Impact on Health Departments After a Seventh Grade Hepatitis B Immunization Requirement

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SYNOPSIS

Objectives. This research was designed to evaluate the impact on health departments of the implementation of a 1999 policy requiring hepatitis B (HBV) vaccination for seventh grade school entry in the state of Missouri.

Methods. The authors employed a retrospective descriptive design using data from the Missouri Health Strategic Architectures and Information Cooperative (MOHSAIC) system. They based their assessment of the impact of the new policy on six outcome variables: total immunizations administered, HBV immunizations administered, HBV immunizations given to children ages 10 to 14, percentage of total immunizations that were HBV, percentage of total HBV immunizations that were given to children ages 10 to 14, and percentage of total immunizations that were HBV given to children ages 10 to 14. Outcome variables from the months of July through September 1998 were compared to similar data from the same period in 1999.

Results. Statewide, there was a significant increase in all outcome variables. Health departments in non-rural settings, however, did not have a significant increase in total immunizations (t = -1.49, p = 0.158). The number of HBV immunizations did increase at health departments where alternative strategies (e.g., school-based programs) were used, but the increase was not as dramatic as for sites where no such strategies were employed.

Conclusions. Implementation of a state policy requiring additional immunizations can be expected to have a significant impact on the resources of health departments statewide. The use of alternative strategies for managing immunizations outside the traditional health department setting can limit that impact.

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In 1996, joint recommendations published by the Advisory Committee on Immunization Practices, the American Academy of Pediatrics, the American Association of Family Physicians, and the American Medical Association were aimed at improving immunization rates among adolescents in the US.1 One recommendation called for state laws and regulations requiring hepatitis B (HBV) vaccination for students entering sixth or seventh grade. In response, 30 states used existing laws or passed new legislation to establish or expand HBV immunization requirements to include middle school grades.2 The impact of this change on health departments in those 30 states has not been reported, although one county in Florida noted that, even with a school-based HBV immunization program in place, the seventh grade school entry requirement led to a 380% increase in HBV vaccinations of 10- to 14-year-olds in the months just prior to the start of school.3 If other jurisdictions experience similar increases with the addition of an HBV immunization requirement, the impact of those increases on state health departments should be made known. The purpose of this research was to evaluate the effect of the seventh grade HBV vaccination policy on health departments in the state of Missouri.

In 1999, the Missouri Department of Health implemented a policy requiring students entering the seventh grade in September of that year to have three doses of HBV vaccine.⁴ The state provided funding for the vaccine, but no money was allocated for health departments to administer the vaccine to a potentially large cohort of children. Official notification of the new requirement was published July 9,1999, leaving little time for health care providers, health departments, or schools to prepare.⁴

Historically, because all school-age children need immunizations for school entry, vaccine usage reports show that many more immunizations are given at Missouri health departments during July, August, and September than during other months. The numbers of patients visiting regular immunization clinics increases dramatically and health departments often schedule extra clinics to meet the demand (Personal communication, LeAnn Glenn, Kansas City Missouri Health Department, September 2, 1998). The addition of a seventh grade cohort to the population seeking immunization for school entry could overburden health department personnel and resources.

METHODS

Study design and variables

A retrospective descriptive design was used for this research study, which drew data from the immuniza-

tion registry of the Missouri Health Strategic Architectures and Information Cooperative (MOHSAIC). After an immunization is given at a public health department in the state of Missouri, immunization data are entered into the MOHSAIC comprehensive database. Aggregate data, by health department, from the months of July, August, and September 1998 and 1999 were accessed and entered into a separate database for the impact analysis (SPSS, Version 9.0, 1998). Six outcome variables served to assess the impact of the new policy: total immunizations administered, HBV immunizations administered, HBV immunizations given to children ages 10 to 14, percentage of total immunizations that were HBV, percentage of total HBV immunizations that were given to children ages 10 to 14, and percentage of total immunizations that were HBV given to children ages 10 to 14. Outcome variables from the months of July through September 1998 were compared to similar data from the same period in 1999.

Because of the limited number of health care providers offering HBV immunizations in their offices in rural counties, it appeared that rural health departments might have significant increases in volume during July, August, and September. In contrast, because a successful school-based HBV immunization program for sixth graders had been in existence in the Kansas City metropolitan area since 1997, the number of Kansas City adolescents needing HBV vaccinations was not expected to rise dramatically in the months before school opening. Health department personnel therefore recommended further analysis of immunization data for July-September by county population. For the purposes of that analysis, health departments were classified as rural—located in counties with fewer than 100 people per square mile, or non-rural—counties with 100 or more people per square mile.

