Vision Surveillance in the United States

Paul P. Lee, MD, JD

- University of Michigan
- Duke University
- PBA (past board member)
- CDC (consultant)

- Conflicts of Interests
  - Genentech
  - Pfizer / Merck / GSK
  - Novartis
  - Quorum
  - Health services research funding

Vision Surveillance

- Why vision surveillance matters
- Goals of vision surveillance
- Current status of surveillance
- Future directions

Public Health Surveillance

CDC Comprehensive Plan for Epidemiologic Surveillance, 1986

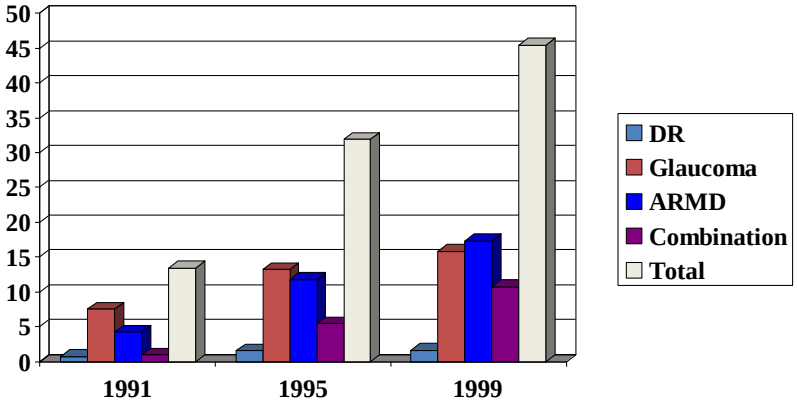
- "… the ongoing systematic collection, analyses and interpretation of health related data essential to planning, implementation and evaluation of health practices…The final link in the surveillance chain is to apply the data toward prevention and control."

Why Do We Care?

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, MD

• PURPOSE. The development of health economic data for vision loss and eye disease is described.
• DESIGN. Data from population-based epidemiologic studies of eye disease, studies of the impact of vision loss on daily living, Australian national health-care costs, census, and demographic projections were combined to develop a model of the economic impact of vision loss in Australia.
• METHODS. Data were considered to assess the current magnitude and costs of vision loss and to make projections as to future costs. Further analysis investigated the costs and economic benefits of various interventions to address avoidable vision loss.
• RESULTS. The amount of vision loss increases threefold and the number with vision loss will double in 20 years. Vision loss cost Australia a total of AU $9.8B billion in 2004. Vision loss ranks seventh in causes of loss of well-being. An intervention package to address avoidable vision loss would cost AU $190 million or AU $5,591/Quality Adjusted Life Year (QALY) and give lifetime savings of AU $911 million.
• CONCLUSIONS. Although specific for Australia, these data can help guide health care policy debate and the priority given to eye care in other developed economies. For each dollar spent on the prevention of vision loss and eye care, there is a 5 dollar return to the community. (Am J Ophthalmol 2007;143:1–8. © 2007 by Elsevier Inc. All rights reserved.)

IT IS A GREAT HONOR TO BE INVITED TO GIVE THE LXIII Edward Jackson Memorial Lecture. Since my first Academy meeting I have enjoyed and learned much from the giants of ophthalmology who have been selected to receive this recognition over the years by the American Ophthalmic Publishing Company and the Academy.[1] I am proud to be the ninth international Jackson Lecturer and the first from Australia.

Accepted for publication Oct 1, 2006.

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Previous Jackson lecturers including Paul Lichter and Dan Albert have given wonderful descriptions of Edward Jackson's life and contributions.[2–4] For those of you who are not familiar with these may I recommend strongly these reviews as being of high interest.

THE PRIORITY GIVEN TO VISION LOSS

LIKE ALL OPHTHALMOLOGISTS, JACKSON INSTINCTIVELY knew the importance of good vision and eye health. The treatment of eye disease and the prevention of blindness is our highest priority; it is our calling. As ophthalmologists, we all accept the importance of good vision without question.

In 1980, the World Health Organization (WHO) asked me to review eye services in Pakistan at the request of the Pakistani government. When I presented my report to the Pakistani Minister of Health, he received the report, but then he stated vision loss was just not a priority for him. As Health Minister, he was faced with many problems; infant mortality, maternal deaths, the provision of primary health care. He had expensive hospitals to run, and also the health problems of a million Afghani refugees present in Pakistan at that time.

The problem I faced was how to convince others of the importance of eye care services and to prioritize them relative to other pressing health demands. This is a challenge we all face, both as individual ophthalmologists and as a profession, whether we are working in our own hospitals, or lobbying politicians and policy makers. On every side, there is competition for health dollars.

POPULATION-BASED EVIDENCE

EPIDEMIOLOGIC FIELD STUDIES CAN PROVIDE A WIDE range of information. In ophthalmology, they have given us great information about the prevalence and incidence of eye diseases and disease risk factors. In 1991, there were no coherent data on the magnitude or causes of vision loss in Australia. At best, only fragmented reports were available. To address this gap, the "Melbourne Visual Impairment Project" (VIP) was started. It was a large, population-based

0002-9394/07/$32.00
doi:10.1016/j.ajo.2006.10.003

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% ($p = 0.041$)

