

# Eye Care in the 21<sup>st</sup> Century: A Challenge to Providers

James M. Tielsch, Ph.D.

Johns Hopkins University

Schools of Public Health and Medicine

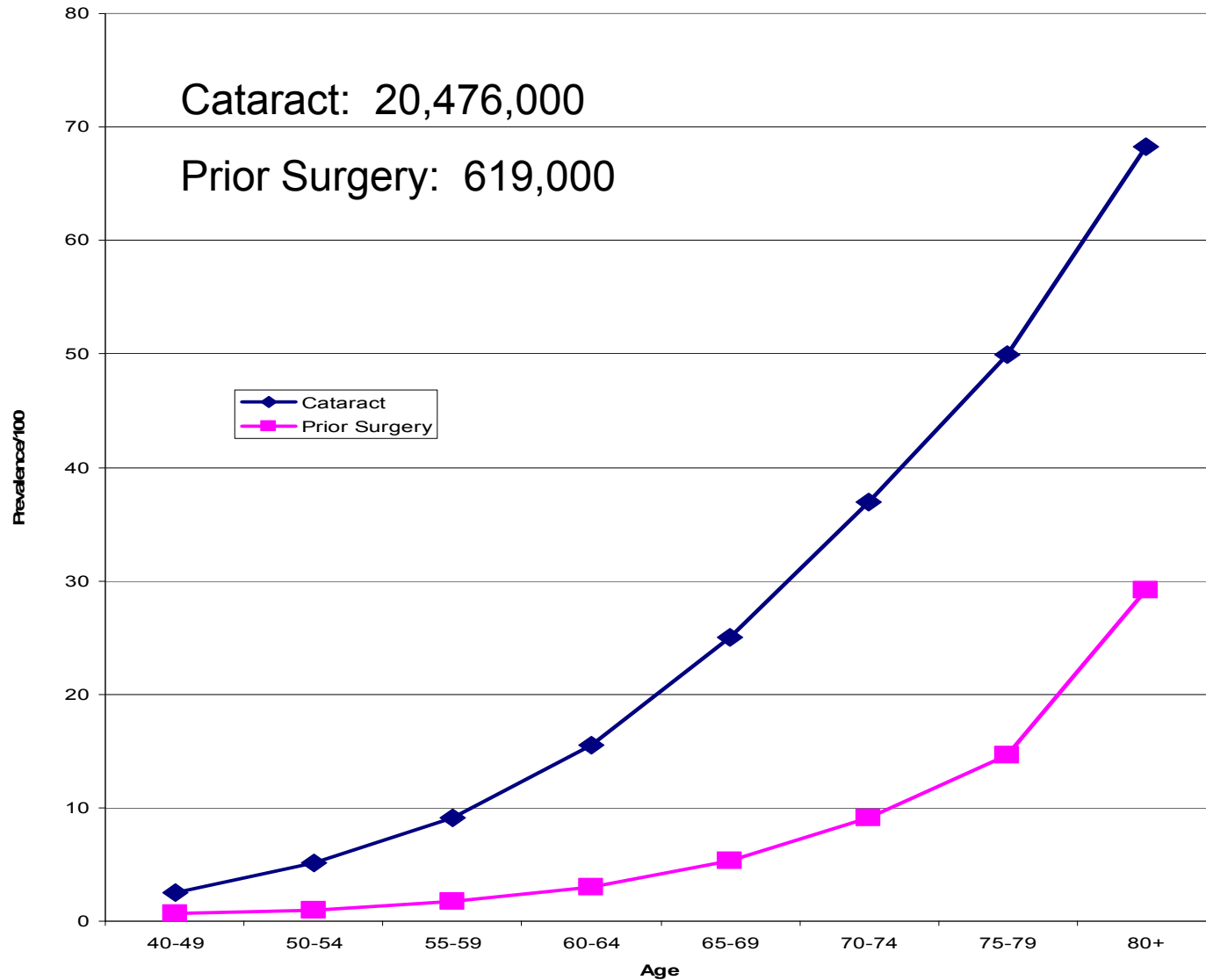
# Outline

- I. Describe the current and projected future burden of ocular disease in the US.
  - I. Prevalence
  - II. Absolute numbers of cases
- II. Factors affecting the future burden
  - I. Current “epidemics”.
  - II. Examples of progress in treatment of disease without concurrent progress in prevention.
  - III. Reductions in disparities in access to care.
- III. Economic costs of eye disease in the US.
- IV. Eye care person-power
  - I. Describe trends in training of eye care providers.
  - II. Projected numbers of retiring and new practitioners.
  - III. Comparison of growth in demand for services with available provider manpower.
- V. Summary and Call to action.

