Michigan Birthing Hospital Approach to Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis Vaccine in an Obstetrical Population

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Abstract

Objective: Pertussis infections have risen exponentially in the United States with the highest incidence of morbidities and mortalities in infants less than one year of age. Although Center for Disease Control and Prevention recommendations have recently changed several times, current recommendations are to give tetanus toxoid, reduced diphtheria toxoid and acellular pertussis vaccine during each pregnancy to all gravidas between 27 and 36 weeks gestation or immediately postpartum. Vaccine “cocooning” of close contacts is also advocated to reduce transmission to newborns. This study was undertaken to determine Michigan birthing hospitals’ Tdap vaccination policies and practices.

Methods: A telephone survey of Michigan birthing hospital administrators was conducted May-June 2012. Statistical analysis was by Fisher exact test for categorical variables.

Results: Response rate was 83% of Michigan’s 84 birthing hospitals. Fifty-one (73%) reported a process in place to assess gravis Tdap vaccine status. Only 14 (20%) had a written policy. Vaccine cost was the most cited barrier (21%) to policy implementation. The majority (91%) of hospitals surveyed indicated that they offered Tdap. The minority (11%) evaluated antepartum-admitted gravidas or vaccinated household contacts (4%). All hospitals documented vaccination in hospital records; only 53% entered these data into the Michigan Care Improvement Registry (MCIR). Most (77%) documented vaccination refusal; few (6%) recorded this in MCIR. Hospitals affiliated with other hospitals and hospitals affiliated with an Obstetrics/Gynecology residency program were more likely to have written postpartum Tdap vaccination policies (P=0.03).

Conclusions: Based on recall data, many Michigan birthing hospitals have not adequately addressed pertussis vaccine surveillance in an obstetrical patient population. Although most reported assessing postpartum patients for vaccine status, few had a written policy. Vaccine opportunities are being missed during the antepartum period and for other close contacts. Finally, suboptimal utilization of a robust statewide vaccine registry compromises the long-term care of these patients.

Keywords: Tdap; Hospital policy; Obstetrics surveillance

Abbreviations: AAP: American Academy of Pediatrics; ACIP: Advisory Committee on Immunization Practices; ACOG: American College of Obstetricians and Gynecologists; CDC: Centers for Disease Control and Prevention; MCIR: Michigan Care Improvement Registry; HCP: Healthcare personnel; TT: Tetanus toxoid; Tdap: Tetanus diphtheria pertussis

Background

Pertussis is a vaccine-preventable infection of the respiratory tract. Despite established vaccine booster recommendations, the incidence of pertussis infections has risen substantially over the last three decades [1]. The rise is most notable among infants less than twelve months of age, who account for the highest rates of morbidity and mortality [1,2]. While the source of the infection is difficult to determine, studies suggest that up to 75% of infants acquire the infection from household members [3,4].

In response to this public health concern, the Centers for Disease Control and Prevention (CDC), the American College of Obstetricians and Gynecologists (ACOG) and the American Academy of Pediatrics (AAP) have emphasized the importance of identifying pregnant or postpartum women unvaccinated for tetanus toxoid, reduced diphtheria toxoid and acellular pertussis (Tdap) to ensure vaccine protection [5,6]. The Advisory Committee on Immunization Practices (ACIP) currently recommends giving Tdap during each pregnancy, irrespective of previous Tdap vaccination history, to all gravidas between 27 and 36 weeks gestation [5]. This allows adequate time for development and transplacental transfer of antibodies [7,8]. If the pregnancy dose is missed, Tdap is recommended immediately postpartum in unvaccinated women [5]. In addition, the concept of “cocooning”, whereby family members and other close contacts of the infant are vaccinated, is advocated as an approach to reduce transmission to newborns [5].

Obstetrician/gynecologists (OB/GYNs) play a critical role in providing many primary care services to women [9]. Several cross-sectional surveys of OB/GYNs found that while most agreed that routine screening for vaccine-preventable diseases was one of their responsibilities, the minority actually screened their patients and provided access to these vaccines in the office [10-12]. Hospitals, too, have well-established interests in providing vaccine-preventable services to their patients and staff. However, little is known about...
hospital vaccination policies in the obstetrical population, particularly in regards to Tdap. Identifying the barriers that prevent hospitals from implementing and executing policies to administer Tdap to these women is an important first step in achieving high vaccination rates and ultimately reducing the transmission of pertussis infection to infants. In this study, we surveyed Michigan birthing hospitals to determine the prevalence of hospitals with Tdap vaccination policies for postpartum women, to collect policy details and to identify barriers to Tdap delivery in an obstetrical patient population.

