Telescreening of Critical Eye Diseases in Rural Areas in Lithuania

A. PAUNKSNIS¹, L. VALIUS¹, K. ANDRIJAUSKAS², D. IMBRASIENE¹, ANDZIUKEVIČIUS⁴, R. KIZLAITIS³

¹LITHUANIAN UNIVERSITY OF HEALTH SCIENCES, ALVYDAS@STRATELUS.COM
EIVENIU STR.2, KAUNAS LT-50009, LITHUANIA
²KALTINENAI PRIMARY CARE CENTRE, LITHUANIA
³VILNIUS UNIVERSITY, LITHUANIA
⁴KAUNAS DAINAVOS POLYCLINIC, KAUNAS, LITHUANIA
Presentation plan

1. Introduction and history of telemedicine in Lithuania
2. Project – Telescreening of critical eye diseases in rural areas in Lithuania
3. Conclusions
Telemedicine in Lithuania (1)

- Started in 1997, at the Lithuanian University of Health Sciences
- International Projects
- Litmed1 project with Sweden
- Litmed2 project with Sweden
- BalticMedWeb
- Tele-educational project with Brasil
Telemedicine activities in Lithuania started in 1997 from telecommunication with Stockholm, St.Erik Eye Hospital.

Teleconsultations and second opinion
There were two different opinions in KMU Eye clinic on etiology of acute retinal necrosis. After common discussion with colleagues from St. Erik hospital, Stockholm the herpes viral etiology of acute retinal necrosis has been established.
Vascular genesis of the orbital tumor determined and after common discussion a surgical treatment delayed.
Virtual Clinical Practice

• In 2004 the Telemedicine Center took part in the RESCUER/MEDCEUR project exercise. Effectiveness of teleconsultations was demonstrated in joint activities of civil and multinational military services in critical situations such as mass casualty events.

• A multinational team of medics at Training Range in Lithuania reacted to a large mass casualty event – treating hundreds of victims from a simulated train crash. In the place of event we arranged live, high level medical multispecialists teleconsultations from Kaunas Medical University Hospital.
Virtual Clinical Practice

These results show the facilities of existing telemedicine infrastructure and needs for further development of existing system into International Integrated eHealth Network for very fast international exchange of medical information, remote consultations of high skilled specialists in emergent or a large mass casualty events from the best European civil and military medical centers and distant education.
Education is a natural function of the network.

Distance education started with lectures, live cataract and vitreoretinal surgery demonstration, from St. Erik, patient demonstration to St. Erik and common discussion.

Live distance lectures, surgery demonstrations, and seminars held on.
Telemedicine in Lithuania (2)

- Start was with educational activities, international teleconsultations, military drills.

- Then, it evolved into next phase: Research and Development, e.g.:
  - State Science and Research Fund supported Health IT projects for interactive and automatic recognition of eye fundus images, recognition algorithms developed.
Strategy and Aims in Telemedicine in Lithuania

Strengthen practical clinical use of telemedicine:

- Train primary care physicians in use of telemedicine, especially in rural areas
- Equip primary care physicians in rural areas with devices suitable for telemedicine (digital fundus cameras, digital slit lamps, digital ECG)
- Strengthen cooperation between primary care physicians in rural areas and tertiary level specialists
- Resolve legal issues such as payment for teleconsultations from the State Patient Fund
Current and Recent Telemedicine Projects in Lithuania

- NICDIT, R&D project supported by EU Eurostars programme: Lithuania-Finland-Sweden
- Development and upgrades of hardware and software for early diagnostics of eye tumours, using telemedicine networks: Optomed (Finland), Stratelus (Lithuania), Softneta (Lithuania)
- Advancement of secure online data exchange: Vilnius Santariskiu University Hospital
This was review of development of telemedicine in Lithuania

...and now,
Example of practical clinical application:

Telescreening of Critical Eye Diseases in Rural Areas in Lithuania
Telescreening of Critical Eye Diseases in Rural Areas in Lithuania

- **Aim:** determine how the collaboration of tertiary and primary level physicians through screenings, remote diagnostics and use of suitable diagnostic equipment could enable earlier diagnostics of eye diseases in rural areas.

