Telemedicine in Eye Care services, China

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MD, MSc
Shen Yang He Eye Hospital
Contents

- Public Health In Eye Care
- Prevention of the blindness
- The currently issues in China
- Telemedicine in He Eye Care system
- In the future… …
Aim

Have a communication with the knowledge in Public Eye Health and contribute to overcome the currently PBL issues in China with the purpose to set up a network in different medical, science, art and social fields.
Public Health

- Deals with local and regional health care promotion
- Focusing on disease control in terms of prevention, diagnosis, treatment and rehabilitation
- Food and drug, hygiene, habit and culture, age, gender, medical services, insurance… …
- Epidemiology, statistics, economics, management, HR ……
- SARS
Public health in Eye care

- Eye diseases is really special in medical sciences
- Subspecialties: cataract, glaucoma, RE, DR, AMD,
- Influencing the quality of life
- Blind – poverty
- Then a branch should be developed with regarding to the eye care services
PREVENTION OF BLINDNESS (PBL)
VISION 2020
THE RIGHT TO SIGHT
Global Strategic Goal of PoB by WHO and IAPB

VISION 2020: The Right to Sight

By year 2020, the avoidable blindness caused by cataract, trachoma, children’s blindness, low vision and refractive error will be eliminated all over the world.

Disease control

HR development

infrastructure development

In 1999, Chinese government promised to actively participate and realize this goal.
VISION 2020: The Right to Sight

Goal

To eliminate avoidable blindness by year 2020 and make everyone enjoy the right to sight.
VISION 2020 Partners

Partners of National Level--National VISION 2020 PoB Plan Implementation of Sustainable PBL Program
Vision acuity

- Indicators
  - examination
  - diagnosis
  - treatment

- Vision acuity criteria

  Blindness: < 0.05

  Low vision: < 0.3
Analysis of Cause of Blindness (VA < 0.05)

45 million

- Cataract, Refractive error: Preventable 60%
- Trachoma, Vit A deficiency, Oncho's sis: Treatable 15%
- Diabetic retinopathy, Glaucoma: Partial preventable 15%
- AMD, RP, others: Research 10%
Magnitude of Visual Impairment
(Visual Acuity <0.3)

153 million
Uncorrected refractive errors

161 million
Eye diseases

314 million
People severely visually impaired
Main factors affecting PBL Program

- HR
- Infrastructure and Equipment

Effective treatment
Eye Care system (function)

- Primary Eye Care
- Secondary Eye Care
- Tertiary Eye Care
- Highest
Ophthalmic HR Distribution

Subspecialties:
- Glaucoma ophthalmologist
- Pediatric ophthalmologists
- …

General ophthalmologists

Traditional ophthalmologists

Community Health workers
- General ophthalmologists
- Optometrist
- …
Primary eye care (community eye care)

- Health promotion
- Disease prevention
- Screening measures
- Rehabilitation
Secondary Eye Care

- Diagnosis measures
- Treatment
- Cataract surgery
- Training
- Referral
Tertiary Eye Care

- Specialist centre
- Teach and training
- Operation and laser
- Research
Centre of excellent (Highest)

- Specialist centre
- University
- Industry
- Reading Centre
- GCP base and Research
- Vision centre with/without amplyopia practice and low vision

**Vision and Strategies**
Projected Trends in Global Blindness

- Without Vision 2020
- With Vision 2020
- 100 m people

Years: 2000, 2010, 2020
A Successful Programme

- Accessibility of services for all
- Availability of services to all
- Appropriateness of services
- Affordability of services
- Awareness of service delivery systems
- Accountability of the infrastructure
- Achieving Quality Patient Care
- Attendance of the community; individual
THE CURRENTLY ISSUES In China
The blindness in China
(2nd nationally disability investigation)

- Vision impairment: 20 million
- Blindness 6 million
- Low vision: 13.4 million
  - Cataract 46.93%
  - Retinal and uveitis 12.65%
  - Corneal (8.52%)
  - Refractive errors (6.39%)
  - Glaucoma (青光眼 5.64%)
  - ……
Barriers to uptake eye care services

From patients sides

- The ability to pay (indirect, direct)
- No access to the eye care services
- Low self-awareness and traditional attitudes
- No escort
- Insurance
- Distance
Barriers to uptake eye care services

From doctors side

- Technique and equipment
- Unbalance of the distribution
- Experience
- Training and education
- Insurance balance / Policy
- Salary or profit
- HR
As WHO required: there should be one community ophthalmic worker in 10,000 person, an assistant ophthalmologist in 100,000, an ophthalmologist or cataract surgeon in 250,000.

