THE IMPACT OF TECHNOLOGY ON THE OPTOMETRIC STANDARD OF CARE IN MICHIGAN

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This paper is submitted in partial fulfillment of the requirements for the degree of:

Doctor of Optometry

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APPENDIX A:

APPROVAL PAGE

THE IMPACT OF TECHNOLOGY ON THE OPTOMETRIC STANDARD OF CARE IN MICHIGAN

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Has been approved

May 2006

Ferris State University
Doctor of Optometry Senior Paper
Library Approval and Release

APPENDIX B:

LIBRARY APPROVAL PAGE

THE IMPACT OF TECHNOLOGY ON THE
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We, Reena Narula and Joseph L. Myers, hereby release this paper as described above to Ferris State University with the understanding that it will be accessible to the general public. This release is required under the provisions of the Federal Privacy Act.

APPENDIX C:

ABSTRACT

ABSTRACT:

The optometric standard of care in Michigan is dictated by the current state law, but also by the practitioners' use of new technology within their practices. A survey was used to poll 300 Doctors of Optometry in Michigan to determine what instrumentation they felt was necessary in order to provide the standard of care for their patients. (Table 1)

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RESEARCH PAPER

Introduction:: The standard of care in optometric practice is dependent on the current laws as it is applied to each individual state. Michigan, a state with a broad scope, grants its practitioners full therapeutic privileges. Along with the ability to prescribe therapeutics for treatment of ocular diseases, comes the responsibility to correctly differentiate and diagnose these anomalies. According to Gaddie, "Standards of care are the legal basis for malpractice suits and the courts use them to determine negligence."[1] Managing a patient in a manner similar to other like practitioners in a community upholds the standard of care. As stated by John Classe, O.D., when negligence is an issue, the question the courts ask is, "What would a reasonable person have done under the same or similar circumstances."[1] Throughout the state of Michigan are a variety of optometrists practicing in different modes. From rural to urban, from private to commercial, all types of optometrists are to practice up to a certain level of care and provide their patients with the most up to date standards according to our profession.

Advances in optometry have brought about much discussion on what the standard of care currently is, and where it will be heading in the future. One of the main problems in looking ahead with the profession is defining the role of optometry and the demands of the profession. As Dr. Elwin Marg stated in 1975, "will the demands be static or will they be modified along with continuing new developments in science and technology?" Further, "will optometry be willing and able to redefine the boundaries of its activities in order to embrace new opportunities?"[2] As we all know, this is a difficult definition to place a finger on due to the pressures from above and below, namely by ophthalmologists and opticians.

Marg states that in the middle ages, surgeons were barbers and optometrists were opticians selling spectacles in a primitive market place. The obvious note is to see how far we as optometrists have come since then in defining who we are as professionals and how we are perceived in society. Marg points out that "improvement in the diagnosis and therapy of ocular and systemic diseases is a continuous process" that is needed in order to allow early detection and prevention.[2] Technology has always been an integral part of this process. Finding better and more efficient ways to diagnose diseases has become necessary in providing a higher standard of care. With advances in technology forcing open new doors and pushing the standard of care into further boundaries, also comes newer and more important responsibilities for optometrists. As Marg notes, back in the 1600's is when refraction of the eye was initially understood followed by development of cylindrical lenses, crossed cylinders and retinoscopy in the 1800's. In the early 1900's we were looking for diseases within the eye with opthalmoscopy, slit lamp examination, tonometry, and visual fields. We have obviously made strides in these areas to more automated technological devices. The 1950's brought on contact lenses and the 70's gave us new automated instruments like refractors and perimeters. Today, we see even more technology aiding us as skilled diagnosticians.[2]

The primary goal of our project was to compare through surveys different modes of practices in communities of different populations, varied ages of practitioners, and the types of instrumentation that was used. By comparing these factors, we hoped to understand better Michigan's "standard of care" in optometric practice. Secondarily, we

were interested in determining whether or not having increased technology to aid in diagnosing and assessment helped to reduce the total exam time for the practitioners.

Methods: The study was conducted by surveying random practitioners drawn from a collaborative list put together by the Michigan Optometric Association. Care was taken to not include more than one person presently practicing within the same confines of a particular practice. A two page survey along with an explanation of the project was sent to 300 doctors of optometry. The practitioners chosen identified the type of practice they worked in (Table 2), their age group (Table 3), and community of practice based on population (Table 4). Further areas of interest included the practitioner's idea of what five instruments defined the standard of care (Table 5 and 6), what instruments were currently in their practice (Table 7 and 8), and what technology they hoped to purchase in the next five years. Analysis of the data was done simply by totaling responses in each section. Bar graphs and tables were used to display frequencies of responses.

Results: Of the 300 surveys that were sent out, 30% (90) were returned. As rated by the optometrists, the five instruments that were most often defined as standard of care were, in order of decreasing frequency, a Visual Field unit (either Humphrey's or FDT), a biomicroscope, the Goldmann tonometer, binocular indirect ophthalmoscope, and phoroptor.
Technology that O.D's have in practice, aside from the basics diagnostic tools of hand held ophthalmoscopes, retinoscopes, phoroptors and biomicroscopes, were most frequently a Visual Field unit, a Non-Contact Tonometer, Autorefractor, Pachymeter, and Retinal Camera (Table 9).
The majority of practitioners that completed the survey were spaced nicely between 30 and 59 years old, mostly in small/commerce or city areas practicing, and majority being in solo or group/partnership practices.
Of those practitioners that had the ability to purchase new equipment, the majority set aside approximately $10,000 per year (Table 10).
Our second goal of the project, to determine whether or not technology helped to decrease the total exam time, was answered with 57 of the 90 optometrists stating that the diagnostic technology did not shorten their exam time (Table 11).

