

## CONCISE COMMUNICATION

## Assessment of a Mandatory Tetanus, Diphtheria, and Pertussis Vaccination Requirement on Vaccine Uptake over Time

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Tetanus, diphtheria, and pertussis (Tdap) vaccine is recommended for all healthcare personnel who provide direct patient care unless medically contraindicated. Our university hospital made employment conditional upon receipt of Tdap vaccine. Implementation for newly hired employees quickly resulted in complete compliance, but achieving adherence among current workers required setting a termination date for noncompliance.

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Healthcare personnel (HCP) are at risk for acquisition of communicable diseases, including droplet-transmitted diseases such as pertussis.<sup>1</sup> Key methods to prevent HCP from acquiring infection include rapid identification and appropriate isolation of patients with communicable diseases, hand hygiene before and after patient contact, proper use of personal protective equipment, and appropriate vaccinations. The Hospital Infection Control Practices Advisory Committee (HICPAC),<sup>2</sup> the Advisory Committee on Immunization Practices (ACIP),<sup>2,3</sup> and the American Academy of Pediatrics (AAP)<sup>4</sup> have recommended that HCP be immune to mumps, measles, rubella, and varicella. HCP who might have exposure to blood or potentially infectious fluids should also be immune to hepatitis B.<sup>2-4</sup> More recently, the AAP<sup>4</sup> and ACIP/HICPAC<sup>5</sup> have recommended that HCP who provide direct patient care receive tetanus, diphtheria, and pertussis (Tdap) vaccine.

The University of North Carolina (UNC) Health Care system has long required HCP to have demonstrated immunity to measles, mumps, rubella, and varicella. Hepatitis B vaccine is offered to all HCP with potential exposure to blood or other potentially infectious fluids. After the 2005 licensure of the Tdap vaccine for adolescents and adults, UNC made working at our facilities conditional on having immunity to pertussis as demonstrated by receipt of the Tdap vaccine unless there was a documented medical contraindication. We report here the time course of implementing this requirement at our healthcare facility and document the importance of making employment conditional upon receipt of the Tdap vaccine.

### METHODS

UNC Health Care is a 799-bed tertiary care academic medical center. All HCP receive their occupational health through an Occupational Health Service staffed by 1 physician, 1 family nurse practitioner, and 2 registered nurses. Immunity to vaccine-preventable diseases (via vaccination or documented by a positive serological test result) or medical contraindication to a specific vaccine is entered into an electronic database. UNC Health Care does not accept religious or personal objections to vaccination. Vaccinations received outside of UNC or reports of medical contraindications must be documented in writing by a medical provider. HCP are excused from the vaccination requirements if they have a medical contraindication as listed in the appropriate ACIP statement.

Data for this article (HCP name, date of Tdap vaccination, and contraindication [if present]) were retrieved from the Occupational Health electronic database. For new hires, data were analyzed only for HCP who were hired from March 2006 through November 2010 and who were still working at UNC as of January 2011.

Following the February 22, 2006, ACIP recommendation that HCP involved in direct patient care receive the Tdap vaccine,<sup>6</sup> UNC began offering the vaccine through its Occupational Health Clinic. On April 1, 2006, UNC decided to require Tdap vaccination of all HCP unless there was a medical contraindication (HCP who had received a tetanus-diphtheria vaccination within 2 years had their Tdap vaccination deferred until 2 years had elapsed). Beginning in April 2006, all new employees were screened by history for receipt of Tdap vaccine (documentation required) and the presence of medical contraindications. HCP who had not received a Tdap vaccination and had no medical contraindication to vaccination were vaccinated within 10 days after employment.

Beginning in April 2006, current employees were offered the Tdap vaccine. HCP were informed of the requirements for vaccination via an employee newsletter and their supervisors, and they were given 2 years to become compliant with the policy. This vaccine directive did not include any penalties for noncompliance. In March 2010, current employees were reminded via an employee newsletter that immunity to pertussis was required of all UNC employees. In September 2010, after an internal review of the policy, current HCP were informed (via supervisors and an employee newsletter) that any persons not providing evidence of a medical contraindication or proof of immunization by November 2, 2010, would be furloughed without pay.

### RESULTS

Following adoption of the Tdap policy in April 2006, 100% compliance was achieved among new employees. Overall,

among new employees ( $n = 4,834$ ), 1,012 (21%) had documentation of Tdap vaccination at the time of hire, 3,472 (72%) were vaccinated, and 350 (7%) had a contraindication.

For HCP who were already employed in April 2006, there was an initial burst of vaccine acceptance, after which few HCP accepted the vaccine (Figure 1). After the March 2010 announcement, 557 employees received the Tdap vaccine from March through August, and 979 employees received Tdap vaccine from September through November. By November 2, only 4 employees (0.1%) remained noncompliant; after individual counseling, each employee agreed to comply with the policy. Overall, among current employees ( $n = 3,935$ ), 279 (7%) had documentation of Tdap vaccination at the time of hire, 3,463 (88%) were vaccinated, and 193 (5%) had a contraindication.

