

Prevalence and Determinants of Influenza Vaccination at Tertiary Pediatric Hospitals

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Introduction

- Children with high risk medical conditions are at risk of severe influenza.
- Despite long-standing recommendations, the uptake of influenza vaccination in high risk children is low.
 - Coverage in the US in this group was most recently estimated, in 2004-05, to be 42%.¹
 - An informal survey at a tertiary pediatric hospital in Sydney, Australia in 2004-05 estimated a coverage rate of 42%.²
- The most important determinant of influenza vaccine coverage in children is recommendation by a doctor.³
 - Around 30% of pediatric oncologists in Australia and the US do not recommend influenza vaccination for their high risk patients.^{4,5}
 - Missed opportunities to vaccinate high risk children in outpatient settings are an important contributor to low influenza vaccination rates.⁶

Aims

- 1) To determine the influenza vaccine coverage rate, and its predictors, among children attending outpatient clinics at the two tertiary pediatric hospitals in Sydney, Australia.
- 2) To assess local Pediatricians' practices and beliefs around influenza vaccination.
- 3) To identify local barriers to influenza vaccination and potential interventions to improve vaccine coverage.

Methods

Survey 1: Parents

- Parents attending outpatient clinics at the two tertiary pediatric hospitals in Sydney between February – March, 2012 were surveyed in person and were eligible if they could read English.
- The survey assessed the following:
 1. Demographic characteristics
 2. Child's influenza vaccination status in 2009-2011
 3. Who, if anyone, recommended influenza vaccine
 4. Sources of information on influenza vaccine
 5. Parental beliefs regarding influenza, influenza vaccination and vaccination in general.

Survey 2: Doctors

- Physicians, surgeons and trainees conducting outpatient clinics at the two pediatric hospitals in Sydney between February – April, 2012 were surveyed in person and by mail.
- The survey assessed the following:
 1. Demographic characteristics
 2. Beliefs regarding influenza, influenza vaccination and other vaccines
 3. Knowledge of recommendations for influenza vaccine use and personal use of guidelines
 4. Perceived barriers to influenza vaccination and potential interventions to assist vaccination.

Results

Survey 1: Parents

Of the 338 eligible parents approached at the inner city hospital, 277 completed surveys were received (response rate: 82.0%). An additional 84 surveys were completed at the outer suburban hospital where, for logistical reasons, the number of ineligible and declining parents was not recorded. 316 surveys were included in analysis after exclusions for age < 6 months (33), inability to access medical records (9) and parental uncertainty regarding vaccination status (3).

- Reported influenza vaccine coverage was 41.3% among high risk children and 14.4% among standard risk children ($p < 0.0001$) (Figure 1).
- In multivariate analysis, adjusting for demographics, **the strongest predictors of influenza vaccine uptake were:**
 - **Recommendation for influenza vaccination from a healthcare worker** (adjusted OR: 29.4, 95% CI: 13.6 – 63.4, $p < 0.0001$)
 - **High risk medical status** (adjusted OR: 3.1, 95% CI: 1.3 – 7.1, $p < 0.01$)
 - **Parental belief that:**
 - **Influenza vaccine is safe** (adjusted OR: 3.0, 95% CI: 1.7 – 5.5, $p < 0.001$)
 - **Influenza vaccine is recommended for children who have the same medical condition as my child** (adjusted OR: 1.9, 95% CI: 1.2 – 3.0, $p < 0.01$)
 - **Influenza vaccine is effective** (adjusted OR: 1.8, 95% CI: 1.0 – 3.0, $p = 0.04$)
- There was an average of **5.0 outpatient clinic visits per unvaccinated high risk child (SD: 6.5) at which influenza vaccination was apparently missed.**

Survey 2: Doctors

201 doctors were approached to complete a survey. 92 doctors responded at the inner city hospital and 9 at the outer suburban hospital for a total of 101 surveys included for analysis (response rate: 50.2%). The response rate was higher among physicians than surgeons (57.2% vs. 28.6%, $p = 0.001$).

Beliefs and Practices

- **Influenza is a significant problem** for patients with chronic medical conditions: **84.2%**
- **I ask about influenza vaccination status** most or all of the time: **39.4%**
- **It is my role to give influenza vaccination**, if indicated: **70.3%**
- **Significantly fewer doctors strongly agreed that influenza vaccination is useful** (48.0%) compared to vaccination against **pneumococcus** (76.0%, $p < 0.0001$), **meningococcus** (74.3%, $p < 0.0001$) or **hepatitis B** (70.0%, $p = 0.0001$).

Perceived Barriers to Influenza Vaccination

- 1) **Lower priority compared to other clinical problems** (54.5% agreement)
- 2) **Difficult to remember** (43.9% agreement)

Popular Interventions to Improve Vaccine Uptake

- 1) **Better education about influenza vaccine recommendations**
- 2) **Vaccines stocked in outpatient clinics**
- 3) **Automated reminder system**

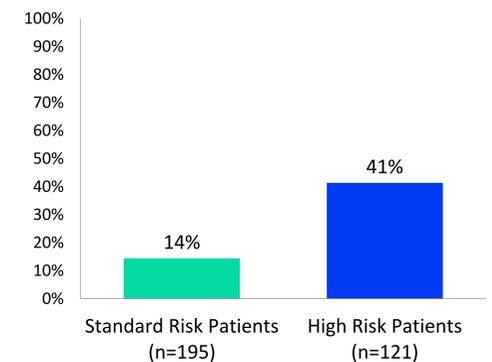


Figure 1: Influenza Vaccination Rate in 2011

Discussion

- Many high risk children in this Australian cohort remain unvaccinated against influenza despite long-standing recommendations.
- Healthcare workers' recommendation of vaccination was the most important determinant of vaccine uptake.
- There were numerous missed opportunities to vaccinate high risk children in tertiary hospital outpatient clinics.
- Parental beliefs about the safety, efficacy and appropriateness of influenza vaccine, as well as the danger posed by influenza infection, were also important predictors of vaccine uptake.^{7,8}
- Pediatricians in our cohort undervalue the utility of influenza vaccination and de-prioritise it compared to other vaccines and clinical issues.
- Automated reminder systems address the two main barriers to influenza vaccination identified in this study and have been shown to improve influenza vaccination coverage of high risk children in both primary care and tertiary hospital settings.^{9,10}
- Reminder systems should be combined with an education campaign for doctors and clear local guidelines.

Conclusion

Influenza vaccination rates in children in Australia are suboptimal. Interventions to improve vaccination rates should target healthcare workers, especially those who care for high risk children, with the aim of increasing recommendations for influenza vaccination.

Acknowledgements

We would like to thank the staff at NCIRS for their assistance with surveying and the parents and staff at both hospitals for their participation in this project.

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