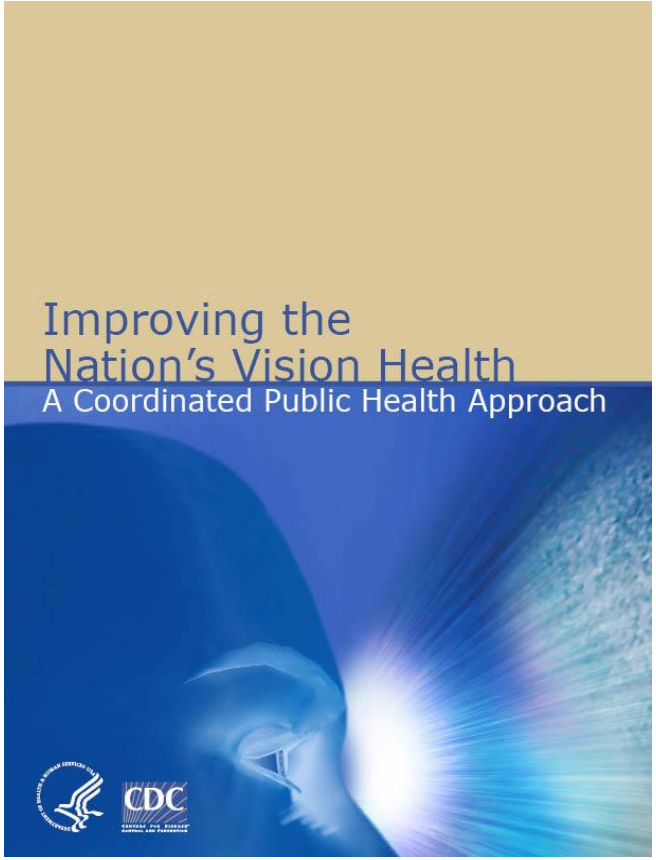
- DM / Cataract / AMD /Age / Female / Yrs. of education / DxCG / Less HMO / Dementia increased risk

Eye Care as Entry to Health Care

- Adults aged 18 and older – Doheny 1990's
  - 28% accessed health care through eye care delivery system
- Medicare patients aged 65 and older
  - Initial visit to clinical provider was in eye care in 8 to 14% within 5 years of eligibility
  - Both ophthalmologists and optometrists

Surveillance's Role

- Monitor / Prioritize / Evaluate
  - Vision loss
  - Use of eye care
  - Eye injury and protection
- Integrate data with programs to meet Healthy People 2020
  - Reduce disparities



Disparities in Adult Vision Health in the United States

Zambelli-Weiner A, Crews J, Friedman DS. AJO Supp 2012

"Data to assess and monitor trends in vision health disparities in the United States are not collected presently in a systematic fashion. This lack of data limits public health efforts to overcome barriers to eye care use and to improve vision outcomes."

American Journal of Ophthalmology

- Volume 154
- Supplement 6
- www.sciencedirect.com/science/journal/00029394/154/6/supp/S

CDC Expert Panel – Surveillance of Vision Disparities

- Sheila West (Co-Chair)
- Paul Lee (Co-Chair)
- Sandra Block, OD, Med
- Janine Clayton, MD
- Mary Frances Cotch, PhD
- Colin Flynn, ScM
- Linda Geiss, MA
- Ronald Klein, MD, MPH
- Timothy Olsen, MD
- Cynthia Owsley, MSPH, PhD
- Susan Primo, OD, MPH
- Gary Rubin, PhD
- Asel Ryskulova, MD, PhD, MPH
- Sanjay Sharma, MD, MSc, MBA
- David Friedman, MD, MPH, PhD
- Xinzhi Zhang, MD, PhD
- John Crews, DPA
- Jinan Saaddine, MD, MPH

Vision Surveillance

- Why vision surveillance matters
- Goals of vision surveillance
- Current status of surveillance
- Future directions

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

Healthy People 2020

- **GOAL**: Improve the visual health of the Nation through prevention, early detection, timely treatment, and rehabilitation.
- Objectives address screening and examinations for children and adults, early detection and timely treatment of eye diseases and conditions, injury prevention, and the use of vision rehabilitation services.

Healthy People 2020 Objectives

- Increase the proportion of preschool children aged 5 years and under who receive vision screening.
- Reduce blindness and visual impairment in children and adolescents aged 17 years and under
- Reduce occupational eye injuries

Healthy People 2020 Objectives

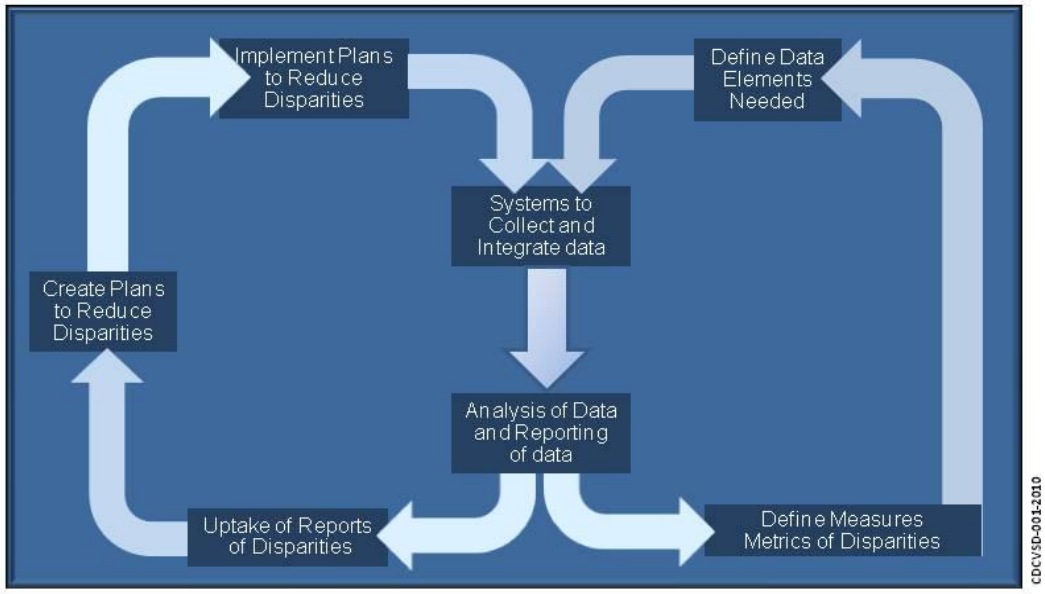
- Increase the proportion of adults who have a comprehensive eye examination, including dilation, within the past 2 years
- Increase the use of personal protective eyewear in recreational activities and hazardous situations around the home
- Increase vision rehabilitation

