A Systems Approach for Vision Health

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• Conflicts of Interests
  – Genentech
  – Pfizer / Merck / GSK
  – Novartis
  – Quorum
  – Health services research funding
Systems Approach for Vision Health

• Focus on the future

• Learning system based on surveillance

• Possible future changes
Eye Care for the Future
Hugh Taylor, Wiesenfeld Lecture, IOVS, 2002

- Poor vision is bad for you
- Poor vision is much more common than we think
  - Refractive error
  - Cataract
  - Diabetes
  - Glaucoma
  - AMD

- Vision 2020 and national action plans (e.g., Healthy People 2020)

Lecture
Eye Care for the Future
Hugh R. Taylor

I am particularly proud to give the Minahed Wiesenfeld Lecture because the work we do in eye care is so important in many ways. This lecture is named for Minahed Wiesenfeld, who was a great advocate for eye care in the United States and around the world. She established the Minahed Wiesenfeld Lecture in 2000 as a way to recognize the importance of eye care and to encourage others to support this vital field of medicine.

Refractive error
Cataract
Diabetes
Glaucoma
AMD

Vision 2020 and national action plans (e.g., Healthy People 2020)

Public Health
I have chosen to talk about eye care for the future, but before we can look ahead, you have to know where you are. What is the current state of eye care in America? How do we measure the health of our eyes and the health of our vision? How can we ensure that everyone has access to the care they need? These are the questions that we need to answer in order to make meaningful progress.

Poor Vision in the Future
The Wiesenfeld Lecture
Hugh R. Taylor

In conclusion, we must work together to ensure that everyone has access to the care they need. This requires a comprehensive approach that includes education, research, and policy changes. By working together, we can ensure that everyone has the opportunity to see clearly and live a healthy life.

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New Paradigm - Prospective Health

Risk Assessment
Decision Support

Symptoms
Low Risk, High Risk, Early Chronic, Late Chronic

Years
Cost

Personalized Health Plan

Personal Lifestyle Plan
Wellness education and Internet & Health Provider guided planning for all; genomics / personalized education

Risk Modification
Wellness education and Internet & Health Provider guided planning for all; genomics guided

Disease Management
Individual-focused; integrated provider systems. Focus on quality of life and palliation at appropriate late stages

(Courtesy of R Snyderman, MD)
Population Health for Systems

Source: Paul Lee

Site of service

Quaternary Hospital
End of life
Spectrum of care
Wellness
Traditional Delivery

New Models & Innovation
Community Health

Source: Paul Lee
Systems Approach and Surveillance

• Monitor / Prioritize / Evaluate
  – Vision loss
  – Use of eye care
  – Eye injury and protection

• Integrate data with programs to meet Healthy People 2020
  – Reduce disparities
Systems Approach for Vision Health

- Focus on the future
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Fundamentals of a Systems Approach: Learning Health Care System

- Critical role of faculty leadership in collaborative, integrated teamwork
- Can establish priorities and governance
- Define outcomes and metrics that matter
- Virtuous cycle of academic and operational improvement
- Implementation in specific areas
Healthy People 2020 Objectives

• Increase the proportion of adults who have a comprehensive eye examination, including dilation, within the past 2 years

• Increase the use of personal protective eyewear in recreational activities and hazardous situations around the home

• Increase vision rehabilitation
Healthy People 2020 Objectives

• Reduce visual impairment in US population
  – Uncorrected refractive error (12 and older)
  – Diabetic retinopathy
  – Glaucoma (45 and older)
  – Cataract (65 and older)
  – Age-related macular degeneration (AMD) (45 and older)
Functions (Minimum) of Vision Surveillance System to Achieve Objectives

• Establish standard definitions of endpoints for Healthy People 2020 objectives
• Reliably collect data on Healthy People 2020 objectives
• Integrate with “effectors” who can implement programs to increase utilization of appropriate services and reduce visual impairment
• Feedback loop of endpoint measurement of progress towards meeting objectives
Systems Approach for Vision Health

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Surveillance Panel Observations

1. Link data collection and analysis with ongoing public health interventions to improve eye health disparities
Panel Observations

2. Effectively assess vision loss
   A. Performance-based measures
      Threshold approach
      Central visual acuity
      Contrast sensitivity
   B. Self-reported measures
      Need to harmonize measures
Technology Interface

