

**HANDWASHING AND DISINFECTION METHODS FOR MICHIGAN
OPTOMETRISTS**

By

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ABSTRACT

Purpose. Contamination of equipment and spread of microorganisms are often overlooked as occupational hazards for optometrists and their patients. It is important to identify the potential spread of microorganisms between the doctor and patient. This can be through an absence of hand washing as well as improper disinfection of instruments. This study will uncover hand washing techniques used by practicing optometrists, as well as educate the readers on the importance of decreasing the spread of microorganisms. **Methods.** A survey taken by optometrists belonging to the Michigan Optometric Association (MOA) has been conducted. This survey gathered information about the techniques used to wash their hands during a routine exam and methods of equipment disinfection.

Results. The surveys will be analyzed to determine what current standard of hand washing and disinfection techniques are considered acceptable within this group, and the familiarity this group has regarding proper hand washing guidelines described by the Centers for Disease Control (CDC). To what extent the guidelines are followed by these individuals will also be examined. **Conclusions.** This research will emphasize the importance of proper disinfection in a variety of optometric settings and help promote the CDC antiseptic guidelines. This information will benefit both optometrists and their patients by reviewing the proper hand washing procedures and pointing out common areas of noncompliance.

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INTRODUCTION

Hand hygiene among health care workers plays a major role in preventing the spread of infectious agents. The Centers for Disease Control and Prevention (CDC) hand hygiene guidelines have been implemented in hospitals but are not mandatory in most optometric settings. Optometrists may best improve hand washing compliance by assessing the barriers to it, measuring the rates of compliance, educating themselves on the importance of hand hygiene, making sanitizing products more available for their own and staff use, and holding themselves and other staff members accountable.

Each year there are over a million health care-associated infections and almost 100,000 associated deaths.¹ Some states now require hospitals to publicly disclose their rates of hospital-acquired infections, and some insurance companies no longer make payments for the treatment of a variety of hospital-acquired conditions, including some types of infections. There have been no such requirements for non-hospital optometric practices settings, thus it is vital that optometrists educate themselves and hold themselves accountable for performing proper hand hygiene. Studies done by the Centers for Disease Control and Prevention found that among all health care workers, compliance with recommended hand-hygiene procedure was poor, occurring less than half of the time where appropriate.²

Hand hygiene is straightforward, but it can also be repetitive and tedious. There are many barriers to compliance with proper hand washing. Infections develop slowly after an initial exposure, and the direct connection between the poor hand hygiene of a health-care worker and a patient's infection is not directly observable. Also, positive feedback for acts of compliance is also uncommon. Other common barriers involving compliance with hand hygiene guidelines include: a lack of access to hand washing sinks, insufficient time, skin irritation, ignorance about the problem, and individual preferences or habits. The purpose of the survey was to determine Michigan optometrists' level of knowledge about hand hygiene and to elicit information on the barriers to good hand hygiene practices on campus.

METHODS:

A twelve question survey was conducted by mail to 500, randomly selected, optometrists belonging to the Michigan Optometric Association. The questions were conducted using the Center for Disease Control's Guidelines for Hand Washing. The survey was kept anonymous and the participants were given two weeks to complete the surveys. Out of the 500 mailed, 169 surveys were returned. Prepaid addressed envelopes were included with the surveys mailed and no return addresses were placed on these envelopes. A participant consent form

that explained the purpose of the study was developed and participants were aware by completing the survey they were giving their consent to participate. The Human Subjects Review Committee of Ferris State University approved the methodology, the survey, and the patient consent forms. The survey (see Appendix) addressed different hand washing techniques as well as methods used to disinfect equipment. After the surveys were received and the information was collected, an analysis of the results was performed.

