

## Veteran Eye Disease After Eligibility Reform: Prevalence and Characteristics

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**ABSTRACT** Purpose: To determine the prevalence of eye disease in new “routine” eye patients at the Atlanta Veteran Affairs Medical Center. Design: Retrospective chart review of all new eye patients seen in the Atlanta Veteran Affairs Medical Center Comprehensive Eye Clinic over a 2-month period (January 1, 2008–February 28, 2008). Participants: 691 charts met inclusion criteria, with 33 charts excluded for insufficient documentation in the medical record. This left a total of 658 charts for the study. Methods: Charts were reviewed for the following information: demographic data, vision, ocular diagnoses (International Classification of Diseases, 9th Revision, Clinical Modification codes), and planned minor/laser/incisional surgical procedures. Additional data collected included whether glasses were prescribed and legal blindness. Main Outcome Measures: Vision-threatening ocular diagnoses and need for minor/laser/incision surgery were tabulated. Results: There was a very high prevalence of potentially blinding disease in this population of new “routine” eye patients. About 63.4% of veterans were diagnosed with at least one ocular diagnosis other than refractive error; 25% had glaucoma or were suspects, 6% had cataracts, 5% had age-related macular degeneration, and 8% required a surgical procedure. Conclusion: The rate of ocular pathology is high in the veteran population.

### INTRODUCTION

The Veterans Health Administration (VHA) is one of the largest independent U.S. agencies providing health care to eligible veterans through a system of Veterans Administration (VA) hospitals and clinics. The VHA was officially established in 1930 by President Hoover and elevated to cabinet status under the Department of Veteran Affairs in 1988 by President Reagan.<sup>1,2</sup> Initially, the VHA provided eye care to veterans only for conditions that developed while in service (service connection). However, in October 1996, Congress passed the Veterans’ Health Care Eligibility Reform Act (Public Law 104–262), which expanded health care benefits to all veterans, including prescription drugs, prosthetics, and sensory aids (eyeglasses and hearing aids). These services drew many new veterans to the VA system, particularly for eye care services. To illustrate the growth in demand for eye services requires an examination of National Eye Care workload data.<sup>3</sup> From 2006 to 2010, there was an increase of 19.4% in eye services nationally (based on number of eye clinic visits in optometry and ophthalmology)<sup>3</sup> and this growth was not uniform across the country. Certain areas grew faster than the national trend. For example, in fiscal year 2006, the Atlanta Eye Clinic had a total of 18,715 visits compared to 29,161 visits in 2010, a growth of 55.8%, approximately 2.8 times more than the national average.<sup>3</sup> Given the current economic climate and the influx of

enrollees from the Gulf War, Afghanistan, and Iraq theaters, it is reasonable to presume that continued growth will occur. In addition, given the increase in demand for eye services in the VA, it would be important for VHA long-term strategic planning to have data available on the prevalence and classification of ocular disease in veterans and to examine if it differs from the general U.S. population. Such data will be essential for long-term planning and to ensure the VA system is adequately prepared to serve these veterans in the future. However, the last epidemiological study of Eye Care in the VA published in the peer-review literature was conducted in 1972,<sup>4</sup> at a time when service connection for an eye issue was required. Other available literature focuses on the general U.S. population and does not concentrate specifically on veterans. Therefore, the current pilot study was undertaken to explore the process of gathering and analyzing such information in the expanded population of veterans at the Atlanta VA after eligibility reform.

### METHODS

After appropriate Institutional Review Board (IRB) submission (IRB No. 44733) to the Atlanta VA Research and Development Division and Emory University, the study was found to be quality improvement and thus did not require IRB approval. A retrospective chart review of all new eye patients seen in the Atlanta VA Medical Center Comprehensive Eye Clinic over a 2-month period (January 1, 2008–February 28, 2008) was performed. This 2-month period was selected because it would statistically provide enough charts to adequately capture the breadth of ocular disease given known frequencies of eye disease in the general U.S. population. Furthermore, the Comprehensive Eye Clinic at the Atlanta VA manages only new “routine” patients who have no known previous eye diagnosis with the exception of a refractive

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error. Patients with known ocular problems who are new to the Atlanta VA enter the system through other clinics (i.e., “Consult” or “Regular”), and these charts were not utilized for this particular study.

Inclusion criteria for charts specified that a comprehensive eye examination, CPT 92004—including refraction, anterior segment slit lamp biomicroscopy, and a dilated funduscopic examination—was performed. Charts were excluded if the patient did not receive a full eye examination (e.g., refused dilation).

