period, 74% (n = 1964) of patients who were prescribed spectacles proceeded to purchasing them
 - median order intention time: 0 (IQR 0, skewness 3.3)
 - median procurement time: 21 days (IQR 247, skewness 2.7)

* total number of study participants during the study period, adjusting for individuals born after the start of the study period

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 data)
- 81.5% (n = 5171) had at least 1 examination within the last 5 years of study period
- 48.2% (n = 3059) of participants having 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

Sex		Purchases		Procurement time (days)*
		n	%	Median (IQR, skewness)
Male	0 – 4	19	1.0	22 (149, 3.5)
	5 – 19	446	22.7	20 (180, 3.2)
Female	0 – 4	19	1.0	22 (149, 3.5)
	5 – 19	446	22.7	20 (180, 3.2)
Total	0 – 4	38	1.0	22 (149, 3.5)
	5 – 19	892	22.7	20 (180, 3.2)
Total	40 – 64	637	32.4	14 (201, 3.0)
	≥ 65	137	7.0	1 (31, 3.7)
Total		1984	100	21 (247, 2.7)

DISCUSSION

Ametropias and risk of refractive amblyopia

- Myopia is a significant burden (46.5%)
 - Worldwide estimated pooled prevalence (EPP): 26.5% (SE ≤ -0.50 D)²
 - Other Canadian Indigenous population: 8%³
 - Other Canadian non-Indigenous population⁴: 13.6% – 42.4%
 - Chinese-Canadian population⁵: 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-based vs. population based sample
- Study population excludes patients accessing eye care out of Nunavik
- No data on cycloplegia

TAKE HOME MESSAGE

- **Nunavik Inuit have**
 - significant burden of disease in refractive error
 - lower utilization of eye health services than Canadian population
 - lower frequency of examinations vs. recommendations
- **Most patients needing spectacles proceed to ordering them and obtain them within a few weeks**
- **Eye care services should be optimized, especially for school-aged children**

References

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