

Newborn Hepatitis B Vaccination Policy in Hospital Nurseries

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ABSTRACT. *Objective.* Hepatitis B vaccination (HBV) is unlike any other immunization series because it can be initiated in the hospital nursery. The objective of this study was to describe how hospital nurseries develop HBV policies and to describe the sources of information used for learning about national HBV recommendations.

Methods. A cross-sectional telephone survey was conducted on a national random sample of nursery medical directors of 290 hospital nurseries representing all 50 states. The outcomes measured were methods used by hospital nurseries to develop HBV policy and sources of information used by nursery directors to learn about national HBV recommendations.

Results. Directors at 207 (71%) of 290 eligible nurseries responded. Of the 184 nurseries that have considered developing an HBV policy, the most common method was through a formal committee (43%). In 104 (57%) of these nurseries a nurse was involved in policy development, and in 15 (8%) the nurse manager initiated the process. The most common source of initial information about the July 1999 announcement to suspend the nursery dose of HBV was the American Academy of Pediatrics. The most common initial source of information about the availability of thimerosal-free HBV was pharmaceutical companies. Physician, nurse, and pharmacist colleagues were cited as sources of information with similar frequency (12, 11, and 20 cases, respectively).

Conclusions. Physicians are not the sole initiators and developers of HBV policy in the newborn nursery. Although almost all nurseries designate a physician as a nursery director, in many cases (55% of cases) the position is "rotating" or as part of another administrative position (63% of cases). Many hospital nurseries involve nurses and pharmacists in key roles to stay current with HBV recommendations and to develop subsequent policy. Using nonphysician national organizations as additional channels of information might expedite dissemination about changes in HBV recommendations and, as a result, improve nursery awareness and adoption of national HBV guidelines. *Pediatrics* 2002;109(2). URL: <http://www.pediatrics.org/cgi/content/full/109/2/e21>; hepatitis B vaccination, physician practice patterns, nursery, hospital organization, practice guidelines.

ABBREVIATIONS. HBV, hepatitis B vaccination; CDC, Centers for Disease Control and Prevention; AAP, American Academy of Pediatrics; NICU, neonatal intensive care unit; AAFP, American Academy of Family Physicians.

The hepatitis B vaccination (HBV) series is unlike other pediatric vaccinations because it can be routinely initiated in an inpatient setting—the hospital nursery. The newborn nursery represents the first opportunity to immunize children and establish immunization practices and attitudes at the family and individual levels. The newborn period may be a time when parents are especially receptive to information about immunizations, because HBV at birth is associated with timely receipt of other vaccines.¹ In addition, a nursery's immunization policy can greatly influence the adoption of vaccination recommendations by individual health care providers in the same community.²

In July 1999, the Centers for Disease Control and Prevention (CDC) and the American Academy of Pediatrics (AAP) instituted changes in HBV recommendations for low-risk infants—those born to mothers who test negative for hepatitis B surface antigen.³ Because of the potential risk of thimerosal, a mercury-containing vaccine preservative, the recommendation suggested that health care providers postpone the first dose of HBV from birth until 2 to 6 months of age for low-risk infants. In September 1999, the CDC announced the availability of a thimerosal-free HBV,⁴ and in June 2000, the AAP announced that there was an adequate supply of thimerosal-free HBV to vaccinate the 0- to 6-month age group in all states.⁵

Although many studies have examined outpatient immunization decision-making at the provider level,^{6,7} we are unaware of any study that has examined the process of immunization policy development in this unique and influential setting—the hospital nursery. Unlike the outpatient office, the hospital nursery is a setting where multiple physicians from different practices, having varying degrees of affiliation with the hospital, provide care to newborns. In smaller hospitals, physicians may attend the nursery infrequently, and nonphysician personnel, such as nurses and pharmacists, may have greater continuity and familiarity with nursery policy and procedures. Recent changes in HBV recommendations offer an opportunity to study how nurseries develop immunization policy and to describe the sources of information used for learning about national HBV recommendations.

