

Hepatitis B birth dose vaccination decision-making over time in a cohort of mothers with multiple children in the Military Health System, 2014-2017

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Background

The hepatitis B (HepB) birth dose is the first vaccine recommended to be given in a child's life. First-time mothers may be more likely to have vaccine concerns, adopt an ACIS, or delay the HepB birth dose.⁷ There is little known on how parental vaccination decisions change over time or over subsequent children and how this impacts vaccine uptake. To understand longitudinal parental decision-making, we utilize diagnosis and CPT codes from infant inpatient and outpatient administrative claims, which include parental refusal codes, from the Military Health System (MHS), the global health system for the US Department of Defense (DoD). The objective of this study was to assess first-time mothers' decision-making on the HepB birth dose and the change in decision-making with subsequent children.

Methods

We conducted a longitudinal cohort analysis of mothers who had their first liveborn child and a subsequent liveborn child in the Military Health System (MHS) from January 1, 2014 through June 30, 2017 utilizing administrative claims data. We analyzed diagnosis codes for vaccine refusal and vaccination and current procedural terminology (CPT) codes to identify mother's vaccination decisions. Logistic regression models were used to assess parental vaccination decision for the firstborn on parental vaccination decision for the subsequent child. Two logistic regression models with a Firth's bias correction, were used to generate adjusted odds ratios for rare outcomes to reduce the small sample bias in maximum likelihood estimation. The first model assessed the binomial association of delaying the first HepB vaccine >3 days of life for the subsequent child given delaying the first HepB vaccine >3 days of life for the firstborn child compared to providing the HepB birth dose. The second model assessed the binomial association of refusing any HepB vaccine in the first 18 months of life for the subsequent child given refusing any HepB vaccine in the first 18 months of life for the firstborn child compared to providing the HepB birth dose.

Results

Overall, 96% of mothers made the same vaccination decision for both children, with 94% of mothers accepting the HepB birth dose for both children. When mothers decided to delay the first HepB vaccine >3 days or refuse any HepB vaccine for the first 18 months for the firstborn child, there was a higher odds of the mother delaying (aOR=46.2 (95% CI: 27.1, 78.9)) or refusing (aOR=176.2 (95% CI: 68.0, 456.5)) the first HepB vaccine for the subsequent child compared to accepting the HepB birth dose.

Table 1. Characteristics of study population by subsequent born hepatitis B vaccination decision

	Total N=3,685	Received HepB birth dose N=3,524	First HepB vaccine >3 days of life N=106	No HepB vaccine in first 18 months of life N=55	p- value
Maternal Race					
Non-White (%)	1,514	1,465 (41.6%)	29 (27.4%)	20 (36.4%)	0.01
White (%)	2,171	2,059 (58.4%)	77 (72.6%)	35 (63.6%)	
Military Branch					
Army (%)	1,449	1,404 (39.8%)	34 (32.1%)	11 (20%)	<.0001
Air Force (%)	658	622 (17.7%)	7 (6.6%)	29 (52.7%)	
Marine Corps (%)	509	469 (13.3%)	34 (32.1%)	6 (10.9%)	
Navy (%)	1,029	991 (28.1%)	29 (27.4%)	9 (16.4%)	
Other (%)	40	38 (1.1%)	2 (1.9%)	0 (0%)	
Mean Maternal Age at time of subsequent child's birth					
	3,685	27.4	28.6	27.9	0.02

Figure 1. Firstborn hepatitis B vaccination decision by subsequent born hepatitis B vaccination decision

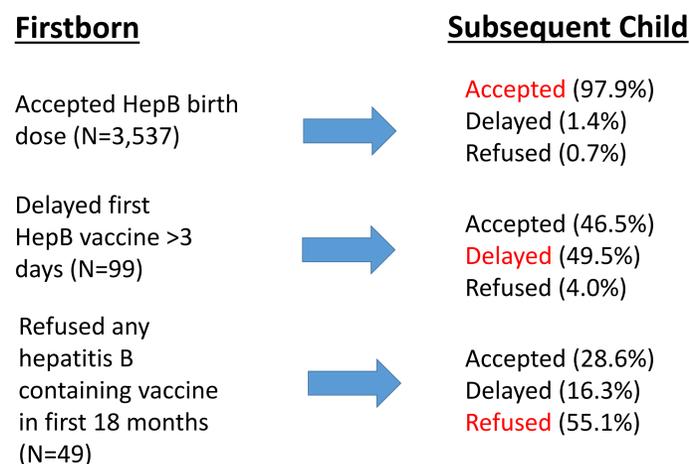


Table 2. Multivariable logistic regression analysis of subsequent child hepatitis B vaccination decision

	aOR ^a of delaying first HepB >3 days of life versus accepting HepB birth dose (95% CI)	aOR ^a of refusing any HepB vaccine in first 18 months of life versus accepting HepB birth dose (95% CI)
Firstborn receipt of HepB birth dose		
Accept HepB birth dose	Ref	Ref
Delay first HepB vaccine >3 days of life	46.2 (27.1, 78.9)	-
Refuse any HepB vaccines in first 18 months of life		
	-	176.2 (68.0, 456.5)
Maternal race		
White maternal race	Ref	Ref
Non-white maternal race	0.7 (0.4, 1.0)	0.9 (0.5, 1.6)
Maternal age at time of subsequent child's birth		
	1.0 (1.0, 1.1)	1.0 (1.0, 1.1)
Sponsor military branch		
Army	Ref	Ref
Air Force	0.6 (0.2, 1.7)	
Marine Corps	2.3 (0.9, 5.9)	
Navy	1.5 (0.6, 3.6)	2.3 (0.5, 10.6)
Other	4.3 (1.0, 18.6)	5.7 (0.4, 84.8)

Conclusion

First-time mothers in the MHS who had at least two children during the study period are compliant with the HepB birth dose recommendation, with 94% of all mothers providing the HepB birth dose to both children. Although rare, first-time mothers who delayed the first HepB vaccine >3 days of life and mothers who refused any HepB vaccines in the first 18 months of life had a higher odds of demonstrating the same vaccination decision for subsequent children. Public health interventions should focus on identifying mothers who do not comply with the hepatitis B vaccination recommendations for the first child, as this same vaccination decision is likely to be repeated in subsequent children. Non-compliance with the recommendations for the first vaccine of a child's life may also predict vaccination decisions for other childhood immunizations. Further research into this area is needed.