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# Visual needs in different occupational settings

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## Abstract

The occupational setting is quite diverse in its visual demands. Part of the duty of the practicing optometrist is to address the visual needs of the patient and thereby provide the appropriate treatment and information to the patient to satisfy those varying visual needs for optimum vision. We surveyed four occupations concerning vision in the workplace: travel agent, physical therapist, private investigator, and paramedic. From the collected data it is very apparent that each of these occupations has a variety of visual tasks that are often associated with visual problems and, hence, this is likely in other fields of work as well. This is where the optometrist has a special place as a problem-solver. Specifically we found that progressive lenses, safety eyewear, and gas permeable contact lenses are underutilized. Also there is plenty of room for improving lighting in the workplace and reducing the amount of headaches and other common near task complaints like dry eyes. Proper communication with the patient about their occupational tasks and hobbies will better enable the optometrist to meet the varying visual needs of patients.



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# VISUAL NEEDS
# IN DIFFERENT OCCUPATIONAL SETTINGS

By

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## Biographical Sketch

The author is originally from eastern Utah. He received his Bachelor of Science Degree in applied physics from Brigham Young University in 1994. He has attended Pacific University's College of Optometry since the fall of 1996, and is currently a Doctor of Optometry candidate for the May 2000 commencement. He is an excellent pianist, loves sports, enjoys spending time with his family, and plans to practice optometry in his home state upon graduation.

**Abstract**

The occupational setting is quite diverse in its visual demands. Part of the duty of the practicing optometrist is to address the visual needs of the patient and thereby provide the appropriate treatment and information to the patient to satisfy those varying visual needs for optimum vision. We surveyed four occupations concerning vision in the workplace: travel agent, physical therapist, private investigator, and paramedic. From the collected data it is very apparent that each of these occupations has a variety of visual tasks that are often associated with visual problems and, hence, this is likely in other fields of work as well. This is where the optometrist has a special place as a problem-solver. Specifically we found that progressive lenses, safety eyewear, and gas permeable contact lenses are underutilized. Also there is plenty of room for improving lighting in the workplace and reducing the amount of headaches and other common near task complaints like dry eyes. Proper communication with the patient about their occupational tasks and hobbies will better enable the optometrist to meet the varying visual needs of patients.

## Acknowledgement

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## Background

One of the important factors in caring properly for the visual needs of patients is awareness of the specific tasks performed by the patient. Perhaps this specificity of vision is most apparent in the occupational setting. There are literally thousands of different jobs. And even within a particular field of work there may be several variations of the required tasks and the job setting itself. Hence the workplace involves a variety of visual requirements. Job tasks vary in working distances, acuity demands, color vision and peripheral vision requirements (or non-requirements). Even such things as safety concerns and local environment must be considered. And let us not forget the role that computers now play in the workplace. Virtually every type of work uses computers in one way or another. Computer use alone has a specific set of visual demands and problems.

With this topic in mind, we decided to perform an occupational survey of different professions to obtain information on how people use their eyes on the job. Also we wanted to know what kind of problems they might be having with their eyes at work so that we as eye care professionals can more appropriately serve these needs.

It was not feasible to conduct a survey of all occupations. An extensive project of this type was completed in the 1950's, some of which is still a good source of information today.[1] But times have changed and so have occupations (and therefore the visual needs of the public). Using a list of top jobs for the next century,[2] based on estimated growth trends, we selected four occupations to survey. These four occupations were selected based on lack of previous research, accessibility to addresses, and personal

interest. The four occupations are: travel agent, physical therapist, private investigator, and paramedic.

## Methods

We developed a survey (see Table 1) that would question workers from the various occupational settings on how they use their eyes on the job and problems they encounter with vision. We also asked for suggestions and comments they might have which can help optometrists and other eye care professionals become more familiar with these jobs and occupational visual needs in general.

The addresses were obtained either directly or indirectly using the Internet. The travel agent addresses were obtained through Internet yellow pages of travel agents in three major market cities (Seattle, Portland, and Salt Lake City). The paramedic addresses were obtained from the National Registry of Emergency Medical Technicians.[3] The physical therapist and private investigator addresses were located on the Internet.[4,5]

We sent out exactly one thousand surveys. These were divided as follows: 329 to physical therapists, 263 to private investigators, 208 to travel agents, and 200 to paramedics. It was hoped that a response of approximately twenty to thirty percent would give us an adequate amount of data to work with (two to three hundred responses). We also divided the surveys between traditional mailings and electronic mailings. In this way we could compare which method would give us the better response percentage and thereby also make a guarded recommendation as to which method may reap higher response rates for the benefit of future research. The electronic mailings included an

Internet address as well as a direct link if to a site where the survey form was located. The completed surveys were returned via e-mail and the results tallied and reviewed. Private investigators and physical therapists were the recipients of these electronic surveys. The traditional mailings included a copy of the survey and a return envelope that required no postage from the participant. The traditional mailings were sent to travel agents and paramedics.

The survey begins with an overview of the project (including who was conducting the survey, how the subject's address was obtained, and why their help would be appreciated and useful) followed by the body of the survey. All numeric data is presented in Tables 2-6 with Table 7 being a key to the coding used in the tables (and also the surveys themselves).

**Results**

One hundred forty-four of the electronic mailings (out of 592) were returned as "undeliverable mail." Of the remaining 448 we received fifty-four responses from physical therapists and thirty-one responses from private investigators, giving a response rate of twenty percent for the therapists and 17.4 percent for the investigators and an overall response rate among the electronic mailings group of nineteen percent. As for the standard mailings, nineteen of the paramedic surveys were undelivered (returned) and thirty-two of those sent to travel agents were returned, giving a response rate of 24.3 percent for the paramedics and seventeen percent for the travel agents and an overall standard mail response rate of 20.7 percent, only slightly higher than the electronic

mailings. From our survey, therefore, we cannot say with any confidence whether surveys are best done by standard mail or using the Internet, at least in terms of response rates. The complete response rate for the survey was 19.8 percent, or roughly one-fifth of those who received our survey.

We will first present a basic overview of the statistics obtained in the survey. Complete numerical tallies are located in Tables 2-6, as previously stated. Also, Tables 12-19 display in graphical form the grand total results by percentage of some of the survey categories.

The ages of those surveyed varied little from group to group. The average age was forty-one with the younger response groups being those working in the health professions (physical therapists and paramedics). Interestingly, this is almost exactly the typical age presbyopia affects most of the population. Nearly 80% of the respondents reported either wearing glasses or using no correction at work. Relatively few use contacts or both contacts and glasses. And of those using glasses, surprisingly few are using multifocals. Single vision lenses totaled more than all other categories combined (bifocals, trifocals, progressives, and prescription sunglasses). Bifocals accounted for about one-quarter of the glasses. Progressive lenses were used by only six respondents, three of whom also used another type of prescription glasses. Of contact lens users, 86% were using soft lenses. Safety glasses are used by nearly all the paramedics but only a handful of the physical therapists even though as we will later see the therapists mention eye hazards on the job. None of the travel agents or investigators reported using eye protection at work. 98% of respondents say they perform near tasks (within two

feet) at work and all but six of these say that it includes reading. And 89% use computers with an average daily use time of 3.6 hours (travel agents the highest at 6.9 hours per day). With respect to computer use, 36% is reported as data entry, 30% as word processing, and 35% as other types of computer use. 83% of respondents reported doing intermediate tasks (between two and five feet) and 74% reported doing distance tasks (distance tasks defined as those beyond five feet). The need for good peripheral vision at work was reported by 71% of respondents and for good color vision by 70% (in both these categories travel agents followed by physical therapists had less of a need). We also questioned about the occurrence of eye pain, dry eyes, double vision, and headaches while working. 94% reported occasional or infrequent eye pain. 86% reported either infrequent or occasional eye dryness and/or burning. 15% reported frequent headaches and 2 respondents reported constant headaches. When asked about diplopia or double vision, 95% of respondents were in the infrequent category. In terms of on-the-job lighting, 72% reported adequate lighting, leaving at least 28% of job settings which could benefit from professional recommendations about appropriate lighting in the workplace. All the paramedics, about half of the private investigators and physical therapists, and only one travel agent reported eye hazards or dangers associated with their line of work.