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METHODS

We conducted semistructured telephone interviews from August 2000 to April 2001 with nursery directors from a national random sample of 296 hospital nurseries from the Hospital Management Research Institute database. Through a contracted vendor (Medical Marketing Services, Wood Dale, IL), we selected a simple, random sample of hospitals with traditional birthing units or birthing/labor and delivery rooms in the United States. The Hospital Management Research Institute database includes >7277 facilities in the United States and is updated annually. The institutional review board of the University of Michigan Medical School approved the study protocol.

Participants

We contacted each of the hospital nurseries to identify the medical director of the nursery. When there was no official medical director of the nursery, we contacted the chief of pediatrics or family medicine or a physician who was knowledgeable about the details and development of nursery immunization policy. Physicians were allowed to designate an allied health professional if they believed that this person was equally or more knowledgeable about the details or development of nursery immunization policy.

Survey Instrument/Script

We asked respondents about immunization policies before the July 1999 announcement about thimerosal and after the availability of a thimerosal-free HBV. In addition, we asked directors whether they were aware of the CDC/AAP announcement about thimerosal and about the availability of thimerosal-free HBV.

When they were aware of either recommendation, then we asked through which source of information they first became aware of the recommendation, all subsequent sources of information, and the most influential source of information. When respondents reported an organization or agency as a source of information, we asked about the specific method of communication (eg, letter, fax, newsletter).

When a new immunization policy was considered, we asked how the new policy was developed (formal committee, informal discussion, staff meeting discussion, or individual decision maker) and the profession and specialty of each person involved in initiating the process, commenting on the process, or approving the policy.

Finally, we asked about hospital characteristics, including births per year, presence of residents or medical students in the nursery, and presence of a neonatal intensive care unit (NICU) or an intermediate care unit. A NICU was defined as a unit that routinely cares for infants <37 weeks' gestation and that can provide long-term mechanical ventilation. An intermediate care unit was defined as a unit that routinely cares for infants <37 weeks' gestation but does not provide long-term mechanical ventilation.

We developed an instrument with semistructured questions that encouraged respondents to answer with detail specific to their institutions but within a framework that allowed comparison between respondents. We pilot-tested a standard interview instrument with a convenience sample of 10 nursery directors from 4 states.

Analysis

We used qualitative analytic techniques to identify the common categories for how nursery policies are developed and how nursery directors became aware of recommendations. The categories were then quantified by simple count. We used Fisher exact test to determine whether there were differences in the frequency of sources of information cited for the announcement about the suspension of newborn HBV and the announcement about the availability of a thimerosal-free HBV.

RESULTS

Of the 296 nurseries in our sample, 4 hospitals were closed or no longer delivering infants. In 2 hospitals, there was no physician who was affiliated with the hospital before July 1999 and who could describe the previous HBV policies.

At the remaining 290 eligible hospitals, 26 nursery directors declined to participate. We were unable to contact 57 nursery directors after at least 5 attempts. Overall, we completed interviews with 207 nursery directors (71% response rate), representing hospitals in all 50 states (Table 1).

Respondents

The majority of the respondents ($n = 186$) were physicians who specialized in pediatrics, neonatology, family practice, or internal medicine-pediatrics (Table 2). In 21 cases, a physician designated a nurse manager of the nursery ($n = 9$), a director of nursing ($n = 11$), or a nurse practitioner ($n = 1$) to complete the interview. The respondents belonged to a variety of professional organizations. Of the 161 pediatrician respondents, 146 (91%) were members of the AAP. Of the 25 family practitioner respondents, 21 (84%) were members of the American Academy of Family Physicians (AAFP). Of the 21 nurse respondents, 15 (71%) were members of a national nursing organization, such as the Association of Women's Health, Obstetrics and Neonatal Nursery and the National Association of Neonatal Nursing.

