



The Optometry Surplus

A Quantitative Determination Of Excess Densities

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Executive Summary

*This study calculates the degree to which additional schools of optometry, and increased enrollments at existing schools have, and will, produce record densities (**D**) of optometrists and an increasing surplus of optometry manpower.*

*Since 1997, graduates will, this year, have increased by 42%, enrollments by 55% and density of optometrists by 11%, from **D=11.5** in 1997 to over **D = 12.8** per 100,000.*

*In 1997 the national Optometry Census led to the conclusion supply equaled demand for the density at that time of **D=11.5**. A manpower study, released in 2000 by Abt. Associates, sponsored by the AOA, projected surpluses from 1998 to 2030 if graduation rates remained at 1,127. But, graduation rates have increased and will reach 1,700 by 2016 and perhaps approach 1,900 by 2018 when two additional schools begin to produce graduates. In the past 80 years **D** has only once, briefly, reached **14** in the early 1950's.*

*This surge in enrollments, if unchecked, will cause densities to reach record highs each year until eventually peaking at **D=15-17**. Creditable projections of future population growth and demand for optometry care do not require these high densities, and will create market disorders as population growth rate is low and falling.*

A surplus density creates real hardships for optometrists burdened with educational loans and especially new graduates, and is a misuse of valuable human resources. Then, if applications decline as candidates question entering an overpopulated profession, this can drive schools to accept less qualified applicants. Applicants for the 2013 entering classes, for example, were already below 1.4 per seat.

Free-standing schools unaffiliated with universities have higher enrollments and are most vulnerable. Two have begun training physician assistants or audiologists to mitigate effects of optometry oversupply and declines in applicants.

As in other education "bubbles" there are three key drivers:

- *Overly optimistic predictions of future demand and employment opportunities.*
- *Accreditation Council on Optometric Education standards that, unlike medical and dental accrediting bodies, lack quantifiable, clinical, training requirements.*
- *Guaranteed student loans for which schools have no re-payment obligations.*

*This paper quantifies the impact increased enrollments have had, and will have, on future supply as measured by the density (**D**) of optometrists.*

*In 1997, **D** was at 11.5 with 30,510 optometrists and it was believed demand equaled supply at that time. Since then, enrollments have increased faster than population growth. These increased enrollments will drive **D** to the range 15- 17. In the past 60 years **D** hovered between 10 to 12 and future demands are unlikely to require optometry densities much, if any, above the current 12.8 because there is already evidence of excess supply with this density. (About 30% of ODs have two or more part-time practice sites.)*

*Readers can reach their own conclusions by predicting the **D** required in future years to equal demand. A surplus is the difference between the numbers projected to be in practice and the numbers needed to achieve the **D** required to meet predicted demand.*

*The attached figures calculate surpluses by taking the projected supply in each year and subtracting from it the number of optometrists required to meet demand **D**'s of 11.5, 12.8 or 14.0.*

The following figures and charts appear in the text.

- #1 Optometry enrollments vs. population growth.**
- #2 Densities per 100,000 based on two future graduation rates.**
- #2a. Impact of GI Bill on past Density**
- #3 Surpluses per year with graduation rate of 1,700.**
- #4 Surpluses per year with graduation rate of 1,900.**
- #5 Abt. Associates surpluses with 1,127 graduation rate.**

Numerical values of surpluses are shown below for years 2010 – 2060 and graduation rates of 1,700 to 1,900 per year.

*The most uncertain part of any manpower study is predicting the future **Densities (D)** required to meet future demands. Because of the many pitfalls and uncertainties in trying to predict future demand, this study explores a range from **D=11.5** to **D=14** as needed to meet future demand. Linear interpolations can be made for other demand densities and graduation rates.*

Future supply densities were determined using the projected supply of optometrists derived from graduation rates; population projections determined from the US Census Bureau, an average annual attrition rate of optometrists from practice due to death, disability or retirement of 2.5% per year, with supplementation from cross-matching past graduation rates with future graduation rates year-by-year.

*Density **D** is the best indicator of supply and projected demand because, unlike counting numbers of optometrists, it includes the effect of population growth over time.*

*This study concludes a current surplus exists and, unless demand requires **D**'s higher than 13, ever larger surpluses will exist each year over the next 35 years.*

Future Surplus Numbers (2)

A: Surpluses with a Graduation Rate of 1,700 in 2016 and constant thereafter.

	<i>If D = 11.5 is needed to meet demand (1)</i>	<i>* If D = 12.8 is needed to meet demand</i>	<i>If D= 14 is needed to meet demand</i>
<i>Year</i>	<i>Surplus Numbers</i>	<i>Surplus Numbers</i>	<i>Surplus Numbers</i>
2010	3,223	133	-4,502
2015	5,845 (4)	1,672	-2,180
2020	7,805	3,476	-520
2025	9,460	4,962	810
2030	11,195	6,541	2,245
2035	12,505	7,708	3,280
2040	13,740	8,800	4,240
2045	15,205	10,168	5,480
2050	16,555	11,368	6,580
2055	15,705	10,388	5,480
2060	14,590	9,130	4,000

B: Surpluses with a Graduation Rate of 1,900 reached in 2018 and constant thereafter. #

	<i>If D = 11.5 is needed to meet demand (1)</i>	<i>*If D = 12.8 is needed to meet demand</i>	<i>If D = 14 is needed to meet demand</i>
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2035	16,505	11,708	7,280
2040	18,740	13,800	9,240
2045	21,205	16,168	11,480
2050	23,555	18,368	13,580
2055	24,905	19,588	14,680
2060	24,890	19,430	14,390