Conclusions: The top five instruments that appeared throughout the study (Visual Field unit, a biomicroscope, the Goldmann tonometer, binocular indirect ophthalmoscope, and phoroptor) are and have been considered the standard of care for sometime now. These are what practitioners feel are the absolute basic needs of an optometrist to practice their skill. The next component of our project was to see what types of instruments these doctors actually did have within their practices, in addition to the basics as described above. The top five in this category were a Visual Field unit, a Non-Contact Tonometer, autorefractor, pachymeter, and retinal camera. These technologies appear to be advances on the older equipment that seems to all be a large part of the first category, meaning that technology is upgrading their optometric equipment and being used in office, even for the simplest of tasks. The largest age group that returned the survey was the 30-39 year old age group; however, this group came really close to obeying the standard bell curve and showed us a good distribution. Similarly the community that the doctors practiced in was

fairly well correlated to the bell curve peaking with a commerce community and dropping off slightly with small communities and metropolitan-based practices. These areas probably do have higher mean incomes and could possibly represent the doctors purchasing these newer technologies However, random studies, and surveys being a part of them, prevent us from pinpointing this statistic. The most common mode of practice surveyed was the solo practitioner. The solo practitioner tended to have the same amount or less technology than other modes. In the few cases that the solo doctor did have more than the average technology, the motivation may be to decrease the amount of time that the doctor actually spends with the patients. These practices may employ a technician to operate all the equipment, and thus, allows the solo doctor to be more time efficient. The reason that new technology is not so prevalent in solo practices is that financially there would not be adequate funds to purchase the larger equipment, because of not having the ability to cost share and produce the patient load to need the larger more advanced equipment.

As stated by Gary Andrus, O.D. "as the profession of optometry changes and advances, we feel more constraints on our most precious asset: time. Anything that helps ease the daily flow of patients through our practices is of tremendous value."[3] Unfortunately, our results did not find that new technology shorted the total exam time. By overwhelming majority, it was shown that the new advances in technology were not decreasing the doctor's amount of time with the patients. They are finding that more time is required to spend on interpretation of test results and education of diseases. The new equipment is giving more information to analyze and more diagnoses to be made. It could also mean that practitioners are lengthening their exam times to perform an acceptable and full scope exam to patients desiring the highest standard of care from quality doctors while incorporating technology.

Discussion: While some things today are increasing in size, other things, such as technological devices, are getting smaller and smaller. Portable, handheld technology keeps getting faster and smaller, just like the trend in computers.[4] Allowing your practice to be upgraded to quicker and faster technology can allow patients to feel like they are being treated with the highest amount of care by having the most advanced testing available to them. While this could seem pricy, it could allow a patient to be moved quicker and more efficiently through their optometric experience. According to Walter West, O.D., new technology is recommended to "increase direct and indirect profitability, reduce workload, increase the ability to delegate additional data gathering to appropriately trained staff, as well as to increase your clinical capacity."[5] In considering the new instrumentation available, "any new type of data gathering technology can simplify the way you practice by allowing you to screen patients efficiently and conveniently"[4]. The new instrumentation can be costly for the smaller practices, but are becoming a part of the optometry realm. The doctor down the street may be the first with the instrument, may be the first to be able to apply it to the community that it is used in, but until those instruments become mainstream and statistical analysis is born regarding the data, the instruments are useless.

Our main goal in conducting this survey was to allow recent graduates to see what technological trends they needed to follow in order to keep up with surrounding doctors.

From these patterns, we can gather what instruments play the biggest role in our everyday practices in keeping with the changing philosophies and definitions regarding the standard of care in optometry. In regards to these questions, the surveys reveal that there are still instruments which have been able to withstand the changing times, ie. the phoropter, automated perimeters and goldmann tonometry. However, there are new instruments that our mentors probably never thought would be used during a standard comprehensive examination. In discussion with some of the more experienced practitioners, 25-30 years ago dilation was done minimally if ever, due to the monocular directs, and very little attention was focused on this idea due to the pharmaceuticals that could not be used by optometrists. As students in progress to become doctors, most of our peers will dilate routinely, and technology will become our ally in diagnosing and treatment options for our patients.

The auto-anything has forged forward as the wave of the future. With one click of a button we are able to gather more data in a smaller amount of time, giving us more time to sufficiently analyze a disease process. Instruments such as the pachymeter, GDX/HRT/OCT, and retinal cameras allow us to better diagnose diseases such as glaucoma more accurately than ever before. The responses to our survey suggest that these instruments are being used effectively each and every day in mainstream practice. Because these instruments are being purchased with higher frequency and are being used in more and more practices shows us how important they have become to our profession.

The instruments that placed highly on our list are being used more and have successfully helped doctors diagnose diseases. Having been taught recently about some of the newer instrumentation, there are certain ones whose perceived value is higher than their actual value. However, certain instruments including those items that were purchased more often according to our survey, have been developed well enough to produce trusted results based on research and clinical studies. As more instrumentation is developed, more aspects of the specifics of each disease process will be assessed.

