CENTER FOR GLOBAL EYE HEALTH
(Unité de Santé Visuelle Internationale)

A NEW MULTIDISCIPLINARY COLLABORATIVE GROUP AT UNIVERSITY OF MONTREAL, CANADA

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Disclosure Statement of Financial Interest

"I have no financial disclosures that would be a potential conflict of interest with this presentation."

Outline

• 10 Facts about Global Eye Health

• Center for Global Eye Health (USVI)
  • Who, what, where, how
  • Objectives
The Problem

Blindness and Visual Impairment
Globally, every 5 seconds, a person goes blind.

A child goes blind every minute.

7 million people in the world go blind every year.
The world population is 7.3 billion.

- 36 million people are blind.
- 217 million people are MSVI.
- 253 million people are visually impaired.

More than 75% of visual impairment is avoidable.

Source: International Agency for the Prevention of Blindness (IAPB)
Estimated 3X increase in number of BLIND from 38.5 M in 2020 to 115 M in 2050.

Figure 3: Global trends and predictions of numbers of people who are blind or moderately and severely vision impaired, from 1990–2050

Source: Bourne RRA et al. Lancet Glob Health 2017
« People do not go blind by the millions. They go blind one by one, in families and communities, each with his own predicament. »

-Sir John Wilson, founder of the International Agency for the Prevention of Blindness.
The Burden
« Visual impairment is a major cause and consequence of unnecessary human suffering, often leading to poverty, unemployment, ill health, social exclusion and early death. »

-IAPB (International Agency for the Prevention of Blindness)
Figure 5. Disability-adjusted life years (DALYs) according to the burden of various diseases

Source: WHO
PREVALENCE OF BLINDNESS

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.
The Cost

The total cost of VI globally is estimated at $3 trillion in 2010, of which $2.3 trillion was direct health costs.

(Gordois et al, Global Public Health, 2012)

The global productivity loss due to uncorrected refractive error is between $269 and $428 billion.

(Smith et al, Bull WHO, 2009)
Figure 6. Projected worldwide cost of reduced productivity due to visual impairment caused by eye diseases, 2000–2020 (estimated in the 1990s)

Source: WHO
The Response
The VISION 2020 Structure

- Objective: to assist Member States to effectively prevent blindness and restore sight
- Target: to reduce global blindness prevalence to < 0.5 % or < 1 % in any country

Source: World Health Organization, Prevention of Blindness Programme (WHO/PBD)
1. Disease control
2. Human resource development
3. Infrastructure development
The Numbers

How many?
FACT 1

THE WORLD

POPULATION

7.3 BILLION

36 MILLION PEOPLE ARE BLIND

+ 217 MILLION PEOPLE ARE MSVI

= 253 MILLION PEOPLE ARE VISUALLY IMPAIRED

Source: IAPB
Magnitude, temporal trends, and projections of the global prevalence of blindness and distance and near vision impairment: a systematic review and meta-analysis


Source: Bourne RRA et al. Lancet Glob Health Sep 2017

Global causes of blindness and distance vision impairment 1990–2020: a systematic review and meta-analysis


Source: Flaxman SR et al. Lancet Glob Health Dec 2017
## Levels of visual function

<table>
<thead>
<tr>
<th>Vision Impairment</th>
<th>Presenting visual acuity* in the better eye</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild vision impairment</td>
<td>&lt;6/12 but 6/18 or better</td>
</tr>
<tr>
<td>Moderate and severe vision impairment</td>
<td>&lt;6/18 but 3/60 or better</td>
</tr>
<tr>
<td>Blindness</td>
<td>&lt;3/60</td>
</tr>
<tr>
<td>Presbyopia</td>
<td>Near vision worse than N6 or N8 at 40 cm and best corrected visual acuity ≥6/12 (20/40)</td>
</tr>
</tbody>
</table>

*Snellen visual acuity or the equivalent calculated from published logarithm of the minimum angle of resolution values.

**Table 1: Categories of vision impairment with corresponding visual acuity**

Source: Bourne RRA et al. Lancet Glob Health 2017
Definitions

Visual Impairment = Blindness + MSVI (LV)

WHO (ICD-10)

Blindness: Presenting VA in best eye <3/60 (<20/400 ou <0.05) and/or VF < 10°

Low vision (MVI and SVI): Presenting VA in best eye 3/60 (20/400 or 0.05) to <6/18 (20/60 or 0.33) and/or VF < 20°

USA Legal Blindness

VA = ou < 20/200 in best eye with Best Corrected Visual Acuity (BCVA) and/or VF of 20° or less

Key issues:
Threshold of distance VA
Presenting vs BCVA
VF constriction
Global Estimates: 285 million people are affected by visual impairment*. 