** D= 12.8 in 2012, D= 11.5 in 1997 at time of Abt. Associates study.*

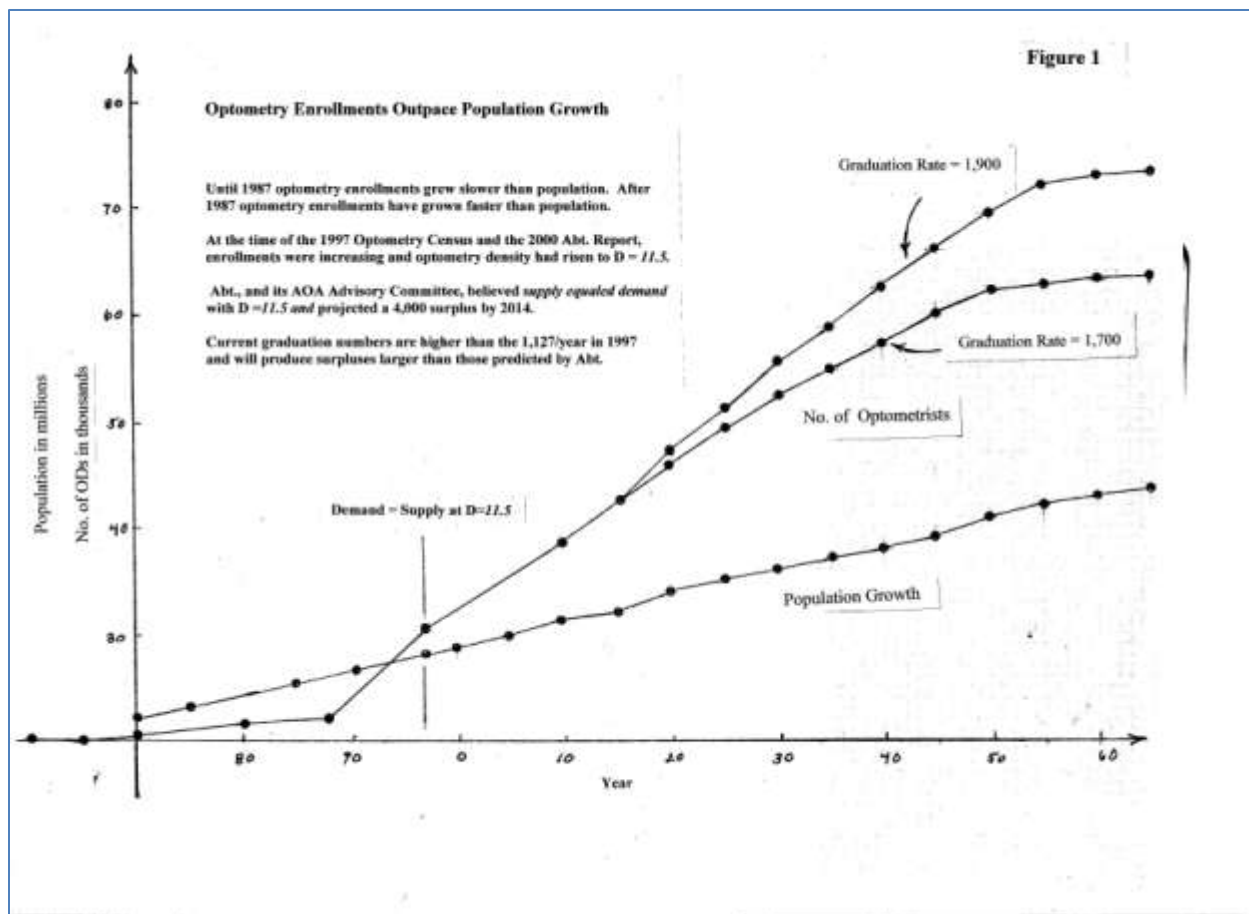
Based on graduates from two additional schools beginning 2018

(1) In 1997, supply = demand at D=11.5 per Abt. and AOA.

(2) These are national averages. Local densities vary widely. The 1997 Project Hope Census of Optometrists found regional Ds ranging from 1.61 to 39.09. Similar variations exist for physicians, and other health providers.

(3) Graduation rate for 2014 is predicted to be 1,600.

(4) Abt., with D=11.5, and 1,127 grads/year, predicted a surplus of over 4,000 by 2015.



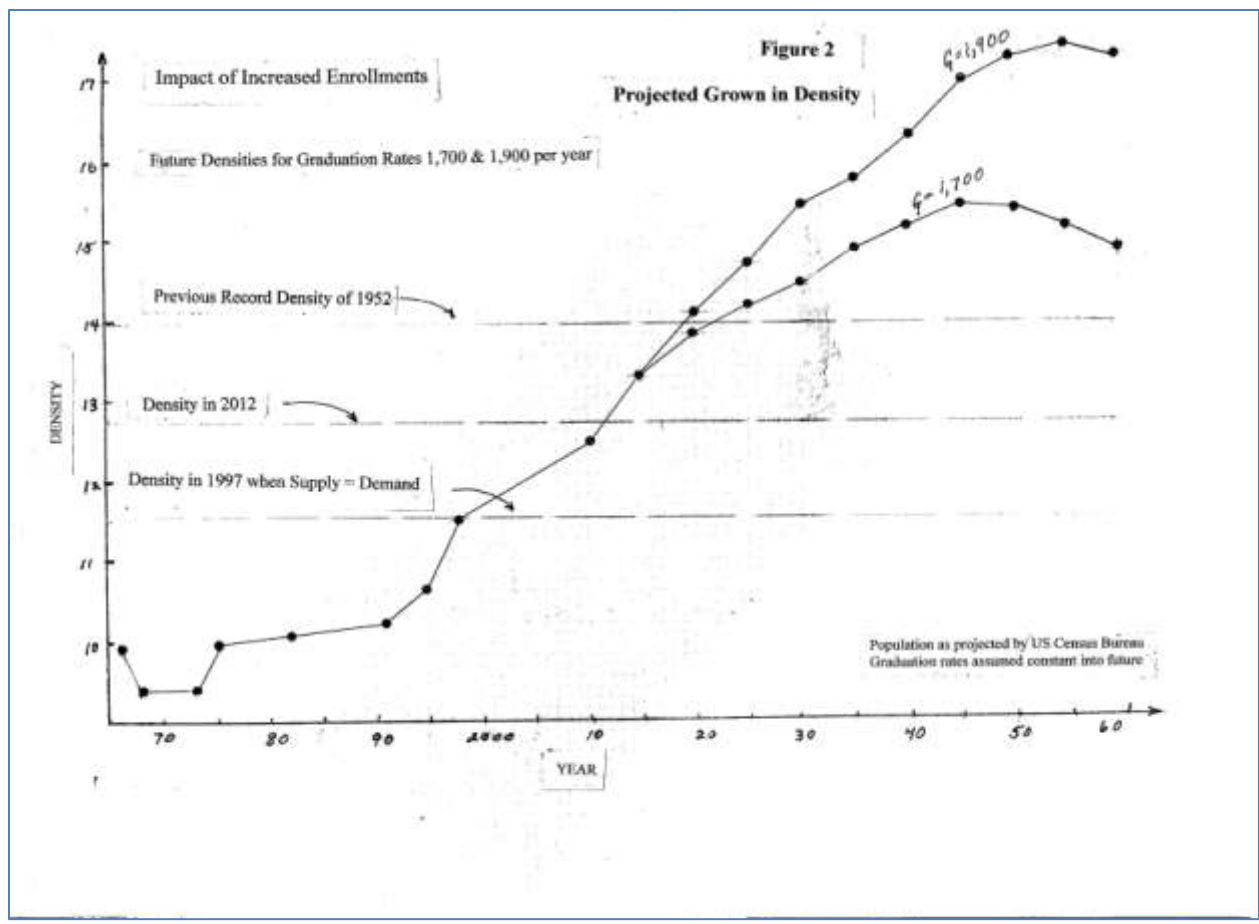
Purpose of Study.

To estimate the amounts by which rising enrollments increase density (**D**) of optometrists per 100,000, above its 1997 value of **11.5** determined by the national optometry census (Project HOPE), at which time it was believed the supply of optometrists equaled the demand for their services. [Figure 1]

Density is the best indicator of *supply* and can be accurately tracked back in time to 1930 and projected into the future, unlike *demand*, which is far more difficult to predict as it depends on many assumptions. For these reasons this study concentrates upon **D** and how it is affected by increases in optometry schools and numbers of graduates.

Background

In 1952 **D** rose to a brief record high of **14** from graduates under the “GI Bill” but steadily declined to **10** by 1967 when there were 12 U.S. schools of optometry and graduation rates of around 500. [Figures 2, 2a] There are 20 US schools of optometry with 2 more expected and the most recent graduating classes totaled 1,567.