- **Background:** Advanced eye disease diagnostics and treatment in Lithuania are concentrated in two main tertiary centers. Rural areas have lower access to advanced healthcare services due to the shortage of specialty doctors, long waiting times and distance to points of service.
Telescreening of Critical Eye Diseases in Rural Areas in Lithuania: Project Structure

- **Project Partners:** Stratelus JSC (www.stratelus.com), Telemedicine Research Center (www.telemedcentre.com) in conjunction with the Telemedicine Centre of the Lithuanian University of Health Sciences and the Family Clinic of the Lithuanian University of Health Sciences

- **Patients and Locations:** Kaltinenai Primary Care Centre (rural); Dainavos Polyclinic and LUHS Family Clinics in Kaunas (urban). Ukmerge Family clinic (rural), Elektrenai Primary Care Center (rural)

- The following eye diseases were screened and diagnosed: glaucoma, aging macular degeneration and diabetic retinopathy
Telescreening of Critical Eye Diseases in Rural Areas in Lithuania: Methodology

- Identified a pilot group of primary care physicians;
- Trained them in telescreening and use of handheld digital fundus camera, digital IOP tonometer, handheld slitlamp.
- Primary care physicians at rural locations were tasked to screen the population, detect eye diseases and assess the degree of advancement of the disease when the disease is diagnosed for the first time, and transfer data for evaluation of the tertiary level physicians.
The stage of disease was evaluated for the patients who were diagnosed with the disease for the first time

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<td>5/30</td>
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<tr>
<td>Aging macula degeneration</td>
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<td>37/-</td>
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<td>Glaucoma</td>
<td>9/35</td>
<td>1/39</td>
<td>31/-</td>
<td>62/-</td>
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Telescreening of Critical Eye Diseases in Rural Areas in Lithuania: Interpretation of Findings

- **Tendency:** we observed that early changes to the eye fundus are more frequently diagnosed in urban areas than in remote, rural areas.

- Of the patients who were diagnosed with diabetic retinopathy, aging macula degeneration, and glaucoma for the first time in the rural areas, they had **advanced stage of disease more often** than early stage of disease, particularly in case of diabetic retinopathy and glaucoma.

- This pilot project will continue and larger sets of data collected will be analysed.
Eye Fundus Images acquired with the handheld Smartscope digital fundus camera

Retinopatia diabetica simplex (urban)  Retinopatia diabetica proliferans (rural)
Conclusions

- The findings confirm the assumption that critical eye diseases -- diabetic retinopathy, aging macula degeneration, and glaucoma -- are diagnosed at an earlier stage in urban areas as compared to rural areas.

- Late diagnostics of these critical eye diseases, their diagnosis at an advanced stage is an area of concern as it may have negative impact on treatment outcomes, patient health and potential disability.

- Use of mobile digital telemedicine-enabled diagnostic equipment is very helpful in early diagnostics.
Broader Implications

Among the likely reasons of differences in disease stages diagnosed between urban and rural areas are that

- Urban population are taking better care of their health,
- Urban population have better access to specialists and advanced healthcare services.
- In rural areas, where percentage of critical eye diseases diagnosed at an advanced stage was higher, lower access to advanced healthcare, lack of specialist physicians, remoteness to advanced care centers, behavioural aspects (people in rural areas often tend to be less focused on health prevention) can explain the higher number of neglected cases.
Benefits of Telemedicine

- Proactive preventive population screenings in rural areas, patient education, tertiary and primary level physician cooperation, use of remote diagnostics via telemedicine and appropriate diagnostic medical equipment in detecting critical eye diseases brings the service closer to the patient and effectively enable earlier diagnosis of eye diseases in rural areas.

- Use of telemedicine in rural areas involved in the project was also found to be economically efficient. Diagnosing diseases at an earlier stage is important in improving the prospects for treatment effectiveness, outcomes, patient disability and mortality, and long-term social and economic costs.
Next Steps

- Promote use of telemedicine, especially in rural areas
- Expand the number of telemedicine partners
- Lithuanian Telemedicine Association has been established in 2012 with the aim to promote telemedicine in Lithuania

THANK YOU!