RESULTS

Methods of Hand Washing

The methods the optometrists used to wash their hands were compared. Out of the 169 optometrist surveyed, none reported using only water. Of the doctors surveyed, 79.3% reported use of an anti-bacterial soap and 11.2% used an alcohol-based hand sanitizer. Only 7.7% reported using a combination of the anti-bacterial soap and the alcohol-based hand sanitizer. Two of the optometrists reported use of a hand soap that wasn't anti-bacterial and one optometrist reported the use of either a sanitizer, antibacterial soap or just water to wash their hands.

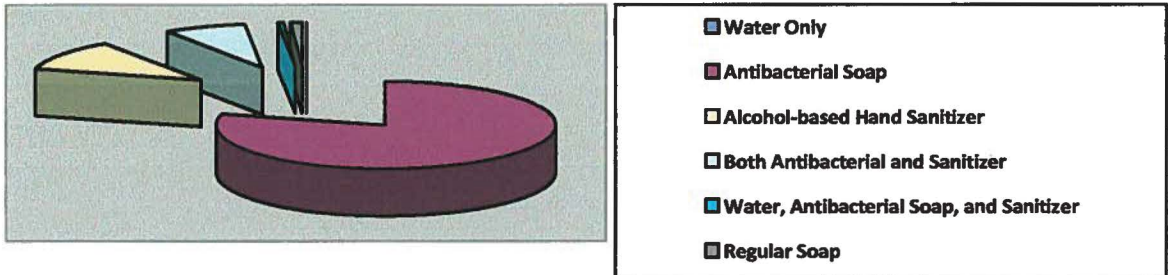


Figure 1 Methods of Hand Washing

Frequency of Hand Washing During the Exam

The majority of the optometrists washed their hands once during an exam, with 66.3% reporting this response. The remaining optometrists reported washing their hands three times, two times, or not at all during an exam, at 3.6%, 20.7% and 9.5% respectively.

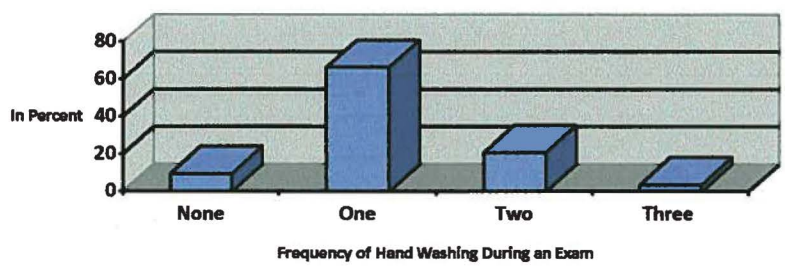


Figure 2 Frequency of Hand Washing During Exam

Duration of Hand Washing

Of the optometrists that reported the use of soap and water (150), 44% stated that they washed their hands for 10 seconds while 35.3% reported they spent 20 seconds washing their hands. Nineteen (12.7%) of the optometrists reported they spent about 5 seconds or less, while four (8%) of the optometrists said they spent at least 30 seconds.

When considering those who used hand sanitizer (13), 39.4% rubbed their hands together for 10 seconds. Twenty-seven percent rubbed their hands together until the hand sanitizer had dried, while 15.2% rubbed the alcohol for only 5 seconds.