During the 30 years after 1969, additional schools opened, enrollments rose, and **D** slowly increased. When the 1997 national Census of Optometrists was conducted, in cooperation with the American Optometric Association (AOA), **D** had risen to **11.5** and graduation rates were hovering around 1,127. [Footnote 4]

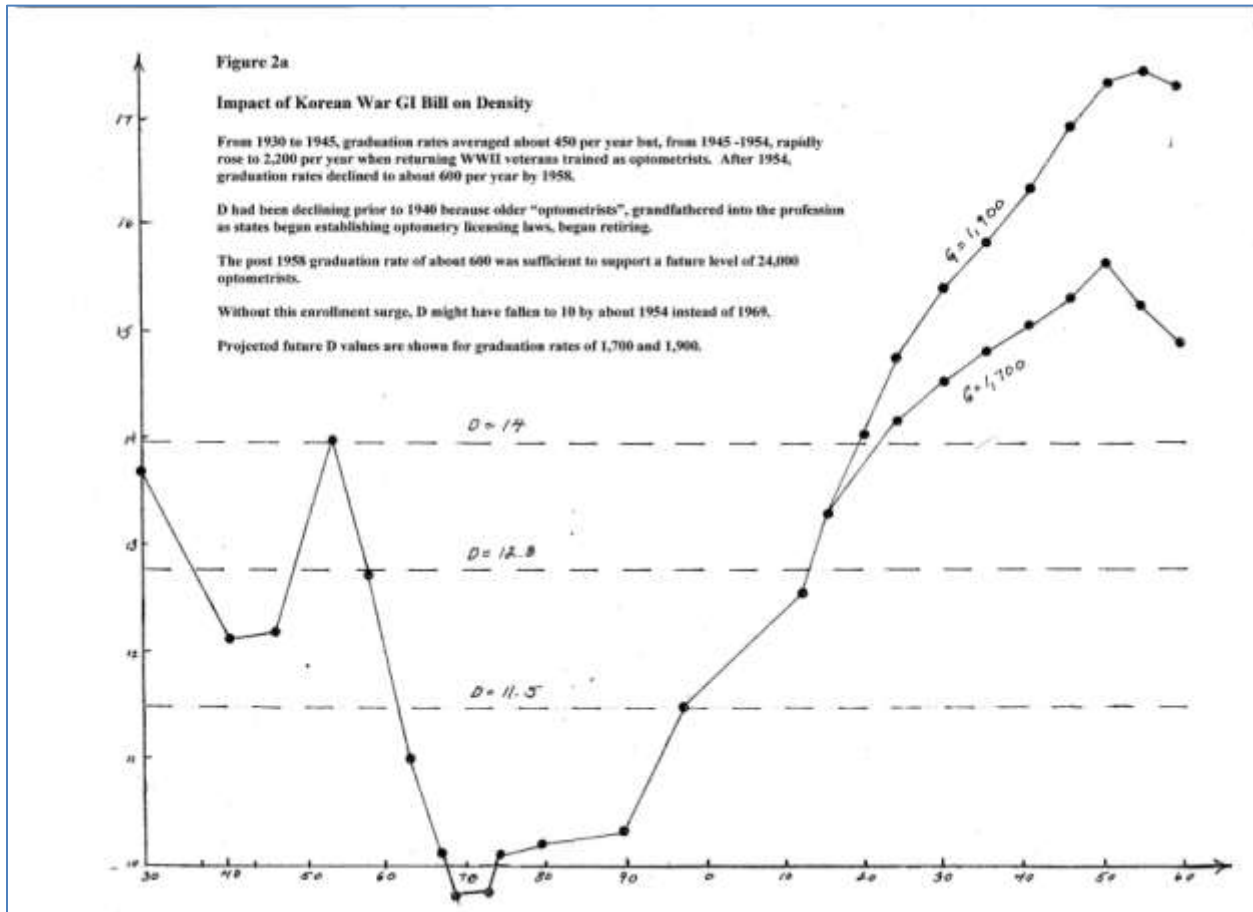
In 2000, Abt. Associates released its “Workforce Study of Optometrists”, based upon the 1997 Optometry Census. This report projected future surpluses (just over 4,000 by 2015) and higher **D**’s, if *no* additional schools opened and graduation rates remained at 1,127 per year.

Following this 2000 study, additional schools of optometry opened, entering classes rose by 2012 to 1,760, and two more schools plan to enroll graduates by 2018 creating total future graduation rates of perhaps nearly 1,900 per year. [Footnote 5]

During this recent expansion the numbers of qualified applicants per seat declined to the level that in 2012 some seats went unfilled due to a lack of qualified “back-up” applicants.

Based upon this study, graduation rates by 2018 may be as much as 73% above the levels of 1997, when **D** = **11.5** and supply equaled demand.

This growth in graduates far outstrips the growth of US population since 1997 with the latter increasing at a rate of only 0.87% per year and projected to decline further by the Census Bureau. [Figure 1]



- 1967** Graduation rate = 500, Population = 199 million **D =10**
- 1997** Graduation rate = 1,127, Population = 266 million **D =11.5** [Supply = Demand]
- 2014** Graduation rate = 1,600, Population = 317 million **D =13.4**
- 2018** Graduation rate = 1,900, Population = 340 million **D =14.0**

The population growth rate continues to decline. The average rate for the last century was 1.3% per year but fell below 1% 15 years ago and is now at 0.87% due to a drop in fertility rates. Without immigrations the rate would be even lower and the Census Bureau predicts further lowering of the growth rate over the next 40 years.

The 2000 Abt. manpower study was funded by the AOA which fully cooperated in the study. [Abt. stated "we are indebted to members of the AOA Workforce Committee, who have provided us with data, advice, criticism, and support throughout the project."]. One member of the AOA Workforce Committee later served as the AOA Executive Director.

Since the Abt. report believed “supply was equal to demand” on the basis of the 1997 Project Hope Census data, when **D** was **11.5**, this value for **D** will serve as a benchmark against which future densities are compared.

The Abt. projection for numbers of optometrists in 2012 agrees very closely with the value of 40,000 given by the AOA for that year. Abt. believed this number would represent a surplus of about 4,000 which is reflected by the density having risen to **12.8** in 2012 vs. **11.5** in 1997 and is now at about **13.4**. [Figs. 3, 5].

Methodology:

The law of Supply and Demand is difficult to apply to healthcare and optometry in particular. While “supply” is subject to quantitative assessment, “demand” is difficult to define and measure and requires predicting future levels of care actually sought by the public and changes in the US health insurance system and economy.

In the author’s opinion, too much guess work is required to make other than rough predictions about future demand levels and it is best to project changes in density and ask if they seem congruent with reasonable future demands.

This study examines the past densities of optometrists and projects future densities using expected 2018 enrollment rates and future rates of population growth.

The Abt. Report projected a future surplus that would peak just over 4,000 for a 5-year period around 2015 [Figure 5] and assumed graduation rates would remain at 1,127. That prediction appears accurate since **D** in 2014 has risen from **11.5** to **13.4**, a little higher than Abt. predicted because graduation rates had risen above the 1,127 Abt. predicted would remain constant. This means that a surplus now exists larger than Abt. predicted.

Parameters Determining Density

Density of Optometrists

1: D = number of optometrists per 100,000 population can also used to quantify future demand levels per 100,000. A surplus exists if **D** of supply exceeds **D** of demand.

D varies considerably from state-to-state, as it does for physicians, dentists and other doctorial health providers. While some believe increasing the supply of health providers “smoothes” out these variations, there is evidence it does not and “mal-distributions” continue despite increased numbers of providers. Offering financial incentives [loan forgiveness and bonuses] appear more effective.