Ten years ago, the definition of prudent or due care wasn't difficult to grasp. We'll remember the past decade as a time of rapid technological advancement and change in general. Standards of care aren't static, and time will dictate a more rigid set of expectations, which encompass the great strides in technology. We must continue to train optometrists to the highest scope so that we may best use our inherent skills and training. It is our responsibility to maintain these skills and to embrace potential technology so as to better serve our patients.

APPENDIX G:

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APPENDIX H:

LIST OF APPENDICES

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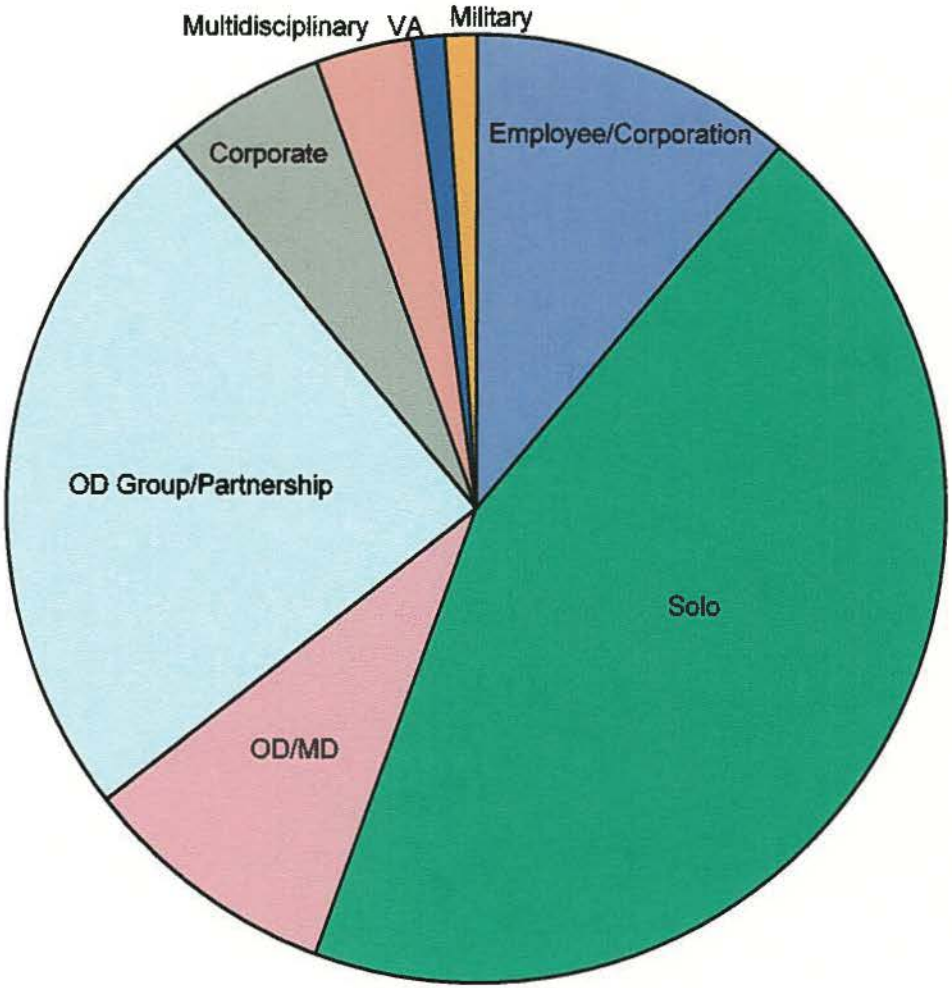
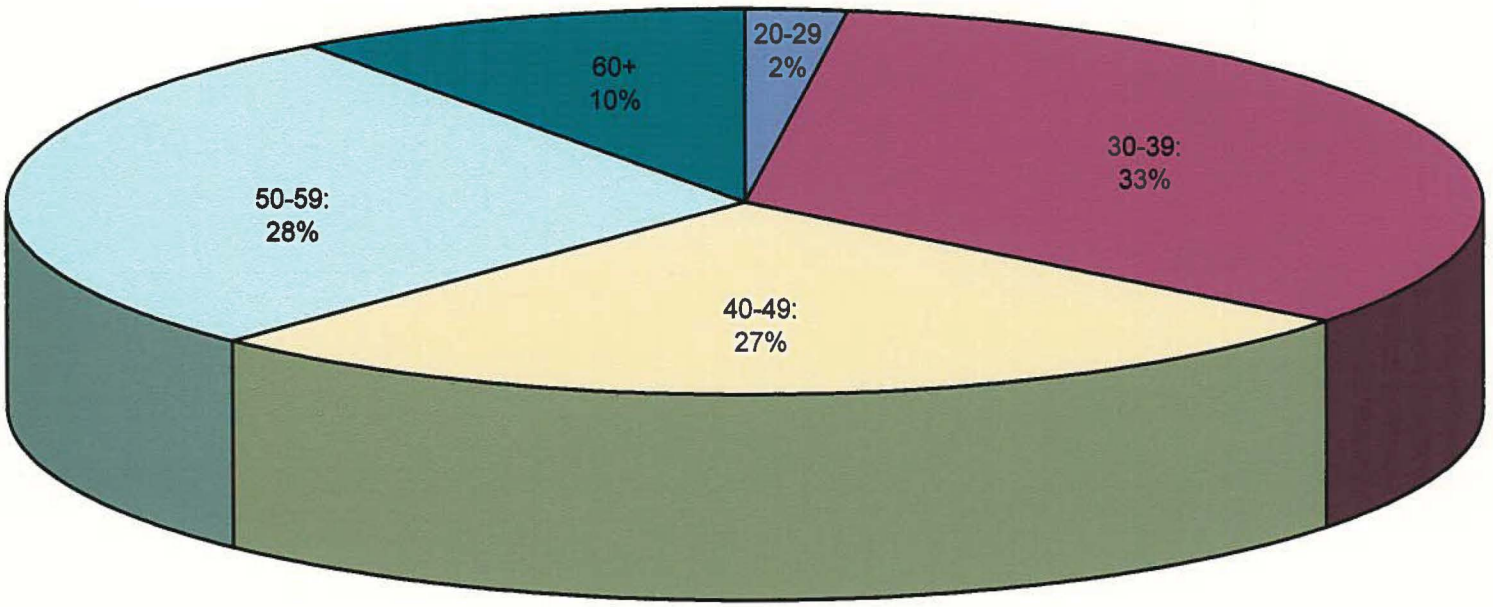
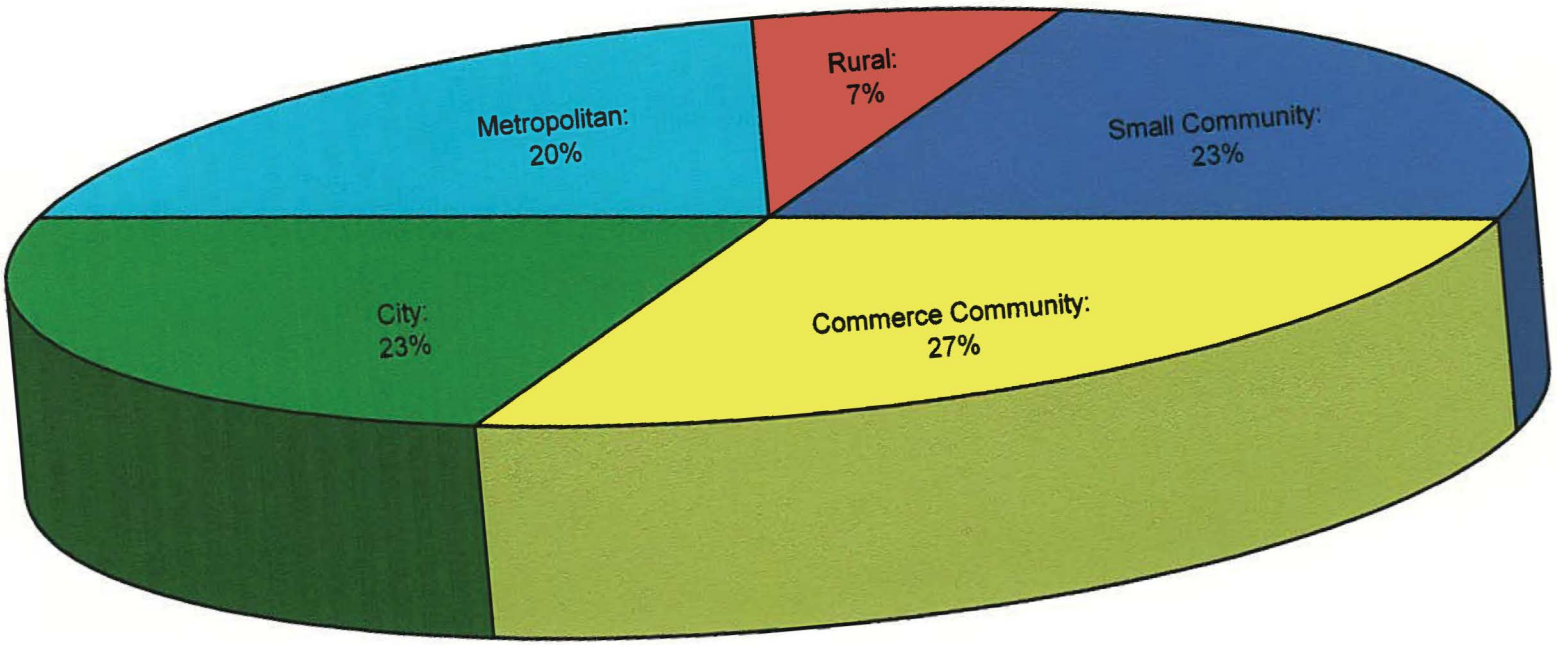
Types of Practice

