



**FOCUS ON EYE HEALTH**  
National Summit



**Tuesday**  
**June 18, 2013**

Washington Marriott at Metro Center  
Washington, DC

**Women's Eye Health**

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NIH Associate Director for Research on Women's Health

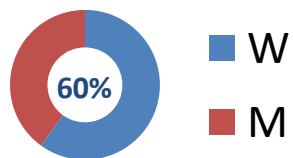
# Office of Research on Women's Health

- Enhance, stimulate, and expand efforts to improve the health of women through biomedical and behavioral research, *across NIH*
- Examine the role of sex/gender in health and disease, *across NIH*
- Promote recruitment, retention, reentry, and advancement of women in biomedical careers

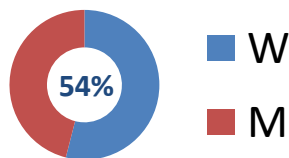


# Vision Disorders Disproportionately Affect Women

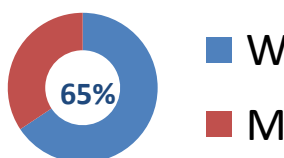
### Hyperopia



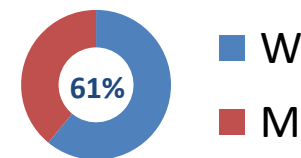
### Myopia



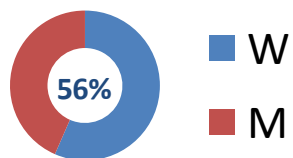
### AMD



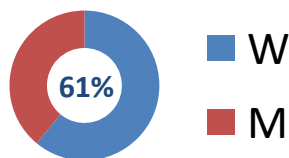
### Cataract



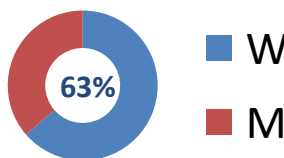
### Ref. Error



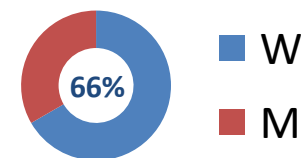
### Glaucoma



### Low Vision



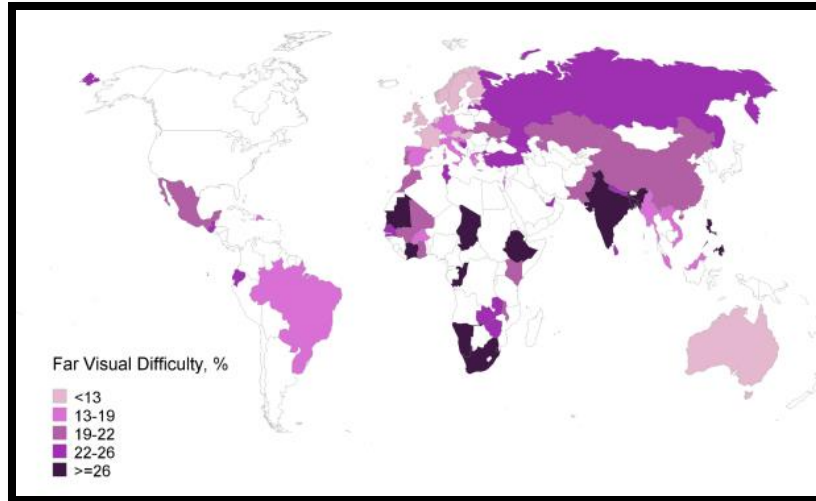
### Blindness



All disorders  $\geq 40$  yrs except AMD ( $\geq 50$  yrs)

[www.visionproblemsus.org](http://www.visionproblemsus.org) (U.S. data)

# Global Burden of Visual Difficulty



- World Health Survey conducted in 70 countries in 2013
- 21 percent of adults reported far vision difficulty
- Risk factors:
  - Older age, female sex, low socioeconomic status, lack of education, diabetes