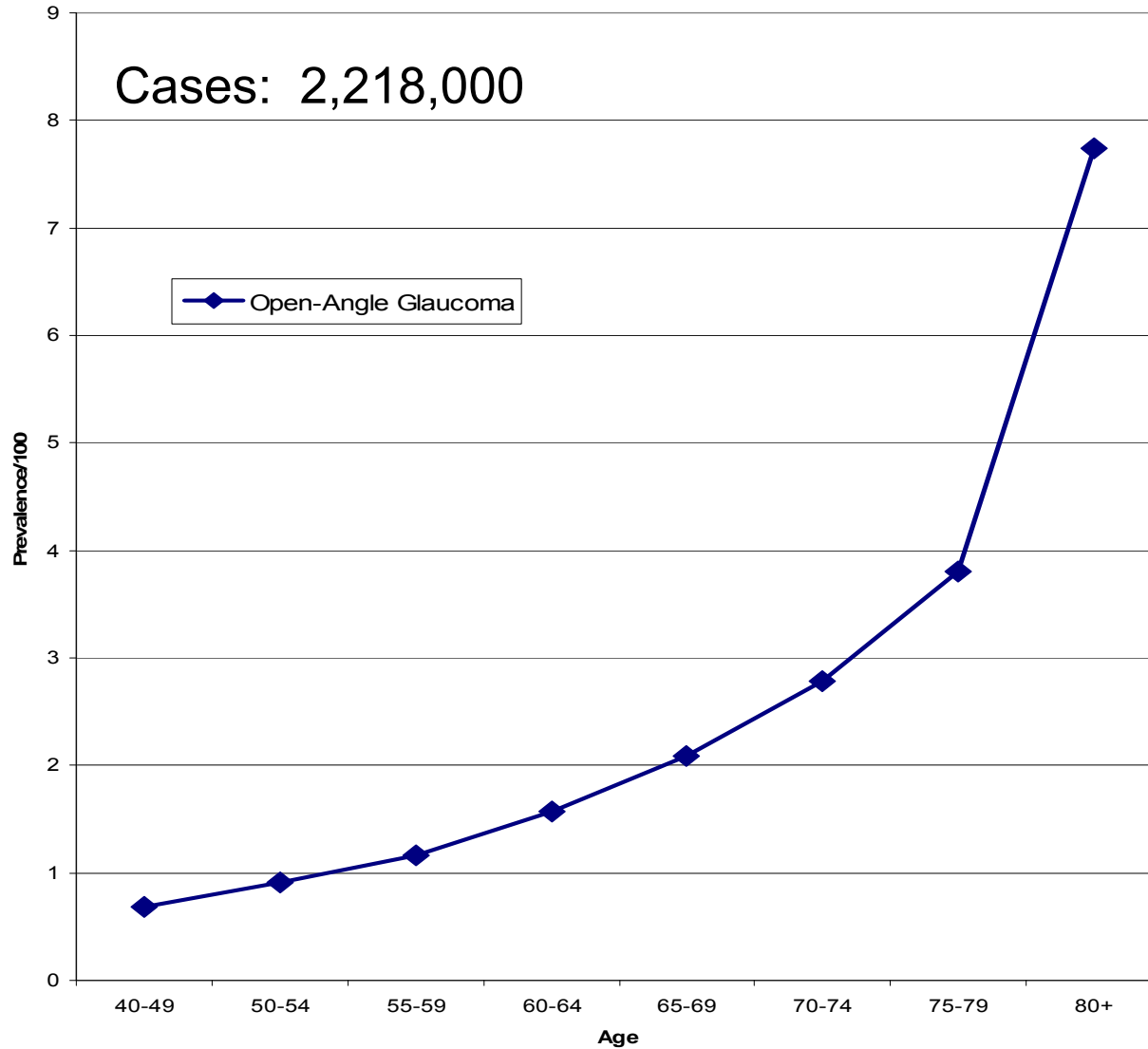
# Major Ocular Disorders are Strongly Age Related

- Cataract
- Age-Related Macular Degeneration
- Glaucoma
- Diabetic Retinopathy
- Refractive Error

