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Inside this issue:

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Assessing Knowledge, Attitudes, and Usage of Personal Protective Equipment in Miami-Dade Infection Control and Hospital Emergency Departments

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Introduction

Personal protective equipment (PPE) is any equipment used to protect oneself from hazards that can cause serious workplace injuries and/or illnesses (World Health Organization, 2014; Centers for Disease Control and Prevention, 2015). When used correctly, the equipment acts as a barrier between the infectious individual or objects and the health care worker.

Depending on the suspected diagnosis, proper PPE must be used while the worker is in contact with the infected patient. The Occupational Safety and Health Administration (OSHA) categorizes PPE into four levels which are based on the amount of protection that is required as shown in Table 1 (U.S. Department of Health & Human Services, 2017). In addition to using the proper equipment during a procedure, the health care worker must correctly apply (don) and remove (doff) the PPE in order to prevent exposure and/or transmission. The correct sequence of donning is gown, mask/respirator, goggles/face shield, and gloves. The correct sequence of doffing is gloves, goggles/face shield, gown, and mask/respirator (CDC, 2015). The mask/respirator is removed once the health care worker leaves the patient's room. Additional of donning and doffing steps are required when one uses Level C PPE; these steps are listed in Table 2.

It is imperative that health care workers follow the proper use of PPE, especially when taking care of a patient who is highly infectious. If proper PPE is not used correctly, transmission can occur between the health care worker and the patient, as in the instance of the Ebola Virus cluster that occurred in Dallas, Texas in 2014 (CDC, 2014). In order to prevent exposure transmission and/or death, hospitals are required to provide comprehensive and ongoing training and demonstrations on how to correctly don and doff PPE, how to select the correct type of level of PPE needed with each patient, and provide all supplies with the correct sizes (CDC, 2015).

In response to the Ebola virus cluster in 2014, this project was developed to evaluate the knowledge, attitudes, and usage of PPE in emergency departments across Miami-Dade County. With the data obtained, public health professionals can evaluate the effectiveness of PPE training and the strengths and weaknesses of how well the emergency department staff knows how to correctly apply PPE, and how frequent they use PPE. The results of this study will aid in the development of recommendations to increase, or maintain, the appropriate use of PPE in a hospital setting throughout Miami-Dade County.

Table 1: Levels of PPE and corresponding required equipment (U.S. Department of Health & Human Services, 2017).

Levels of PPE	Severity of the Exposure	Type of Equipment Required
Level A (Highest Level of Protection)	Unknown exposure Greatest potential of exposure Greatest level of skin, respiratory, and eye protection	Positive pressure, full face-piece self-contained breathing apparatus (SCBA) or positive pressure supplied air respirator with escape SCBA Totally encapsulated chemical- and vapor-protective suit Inner and outer chemical-resistant gloves Disposable protective suit, gloves, and boots
Level B	Greatest respiratory protection, lesser level of skin protection	Positive pressure, full face-piece self-contained breathing apparatus (SCBA) or positive pressure supplied air respirator with escape SCBA Inner and outer chemical-resistant gloves Face shield Hooded chemical resistant clothing Coveralls Outer chemical-resistant boots
Level C	Exposure is known Respiratory protection is known	Full-face air purifying respirators Inner and outer chemical-resistant gloves Hard hat Escape mask Disposable chemical-resistant outer boots
Level D (Least level of Protection)	No known hazard in the atmosphere Minimum protection required	Gloves Coveralls Safety glasses Face shield Chemical-resistant, steel-toe boots or shoes

Methods

The survey was created using the online survey platform, SurveyMonkey. The survey was distributed to all 23 Miami-Dade County hospitals which maintain an emergency room. Out of the 23 locations, 15 hospitals completed the survey; the majority of submissions came from two large hospital systems. The survey included 19 questions about HCWs' training on PPE, retained knowledge and attitudes about PPE, and usage of PPE during patient interaction; 11 asked about knowledge of PPE, including the proper sequence of donning and doffing level C PPE, two questions were based on the participant's attitude on PPE use, four questions were based on PPE usage during patient care, and the remaining two were based on the amount of training HCWs received. The staff who received the survey were physicians, physician assistants, nurse practitioners, nurses, intensive care nurses, medical technicians, infection control practitioners (ICP), and financial representatives. Participants had a two-week time period to complete the survey.