Methods

A telephone survey at all 84 Michigan birthing hospitals was conducted from May to June 2012 using a 13-question survey designed by the authors of this study. The survey collected information about hospital demographics, hospital Tdap vaccination practices in an obstetrical population, vaccine documentation and perceived obstacles to having an established vaccination policy. Most questions were multiple-choice, with three questions allowing for open-ended responses.

A single interviewer contacted the labor and delivery department at birthing hospitals and asked to speak with the person most knowledgeable about the hospital’s obstetric Tdap vaccination policies and practices. Often, this person was the OB/GYN manager. Other times, this was the Director of Women’s Services or the Immunization Coordinator. The interviewee was then asked to complete the survey using recall information.

The study was reviewed by the Institutional Review Board (IRB) of Wayne State University and found exempt from human subjects review. A copy of the survey is available on request. Fisher’s exact test was used to examine the relationships between hospital demographics and Tdap vaccination practices.

Results

A total of 70 hospitals participated in the survey, for a response rate of 83%. Of all respondents, 36% were affiliated with an OB/GYN residency training program and 66% were part of a larger hospital system (Table 1). About one-third of hospitals (36%) were located in southeast Michigan, which encompasses Macomb, Monroe, Oakland, St. Clair and Wayne counties. The majority of respondents (67%) were located in ‘Metro’ areas, as classified by the U.S. Department of Agriculture’s Rural-Urban Continuum (RUC) Codes [13].

The majority of hospitals (73%) reported having a process to assess gravid Tdap vaccination status. Furthermore, almost all of hospitals with a process (98%) reported that they also offered the vaccine postpartum to eligible patients. Hospitals that did not have a process to routinely assess vaccination status (26%) were less likely ($P = 0.004$) to report that they offered Tdap postpartum (72%) as compared to hospitals with an established process.

Among hospitals that had a process to screen pregnant patients for Tdap eligibility, 96% relied on patient recall as a means of verifying vaccination status. Additional methods of verification included checking the patient’s hospital records (43%) and checking the patient’s immunization record in the Michigan Care Improvement Registry (MCIR) (35%). Responses exceed 100% because this question allowed for multiple responses. If a hospital was unable to ascertain a patient’s vaccination history, most (68%) would still administer Tdap.

Only 20% of responding hospitals reported a written policy specific to Tdap vaccination of postpartum women. The most commonly reported barrier to Tdap vaccine policy implementation (21%) was the cost of the vaccine (Table 2). The next most commonly stated reason was the hospital does not need a written policy (19%). Sixteen percent of respondents felt that there was no barrier to enacting a written policy. Responses exceed 100% because respondents were allowed to list up to three reasons.

In regards to vaccine administration, 91% of all hospitals surveyed reported offering Tdap to postpartum patients. When probed further about the means by which Tdap was offered to patients, it was discovered that a standing order for Tdap administration was included as part of the routine postpartum order set in 33% of administering hospitals. Request for Tdap vaccine by the physician and/or patient was required at 25% of hospitals surveyed. At another 25% of hospitals, nurses first assessed patients for vaccine eligibility and then asked a physician to place an order for the vaccine. Finally, at 17% of hospitals, nurses were pre-authorized to order and administer Tdap.

Few hospitals (11%) reported a process to vaccinate antepartum-admitted pregnant gravidas patients with Tdap. In addition, only 4% of hospitals surveyed offered the vaccine to household contacts of the infant.

All hospitals that offered inpatient Tdap recorded vaccine administration in hospital charts, but only 53% entered these data into MCIR. Most (77%) documented patient vaccination refusal in hospital records, however, few hospitals (6%) recorded these additional data in MCIR.

Respondents that reported having a process to screen gravid women for Tdap vaccine status were asked whether they held educational sessions to inform staff about the hospital’s Tdap vaccination process. If respondents replied in the affirmative, they were asked whether...
the sessions were mandatory. Most hospitals (75%) in this group distributed information about the Tdap vaccination process to the staff. Of these hospitals, 47% held some form of mandatory education. Notably, these educational sessions were mandatory for nurses at all hospitals that offered educational services; at 16% of these hospitals, these sessions were also mandatory for physicians.

Fisher’s exact test was used to examine the relationships between various hospital demographics and Tdap vaccination practices. Hospitals with a written policy specific to postpartum Tdap vaccination were more likely to be affiliated with an OB/GYN residency training program than hospitals without a written policy ($P = 0.03$). Likewise, hospitals with a written policy were more likely to be affiliated with other hospitals ($P = 0.03$). Hospitals with a written policy were not more likely to be located in southeast Michigan ($P = 0.55$) or to be located in a ‘Metro’ area ($P = 0.35$).

