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Introduction: Influenza is a global health problem annually resulting in excess mortality and morbidity. Vaccination is a well-established preventative measure for influenza, and is especially encouraged in healthcare workers to prevent passing disease onto patients.

Objective: The objective of this study was to use employee vaccination data to assess factors associated with vaccination uptake among workers at a large, healthcare institution in California during the seasons of 2006-2007 through 2011-2012.

Methods: A combined cohort and cross sectional study design was utilized for this study. Basic descriptive analyses were used to describe vaccination rates and reasons for vaccination declination by important subgroups. A logistic regression model was fit to examine factors (i.e., age, gender, job category, and work department) associated with vaccination uptake.

Results: The vaccination rates increased from 48% in 2006-2007 to 74.9% in 2011-2012. During the 2009 influenza pandemic, 72% of employees got the seasonal flu vaccine compared to 68% who got the 2009 H1N1 vaccine. The most common reason for declination across all job categories was “personal reasons” (58%), followed by “I get ill from the flu vaccine” (16%). Using data from the 2011-2012 season, we found that vaccination rates varied by age (OR=1.005) and employee type (nursing assistants compared with nurses, OR =1.408), and location (working in a procedure area compared with working in med surg, OR= .840)

Conclusion: The identification of factors related to vaccination uptake is an important step in developing targeted strategies to increase compliance with vaccination recommendations.

Learning Objectives

Describe the vaccination patterns among employees from a large healthcare system in San Diego. Identify factors that are related with vaccination uptake among healthcare workers. List reasons for vaccination declination among healthcare workers.

Summary of Sample Included for Analysis

Cases	N	%
Included cases	15227	81
Missing cases	3573	19
Total	18800	100

Results for RQ1 Summary of Vaccination Rates for the Previous Six Seasons

Season	Seasonal vaccination rate	Compliance	2009 H1N1 Vaccination rate	2009 H1N1 compliance rate
2006-2007	48.0%	missing	n/a	n/a
2007-2008	59.0%	85.0%	n/a	n/a
2008-2009	67.3%	93.2%	n/a	n/a
2009-2010	72.0%	93.0%	68.0%	91.0%
2010-2011	73.0%	94.0%	n/a	n/a
2011-2012	74.9%	100.0%	n/a	n/a

Demographic and Vaccination Characteristics of HealthCare Workers for the 2011/2012 Flu Season Including Unadjusted p values and Odds Ratios

	n	%	Vaccinated (%) n (%)	Not vaccinated n (%)	P- value	OR
Gender	15227	100	11407 (74.9)	3820 (25.1)		
Female	12036	79	9050 (75.2)	2986 (24.8)	.124	1.072
Male	3191	21	2357 (73.9)	834 (26.1)		
Age	15227	100	11407 (74.9) <i>M=42.20,SD=11.6</i>	3820 (25.1) <i>M=42.66,SD=12.37</i>		
19-34	4382	28.8	3301(75.3)	1081(24.7)	.041	1.003
35-49	5634	37	4119 (73.0)	1514 (27.0)		
50-64	4620	30	3505 (75.9)	1111 (24.0)		
>65	596	4.2	482 (80.9)	114 (19.1)		
Job Class	15227	100	11407 (74.9)	3820 (25.1)	.000	
Administrative	4831	31.8	3574 (74.0)	1257 (26.0)	.017	.896
Allied Health	1910	12.5	1357 (71.0)	553 (29.0)	.000	.773
Nursing/Support	1452	9.5	1180 (81.3)	272 (18.7)	.000	1.367
Other	1775	11.7	1297 (73.1)	478 (26.9)	.012	.855
Nursing	5259	34.6	3999 (76.0)	1260 (24.0)		ref
Department	15227	100	11407 (74.9)	3820 (25.1)	.000	
ED	781	5.1	577 (73.9)	204 (26.1)	.040	.823
ICU	538	3.5	433 (80.5)	105 (19.5)	.125	1.201
L&D	836	5.5	641 (76.7)	195 (23.3)	.643	.957
NICU	298	2.0	238 (79.9)	60 (20.1)	.345	1.155
Oncology	177	1.2	137 (77.4)	40 (22.6)	.987	.997
Other	5137	33.8	3804 (74.0)	1333 (25.9)	.001	.831
Multi/Location	2493	16.4	1859 (74.6)	634 (25.4)	.018	.854
Procedure Areas	2510	16.5	1815 (72.3)	695 (27.7)	.000	.760
Med/Surg	2457	16.0	1903 (77.5)	554 (22.5)		ref

Reason for declination by important job category

Reason for declination	Administrative (%)	Allied Health	Nursing Support	Other	Nursing	Total
Don't believe in vaccines	39 (3.1)	9 (1.6)	4 (1.5)	18 (3.8)	29 (2.3)	99 (2.6)
Don't Need	113 (9.0)	47 (8.5)	18 (6.6)	44 (9.2)	69 (5.5)	291 (7.6)
Fear of Needles	47 (3.7)	13 (2.4)	6 (2.2)	25 (5.2)	22 (1.7)	113 (3.0)
I get sick from flu vaccine	200 (15.9)	68 (12.3)	67 (24.7)	80 (16.7)	202 (16.0)	617 (16.2)
Medical Reasons	107 (8.5)	50 (9.0)	26 (9.6)	37 (7.7)	144 (11.4)	364 (9.5)
Personal Reasons	706 (56.2)	349 (63.1)	140 (51.5)	261 (54.6)	774 (61.4)	2230 (58.4)
Vaccine doesn't Work	29 (2.3)	9 (1.6)	9 (3.3)	8 (1.7)	11 (0.9)	66 (1.7)
Vaccine Program is Inconvenient	16 (1.3)	8 (1.4)	2 (0.7)	5 (1.0)	9 (0.7)	40 (1.0)
Total	1257	553	272	478	1260	3820

Logistic regression output

	B	S.E	Wald	df	Sig	Odds Ratio	95% C.I for OR Lower	95% C.I for OR Upper
Age	.005	.002	8.571	1	.003	1.005	1.002	1.008
Male	.013	.047	.073	1	.787	1.013	0.924	1.110
Job			41.083	4	.000			
Admin	-.065	.060	1.197	1	.274	.937	.834	1.053
Allied	-.226	.072	9.758	1	.002	.798	.692	.919
Nsg/Supp	.342	.076	20.392	1	.000	1.408	1.214	1.634
Other	-.117	.071	2.666	1	.103	.890	.774	1.024
Dept			19.999	8	.010			
ED	-.145	.095	2.303	1	.129	.865	.718	1.043
ICU	.221	.120	3.400	1	.065	1.247	.986	1.577
L&D	-.004	.096	.002	1	.966	.996	.826	1.201
NICU	.184	.153	1.450	1	.229	1.202	.891	1.623
ONCO	-.027	.187	.020	1	.887	.974	.676	1.404
Other	-.079	.070	1.254	1	.263	.924	.805	1.061
MULTI	.006	.077	.007	1	.934	1.006	.865	1.171
PROCE	-.174	.070	6.129	1	.013	.840	.732	.964
Constant	.976	.093	111.177	1	.000	2.653		