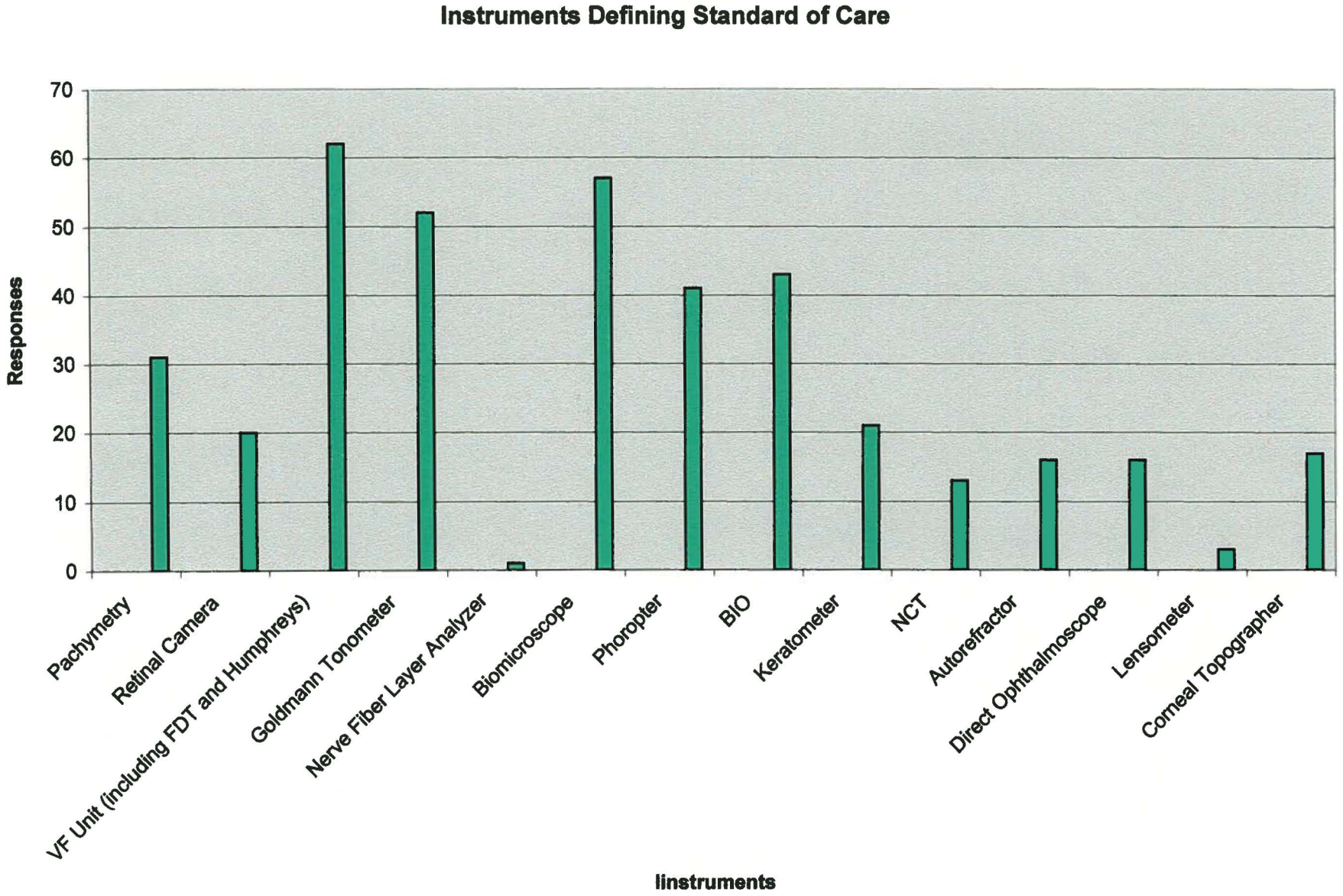


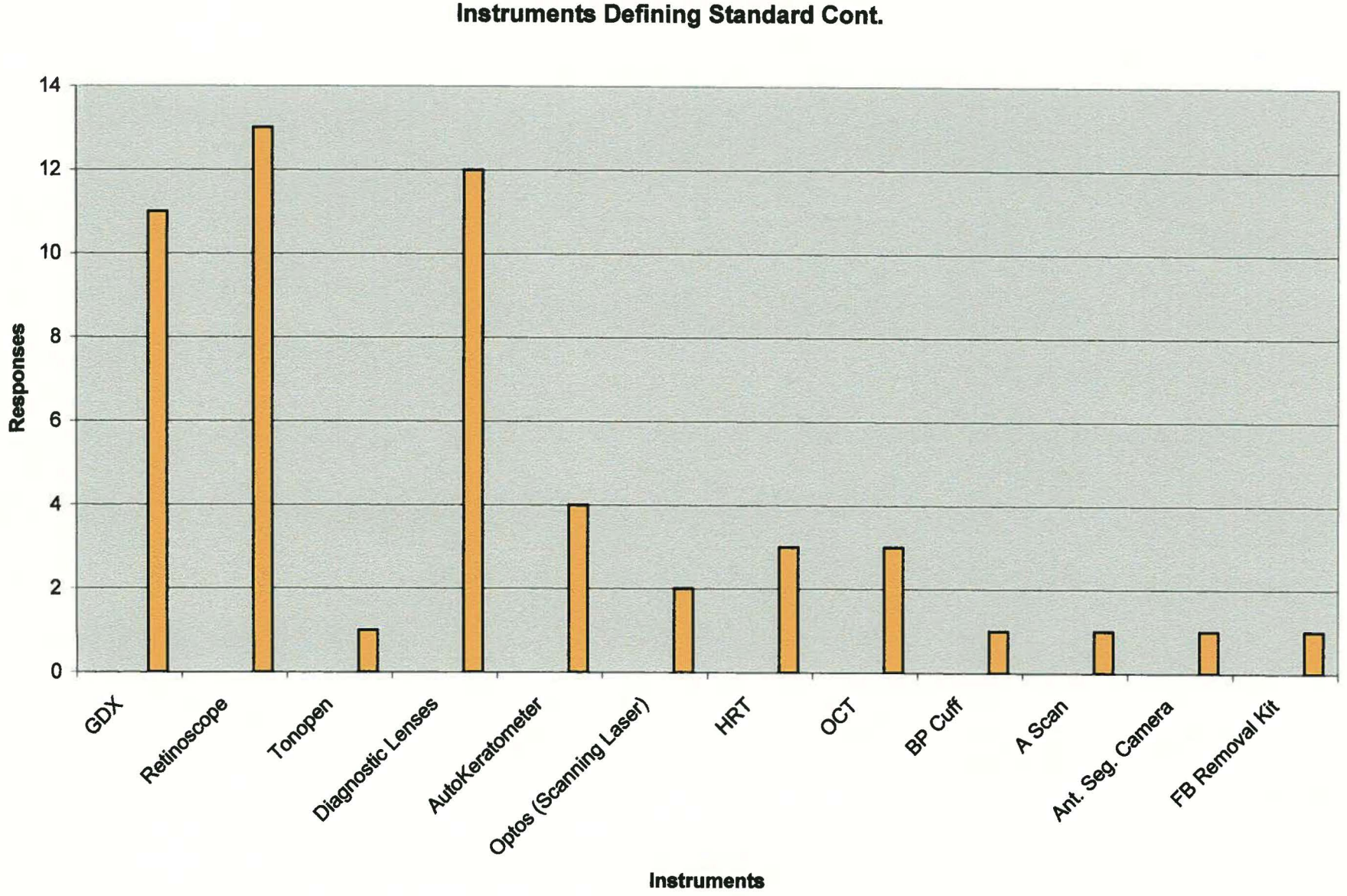
Age of Practioners Responding

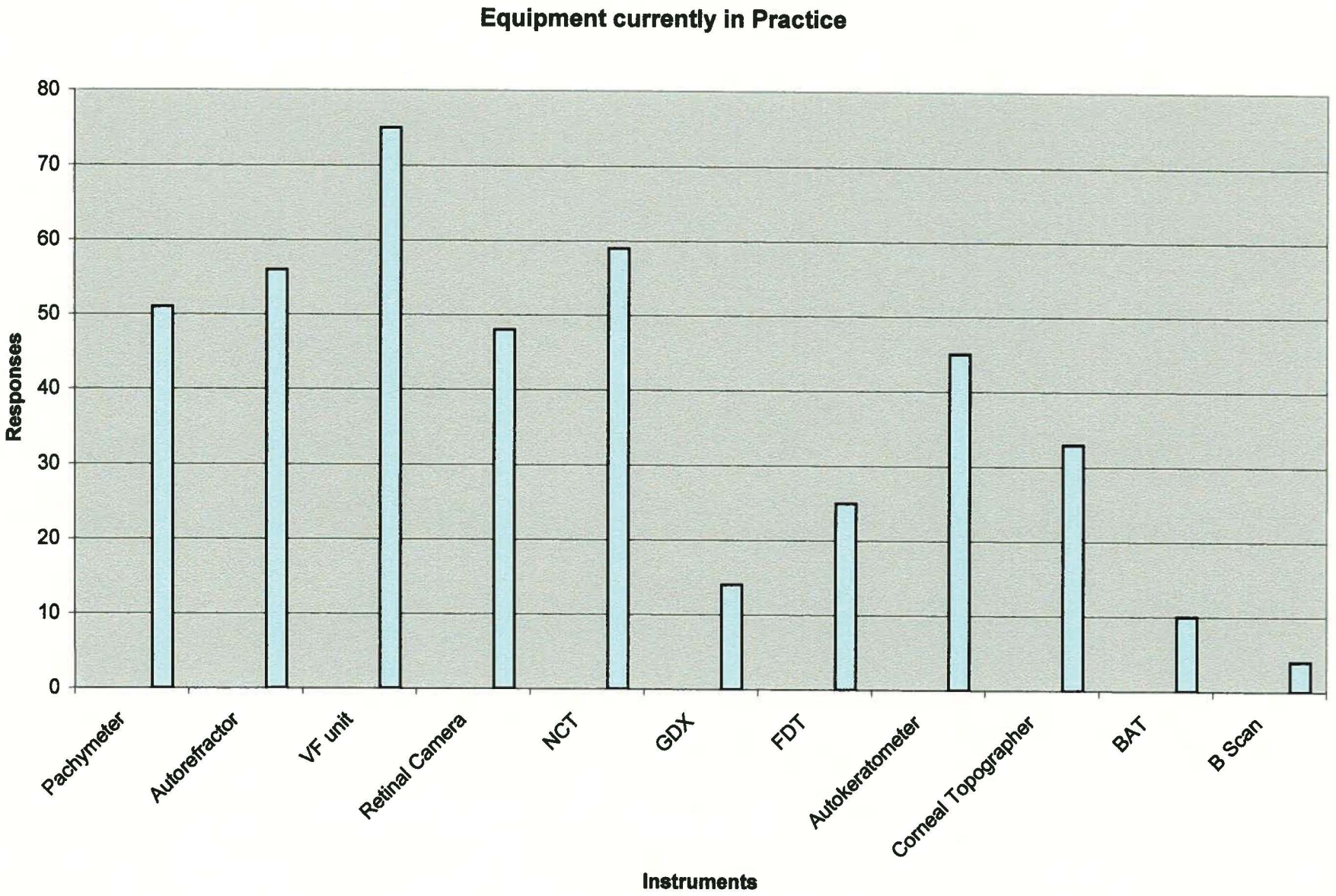


Community of Practice

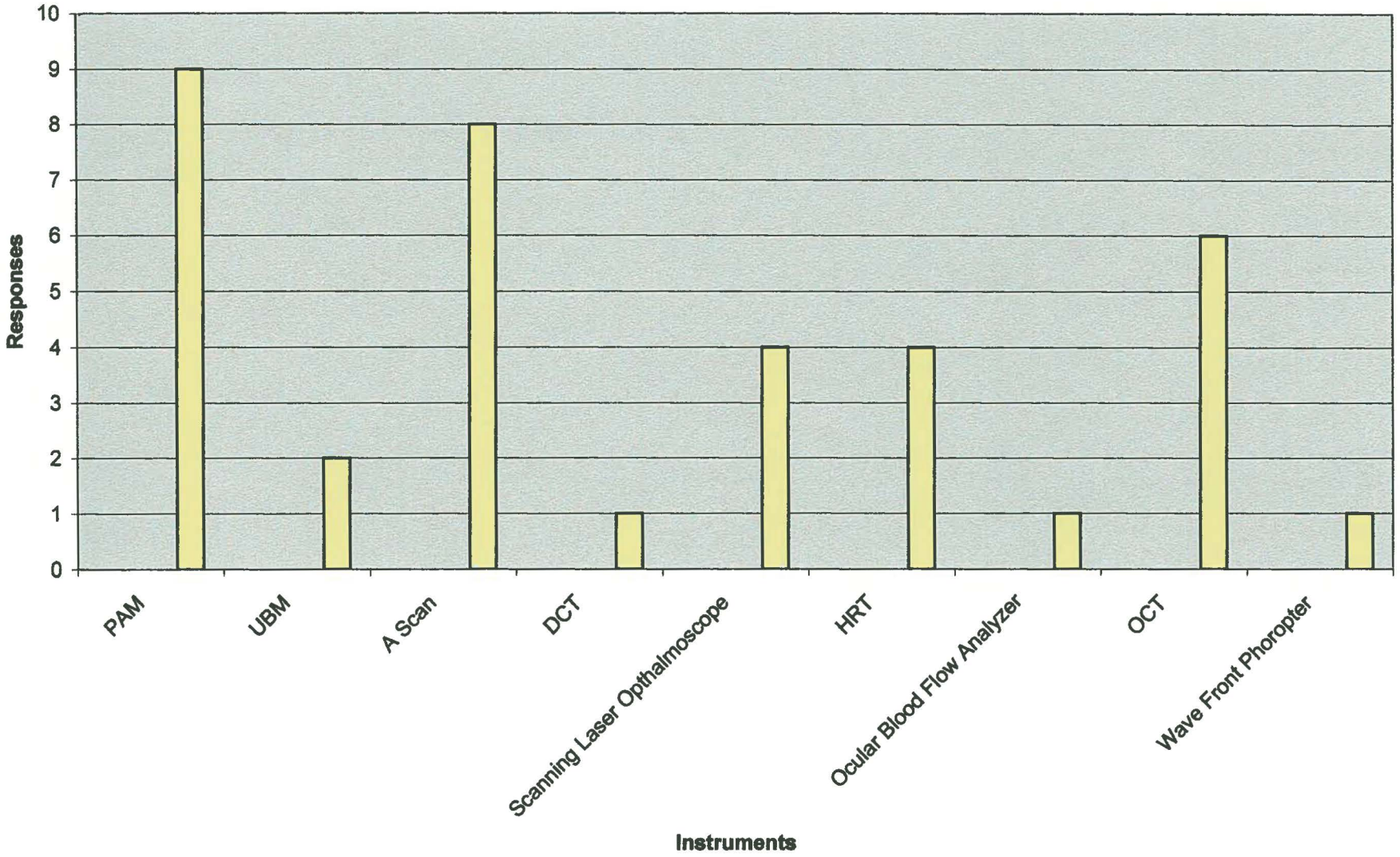



Instruments Defining Standard of Care
Responses
70
60
50
40
30
20
10
0
Pachymetry
Retinal Camera
VF Unit (including FDT and Humphreys)
Goldmann Tonometer
Nerve Fiber Layer Analyzer
Biomicroscope
Phoropter
BIO
Keratometer
NCT
Autorefractor
Direct Ophthalmoscope
Lensometer