- VI: 285M (4.25%)
- Blind 39M (14%)

2015 Global Estimates: 253 million VISUALLY impaired

- 36 million BLIND + 217 million MSVI

- Better data? Interventions to reduce VI?
The Global Initiative for the Elimination of Avoidable Blindness
Change in Prevalence of Visual Impairment

1. Age-standardised prevalence of Visual Impairment has declined over 25 years.

2. The decline is striking and evident in every world region.

3. However, rates of Visual Impairment in low-income countries are considerably greater than in high-income countries.

Data correct as at 12th Oct 2017

Source: IAPB
The Causes

Disease

Access
FACT 2

Causes of global visual impairment (all ages - blindness & MSVI)

- AMD: 4.10%
- Cataract: 25.81%
- Corneal Opacity: 1.65%
- DR: 1.16%
- Glaucoma: 2.78%
- Trachoma: 0.79%
- Other: 14.71%
- URE: 48.99%

Source: IAPB
FACT 2

Of the 253 million people who are VISUALLY impaired, 124 million (49%) are VISUALLY impaired due to uncorrected refractive errors (URE).

Source: IAPB
Figure 2. Global extent of visual impairment due to uncorrected refractive errors (in millions)

Source: WHO
FACT 3

Causes of global blindness (all ages)

- AMD 5.64%
- **Cataract 34.47%**
- Corneal Opacity 3.46%
- DR 1.07%
- Glaucoma 8.30%
- URE 20.62%
- Trachoma 0.98%
- Other 25.46%

Source: iapb
FACT 3

The leading cause of BLINDNESS is CATARACT.

Cataract surgery is one of the most cost-effective treatments in all of medicine.
FACT 4

75% of distance visual impairment is avoidable (>56% of blindness and >78% of MSVI).

>75%

OF VISUAL IMPAIRMENT IS AVOIDABLE

AVOIDABLE

Cataract surgery and correction of refractive errors are among the most cost-effective health interventions.

Source: IAPB
Figure 6 – Percentage of avoidable distance visual impairment in the 21 GBD regions of the world
The Risk Factors

*Being poor ...*
FACT 5

89% OF VISUALLY IMPAIRED PEOPLE LIVE IN LOW- AND MIDDLE-INCOME COUNTRIES

ACCESS TO EYE CARE

- Access to preventive care education, quality curative services and rehabilitation not universally available.

- Africa averages 1 ophthalmologist for every 1.25 million people.

Source: IAPB
Global estimates of BLINDNESS

PREVALENCE OF BLINDNESS

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Global estimates of VISUAL IMPAIRMENT

Prevalence of people all ages with visual impairment per 100

- 2.91% - 3.17%
- 3.18% - 3.33%
- 3.34% - 5.61%
- Not applicable
- Data not available

*The WHO region SEARO was divided in two: SEARO-(India) and India, as well as WPRO in WPRO-(China) and China.

Global Estimates: 285 million people are affected by visual impairment. The geographical distribution of Visual Impairment is uneven in the world.
In the Low and Middle Income countries group the prevalence of VI prevalence is higher

Higher countries/regions investments in health correspond to lower prevalence of visual impairment.
Cartogram showing the prevalence of blindness by WHO region (using WHO region colours).

Cartogram showing the number of practicing ophthalmologists worldwide by country.

The World Divide

The quality of eye care that is standard in North America, Europe, Australia and Japan is not consistently available in emerging nations.

- HUMAN RESOURCE: Inadequate numbers and distribution of ophthalmologists and optometrists
- INFRASTRUCTURE: Absence of funding to buy pharmacologics and surgical instruments
- BARRIERS to access eye care
Barriers to access care

A. awareness
B. bad outcome
C. costs
D. distance
The Risk Factors

Being old ...
FACT 6

An estimated 82% of all people with BLINDNESS are > 50 years old.

Number expected to increase with the world's population aging.
It is estimated that in the next 9 years the number of blind people aged 50+ will grow in all WHO Regions; particularly in:

- China
- India
- South-East Asia
- Eastern-Mediterranean

unless action is taken to prevent and cure main causes of visual impairments.

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*2019 projections assume constant ratio between population and VI prevalence rates*
The Risk Factors

Being young ...
FACT 7

28% of people living with moderate or severe visual impairment are in their WORKING years.

- This impacts their ability to find employment and provide for their families.
- If working, this impacts their safety.

55% OF VISUALLY IMPAIRED PEOPLE ARE WOMEN
FACT 8

Around 1.4 million children < age 15 are blind 19 million are visually impaired.

• 75 M blind-years (number blind x length of life).

• > 50% of childhood blindness and VI can be avoided or treated.

• 12 M from uncorrected refractive errors.
Major causes include: cataract, retinopathy of prematurity, vitamin A deficiency, refractive errors.
FACT 9

Age-related macular degeneration (AMD) and glaucoma are the leading causes of blindness in middle-upper- and high-income countries.

- Target the exposures to risk factors (smoking, genetic predisposition, systemic diseases).
- Regular eye examinations for early diagnosis and treatment.
FACT 9

Causes of global blindness (all ages)

- **AMD**: 5.64%
- **Cataract**: 34.47%
- **Corneal Opacity**: 3.46%
- **DR**: 1.07%
- **Glaucoma**: 8.30%
- **URE**: 20.62%
- **Trachoma**: 0.98%
- **Other**: 25.46%

Source: iapb
The Response
Goal: to achieve a global 25% reduction in avoidable visual impairment by 2020.
FACT 10

Disease

Diseases priorities:
cataract, uncorrected refractive errors,
glaucoma, diabetic retinopathy, age-related macular degeneration.