For analysis purposes, the occupation was divided into three groups; Physicians/Nurses, ICP, and "Other". The "Other" group includes medical and lab assistants and administrative staff. Although a majority of ICP are registered nurses, ICP were grouped separately from nurses because they rarely interact with patients in the hospital. Using Statistical Analysis System (SAS) 9.4, 15 of the 19 questions were scored using a binary outcome in which participants received a "1" for every correct answer. However, the two questions regarding donning and doffing had a weight of 3 points each since it required the participant to spend more time in selecting the correct sequence. Answers to the remaining two questions regarding

Table 2: The sequence of donning and doffing for Level C PPE (CDC, 2015).	
Sequence of Donning	**Sequence of Doffing**
Engage a trained observer Remove personal clothing and items Inspect PPE to make sure it is not compromised/ Damaged Hand Hygiene Boot/Show Covers Inner gloves Impermeable gown N95 Respirator Surgical Hood Face Shield Outer gloves	Have a monitor in place, wearing proper PPE, to observe and assist with your PPE removal Using bleach wipes, clean outer gloves Remove outer gloves and dispose of them, along with bleach wipes, in the biohazard bag Using bleach wipes, clean the inner gloves Using bleach wipes, beginning at the top, wipe the full face shield, the additional hood, and the coverall suit Remove the face shield, lifting up and to the front, and hand to your monitor for further disinfection Using bleach wipes, again, clean the inner gloves Unzip and carefully remove the coverall suit, starting at the neckline, folding and rolling inside out, away from the body and down to the ankles Bleach wipe the inner gloves again Place the suit and booties into the biohazard bag Bleach wipe the inner gloves again Remove the N-95 Mask and place in the biohazard bag Using bleach wipes, again, clean inner gloves Slowly remove the inner gloves using the glove in glove technique and place into the biohazard bag Use hand sanitizer immediately, followed by hand washing with soap and water

number of trainings received by HCWs were tallied numerically. The maximum score a participant can receive on the survey is 21. Considering the questions that include “check all that apply”, participants must answer all the correct answer choices to receive the point. The overall total score of the survey displayed a normal distribution, which allowed us to perform an ANOVA table. The p-value from the ANOVA exceeds the .05 alpha threshold used among all the occupation groups.

Results

Of 83 surveys received, 37 had completed data. Thus, incomplete surveys were removed prior to analyzing the data. Out of the 37 remaining participants, 17 were Physicians/Nurses, 13 were ICP, and seven fell in the “Other” category. Out of the 17 Physicians/Nurses, only four participants from this group were physicians. The average total score from all the participants was 13.36 with a standard deviation of 1.90. The maximum score a participant obtained was 16.52 and the minimum score was 8.84.

Participants had an average score in PPE knowledge. Out of a maximum possible points of 15; Physicians/Nurses average score was 7.9, ICP average score was 7.67, and “Other” average score was 6.78. The donning and doffing questions each had a maximum score of three. For the donning Level C PPE sequence question, Physicians/Nurses had an average score of 1.06, ICP average score was 1.45, and “Other” was 1.13. For the doffing Level C PPE sequence question, Physicians/Nurses had an average score of 1.14, ICP average score was 1.07, and “Other” average was 0.94.

All three occupation groups scored similarly in their attitude towards PPE use during patient care. With a maximum point of two, Physicians/Nurses average score was two, ICP average score was 1.85, and “Other” was 1.86. Overall, all participants scored similarly for using PPE correctly during patient care. With a maximum point of four; Physicians/Nurses average score was 3.82, ICP average score was 3.92, and “Other” was 3.71. 94.5% of the participants attended standard PPE training sessions at least “one to two times per year”, 47.1% of staff who attended training were Physicians/Nurses. These hospitals also provide Level C PPE training annually which 97.3% of the participants attended in these training sessions.

Discussion

There were no significant differences in PPE knowledge, attitudes, and usage among Physicians/Nurses, ICP, and “Other” ($p>.279$). There were also no significant differences in PPE knowledge, attitudes, and usage between the two groups of Physicians/Nurses and ICP, ($p>.6746$).

Overall, each occupation group believed in the effectiveness of PPE and the majority used PPE during patient interaction; however, all groups scored average for PPE knowledge. Despite receiving periodic PPE training, there were important knowledge gaps in HCWs, especially regarding the concepts of donning and doffing. This is concerning in that some health care workers considered using PPE to be a burden.

Even though the sample size was small, we were able to obtain a snapshot of the overall knowledge, attitudes, and usage of PPE in the emergency departments in Miami-Dade County. This shows that there is very little difference of knowledge, attitudes, and usage among the groups when it comes to PPE usage in the emergency department.

Limitations

This survey had several limitations. The first limitation is the small sample size. After removing the incomplete surveys, there were only 37 participants. With the small sample size, it is difficult to generalize these finding to all emergency room staff. The second limitation is the type of participants who completed the surveys. More ICP and nurses completed the survey than did physicians. Considering that the survey was intended to evaluate health care workers with most direct patient contact, it is concerning to have had such a low physician participation. The third limitation is the overall scoring for each question. The questions that include the "check all that apply" option were scored based on whether the participant fully answered the question right or not; there was no partial credit given. Thus, the overall score may be low because the participant may have answered an extra answer choice that did not apply, or did not select all the one that applied. The fourth limitation is the answer choices that were available for the donning and doffing questions. Since the Ebola Virus outbreak, the CDC has updated the sequence of level C PPE. The survey includes an older version of the sequence that does not include some of the steps that is listed in table two. This may be due to the delay in survey administration since there were several people involved in the project. Thus, there were answer choices missing in these two major questions.