Now we will describe some of the major comments and descriptions from the essay/open response portions of the survey. This will best be done by job category (see Tables 8-11 for job activity and general comments summaries).

- *Private Investigators*

The private investigators describe their job activities as: driving, computer use, video camera and binocular use, reading documents, meeting and watching people, doing paperwork, phone conversations, working at crime scenes, general surveillance, one-on-one interviews, reading serial numbers and maps, looking at photographs, microfiche and court record research, and both day and night work. There were relatively few responses on specific uses for glasses worn. Those using trifocals or progressive lenses reported using them full-time. Sunglasses were frequently reported as being used outdoors for driving, surveillance, etc.. Near tasks besides reading included many of the items listed above along with examining physical evidence, writing, and assembly and repair of surveillance equipment. Other types of computer use (besides those listed on the survey) included Internet and e-mail, charting, record searches, desktop publishing activities, communications, contracts and ledgers, and general research activities. Types of intermediate tasks include some items already listed and also reading wall charts. Distance task descriptions included identification of house addresses and license plate numbers, and giving lectures/participating in meetings.

Private investigators described other job-related eye problems including: night driving, moving surveillance eye tasks, eye strain, tearing, redness, and tired gritty-feeling eyes. Lighting recommendations would be to have brighter interior vehicle lights and better general neighborhood illumination (alleys, bars, etc...) and also floodlights for surveillance. They note working in various lighting conditions (day and night) and that good lighting isn't always possible. Job hazards include: assault potential by people or

dogs, vehicle and driving hazards (following cars, for example), weather hazards, hazardous materials handling, dangerous neighborhoods, and shootings.

Under the topic of general comments the private investigators noted several items: a modest-priced transition lens is desirable (also just sunglasses and reduced glare are helpful), headaches are a common complaint in a certain office, contact lenses can be difficult indoors with the dry air environment, night vision equipment causes eye strain, need for good accommodative facility (ability to rapidly focus between near and far targets), importance of visual breaks, and photophobia at night.

- *Physical therapists*

The physical therapists described their job tasks as follows: computer use, writing and reading charts and notes, meetings and conferences, monitoring vital signs, research, direct patient care and observation, physical activities, equipment repair, teaching; driving; reading odometer mileage and house numbers and maps, dictation, looking at monitors and x-rays, and hands-on therapy. Again, not many specific glasses uses were described except for the common full-time use of progressive lenses and trifocals and also prescription sunglasses for driving, sports/recreation, and outdoor reading. Near tasks besides reading included many of the above plus: setting up and using equipment, measuring joint angles, looking at eyes for presence of nystagmus, balance training, adjusting splints and braces, teaching patients exercises and massage, and observing body landmarks. Other computer uses include: e-mail and Internet, reviewing records, materials management and marketing, graphics and presentations, creating forms, and charting. Specific intermediate tasks not already mentioned of include: gait training

and assessment, stair training, talking to patients and their families, developing information packets, working with IV's, and direct wound care. Distance activities also include reading/timing from the wall clock, safety evaluations from across the room, and driving (home health).

The therapists as a group expressed other eye problems in the following ways: problems with computer contrast variations, glasses bothering nose, accommodative facility problems, itchy and watery eyes from allergies/dry environment/airborne contaminants, eye fatigue and strain (especially at near and more problematic with a couple of respondents who said they were amblyopic), fogging of vision with contacts, and sweat getting into eyes causing burning and redness.

Lighting improvements would include direct lighting for wound inspection (sometimes another person holds a flashlight!), brighter or more illumination (preferring white over yellow and incandescent to fluorescent), individual desk lights, elimination of shadows, glare, and flicker, and increasing the number of available power outlets. Job hazards listed were: chemicals (cleaning and in whirlpool water), blood and body fluids, lifting hazards, hostile patients, footpath hazards (boxes, loose carpet), needles, spread of infection from wounds, "pressure driving" dangers, and falls. General comments included the following: need for adequate lighting, glasses should be comfortable, proper ergonomics, concerns the profession has "taken a toll" on the eyes, age-related changes of the eyes (need for separate near lens), importance of having good vision to helping others at work (especially those with poor vision themselves), eye hazard concerns, inability to wear contacts due to dry environment, hard to find reading glasses when required,

postural effects on acuity, changing visual demands, fatigue, accommodative facility problems, stress-induced eye strain, and one subject commented that the dominant eye must be used in certain situations like assessing spine contours to be accurate.

- *Travel Agents*

The travel agents job description is as follows: mostly computer activities, phoning, filing, reading brochures and reports, doing paperwork like itineraries, reading reports, atlas and map reading, and face to face communications with clients. Glasses uses as before included sunglasses for driving. Not very many descriptions were given on specific glasses uses but when written often dealt with the distances at which each type of glasses were being used. Other near tasks besides reading included writing notes and computer/keyboard use (mentioned frequently). Other types of computer uses besides those given on the survey were airline and vehicle reservations, e-mail and Internet use, bookings, and accounting and spreadsheet tasks. Intermediate tasks: using mailing machines, helping customers and other agents, reading, computer use, filing, and working with printers and fax machines. Distance tasks: maps, greeting clients, doing promotions, and airports (people and signs). Vision problems mentioned included concern that computers were worsening vision, blur (including post-work blur), and having to focus very close (ten to twelve inches).

More natural lighting was recommended along with comments about improper brightness of lights (both not bright enough and overheads being too bright). Hazards of the job include ergonomic issues like possible carpal tunnel syndrome risks and sore necks and backs. General comments from the travel agents include: the belief that computer

users have more frequent Rx changes, difficulty reading small print on brochures and therefore a need for good lighting, air ventilation system causing dry eyes, different focusing demands, sunlight glare off computer screen, and a question as to which color is best on the computer screen.

- *Paramedics*

The paramedics described their job activities as follows: computer use, paperwork, driving (sometimes at high speeds), mechanical work at various angles and distances, patient examination and treatment, fire fighting, starting IV's, reading (including prescription bottle labels, ECG printouts, residence numbers and maps), changing focusing distances, lecturing and using overheads, drawing medications, underwater and parachute operations with long distance targets (like sniper activities) and explosive use by a Navy SEAL paramedic, flying (with different lighting conditions), filing, cleaning, inspecting and using medical equipment, and generally stressful work conditions. Specific glasses uses included driving at night and in bad weather, bifocal use for reading, patient care, paperwork, computer use, and sunglasses for driving. Near tasks besides reading, not already mentioned above include: tying knots, using radio equipment, performing surgical procedures, drug inventory and dispensing, and patient care, including equipment used. Other computer uses include: computer-aided dispatch, e-mail and Internet, information research, and order entry. Intermediate tasks include: fire fighting, rescue, street signs, supervising others, patient assessment and contact, medical equipment use, cleaning, watching monitors, power tools, and stocking supplies. Distance tasks include: driving and observation of the scene (including recognition of hazards), communicating

with people from a distance, other aircraft or landing obstacles, street signs and house numbers, and sniper activities.

