5th Annual
FOCUS ON EYE HEALTH NATIONAL SUMMIT
VISION TO ACTION: Collaborating Around a National Strategy

Wednesday, July 13, 2016
National Press Club | Washington, DC
Preventing Vision Loss: Accessing Care
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Conflicts of Interests Disclosure

• AAO Foundation – Hoskins Center for Quality and Safety
• American Board of Ophthalmology
• Centers for Disease Control and Prevention
• American Glaucoma Society
• American University Professors of Ophthalmology

• Private investment
  – Vital Spring Health Technologies

• Consultant and Research funding
  – National Eye Institute
  – Kellogg Foundation

• University of Michigan
• Duke University
• Intellectual property
  – Statins for glaucoma
  – EMR decision support and data entry
Themes

• Vision is important
• Progress is being made in reducing vision loss, but …
• Access to care remains a public health issue
• Current and future efforts can enable us to address the challenges
Why Does Eye Care Matter?

Impacts Almost Everyone

Prevalence (%) of Chronic Eye Diseases in Cohort Panel in Medicare Population

Lee PP et al, Arch Ophth 2003

Vision Care is Cost Savings to Society

LXIII Edward Jackson Memorial Lecture: Eye Care: Dollars and Sense

HUGH R. TAYLOR, AC, ND

The development of health economic data for vision loss and eye diseases is described. These data, population-based epidemiologic studies of chronic diseases, estimated the impact of vision loss on daily living. Australian national health-care costs, severe, and demographic projections were combined to develop a model of the economic impact of vision loss in Australia.

METHODS: Data were collected to assess the current prevalence and costs of vision loss and to make projections for the future using econometric modeling and demographic data. If current projections in the Australian population were to continue, it is estimated that Australia will face massive costs of vision loss.

RESULTS: The amount of vision loss increases three-fold each decade with vision loss prevalence in 20 years. Vision loss costs Australia a total of A$5.9 billion in 2004. Vision loss makes significant economic loss of well-being. An intervention package to address avoidable vision loss would cost A$1.8 billion in 2004.

CONCLUSIONS: Although results for Australia, these data can help guide health care policy debates and the priority given to eye care in other developed countries. For such efforts, the preponderance of vision loss and cost data are most informative. The vision loss costs and vision loss blindness data are also important for national health planning and government decision making.

The great honor to deliver the 11 Edward Jackson Memorial Lecture. Since my first Academy meeting I have appreciated learning from the giants of ophthalmology who have been selected to receive this recognition. Since 1973, the Architect of the Eye, a special volume containing the proceedings of the Academy, has been published. I am proud to be the sixth International Jackson Lecturer and the first from Australia.

The Edward Jackson Lecture includes the following three parts of Edward Jackson’s life and contributions: (1) For those of you who are not familiar with these names I mentioned strongly these reviews as being of high interest.

THE PRIORITY GIVEN TO VISION LOSS

Clinical, medical, and preventive services for vision loss are underfunded, yet the impact of vision loss needs to be recognized. In 1980, the World Health Organization (WHO) asked me to review eye care services in Pakistan as part of the Tanzanian government. When I presented my report to the Minister of Health, he received it, but then he underscored the need to prevent blindness. As Health Minister, he faced many staff problems related to mental health, the prevalence of vision problems, and the need to provide eye care services. The eye care services in Pakistan were in fact based on prevention, and he asked: "What do you recommend?" There is a puzzle that these services are more important than the costs of vision loss, which are significant. There is also a challenge we will face, both in individual ophthalmologists and as a profession, whether we are working on our own, in a hospital, or in a government facility. The profession will be committed to saving health dollars. On these costs, there is competition for health dollars.

POPULATION-BASED EVIDENCE

I have been asked by the President of the Academy to discuss a wide range of information. In ophthalmology, they have given a great information about the prevalence and incidence of eye disease and vision loss. In 1994, there were no reliable data on the magnitude or causes of vision loss in Australia. After the National Eye Institute (NEI) was named, it was a large population-based...
Outcomes of Eye Care – Why Regular Eye Care is Important  Sloan FA, et al, JAGS, 2005

• 21% of population (NLTCS) developed increase in IADL limitations between 1994 and 1999

• Effect of moving from 1.64 annual eye exams to 2.64 annual exams (mean of 2.14)

  = decrease from 27.5% to 14.5% (p = 0.041)

• DM / Cataract / AMD /Age / Female / Yrs. of education / DxCG / Less HMO / Dementia increased risk
Themes