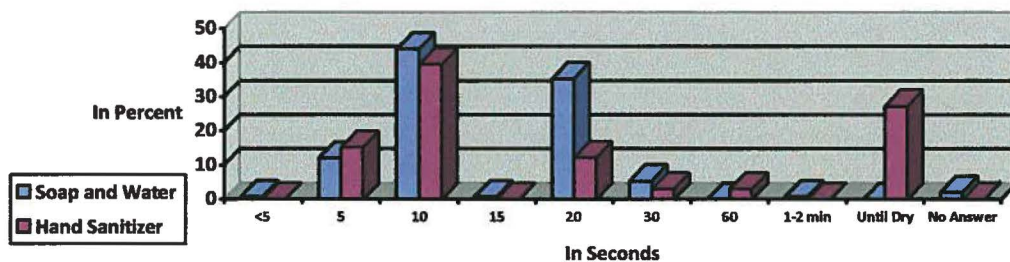


Figure 3 Duration of Hand Washing

Hand Washing During the Exam

Out of the 169 optometrist responding, 141 stated that they wash their hands at the beginning of the exam. Thirty-five of the optometrists wash their hands after the exam is completed. Twenty-five commonly wash their hands after the instillation of ophthalmic drops and 19 wash after biomicroscopy. Additional responses included: before instillation of drops (5 optometrists), before internal examination (4 optometrists), before contact lens insertion and removal (8 optometrists), whenever contact was made with the patient (4 optometrists), or when an infection was found (4 optometrists). Seven percent surveyed did not wash their hands during the examination.

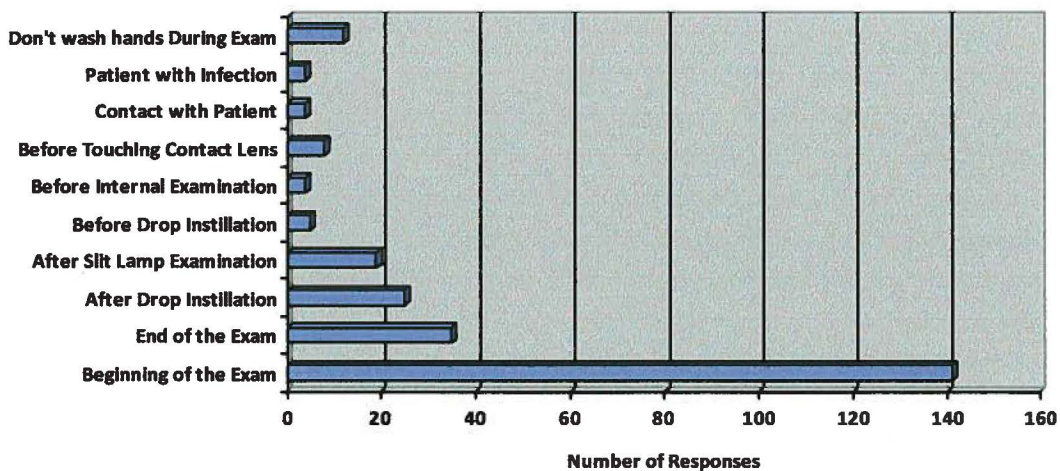


Figure 4 Hand Washing during Exam

Method of Turning Off the Faucet

Most of the optometrists stated that when they turn off the faucet they use some part of their hand, with 28.4% using the front of the hand and 36.1% using the back of the hand. It was reported that 20.7% use a paper towel to shut off the faucet and 1.78% use the elbow and another 1.78% use a combination of the paper towel and the back of the hand.

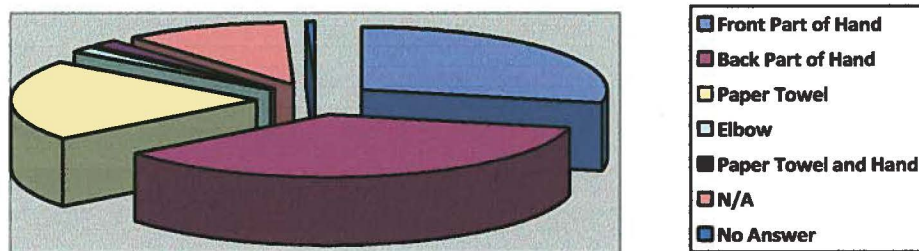


Figure 5 Method of Turning off Faucet

Reasons for Not Washing

The majority of those surveyed, 38.5%, reported this question was not applicable or that they always washed their hands. The next two most frequent responses were that the practitioner did not feel it was necessary (17.75%) or that the practitioner was too busy (17.16%). Some stated the hand washing made their hands dry and irritated (7.7%), while others indicated it was because of the location of the sinks (4.73%). The most common write-in response was that they simply forgot (5.9%). This was followed by the response that it was unnecessary

because they had not touched the patient (1.8%). Eleven of the 169 optometrists reported a combination of 2 or more of the above reasons.