National **D** values are used to indicate *relative* supply and demand over time. The levels since Abt. and the AOA felt supply equaled demand in 1997 with **D = 11.5** is used as a benchmark of supply equal to demand. **D** has already risen to **13.4** as Abt. predicted.

2: Population and its Growth

The study uses future population estimations of the US Census Bureau.

3. Numbers Graduating from Schools of Optometry.

This data is available since 1940. Based on entering 2012 enrollments, the graduation rate will exceed 1,700 in 2016 and by 2018 may reach nearly 1,900. This study assumes no additional schools open and graduation rates remain in a range of 1,700 to 1,900 per year.

4. Demand for Optometry Care

In 1970 an article by Pennel & DeLong opined **D = 13-14** would be required for “good” care *if* every US citizen were eligible for free, comprehensive care under a future National Health Care Plan. In 1972, AOA’s “Optometry Today: The Vision Profession” stated an optimum density was **13-14**. See also Mote [JAOA, No. 40, Dec., 1969] but there remains no quantitative determination of optimum **D**. Instead, manpower studies have attempted to predict demand based upon algorithms and assumptions. In truth, **D** has been driven by the number of schools and their class sizes with no master plan.

D has been under **12** for most of the last 60 years and, at its brief record **14** in 1964 from “GI Bill” students, when enrollments quadrupled, considerable numbers of graduates experienced difficulty establishing practices.

“Demand” is strongly influenced by the degree to which medical insurance and vision benefit programs provide eye/vision coverage, the cost of co-pays, the state of the national economy and the political climate set by special interest groups lobbying for health care. Predicting future demand is thus a guessing game.

It is not possible to accurately quantify future “demand” and this study will not do so other than observe supply equaled demand at **D = 11.5** in 1997 and there is probably a surplus now as predicted by Abt. Instead, readers can predict future required **D**’s and use the attached charts and figures to determine the extent of future surpluses.

*The reference point is 1997 when supply equaled demand for optometry services at **D=11.5**. The charts show surpluses for future demands ranging from **D =11.5 to 14.0**.*

Past Optometry Manpower Studies:

1. RAND Corporation Workforce Study.

Released in 1995 by the RAND “think tank”, and sponsored by the American Academy of Ophthalmology, this study included ophthalmologists and optometrists and postulated three future systems in which they would practice. The AOA did not participate.

In all 3 future systems, RAND projected surpluses of ophthalmologists and optometrists, including the system in which patients decided whether they would seek care first from an ophthalmologist or optometrist.

2. Project Hope National Census of Optometrists

In 1997 the national “Project Hope Census of Optometrists” [supported by the AOA] determined there were 30,510 practicing optometrists and the US Census Bureau report for 1997 stated national population was 266,490,000. These yield a density **D** of **11.5** in 1997.

3. Abt. Associates Manpower Study

In 2000, Abt. Associates of Cambridge Mass. released its “Workforce Study of Optometrists”. Funded by the AOA and with an AOA Workforce Committee providing “data, advice, criticism and support”, the Project Hope Census data of 1997 was used as the base upon which it developed projections of future supply and demand for optometrists.

Abt. assumed *the supply of optometrists equaled demand in 1997 [D = 11.5]* and, as the graduation rate of optometrists had been almost constant [1,023-1,232] from 1983 to 1995, *assumed a constant graduation rate of 1,127 through 2030.*

Acting with the advice and suggestions from its AOA Advisory Committee, Abt. projected a surplus of optometrists that would grow to 10% [just over 4,000] in 2013-2017 and then decline by 2030. [Figure 5]

As a test of its accuracy, Abt. projected a total of 39,685 optometrists by 2012 and in 2013 the AOA reported 40,000 were in practice in 2012 which is a reasonable match.

But the number of graduates began to increase above 1,127/year after the Abt. report and if one adds those additional graduates to the Abt. projection for 2012 it becomes 40,058, an almost exact match with the AOA 2013 report of 40,000 for 2012.

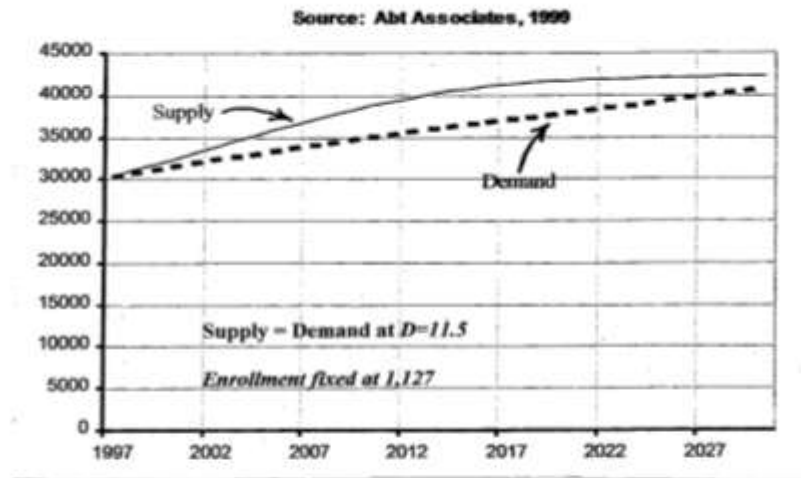
This close match of the Abt. supply projection for 13 years in the future demonstrates the Abt. supply model and its predictions of surpluses were accurate up to 2012 but are now *underestimations* of surpluses because graduation rates are above the 1,127 assumed by Abt.

When Abt. made its study there were 13 U.S. schools graduating 1,127 per year but in 2018 there will be 22 U.S. schools graduating perhaps as many as 1,900 per year.

The Abt. data base for its supply algorithm could be updated using post-1997 graduation rates by adjusting Table 5.17 (page 10) graduation rates in Column #1 and re-computing Column #3 (surplus) and Column #4 (% surplus).

Abt. Associates Projected Surpluses

Figure 5



In 2000, Abt. projected surpluses averaging 4,000 per year from 2011 to 2018.

Based upon the advice of its AOA Advisory Committee, Abt. attempted to anticipate future changes in demand by making predictions of which these were the most important.

1. Supply equaled demand in 1997 at $D=11.5$.
2. Graduation rates will remain at 1,127 through 2030.
3. Patient visits by the elderly gradually increases by 25%.
4. Numbers uninsured decline from 16% to 12%.
5. Numbers receiving managed care increases to 70%
6. Optometry retirement ages remain the same
7. Optometrists work an additional 3 hours per week.
8. Optometry exam times decline from 25 to 20 minutes.
9. Female optometrists represent 50% of workforce
10. Average optometrist workweek increases by 3 hours.
11. Female optometrists work slightly fewer hours per week.

The key assumptions are that supply of optometrists was assumed to equal demand in 1997 and that graduation rates would remain constant at 1,127.

Graduation rates did not stay constant at 1,127 and will reach about 1,760 by 2016 and about 1,900 by 2020 indicating the Abt. estimates of future surpluses were significantly under estimated.

Conclusions from Abt. Study.

The Abt. modeling for supply was accurate for 13 years but its future predicted surpluses are now underestimates.

The Abt. "Optometric Workforce Simulator"... "we developed a flexible forecasting tool that can produce workforce estimates under a range of future scenarios." could have been updated if the AOA wanted to account for increased numbers of graduates but it choose, instead, to fund a new study by the Lewin Group which is yet to be released.

