

Incentivizing internal medicine residents to take sick leave and its effect on inpatient transmission of influenza at an academic hospital

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Abstract:

Medical residents are primary caregivers to patients in academic centers. Current sick pay policies for residents often do not provide compensation to residents who take off for sickness, and potentially encourage residents to work in times of illness. Incentivizing residents to take off of work during periods of illness might decrease acquisition of transmissible infections to patients for whom they provide care.

We plan to perform a prospective, randomized trial of instituting a resident sick pay policy on incidence of inpatient influenza infections. We will randomly assign four housestaff run inpatient medicine services to current sick leave policy or a pilot program that pays a salary for time spent covering residents out sick. Patients admitted to these services will be tested on admission and then three times per week for influenza A and B. Those patients who are negative on admission, but subsequently test positive for influenza during hospital admission will be classified with a hospital acquired infection.

We predict a baseline hospital acquired influenza infection incidence of 5% in our control group and an effect size of 60%, for a 2% incidence in the intervention group. The patient population will include all patients admitted to the oncology, cardiology, general medicine 1, general medicine 2 services. As each medical service admits approximately 200 patients per month, we will conduct the study for two-three months beginning in December 2009, to maximize enrollment of patients during the influenza season.

A. Study Purpose and Rationale

In December, 2008 the Institute of Medicine charged national residency programs with enhancing safety of residency programs. “The nation must take a hard look at its residency programs—including hours, schedules, supervision, patient caseloads and handovers—and ensure that they serve both patient and resident safety today and educational needs for tomorrow¹.” Though work hours and sleep deprivation were the central theme of this report, multiple other areas of improvement, including the role of residents as vectors for transmissible diseases should be considered in enhancing safety of resident based patient care.

Previous research has suggested that the single most effective means of preventing healthcare associated influenza is vaccination of health care workers^{2,3}. Based on this data, the CDC recommends that all health care employees are vaccinated⁴. However, in the cases of poor vaccination coverage, misformulated vaccines, antigenic shift, or infections for which no vaccine exists, other measures should be taken to prevent hospital acquired infection. These measures include personal protective equipment, proper hygiene, and discouraging sick employees from working.

Current sick leave policies for the internal medicine residency at Columbia Presbyterian Medical Center are based on a “jeopardy” system. In brief, if a resident deems him/herself unfit for work, he notifies a chief resident who replaces the sick employee with a resident on an elective rotation. The replacing resident is not rewarded for the make-up work in terms of either pay or future time off. Furthermore, substituting residents have their limited elective time, typically spent outside the hospital with minimal hours, replaced with inpatient duties. Moreover, there exists a policy of personal responsibility in residency programs, borne from duty to patients and colleagues, that might dissuade residents from taking time off and/or requesting their peers work in their stead. In sum, the current policy likely disincentivizes ill residents from calling in sick.

A potential unintended consequence of this system is that residents might work at times when they are ill, and put their peers and patients at risk. We hypothesize that, in times of high prevalence of contagious diseases like influenza epidemics, that this system may contribute to transmission of disease to patients. No prior study we are aware of has tested this hypothesis.

Therefore, we propose to study the effect of a novel pilot program to incentivize residents to take time off when they are ill. As opposed to the current system of sick leave, covering residents on elective time who are asked to work as substitutes for sick colleagues will be paid a hospitalist wage for the covered shift. As a control group, we will randomize medical services to the current system of sick leave or to the pilot program of paid coverage. The primary outcome of interest will be hospital acquired influenza infections with active screening of patients cared for on resident-run inpatient services.

B. Study Design and Statistical Analysis

All patients admitted to internal medicine housestaff managed services will be recruited into the study. We will randomly select two of the four primary housestaff managed services (oncology, cardiology, general medicine 1 and general medicine 2) to standard sick leave policy or the pilot sick leave pay policy. Residents working for the sick leave pay services will be paid a hospitalist wage for all shifts work in substitution of sick residents.