Other visual complaints besides those listed in the survey include fatigue, exposure to the environment (allergic itching, smoke irritation), dry eyes, blurry vision when waking up for a call, lighting changes, photophobia, contact lens fit problems, and night "blindness." Lighting is often poor (streets, homes) for paramedics. Lights to see through smoke would help. Also recommended was better maintained ambulance lighting, more lights on city buildings for public safety, and the fact that there are too many fluorescent lights in use. On the job hazards include: chemicals, fire fighting risks, sharp instruments, blood and body fluids, assaults, accidents, emergency driving, foreign object injuries, heat, smoke, dust, glass, acid, jagged wreckage/metal cutting tools, carpet fungus, landing dangers (when flying), weather-related dangers, and building collapses.

Some of the general comments from the paramedics include: one individual who was unhappy with his previous radial keratotomy results, now considering LASIK to at least reduce current astigmatism (others also mentioned interest in corrective surgery), eye protection is uncomfortable and doesn't change with changes in illumination, eye correction (glasses) can't be worn under air mask (scuba masks also not corrected), difficulty seeing in poorly lighted areas, need for proper eye protection, need for crisp distance and near vision (and the need to change focus back and forth between them), reflections generated from ambulance lights, need to rest eyes between jobs, dry eyes, and one paramedic noted the usefulness of a "double D" or superior and inferior gaze bifocal.

## Discussion

It is obvious even with only four occupations surveyed that different jobs have different tasks and, therefore, different visual demands. Even those jobs with some similarities (for example physical therapists and paramedics in our survey) have so many different tasks that each job's visual demands are unique. The respondents who took the time to really consider how they use their eyes on the job proved this with their detailed accounts of their job activities and their varied complaints and suggestions for better vision based on their personal situations in the workplace. A good optometrist should be aware enough of these variations to at least make professional recommendations on lens type, lighting, ergonomics, and eye protection to their patients.

One thing this survey demonstrated is how much people really know about their eyes and what causes them problems. Optometrists may be the experts on vision but the patient is the expert on what they do for a living. This is important to remember in terms of patient communication. Part of being a good problem-solver as a doctor is being a good listener. Even in the surveys some of the respondents were asking questions such as, "What is the best color for a computer display?" and, "Is there a inexpensive transition lens on the market?" I was surprised how few of these subjects who average over forty years old were not wearing multifocal corrections. Here is an opportunity for us to educate the public about presbyopia and how its adverse symptoms can best be alleviated.

From the collected data there appears to be a significant number of headache sufferers on the job. Of course these may not all be eye-related, but it is likely many of them are.

Protective eyewear isn't being utilized enough—only about half of the physical therapists we surveyed are using eye protection, yet as a group they note several risks such as whirlpool chemicals and blood and body fluid contamination.

With the large quantity of valuable information we received from only 159 returned surveys across only four different occupations it is obvious that different occupations have different visual needs and demands. As eye care professionals we can better serve our patients by remembering to ask questions about the occupations our patients are involved in and then listening to them, the experts in their field. We can thereby add our expertise to provide better vision and therefore a better quality of life to our patients, the goal of all branches of the health care community.

**Recommendations**

Specifically, optometrists should remember to include occupational and vocational questions as an integral part of their case history. We need to be good listeners to truly understand the occupational visual demands of our patients, which are quite varied. It is important to be well educated on the various types of prescription eyewear available and in what situations each would be the best choice (safety lenses, contact lens materials, multifocals or separate pairs of lenses, etc...). Also, the optometrist should address eye health issues (dry eye, vision-related headaches, general asthenopia) and ergonomic factors such as lighting and eye position with respect to the tasks—computer screen

angle, for example. We are taught much of this information in optometry school but I believe it is often forgotten in the shuffle of fast-paced clinics. And from this survey it is apparent it is a very real issue.

**Bibliography**

[1] Holmes C, Jolliffe H, Gregg J. Guide to Occupational and Other Visual Needs. 1958: vol. I, II.

[2] Research and Education Association's Authoritative Guide to the Top 100 Careers to Year 2005. 1997: 19-22.

[3] National Registry of Emergency Medical Technicians. P.O. Box 29233, Columbus, OH 43229.

[4] Internet: www.physicaltherapist.com

[5] Internet: www.pimall.com/nais

**Table 1. Copy of the Survey**

Visual Needs in Different Occupational Settings

Neil J. Roberts, Intern
Darin L. Paulson, O. D.

Occupation: Travel Agent Paramedic EMT Private Investigator Physical Therapist

**I. General Information**

A. Age: _____

B. While working, do you currently wear: Glasses Contacts Both

1. If you wear glasses, please check the type that best describes what you wear (please mark all that apply and specify what each pair is used for if you have more than one pair):

Single Vision Uses: _____

_____

Bifocal Uses: _____

_____

Trifocal Uses: _____

_____

Progressive addition (PAL) Uses: _____

_____

Prescription sunglasses Uses: _____

_____

2. If you wear contacts, what type? Soft Gas Permeable (Hard)
3. Do you use safety glasses at work? Yes No

**II. Work Description**

A. Please briefly describe a typical day on the job with attention to the demands on your eyes (for example: "I use the computer for a couple of hours and spend the other six hours filing and reading reports."):

_____

_____

_____

**III. Specific Visual Requirements**

A. Does your occupation involve near tasks (within two feet of you)? Yes No

1. If yes, does this involve reading? Yes No
2. What other near tasks, if any, are required?

_____

_____

B. Do you use a computer on the job? Yes No

1. If yes, how many hours per day? _____
2. What type of computer work (mark all that apply)?

Data entry Word Processing Other (please specify): _____

C. Does your occupation involve intermediate distance tasks (from two to five feet)? Yes No

1. If yes, describe the tasks:

_____

D. Does your occupation require good distance vision (beyond five feet)? Yes No

1. If yes, describe the tasks:

_____

E. Does your job require good peripheral (side) vision? Yes No

F. Does your job require good color vision? Yes No

**IV. Asthenopia and other Complaints**

A. How often, if at all, do your eyes hurt on the job in a given day?

Infrequently (less than 15 min.) Occasionally (15 min. to 1 hr.)
Frequently (1 to 3 hrs.) Constantly (more than 3 hrs.)

B. How often, if at all, do your eyes feel dry and/or burn on the job in a given day?

Infrequently (less than 15 min.) Occasionally (15 min. to 1 hr.)
Frequently (1 to 3 hrs.) Constantly (more than 3 hrs.)

C. How often, if at all, do you experience headaches on the job?

Infrequently (less than 15 min.) Occasionally (15 min. to 1 hr.)
Frequently (1 to 3 hrs.) Constantly (more than 3 hrs.)

D. How often, if at all, do you experience double vision on the job?

Infrequently (less than 15 min.) Occasionally (15 min. to 1 hr.)
Frequently (1 to 3 hrs.) Constantly (more than 3 hrs.)

E. Describe any other eye/vision problems you experience while at work: _____

_____

**V. Lighting**

A. Do you feel the lighting at your job location is appropriate? Yes No

1. If no, what change(s) would help you? _____

_____

**VI. Hazards/Safety**

A. Are there any dangerous or hazardous conditions associated with your job? Yes No

1. If yes, please explain: _____

_____

**VII. Comments**

A. Please comment on anything you feel is important to your vision on the job and/or specific needs or problems you face relating to your eyes in the workplace: _____

_____

_____

_____

Thank you very much for your time!