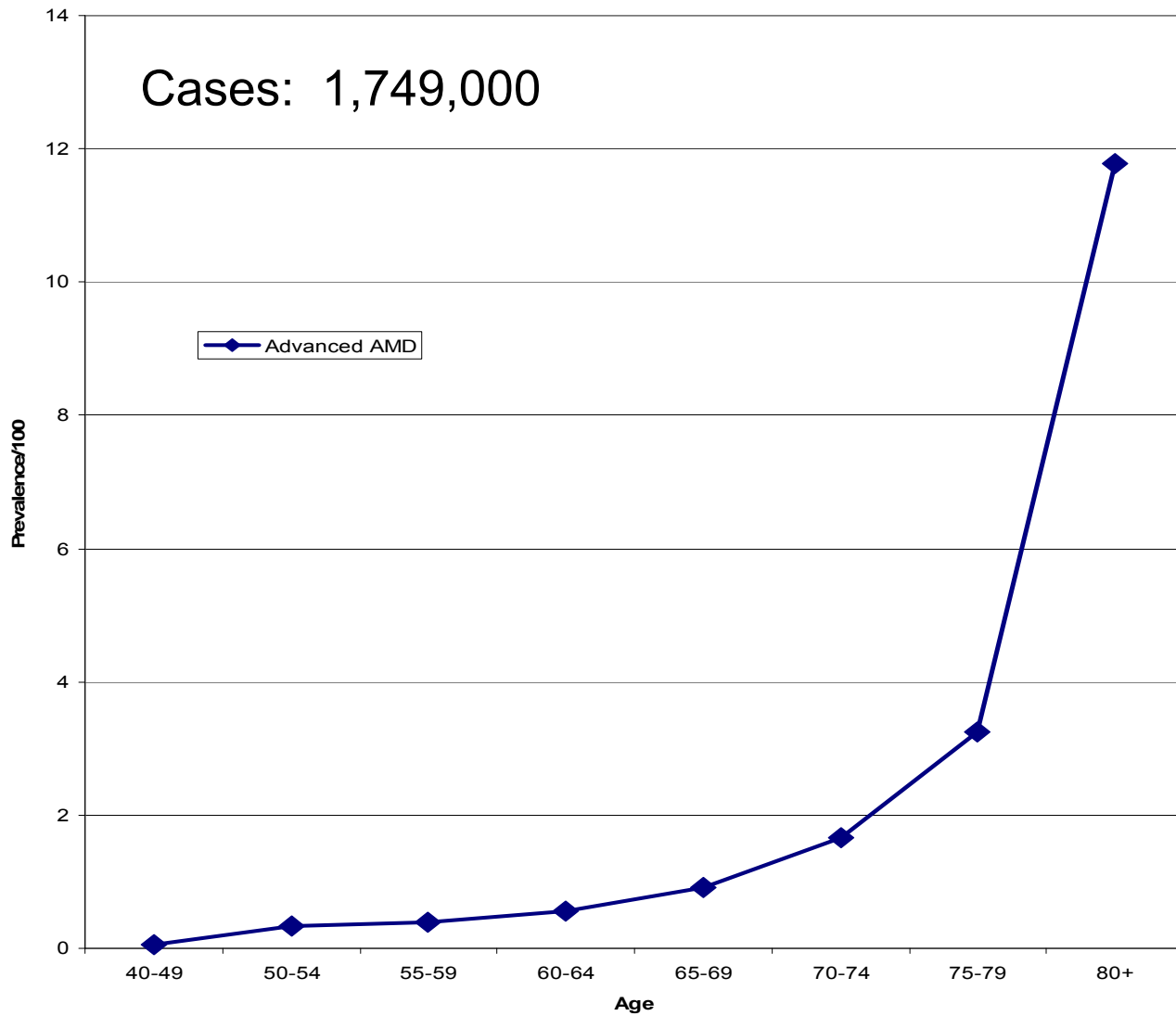
# Cataract and Cataract Surgery



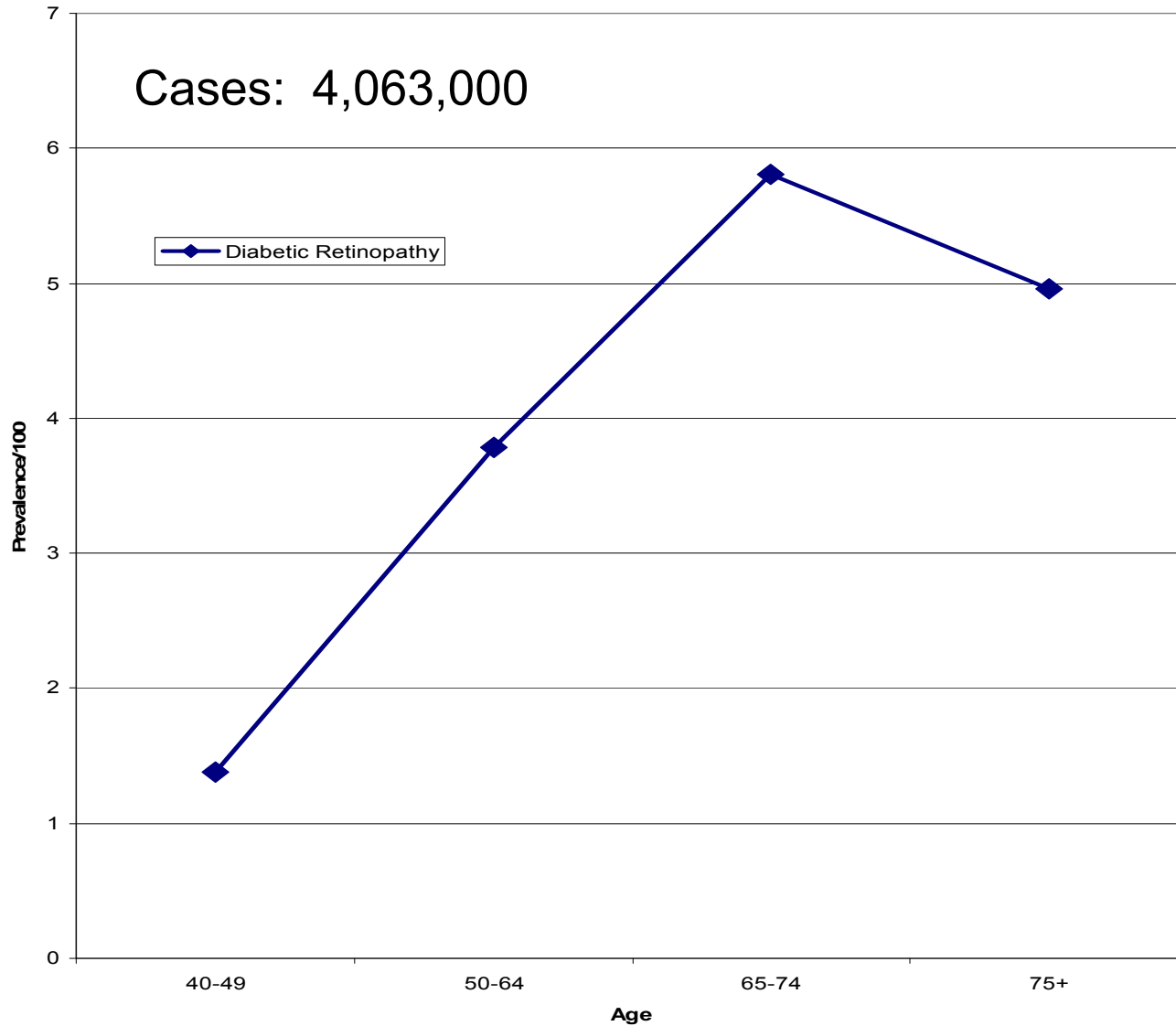
# Open-Angle Glaucoma