Access

Eye care services: should be included in universal access to health care.
**Africa**
Shortage of health workers across Africa is alarming...

**Europe**
DR & AMD are major causes in W. Europe, while cataract & RE are also important...

**L America**
Cataract, DR, glaucoma & ROP are the major causes of blindness and VI...

**N America**
Glaucoma, DR & AMD, as well as RE are major threats...

**S E Asia**
One third of the world's blind & half the world's 1.5 million blind children live here...

**W Pacific**
New disease priorities are emerging with the prevalence of diabetes growing fast in the region...
USVI team

- Founding director: Dr Marie-Josée Aubin
- Coordonnator - Optometry: Dr Benoît Tousignant
- Coordonnator - Ophthalmology: Dr Nieves Rodriguez
- Coordonnator - Student affairs: Dre Mariem Abidar, Dre Christelle Doyon
- Management: Ms Karina Dubois-Nguyen
- Communication: Ms Wenzhen Zuo
To decrease the prevalence of visual impairment in populations most in need:
• In developing countries
• In the underserved communities of high & middle-income countries.
Collaboration

Establish LONGTERM COMMITMENT with global partners, such as NGOs and universities:
- development of training programs
- partnerships (e.g. with NGOs)
- creation / strengthening of inter-university agreements
Create and support opportunities for students and/or faculty members to engage in educational activities, such as TRAINING & TEACHING, based on bilateral participation through:

- overseas traineeships (1-8 weeks)
- formation at University of Montreal (internships, student exchange, summer course, degree in global health)
It is important to identify the people's NEEDS and to document the IMPACT of activities. Such data will help establish / confirm:

- the prevalence of blindness and visual impairment and its causes
- the utilization of eye care services
- the effectiveness of program implementation and project activities (e.g. screening for eye diseases and for refractive errors)
Local Projects

- **Annual glaucoma screening**
  GUHG

- **Mobile clinic**
  Dr Tousignant and Optometry students
GUHG

Glaucoma Screening Day in Montreal

Groupe Université de Montréal Glaucome Haïti

- Ophthalmology Residents at UofM
- Founded in 2014 by Dr Nicolas Cadet

Teaching and Screening Days

Eye Care Clinic for Refugees

Annual Glaucoma Screening Day

- In collaboration with the Association des Médecins Haïtiens à l’Étranger (AMHE)
Mobile clinic for Montreal homeless population

A mobile clinic provides free eye care services to the homeless population at La Maison du Père in Montreal, Canada.
Projects abroad

Haiti – GUHG – USI
Gonaïves

Haiti – Optometry School
Limbé

Nepal – SEVA Foundation

Orbis

DWB - telemedicine
Haiti

- Population: 10.8 million
- 0-14 years: 33%
- Rural: 40%
- GNI per capita (US$): 760
- Poorest country in the Americas
- Eye care resources:
  - 60 ophthalmologists
  - 7 optometrists
On the international level, GUHG has been involved in Haiti since 2014.

It has organized 4 missions offering teaching to nursing staff and dispensing screening and treatment of ocular diseases to more than 1700 Haitians.
Project to support the management of the Hospital La Providence in Gonaïves.

USI - USVI - GUHG

Project to establish an eye care clinic at the Hospital La Providence in Gonaïves.
Optometry traineeship in Limbé, Haiti.

Optometry students from University of Montreal can participate in one to two weeks internship.

- Collaboration with IRIS Mundial, UofM Optometry School and CEDI-VE (Haiti).
- The students receive pre-departure preparation and training (logistics, management, cultural and language skills, vaccination).
Bienvenue au PPLC
First Optometry School established in Haiti

First Optometry School in Haiti, the program will seek to graduate 16 optometrists per year, in a 5-year Bachelor of Vision Science degree.

- The first cohort of students started on November 6th 2017.
- Official launch on April 12th 2018.
- Collaboration between l'Université d'État d'Haiti, Brien Holden Vision Institute, Optometry Giving Sight, VOSH International and Charity Vision, with the support from University of Montreal.
Papua New Guinea & Pacific Islands

Research on the impact of workforce support for trained mid-level eye care workers (ophthalmic nurses) in Papua New Guinea & Pacific Islands.

- Project conducted by Dr Tousignant in collaboration with the Fred Hollows Foundation of New Zealand (FHFNZ).
SEVA foundation: Projects in Nepal and India

Doctors, residents and fellows at University of Montreal Ophthalmology Department have been involved with overseas projects in Nepal (Bhairahawa Eye Hospital) and in India (Aravind Eye Hospital).
Cataract surgery, Nepal
Orbis

Many ophthalmologists from University of Montreal participate in overseas missions with ORBIS International.

Dre Cynthia Qian
For more information
usvi.umontreal.ca
Thank you