HBV Policy Development

Of the 207 nurseries, 23 (11%) had never attempted to develop a policy or consensus regarding HBV for low-risk infants. At the remaining 184 nurseries, a variety of methods were used to develop HBV policies. The most common method ($n = 80$) was a formal committee, followed by formal discussion at department staff meetings ($n = 35$), development by chair or nursery director alone ($n = 27$), and informal discussion among physicians ($n = 24$). In 15 of the 184 hospitals, the nurse manager initiated and developed HBV policy. In 3 nurseries, because there was

TABLE 1. Characteristics of Participating Nurseries ($n = 207$)

Characteristic	Number of Nurseries (n [%])
Number of births/year	
<100	12 (6%)
100-365	45 (22%)
366-1000	72 (35%)
1001-2500	54 (26%)
>2500	24 (12%)
Self-described location	
Large metropolitan area	26 (12%)
Suburban	21 (10%)
Small- to medium-sized city	57 (28%)
Small town or rural	101 (49%)
Military base	2 (1%)
Nursery facilities	
NICU present	53 (26%)
Intermediate care unit but no NICU	66 (32%)
Well-baby nursery only	88 (43%)
Number of physicians with nursery attending privileges	
1	3 (1%)
2-5	36 (17%)
6-15	91 (41%)
16-50	59 (29%)
>50	18 (8%)
Medical students or residents routinely present in nursery	60 (29%)

TABLE 2. Characteristics of Respondents (*n* = 207)

Characteristics	Number of Respondents
Specialty	
Physicians	
General pediatrics	115
Pediatric subspecialist (except neonatology)	6
Neonatology	30
Family practice	25
Medicine-pediatrics	10
Nurses	21
Title of current position	
Nursery Director	37
Neonatal Intensive Care Unit Director	11
Chairperson	
Pediatrics	66
Obstetrics	7
Obstetrics/Perinatal Medicine	5
Internal Medicine/Pediatrics	1
Family Practice	1
Physician with Attending Privileges	55
Chief of Hospital Staff	7
Nurse Manager	9
Director of Nursing	11
Nurse Practitioner	1
Membership in professional organizations	
AAP	146
AAFP	21
Association of Women's Health, Obstetrics and Neonatal Nursing	14
American College of Physicians	4
National Association of Neonatal Nursing	1
American College of Osteopathic Pediatricians	1
Academy of Osteopathic Family Practice	1

only 1 attending physician, a policy was not developed.

From the 184 nurseries that attempted to develop an HBV policy, we asked the profession and specialty of each person involved in the steps of initiating, developing, or commenting on nursery HBV policy. Of the 184 nurseries, at least 1 general pediatrician or subspecialty pediatrician was involved in 1 of the above steps of HBV policy development in 161 cases (88% of the nurseries). At least 1 general

pediatrician was involved in 152 cases (83%). With regard to nonphysicians, at least 1 registered nurse was involved in 104 cases (57%), and at least 1 pharmacist was involved in 10 cases (5%).

Of the 184 nurseries that attempted to develop an HBV consensus or policy, nursery directors at 138 of the hospitals (75%) stated that HBV policy development was similar to how other nursery policies are developed.

We also asked respondents at all 207 hospitals whether a person was designated as the nursery director. Information was incomplete from 5 surveys, leaving 202 for analysis. For 163 of 202 nurseries, there was a designated nursery director. In 102 cases, the director was the chief of the medical staff or the chair of pediatrics, obstetrics, or family practice, or the NICU director, by default.

Of the 61 nursery directors who were not also department chairs, in 25 cases the position was rotating. For example, community physicians elect 1 physician to serve as the nursery director for a limited tenure, usually 1 to 2 years. Of the 102 chairs that were nursery director by default, in 66 cases the position of chair was also rotating.

For the 39 nurseries that did not have 1 single person as a nursery director, the daily administration of nursery policy was handled by a variety of methods, including a nursery committee, consultation with neonatologists from a larger hospital, or a nurse manager who consulted with a committee or several physicians, as needed.

Awareness of HBV Recommendations

Of 207 respondents, 203 (98%) were aware of the July 1999 announcement to suspend the nursery dose of HBV, and 202 (98%) were aware of the availability of a thimerosal-free HBV. The sources of how nursery directors first became aware of HBV information are presented in Table 3.