Discussion

Based on recall data, it appears that many Michigan birthing hospitals are aware of the importance of pertussis vaccine surveillance and administration in an obstetrical patient population, but have not adequately taken measures to address this issue.

Screening for Tdap vaccine status is an integral step to initiating vaccine administration, however, only 73% of responding hospitals reported routine screening. Many hospitals rely on patient recall as the sole means of verification. Patient recall is not the most accurate method of confirming this information; as several studies found, this data was inaccurate for Tdap or tetanus-containing vaccines 33-43% of the time [14,15]. Checking a patient’s record in MCIR or having access to a patient’s prenatal records could improve the accuracy of vaccination status assessment; this could improve vaccination rates and reduce excess vaccination.

Although it was common to report some surveillance process, the minority actually had a written policy to establish adherence to standards. Cost or reimbursement concerns, the number one barrier cited in this survey, are not unique to Tdap, and have been reported as a major obstacle to providing vaccines in general in several other surveys of OB/GYNs [10-12,16]. Surprisingly, 19% of hospitals felt that a written policy was unnecessary because their current process adequately protected patients. This represents a serious underestimation of the importance of written policy in achieving high quality care. Studies have consistently shown that the use of standing orders and written vaccination policy increase vaccine uptake [17-19]. Many hospitals reported no barriers to implementing a written Tdap vaccination policy. Further education from the CDC or local health departments may be warranted to highlight the need for Tdap vaccination policies in pregnant and postpartum women as well as their close contacts.

Vaccine administration in the hospital setting remains a concern, in that “offering” Tdap does not necessarily translate into efficient acquisition of the vaccine. Although 91% of respondents reported that the hospital offers Tdap, at half of these hospitals, individual decisions or requests by Health Care Personnel (HCP) or patients is required to initiate the vaccination process. Studies at hospitals that implemented Tdap vaccination policies that automatically ordered the vaccine for all obstetrical patients found that this approach reduced the burden on HCP and helped increase the number of patients vaccinated [14,20].

Also concerning is the fact that few offer Tdap to gravidas admitted to the hospital during the antepartum period, which represents a missed opportunity for vaccination. Recent CDC and ACOG recommendations have focused on Tdap administration during the third trimester of pregnancy as an improved mechanism for both maternal and neonatal protection [5].

Likewise, vaccine opportunities are being missed for family members and other close contacts. The extra cost of providing vaccines to other contacts prevents hospitals from adequately cocooning infants. Additionally, several respondents reported that the hospital would first have to formally “register” family members in order to administer Tdap. Logistically, this process is probably not feasible and represents a significant vaccine barrier. An alternative approach could involve vaccinating close contacts during antepartum obstetrical office appointments, or offering the vaccine at post-natal visits. However, studies that measured the degree to which cocooning reduced the incidence of infant pertussis infections yielded mixed results regarding its success [21,22]. Given this uncertainty, cocooning may not be the most effective way to reduce pertussis infection in infants in the near future and other strategies should be given priority.

With regard to vaccine administration documentation, despite having a robust state-wide immunization information registry, suboptimal utilization of this system compromises the long term care of these patients and can lead to both underutilization and overuse of Tdap vaccine in the future.

Staff education about Tdap and the hospital’s Tdap policy is another means to improving vaccination rates. Several studies of programs that implemented postpartum Tdap immunization policies observed that educating all staff members, especially nurses, greatly contributed to increasing vaccination rates [14,20]. Likewise, HCP who are aware of vaccine guidelines are more likely to recommend vaccination than those who are less knowledgeable [23].

Several limitations to this study should be discussed. First, the study relied on recall information provided by the person interviewed. This approach may have lead to incomplete or inaccurate representations of the individual hospitals surveyed. However, the contacted hospital representatives were first identified based on their acknowledged responsibility in this area of interest and therefore should have best been able to relay pertinent data. The survey was conducted using the guidelines released by the CDC in October 2011 [24], which recommended giving Tdap to all gravidas after 20 weeks gestation or immediately postpartum. Given the rapidly changing guidelines for Tdap vaccination in an obstetric population, it is possible that some hospitals may have updated their policies since new recommendations [5] were released. This implies that continued assessment of hospital Tdap vaccine strategies needs to be performed, so that the most up to date information can be used to guide future recommendations and educational initiatives. Lastly, non-responders may have a different demographic and policy profile than respondents. Although our survey robustly accessed the majority of birthing hospitals in Michigan, the results presented in this study may not apply to those hospitals that did not respond, or to other hospitals outside the state. This may be particularly true for issues related to vaccine registries, which vary considerably around the country.

Disclosure

Dr. Gonik is a consultant for Merck Vaccines, GlaxoSmithKline Vaccines, Sanofi Pasteur and Novartis Pharmaceuticals.

References


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