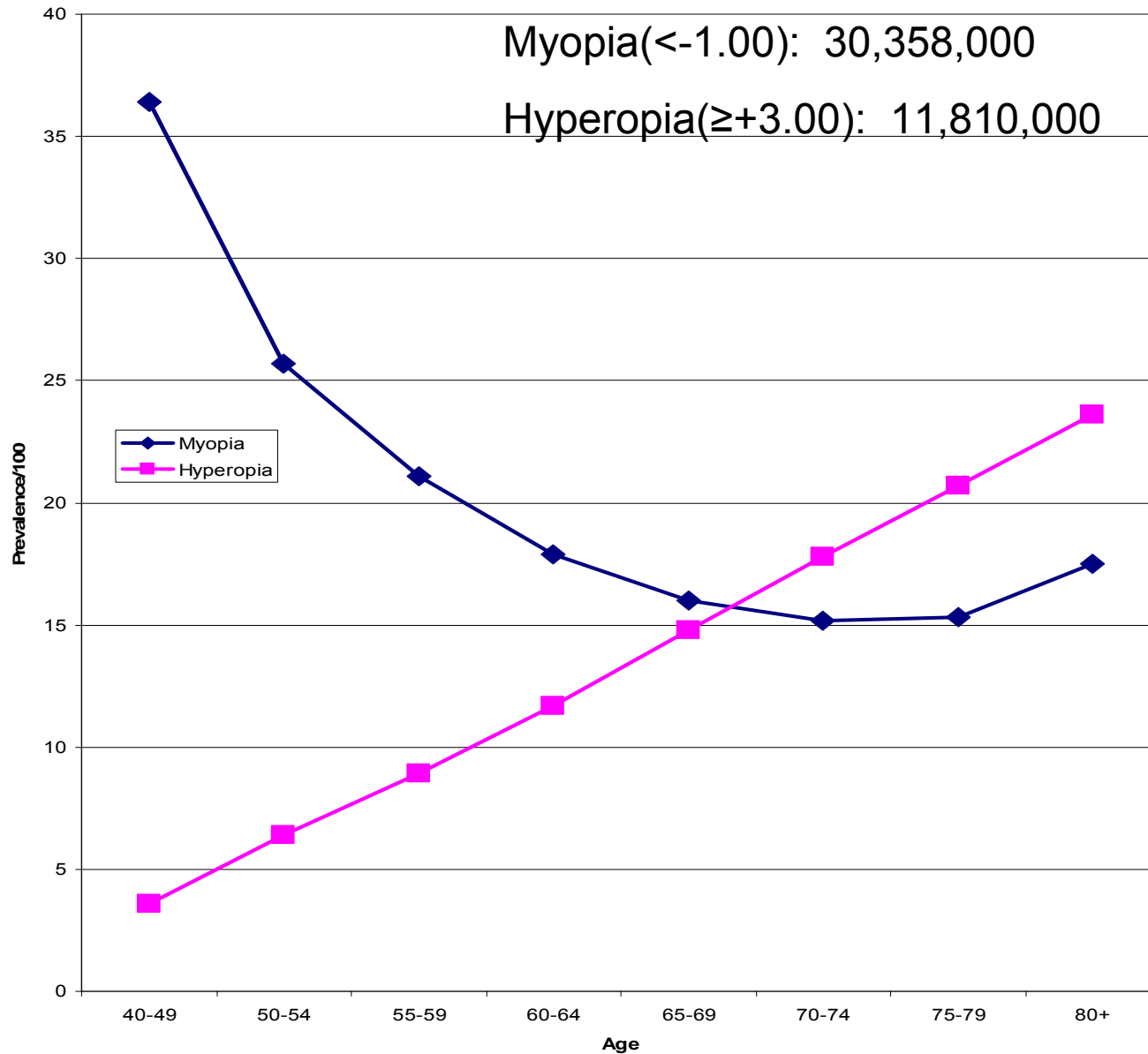
# Age-Related Macular Degeneration



# Diabetic Retinopathy



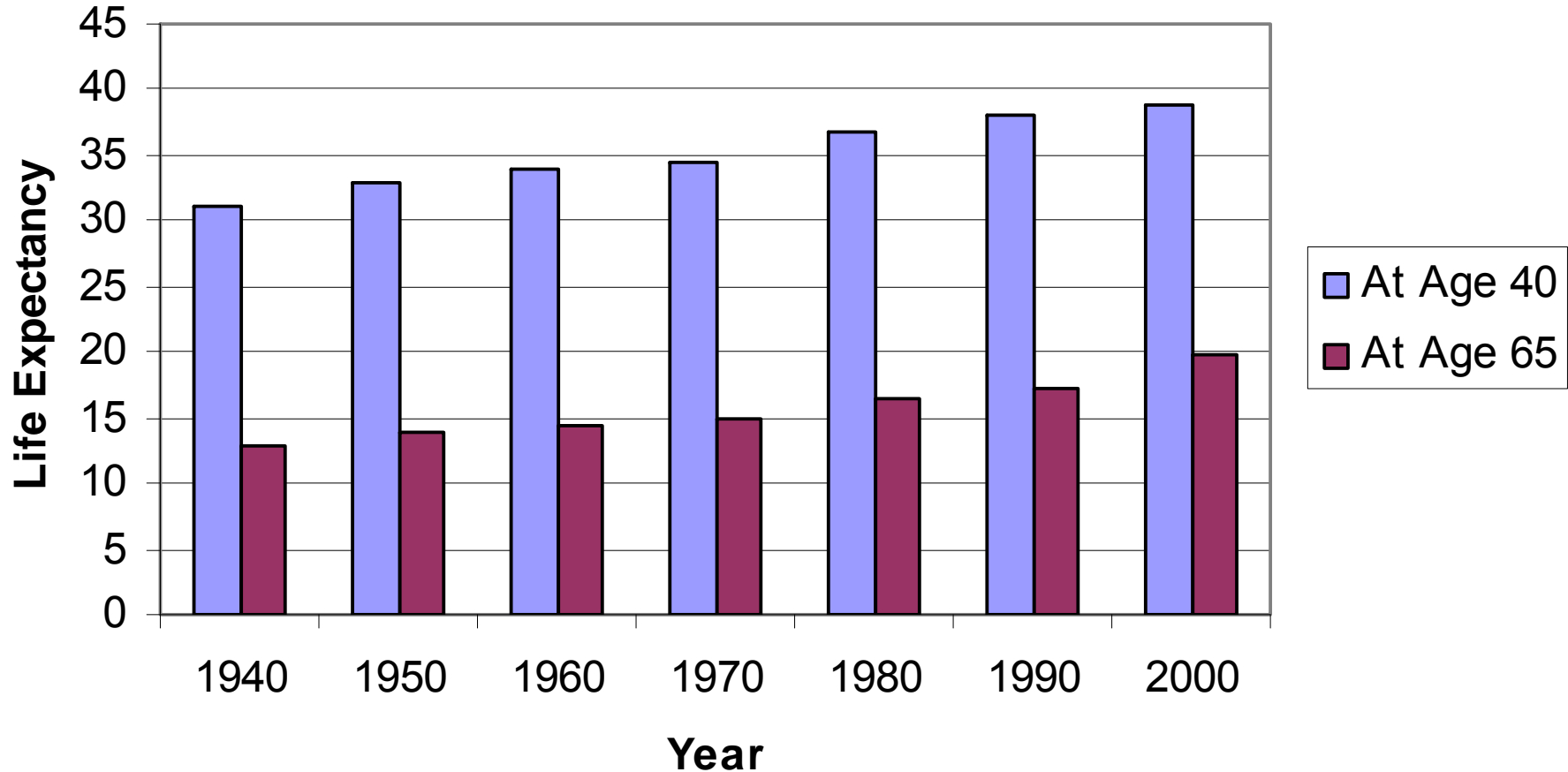