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• Access to care remains a public health issue

• Current and future efforts can enable us to address the challenges


Angelo P. Tanna, H. Stephen Kaye


http://dx.doi.org/10.1016/j.ophtha.2012.04.018
When diabetic retinopathy is detected early, treatment is 95% effective in preventing severe vision loss.
Long-Term Trends in Glaucoma-Related Blindness in Olmsted County, Minnesota, Ophthalmology 2014, Mehrdad M et al  
http://dx.doi.org/10.1016/j.ophtha.2013.09.003
Geographic Variation in the Age-Standardized Cataract Surgery Rate Throughout the United States. Communities with a lower age-standardized rate of initial cataract surgery are shaded lighter in color, while those with a higher age-standardized rate of initial cataract surgery are shaded with darker colors.
Geographic Disparity (by County) of Poverty and Vision Loss

Kirtland KA, et al, MMWR, 2015

Percentages $\geq 18$ with severe vision loss (blind or serious difficulty seeing even with glasses)

Percentages $\geq 18$ with family income below poverty
Per Capita Prevalence of Visual Impairment in the United States in 2015

Per Capita Prevalence of Visual Impairment in the United States in 2015

From: Visual Impairment and Blindness in Adults in the United States: Demographic and Geographic Variations From 2015 to 2050 (Varma R, et al)

JAMA Ophthalmol. Published online May 19, 2016. doi:10.1001/jamaophthalmol.2016.1284
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Disparities in Vision Loss and Eye Care

- Age
- Race
- Gender
- SES (Education/Income)
- Culture
Insurance and Use of Eye Care

Zhang X, et al, Arch 2008

![Graph showing Eye Care Services by Type of Health Insurance: US-Private, US-Public, US-None, Canada.]

![Map showing Percent of Total Population without Health Insurance Coverage, 2000.}
Socioeconomic Factors in First Presentation of VF Loss


- SES from ACORN index – 15 residences
- Clinical factors
  - Age
  - High IOP, Large C/D ratios, Worse VA
  - Family history
  - Increased # of systemic health issues

![Graphs showing visual field loss in the worst and least affected eye for Group 1 and Group 2.]
Disparities in Eye Care Utilization Among the United States Adults With Visual Impairment: Findings From the Behavioral Risk Factor Surveillance System 2006-2009

Chou CF, et al, AJO, Volume 154, Supplement, 2012, S45 - S52.e1

http://dx.doi.org/10.1016/j.ajo.2011.09.025
Focus Groups: Why People Don’t Use Services  Owsley et al, IOVS, 2006

- Affordable and accessible transportation
- Cultural sensitivity
- Age-appropriate communications
- Trust-building
- Differing expectations
Addressing Patient Expectations – (Patient and Family Centered Care)
Dawn & Lee, Archives, 2003

• Communication
  – honesty (1);
  – diagnosis and prognosis (2);
  – clear language (3);
  – listening and addressing concerns (6)

• Interpersonal manner
  – empathy (5);
  – personal connection (7)
• ...uncertainties in the assumptions that underlie any prediction will contribute to the difficulty in making any prediction related to the ophthalmic marketplace.

• ...ophthalmologists must navigate among specialists and primary care providers at a time when we are not significantly increasing in numbers, and depending on how one models the delivery of eye care, we may have an oversupply or an undersupply of ophthalmologists.

• We will need to participate in team-based care, a term that we will continue to hear more about because it is the type of care that engages nurse practitioners, social workers, and others in the continuum.
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Health and Health Care in 2032:
RWJ Foundation / Institute for Alternative Futures, 2012

• 4 scenarios for next 20 years for USA

• Culture of health
• Big data, big health gains

• Slow reform, better health

• Health if you can get it
Social Determinants of Health

Source: Dahlgren and Whitehead, 1991
Common Features Across RWJ Scenarios: “Must do’s”

- Continued technological innovation in our therapies and diagnostics
- Personalized care approaches
- Greater efficiency and value
- Alternative means of providing care
- Greater use of data (but in different ways)

- Emphasis on preventing disease development in more advanced scenarios
Expanded Opportunities for Care

- CDC Efforts
  - Walmart – UAB
  - Community Groups – Wilmer
  - Senior Housing / Vans – Wills
  - FQHC’s
Aravind Eye Center
Innovations
Impact of Refractive Error


- 71.9% of US individuals with visual impairment could be clinically better with vision assessment and proper refractive correction
- 22.1% of those blind could also experience clinical improvement