From the statistics yearbook, the population is 1,340,000,000 in China; according to ICO, the number of Chinese ophthalmologist is 28,338 in 2012. (i.e. 1 in 50,000)
Ophthalmic HR Situation in China

- Lack of professional knowledge and clinical technique, the doctors at township hospital is unable to conduct cataract surgery;
- Lack of basic eye care knowledge, basic doctors (community health workers, general ophthalmologists and village doctors) do not know how to use a slit lamp, how to make a fundus examination, so that could not deal with simple eye diseases;
- Community workers did not involve into the primary eye care, including the public education, patients screening and referral, low vision rehabilitation.
PBL staffs lack management skills of public health in eye care. That affects the quality of the PoB project nationally.

Although medical students learned knowledge about eye disease at university, they could not get the enough practical training in the clinic or wards.
The optometrists are coming from different educational background and can not provide high quality refraction for the needs. Also they know too little on eye disease to make good counseling for the patients.

Ophthalmologists, optometrists, community health workers do not have enough professional knowledge or training, so low vision service is far from satisfactory.
Main challenge: How to reduce the gaps

intercontinental

National

City

South Africa

Shanghai

San Paolo

Maliz (West Africa)

Rural

San Paolo
TELEMEDICINE IN EYE CARE SYSTEM
He Eye Care System

- Started from Shenyang He Eye Hospital in December 1995, which was approved by the Ministry of Health China as the first not-for-profit private eye hospital in China.
- Developed from one hospital into He Eye Care System (HECS)—a non-profit organization integrating medical service, education, blindness prevention and treatment, research and eye industry development.
- Currently owns 7 He Eye Hospitals, over 60 He Vision Centers, He University, He Graduate Institute of Ophthalmology and Visual Sciences, Shenyang Green Valley Biotechnology Industrial Co., Ltd, Shenyang Silver Sea Medical Products Co., Ltd, and more. Over 1,400 employees, more than 50 are Master or Ph.D. degree holders with overseas education background.
Used to in Shenyang Childern's Hospital
He Eye Care System

Education and Training
- College of Ophthalmology & Visual Science
- Postgraduate Institute of Ophthalmology & Visual Science
- International Training Center for Community Eye Health

Clinical Services
- 4 He Eye Hospitals (Shenyang, Dalian, Huludao, Panjin)
- 45 Vision Centers (Shenyang, Dalian, Huludao)

Research
- Bio-tech Incubator
- Gene Lab
- Bio-pharmacy Lab
- Stem Cell Biology
- Myopia Lab
- Neuro-ophthalmology Lab

Industrialization
- Shenyang Green Valley Biotech Industry Co. Ltd
- Eye Products Development and Manufacturing

Public Eye Care
- Eye Camp
- Public Education
- PBL Projects
- Eye Museum
- Visual Arts Museum

Eye Care for All
PBL model at county, township and village level

Eye care coverage in urban area:
Training, Referral, Telemedicine

Eye care coverage in rural area:
Training, Referral, Telemedicine
He Steps in Liaoniang

- He Eye Hospitals
- Screened
He Septs in China

- He Eye Hospitals
- Screened area

Liaoning
Jilin
Inner Mongolia
Xinjiang
Tibet
Sichuan
Hubei
Hainan
Fly eye hospital, ORBIS

North Korea

Wenchuan

Yamen

Mianzhu

Uganda

Benshan bright actions
Community screening
Kindergarten screening
Public education and village doctors training
There are 6 million blindness in China.

Almost 80% of them lived in rural and remote areas where there is lack of the eye care service.

Capability building on the doctors at county, township and village hospitals.
Telemedicine network

区域眼科远程医疗网

1. 眼部照相并建电子病例
2. 电子病例上传至服务器
3. 阅片及远程诊断处理
4. 诊疗数据传输给基层医生
5. 基层医生告知患者结果
6. 白内障等疾病转诊到上级医院治疗

信息服务数据存储数据备份
The function of telemedicine

- Training and education
- Diagnosis
- Counselling
- Treatment

Data collection
Instructure and equipment

- A clinic or a separated room
- Table and chairs
- Non-dilated pupil fundus camera
- Slit-lamp
- Computer
- Software
- Technician or doctors

http://telemed.hsyk024.com/
**新建病例**

## 病例信息

### 病例级别
- 普通
- 中等 (72小时内回复)
- 紧急 (24小时内回复)

### 私人医生
- 姓名：
- 性别：请选择

### 病种
- 病种：请选择病种
- 当前日期：2011-09-18

### 姓名
- 姓名：
- 性别：

### 预约日期
- 年龄：

### 眼视力
- 右眼：
- 左眼：

### 眼压状态
- 右眼：
- 左眼：

### 初步诊断
- 诊断：
- 日期：

### 治疗经过及理由
- 治疗经过及理由：

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### 下一步
- 下一步
- 重置
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<td>病例标识</td>
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<td>远视: 0.1 右 0.1 左 0.2</td>
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<td>年 龄</td>
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<td>诊断: 双眼老年性白内障</td>
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<td>治疗经过与结果</td>
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<td>上传图片</td>
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![图片上传](image_url)
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<th>病例名称</th>
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<th>住院日期</th>
<th>病史</th>
<th>处方</th>
<th>用药</th>
<th>诊断</th>
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图片：