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)

Panel Observations

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



Vision Surveillance

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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**

Defining Vision Loss for "Visual Impairment"

- "Final common pathway" of visual diseases
- Known performance / reliability for "performance-based" measures
  - Visual acuity (BUT standardize definition)
  - Contrast sensitivity
- Relationship to societal policies
  - Driving
  - Disability

Additional Measures of "Vision Loss"

- Patient reported outcomes (PRO's) to assess visual function – patient centered approach
  - Multiple questions / instruments available
  - Independent but related to traditional measures
  - Potential cultural differences
- Observed test performance for mobility, driving, task performance – cost / availability

Sources of Data for Vision Loss

Current HP 2020 Sources

- National Health Interview Survey (NCHS/CDC)
  - Vision supplement in 2002/08
- National Health and Nutrition Examination Survey (NCHS/CDC)
  - Vision examination of 5000
  - Examination stopped 2009
- National Electronic Injury Surveillance System
- HHS Health Indicators Warehouse

Potential Additional Sources

- Behavioral Risk Factor Surveillance System (BRFSS)
  - CDC telephone tracking survey
  - State level data (23 states)
  - Discontinued in 2011
- Health and Retirement Survey (NIA)
  - Linked claims data
- American Community Survey (Census Bureau)
- Claims data (Javitt J, et al)

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

Measuring Utilization of Eye Care

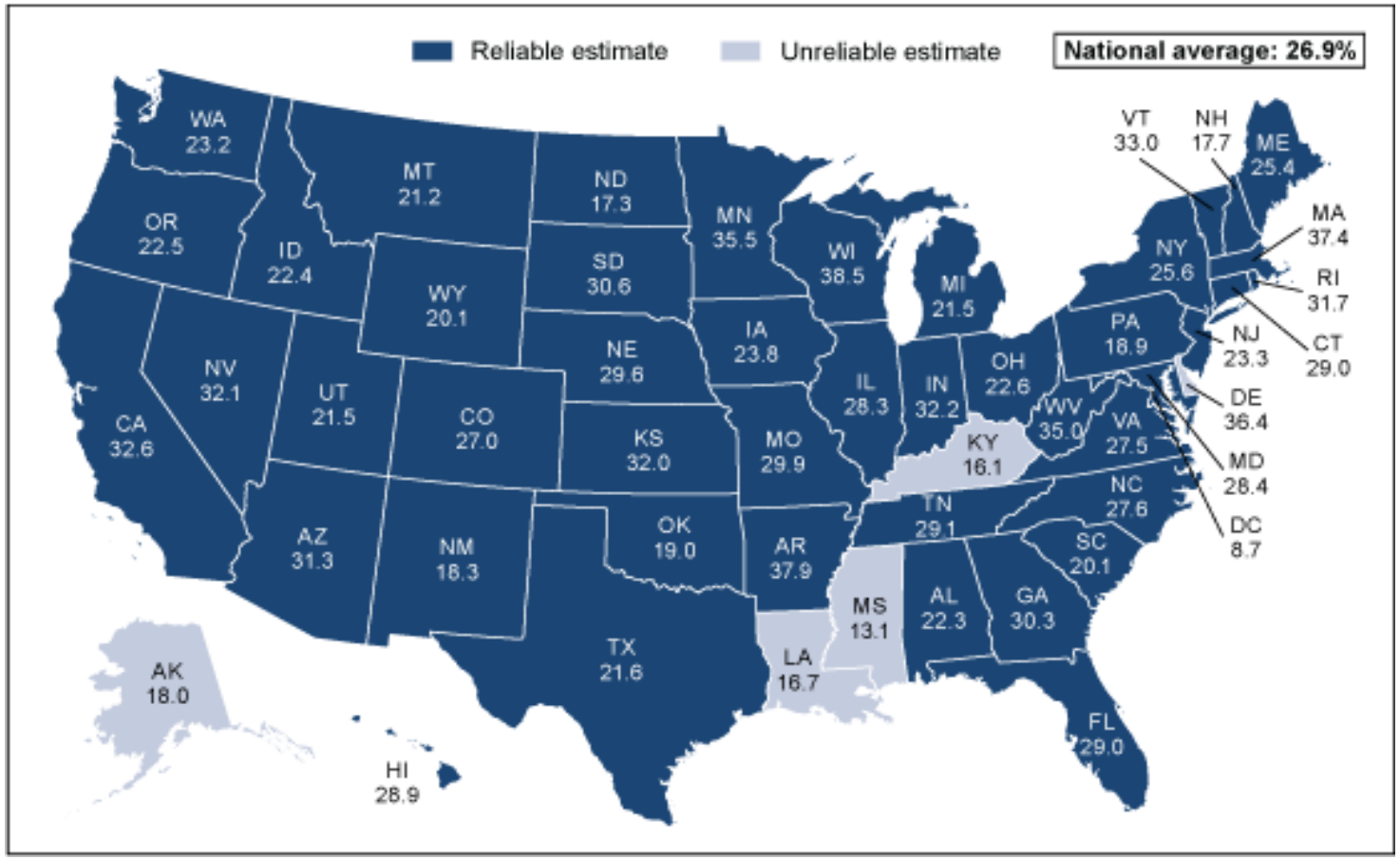
- Direct endpoint in Healthy People 2020
- Data sources noted
  - National Health Interview Survey (NHIS)
  - HHS Health Indicators Warehouse
- Care site sources
  - NHDS / NHAMCS / NAMCS
- Additional data sources
  - Claims linked databases
    - Medicare / Medicaid
    - Current Medicare Beneficiary Survey
    - Commercial insurers
  - AHRQ datasets
    - Medical Expenditure Panel Survey (MEPS)
    - Healthcare Utilization Project (HCUP)
  - National Health Surveys