Corneal Topographer
Iinstruments


Instruments Defining Standard Cont.
Responses
14
12
10
8
6
4
2
0
GDX
Retinoscope
Tonopen
Diagnostic Lenses
AutoKeratometer
Optos (Scanning Laser)
HRT
OCT
BP Cuff
A Scan
Ant. Seg. Camera
FB Removal Kit
Instruments


Equipment currently in Practice
Responses
80
70
60
50
40
30
20
10
0
Pachymeter
Autorefractor
VF unit
Retinal Camera
NCT
GDX
FDT
Autokeratometer
Corneal Topographer
BAT
B Scan
Instruments

Equipment In practice Cont.



MYERS/NARULA SENIOR PROJECT

5 PIECES THAT DEFINE STANDARD OF CARE (# OF DOCS WHO REPORTED EACH OF THE FOLLOWING ITEMS):

Pachymetry	31
Retinal Camera	20
VF Unit (including FDT and Humphreys)	62
Goldmann Tonometer	52
Nerve Fiber Layer Analyzer	1
Biomicroscope	57
Phoropter	41
BIO	43
Keratometer	21
NCT	13
Autorefractor	16
Direct Ophthalmoscope	16
Lensometer	3
Corneal Topographer	17
GDX	11
Retinoscope	13
Tonopen	1
Diagnostic Lenses	12
AutoKeratometer	4
Optos (Scanning Laser)	2
HRT	3
OCT	3
BP Cuff	1
A Scan	1
Ant. Seg. Camera	1
FB Removal Kit	1