*Please return form in the reply envelope; no postage necessary.

**Table 2. Private Investigator Totals**

| PI | IA | IB | IB1 | IB2 | IB3 | IIIA | IIIA1 | IIIB | IIIB1 | IIIB2 | IIIC | IIID | IIIE | IIIF | IVA | IVB | IVC | IVD | V |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 41 | N | N | N | N | Y | Y | Y | | 5 D | N | Y | Y | Y | I | I | I | I | ` |
| 2 | 48 | G | SV | N | N | Y | Y | Y | | 4 D,O | Y | Y | Y | Y | I | I | I | I | ` |
| 3 | 50 | G | BF | N | N | Y | Y | Y | | 3 W,O | Y | Y | Y | Y | I | I | I | I | ` |
| 4 | 61 | G | BF | N | N | Y | Y | Y | | 1.5 D,O | N | Y | Y | Y | I | I | I | I | I |
| 5 | 57 | G | BF | N | N | Y | Y | Y | | 6 O | Y | Y | Y | Y | I | I | O | I | ` |
| 6 | 33 | N | N | N | N | Y | Y | Y | | 3 D,O | Y | Y | Y | Y | F | F | F | O | I |
| 7 | 44 | B | SV | S | N | Y | Y | Y | | 6 D | Y | Y | Y | Y | I | F | I | I | ` |
| 8 | 31 | C | N | GP | N | Y | Y | Y | | 5 D,O | Y | Y | Y | Y | O | I | O | I | ` |
| 9 | 45 | N | N | N | N | Y | Y | Y | | 2.5 D,O | Y | Y | Y | Y | I | I | O | I | ` |
| 10 | 52 | G | SV,TF | N | N | Y | Y | Y | | 3 W,O | N | Y | Y | Y | I | I | I | I | I |
| 11 | 54 | G | BF | N | N | Y | Y | Y | | 3 W,O | Y | Y | Y | Y | I | I | I | I | ` |
| 12 | 61 | G | BF,S | N | N | Y | Y | Y | | 4 W,O | Y | Y | Y | Y | I | I | I | I | ` |
| 13 | 53 | G | SV | N | N | Y | Y | Y | | 3 D,O | Y | Y | Y | Y | I | I | I | I | I |
| 14 | 53 | G | SV | N | N | N | N | Y | | 4 W,O | N | Y | Y | Y | I | I | I | I | ` |
| 15 | 44 | B | BF,S | S | N | Y | Y | Y | | 4 D,O | Y | Y | Y | Y | I | O | O | I | ` |
| 16 | 43 | N | N | N | N | Y | Y | Y | | 3 W,O | N | Y | Y | Y | I | O | I | I | ` |
| 17 | 54 | G | BF | N | N | Y | Y | Y | | 4.5 D,O | Y | Y | Y | Y | O | F | I | I | ` |
| 18 | 63 | N | N | N | N | Y | N | Y | | 4.5 D,O | Y | Y | Y | Y | I | I | I | I | ` |
| 19 | 50 | G | SV | V | V | Y | Y | Y | | 5 W,O | Y | Y | Y | Y | I | I | O | I | I |
| 20 | 46 | N | N | N | N | Y | Y | Y | | 4.5 D | Y | N | Y | Y | I | O | O | I | ` |
| 21 | 48 | G | SV | N | N | Y | Y | Y | | 3 W,O | N | Y | Y | Y | I | I | O | I | ` |
| 22 | 59 | C | BF | N | N | Y | Y | Y | | 3 W,O | N | Y | Y | Y | I | O | I | I | ` |
| 23 | 54 | G | SV | N | N | Y | Y | Y | | 10 D,O | Y | N | N | Y | I | I | I | I | ` |
| 24 | 53 | G | SV | N | N | Y | Y | Y | | 7 W,O | N | Y | Y | Y | I | I | I | I | ` |
| 25 | 50 | G | PAL,S | N | N | Y | Y | Y | | 3 D | N | Y | Y | Y | I | O | I | I | ` |
| 26 | 36 | C | N | S | N | Y | Y | Y | | 8 O | Y | Y | Y | Y | O | O | O | O | ` |
| 27 | 28 | N | N | N | N | Y | Y | Y | | 5 D,O | N | Y | Y | Y | I | I | O | I | ` |
| 28 | 54 | G | SV | N | N | Y | Y | Y | | 4.5 D,O | Y | Y | Y | Y | I | I | I | I | ` |
| 29 | 37 | B | SV | S | N | Y | Y | Y | | 6 D | Y | Y | Y | Y | F | F | F | I | ` |
| 30 | 34 | C | SV | S | N | Y | Y | Y | | 2 W,O | Y | Y | Y | Y | I | I | O | I | ` |
| 31 | 30 | N | N | N | N | Y | Y | Y | | 3 D,O | Y | Y | Y | Y | I | I | I | I | I |
| Totals | 47 | 16G | 10N | 25N | | 30 Y | 29Y | 31 Y | 4.3 | 18D | 21Y | 29 Y | 30 Y | 31 Y | 26I | 21I | 19I | 29I | 2 |
| | | 8N | 12SV | 5S | 31N | 1N | 2N | | | 26O | 10N | 2N | 1N | | 3O | 6O | 10O | 2O | 6 |
| | | 4C | 8BF | 1GP | | | | | | 11W | | | | | 2F | 4F | 2F | | |
| | | 3B | 3Sun | | | | | | | | | | | | | | | | |
| | | | 1PAL | | | | | | | | | | | | | | | | |
| | | | 1TF | | | | | | | | | | | | | | | | |