Possible Future Data Sources

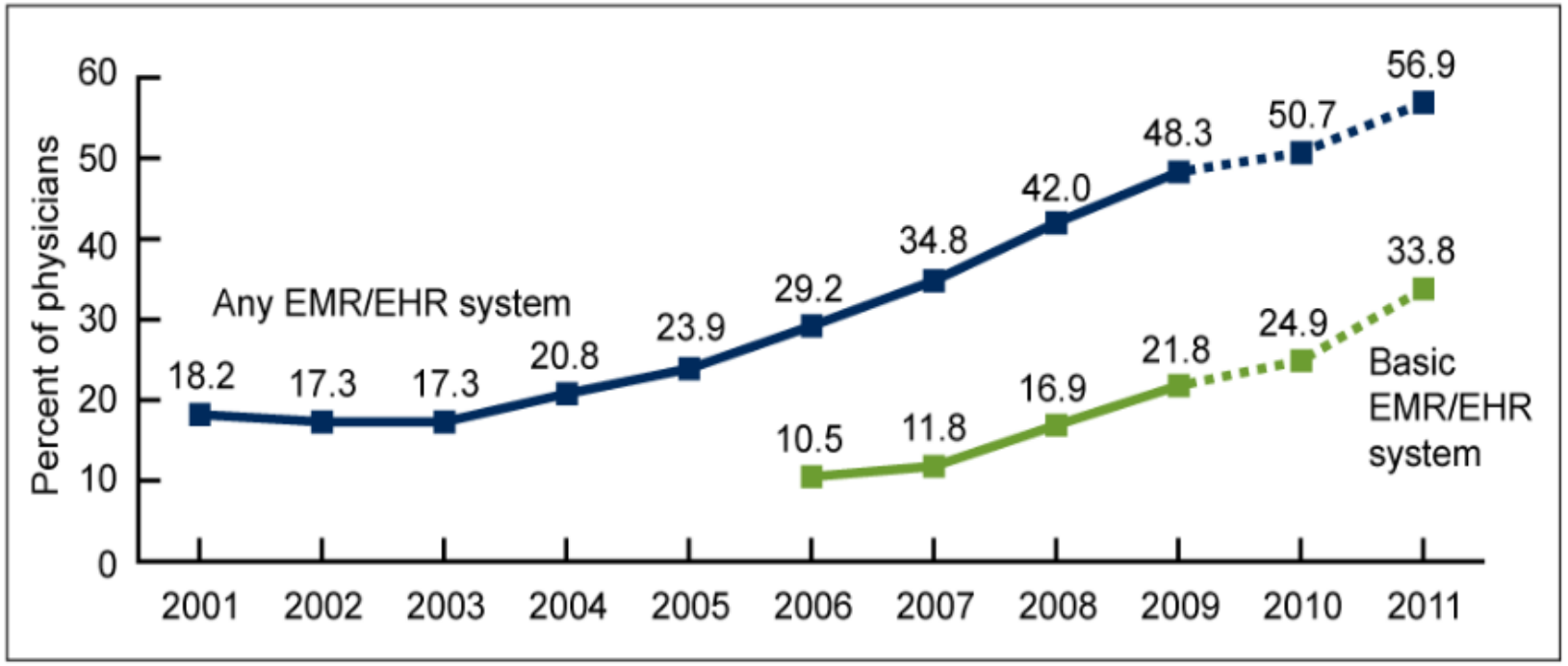
- Visual Impairment
- Electronic Health Records
  - CMS / VA / Kaiser / others
- Patient Registries
  - AAO
- Online Systems
  - Communities
  - Search queries (e.g., flu)

- Care Utilization
- Electronic Health Records
- Patient Registries
- Robust claims data analyses with ICD-10 coding

Percent with EHR Meeting Stage 1 Meaningful Use (CDC / NCHS, NAMCS, Dec. 2012)