Conclusion and Recommendations

According to the standard regulation 1910.132 from Occupational Safety and Health Standards, employees who directly work and respond to hazardous substances are required to have at least 24 hours of training when they are first hired. Other employees who do not have a direct response, but still provide care to anyone nearby, require eight hours of training when first hired. After the initial training is complete, refresher training is required to be performed annually and employees must receive a certificate as proof of training completion (United Department of Labor, 2013).

It is important to provide information regarding infectious disease and the proper use of PPE to the staff in the emergency department in order to prevent the spread of infectious diseases. In order to ensure that the staff correctly don and doff PPE, educational flyers on how to correctly don and doff PPE can be provided to the hospitals. Flyers can be found on the CDC's web-site at: https://www.cdc.gov/vhf/ebola/healthcare-us/ppe/guidance.html. The ICP of each hospital can hang the flyers by the nurses' station and where the hospital stores their equipment. This will allow physicians, nurses, and/or the medical technicians to reference the sequence and verify that their colleague is applying the equipment properly prior and after examining a patient. Hospitals may consider implementing in-person training in addition to computer training for PPE knowledge and usage for refreshing sessions. This will allow the HCWs to role play a scenario and allow them to practice the sequence in front of a trained observer. In addition, a joint work with hospital Infection Control and Clinical Education are recommended to identify and fill the gaps in PPE knowledge.

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References

Centers for Disease Control and Prevention. (2014). *Ebola virus disease cluster in the United States – Dallas county, Texas, 2014.* Atlanta: Morbidity and Mortality Weekly Report.

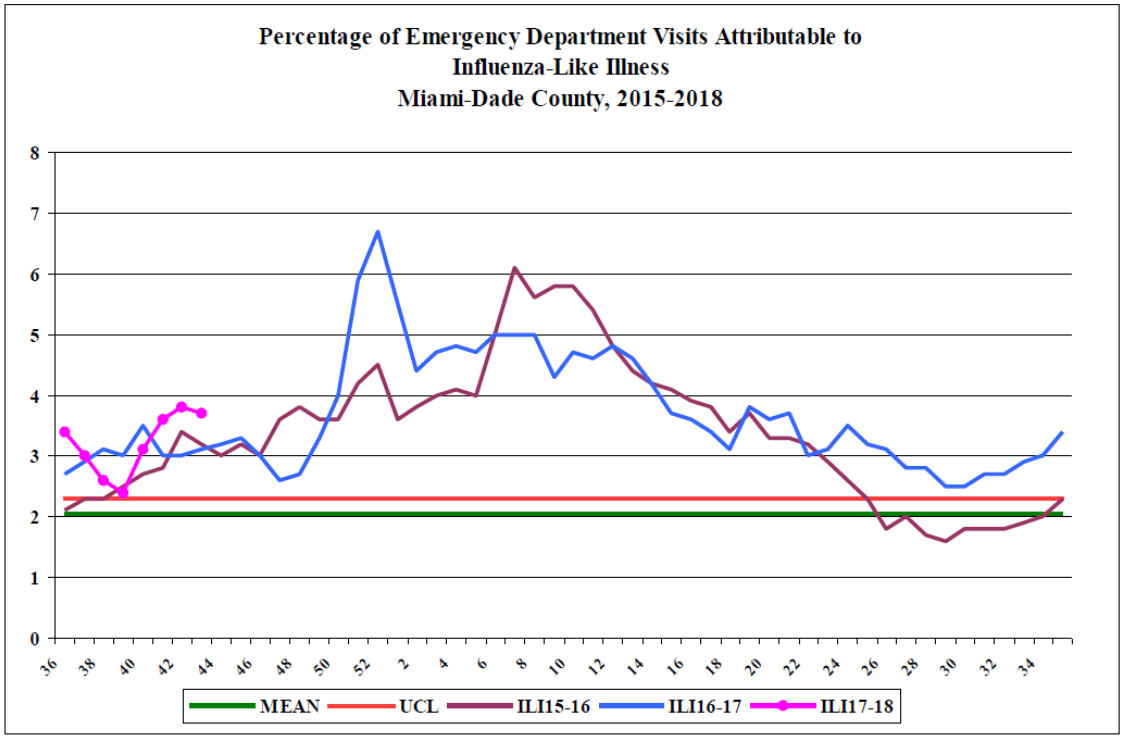
Centers for Disease Control and Prevention. (2015). *Guidance for the selection and use of personcal protective equipment (PPE) in healthcare settings.* Atlanta: Centers for Disease Control and Prevention.