# Eye Health: A Window on General Health

## Ophthalmology

Available online 9 May 2013

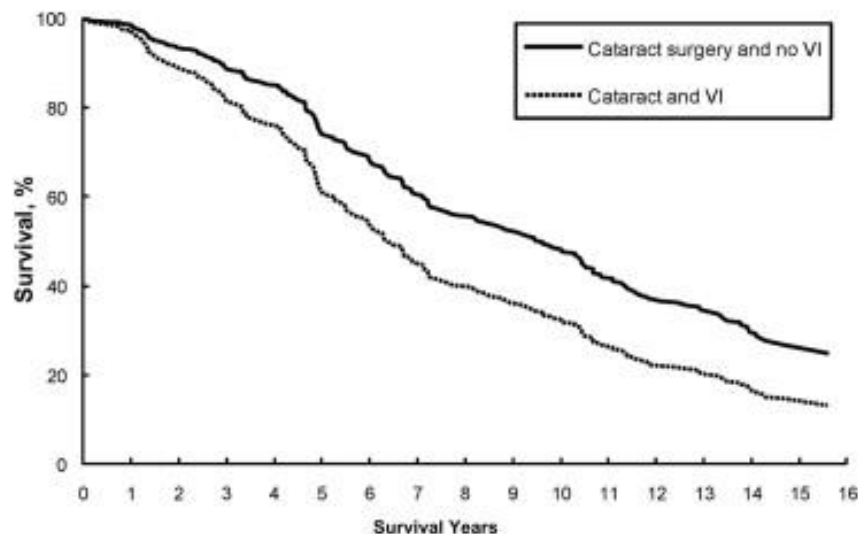
Original article

### Correction of Visual Impairment by Cataract Surgery and Improved Survival in Older Persons: The Blue Mountains Eye Study Cohort

Calvin Sze-un Fong, MBBS<sup>1</sup>, Paul Mitchell, MD, PhD<sup>1</sup>, Elena Rochtchina, BSc, MAppStat<sup>1</sup>, Erdahl T. Teber, BSc (Hon), PhD<sup>1</sup>, Thomas Hong, BAppSc (Orthoptics), MScMed (ClinEp)<sup>1</sup>, Jie Jin Wang, MMed, PhD<sup>1, 2</sup>  

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<sup>2</sup> Centre for Eye Research Australia, University of Melbourne, Melbourne, Australia



- Population-based cohort study
- Surgical correction of visual impairment/cataract:
  - Better long-term survival of older Australians



# Elderly Population is Growing



- “Oldest old” ( $\geq 85$  yrs) is fastest growing of many older populations
- Expected to be 19 million in 2050 (5 percent of all Americans)
- More older women than older men

# Vision Disparities: Many Factors

- Aging: Women typically live longer than men
- Sex effects: autoimmune disease, androgen deficiency, dry eye
- Gender effects: pain reporting
- Socioeconomic, cultural issues
- Health states unique to women: menopause/dry eye



# Vision Disparities: Many Factors

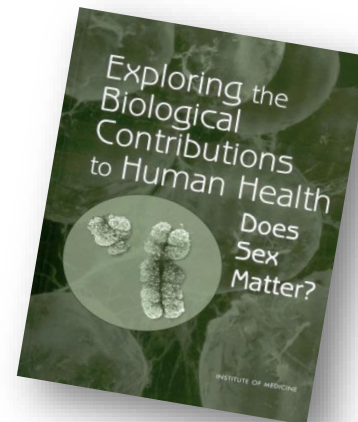
- Retrospective analysis of ocular expenditure: ~ 20K participants
- Risk factors for eye care expenditures:
  - Older age
  - Female sex
  - (Lack of) insurance
  - Low education
  - Visual impairment





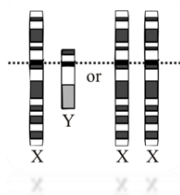
# Why Sex/Gender Matters in Biomedical Research

- Every cell has a sex
- Sex begins *in utero*
- Sex affects behavior and perception
  - Gender also affects behavior and perception
- Sex affects health
  - Gender also affects health



“Sex”: classification derived from the chromosomal complement (reproductive organs and functions)