Overall EHR/EMR Adoption

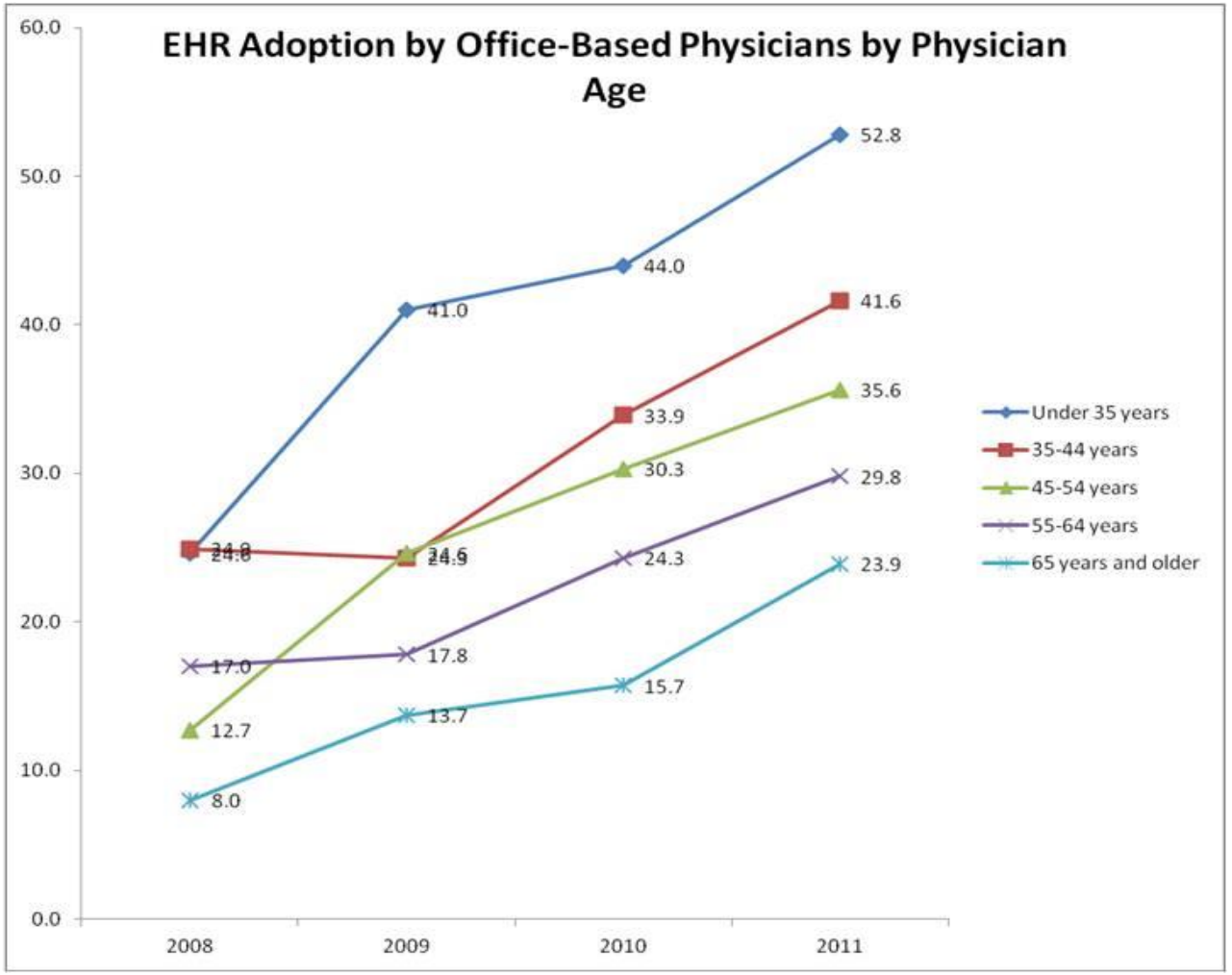


NOTES: EMR/EHR is electronic medical record/electronic health record. "Any EMR/EHR system" is a medical or health record system that is all or partially electronic (excluding systems solely for billing). Data for 2001–2007 are from the in-person National Ambulatory Medical Care Survey (NAMCS). Data for 2008–2009 are from combined files (in-person NAMCS and mail survey). Data for 2010–2011 are preliminary estimates (dashed lines) based on the mail survey only. Estimates through 2009 include additional physicians sampled from community health centers. Estimates of basic systems prior to 2006 could not be computed because some items were not collected in the survey. Data include nonfederal, office-based physicians and exclude radiologists, anesthesiologists, and pathologists.

SOURCE: CDC/NCHS, National Ambulatory Medical Care Survey.

EHR Adoption Estimates (US Dept HHS)

2012http://www.healthit.gov/buzz-blog/meaningful-use/ehr-adoption-rates-and-achieving-meaningful-use



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**

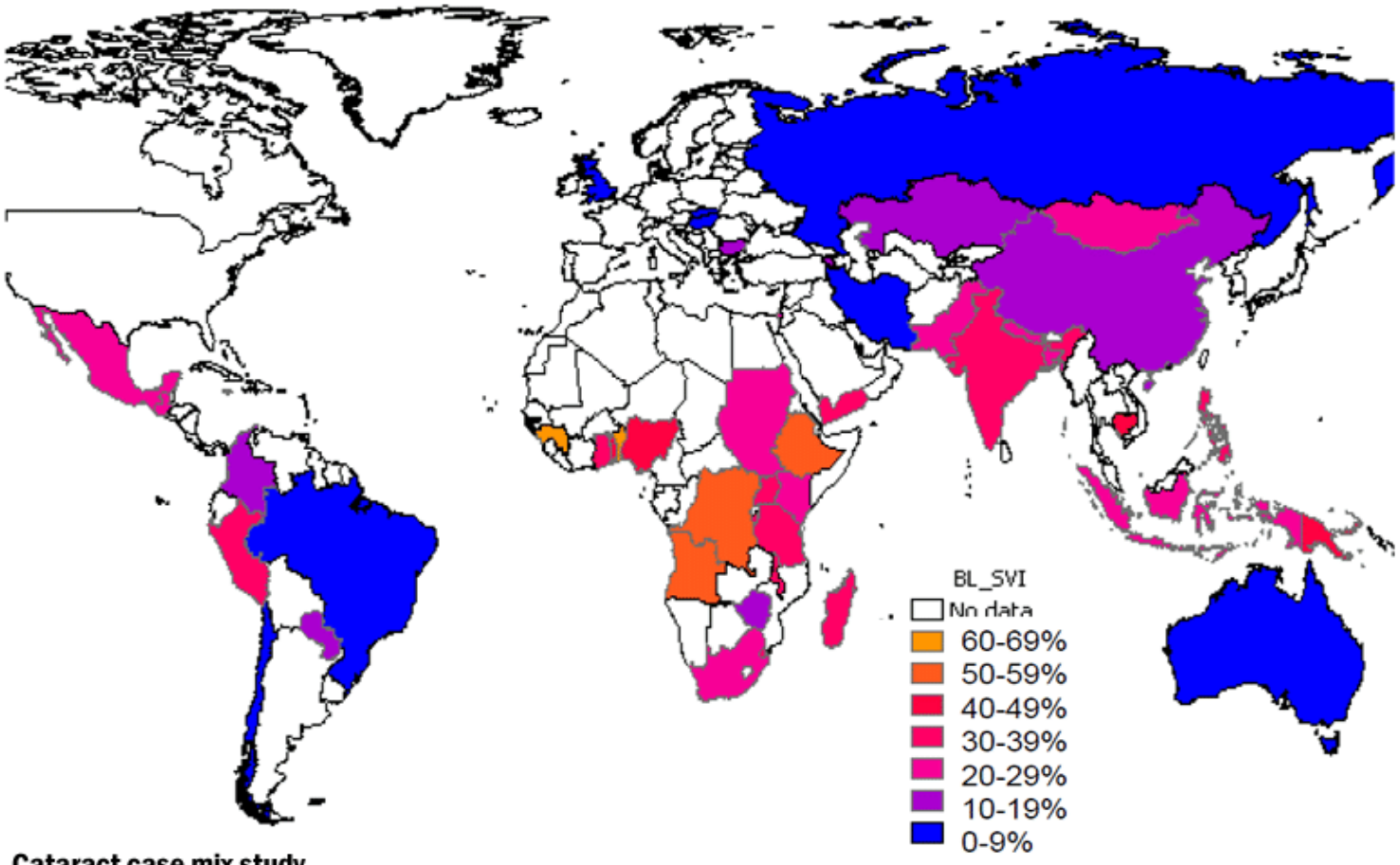
Eye Care Utilization and Insurance Status from NHIS (Lee DJ, et al, Archives 2009)