The following data were collected: demographic information, best corrected Snellen visual acuity in each eye, next follow-up visit scheduled (in days), ocular diagnoses (International Classification of Diseases, 9th Revision, Clinical Modification codes), diagnostic procedures performed at that visit (e.g., pachymetry, gonioscopy), diagnostic procedures planned to be done at the next visit (e.g., Humphrey Visual Field [a peripheral vision test], optic nerve analysis), prescribed ophthalmic medications, and planned minor/laser/incisional surgical procedures. Additional data included whether glasses were ordered, the presence of a systemic diagnosis requiring ongoing eye care monitoring, the use of a systemic medication with potential ocular side effects, the need for low vision services, and service connection for either eye disease or a systemic disease that influenced ocular health. To avoid data collection bias, an ICD-9 code was only recorded as an ocular diagnosis if it was specified by the examining physician in the assessment and plan. For example, if trace nuclear sclerosis was noted under slit lamp examination findings but was not documented as “visually significant cataract” in the assessment and plan, then the diagnosis was not recorded. Eye diseases such as dry eye or blepharitis were only recorded if it was clear from the chart review that there were vision changes associated with the condition. For instance, if a patient had decreased vision unexplained by other ocular findings and the physician indicates the cause for vision changes is from dry eye under the assessment, then that diagnosis was recorded as “severe dry eye” or “blepharitis.”

Low vision was only recorded if the patient met the criteria for legal blindness (better seeing eye worse than 20/200 or visual fields less than 20°). Systemic conditions were recorded if they were known to affect the eyes and required consistent monitoring (e.g., autoimmune conditions, diabetes, human immunodeficiency virus, and sickle cell/sickle trait). Hypertension was not recorded unless the patient had significant vision loss from uncontrolled high blood pressure. Frequency of disease was calculated using Predictive Analytics Software from Statistical Package for the Social Sciences.

## RESULTS

A total of 691 new patients were seen in the Comprehensive Eye Clinic over the 2-month period; 33 charts were excluded because of insufficient information. A total of

**TABLE I.** Demographic Data

Factor	
Age (Years)	
Mean	57.3
Range	21–95
Gender, <i>n</i> (%)	
Male	600 (91)
Female	58 (9)
Race, <i>n</i> (%)	
Caucasian	273 (41)
African American	375 (57)
Hispanic	8 (1)
Other/Not Documented	2 (<1)

658 new patients met the inclusion criteria. Most of the patients were male; 57% were African American and 41% were Caucasian. The mean age was 57.3 years with a range from 21 to 95 (Table I).

Table II shows the distribution of best corrected visual acuity for each eye. 44 eyes (4.1%) in the cohort were visually impaired (best corrected vision of 20/70 or worse); 12 patients (1.7%) were legally blind in both eyes. Vision could not be obtained in 3 right eyes and 3 left eyes because of the patient’s mental status.

Table III is a summary of patient disposition. Glasses were prescribed for 85% of patients. A follow-up visit within 1 year was required for 29% of patients. Medications were prescribed for 13% of patients. A surgical procedure was recommended for 7.6% of patients. 12 patients (1.7%) met the requirements for blind rehabilitation services.

**TABLE II.** Visual Acuity

Vision	Right Eye (No. of Eyes)	Left Eye (No. of Eyes)
20/10–20/25 (Normal)	536	530
20/30–20/60 (Near Normal)	98	100
20/70–20/160 (Moderate)	10	6
20/200–20/400 (Severe)	2	4
< 20/400 (Profound)	5	11
No Light Perception (Total)	3	3
Unable to Check Vision (Mental Status)	3	3
Legal Blindness (Both Eyes 20/200 or Worse)	12	17

**TABLE III.** Summary of Patient Disposition

Characteristic	No. of Patients	Percent
Spectacles Prescribed	588	85.1
Follow-Up Visit Within 1 Year	192	29.2
Incisional Surgery	32	4.9
Laser Surgery	13	2.0
Other Minor Procedure	5	0.75
Medication Prescribed	90	13.0
Blindness Services	12	1.7
Systemic Diagnosis Requiring Yearly Eye Examination	125	19.0

**TABLE IV.** Frequency of Nonrefractive Ocular Diagnoses

Diagnosis	Frequency	Percent
Glaucoma	168	25.5
Suspect	133	20.2
Primary Open Angle	27	4.1
Angle Closure	4	0.6
Pseudoexfoliation	1	0.2
Traumatic	3	0.5
Diabetes	91	13.8
No Retinopathy	68	10.3
Nonproliferative	16	2.4
Macular Edema	2	0.3
Proliferative	5	0.8
AMD	31	4.7
Nonexudative	21	3.2
Drusen	8	1.2
Exudative	2	0.3
Other	139	21
Blepharitis	43	6.5
Cataract	39	5.9
Retinal Vascular Disease	22	3.3
Severe Dry Eye	14	2.1
Optic Neuropathy	11	1.7
Peripheral Retinal Disease (Lattice, Retinal Break, Detachment)	10	1.5

Table IV lists the most common diagnoses; 63.4% of patients had an ocular diagnosis other than refractive error. Glaucoma or glaucoma suspect was diagnosed in 25.5% of patients. Diabetes with and without retinopathy (13.8%), age-related macular degeneration (AMD; 4.7%), and cataract (5.9%) also were common findings.