We will begin recruiting patients on December 1st, 2009 at the typical onset of the influenza season, with a goal of enrolling approximately 300 (of 400 admitted) patients per month in each arm for 2-3 month influenza season for a total of 650 patients in each arm, or 1,300 patients total. This number of patients will give us 80% power to detect a 60% decreased risk of infection from a baseline 5% incidence, at an alpha of 0.05. Based on admissions of 150 patients per service per month, and two services (general medicine one, general medicine two, cardiology, and oncology) per arm, we hope to achieve or enrollment during the course of a single influenza season.

The outcome of interest will be proportion of patients with hospital acquired influenza, defined as any patient who tests negative on admission, but positive during repeat testing for influenza A or B by nasopharyngeal swab with enzyme immunoassay (EIA), direct immunofluorescence (DFA), and PCR testing.

The primary analysis will include a chi-squared test of proportions to detect a difference in hospital acquired influenza infection in control versus paid sick-leave resident care services.

A secondary analysis will utilize a poisson regression model to analyze risk factors for hospital acquired influenza infection with patient characteristics including age, sex, medical service, history of COPD, asthma, and current cancer.

C. Study Procedure

Patients will be recruited on day of admission as explained above. Patients will be given informed consent about the study, and asked to sign to enroll. All patients recruited and agreeing to participation will have a nasopharyngeal swab for influenza testing performed on the day of admission, and then thrice weekly for the duration of their inpatient stay.

Any patient testing positive for influenza A or B will be offered oseltamavir treatment. The treatment will be given per federal drug administration recommended protocols of 75mg orally, twice daily, or based on renal function for those with impaired creatinine clearance, for a five day course. Treatment will be recommended but optional, based on patient wishes after describing risks and benefits of treatment.

D. Study Drugs

This is not a drug study, and therefore no pharmaceutical intervention will be evaluated. However, as explained above, patients testing positive for influenza A or B during study participation will have the option of taking oseltamavir (Tamaflu®). Oseltamavir is a prodrug which is metabolized to its active form, oseltamavir carboxylate, an inhibitor of the viral protein neuraminidase. Neuraminidase is a viral enzyme which is required to release the developing virus from the infected cell prior to release. The drug is Food and Drug Administration approved for treatment of influenza A and B. The Centers for Disease Control recommends oseltamavir treatment for all inpatients with confirmed H1N1 influenza infection (<http://www.cdc.gov/h1n1flu/recommendations.htm>). Moreover, early data on drug susceptibility confirmed sensitivity of oseltamavir in 13 of 13 isolates tested in April, 2009⁵.

The only absolute contraindications to oseltamavir therapy for the management of influenza infection is history of hypersensitivity reaction to the drug. Relative contraindications include severe hepatic impairment, a population in which the drug has not been studied thoroughly.

E. Study Subjects

Patients aged 18 and older admitted to the oncology, cardiology, general medicine 1, or general medicine 2 medical housestaff services beginning on December 1, 2009 will be eligible for the study. Patients who test positive for influenza A or B by nasopharyngeal swab testing on admission, or who report that they have had a confirmed case of influenza in the prior six months will be excluded. All patients must be capable of providing informed consent.

F. Recruitment of Subjects

Patients will be recruited by the charge nurse on floors where patients admitted to these studies are admitted.

G. Confidentiality

Patients will be identified by a unique number which will be associated with their name in a locked location by the primary investigator of the study. Patient data will be associated with the identifying

number in all analyses, and the patients will not be identified by name, address, or date of birth in any analyses or published reports.

H. Potential Risks

Potential risks to the patients participating in this study include discomfort from nasopharyngeal testing.

I. Potential Benefits

The study subjects may or may not benefit from participation in this study. If influenza A or B is diagnosed, they may receive anti-viral treatment which has been shown to reduce symptoms and severity of influenza infection⁶. For patients who are not diagnosed with influenza, no direct benefits will come from study participation.

Overall, the study might benefit society for its role in determining the effect of incentivization of medical resident sick pay. As little is known about or published about this issue, this study will help to inform residency programs on the role for sick leave and possibly prevent future hospital acquired infections.

J. Compensation

Patients will not be compensated for this study. Charges for testing for influenza A and B will be waived, as will the cost of anti-viral medicines for those who test positive during hospitalization.

K. References

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