• Fundus / Imaging cameras
  – Telephone camera
  – Cheaper systems

• Assessment of acuity
  – Online
  – I-pad
Automated Detection of DR
Abramoff MD, Neimeijer M, Russell SR. Expert Rev Med Dev 2010

Performance

• “... performance of the algorithms measured in ROC only slightly lags behind the sensitivity and specificity of the experts.”
• “… the system can always match the sensitivity of the human expert – but at a lower specificity.”
• “ the cost per patient for automated detection to be ... [US $ 0.25 ]

Future Efforts

• “... further measurable improvements in detection performance have become difficult to achieve.”
• “… validation on well-defined populations of patients with diabetes ... are more urgent than further algorithm development.”
Panel Observations

3. Effectively assess utilization of care
   A. Currently measured in < ½ states
   B. Multiple methods available
      surveys / claims data / EHR’s
   C. Topics of interest
      use intervals / barriers / rehab use
Use of Claims Databases

Jonathan Javitt – pioneer in Medicare database analyses

Issues with Current Analyses

- Accuracy of coding
  - Procedures - high
  - Diagnoses (3/4/5 digits) - variable

- Completeness of coding for all conditions in patient

- Uncoded / unbilled services

- No laterality

- Generally no severity / stage of condition (but DM and AMD have stages, and OAG soon)

- Aggregates across all providers for patient data
Impact of ICD-10 Coding System
Starting October 1, 2013

• ICD-10-CM for diagnoses
  – Up to 155,000 combinations
  – Goes to 7 alphanumeric characters (6 eye) with decimal after 3rd
    – Laterality (inc bilateral)
    – Combines conditions and common symptoms
    – Future expansion possible
    – Expanded post-operative complications
    – Distinction intra and post-operative complications

• ICD-10-PCS for procedures (2012)
  – 7 alphanumeric characters, no decimals
  – 71,918 codes total
    • 61,896 in med / surg
    – Greater detail about devices
    – Restricts NOS / NEC
    – Character 2 = body system
    – Character 3 = root operation
    – Characters 4 through 7
      • Body part / Approach
      • Device / Qualifier
Sampling of Registries

Non-Ophthalmic

- US Bureau of Pension for Union Army Civil War disability pensions (1890)
- Uses
  - Prevention
  - Treatment
  - After care
  - At risk
  - Population status / disease
- Duke Databank for Cardiovascular Disease, 1969 (Eugene Stead)

Eye Care

- Blindness Registries
  - Country
  - State
- Retinoblastoma (Netherlands)
  - Data as far back as 1862; start 1945
- Ocular side effects of drugs
- Cataract Surgery
- Corneal grafts
- Eye injury / trauma
- Dry eye
- Glaucoma
Swedish Cataract Registry Work

Quality of Life measures using CATQUEST

Pre-operative VA
Panel Observations

4. Include defined populations to assess disparities in vision loss and utilization of care
   A. Geographic
   B. Gender
   C. Race/ Ethnicity
   D. Socioeconomic status
Geographic Variation Mapping: Economics and Health

Poverty – US 2007

Disability – US 2007
Insurance and Use of Eye Care

Zhang X, et al, Arch 2008
Social Determinants of Health

Source: Dahlgren and Whitehead, 1991
Panel Observations

5. Include and sustain ophthalmic / vision measurement and question components within national surveys

A. BRFSS – vision module in 23 states
   (since 2005; discontinued in 2011)
B. NHANES – vision discontinued in 2009
C. NHIS vision supplement in 2002 and 2008
Social Networks to Change Attitudes

- **WIRED**, Issue 17.10, Sept 2009

- People cluster around happy people / joyful expressions

- Smoking cessation
- Weight loss
- Healthy behaviors
Panel Observations

6. Vision surveillance system needs to be forged among federal agencies and other stakeholders to monitor nation’s eye health and eye care utilization for trends in disparities
   A. Harmonize self-reported items
   B. Promote implementation of system
   C. Offer input to private entities
Engaging **Care System** to Meet Healthy People 2020 Objectives

- Essential link in continuous improvement / learning systems approach
- Enterprise approach with coordination of care system stakeholders
  - Support surveillance system
  - Coordinate implementation programs / approaches