“Gender”: a person’s self-representation as male or female



# Trachoma: More Common in Women

- Leading cause of infectious blindness in the world: neglected tropical disease
- Scarring → trichiasis → blindness
- Women 3 times more likely than men to be blinded by trachoma, due to their roles as caretakers in the family
- Women also less likely to get treatment, yet ...
  - Preventable with surgery
  - Antibiotic treatment effective



# Onchocerciasis: More Common in Men

- Second leading cause of infectious blindness in the world
- More common in men, who work in the water
- Treatments: ivermectin, doxycycline
- Global burden: 987,000 disability adjusted life years (DALYs)
- Public health campaigns have been successful



# Women and Eye Disease

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- Two thirds of blindness and visual impairment occurs in women
- Four-fifths of blind and visually impaired people live in developing countries
- Three-quarters of visual impairment is estimated to be preventable or correctable
- One third of age-related macular disease and cataract may be due to smoking
- Eye disorders occur more often in women because women live longer than men



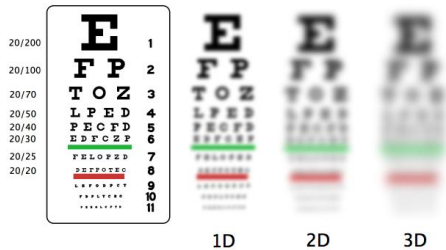
**Women's Eye Health.org**





# Refractive Errors

- Common and correctable cause of visual impairment in the United States
- ~ Half of all American adults don't have 20/20 vision due to refractive errors
- Women have refractive error more frequently than men:
  - 26 percent more women aged 12 and older have uncorrected visual impairment due to refractive error compared with men aged 12 and older
  - 14 percent more women aged 40 and older have refractive errors compared with men aged 40 and older