## DISCUSSION

This is the first study to evaluate the prevalence and characteristics of eye disease in a veteran population presenting to a VA Comprehensive “Routine” Eye Clinic in the post-Eligibility Reform era. Our retrospective chart review of new eye patients seen in a Comprehensive VA Eye Clinic illustrates that veterans have a wide variety of ocular diseases; 63.4% of patients had another ocular diagnosis other than refractive error on their initial eye examination. This number is considerably higher than the 21.1% rate reported in Kleinstein and Newcomb’s 1972 study. The difference between these studies, conducted nearly 40 years apart, may reflect the aging veteran demographic. Our data indicate that in veterans, the most common ocular conditions were glaucoma/glaucoma suspect, cataract, AMD, and diabetes/diabetic eye disease. Veterans appear to be afflicted with similar age-related eye disease of the general U.S. population >50 years of age,<sup>5</sup> but the actual prevalence rates obtained in our study varied compared to previously published literature. Potential reasons for these differences are discussed below.

According to the 2011 Survey of Veteran Enrollees, the average age of veterans enrolled at the VA is 62, with 81.1% of enrollees greater than 50 years old; a significant difference when compared to the average age of the general U.S. popu-

lation (30 years old).<sup>6</sup> Furthermore, 11.7% of VA enrollees are African American, and 16% of those African American enrollees are over the age of 50; this representation exceeds their representation in the U.S. population.<sup>6</sup> The percent of Hispanic and Latino enrollees (6%) is also steadily increasing. Therefore, enrolled veterans are (1) older and (2) have a greater representation of minorities, namely African Americans and Hispanics.<sup>6</sup> These facts help explain why the prevalence of glaucoma/glaucoma suspect in veterans is higher when compared to the general U.S. population. In our study, the prevalence of open angle glaucoma was 4.1%, more than double the prevalence rate of the general U.S. population (estimated at 1.86%).<sup>7</sup> The prevalence of glaucoma in veterans closely approximates the prevalence of glaucoma in nondiabetic patients over the age of 60 (4.3%) found in the Centers for Disease Control and Prevention weekly report,<sup>5</sup> probably because of similarity in the two study populations’ average age.

Interestingly, some of our data reflect a lower prevalence rate of certain eye conditions than what is reported in the general U.S. population. For example, our study rate of AMD and drusen was lower than previously published numbers. According to Friedman et al,<sup>8</sup> the prevalence of at least 1 drusen in one or both eyes greater than 125  $\mu$ m (high risk for developing AMD) in adults over 40 was 6.12%. Given that the majority of enrolled veterans in the VA are Caucasian (80.8%) and over the age of 60,<sup>6</sup> it is surprising that in our study, only 1.2% of the veterans were found to have drusen, with 3.2% documented as “dry AMD.” The difference in prevalence may reflect patient selection and the Atlanta VA’s patient population. This study was conducted using only charts of new “routine” eye patients. If the patients already had a diagnosis of AMD, they would have been scheduled to be seen through a different clinic. Therefore, it is possible that because we chose to examine only new routine eye patient charts, the rate of pathology is lower because of the type of patients scheduled into the “New Comprehensive Eye” Clinic. Furthermore, we had a high minority population in our patient demographic, with 57% African American representation. AMD is less common in African Americans than in Caucasians,<sup>8</sup> and this may also explain the lower AMD prevalence in our study.

Cataract was another common ocular disease found in our veterans, at a prevalence of 5.9%. Our study’s definition of cataract specifically refers to “visually significant cataract,” i.e., causing central vision to be less than 20/40 or glare worse than 20/40 in the affected eye. The prevalence of cataract in the general population is estimated at 17.2% in adults over age 40,<sup>9</sup> which is significantly higher than our data but the cataract prevalence numbers in Congdon et al’s study encompasses any type of lens opacity, both surgical or nonsurgical. Congdon et al, however, reports that the prevalence of pseudophakia/aphakia in the general U.S. adult population is 5.1%, which matches our surgical cataract prevalence of 5.9%.