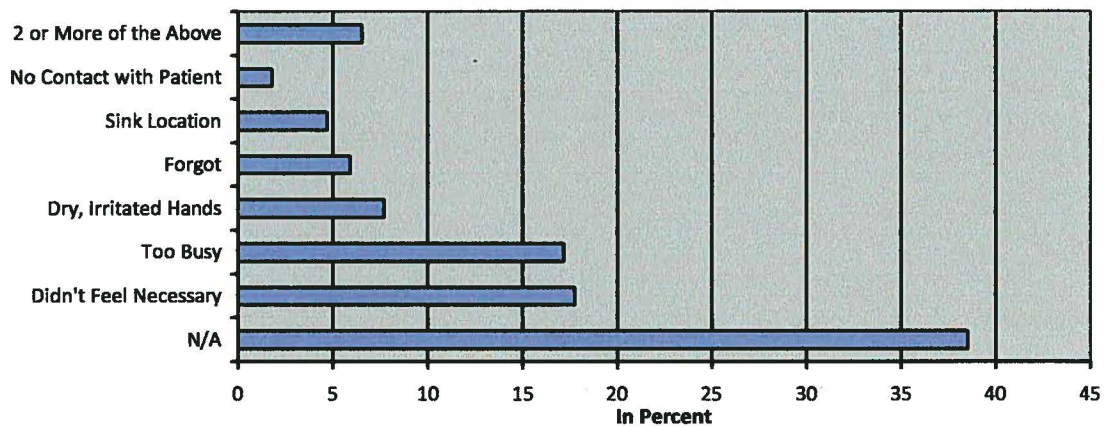


Figure 6 Reasons for Not Hand Washing

Familiarity with Guidelines

Of the optometrists surveyed 107, or 63.3%, were not familiar with the CDC Guidelines for Hand Hygiene. Of the remaining 36.7% reporting that they were familiar with the guidelines, 56.5% stated they followed the guidelines most of the time while 30.7% said they followed the guidelines some of the time and only 12.9% used the guidelines all of the time.

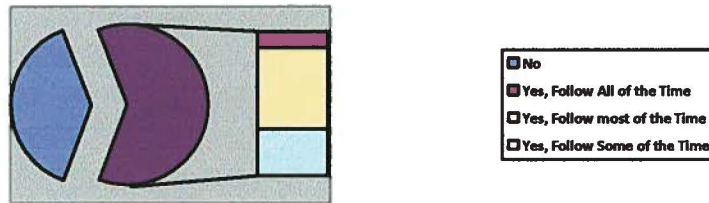


Figure 7 Familiar and Follow Guidelines

Practice Mode and Reminders

Most of the optometrists replying to the survey were involved in a private practice, which made up 79.3% of the optometrists. Commercial optometrists accounted for 19.5% of those surveyed, one optometrist being in an educational setting, and one optometrist choosing not to answer. Within those practices, only a total of five, or 3%, had hand washing reminders.

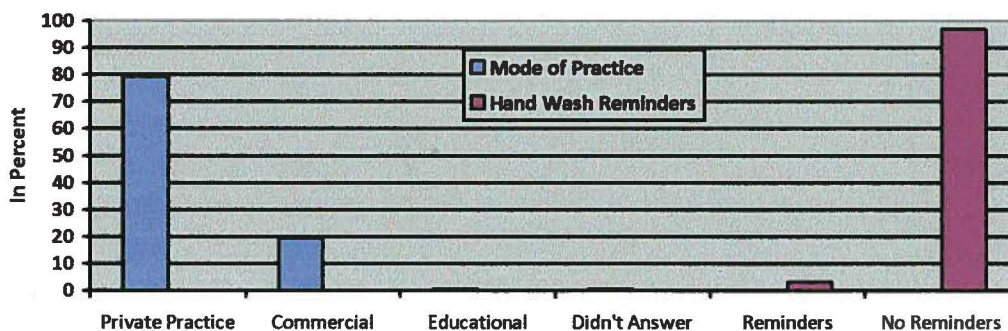


Figure 8 Practice Mode and Hand Washing Reminders

Disinfection Between Patients

68.4% reported disinfecting their optometric equipment in between every exam.

