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On-site influenza vaccination arrangements improved influenza vaccination rate of employees of a tertiary hospital in Singapore

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Background: On-site vaccination arrangements were introduced in 2005 to improve influenza vaccination rate among employees of a 1500-bed tertiary hospital in Singapore.

Methods: On-site arrangements include mobile teams to 3 distant departments and same-service area vaccination for employees at 4 service areas.

Results: Influenza vaccination rate in 2005 was 66.4% (versus 56.8% in 2004, odds ratio 1.50, 95% confidence interval 1.39–1.62). Employees who attended on-site arrangements had higher influenza vaccination rate (97.0%).

Conclusion: On-site vaccination arrangements improved influenza vaccination rate among hospital employees. (Am J Infect Control 2007;35:481-3.)

In equatorial Singapore, influenza occurs year round with mild increases in incidences from April to July and November to January. In Singapore, the annual disease burden of influenza is estimated to be 630,000 cases,¹ and influenza is associated with an annual death rate from all causes of 14.8 per 100,000 years, a figure comparable with observations in the United States.²

Hospital employees are at greater risk of contracting influenza in their work area as well as spreading it. Hospital employees are a source of influenza virus with seroprevalence as high as 23% among acute care hospitals' health care workers,³ putting patients at risk of contracting influenza.

Influenza vaccination for health care personnel is recommended by US Centers for Disease Control and Prevention.⁴ Compliance with influenza vaccination by health care workers was associated with significant reductions in laboratory confirmed cases of

both influenza among health care workers and nosocomial influenza among hospitalized patients.⁵ However, the influenza vaccination rate among health care workers remained low, at approximately 34% in the United States,⁶ though self-reported influenza vaccination rate among physicians could be as high as 87%.⁷

Various strategies were used to increase influenza vaccine acceptance among health care workers including: 1) the use of mobile cart vaccination program;⁸ 2) mobile cart system with active campaign and low cost vaccine;⁹ 3) active educational effort together with walk-in vaccination clinics, and 4) direct offer of influenza vaccination in the wards.¹⁰

The Ministry of Health in Singapore recommends influenza vaccination for health care workers to protect them from the circulating strains of influenza and reduce the "background noise" so that diseases like Severe Acute Respiratory Syndrome would not be masked by influenza in a health institutional setting.¹¹ Moreover, influenza vaccination for health care workers may help identify new pandemic strains of influenza, a world health concern.

To improve influenza vaccination rates for employees of a 1500-bed tertiary hospital in Singapore, we used the following on-site vaccination arrangements: mobile vaccination teams and same-service area vaccination arrangements, in addition to the existing use of vaccination booths during the vaccination period in 2005.

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Table 1. Influenza vaccination status by types of vaccination arrangements for employees who reported for vaccination in 2005

	Vaccinated No. of Employees (Row %)	Not vaccinated No. of Employees (Row %)	OR (95% CI)*
On-site arrangements	840 (97.0)	26 (3.0)	20.52 (13.83–30.43)
Vaccination booths	3107 (61.2)	1973 (38.8)	

*"On-site arrangements" versus "Vaccination booths" (reference group).

METHODS

The influenza vaccination program is organized once annually (started in 2004) for all employees of the hospital and held over a 2- to 3-week period from late September to early October. The influenza vaccine is offered at no cost to the employees.

In 2004 and 2005, 3 vaccination booths were set up at convenient locations within the main hospital building for easy access by employees. Employees reported at these vaccination booths to receive influenza vaccination from nurses at the booths.

In 2005, on-site arrangements for influenza vaccination through the use of mobile vaccination teams and same-service area vaccination arrangements were organized to improve influenza vaccination rates: 1) mobile vaccination teams—each team comprised a nurse and an assistant; the team would proceed to the departments located at a distance from the main hospital building to vaccinate the employees of these departments; 2) same-service area vaccination arrangement—an arrangement to provide on-site vaccination to employees who worked in a same working or service area within the hospital (eg, the operating theatres and the specialist outpatient clinics area). The hospital's pharmacy delivered the influenza vaccines to the service area, and designated nursing team members on the service area would then vaccinate employees on-site.

The influenza vaccination data of employees were captured electronically during the vaccination period. Reporting and influenza vaccination rates of on-site arrangements and vaccination booths were calculated and compared by chi-square tests. Statistical analysis was performed with the statistical program SPSS (version 11.0; SPSS, Inc., Chicago, IL).

RESULTS

In 2005, the influenza vaccination rate for all employees was 66.4% (versus 56.8% in 2004, odds ratio (OR) 1.50 with 95% confidence interval (CI) 1.39–1.62), the highest reported influenza vaccination

rate to date for employees of a tertiary hospital in Singapore.

The mobile vaccination team reached out to 3 distantly located departments. The same-service area vaccination arrangements were organized for 4 service areas in the hospital: the main radiology area, operating theatres, specialist outpatient clinics, and the emergency department area. Overall, on-site arrangements were available to approximately 1 in 4 (or 23.9%) employees in 2005.

In 2005, the reporting rate of all employees at on-site arrangements was 86.9% (versus 70.4% at vaccination booths, OR 2.77 with 95% CI 2.29–3.37).

Among the employees who reported for vaccination, influenza vaccination rate was significantly higher (97.0%) at on-site arrangements than at the vaccination booths (61.2%) ($P < .001$). Employees who attended on-site arrangements were approximately 20 times more likely to be vaccinated than employees who attended the vaccination booths (Table 1).

DISCUSSION

On-site influenza vaccination arrangements, previously unreported in Singapore, had higher reporting as well as influenza vaccination rates. The reasons could be the physical proximity and the convenience of timing brought about by on-site arrangements. Participation and interaction during the vaccination period by groups of employees within the same locality could also act as encouragement and motivation for some employees who might otherwise remain hesitant about receiving influenza vaccination. The vaccinations at same-service areas by familiar nurses from within the service area could also have contributed to the higher influenza vaccination rates.

The higher influenza vaccination rate was consistent with the increased influenza vaccination rates reported in other studies,⁸⁻¹⁰ which utilized on-site vaccination strategies (eg, mobile cart) in combination with other promotional efforts.

On-site arrangements could have accounted for the improved influenza vaccination rate in 2005, as these arrangements were not organized in 2004. However, as on-site vaccination arrangements were only available to approximately 25% of all employees in 2005, other contributory factors to the higher influenza vaccination rates in 2005 should be examined: the provision of influenza vaccine at no cost to the employees, publicity strategies such as the use of posters during the vaccination period, strong support from the senior management of the hospital, and provision of small souvenirs to employees after vaccination. However, it would be difficult to quantify objectively the effects of these factors (which were also present in 2004's

vaccination period) on influenza vaccination rates without a comprehensive survey.

CONCLUSION

On-site influenza vaccination arrangements using mobile vaccination teams and same-service area vaccination arrangements are effective strategies to improve influenza vaccination rates and should form an integral part of influenza vaccination for hospital employees.

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