Although more than one fourth of respondents heard about the July 1999 announcement via the

TABLE 3. How Nursery Directors First Became Aware of New Recommendations (*n* = 207)

Method	July 1999 Recommendation to Postpone (<i>n</i> [%])	Availability of Thimerosal-Free HBV (<i>n</i> [%])
Professional organizations		
AAP*	55 (26.6)	34 (16.4)
AAFP	1 (0.5)	1 (0.5)
NANN	1 (0.5)	0
Pharmaceutical company*	33 (15.9)	58 (28.0)
Colleague		
Physician	15 (7.2)	12 (5.8)
Nurse	11 (5.3)	11 (5.3)
Pharmacist	15 (7.2)	20 (9.7)
Other (meetings, grand rounds)	3 (1.4)	5 (2.4)
Local health department	19 (9.2)	19 (9.2)
Journals and other publications	11 (5.3)	8 (3.9)
CDC	5 (2.4)	3 (1.4)
Nonmedical sources	4 (1.9)	0
Patient/parent	2 (1.0)	0
Don't recall	28 (13.5)	31 (15.0)
Not aware	4 (1.9)	5 (2.4)

NANN indicates National Association of Neonatal Nursing.

* Indicates *P* < .05 by Fisher exact test for comparing how often the source was mentioned for July 1999 recommendation versus availability of thimerosal-free HBV.

AAP, the AAP was less frequently cited as the first source of information about the availability of a thimerosal-free HBV. For the 55 respondents who cited the AAP as their initial source of information about the July 1999 announcement, 19 received a letter, 13 were informed by *AAP News*, 8 received a fax from an AAP chapter, 4 received information from an AAP listserve, 3 learned about it from the AAP web site, and 2 read the statement in *Pediatrics*. Six respondents could not recall the specific AAP source.

Significantly more respondents ($n = 58$) first heard about the availability of a thimerosal-free HBV from pharmaceutical companies. Forty-nine of the 58 received initial information directly from a pharmaceutical representative, 3 from a mailing, and 6 could not recall the specific pharmaceutical company source. Physician (6%), nurse (5%), and pharmacist (10%) colleagues were cited with similar frequency as a source of initial thimerosal-free HBV information.

We asked respondents to list all of the sources of information about the HBV recommendations (Table 4), in addition to their initial source of information. Although pharmaceutical companies were a common initial source of information for physicians for the availability of a thimerosal-free HBV, the AAP was still frequently cited as a subsequent source of information. The use of the AAP as an initial source of information was limited to pediatricians. No family physicians and only 4 nurses listed the AAP as a first or subsequent source of information.

For the 175 respondents who listed more than 1 source of information, we asked them which source of information was the most influential. Ninety-two respondents (53%) indicated that the AAP was the most influential source of information regarding thimerosal. However, all 92 respondents specialized in pediatrics, neonatology, or internal medicine-pediatrics. There was no commonly cited influential source among family practice or nursing respondents (Table 5).

DISCUSSION

This is the first study we are aware of that examines how HBV policies are developed in the newborn nursery. Overall, we found that nursery HBV policies were developed through a variety of methods, and nursery directors were informed of HBV recommendations from a variety of sources. For both of these processes—development and awareness—physicians are not the sole determinants of HBV policy in the hospital nursery.

Many hospitals involve nurses and pharmacists in key roles to stay current with newborn immunization recommendations and to develop immunization-related policy. When nursery immunization policies were developed, nurses initiated the process in 8% of cases and participated in 56% of all cases. Furthermore, 15% of respondents indicated that nurses and pharmacists were their first source of information about thimerosal, even before any communication from the CDC or AAP. In addition, nurses or pharmacists were the first source about availability of thimerosal-free HBV for 18% of respondents.

Only 4 of 5 nurseries in our sample have a single physician designated as a nursery director, and in more than half of these cases (56%), the position of nursery director is rotating. In many community hospitals, many physicians from multiple practices provide care to newborns, and staff nurses and pharmacists may have greater continuity and familiarity with nursery policy and procedures. The involvement of nurses and pharmacists in nursery HBV policy development, nurseries' awareness of national HBV recommendations, and the rotating nature of the nursery directorship in many hospitals suggest the importance of disseminating national HBV recommendations to nurses and pharmacists in hospital nurseries, as well as to primary care physicians.