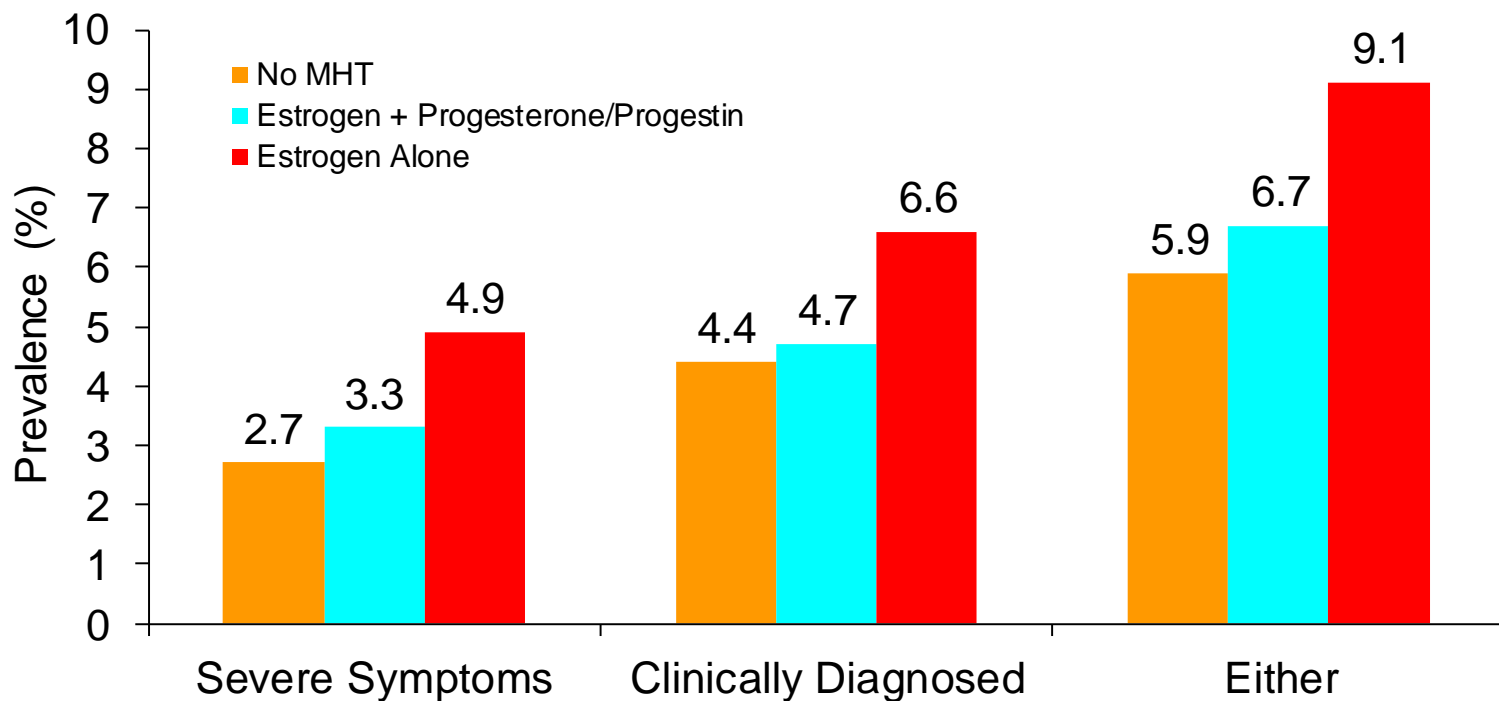
# Women and Dry Eye

- Older adults (>50 years)
  - 3 million women
  - 1.5 million men
- Overall annual burden for U.S. healthcare system = \$3.84 billion
- Side effect of some medications
- Pregnancy, hormone replacement therapy
- Immune system disorders
- Premature ovarian insufficiency



Yu J, Asche CV, Fairchild CJ. The economic burden of dry eye disease in the United States: a decision tree analysis. *Cornea*. 2011;30:379-87.

# Menopausal Hormone Therapy and Dry Eye



Schaumberg DA, Buring JE, Sullivan DA, Dana MR. Hormone replacement therapy and dry eye syndrome. *JAMA*. 2001;286:2114-2119

# What It's Really Like

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“Welcome to my world ... At night my dry eye disease causes my eyelids to stick together and interferes with sleep. During the day, my dry eye limits reading, working on the computer, and watching television. And during both night and day my dry eye gives me constant pain, makes driving difficult, and interferes with my career and hobbies.”

“I can't cry ... what makes us more human than that?”



# AMD: We're Making Progress

- 2001: AREDS I: antioxidants and zinc significantly reduce the advanced AMD risk
- 2005: alterations in complement factor H genes account for 75 percent of AMD risk
- 2013: AREDS II: no beneficial effect of omega-3 fatty acids, lutein & zeaxanthin + AREDS formulation ( L/Z safe replacement for beta-carotene)