**Table 3. Physical Therapist Totals**

| PT | IA | IB | IB1 | IB2 | IB3 | IIIA | IIIA1 | IIIB | IIIB1 | IIIB2 | IIIC | IIID | IIIE | IIIF | IVA | IVB | IVC | IVD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 39 | G | SV | N | N | Y | N | Y | 2.5 | W | Y | Y | Y | N | I | O | I | I |
| 2 | 30 | C | N | S | N | Y | Y | Y | 1 | W | Y | Y | N | N | I | I | I | I |
| 3 | 38 | N | N | N | N | Y | Y | Y | 6 | W | Y | N | Y | Y | I | I | I | I |
| 4 | 49 | G | BF | N | N | Y | Y | N | 0 | N | Y | Y | Y | N | I | I | O | I |
| 5 | 38 | N | N | N | N | Y | Y | Y | 1 | D | Y | Y | Y | Y | I | I | O | I |
| 6 | 28 | N | N | N | N | Y | Y | Y | 0.3 | D | N | N | Y | Y | I | I | F | I |
| 7 | 28 | N | N | N | N | Y | Y | Y | 1.5 | W | Y | Y | Y | N | I | I | O | I |
| 8 | 30 | B | SV | S | N | Y | Y | Y | 0.2 | O | Y | Y | Y | Y | I | I | I | I |
| 9 | 25 | N | N | N | N | Y | Y | Y | 1.5 | D | Y | Y | Y | N | I | I | F | I |
| 10 | 28 | G | SV | N | N | Y | Y | Y | 3.5 | D | Y | N | N | N | I | O | I | I |
| 11 | 43 | N | N | N | N | Y | Y | Y | 2.5 | D | Y | Y | Y | Y | I | I | I | I |
| 12 | 25 | N | N | N | N | Y | Y | N | 0 | N | Y | N | Y | Y | I | I | I | I |
| 13 | 24 | B | SV | S | N | Y | Y | Y | 0.2 | W | Y | Y | Y | N | I | I | O | I |
| 14 | 30 | N | N | N | N | Y | Y | Y | 1.5 | O | N | N | Y | Y | I | F | O | I |
| 15 | 45 | G | SV | S | N | Y | Y | Y | 1 | W | Y | Y | N | N | I | O | I | I |
| 16 | 27 | N | N | N | N | Y | Y | N | 0 | N | Y | Y | Y | Y | O | F | O | I |
| 17 | 28 | N | N | N | Y | Y | Y | Y | 1.5 | W,O | Y | Y | Y | Y | I | O | I | I |
| 18 | 36 | G | SV | N | N | Y | Y | Y | 0.2 | D | Y | N | Y | N | I | O | I | I |
| 19 | 47 | N | N | N | N | Y | Y | Y | 1.5 | W,O | Y | Y | Y | Y | I | I | I | I |
| 20 | 48 | G | PAL | N | N | Y | Y | Y | 0.5 | W | Y | Y | Y | N | I | I | I | I |
| 21 | 32 | N | N | N | N | N | N | N | 0 | N | Y | Y | N | N | I | O | I | I |
| 22 | 28 | G | SV | S | N | Y | Y | N | 0 | N | Y | Y | Y | Y | I | I | F | I |
| 23 | 25 | G | SV,S | GP | N | Y | Y | Y | 0 | D | Y | N | N | N | I | I | F | I |
| 24 | 39 | N | N | N | N | Y | Y | Y | 4 | D | Y | Y | Y | Y | O | I | I | I |
| 25 | 36 | N | N | N | Y | Y | Y | Y | 2 | W,O | Y | Y | Y | Y | I | I | O | I |
| 26 | 31 | N | N | N | N | Y | Y | Y | 4 | W,O | Y | Y | N | Y | I | I | I | I |
| 27 | 43 | C | N | S | N | Y | Y | Y | 1 | W,O | Y | Y | N | N | I | I | I | I |
| 28 | 31 | N | N | N | Y | Y | Y | Y | 0.3 | D | Y | N | Y | N | O | I | I | O |
| 29 | 47 | G | SV | N | N | Y | Y | Y | 1.5 | D,O | Y | Y | N | Y | I | I | I | I |
| 30 | 47 | G | SV | N | N | Y | Y | Y | 0.3 | D | Y | Y | Y | Y | I | I | I | I |
| 31 | 32 | G | SV | N | N | Y | Y | Y | 3 | D | Y | Y | N | Y | I | I | I | I |
| 32 | 30 | C | N | S | N | Y | Y | Y | 1.5 | D | Y | Y | N | N | I | I | O | I |
| 33 | 26 | N | N | N | N | Y | Y | Y | 1.5 | O | Y | N | N | N | I | I | I | I |
| 34 | 38 | SV | N | N | Y | Y | Y | Y | 0.8 | W,O | Y | N | Y | Y | I | I | O | I |
| 35 | 32 | B | SV | S | N | Y | Y | Y | 2 | D | Y | Y | Y | Y | O | C | F | I |
| 36 | 46 | G | BF | N | N | Y | Y | Y | 0.5 | W | Y | Y | Y | N | I | F | F | I |
| 37 | 30 | N | N | N | N | Y | Y | N | 0 | N | Y | Y | N | Y | I | I | O | I |
| 38 | 39 | N | N | N | N | Y | Y | Y | 1.5 | W | Y | Y | Y | Y | I | I | F | I |
| 39 | 46 | C | N | S | N | Y | Y | Y | 1.5 | D | Y | Y | Y | Y | I | I | I | I |
| 40 | 33 | G | SV,S | N | N | Y | Y | N | 0 | N | Y | N | N | N | I | I | I | I |
| 41 | 41 | N | N | N | N | Y | Y | Y | 0.8 | D,O | Y | Y | Y | Y | I | I | O | I |
| 42 | 30 | N | N | N | N | Y | Y | Y | 0.5 | W,O | Y | Y | N | N | I | I | O | I |
| 43 | 50 | G | TF,S | N | N | Y | Y | Y | 2.5 | D,O | Y | Y | N | Y | I | I | I | I |
| 44 | 37 | N | N | N | N | Y | Y | Y | 0.5 | W | Y | Y | Y | Y | I | I | I | I |
| 45 | 36 | N | N | N | N | Y | Y | Y | 1 | W,O | Y | Y | Y | N | I | I | I | I |
| 46 | 41 | C | N | S | N | Y | Y | Y | 1 | D,O | Y | Y | Y | Y | F | F | C | I |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 47 | 34 | G | SV | N | N | Y | N | N | 0 | N | Y | Y | N | Y | I | I | I | I |
| 48 | 30 | B | SV | S | N | Y | Y | Y | 0.1 | W,O | Y | Y | N | N | I | I | I | I |
| 49 | 39 | N | N | N | N | Y | Y | Y | 1.5 | W | Y | N | Y | N | I | I | I | I |
| 50 | 40 | N | N | N | Y | Y | Y | Y | 1.5 | D | Y | Y | N | Y | I | O | I | O |
| 51 | 30 | G | SV | N | N | Y | Y | Y | 1.5 | D | Y | Y | Y | Y | I | O | I | I |
| 52 | 25 | N | N | N | N | Y | Y | Y | 1.3 | O | Y | N | Y | N | O | O | F | O |
| 53 | 27 | N | N | N | N | Y | Y | Y | 4 | D | Y | N | Y | Y | O | I | O | C |
| 54 | 46 | G | SV,S | N | N | Y | Y | Y | 1.5 | D | Y | Y | N | Y | I | O | I | I |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Totals | 35 | 18G | 32N | 42N | 5Y | 53Y | 51Y | 46Y | 1.3 | 22D | 52Y | 40Y | 35Y | 31Y | 47I | 39I | 32I | 50I |
| | | 27N | 18SV | 11S | 49N | 1N | 3N | 8N | | 20W | 2N | 14N | 19N | 23N | 6O | 10O | 13O | 3O |
| | | 5C | 2BF | 1GP | | | | | | 17O | | | | | 1F | 4F | 8F | |
| | | 4B | 4Sun | | | | | | | 8N | | | | | | 1C | 1C | 1C |
| | | | 1PAL | | | | | | | | | | | | | | | |
| | | | 1TF | | | | | | | | | | | | | | | |