All health departments in the study were asked if alternative strategies such as school-based programs, immunizations at shopping malls, and the like were used. Responses were categorized as (a) strategies implemented in both 1998 and 1999, (b) strategies implemented only in 1999, and (c) no alternative strategies used. Comparisons of the outcome variables were made between health departments that used alternative strategies and those that did not.

Analysis

Descriptive statistics of the county populations and outcome variables were calculated. Comparisons of the data from 1998 and 1999 were conducted with paired *t* tests. A one-way ANOVA was used to compare differences in outcome variables between groups categorized by the use of alternative strategies.

RESULTS

At the time of this study, 5.47 million people lived in Missouri's 115 counties. Children under the age of 18 accounted for 15.6% of those residents. Only 16 of the 115 counties met the criteria for non-rural. Population density in those counties ranged from 100 people per square mile to 5,523 people per square mile in the urban areas, with a mean of 678 residents per square mile. In the 99 rural counties, residents per square mile ranged from 8 to 83, with a mean of 30.

Throughout Missouri 112 health departments serve the residents, 18 in non-rural areas and 94 in rural counties. Of those in non-rural settings, two serve urban centers exclusively (Kansas City and St. Louis). Complete data for both years and all variables were received from 79 (70%) of the health departments. Comparisons of the outcome variables for 1998 and 1999 are shown in Table 1.

For the 79 counties that provided adequate data, there was a significant increase in total immunizations administered (t = -0.349, p = 0.001). The change ranged from a decrease of 39% to an increase of 256%. The total number of HBV immunizations also rose significantly (t = -7.41, p < 0.01), as did the number of HBV immunizations given to 10- to 14-year-old children (t =-8.14, p < 0.01). Changes in HBV immunizations given ranged from a decrease of 17% to an increase of 530%, with eight health departments reporting a decrease. Changes in the remaining outcome variables were equally dramatic. The percentage of total immunizations that were HBV (t = -12.63, p < 0.01), percentage of total HBV immunizations that were given to children ages 10 to 14 (t = -19.16, p < 0.01), and percentage of total immunizations that were HBV given to

children ages 10 to 14 (t = -17.23, p < 0.01) all increased significantly.

Rural and non-rural

Descriptive findings and results of a comparison between 1998 and 1999 for rural and non-rural health departments are shown in Table 2. All outcome variables showed a significant increase in both rural and non-rural settings, with one exception: Health departments in non-rural settings did not have a significant increase in the total number of immunizations given. Rural health departments had a 19% increase in total immunizations administered, whereas non-rural health departments had an increase of only 8%.

Because of raw data differences in rural and non-rural settings, three outcome variables were standardized and percentage increases in rural and non-rural outcomes were compared. Only one significant finding was encountered: The percentage increase in the number of HBV immunizations given to 10- to 14-year-old children was significantly higher in rural health departments (t = 3.8, p = 0.008).

Use of alternative settings

Seventy-seven health departments provided adequate data for the analysis of alternative settings. Results comparing the change in three outcome variables from 1998 to 1999 for each of the three usage groups are presented in Table 3. Analyses of the remaining three variables were all statistically significant. All three groups showed significant increases in the administration of HBV vaccine. In health departments using alternative strategies, however, total immunizations administered did not increase significantly, nor was the increase as dramatic as in health departments not

Table 1. Statewide outcome variables and percent change from 1998 to 1999

Outcome variable	1998	1999	Change 1998 to 1999
	Mean	Mean	
Total immunizations	1,627	1,844	+13%
Total HBV immunizations	386	767	+99%
HBV immunizations given to 10–14-year-olds	101	480	+375%
	Percent	Percent	
Percentage of total immunizations that were HBV			
immunizations (HBV total/Total immunizations)	24	43	+71%
Percentage of total HBV immunizations that were given to			
10–14-year-olds (HBV 10–14-year-olds/total HBV)	26	61	+142%
Percentage of total immunizations that were HBV immunizations			
given to 10–14-year-olds (HBV 10–14-year olds/total immunizations)	6	26	+333%