There are several limitations to this study. First, respondents' descriptions of their hospital nursery

TABLE 4. Number of Times the Following Sources Were Cited by 207 Nursery Directors for How They Heard About Immunization Information

Method	July 1999 Recommendation to Postpone HBV	September 1999 Availability of Thimerosal-Free HBV
Professional organizations		
AAP	109	84
AAFP	5	3
NANN or AWHONN	3	1
Drug company	61	88
Colleague		
Physician	33	28
Nurse	17	18
Pharmacist	21	27
Other (meetings, grand rounds)	9	7
Local health department	32	32
Journals and other publications	45	34
CDC	19	16
Nonmedical sources	20	2
Internet, World Wide Web	5	1
Patient/parent	5	3
Not aware	4	5

NANN indicates National Association of Neonatal Nursing; AWHONN, Association of Women's Health, Obstetrics and Neonatal Nursing.

TABLE 5. Most influential Source of Information Regarding Announcement About Thimerosal for Respondents by Specialty (*n* = 175)

Source of Information	Specialty		
	Family Practice (<i>n</i> = 17)	Pediatrics/Internal Medicine-Pediatrics (<i>n</i> = 144)	Nursing (<i>n</i> = 14)
AAP	0	92	0
AAFP	3	0	0
Colleague			
Physician	0	4	1
Nurse	1	1	2
CDC	1	8	0
Local health department	4	2	3
Other	1	6	0
Multiple influential sources	5	20	5
Don't recall	2	11	3

reflect the perceptions of only 1 individual at each institution. Second, the interviews occurred up to 18 months after the temporary suspension of the birth dose of HBV. Details about which we did not specifically query regarding the awareness and development process may have been forgotten.

In addition, sources of information regarding the July 1999 announcement about thimerosal that family physicians used may not be generalizable. Unlike other recent HBV recommendation announcements, the AAFP did not make a joint announcement with the US Public Health Service regarding the suspension of the birth dose of HBV in July 1999.³ The results may underestimate the importance of the AAFP as a source of information to family physicians.

Despite these limitations, there are several implications. The results highlight the influence of specialty organizations on awareness of HBV guidelines. The AAP was cited by more than half of respondents (53%) as the most influential source of information about the July 1999 announcement regarding the suspension of the birth dose of thimerosal. However, respondents who indicated that the AAP was most influential all specialized in pediatrics or internal medicine-pediatrics. The AAFP was cited as a source of information only by family physicians. In many studies regarding guideline adherence, health professionals tend to adhere to guidelines developed by their own specialty organization.^{8–10}

The AAP is an influential source of information for pediatricians, who were involved in 88% of cases of HBV policy development in hospital nurseries in our sample. The Advisory Committee on Immunization Practices has traditionally partnered with physician organizations (AAP and AAFP) to develop a consensus on HBV recommendations. In addition, the US Public Health Service has partnered with the AAP to announce changes in HBV recommendations.³

However, in a relatively small but significant number of hospitals, nonpediatricians (family physicians) and nonphysicians (nurses, pharmacists) are key participants in HBV policy development and nursery awareness of national HBV recommendations. Although almost all nurseries designate a physician as a nursery director, in many cases this is an additional

administrative position associated with running a larger administrative unit or department. In more than half of cases, the nursery director position is rotating.

Nurses and pharmacists are involved in HBV policy development in many nurseries and may provide greater continuity and familiarity with nursery policy and procedures. Using nonphysician national organizations, such as the American Society of Health System Pharmacists; the National Association of Neonatal Nurses; or the Association of Women's Health, Obstetrics and Neonatal Nursing as additional channels of information might also expedite dissemination about changes in HBV immunizations to hospital nurseries and primary care physicians who care for newborns.

Finally, this is the first study that we are aware of that describes how HBV policy—or any policy in general—is developed in hospital nurseries. Of the nursery directors that described how HBV policy was developed, 75% stated that HBV policy development was similar to the development of other policies. For future public health interventions that involve the newborn nursery, such as changes in screening of inherited metabolic disorders, group B streptococcus, or newborn hearing disorders, these findings suggest that a multidisciplinary approach might also improve nursery awareness and adherence to other public health recommendations for newborns.

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