![病例图片](image-url)

病例查看
年龄相关性白内障
(age related cataract)
最常见的白内障，多见于50岁以上老年人，随年龄增长发病率增高。它是晶状体老化过程中逐渐出现的退行性改变。
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<th>项目</th>
<th>确认栏</th>
<th>青光眼</th>
<th>白内障</th>
<th>老年性黄斑变性</th>
<th>视网膜脱离</th>
<th>糖尿病视网膜病变</th>
<th>视网膜血管阻塞</th>
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<td>眼睛周围有彩虹样光环</td>
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<td>看东西有缺损（中心或周边）</td>
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<td>有高度近视</td>
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<td>看东西出现重影或三重影</td>
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<td>在暗处视物不清</td>
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<td>在亮处感觉刺眼</td>
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<td>平时视物不清，偶尔能看得比较清楚</td>
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<td>感觉物体扭曲变形</td>
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<td>左右眼看物体大小不同</td>
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<td>有视野缺损</td>
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<td>眼前漂浮丝状物或飞蚊样物</td>
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<td>看东西发暗</td>
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<tr>
<td>有时眼皮跳动</td>
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确认栏中打✓者，有可能是●标记的眼病的表现。建议咨询眼科医生或到眼科门诊进行系统检查。
Vision function

1. 请选择看到的圆的个数：
   - 2个圆
   - 3个圆
   - 4个圆

2. 提交

3. 查看结果：您看到4个圆，检查结果异常，您融合视功能欠佳！
Pros.

1. Could change the unbalance of the eye care resource, which contributes to the equity—the right to see (vision2020)

2. Make the patients get the professional diagnosis and treatment

3. Significantly improve the clinical ability of local doctors
IN THE FUTURE
Life styles are changing!
Diabetes is a Large Problem

**DIABETES ATLAS, 2011: UPDATING BITTER FACTS**

**TOP TEN NATIONS**

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<th>Country/Territory</th>
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<td>China</td>
<td>90.0</td>
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<td>India</td>
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<td>Indonesia</td>
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**TOTAL HEALTH EXPENDITURE DUE TO DIABETES**

**Deaths due to Diabetes as a % of all deaths (20-79 years)**

*In 2030 Japan will not be among the top 10 nations. Pakistan will be in the list at 11.4 million*
Diabetes leads to complications!

FIGURE 1: The major diabetes complications

- Eyes (retinopathy)
- Brain and cerebral circulation (cerebrovascular disease)
- Heart and coronary circulation (coronary heart disease)
- Kidney (nephropathy)
- Peripheral nervous system (neuropathy)
- Lower limbs (peripheral vascular disease)
- Diabetic foot (ulceration and amputation)
Retinopathy can be seen by fundoscope
Fig. 1.1. A drawing of a section through the human eye with a schematic enlargement of the retina.

Fig. 14. Ophthalmoscopic appearance of the retina to show the macula lutea (yellow around fovea).
Retinopathy

Non-proliferative diabetic retinopathy
- Aneurysm
- Hemorrhage
- Hard exudate

Proliferative diabetic retinopathy
- Growth of abnormal blood vessels
Annual Screening is recommended
Retinopathy

• Number One cause of *de novo* blindness in the working population
• Can largely be prevented with proper Vigilance
• WHO recommends diabetes patients to visit Ophthalmologist once per year
• *Many photos!*
Retinopathy

- Mobile screening
- Automatic analysis for photo preselection
• **EFSD Project**
  - Automatic Diagnosis
  - Automatic Risk Identification
  - Creation of a database

• **Future**
  - Detection of other disorders
  - Detection of non-eye related disorders?
Retinopathy

- Successful grant application EFSD/CDS/Lilly
- Several in the pipeline

**EFSD**
European Foundation for the Study of Diabetes

**EFSD/Chinese Diabetes Society/Lilly**

Programme for Collaborative Diabetes Research between China and Europe

**Research Grant Application**

1. Applicant Information

   **Principal Investigator:** Prof. Wei He, MD, PhD, EMBA  
   Shenyang He Eye Hospital  
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   E-mail: hewei@163.com

   **Co-Applicant 1:**  
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   Sino-Dutch Biomedical and Information Engineering School, Northeastern University  
   Postal address: 11-3 Lane, Wenhu Road, 110004 Shenyang, China  
   Telephone: +86 13900698399  
   E-mail: yankang@163.com
Avoidable blindness would be eliminated
Thank you for your time