The others reported disinfecting most of the time (17.8%) and occasionally (11.8%). Only one person reported never disinfecting between patients and two chose not to answer.

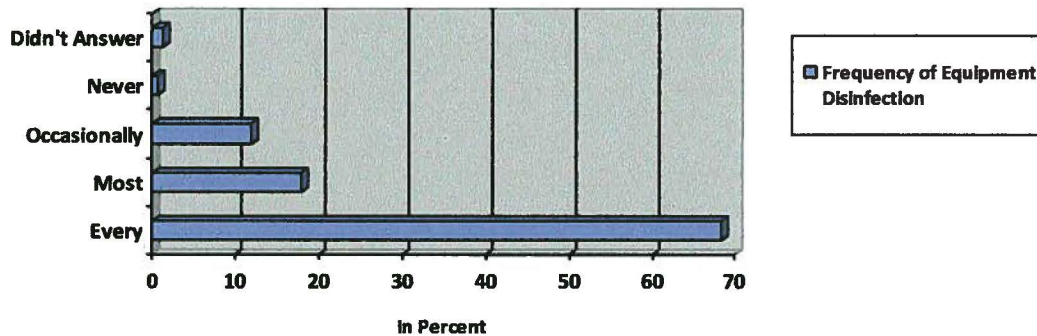


Figure 9 Disinfection between Patients

Methods for Disinfection

The majority of the optometrists disinfected their equipment with alcohol (85.8%). A few stated they use alcohol and hydrogen peroxide (7.1%). Other methods used included peroxide only, cavicide only, or a combination of alcohol and cavicide, with each category accounting for 1.18%. One person chose to use soap, another used a combination of Optive and alcohol, and yet another used a combination alcohol and 15% formaldehyde. Three people didn't answer this question.

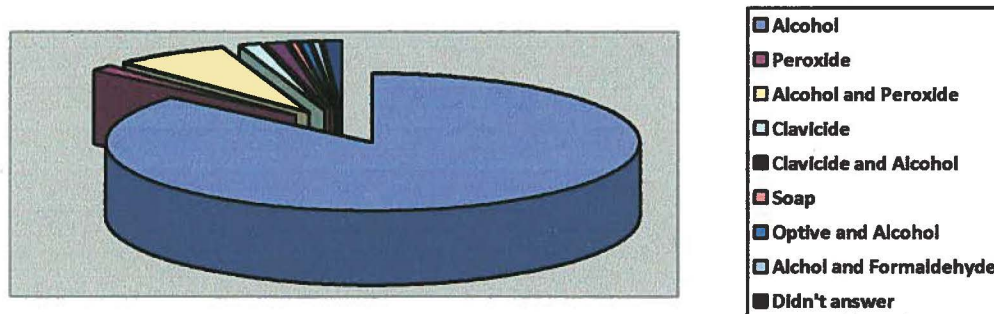


Figure 10 Methods of Disinfection

DISCUSSION

Of all optometrists surveyed, 63.31 % stated that they were not familiar with the CDC guidelines for proper hand washing. This suggests that more education on proper hand washing protocol needs to be taught in optometric education and continuing education courses. It is possible for an eye care provider to be unfamiliar with CDC hand hygiene guidelines and still practice proper hand hygiene, but increased education of correct protocol would likely increase compliance with hand washing.