**Table 4. Travel Agent Totals**

| TA | IA | IB | IB1 | IB2 | IB3 | IIIA | IIIA1 | IIIB | IIIB1 | IIIB2 | IIIC | IIID | IIIE | IIIF | IVA | IVB | IVC | IVD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 26 | G | SV | N | N | Y | Y | Y | 8 | W,O | Y | N | N | Y | I | I | I | I |
| 2 | 60 | G | TF | N | N | Y | Y | Y | 8 | D,W | Y | Y | Y | Y | I | I | I | I |
| 3 | 28 | N | N | N | N | Y | Y | Y | 8 | D,W,O | Y | N | N | N | O | O | I | I |
| 4 | 32 | C | SV,S | S | N | Y | Y | Y | 4 | D,W | N | N | N | N | I | I | I | I |
| 5 | 57 | G | BF | N | N | Y | Y | Y | 2.5 | D,W,O | N | Y | N | N | I | I | I | I |
| 6 | 52 | G | BF,S | N | N | Y | Y | Y | 8 | W,O | Y | N | N | N | I | O | F | I |
| 7 | 36 | B | SV | S | N | Y | Y | Y | 8 | O | N | N | N | N | O | F | F | I |
| 8 | 46 | N | N | N | N | Y | Y | Y | 6 | D,W,O | Y | Y | N | Y | I | I | C | I |
| 9 | 54 | G | BF | N | N | Y | Y | Y | 8 | D,W | Y | N | N | N | I | I | I | I |
| 10 | 66 | C | N | S | N | Y | Y | Y | 8 | O | N | N | N | N | I | I | I | I |
| 11 | 47 | G | SV | N | N | Y | Y | Y | 8 | O | N | N | Y | Y | I | I | I | I |
| 12 | 39 | B | SV,S | GP | N | N | N | Y | 8 | O | N | N | N | N | I | O | F | I |
| 13 | 29 | G | SV | N | N | Y | Y | Y | 7.8 | O | Y | N | N | N | C | C | O | I |
| 14 | 56 | G | TF,S | N | N | Y | Y | Y | 8.5 | O | N | N | N | N | I | I | I | I |
| 15 | 46 | G | SV | N | N | Y | Y | Y | 6 | D,W | N | N | N | Y | O | O | F | I |
| 16 | 46 | G | BF | N | N | Y | Y | Y | 5.5 | O | Y | N | N | N | F | C | F | I |
| 17 | 36 | C | N | S | N | Y | Y | Y | 4 | D,W | Y | N | N | N | I | I | I | I |
| 18 | 52 | G | BF | N | N | Y | Y | Y | 6.5 | D,W,O | Y | N | N | Y | I | I | I | I |
| 19 | 60 | G | PAL, S | N | N | Y | Y | Y | 9 | O | Y | N | N | N | I | I | I | I |
| 20 | 48 | B | BF | S | N | Y | Y | Y | 8 | O | Y | N | N | N | O | O | O | I |
| 21 | 42 | N | N | N | N | Y | Y | Y | 7 | W,O | N | N | N | N | I | O | O | I |
| 22 | 52 | C | SV | GP | N | Y | Y | Y | 8 | O | Y | N | N | Y | I | I | I | I |
| 23 | 43 | B | BF | S | N | Y | Y | Y | 6 | O | N | N | N | N | O | I | O | O |
| 24 | 21 | N | N | N | N | Y | Y | Y | 8 | O | N | N | N | N | I | I | O | I |
| 25 | 58 | G | BF | N | N | Y | Y | Y | 4 | D,W,O | N | N | N | N | I | I | I | I |
| 26 | 31 | N | N | N | N | Y | Y | Y | 7 | D,W | Y | N | N | N | F | F | I | I |
| 27 | 38 | C | SV | S | N | Y | Y | Y | 8 | O | Y | N | N | Y | I | I | I | I |
| 28 | 49 | G | SV | N | N | Y | Y | Y | 7 | D,W,O | N | N | N | N | I | O | I | I |
| 29 | 53 | N | N | N | N | Y | Y | Y | 6 | D,W,O | Y | Y | Y | Y | F | O | F | I |
| 30 | 45 | C | SV | S | N | Y | Y | Y | 6 | D,W,O | Y | N | Y | Y | I | F | I | I |
| Totals | 45 | 14G | 8N | 20N | | 29 Y | 29Y | 30 Y | 6.9 | 14D | 17Y | 4Y | 4Y | 10Y | 21I | 17I | 18I | 29I |
| | | 6N | 11SV | 8S | 30 N | 1N | 1N | 10 N | | 17W | 13N | 26N | 26N | 20N | 5O | 8O | 5O | 1O |
| | | 6C | 8BF | 2GP | | | | | | 24O | | | | | 3F | 3F | 6F | |
| | | 4B | 5Sun | | | | | | | | | | | | 1C | 2C | 1C | |
| | | | 1PAL | | | | | | | | | | | | | | | |
| | | | 2TF | | | | | | | | | | | | | | | |