- Healthy People 2010 = target of 58% of adults 18 and older with dilated eye exam within past 2 years

- Prevalence of eye care use within past 12 months

Insurance Status	All	No VI	Severe VI
Insured 12 + mos	39%	38%	61%
Gaps w/in 12 mos	29%	27%	42%
Not now but some	22%	21%	46%
Not insured 12 + mos	12%	11%	34%

Geographic Variation in Surgery



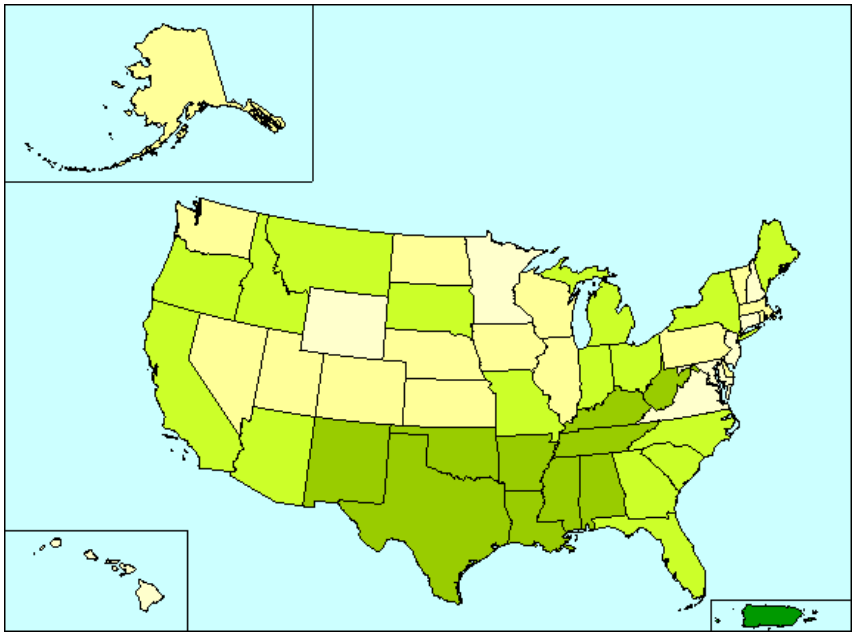
Cataract case mix study

Variation in preoperative visual acuity <6/60

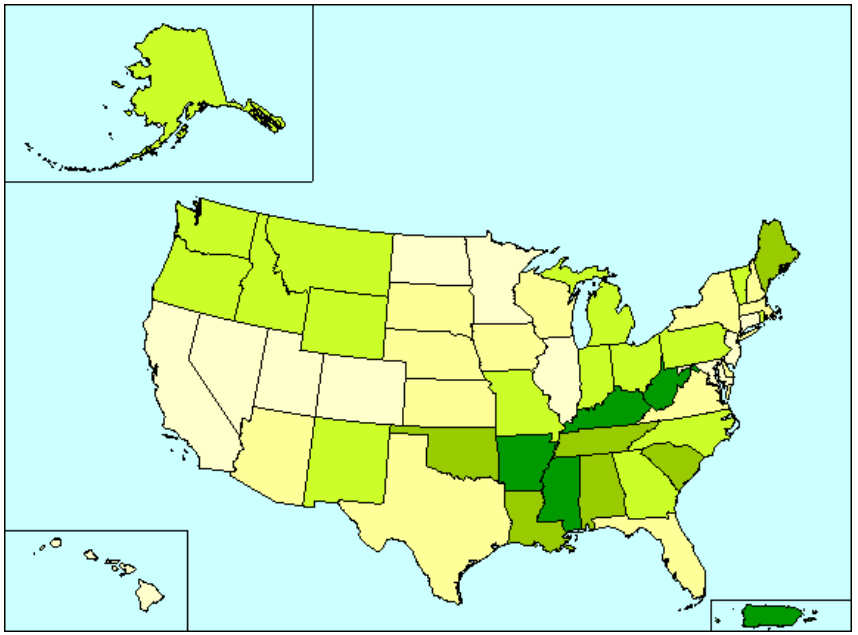
Map designed by Priya Morjaria - Research Assistant at ICEH, June 2010.