Most of the optometrists in this study use either or both of the two methods recommended by the CDC. A majority of optometrists surveyed (79.23%) stated that they use soap and water as their method of hand sanitization and 11.24% use an alcohol-based hand rub. The use of an alcohol based hand rub is as effective as soap and associated with increased compliance.³ Approximately

7.7% surveyed stated the use of both methods. The CDC recommends washing with soap (either antimicrobial or non-antimicrobial) and water for visibly soiled hands. It is acceptable to use an alcohol-based hand rub for hands that are not visibly soiled.⁴

Optometrists following the CDC guidelines should wash their hands before direct contact with a patient, after direct contact with patient or non-sterilized inanimate objects in the exam room and after moving from a contaminated-body site to a clean-body site during patient care.⁴ There is foreseeable variability in the frequency of the aforementioned situations when comparing practitioners with one another. For example, a practitioner who is performing a contact lens exam may need to perform hand washing more frequently since he/she may have to touch more inanimate objects (contact lens packaging or contact lens solution containers) in between direct patient contact. Also, a provider may pause to write (with a non-sterile pen) in the patient's chart more frequently during an exam than another provider. In this survey, respondents most often (66.27%) answered that they wash once during an eye exam. With 88.17% answering that they wash their hands at the beginning of the exam, it appears that the most common hand washing practice, in this group, is to wash hands once at the beginning of the exam and not again until the next patient. We did not inquire about the exam sequencing in this survey, thus we cannot

determine if these respondents failed to wash again when indicated by the CDC guidelines. A surprising 9.47% answered that they do not wash their hands at all during an eye exam. This response may be misinterpreted due to wording of the question. Multiple respondents choose “zero” as their choice but wrote in next to the question that they wash once before entering the exam room. Therefore, some surveyed took “during” the exam to mean once the exam started while others interpreted as any time before coming in contact with a patient. Direct patient contact and contact with medical equipment are both frequent occurrences during an eye exam and the amount of each will vary with each individual’s examination procedures and sequence. The most frequent response (88.17%) to when hands are washed was “at the beginning of the exam.” The second most common response (20.17%) was “after the exam.” Other common responses included after drops (14.79%), after slit lamp exam (11.24%), and when infection is suspected (2.37%). These smaller percentages may indicate that the majority of these optometrists surveyed do not wash their hands as frequently or at the appropriate times as the CDC hand hygiene guidelines would indicate.

When washing with soap and water, one should rub hands together for at least 15 seconds.⁴ None surveyed gave this response. Instead, the top two responses were 10 or less (56.66%), 10 seconds (44.0%) and 20 or more seconds (42.65%). Over half of respondents did not properly wash their hands with soap and water and as a result do not effectively remove bacteria from their hands

before or after direct patient contact. To properly use alcohol-based hand rubs one should apply enough product to take at least 15 seconds to dry completely on the hands. Approximately 54.54% of those surveyed responded that they rub their hands together for 10 seconds or less when using an alcohol-based hand rub. Consequently, over half of respondents are not properly performing hand hygiene when using an alcohol-based hand rubs before direct patient contact. Less than one third of those surveyed chose the correct response of “until dry”.

The CDC hand-hygiene technique when using soap and water includes turning off the faucet by using the disposable towel employed to dry the hands.⁴ Only 20.17% of those surveyed stated that they use this method. Most respondents (36.09%) answered that they used the back of their hand to turn of the faucet. Over 70% of those surveyed are not using the CDC’s recommended technique for hand washing with soap and water.

For those respondents reporting *never* having washed their hands prior to examining a patient, the most common reasons cited included “not necessary” at 17.75%, followed closely by “too busy” at 17.16%. These responses were found to be the most common only after factoring out all responses of “not applicable.” In other words, 38.46% of those surveyed stated that they had never missed a hand washing before examining a patient.