**Table 5. Paramedic Totals**

| Med | IA | IB | IB1 | IB2 | IB3 | IIIA | IIIA1 | IIIB | IIIB1 | IIIB2 | IIIC | IIID | IIIE | IIIF | IVA | IVB | IVC | IVD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 26 | C | N | S | Y | Y | Y | Y | 1 | D | Y | Y | Y | Y | F | C | O | I |
| 2 | 22 | N | N | N | Y | Y | Y | Y | 1 | D | Y | Y | Y | Y | O | O | F | I |
| 3 | 28 | N | N | N | Y | Y | Y | N | 0 | N | Y | Y | Y | Y | I | I | I | I |
| 4 | 23 | G | SV | N | Y | Y | Y | N | 0 | N | Y | Y | Y | Y | I | O | O | I |
| 5 | 37 | G | SV | N | Y | Y | Y | Y | 0.5 | W,O | Y | Y | Y | Y | I | O | O | I |
| 6 | 25 | N | N | N | Y | Y | Y | N | 0 | N | Y | Y | Y | Y | O | O | I | I |
| 7 | 32 | C | N | S | Y | Y | Y | N | 0 | N | Y | Y | Y | Y | O | C | O | I |
| 8 | 48 | G | BF | N | Y | Y | Y | N | 0 | N | Y | Y | Y | Y | I | O | I | I |
| 9 | 45 | C | N | GP | Y | Y | Y | Y | 3 | O | Y | Y | Y | Y | I | I | O | I |
| 10 | 36 | G | SV | N | N | Y | N | Y | 0.5 | W,O | Y | Y | Y | Y | I | I | I | I |
| 11 | 29 | N | N | N | N | Y | N | Y | 1.5 | D,W | N | Y | Y | Y | I | I | I | I |
| 12 | 49 | G | PAL | N | Y | Y | Y | Y | 2 | D,W | Y | Y | Y | Y | I | F | I | I |
| 13 | 36 | N | N | N | Y | Y | Y | Y | 2 | D | Y | Y | Y | Y | I | O | F | I |
| 14 | 25 | G | SV | N | Y | Y | Y | N | 0 | N | N | Y | Y | N | O | F | O | I |
| 15 | 49 | G | BF | N | Y | Y | Y | Y | 2 | D,W | Y | Y | Y | N | I | O | I | I |
| 16 | 40 | G | BF,S | N | Y | Y | Y | Y | 5 | D,W | Y | Y | Y | Y | O | I | F | I |
| 17 | 32 | N | N | N | Y | Y | Y | Y | 4 | D | Y | Y | Y | Y | I | I | I | I |
| 18 | 40 | G | SV | N | N | Y | Y | Y | 3 | D,W | Y | Y | Y | Y | I | O | F | I |
| 19 | 32 | BF | SV,S | S | Y | Y | Y | Y | 1 | W,O | Y | Y | Y | Y | I | O | I | I |
| 20 | 34 | N | N | N | Y | Y | Y | Y | 1 | D,W | Y | Y | Y | Y | O | O | O | I |
| 21 | 31 | N | N | N | Y | Y | N | Y | 0.5 | D | Y | Y | Y | Y | I | I | F | I |
| 22 | 29 | G | SV | N | N | Y | Y | Y | 3.5 | D,W | Y | Y | Y | Y | I | I | I | I |
| 23 | 44 | G | BF | N | Y | Y | Y | Y | 7 | D,W,O | Y | Y | Y | Y | F | F | O | I |
| 24 | 35 | C | N | S | Y | Y | Y | Y | 2 | D,W | Y | Y | Y | Y | I | O | I | I |
| 25 | 36 | N | N | N | N | Y | Y | Y | 1 | D,W | Y | Y | Y | Y | I | I | I | I |
| 26 | 37 | G | SV | N | Y | Y | Y | Y | 1.5 | D | Y | Y | Y | Y | I | I | I | I |
| 27 | 35 | BF | SV | S | Y | Y | Y | Y | 2 | D | Y | Y | Y | Y | I | O | I | I |
| 28 | 27 | N | N | N | Y | Y | Y | Y | 2 | D,W,O | Y | Y | Y | Y | I | O | I | I |
| 29 | 40 | G | SV | N | N | Y | Y | Y | 2 | D | Y | Y | Y | N | O | O | I | I |
| 30 | 25 | G | SV | N | N | Y | Y | N | 0 | N | Y | Y | Y | Y | I | I | I | I |
| 31 | 52 | G | BF,S | N | Y | Y | Y | Y | 0.8 | D,W | Y | Y | Y | Y | I | I | I | I |
| 32 | 44 | G | PAL,S | N | N | Y | Y | Y | 0.5 | D,O | Y | Y | Y | Y | O | F | F | I |
| 33 | 24 | C | N | S | Y | Y | Y | N | 0 | N | Y | Y | Y | Y | O | F | O | O |
| 34 | 30 | BF | SV | S | Y | Y | Y | N | 0 | N | Y | Y | Y | Y | I | O | F | I |
| 35 | 46 | G | SV | N | Y | Y | Y | Y | 1 | D,W | Y | Y | Y | Y | I | I | I | I |
| 36 | 37 | N | N | N | Y | Y | Y | Y | 3 | D,W,O | Y | Y | Y | Y | O | O | O | I |
| 37 | 38 | N | N | N | Y | Y | Y | Y | 10 | O | Y | Y | Y | Y | I | I | I | I |
| 38 | 34 | N | N | N | Y | Y | Y | Y | 4 | D | Y | Y | Y | Y | I | I | O | I |
| 39 | 28 | C | N | S | N | Y | Y | Y | 5 | D,W | Y | Y | Y | Y | O | O | O | I |
| 40 | 36 | N | N | N | Y | Y | Y | N | 1 | D | Y | Y | Y | N | I | I | I | I |
| 41 | 29 | G | SV | N | Y | Y | Y | Y | 0 | N | Y | Y | Y | Y | I | O | O | I |
| 42 | 27 | N | N | N | Y | Y | Y | Y | 6 | O | Y | Y | Y | Y | I | I | O | I |
| 43 | 38 | N | N | N | Y | Y | Y | Y | 2 | D | Y | Y | Y | Y | I | I | F | I |
| 44 | 43 | G | PAL | N | Y | Y | Y | Y | 2 | W,O | Y | Y | Y | Y | O | I | O | I |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Totals | 35 | 19G | 22N | 35N | 35 Y | 44 Y | 41Y | 34 Y | 1.9 | 27D | 42 Y | 44 Y | 44 Y | 40 Y | 30I | 19I | 21I | 43 |
| | | 16N | 14SV | 8S | 9N | | 3N | 10 N | | 19W | 2N | | | 4N | 12O | 18O | 15 O | 1O |
| | | 6C | 5BF | 1GP | | | | | | 11O | | | | | 2F | 5F | 8F | |
| | | 3B | 4Sun | | | | | | | 10N | | | | | | 2C | | |
| | | | 3PAL | | | | | | | | | | | | | | | |
| | | | 0 TF | | | | | | | | | | | | | | | |

**Table 6. Grand Totals**

| Grand | IA | IB | IB1 | IB2 | IB3 | IIIA | IIIA1 | IIIB | IIIB1 | IIIB2 | IIIC | IIID | IIIE | IIIF | IVA | IVB | IVC | IV |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Totals | 41 | 67G | 72N | 122N | 40Y | 156Y | 150Y | 141Y | 3.6 | 81D | 132Y | 117Y | 113Y | 112Y | 124I | 96I | 90I | 1: |
| | | 57N | 55SV | 32S | 119N | 3N | 9N | 18N | | 67W | 27N | 42N | 46N | 47N | 26O | 42O | 43O | 7( |
| | | 21C | 23BF | 5GP | | | | | | 78O | | | | | 8F | 16F | 24F | 0I |
| | | 14B | 16Sun | | | | | | | 18N | | | | | 1C | 5C | 2C | 1( |
| | | | 6pal | | | | | | | | | | | | | | | |
| | | | 4TF | | | | | | | | | | | | | | | |

**Table 7. Totals Key**

IA: Age
IB: Glasses and/or contacts at work (G=glasses; C=contacts; B=both; N=none)
IB1: Type of glasses if worn (SV=single vision; BF=bifocal; TF=trifocal; PAL=progressive; S=prescription
sunglasses; N=none)
IB2: Type of contacts if worn (S=soft; GP=gas permeable; N=none)
IB3: Safety glasses worn (Y=yes; N=no)
IIIA: Near tasks involved (Y=yes; N=no)
IIIA1: Reading involved (Y=yes; N=no)
IIIB: Computer used (Y=yes; N=no)
IIIB1: How many computer hours
IIIB2: Category of computer use (D=data entry; W=word processing; O=other; N=none)
IIIC: Intermediate tasks involved (Y=yes; N=no)
IIID: Distant tasks involved (Y=yes; N=no)
IIIE: Peripheral vision needed (Y=yes; N=no)
IIIF: Color vision needed (Y=yes; N=no)
IVA: Eye pain (I=infrequently; O=occasionally; F=frequently; C=constantly)
IVB: Dry eyes (I=infrequently; O=occasionally; F=frequently; C=constantly)
IVC: Headaches (I=infrequently; O=occasionally; F=frequently; C=constantly)
IVD: Double vision (I=infrequently; O=occasionally; F=frequently; C=constantly)
VA: Appropriate lighting (Y=yes; N=no)
VIA: Hazardous conditions (Y=yes; N=no)

**Table 8**

*Private Investigators*

Activities:

- driving
- computer use
- video camera and binocular use
- reading documents
- meeting and watching people
- doing paperwork, phone conversations
- working at crime scenes
- general surveillance
- one on one interviews
- reading serial numbers and maps
- looking at photographs
- microfiche and court record research
- both day and night work

Comments:

- a modest-priced transition lens is desirable
- headaches are a common complaint in a certain office
- contact lenses can be difficult indoors with the dry air environment
- night vision equipment causes eye strain
- need for good accommodative facility (ability to rapidly focus between near and far targets)
- importance of visual breaks
- photophobia at night

**Table 9**

*Physical Therapists*

Activities:

- computer use
- writing and reading charts and notes
- meetings and conferences
- monitoring vital signs
- research
- direct patient care and observation
- physical activities
- equipment repair
- teaching
- driving
- reading odometer mileage and house numbers and maps
- dictation
- looking at monitors and x-rays
- hands-on therapy

Comments:

- need for adequate lighting
- glasses should be comfortable
- proper ergonomics
- concerns the profession has "taken a toll" on the eyes
- age-related changes of the eyes (need for separate near lens)
- importance of having good vision to helping others at work
- eye hazard concerns
- inability to wear contacts due to dry environment
- hard to find reading glasses when required
- postural effects on acuity
- changing visual demands
- fatigue,
- accommodative facility problems
- stress-induced eye strain
- one subject commented that the dominant eye must be used in certain situations

**Table 10**

*Travel Agents*

Activities:

- mostly computer activities
- phoning
- filing
- reading brochures and reports
- doing paperwork like itineraries
- reading reports
- atlas and map reading
- face to face communications with clients

Comments:

- the belief that computer users have more frequent Rx changes
- difficulty to read small print on brochures and the associated need therefore of good lighting
- air ventilation system drying eyes
- different focusing demands (like near to medium range)
- sunlight glare off computer screen
- a question as to which color is best on the computer screen

**Table 11**

*Paramedics*

Activities:

- computer use
- paperwork
- driving (sometimes at high speeds)
- mechanical work at various angles and distances
- patient examination and treatment
- fire fighting
- starting IV's
- reading (including prescription bottle labels, ECG printouts, residence numbers and maps)
- changing focusing distances
- lecturing and using overheads
- drawing medications
- underwater and parachute operations with long distance targets and explosive use
- flying (with its different lighting conditions)
- filing
- cleaning
- inspecting and using medical equipment
- stressful conditions

Comments:

- one paramedic was unhappy with his previous radial keratotomy results, now considering LASIK
- eye protection is uncomfortable and doesn't change with changes in illumination
- eye correction (glasses) can't be worn under air mask (scuba masks also not corrected)
- difficulty seeing in poorly lighted areas
- need for proper eye protection
- need for crisp distance and near vision
- reflections generated from ambulance lights
- need to rest eyes between jobs
- dry eyes
- one paramedic noted the usefulness of a "double D" or superior and inferior gaze bifocal

**Table 12**

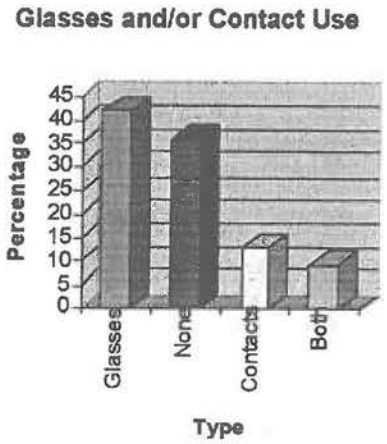



**Table 13**

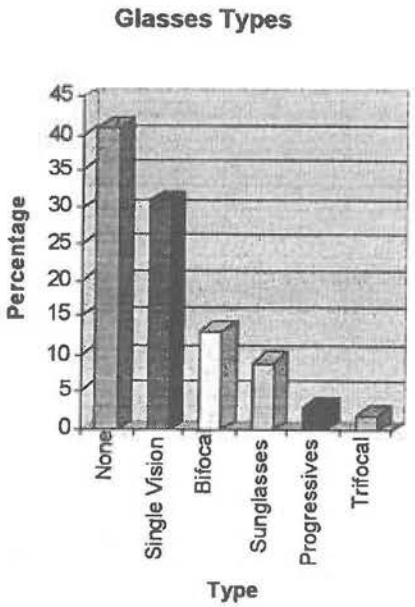



**Table 14**

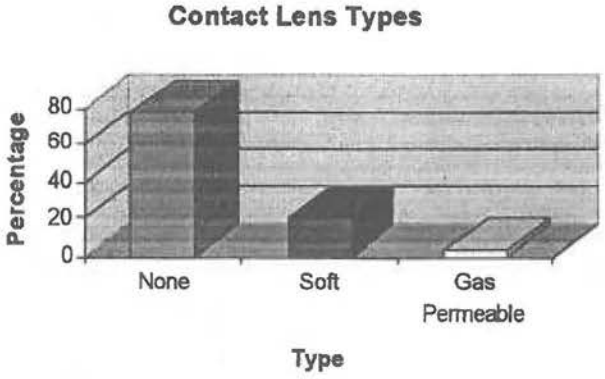

Contact Lens Types
Percentage
80
60
40
20
0
None
Soft
Gas Permeable
Type

**Table 15**

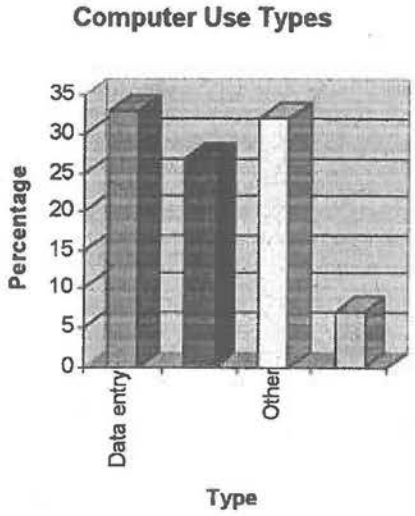



**Table 16**

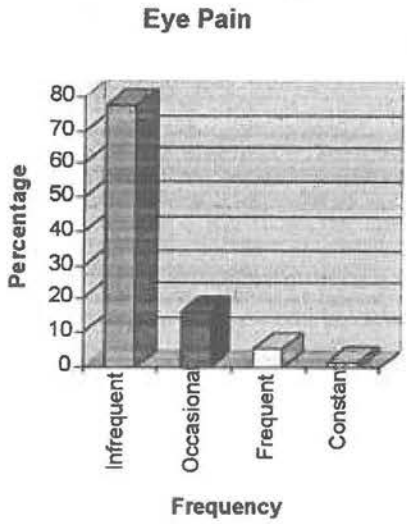


**Table 17**

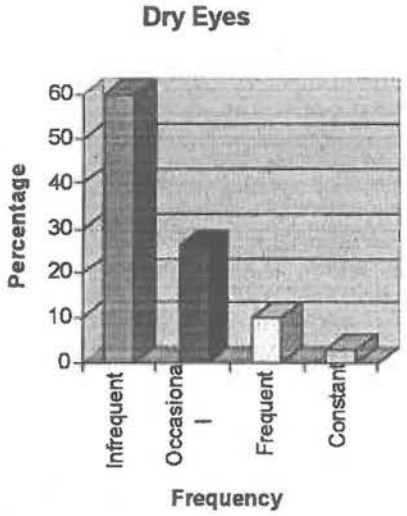



**Table 18**

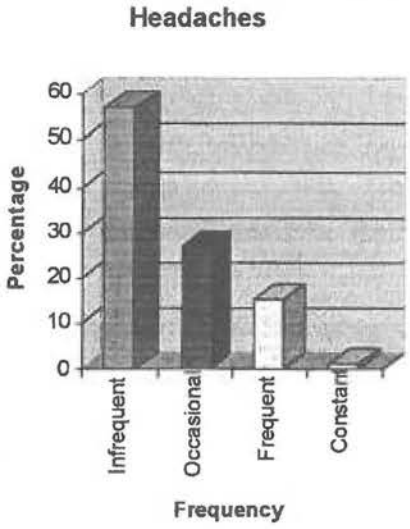
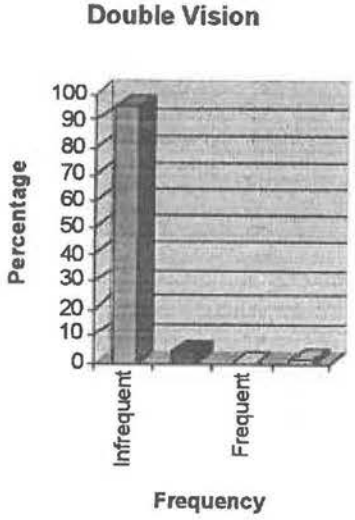


**Table 19**


Double Vision
Percentage
100
90
80
70
60
50
40
30
20
10
0
Infrequent
Frequent
Frequency