## DISCUSSION

Pertussis is often a serious disease in both children and adults.<sup>5</sup> The majority of adults exhibit paroxysmal coughing and cough for more than 3 weeks (median duration of cough, 7–9 weeks). Difficulty sleeping, difficulty breathing, apnea, posttussive vomiting, and weight loss are common. Infants frequently develop pneumonia and often require hospitalization. It has been estimated that there are between 800,000 and 3.3 million cases of pertussis per year in the United States.<sup>7</sup>

HCP are at risk for being exposed to pertussis in healthcare facilities, especially in pediatric facilities and emergency departments.<sup>5</sup> In a survey of infection control professionals from

pediatric hospitals, 90% reported HCP exposures to pertussis over a 5-year period; at 11% of the reporting institutions, a physician contracted the disease.<sup>8</sup> Multiple outbreaks of pertussis have been reported in healthcare facilities.<sup>5</sup> For example, a community outbreak in Rochester, Minnesota, led to an outbreak at the Mayo Clinic in which 64 HCP developed pertussis.<sup>9</sup> HCP may acquire infection from patients but may also serve as sources of infection for patients and other HCP.

Based on the high risk of acquiring pertussis among HCP and the consequences of disease transmission from HCP to patients and other staff, UNC decided to require immunity to pertussis as a condition of employment. Instituting screening for pertussis immunity and providing Tdap to newly hired employees was highly successful. To our knowledge, no eligible employee refused vaccination and was terminated. However, because the vaccination requirements were sent to all prospective employees, it is possible that some HCP chose not to apply for a position because of our Tdap policy. Offering vaccine to current employees resulted in 1,936 (56%) of the eligible HCP receiving vaccine from March 2006 through February 2010. Several spikes in vaccination appeared to coincide with community outbreaks and/or hospital exposures. However, it was only when UNC made continued employment conditional on receipt of vaccine that we were able to achieve virtually 100% compliance. Our experience with making employment conditional on Tdap vaccination is similar to that reported by BJC Healthcare for influenza vaccination. In 2008, this system of 11 acute care facilities and 3 extended care facilities around St. Louis, Missouri,

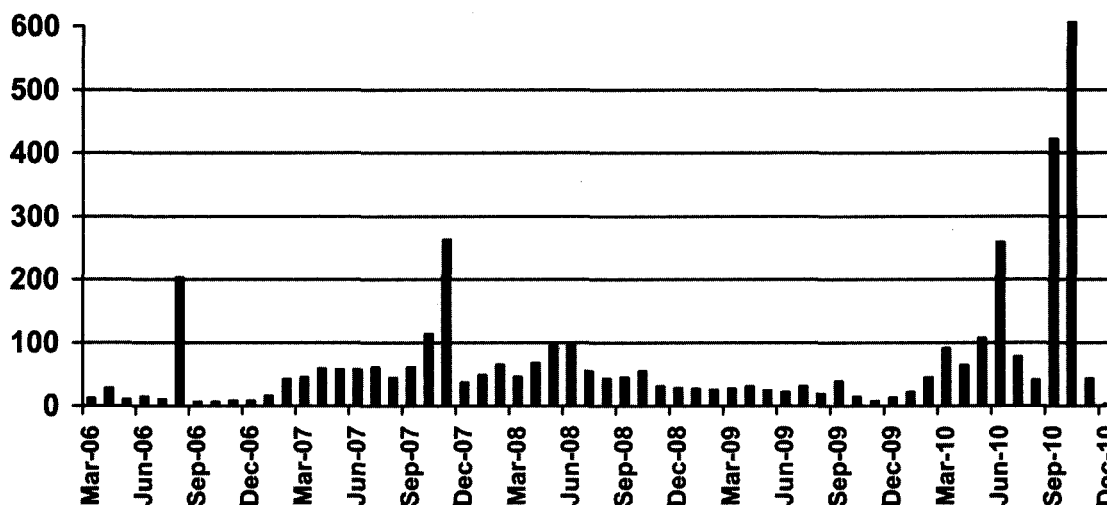


FIGURE 1. Timing (by month) at which current healthcare personnel (HCP) complied with tetanus, diphtheria, and pertussis (Tdap) vaccination policy. Numbers for each month include all HCP who complied with the policy by means of documented Tdap vaccination or documented medical contraindication or who deferred because of receipt of tetanus and diphtheria vaccination within the previous 2 years. Policy notifications were as follows: in April 2006, Tdap vaccination was offered to all current University of North Carolina (UNC) employees and was required of all new employees; in March 2010, a letter was distributed that reminded all UNC employees that Tdap vaccination was required; and in September 2010, a letter was distributed to all UNC employees notifying them that noncompliance by November 2, 2010, would result in the employee being furloughed.

increased their HCP influenza vaccination coverage from 71% before implementation of the mandate to 98.4% in the first season after the mandate. Nearly 26,000 BJC Healthcare employees were vaccinated, and just 8 had their employment terminated.<sup>10</sup>

In summary, we were highly successful in making employment conditional on receipt of Tdap vaccine. Initiation of this program for newly hired workers was rapidly achieved and well received. However, despite multiple reminders of our policy, high coverage among existing personnel was only achieved once the institution made continuing employment conditional on receipt of Tdap vaccine.

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