Geographic Variation Mapping: Economics and Health

Poverty – US 2007

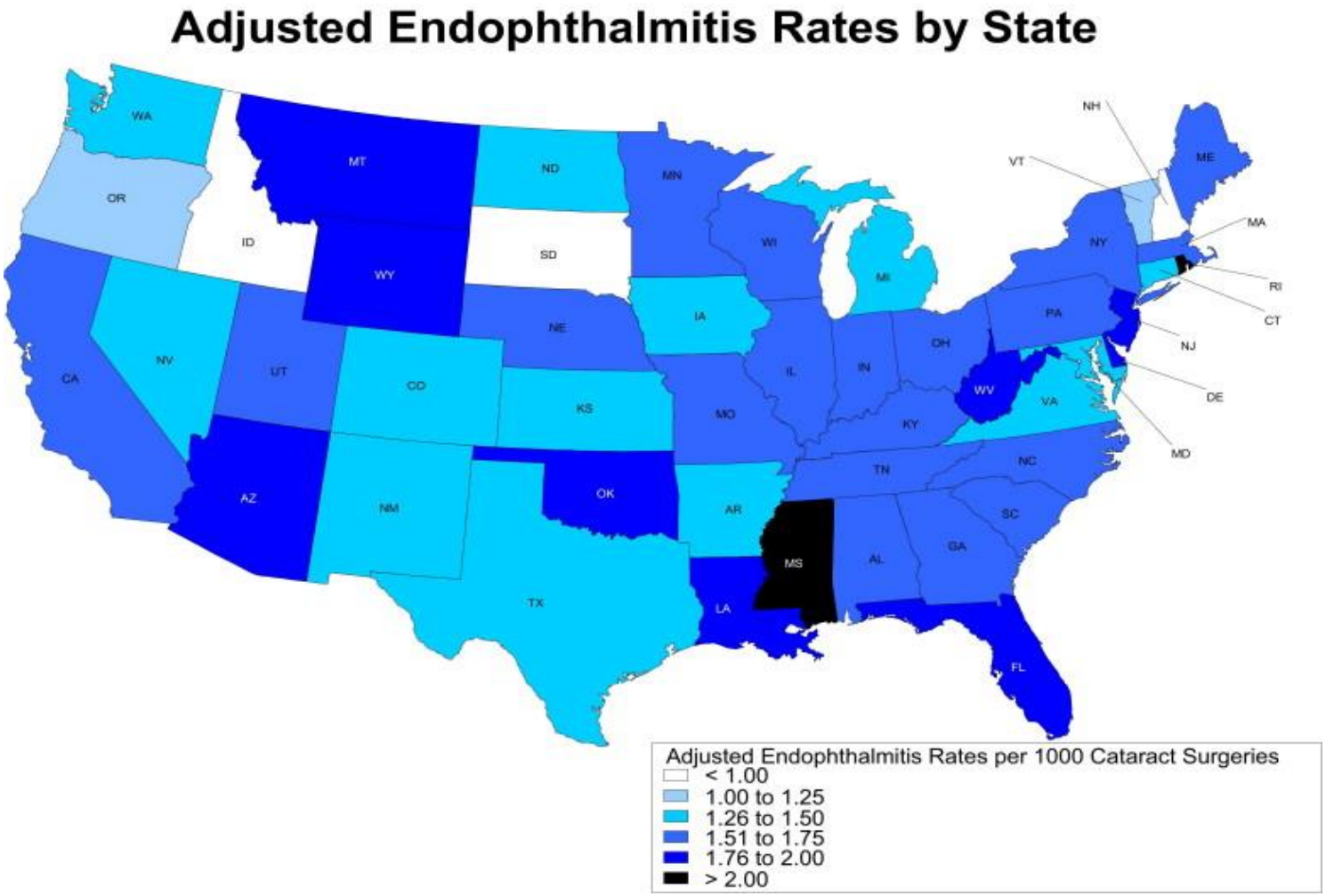


Disability – US 2007



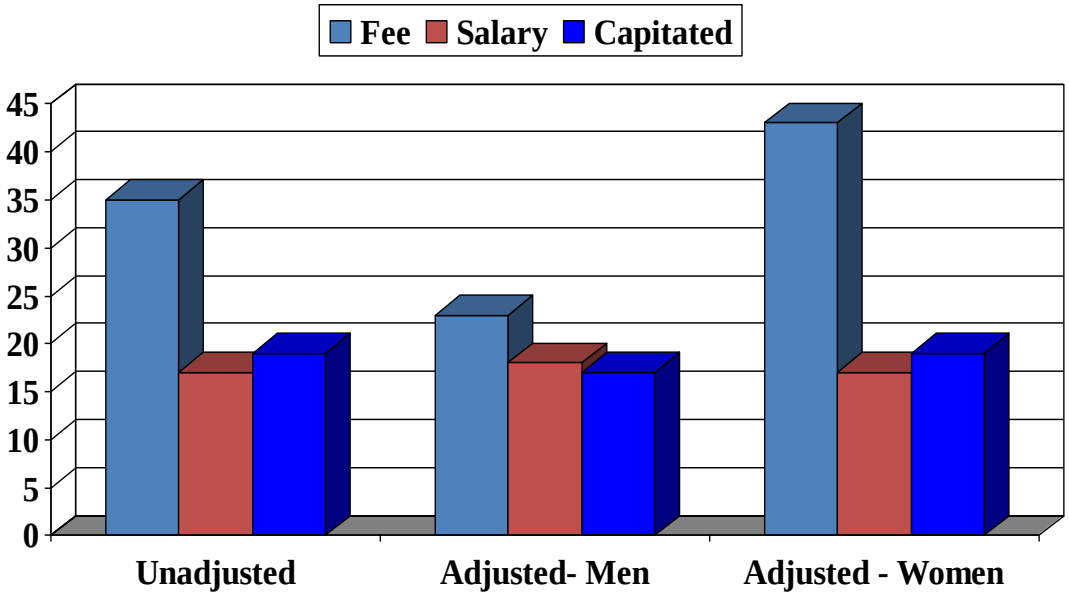
Geographic Variation in Outcomes

L Keay et al, Ophthlamology, 2012



Key Target Populations – Disparities

- Age
- Ethnicity
- Race
- Gender
- SES
- Geographic



Cataract Surgery Rates in Southern CA
Lubick, et al, JAMA, 1997

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**

Technology Interface

- Fundus / Imaging cameras
  - Telephone camera
  - Cheaper systems

- Assessment of acuity
  - Online
  - I-pad

Panel Observations

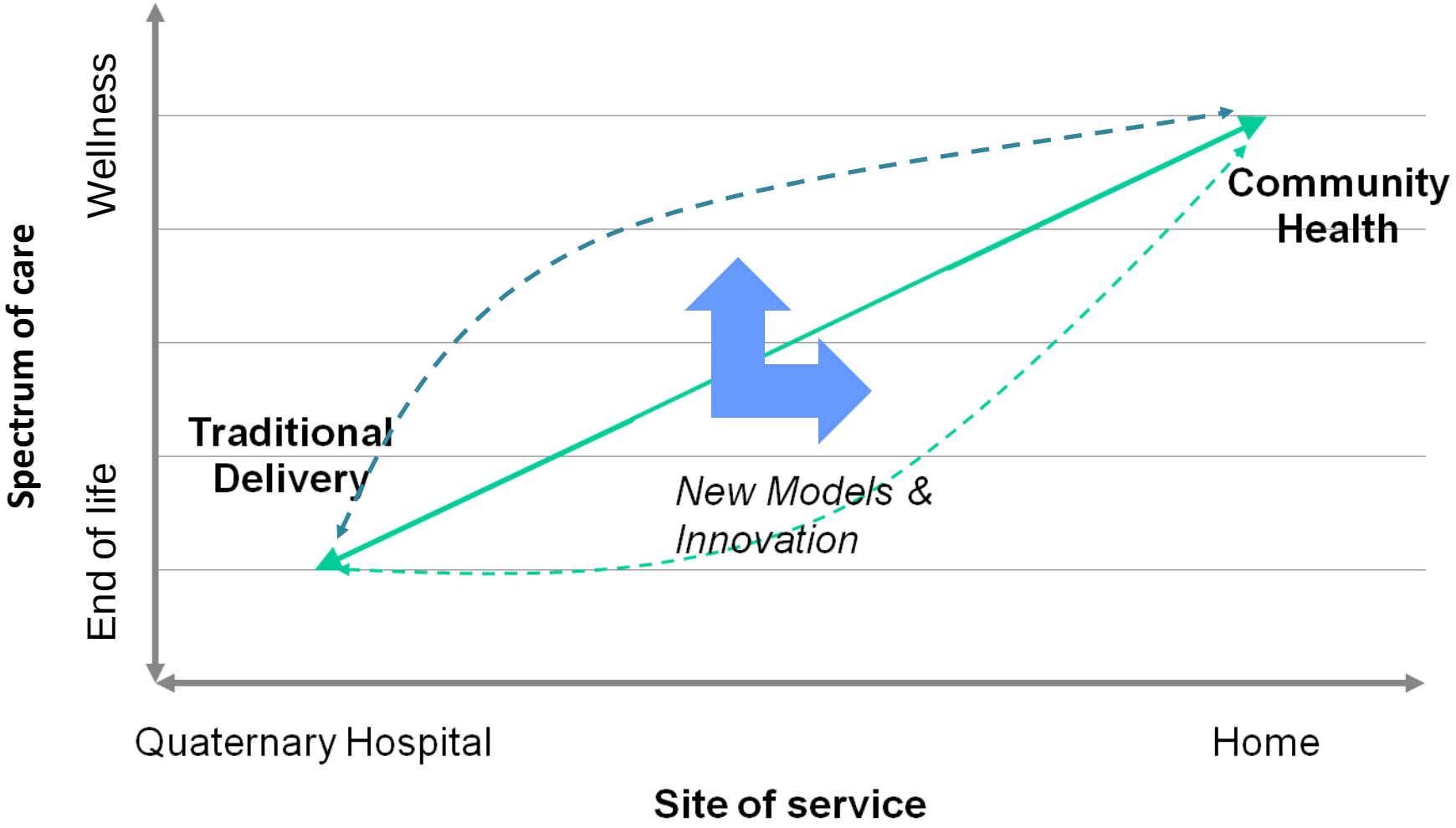
6. Vision surveillance system needs to be forged among federal agencies and other stakeholders to monitor nation's eye health and eye care utilization for trends in disparities

A. **Harmonize self-reported items**

B. **Promote implementation of system**

C. **Offer input to private entities**

Population Health & Health Innovation



Source: Paul Lee

Meeting the Needs of Patients

Getting your health care at Wal-Mart
Wednesday, October 05, 2005
By Jane Spencer, The Wall Street Journal

Americans can increasingly get basic medical care in the same place they buy toothpaste and light bulbs.

In a development that has broad implications for the nation's primary-care system, a rising number of major pharmacy and retail chains -- including CVS Corp., Wal-Mart Stores Inc. and Target Corp. -- are opening in-store health clinics…

The trend is rapidly spreading in pharmacy chains as they look for ways to stem losses to mail-order pharmacies and big-box stores.

Examples of CMS Innovations Awards in 2012

- Structured analyses and modeling of care delivery innovations
- School health
- Home health monitoring
- Training new workforce types and functions
- Information overload management in ICU
- Patient and family activation in care

Surveillance – Importance in Vision

- Monitoring
  - Detect new problems; assesses and tracks magnitude of problems; risk factors of population
- Prioritization
  - Target key problems, groups; set national objectives; identify research needs; allocate resources
- Evaluation
  - Track response effectiveness; progress towards goals

Prevent Blindness America®

Our Vision Is Vision®