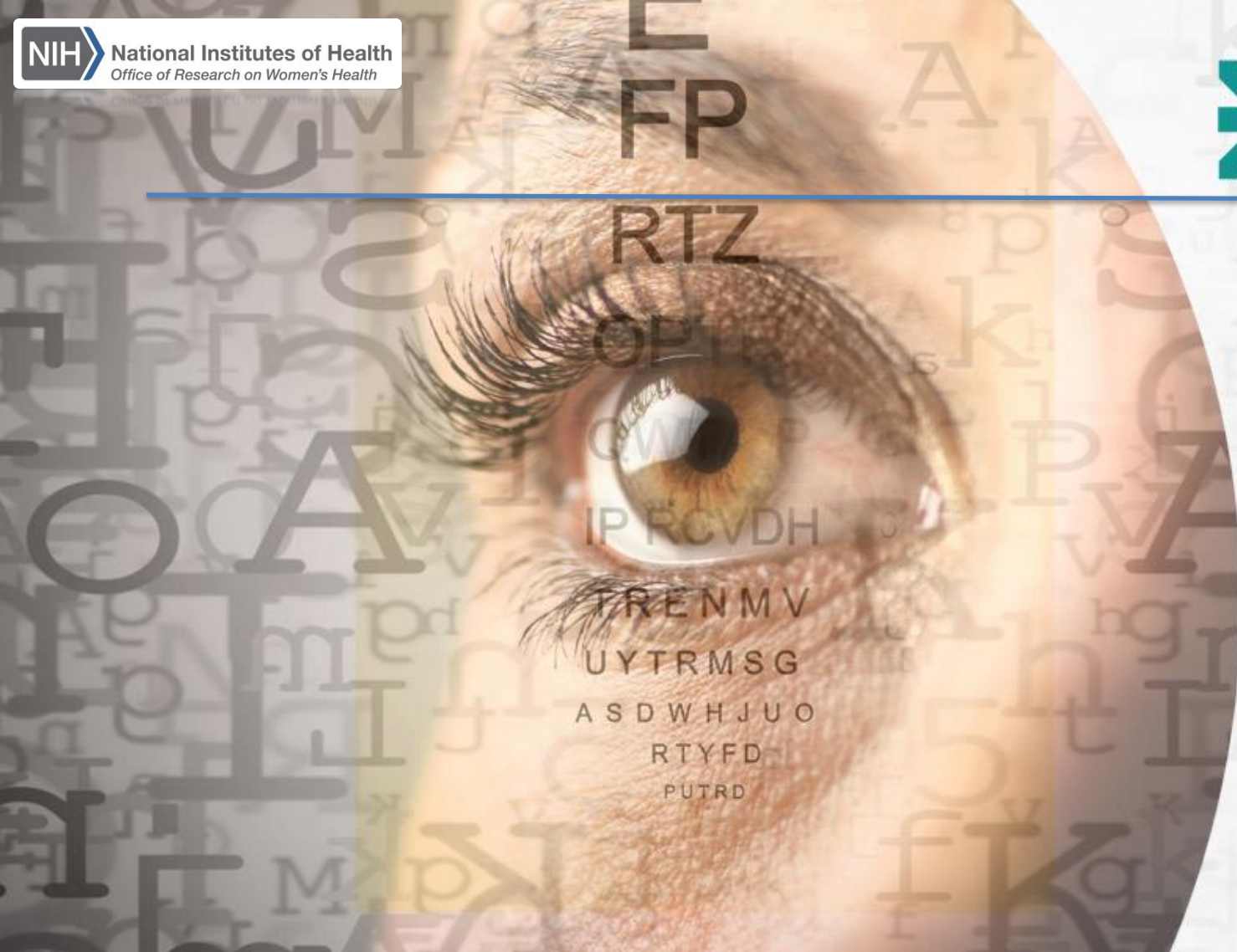
2,069,403 Americans affected  
(1,345,112 are women)\*

[\\*http://www.visionproblemsus.org/](http://www.visionproblemsus.org/)

# Why Sex/Gender Matters for Vision Research



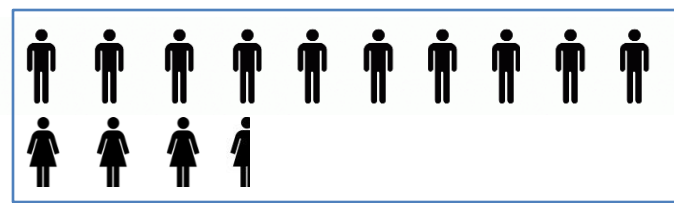
- Many significant sex factors in diseases/organs **related** to reproduction
- Many significant sex factors in diseases/organs **unrelated** to reproduction
- Sex differences not always differences: **“sex factors”**
- **What are we missing** by not including sex and gender in investigations at all levels?
- **What harm are we doing** by not including sex and gender in investigations at all levels?
- **Sex-based reporting** of results also essential for research and for policy



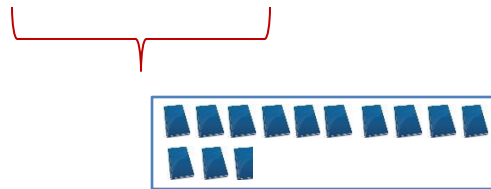
# Beyond Research Inclusion: Sex-Specific Reporting



← U.S. Population



← NIH-funded clinical trial sex/gender **inclusion** (average female enrollment): **37 percent<sup>1</sup>**