Most surveyed (85.80%) stated that they disinfect their ophthalmic equipment in between “every” patient. Approximately 17.8% of those surveyed

answered that they disinfect between “most” patients, 11.83% replied “occasionally”, and 0.59% replied “never”. The most common method for equipment disinfection cited by respondents was alcohol. Both alcohol and peroxide were methods used by 7.1% of those surveyed. Ethyl alcohol, at concentrations of 60%–80%, is a potent virucidal agent inactivating all of the lipophilic viruses and many hydrophilic viruses.⁵ Commercially available 3% hydrogen peroxide is a stable and effective disinfectant when used on inanimate surfaces.^{5,6}

CONCLUSION

A majority of respondents to this survey indicated use of the proper methods (soap and water or alcohol-based hand rubs) of hand hygiene. A large portion of this small subset of Michigan optometrists lacks knowledge of when hand hygiene is necessary and the proper technique with which to perform it. This is true only when evaluating their hand hygiene habits using the CDC’s guidelines and is not implying that those surveyed do not effectively prevent the spread of infection among their patient base when using their own professional judgment.

According to the CDC, when using soap and water, the hands are wetted first, followed by the application of anti-microbial soap and vigorous hand

rubbing for at least 15 seconds covering all surfaces of the hands and fingers. Hands must then be rinsed with water and dried thoroughly with a disposable towel; the towel is then used to turn off the faucet. Avoiding hot water may help reduce the risk of dermatitis. When using an alcohol-based hand rub, the product is applied to one palm and the hands are rubbed together covering all surfaces until hands are dry.²

Appropriate instrument disinfection should be performed on instruments that come in contact with the patient after each use. According to the American Optometric Association (AOA), most ophthalmic instruments can be disinfected by immersion for 10 minutes in 3% hydrogen peroxide, a 1/10 dilution of bleach, or 70% ethanol or isopropyl alcohol. The device should be thoroughly rinsed in water and air dried.⁷

Optometrists are expanding their scope of practice in the treatment and the management of eye diseases and injuries; this in turn increases the techniques and procedures that pose an increased risk for transmission of infectious diseases within optometric practices. Optometrists need to pay more attention to simple things such as hand washing and equipment disinfection in order to minimize the transfer of infections between patients.

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APPENDIX A

Survey

1. Which method below best describes how you wash your hands?
 - a. Water only
 - b. Antibacterial soap and water
 - c. Alcohol-based hand rub

2. How many times do you wash your hands during a comprehensive eye exam?
 - a. 0
 - b. 1
 - c. 2
 - d. 3
 - e. Other _____

3. If you use a soap and water method, approximately how long do you wash your hands?
 - a. 5 secs
 - b. 10 secs
 - c. 20 secs
 - d. 30 secs
 - e. Other _____

4. If you use an alcohol-based rub, approximately how long do you rub your hands together?
 - a. 5 secs
 - b. 10 secs
 - c. 20 secs
 - d. 30 secs
 - e. 60 secs
 - f. until my hands are dry

5. At which time during the examination do you commonly wash your hands? (circle all that apply)
- a. At the beginning
 - b. After slit lamp examination
 - c. After inserting drops
 - d. After the examination is complete
 - e. Other(s) _____
6. How do you shut the water off when you are finished washing your hands?
- a. Does not apply, hand sanitizer or auto shut-off faucet
 - b. With the front part of my hand
 - c. With the back part of my hand
 - d. With the paper towel
7. If you have ever not washed your hands before or after performing an eye exam, which of the following best explains why?
- a. cleaning irritates or dries your skin
 - b. sink location/accessibility
 - c. too busy/lack of time
 - d. didn't think it was necessary
 - e. other _____
8. Are you familiar with the CDC guidelines for proper hand washing?
Yes/No
If yes, how often do you follow the guidelines?
- a. all of the time
 - b. most of the time
 - c. some of the time
9. Does your practice setting have hand washing reminders or posters placed near patient encounter areas? Yes/No

10. Which of the following best describes the setting in which you practice?
- a. Private practice
 - b. Commercial practice
 - c. Hospital setting
 - d. Other _____
11. How often do you disinfect your equipment between patients?
- a. Every time
 - b. Most of time
 - c. Occasionally
 - d. Never (only at the beginning of the day)
12. What methods do you use to disinfect your equipment?
- a. Alcohol
 - b. Peroxide solution
 - c. Soap and water
 - d. Kleenex with no solution