# Refractive Error



# Factors Associated with Projected Burden

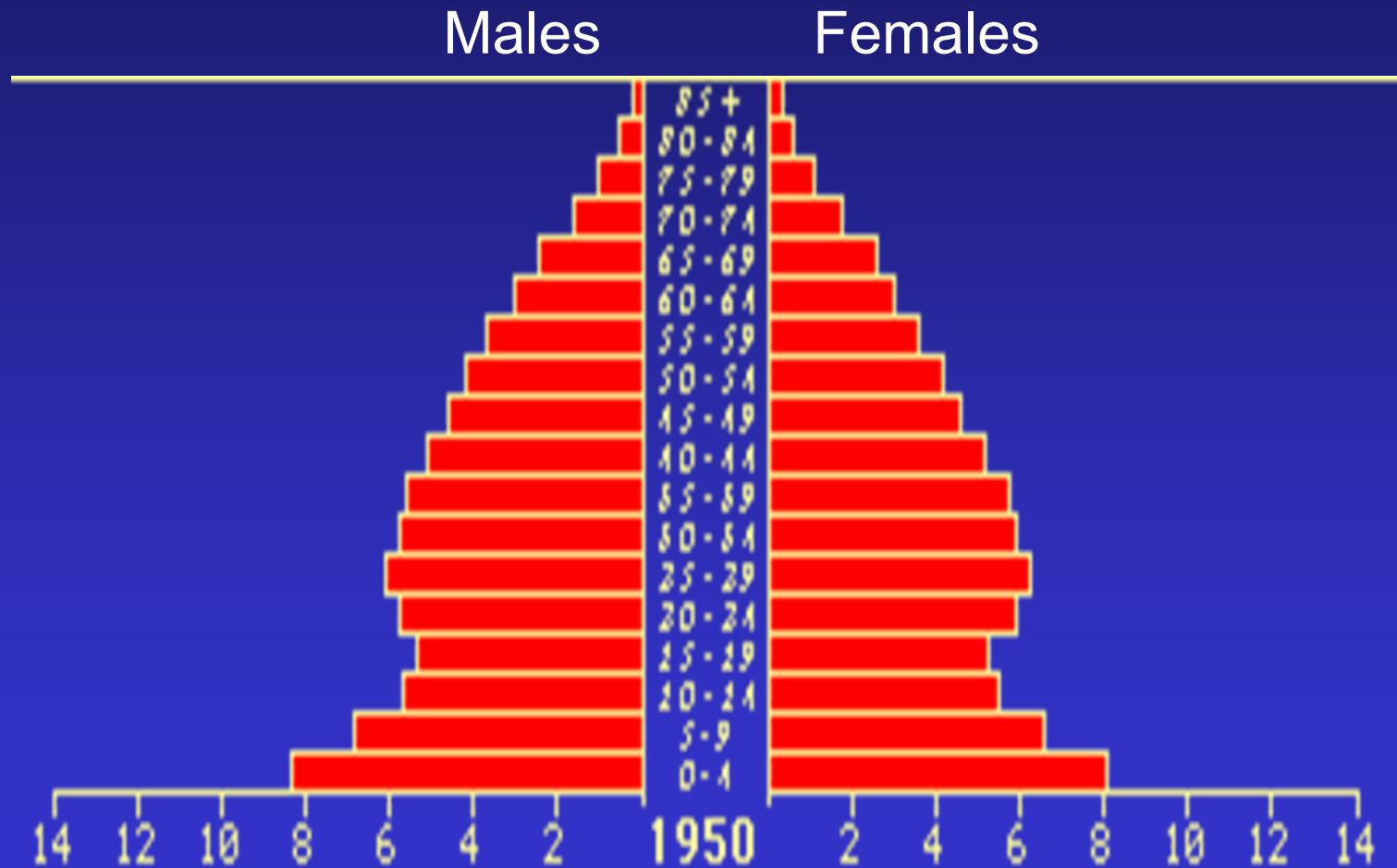
- The “Epidemics”
  - Combination of increasing life expectancy and baby boom.