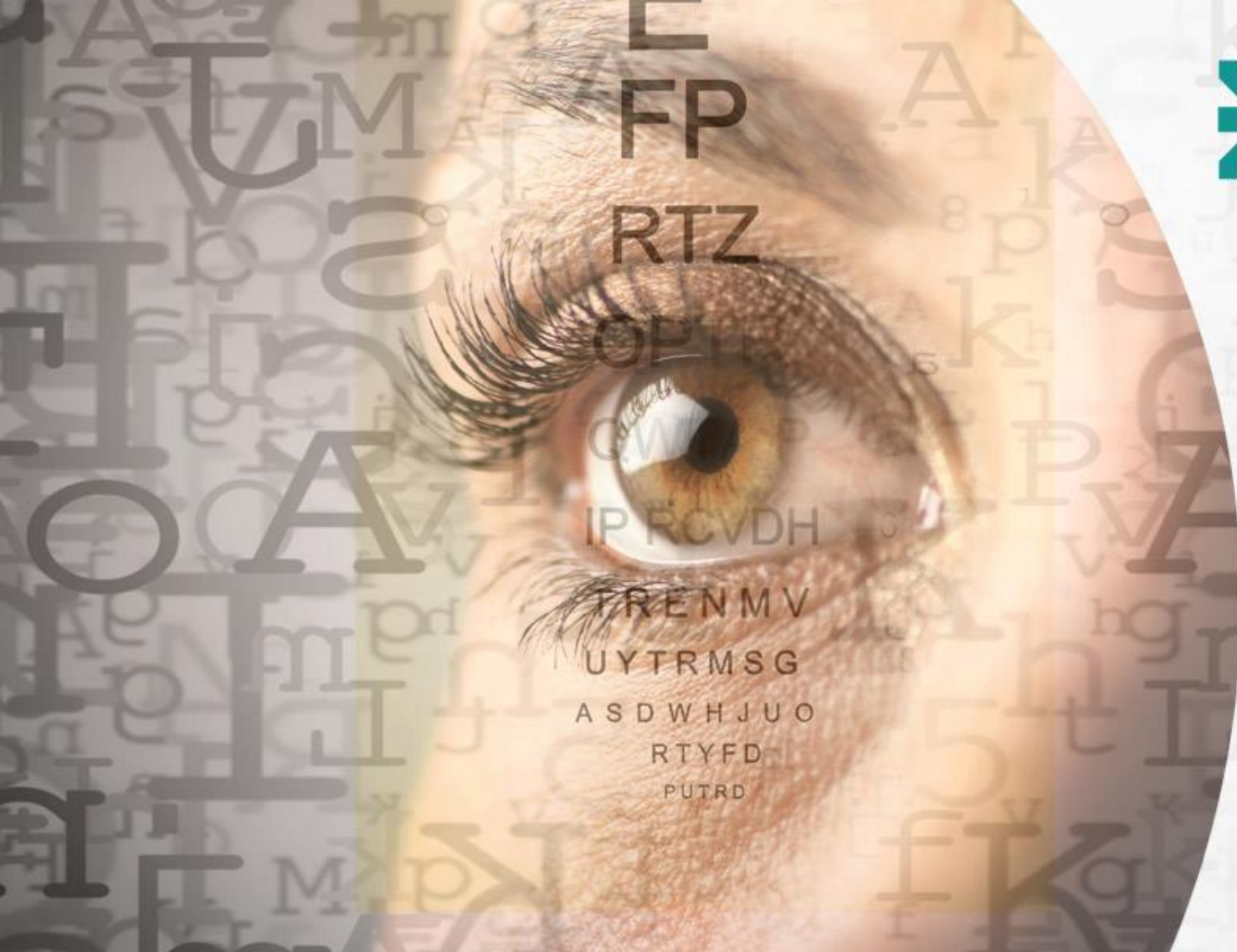
← NIH-funded clinical trial sex/gender **reporting: 28 percent<sup>1</sup>** (of the above group)



- Intersecting roles:
- Journal editors
  - Government funding agencies
  - Industry
  - Basic researchers
  - Professional societies
  - Other stakeholders

<sup>1</sup>Foulkes MA. After inclusion, information and inference: reporting on clinical trials results after 15 years of monitoring inclusion of women. *J Womens Health*. 2011;20:829-36





 **Prevent  
Blindness  
.America**  
Our Vision Is Vision®

E  
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