US Food & Drug Administration. (2016, April 7). *Personal protective equipment for infection control*. Retrieved from US Food & Drug Administration: http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/GeneralHospitalDevicesndSupplies/PersonalProtectiveEquipment/default.htm

World Health Organization. (2014, October 31). *WHO updates personal protective equipment guidelines for Ebola response*. Retrieved from World Health Organization: http://www.who.int/mediacentre/news/releases/2014/ebola-ppe-guidelines/en/

U.S. Department of Health & Human Services. (2017, February 22). *PPE classification system from OSHA and EPA*. Retrieved from Radiation Emergency Medical Management: https://www.remm.nlm.gov/osha_epa_ppe.htm

Influenza-Like-Illness, All Age



During this period, there were 31,025 ED visits; among them 1,161 (3.7%) were ILI. At the same week of last year, 3.1% of ED visits were ILI.

TO REPORT ANY DISEASE AND FOR INFORMATION CALL:
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Hepatitis 305-470-5536
Immunizations or outbreaks 305-470-5660
HIV/AIDS Program 305-470-6999

STD Program 305-575-5430
Tuberculosis Program 305- 575-5415

Immunization Service 305-470-5660

To make an appointment.....786-845-0550

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Florida Department of Health in Miami-Dade County NEEDS Influenza Sentinel Providers!

Sentinel providers are key to the success of the Florida Department of Health's Influenza Surveillance System. Data reported by sentinel providers gives a picture of the influenza virus and ILI activity in the U.S. and Florida which can be used to guide prevention and control activities, vaccine strain selection, and patient care.

- Providers of any specialty, in any type of practice, are eligible to be sentinel providers.
- Most providers report that it takes **less than 30 minutes a week** to compile and report data on the total number of patients seen and the number of patients seen with influenza-like illness.
- Sentinel providers can submit specimens from a subset of patients to the state laboratory for virus isolation **free of charge**.

For more information, please contact

Lakisha Thomas at 305-470-5660.

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The Epi Monthly Report is a publication of the Florida Department of Health in Miami-Dade County: Epidemiology, Disease Control & Immunization Services. The publication serves a primary audience of physicians, nurses, and public health professionals. Articles published in the Epi Monthly Report may focus on quantitative research and analysis, program updates, field investigations, or provider education. For more information or to submit an article, please contact Emily Moore at (305) 470-6918.

Miami-Dade County Monthly Report
Select Reportable Disease/Conditions
September 2017

Diseases/Conditions	2017 Current Month	2017 Year to Date	2016 Year to Date	2015 Year to Date
HIV/AIDS				
AIDS*	2	287	415	353
HIV	24	893	1215	1011
STD				
Infectious Syphilis*	19	276	313	237
Chlamydia*	551	9119	9239	7552
Gonorrhea*	190	2479	2128	1483
TB				
Tuberculosis**	12	74	75	79
Epidemiology, Disease Control & Immunization Services				
Epidemiology				
Campylobacteriosis	50	495	456	508
Chikungunya Fever	0	0	0	22
Ciguatera Poisoning	0	7	4	15
Cryptosporidiosis	4	32	22	36
Cyclosporiasis	0	4	2	3
Dengue Fever	1	4	13	16
Escherichia coli, Shiga Toxin-Producing	0	21	7	14
Encephalitis, West Nile Virus	0	0	0	0
Giardiasis, Acute	9	100	156	142
Influenza Novel Strain	0	0	0	0
Influenza, Pediatric Death	0	1	0	0
Legionellosis	8	31	14	20
Leptospirosis	0	0	0	1
Listeriosis	0	6	5	2
Lyme disease	0	4	2	4
Malaria	0	5	8	6
Meningitis (except aseptic)	3	7	2	6
Meningococcal Disease	1	7	0	6
Salmonella serotype Typhy (Typhoid Fever)	1	2	1	2
Salmonellosis	98	570	511	492
Shigellosis	5	0	0	0
Streptococcus pneumoniae, Drug Resistant	2	21	3	1
Vibriosis	0	4	7	15
West Nile Fever	0	0	0	0
Immunization Preventable Diseases				
Measles	0	0	4	0
Mumps	0	2	4	3
Pertussis	5	31	21	27
Rubella	0	0	0	0
Tetanus	0	0	0	0
Varicella	5	30	61	41
Hepatitis				
Hepatitis A	10	92	33	31
Hepatitis B (Acute)	1	23	16	12
Healthy Homes				
Lead Poisoning	7	63	72	63

*Data is provisional at the county level and is subject to edit checks by state and federal agencies.

** Data on tuberculosis are provisional at the county level.