VF, Biomicroscope, Goldmann Tonometer, BIO and phoropter

EQUIPMENT CURRENTLY IN PRACTICE (# OF DOCS WHO REPORTED EACH OF THE FOLLOWING ITEMS);

Pachymeter	51
Autorefractor	56
VF unit	75
Retinal Camera	48
NCT	59

Top 5: VF unit, NCT, Autorefractor, Pachymeter, Retinal Camera

GDX	14
FDT	25
Autokeratometer	45
Corneal Topographer	33
BAT	10
B Scan	4
PAM	9
UBM	2
A Scan	8
DCT	1
Scanning Laser Opthalmoscope	4
HRT	4
Ocular Blood Flow Analyzer	1
OCT	6
Wave Front Phoropter	1

AGE OF PRACTITIONER:

20-29	2
30-39	30
40-49	24
50-59	25
60+	9

COMMUNITY OF PRACTICE:

Rural:	6
Small Community:	21
Commerce Community:	24
City:	21
Metropolitan:	18

TYPE OF PRACTICE:

Employee/Corporation	10
Solo	40
OD/MD	8

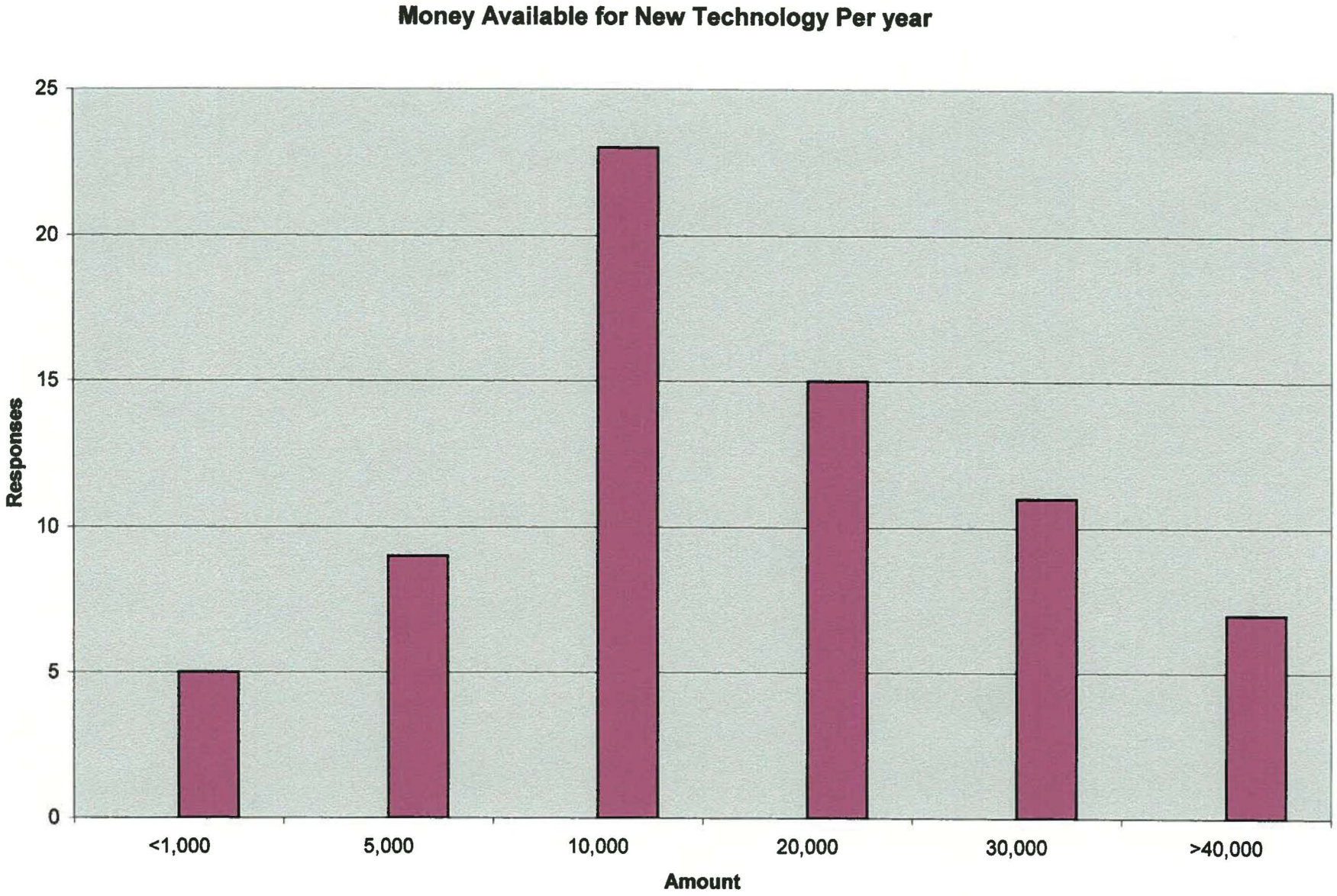
OD Group/Partnership	22
Corporate	5
Multidisciplinary	3
VA	1
Military	1

AMOUNT OF MONEY SET ASIDE FOR BUYING NEW TECHNOLOGY PER YEAR:

<1,000	5
5,000	9
10,000	23
20,000	15
30,000	11
>40,000	7
	2

HAS NEW TECHNOLOGY SHORTENED THE EXAM TIME?

YES	32
NO	57


Money Available for New Technology Per year
25
20
15
10
5
0
Responses
<1,000
5,000
10,000
20,000
30,000
>40,000
Amount

Has Technology Shortened Exam Time