- RAND Health Insurance Experiment demonstrated free care improved vision (one of only 3 indicators to improve with free care)
- “Free care resulted in improved vision by increasing the frequency of eye examinations and lens purchases.”
From: Clinical Validation of a Smartphone-Based Adapter for Optic Disc Imaging in Kenya


Examination Using the Reference Desktop Retinal Camera (A) and the Smartphone-Based Adapter (B)

Peek Grader Being Used to Measure Vertical Cup-Disc Ratio on the Telephone
Telemedicine Improves Access

• RCT of diabetes patients
  – Telemedicine with non-mydriatic camera
  – Traditional surveillance

• Results
  – Telemedicine more likely (94% vs 56%) to have screening exam in first year
  – 21% needed further evaluation, 86% of these due to poor quality digital images
Eye Care Use for 260 Patients Seen in Clinic for 2 Years after Teleretinal Screening by Disease

(Chasan JE, et al, JAMA Ophthalm 2014)
Thinking about E-Health

• Estimates are that up to 25% of outpatient visits will be shifted to e-health by 2025

• Kaiser-Permanente had 2 Million e-health visits last year
  – Greater satisfaction
  – Significant efficiencies
  – High quality
Randomized Trial of a Home Monitoring System for Early Detection of Choroidal Neovascularization Home Monitoring of the Eye (HOME) Study

http://dx.doi.org/10.1016/j.ophtha.2013.10.027
Diabetic Retinopathy Analysis Using Machine Learning (DREAM)

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<th>Method</th>
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<th>SPEC (%)</th>
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Figure 2. The AUC and associated 95%CI for trial 1 (0.03c) as a function of the number of KW gradings per image.

http://journals.plos.org/plosone/article?id=info:doi/10.1371/journal.pone.0071154
Using Filtered Forecasting Techniques to Determine Personalized Monitoring Schedules for Patients with Open-Angle Glaucoma

Gregory J. Schell, Mariel S. Lavieri, Jonathan E. Helm, Xiang Liu, David C. Musch, Mark P. Van Oyen, Joshua D. Stein

Figure 3. Kalman filter trajectories of mean deviation (MD). The figures illustrate the Kalman filter’s ability to accurately forecast MD. The Kalman filter requires 3 visits to calculate initial values of velocity and acceleration for MD.

http://dx.doi.org/10.1016/j.ophtha.2014.02.021

It was hard to keep track of all my drops

When my doctor told me I would need to take two different kinds of glaucoma drops at two different times during the day, I didn’t think I could do it. I was worried that I wouldn’t be able to manage all of the different drops I had to take every day.

But the doctor explained that taking all of these doses will keep my eye pressure from bouncing around throughout the day. The doctor explained that when the eye pressure changes a lot, it puts my optic nerve at risk of being damaged faster. Learning that all of the drops are necessary to help protect my vision made me realize how important it is to take my drops multiple times a day.

Over time I figured out a system that works for me.

I use the alarm on my smartphone to remind me to take my medications. If I can’t take the drops right away, I “snooze” the alarm until I take them. I also use the calendar on my phone to remind me when my refills are due. It also helped to set up automatic medication refills at the pharmacy, so when my prescription is ready they call and remind me to pick it up.

Linking my medication to something I do every day helps me remember to take it. I leave the bottle next to my toothbrush and take it right after brushing my teeth. A friend told me she likes to have it on the nightstand next to her bed so she can put the drops in while she’s lying down.

The dose I have the most trouble remembering is the one I have to take in the middle of the day when I’m not home. I asked my doctor to prescribe me a three-month supply so that I can leave one of the bottles in my purse. That way I always have my medication with me for my mid-day dose. My doctor also told me that I don’t have to worry about the order that I put my eye drops in, so that makes it easier.

Tailored on barrier to glaucoma medication adherence

Tailored on gender and race/ethnicity

Tailored on use of technology

Courtesy of Paula Anne Newman-Casey, MD
AAO IRIS: Unique Patients and Visits

Courtesy of Flora Lum, MD, AAO
Participation in IRIS Registry

Courtesy of Flora Lum, MD, AAO
Systems Medicine: Predictive, Preventive, Personalized and Participatory
Learning Culture(s) – CQI, Lean, TQM

**ACT**
Present results and apply changes

**PLAN**
Establish objectives and processes relevant to outcome

**CHECK**
Measure and analyse quality indicators

**DO**
Implement Quality indicators

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![TQM Model Diagram](image)