Diabetic eye disease had a total prevalence of 13.8%, with 10.2% having no retinopathy and 3.5% with some level of diabetic retinopathy or macular edema. This prevalence level falls within the wide range of published numbers, 10 to 61% for established diabetics and 1.5 to 31% in newly diagnosed diabetics.<sup>10</sup> We found that the prevalence of diabetic eye disease in veterans was on the lower end of the published range, and the lower prevalence of retinopathy in veterans may reflect the positive efforts made by VA primary care to control diabetes and associated comorbidities such as hypertension and high cholesterol. In addition, those diabetics who had known diabetic retinopathy may have entered the Atlanta VA Eye Clinic through other clinics and would not be appropriate candidates for the “routine” eye examination from which our data are derived.

In addition, we believe that veteran ocular prevalence data are heavily influenced by geography. Glaucoma or glaucoma suspect was the number one most common nonrefractive initial diagnosis on a routine eye examination. This study was conducted at the Atlanta VA located in Veterans Integrated Service Network (VISN) 7, comprising several southern states, where the population of African Americans, a higher risk ethnic group for glaucoma,<sup>11,12</sup> is more concentrated.<sup>13</sup> It is possible that a similar study conducted in a different VA geographic region would yield different prevalence rates. A prevalence study conducted in the Northern VISNs may yield a much lower prevalence of glaucoma (closer to the prevalence of the general U.S. population) and a higher prevalence of AMD. It may be useful for the VHA to conduct a multi-VISN eye prevalence study to ascertain the most common eye diseases in the varying regions of the country to better identify eye care needs of a particular area. This would help direct specific eye care resources across the country to the veteran groups who need it most.

In addition to prevalence data, this study performed an overview of patient disposition after the initial visit, which may help with future resource planning and utilization. About 29.2% of new patients received a follow-up appointment within 1 year of the initial visit. Many of the ocular diagnoses established in our cohort of patients are potentially blinding conditions, such as glaucoma and diabetes. These two diagnostic groups alone require a significant dedication of resources as they both involve long-term follow-up ophthalmic care. Of note, 5% of the new comprehensive patients required a major ophthalmic surgical procedure (in some cases, two-bilateral cataract surgery), 2% required a laser surgical procedure, and 1% underwent minor surgery/injection. These percentages only refer to the new patients who were presented to the “routine” comprehensive clinic. In addition, the VA continued to provide ongoing care to established veterans and to new patients with known ocular disease who were scheduled into more complex clinics. As illustrated in the introduction, the demand in eye services is growing steadily. Therefore, the VA system needs, in addition to providing access to an increasing number of new

patients, to budget resources for continuing eye care of established patients in terms of procedures, clinic space, providers, and ancillary personnel.

Other potential vision care costs that need to be considered include diagnostic equipment, spectacles, medications, and visual impairment rehabilitation. In our study, 85% of the veterans were prescribed eyeglasses to improve visual impairment from refractive error. This number is similar to the general U.S. population, where Vitale et al<sup>14</sup> found that 83.3% of patients had improved vision with eyeglasses. In our study, 1.7% of patients were legally blind, which correlates with Kleinstein and Newcomb’s reported rate of 1.8%. Marcussen and Newcomb’s study<sup>15</sup>, conducted 18 years ago, found that the majority of causes for legal blindness in that veteran population was preventable, with 35.4% related to glaucoma. Some of the veterans in our study became legally blind from trauma, although most of the legal blindness was caused by glaucoma or diabetes. It is interesting that this percentage had minimal change over the last 40 years. This would suggest that perhaps the VA needs to focus more on preventative eye care, perhaps by instituting nationwide glaucoma screening for enrolled veterans. Diabetic eye screening would also be important, and this has already been implemented across the VA using teleretinal technology.

The current study has some limitations. It was retrospective in nature and is a relatively small sampling of only “routine” patients at one VA located in the Southern United States. Only the charts of new patients who were considered “routine” were examined and therefore, the prevalence rates derived from this study may be more reflective of “undiagnosed” eye conditions than overall disease burden. Nonetheless, this study’s data confirm that the VA patients are afflicted with similar eye diseases as the general U.S. population—diabetes and diabetic eye disease, glaucoma, cataract, and AMD. Veterans, however, are an older cohort of patients with greater minority representation; thus, the prevalence of glaucoma is higher than the U.S. population. Resources are needed for both initial and subsequent follow-up/ongoing care, especially as demand for eye services increases over time. Given the diversity of ocular problems and the high percentage of veterans requiring long-term follow-up, effective screening methods, such as the established VA diabetic teleretinal program, may be necessary to help improve access to care for veterans, identify, monitor, and treat veterans who are at risk for blindness.

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