This Study

There are three critical parameters in a manpower study.

1. Projected Supply Density
2. Projected Population Growth
3. Density required to meet projected Demand

Supply and population are quantifiable whereas “Demand” requires guesses about legislation, the national economy [GDP correlates with “demand”] and future health treatment modalities, their efficiency, and workforce.

This complexity is shown by the many assumptions Abt. and the AOA made in 1997 in an attempt to project demand.

1. Supply equaled demand in 1997 at **D = 11.5**.
2. Graduation rates would remain at **1.127**.
3. Patient visits by the elderly will slowly increase by 25%.
4. Numbers of uninsured will decline from 16% to 12%.
5. Numbers receiving managed care will increase 70%
6. Optometry retirement age will remain the same.
7. Optometrists will work 3 additional hours per week.
8. Females will represent 50% of work force, work fewer hours than males and retire earlier than males.
9. Population will grow at 1997 rates.

While a supply model can fairly accurately predict future densities of optometry there are many ways to make errors in estimating demand factors like the above or that may appear in the future. Inaccuracy is always greatest in projecting demand.

Most Recent D value

The Census Bureau reported US population of 313 million in 2012 when graduation rates had risen to about 1,500. Total number of O.K. in 2012, per AOA (and projected by Abt.) was 40,000. This yields **D = 12.8** in 2012 and **13.4** in 2014.

Importance and Use of D

In recognition of its importance, the AOA, since 1973, has included in its list of “extant resolutions” that “...the profession will reevaluate at regular intervals the changes in health care delivery systems and the population growth to determine workforce projections and the *ratio* of optometrists to population.

After World War II when enrollments reached over 2,000 from veterans using the GI Bill to attend optometry school, **D** rapidly rose to a record of **14** but soon declined to **10**.

In 1974 the author published a study which concluded graduation rates were too low, enrollments should expand, and additional schools opened, but care would be needed to avoid a 1952 “bubble”.

The Modern Optometry Era

“Modern optometry” began after WWII when enrollments from 1945-1954 briefly quadrupled as returning veterans utilized the GI Bill to gain undergraduate degrees and postgraduate training in the health professions.

As Figure 2a illustrates, optometry densities had been declining since 1930 from the effects of states legislating optometry licensing laws and boards of registration.

Those boards “grandfathered” many older optometrists who often had substandard training and were retiring in increasing numbers after 1930. Without the impact of the GI Bill, **D** would have declined to about **10** around 1950. But the GI Bill, created an all time record **D = 14** which then declined to about 10 by 1970 and would have stayed at this level except new schools began to be established about this time and enrollments increased.

All “grandfathered” optometrists had retired by 1965 when **D** hovered at **10** with 1965 graduation rates of about 500.

As the following data, and Figures 2 and 2a show, the modern optometry era began about 1970 with a **D** of **10** *which has been rapidly increasing ever since due to additional schools being established*. The details follow:

1. 1967 **D = 10**. The American J. of Public Health published “Vision Manpower in the United States” which graphed **D** declining from **14** at the record peak of **14** in 1952 to **10** by 1967.
- 2: 1968 **D=9.3** The U.S. Dept. of Health, Education and Welfare published, in 1968, “Optometric Manpower: Characteristics of Optometric Practice” which found **D** at **9.3**.
- 3: 1973 **D = 9.4** The 1973 landmark “National Study of Optometric Education” conducted by the National Commission of Accrediting” stated on page 23, in the chapter “Manpower in Optometry”, the average national Density was **9.4**, with about 1,000 entering the 12 U.S. schools of optometry and about 21,000 registered optometrists.
- 4: 1974 **D = 10** in a paper published in 1974 by the author showing from 1930 to 1974 **D** had declined from **13.9** down to **10** with a local peak of **14** in 1952 from GI Bill optometry students.
- 5: In 1992-94 the “Georgetown Summit: A Critical Assessment of Optometric Education” issued Action Item S1 calling for the immediate development and publishing by the AOA and IAB of *accurate assessments* of optometric manpower every 5 years. This may have triggered AOA funding the 2000 Abt. manpower report.

6: 1997 **D = 11.5** In March, the Project Hope Center for Health Affairs issued the “First National Census of Optometrists” which showed **D** had increased to **11.5**. This census data was used in the 2000 Abt. Associates manpower study.

7: 1998 **D = 11** A report by the AOA about this time stated **D** was **11**.

8: 2000 **D = 11.5** The 2000 Abt. Associates “Workforce Study of Optometrists” found the average national **D** to be **11.5** [page 109] in 1997 utilizing the census data of Project Hope.

9. 2012 **D = 12.8** In its 2013 State of the Profession the AOA reported 40,000 optometrists in practice in 2012 or a **D** of **12.8** for a 2012 population of 315,091,000.

10. 2012 **D = 12.6** In 1997 Abt. projected 39,685 optometrists for 2012 or a **D** of **12.6***
*This is **D = 12.7** if graduation rates from 1997 to 2012 are inserted in Abt’s model.

U S Population Growth:

As of June 2014, total U S resident population was 318,150,000 [US Census Bureau].

Over the 20th century, U S population grew at an average annual rate of 1.3%.

But, the growth rate for past 20 years averaged 0.98% and for the past 10 years averaged 0.84%. Still lower rates in the future are predicted by the US Census Bureau.

Future population projections used in this study are those of the US Census Bureau.

Numbers of US Optometrists:

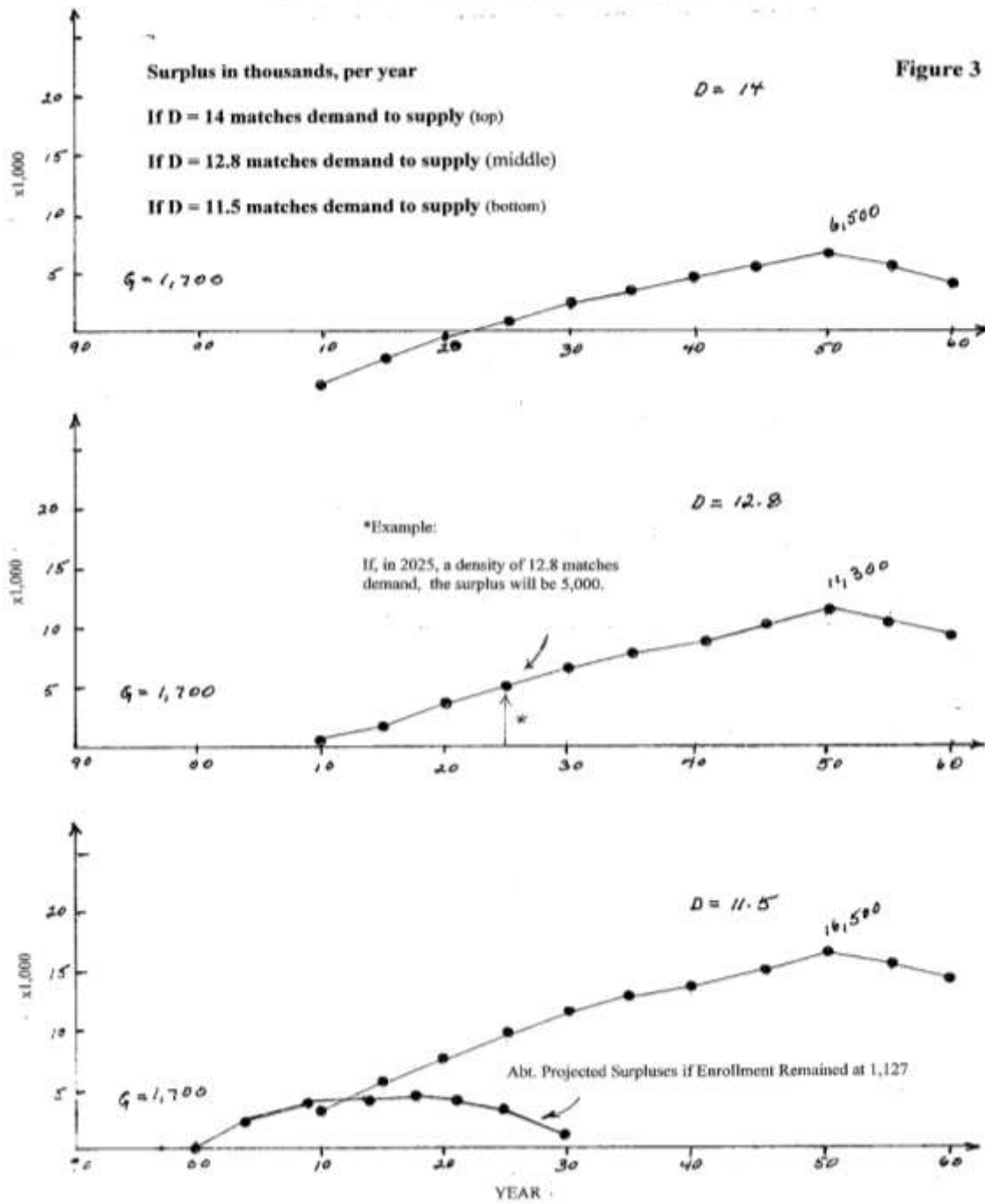
The National Census of US Optometrists in 1997 counted 30,510 with active licenses. This number was used in the Abt. Report as the base number for the 1997.

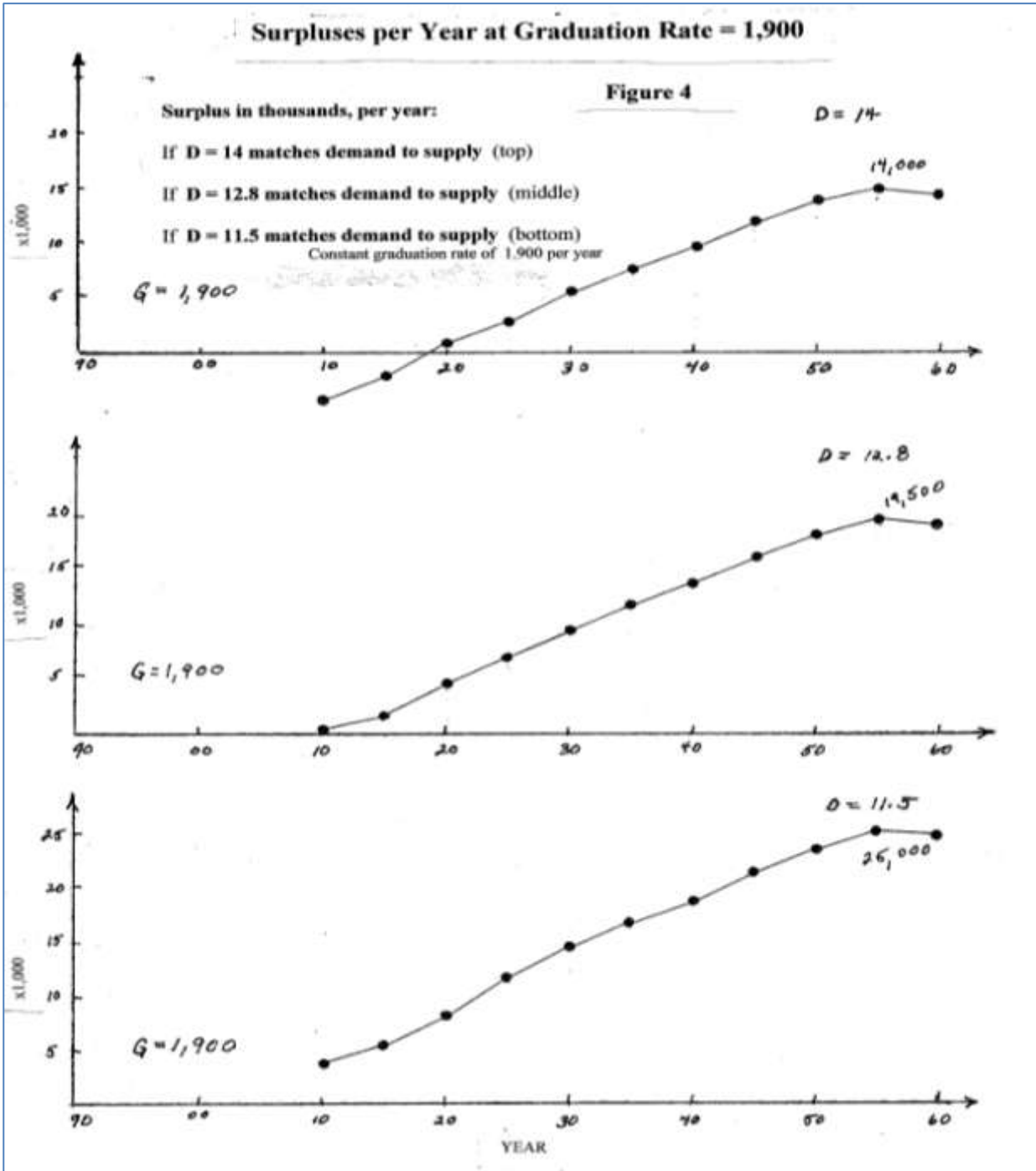
Abt projected that with a graduation rate of 1,127 per year, numbers of optometrists would increase from 30,510 in 1997 to 42,356 by 2030. Abt. concluded this would produce future surpluses of optometrists that peaked at just over 4,000 (10 % surplus) centered about 2015 and would decline to about 3% in 2030 with 42,356 in practice.

Graduation Rates Determine Steady State Numbers of Future Optometrists

The future *steady state* number of optometrists **T**, is determined by the following equation in which **G** is number of graduates/year, **A** the annual attrition percentage due to death, disability or retirement* and **T** the total number of future optometrists. [Figures 3, 4]

Surpluses per Year at Graduation Rate = 1,700





$$T \times A = G$$

To achieve steady state, losses/year must = gains/per year, or

(Total number in practice) x (percent leaving practice) = (graduates per year).

In 2016 the graduation rate will reach 1,700. [In 2013 it was 1,567 and 1,127 in 1997]

If graduation rates remain at a certain level, the net number T will grow each year until T becomes large enough that the attrition rate of 2.5% times T balances G . This future total will be:

1: If graduation rate = 1,700/year.

$T(0.025) = 1,760$, or $T = 68,000$ optometrists.

2: By 2018, with 2 additional schools, the graduation rate may reach 1,900.

$T(0.025) = 1,900$, or $T = 76,000$ optometrists.

3: In base year 1997 with supply equal to demand, the number of graduates was about 1,127 which would have produced a future $T = 45,800$ vs. the above numbers.

