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Knowledge, attitudes, beliefs, and behaviors of parents and healthcare providers before and after implementation of a universal rotavirus vaccination program

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ABSTRACT

Objective: In Canada, rotavirus vaccine is recommended for all infants, but not all provinces/territories have publicly funded programs. We compared public and healthcare provider (HCP) knowledge, attitudes, beliefs, and behaviors in a province with a public health nurse-delivered, publicly funded rotavirus vaccination program to a province with a publicly funded, physician-delivered program. A third province with no vaccination program acted as a control.
Design: Information about knowledge, attitudes, beliefs, and behaviors of parents whose children were eligible for the universal program and healthcare providers responsible for administering the vaccine were collected through the use of two validated surveys distributed in public health clinics, physicians' offices, and via e-mail. Early and postvaccine-program survey results were compared.
Results: A total of 722 early implementation and 709 postimplementation parent surveys and 180 early and 141 postimplementation HCP surveys were analyzed. HCP and public attitudes toward rotavirus vaccination were generally positive and didn't change over time. More parents postprogram were aware of the NACI recommendation and the vaccination program and reported that their healthcare provider discussed rotavirus infection and vaccine with them. Prior to the program across all sites, more physicians than nurses were aware of the national recommendation regarding rotavirus vaccine. In the postprogram survey, however, more nurses were aware of the national recommendation and their provincial universal rotavirus vaccination program. Nurses had higher knowledge scores than physicians in the postprogram survey ($p < 0.001$). Parents of young infants were also more knowledgeable about rotavirus and rotavirus vaccine in the two areas where universal programs were in place ($p < 0.001$).
Conclusions: Implementation of a universal rotavirus vaccination program was associated with an increase in knowledge and more positive attitudes toward rotavirus vaccine amongst parents of eligible infants. Nurses involved in a public health-delivered vaccination program were more knowledgeable and had more positive attitudes toward the vaccine than physicians in a jurisdiction where vaccine was physician-delivered.

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1. Introduction

Rotavirus is the most common cause of infectious gastroenteritis in young children; almost all children will become infected by the age of five years [1–3]. Although primary infection after 3 months of age causes the most severe form of the disease, the spectrum of illness can range from mild gastroenteritis to dehydration, electrolyte imbalance, and shock [4]. In Canada and other industrialized countries, deaths resulting from rotavirus occur rarely, although hospitalizations, emergency room visits, and physician visits occur frequently [5,6]. Two orally administered rotavirus vaccines have been authorized for use in Canada for the prevention of rotavirus infection: RotaTeq® (Merck Canada Inc.) and Rotarix® (GlaxoSmithKline Inc.). Both vaccines were found to be safe and effective in large, phase 3 efficacy clinical trials [7,8]. In 2010, the National Advisory Committee for Immunization (NACI) recommended routine rotavirus vaccination, as did the Canadian Immunization Committee in 2014 [9,10]. Public funding for universal programs did not immediately follow the NACI recommendation because of remaining unknowns about the burden of illness of rotavirus in Canada, the effectiveness of the vaccine in a Canadian context, and the acceptability of a universal program among healthcare providers (HCP) and the public, despite Canadian data suggesting that the vaccines would be cost-effective [11,12]. Key stakeholders for the development and implementation of a new vaccine program include parents and guardians and HCPs. As part of a demonstration project that examined the implementation and effectiveness of a universal rotavirus vaccination program and factors that influence vaccine coverage [13,14], we conducted a series of surveys to examine and understand the psychosocial determinants of parents' acceptance of having their child immunized with rotavirus vaccine as well as HCPs' willingness to deliver the vaccine.

2. Methods

2.1. Study setting

Three jurisdictions with differing vaccine delivery systems participated in the study. Prince Edward Island (PEI), with an annual provincial birth cohort of 1452 infants has publicly funded vaccinations delivered by public health nurses in public health clinics. Capital Health (birth cohort of 4209 infants) in Nova Scotia, comprising more than 40% of the provincial population, has publicly funded vaccines delivered primarily by family physicians. Horizon Health Network in New Brunswick (NB) has an annual birth cohort of 1832 infants and served as the nonintervention location. The study, part of a comparison of the implementation of a universal rotavirus vaccination program delivered either by public health nurses or by family physicians, was set up as a multicenter trial with each province or provincial health district being an autonomous project unit but with a common protocol and questionnaire; the results of the program implementation and effectiveness have been reported [13,14].

2.2. Study population

All infants in Capital Health and PEI born between October 1, 2010 and September 30, 2012 were eligible to receive rotavirus vaccine (Rotarix®, GlaxoSmithKline) at no charge in a two-dose schedule beginning at two months of age as part of a universal rotavirus vaccination program (URVP). Funded rotavirus vaccine was not available in NB. Parents of eligible infants and health care providers in all three jurisdictions were invited to complete the surveys.

2.3. Theoretical perspective

The theory of planned behavior served as the theoretical framework for the design of the survey but was not used exclusively for the analysis. This theory has been used widely to predict health-related behaviors, and its efficiency and validity is recognized in general and for immunization-related behaviors [15]. The principal components of this model helped identify critical internal and external factors that impact the decision to receive or deliver the vaccine. Extensive literature review also revealed that parents' decision to accept or reject the rotavirus vaccine for their infants is the result of a variety of factors such as knowledge of the vaccine and the disease caused by the virus, benefits of the vaccine, concerns about safety and the occurrence of intussusception, fear of adverse events, and recommendations by a healthcare provider. HCPs are influenced in their decision to recommend the vaccine based on the funding status of the vaccine (publicly funded), recommendation by professional bodies, perception of the burden of the disease, and confidence in prelicensure studies on safety and efficacy. Time constraints associated with discussing rotavirus safety, availability of facilities to diagnose adverse events, and adequate vaccine supply were also cited as barriers for vaccine recommendation. Based on these factors and critical components from the theory, a set of variables were identified for use in the survey.

2.4. Study design

Surveys were distributed to parents of eligible infants six to nine months after initiation of the URVP (to assess knowledge, attitudes, beliefs, and behaviors early in the program implementation), with a second distribution occurring at the end of two years, after the URVP was completed. In NS and NB, parent surveys were distributed through family physician contacts, advertisements throughout the hospital, and maternal/baby venues in the community. In PEI, parents were invited to complete the survey by public health nurses at their baby's routine immunization visits. Both hard copy and electronic options for completion were made available. Stamped envelopes were provided to the parents who opted to complete their survey in hard copy. As an incentive, participants were eligible to enter a prize draw.

HCP surveys were distributed to all nurses and physicians in all three jurisdictions that deliver vaccines. In PEI, surveys were distributed to nurses at an educational day prior to the URVP being initiated. Surveys were also distributed postprogram to both physicians and nurses. In Nova Scotia, surveys were distributed via e-mail and through a variety of advertisements to nurses and physicians pre- and post-URVP program. HCP contact lists were provided by Public Health. In New Brunswick, surveys were distributed to physicians and nurses via e-mail at two points in time corresponding with the mail outs in Nova Scotia and using contact lists provided by the health authority. The research protocol was approved by the Research Ethics Board at the IWK Health Centre. For both parent and HCP surveys, informed consent was implied by survey completion.

2.5. Survey instrument development

The survey instruments were constructed following Dillman's principles of survey design [16]. The parent survey was modified from a previously validated instrument [17] and comprised 75 items measuring knowledge, attitudes, and beliefs about gastroenteritis (etiology, risk, and complications), rotavirus and rotavirus vaccine, and parental educational needs with respect to rotavirus protection and prevention. Demographic information and the