  - Obesity and diabetes.
- Treatments outpacing prevention
- Reduction in disparities in access and utilization of eye care services.

# Increasing Conditional Life Expectancy



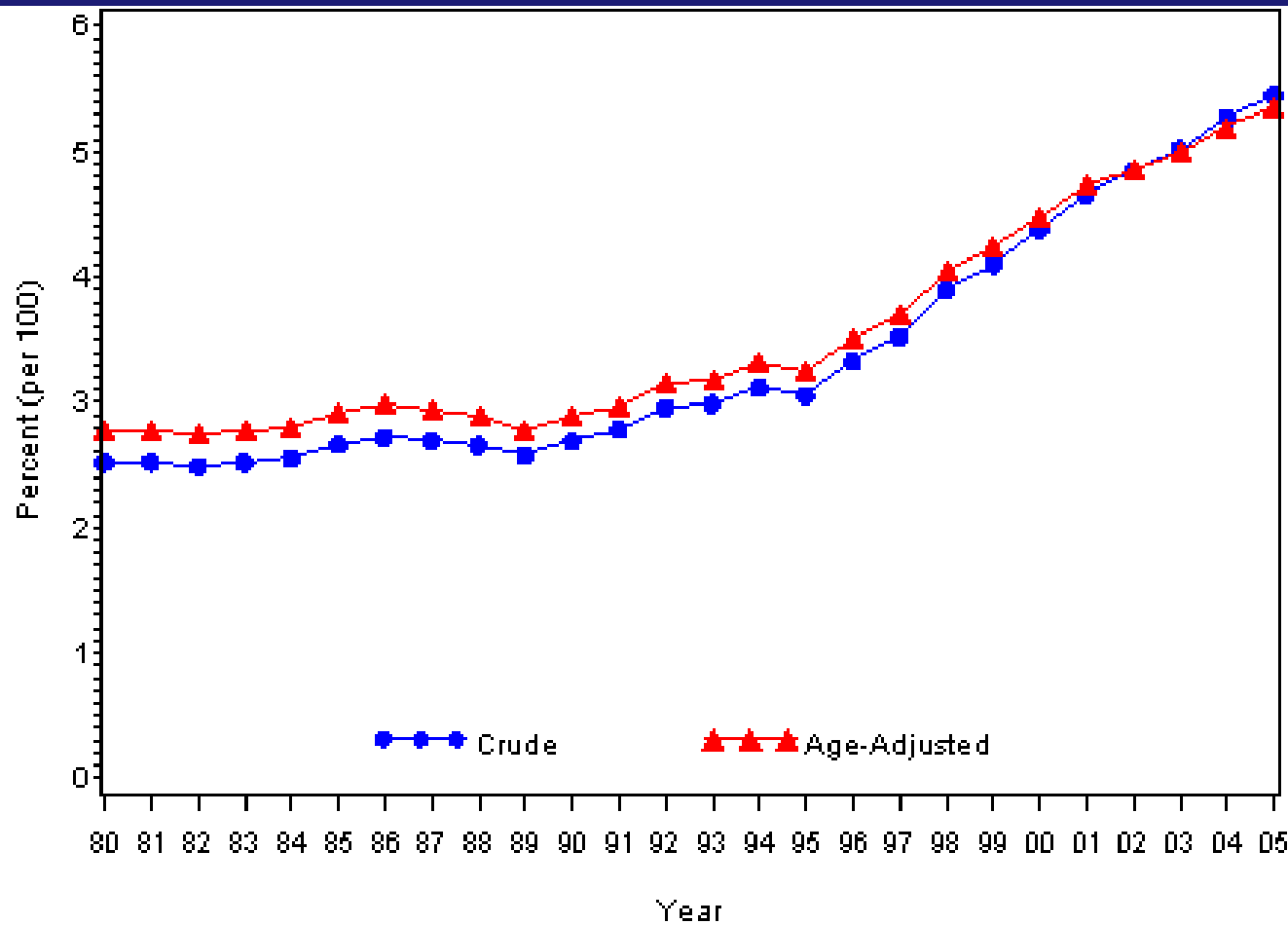
Overall increase driven by increases in the oldest age groups.