HBV = hepatitis B virus

	1998	1999	t	р
	Mean	Mean		
Rural ($n = 65$)				
Total immunizations	985	1,168	-0.35	0.01
Total HBV immunizations	240	528	-8.89	< 0.01
HBV immunizations given to 10–14- year-olds	66	337	-10.85	< 0.01
	Percent	Percent		
Percentage of total immunizations that were HBV immunizations Percentage of total HBV immunizations that were given to	24	45	-11.86	<0.01
10–14-year-olds	28	64	-17.72	< 0.01
Percent of total immunizations that were HBV immunizations given 10–14-year-olds M	7	29	-16.61	<0.01
	Mean	Mean		
Non-rural $(n = 15)$				
Total immunizations	4,367	4,728	-1.49	0.158
Total HBV immunizations	1,009	1,791	-3.75	0.002
HBV immunizations given to 10–14-year-olds	244	1,070	-4.46	0.001
	Percent	Percent		
Percentage of total immunizations that were HBV immunizations	23	38	-5.03	<0.01
Percentage of total HBV immunizations that were given to 10–14-year-olds	24	60	-8.38	<0.01
Percentage of total immunizations that were HBV immunizations given 10–14-year-olds	6	23	-6.35	<0.01

HBV = hepatitis B virus

using alternative strategies. Differences among the three groups were not significant for total immunizations administered (F= 1.37, p=0.260), HBV immunizations (F = 3.09, p=0.051), or HBV immunizations given to children ages 10 to14 years (F= 2.84, p=0.065).

Health departments using alternative strategies in both 1998 and 1999 had mean total immunizations of 2,699 administered in 1998. Those using alternative strategies in 1999 had a 1998 mean of only 1,367, and health departments not using alternative strategies at all had a mean in 1998 of 1,060. It appeared that larger health departments in suburban and urban settings were more likely than smaller or rural health departments to use strategies outside of the traditional health department.

DISCUSSION

The total number of immunizations administered and the administration of HBV vaccine at health departments in Missouri increased significantly with the implementation of a policy requiring HBV immunization for seventh grade school entry. Impact on health departments was not consistent across the state, with rural health departments and those not using alternative strategies such as school-based programs noting the greatest increases. Some health departments actually reported a decrease in total immunizations administered during the year the policy took effect.

There were two unexpected findings: First, the total number of immunizations administered at non-rural health departments did not increase significantly during July, August, and September of 1999 when compared with the same period in 1998. Second, the number of HBV immunizations increased significantly, even in health departments where alternative strategies were employed.

There are several possible reasons for the insignificant increase in total immunizations administered at non-rural health departments. It may be that more children in urban and suburban areas used private providers to obtain immunizations. This explanation is plausible because the number of Missouri children enrolled in Medicaid managed care programs who

Table 3. Comparison of three outcome variables by use of alternative strategies

	n	Change 1998 to 1999	t	р
Use of strategies in both 1998 and 1999	21			
Total immunizations		+15%	-1.26	0.220
HBV immunizations		+97%	-3.00	0.007
HBV immunizations—children 10–14-years old		+161%	-875	< 0.01
Use of strategies in 1999 only	28			
Total immunizations		+23%	-1.44	0.163
HBV immunizations		+155%	-4.12	< 0.01
HBV immunizations—children 10–14-years old		+347%	-10.81	< 0.01
No alternative strategies used	28			
Total immunizations		+35%	-3.71	0.001
HBV immunizations		+194%	-7.02	< 0.01
HBV immunizations—children 10–14-years old		+396%	-14.22	<0.01

HBV = hepatitis B virus

received immunizations from a primary care provider increased 11% in urban areas from 1998 to 1999. The increase in the number of HBV vaccinations given at these health departments in 1999 suggests that nonrural health departments administered fewer non-HBV immunizations in July, August, and September to offset the increase in HBV immunizations. Because health departments have historically been very busy providing immunizations to school-age children during these months and the metropolitan areas had media campaigns advertising the new HBV requirement, it may be that parents of small children "knew" to schedule their children's immunization at other times of the year (Personal communication, Jan Wilson, RN, Public Health Nurse, Jackson County Missouri Health Department; November 22, 1999).

Such alternative strategies as school-based immunization programs have been found to be effective in easing the midsummer impact on health departments. Although the percentage of total immunizations that were HBV given to children 10- to14-years-old increased significantly at all health departments, the increase was highest at health departments that did not use alternative strategies (396%) and lowest at those where such strategies were in effect both years (161%). While effective, such strategies do not reach all children and their parents, as evidenced by the increase in HBV immunizations given prior to school entrance at all health department sites.

This research makes it clear that policies changing immunization requirements for school-age children will affect health departments. Policy-makers must therefore consider the impact of such changes on local public health practice. At the same time, health departments must anticipate the need for more immunizations and plan accordingly, not failing to seek the funding needed to implement a new policy.

Further research is needed, however, to determine how much funding is necessary to meet the needs of the public. Health departments that are unable to expand their services should anticipate significant increases in immunization administration in the months prior to school. The use of alternative strategies, such as sponsoring school-based immunization programs during the school year or providing immunizations at shopping centers in June, can mitigate the late summer impact of such policies and should be strongly considered.

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