Since it takes approximately 35 years to reach steady state levels, surpluses grow each year until reaching the eventual peak **D** which then slowly erodes, if graduation rates continue unchanged, as population grows at about 0.8% per year thereafter.

Here are a range of graduation rates and the eventual T each produces.

Grads per year	Future T	
1,000	40,000	Data show the average male OD practices for 42 years
1,100	44,000	and the average female for 38 years. If half of future
1,200	48,000	practitioners are female, the average career length is 40
1,300	52,000	years which produces an average annual attrition rate of
1,400	56,000	2.5% due to death, disability or retirement.
1,500	60,000	
1,600	64,000	
1,700	68,000	
1,800	72,000	
1,900	76,000	
2,000	80,000	

At this time there are 20 US schools of optometry and one in Puerto Rico. Three more are being organized in Massachusetts, Virginia, and Kentucky with a fourth under consideration in Wisconsin. A total enrollment of 1,900 is indeed possible.

Will Population Growth Absorb Surplus Optometrists?

It will take about 23 years after **D** reaches its future peak for population growth to reduce **D** to its value in base year 1997 since future annual population growth rates projected by the US Census Bureau will require 23 years to grow the population sufficiently to reduce peak **D** to **11.5** [Assuming no additional schools open.]

*For example, by the time 1,900 graduates/year produces a stable 76,000 optometrists [a 150% increase in **T** from the 1997] the population will have increased by only 35%. It will then take about 23 years of additional population growth for **D** to decline to its 1997 value of **11.5**.*

Thus, with 1,700 – 1,900 graduates/year the density of optometrists will continue to rise each year for about 35 years until peaking and then slowly declining.

These findings indicate great care must be taken when enrollments are increased and the long range implications of these increases must be critically considered. This is difficult since it is in the short-term interests of schools to maximize enrollments and revenues. In addition, once a higher enrollment exists it is often difficult to reduce that enrollment level.

Concluding Opinions:

1. There was already indication of surplus supply at **D = 12.8** in 2012. Considerable anecdotal evidence suggests recent optometry graduates can not find full time positions and find it necessary to piece together multiple part time arrangements. About 30% of optometrists now practice at 2 or more locations part-time.
2. The peak density **15-17** will arrive in about 35 years and not until 23 years later will population growth bring density down to the 1997 level of **11.5**.
3. Before this 63-year cycle is complete, student applications will likely decline as it seems unrealistic to predict the US health system will require these record high future **D** values. As is now happening for overpopulated training programs in law and veterinarian medicine, schools may be forced to choose between lowering enrollments and lowering admission standards.
4. The failure to accurately portray these impending surpluses has encouraged universities with health or medical programs to believe there is a need for more optometrists which has led to more schools of optometry and impending surpluses.
5. The profession has not stepped forward to recommend appropriate density levels or to correct misleading information encouraging additional schools.
6. The Accreditation Council on Optometric Education (ACOE) sets the standards new schools must meet for accreditation but these have few, if any, quantifiable requirements for clinical training comparable to those for dental and medical schools. Two proposed schools of optometry are in rural counties with as few as 1,200 people and over 80 miles to the nearest metropolitan center. Uniform standards do not exist to insure students examine specified numbers of patients of required types in various settings prior to graduation.

Enrollment “bubbles” are present in other undergraduate and graduate training programs since universities do not believe it is their responsibility to worry about the numbers they graduate and leave it to the “market place” to correct surpluses. [Footnote 2]

But the market place is unfeeling, as graduates find once they receive their degree and attempt to earn a living, care for their family and repay student debt.

In essence, vested interests and individuals are benefiting, or hope to benefit, from the increase in optometry enrollments since 1997 and they can not be expected to question the effects being produced. Surpluses will continue to grow until they become so obvious the best and brightest decline to choose optometry.

The author published a study 40 years ago that argued optometry enrollments were too low as **D** had declined to about *10* [Bibliography #3]. Now, facts seem just as compelling that enrollments are too high, **D** will reach unsustainable high levels and applicants per seat will continue to decline.

One must ask why the profession continues to issue what appear to the author as overly optimistic projections of future employment opportunities.

Footnotes:

1: The release of the Abt. report did not receive much publicity and most optometrists remain unaware of its findings. Those citing its findings today are told it is outdated because it did not predict passage of the Affordable Healthcare Act, the impact of the increasing elderly population and enrollment increases.

However, the Abt. model was specifically designed to be easily updateable and could have been by entering future graduation rates in its supply model and estimating the impact of the Affordable Care Act on demand. Instead, a new study by the Lewin Group was commissioned by the AOA utilizing external, corporate funding.

To date, the impact of the ACA has increased the number of potential 3rd party patients by around 8 million which is 2.5% of current U. S. population. If all 8 million seek optometry care every two years, this could produce 4 million visits a year or about 90 additional visits per optometrist per year. Since the average number of visits to an optometrist is about 3,600 per year, this increase in visits would average to only a 2.5% increase. [This is an overestimate since elderly patients tend (70%) to select ophthalmologists compared to younger patients, and not all eligible under the ACA will seek, or need eye care.]

Such a small increase in demand from the ACA can not make a dent in future supply surpluses and high optometry densities.

2: From 1975 to 1990, applications to dental schools declined from 2.5 to 1.26 per seat attributable to articles in the media that fluoridation of water and its inclusion in toothpaste would reduce the need for dentists. During that time 7 dental schools closed.

Although it was commonly believed these closings were done to regulate the number of dentists, Dr. Richard Smith, dean of one school that closed stated “The closure of dental schools...had absolutely nothing to do with recommendations from a national dental association.”

Dr. Eric Solomon, who at that time served as assistant director for application services and resource studies at the American Dental Association, said “I was the one who had to tell everybody ...the application pool was falling off the table.”

Dr. Solomon believes “only a drop-off in student demand compels a decision as momentous as closing a school.” [or reducing enrollment] “It is my thesis that until the applicant pool is affected, nothing will change. The educational associations, the professional associations and the institutions themselves do not have a vested interest in reducing enrollment.”

Dr. Smith, now dean of his university’s Graduate School of Arts and Sciences, comments on the educational boom-bust cycle this way. “We do that with everything, with building malls and building condos. *When it looks like a good thing, we build too many and then everyone suffers.* [Emphasis added]

3. Current **D** may be higher than the 12.8 or 13.4 values based upon the AOA figure of 40,000 active optometrists in 2012 projected to 2014. Surprisingly, it is difficult to find sources for the total number of US licensed optometrists. The author found three, higher, estimates of total current supply. The highest was furnished by ARBO, the Association of Regulatory Boards of Optometry (personal e-mail communication). Its OE Tracker system is used to record, track and report to state licensing boards the continuing education hours taken by licensed optometrists required for re-licensing,

When asked about total numbers of licensed US optometrists, the author was told, “We currently have 46,435 ODs in OE Tracker who have an active license in the US.”

When asked “Are these unique ODs?” the reply was “Yes”.

Asked if there might be duplications due to multiple state licenses the response was, “No. OE Tracker numbers are unique to the OD regardless of how many states he or she is licensed in. It is the number of ODs who have an OE Tracker number and a license by a US optometry board.”

Other sources located by the Author gave between 42,000 and 43,000 as the total number of licensed U.S. optometrists at this time compared to the AOA value of 40,000 for 2012.

