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# Demand for Ophthalmic Services and Ophthalmologists - A Resource Assessment

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**OBJECTIVES:** To assess the number of US ophthalmologists and incidence of critical eye diseases and conditions needing ophthalmic care during the period of 2008 to 2015 to determine if resource levels are adequate. **METHODS:** We used professional directories to randomly select 400 ophthalmologists and public records to establish ages and average age of retirement for US ophthalmologists. We also researched ophthalmic residency programs to estimate the number of expected graduates by year through 2015. In addition, we used Market Scope forecasts of the number of cataract and refractive lens exchange surgeries, vitrectomies, laser refractive surgeries, glaucoma patients, AMD

patients and diabetic retinopathy patients by year through 2015. A comparative analysis of this data was performed to measure the change in workload requirement for US ophthalmologists during the next seven years. **RESULTS:** The number of patients/incidents requiring the care of an ophthalmologist is expected to grow by 18.1 percent from 2008 to 2015, while the number of US ophthalmologists is expected to grow by only 0.67 percent. **CONCLUSIONS:** Ophthalmologists will need to improve efficiencies, delegate more patient care, and take other actions that increase capacity and or productivity in order to meet demands for patient care.

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## INTRODUCTION

Incidence of major eye care disease and conditions that require surgical intervention and specialized treatments is increasing rapidly in the US due to rapid growth in the elderly population segment. The elderly are significantly more likely to need cataract surgery, suffer from neovascular AMD and glaucoma, and to require a vitrectomy or other surgical intervention. In addition, growth in the incidence of diabetic retinopathy is significantly outpacing growth in the population due to an epidemic of obesity.

The number of US ophthalmologists is expected to remain relatively constant over the next decade as ophthalmic residency programs are expected to produce new ophthalmologists at a rate that roughly matches the number of retiring ophthalmologists.

The combination of rapidly growing demand for the services of ophthalmologists and a relatively constant supply will result in a shortage of services and/or require significant improvements in efficiencies by ophthalmologists during the next several years.

## METHODS

### NUMBER OF US OPHTHALMOLOGISTS

We selected 400 ophthalmologists at random from the membership directory of the American Academy of Ophthalmology. Online public record databases were used to identify the age of each doctor from their birth date and or date of residency completion. From this sample dataset, we estimated the number of ophthalmologists by age and the percent of ophthalmologists in each age group retiring each year through 2015.

The number of new ophthalmologists completing residency each year was estimated by using data published by the

Association of University Professors of Ophthalmology in their January 2009 – *Ophthalmology Residency Match Report*. We assumed a 2.0 percent annual growth in the number of new ophthalmologists through 2015. Historically, the number of new ophthalmologist has been relatively constant; however, we assumed that educational programs will expand the number of ophthalmic residents in response to increases in demand for services. Note that due to the short time frame of our analysis and the length of ophthalmic residencies, significant changes in the number of new residents beyond those already enrolled is unlikely.

## SURGICAL AND DISEASE PROJECTIONS

Market Scope's ophthalmic disease model was used to estimate the incidence of most common ophthalmic diseases, glaucoma, AMD, and diabetic retinopathy, and of the most common ophthalmic surgical procedures cataract surgery, refractive surgery and vitrectomy for the period 2008 through 2015.

The disease model uses population, age, race, and other correlated factors from the US Census Bureau along with the latest prevalence data extracted from peer review journal articles to estimate the number of patients and surgical procedures required each year. In addition, US Medicare data was obtained by year for the period of 2000 to 2007 along with Market Scope survey data of US ophthalmologists to estimate the number of cataract, refractive, and retinal surgeries.

## ANALYSIS OF DATA

A simple model was constructed to total the estimated number of surgical procedures and major ophthalmic diseases for each year from 2008 through 2015. These numbers were divided by the number of estimated ophthalmologists in that

year to arrive at a ratio for each year. The resulting number is an indicator of the workload requirements and change in workload by year. Note that these numbers do not include any estimates for primary care requirements or routine screening for patients that have not reached these advanced stages. As a result, the ratios are not necessarily a good indicator of total workload by ophthalmologist.

## RESULTS

### NUMBER OF US OPHTHALMOLOGISTS

The number of US ophthalmologists is expected to increase from 15,000 in 2008 to 15,101 by 2015. This change includes an estimated additional 3,124 new ophthalmologists over the seven year period and the anticipated retirement of 3,023 ophthalmologists. Note that our calculations indicated an average retirement age for ophthalmologists of 69.4.

### OPHTHALMIC DISEASES AND SURGICAL PROCEDURES

A growing and increasingly aged population will drive a relatively brisk growth in the incidence of major ophthalmic diseases and conditions including cataract, AMD, vitrectomies, and glaucoma. In addition, growing levels of obesity will lead to increasing levels of diabetic retinopathy. Rising lifestyle expectations and improving economic conditions (beyond the currently depressed levels) are expected fuel growth in demand for refractive surgical procedures.

US Ophthalmic Market – Major Disease/Condition	Year		
	2008	2012	2015
Cataract/ IOL surgical procedures	3,092,000	3,490,635	3,851,000
Vitrectomies	290,000	329,000	350,000
Refractive surgical procedures	1,040,000	1,403,000	1,472,000
Glaucoma patients	4,030,000	4,380,000	4,540,000
Neovascular AMD patients	1,348,000	1,421,000	1,435,000
Vision threatening diabetic retinopathy	1,892,160	2,044,035	2,157,749
<b>Total</b>	<b>11,692,160</b>	<b>13,067,670</b>	<b>13,805,749</b>

### RATIO OF DISEASE/CONDITION TO OPHTHALMOLOGIST

Dividing the total estimate for major ophthalmic disease/condition by the total number of ophthalmologists yields a ratio that describes an annual number of cases of these conditions per ophthalmologist. This is not to be confused with the total number of patients as it excludes all routine eye care and does not reflect the number of patients with non-sight threatening conditions that also require treatment.

Year/Number of Ophthalmologists	Year		
	2008	2012	2015
Beginning	15,000	15,053	15,101
Completing Residency	420	437	482
Retirements	320	450	425
Ending	15,100	15,040	15,158

This ratio grows from 779.5 in 2008 to 914.3 in 2015 for an increase of 17.3 percent over the seven year period. This increase is primarily due to growth in the number of patients with very nominal change in the number of ophthalmologists.

Year/Number of Ophthalmologists	Year		
	2008	2012	2015
Disease/Conditions	11,692,160	13,067,670	13,805,749
Ophthalmologists	15,000	15,053	15,101
Ratio-Disease/Procedures per Ophthalmologist	779.5	868.1	914.3
Change in Disease/Ophthalmologist Ratio from 2008	N/A	+11.4%	+17.3%

## CONCLUSIONS

A shortfall in the number of US ophthalmologists in relationship to the number of serious eye conditions is expected during the next seven years. A conservative estimate of this ratio indicates that ophthalmologists will need to increase their productivity an average of 17.3 percent to meet the needs of their patients.

Although this shortfall may be addressed over time with additional ophthalmologists, it is unlikely that ophthalmic residency programs can react in time to avert this situation. Other options include an extension of retirement dates for ophthalmologists. However, given an average retirement age of 69.4, this is also unlikely to avert the problem.

Increases in productivity are the most likely method of coping with this expected shortfall in resources. Potential strategies to cope with this problem include the addition of support staff and delegation of duties, increased automation of record keeping, additional advanced diagnostic equipment and longer work hours.