# US Population Structure 1950-2050



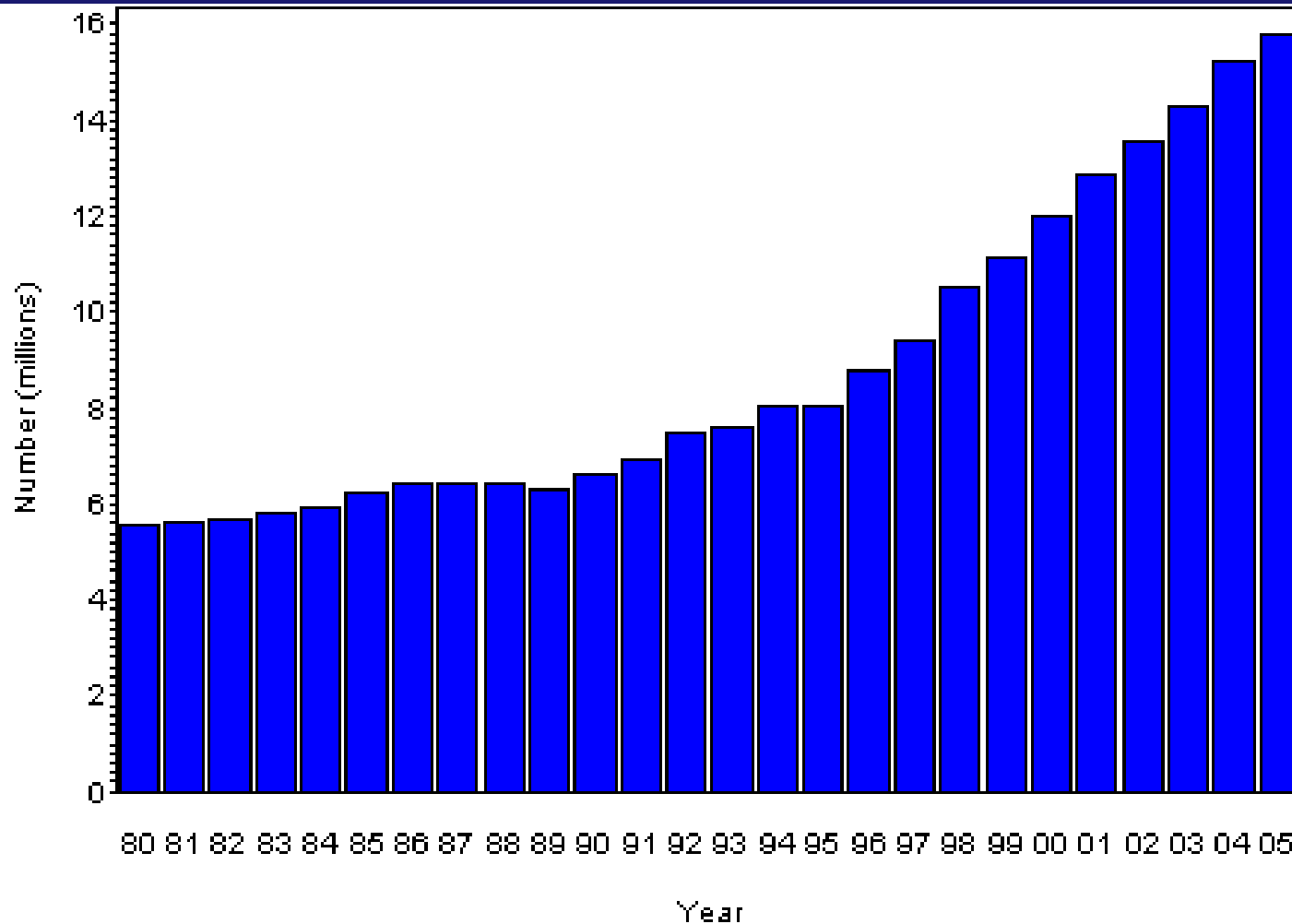
In millions, US Census Bureau

# Prevalence of Diagnosed Diabetes in the US 1980-2005



Estimates of under diagnosed diabetes are as high as 40%.

# Number of Persons with Diagnosed Diabetes, US, 1980-2005



Estimates of under diagnosed diabetes are as high as 40%.

# Projections for the Year 2020

- Cataract: 20.4 million to 30.1 million cases
- Glaucoma: 2.22 million to 3.36 million cases
- AMD: 1.75 million to 2.95 million cases
- DR: 4.1 million to 7.2 million cases\*
- Ref. Error: Little change expected

\* Does not fully account for increasing incidence of diabetes.

# Treatment before Prevention

- **Cataract**
  - Modest evidence for 1° prevention and increasing visual demands of population.
- **Glaucoma**
  - More aggressive Rx will lead to increased visits for care.
  - No 1° preventive approaches.
- **AMD**
  - New Rx for exudative disease will lead to increase in service demand.
  - ? impact of preventive approaches.
- **DR**
  - Complete failure at 1° prevention.
- **Refractive Error**
  - Cohort effects on myopia.
  - ? Long-term complications of refractive surgery.

# Reduction in Disparities

- A hope more than a projection....
- Increasing numbers of uninsured make this unlikely without major policy change.
- BUT, if access improved, demand for eye care services could increase substantially (>15%) from a subpopulation with high prevalence of disease.

# National Health Interview Survey, 2002

Among 61 million adults at high risk for vision loss\*:

- ~50% visited eye doc in past 12 m.
- ~50% had dilated exam in past 12 m.
- ~ 5 million cannot afford eye glasses when needed. Directly related to insurance coverage:
  - 6.7% and 3.5% for public & private insurance vs.
  - 14.7% for uninsured among those <65 y.

\* High risk defined as >65 y, system condition assoc. with risk of vision loss, have ocular disease, or report poor vision.

# Annual Economic Impact, US

Total: **\$51.4** billion

## Costs (in billions)

- Direct medical costs (\$16.2)
- Other direct costs (\$11.2)
- Lost productivity (\$8.0)
- Medical care expenditures (\$5.12)
- Informal care costs (\$0.36)
- Health utility costs (\$10.5)



# Eye Care Person-Power Capacity to Respond?

## Basic Parameters

- ~1100 optometry graduates/yr.
  - At least 500-700 retire/yr; likely will increase substantially over next 15 years.
- ~450 ophthalmology graduates/yr; unchanged for 10 years.
  - >400 expected to retire/yr over next 15 years.
- By 2010, expect ~33,000 optometrists & 16,000 ophthalmologists.
- Assume  $\geq 5\%$  new grads will not practice (research, industry, other reasons).

# Eye Care Person-Power Capacity to Respond?

1995 Eye Care Workforce Study and 2000  
AOA Optometry Workforce Survey:

- Combined conclusion that there was near equilibrium between supply and demand for eye care services by 2000.
  - Geographic variation results in shortage in some areas.
  - Ignores unrealized demand.
- No empirical studies on manpower projections since the use of 1990s data.

# Eye Care Person-Power Capacity to Respond?

## Factors Affecting Supply and Demand for Care:

- Demographic changes
- Increased incidence of disease (diabetes)
- New treatments (e.g. laser ref surgery, anti-VEGF drugs for AMD).
- Reduced disparities in access.
- Practice organization
  - High quality managed care can provide same quant. and qual. with 20-30% lower physician staffing levels.
- Increasing proportion of female providers
  - >50% medical students and residents are female.
  - Practice intensity lower for female providers.

# Eye Care Person-Power Ability to Grow Provider Workforce

## Optometry

- Better able to respond, but few new programs expected.
- >20% expansion in current programs unlikely.

## Ophthalmology

- Very difficult and long lead time. 20% increase in training positions will take over 20 years to increase total providers by 10%.
- Little political will.

# Conclusions

- The train is headed straight for us....
  - Demographic changes will produce significant increase in cases and demand over next 20-30 years.
  - For most conditions, little evidence for 1° prevention strategies beyond reductions in smoking.
- Economic costs are already very high and will double within 20 years.
- Current eye care manpower projections suggest the workforce will be inadequate by 2015.
  - BUT depends on changing incidence of disease, new treatment availability, female practice intensity, etc.
  - Satisfying demand for eye care services will be a challenge with projected increases in demand.