The 2012 **D** of **12.8** in this study is based upon a 2013 AOA publication stating there were 40,000 licensed ODs in 2012 but **D** may now be as high as **14.8** at this time if the ARBO data is correct.

4. Total number of graduating optometrists includes those from the school in Puerto Rico.
5. A 3rd new school, is under consideration in Wisconsin.

Appendix:

How to Use Tables 1 and 2

There are 10 columns with the following headings and meanings:

Year	Data for this year is shown to the right
Pop.	Populations in millions rounded to nearest million
Leaving	Projected number leaving practice due to death, disability or retirement.
# Grads	Projected total number of new graduates
Net	Net increase in numbers of ODs, [#Grads - #Leaving]
O.D.s	Total number of active, licensed US optometrists.
D	Density (number of ODs per 100,000 population)
#for 11.5	Number of ODs required for a density D of 11.5
#for 12.8	Number of ODs required for a density D of 12.8
#for 14.0	Number of ODs required for a density D of 14.0

To determine the surplus in a year in which a Density of 11.5, 12.8, or 14 is required for supply to equal demand, subtract the number listed required for that density [last 3 columns] from the number of optometrists projected for that year [column 6]. The result is the number of optometrists in surplus to the number required for each density level.

For example, suppose one predicts that in 2040, due to “Obama Care, or other legislative changes, a density of **12.8** ODs per 100,000 will be required to meet demand and that graduation rates since 2018 have been 1,900. The # required for a density of **12.8** in 2040 is 48,640 in column 9 and column 6 indicates this graduation rate will result in a total of 58,940 optometrists in that year.

The surplus in 2040 is therefore $62,440 - 48,640 = 13,800$.

Tables 3 and 4 were generated in this manner from data in Tables 1 and 2.

If the reader studies these tables and computes projected surpluses a few times, or studies Tables 3 and 4, it becomes clear these surpluses are sufficiently large that any reasonable future increase in demand would still leave surplus numbers of optometrists. This is seen in Figure 2 which projects future densities. To not have surplus numbers of optometrists, the demand for optometry care would have to increase in step with the increase in density resulting from high enrollments. This is highly unlikely.

How to use Table 3 and 4. For the convenience of the reader, future surpluses are calculated from Tables 1 and 2 as explained above and tabulated in Tables 3 and 4. Simple linear proportional extrapolations can be performed to find surpluses for values of D not listed.

Basic Data Sets

Table 1 **Graduation Rate = 1,900 by 2020***

Year	Pop.	Leaving	# Grads	Net	O.D.s	D	# for 11.5	# for 12.8	# for 14
2010	309	697	1,200	503	38,758	12.5	35,535	38,625	43,260
2015	321	899	1,700	801	42,760	13.3	36,915	41,088	44,940
2020	333	1,032	1,900	868	47,100	14.1	38,295	42,624	46,620
2025	346	1,070	1,900	830	51,250	14.8	39,790	44,288	48,440
2030	358	1,077	1,900	823	55,365	15.5	41,170	45,824	50,120
2035	369	1,185	1,900	715	58,940	15.9	42,435	47,232	51,660
2040	380	1,200	1,900	700	62,440	16.4	43,700	48,640	53,200
2045	389	1,200	1,900	700	65,940	17.0	44,735	49,772	54,460
2050	399	1,200	1,900	700	69,440	17.4	45,885	51,072	55,860
2055	409	1,200	1,900	500	71,940	17.6	47,035	52,352	57,260
2060	420	1,200	1,900	0	73,190	17.4	48,300	53,760	58,800

Table 2 **Graduation Rate = 1,700 by 2020**

Year	Pop.	Leaving	# Grads	Net	O.D.s	D	# for 11.5	# for 12.8	# for 14
2010	309	697	1,200	503	38,758	12.5	35,535	38,625	43,260
2015	321	899	1,700	801	42,760	13.3	36,915	41,088	43,260
2020	333	1,032	1,700	668	46,100	13.8	38,295	42,624	46,620
2025	346	1,070	1,700	630	49,250	14.2	39,790	44,288	48,440
2030	358	1,077	1,700	623	52,365	14.6	41,170	45,824	50,120
2035	369	1,185	1,700	515	54,940	14.9	42,435	47,232	51,660
2040	380	1,200	1,700	500	57,440	15.1	43,700	48,640	53,200
2045	389	1,200	1,700	500	59,940	15.4	44,735	49,772	54,460
2050	399	1,200	1,700	500	62,440	15.7	45,885	51,072	55,860
2055	409	1,200	1,700	700	62,740	15.3	47,035	52,352	57,260
2060	420	1,200	1,700	0	62,890	15.0	48,300	53,760	58,800

(Population numbers from U.S. Census Bureau)

Surplus Numbers of Optometrists

Table 3

Surplus Numbers with a Graduation Rate = 1,900 by 2020*

	<i>If D=11.5 is needed for supply = demand</i>	<i>If D=12.8 is needed for supply = demand</i>	<i>If D=14 is needed for supply = demand</i>
<u>Year</u>	<u>Excess numbers</u>	<u>Excess numbers</u>	<u>Excess numbers</u>
2010	3,223	133	-4,502
2015	5,845	1,672	-2,180
2020	8,805	4,476	480
2025	11,460	6,962	2,810
2030	14,195	9,541	5,245
2035	16,505	11,708	7,280
2040	18,740	13,800	9,240
2045	21,205	16,168	11,480
2050	23,555	18,368	13,580
2055	24,905	19,588	14,680
2060	24,890	19,430	14,390

** Based on 5 additional schools. Mass. Col. Of Pharmacy, Grundy, VA., Pikeville, KT.,
Midwestern Branch in Chicago, Illinois., University of Incarnate Word, Wisconsin.*

Table 4

Surplus Numbers with a Graduation Rate = 1,700 by 2020

	<i>If D = 11.5 is needed for supply = demand</i>	<i>If D = 12.8 is needed for supply = demand</i>	<i>If D = 14 is needed for supply = demand</i>
<u>Year</u>	<u>Excess numbers</u>	<u>Excess numbers</u>	<u>Excess numbers</u>
2010	3,223	133	-4,502
2015	5,845	1,672	-2,180
2020	7,805	3,476	-520
2025	9,460	4,962	810
2030	11,195	6,541	2,245
2035	12,505	7,708	3,280
2040	13,740	8,800	4,240
2045	15,205	10,168	5,480
2050	16,555	11,368	6,580
2055	15,705	10,388	5,480
2060	14,590	9,130	4,090

How Optometry Enrollments Compare

Specialty	1985	1990	1995	2000	2005	2010	Change
M.D.	15,938	15,043	15,341	15,403	15,461	16,356	+2.6%
Dental	5,046	3,699	3,697	4,391	4,389	4,918	-2.5%
Podiatry	612	589	650	528	347	491	-20%
D.C.	3,395	2,647	3,379	3,769	2,564	2,601	-23%
Law	35,844	37,945	39,828	37,904	43,423	44,345	+24%
O.D.	1,029	1,115	1,231	1,289	1,198	1,335	+30%
D.O.	1,547	1,459	1,895	2,450	2,718	3,890	+150%

Source: Digest of Educational Statistics, National Center for Ed. Statistics, US Dept. of Education
<http://nces.ed.gov>

1. More recent values not available.
2. The rise in optometry graduates following the 1997 Abt. Report is reflected beginning in 2010.

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