Parents’ and adolescents’ willingness to be vaccinated against serogroup B meningococcal disease during a mass vaccination in Saguenay–Lac-St-Jean (Quebec)

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A mass vaccination campaign with the 4CMenB vaccine (Bexsero®; Novartis Pharmaceutical Canada Inc) was launched in a serogroup B endemic area in Quebec. A telephone survey was conducted to assess parental and adolescent opinions about the acceptability of the vaccine. Intent to receive the vaccine or vaccine receipt was reported by the majority of parents (93%) and adolescents (75%). Meningitis was perceived as being a dangerous disease by the majority of parents and adolescents. The majority of respondents also considered the 4CMenB vaccine to be safe and effective. The main reason for positive vaccination intention or behaviour was self-protection, while a negative attitude toward vaccination in general was the main reason mentioned by parents who did not intend to have their child vaccinated. Adolescents mainly reported lack of interest, time or information, and low perceived susceptibility and disease severity as the main reasons for not intending to be vaccinated or not being vaccinated.

Key Words: 4CMenB vaccine; Adolescents; Children; Meningococcal serogroup B vaccine; Vaccine acceptability

In Canada, invasive meningococcal disease (IMD) is endemic with outbreaks caused by virulent Neisseria meningitidis clones. The incidence of IMD varies considerably depending on the different serogroups, age groups, geographical areas and time periods. Before 2005, most cases of IMD were caused by serogroup C (1). In recent years, the incidence of serogroup C disease has declined significantly due to the introduction of meningococcal C conjugate vaccine into routine immunization programs for infants, children and adolescents (2-4).

Since the widespread use of the meningococcal C conjugate vaccine, serogroup B infection now makes up the greatest proportion of reported IMD cases in Quebec (5). Between 2003 and 2010, 72% of all cases of meningococcal disease were due to serogroup B meningococci (6) and the province reported the highest incidence of serogroup B IMD across Canada. Important disparities in incidence occur among different regions in Quebec. In the area of Saguenay–Lac-St-Jean, the incidence of serogroup B IMD is seven times higher than in other areas in the province (5). Therefore, with the licensure in December 2013 of a new vaccine against meningococcal serogroup B (4CMenB, Bexsero®; Novartis Pharmaceutical Canada Inc.) (7), the Quebec Immunization Committee (CIQ) recommended vaccination of individuals from two months to 20 years of age residing in Saguenay–Lac-St-Jean to control the incidence of IMD caused by serogroup B (5). A targeted vaccination campaign was started on May 4, 2014.

In the context of the targeted mass vaccination campaign against meningococcal serogroup B disease in Saguenay–Lac-St-Jean, the objective of the present study was to assess the knowledge, attitudes and intention of parents of eligible children and of adolescents targeted to receive the 4CMenB vaccine over time. The present article describes the first phase of the study.

METHODS

Study design
The first phase of the present longitudinal study was conducted at the beginning of the mass vaccination campaign to assess the determinants of parents’ intention to have their child vaccinated with the 4CMenB vaccine (or adolescents’ intention to receive the 4CMenB...
TABLE 1
Parents’ and adolescents’ self-reported vaccine status

| All recommended vaccines | Some vaccines only | No vaccine | Do not know |
|--------------------------|-------------------|------------|-------------|
| Parents of children:     |                   |            |             |
| 2 months to <5 years of age | 88.3 (84.42–92.17) | 9.5 (6.00–13.02) | 1.7 (0.00–3.42) | 0.5 (0.00–1.17) |
| 5 years to <12 years of age | 96.2 (93.45–98.90) | 3.6 (0.91–6.29) | 0.2 (0.00–0.67) | 0.0 |
| 12 years to <16 years of age | 91.2 (86.62–95.86) | 7.9 (3.54–12.17) | 0.0 | 0.9 (0.00–2.69) |
| Total (parents) | 92.5 (90.40–94.53) | 6.5 (4.58–8.46) | 0.6 (0.06–1.21) | 0.4 (0.00–0.87) |
| Adolescents | 65.8 (57.98–73.64) | 29.0 (21.56–36.52) | 0.7 (0.00–2.19) | 4.4 (0.93–7.89) |

Data presented as % (95% CI)

Table 1 shows the self-reported vaccine status of parents and adolescents. The table lists the percentages of parents and adolescents who reported having had all recommended vaccines, some vaccines, no vaccine, or not knowing their vaccination status. The data is presented as a table with columns for each category of vaccine status and rows for different age groups of parents and adolescents.
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frequent reason mentioned by parents who did not intend to have their child vaccinated was opposition to vaccination in general. For adolescents, lack of interest, time or information about the vaccine and low perceived susceptibility to infection and perceived low disease severity were the main reasons cited by adolescents who did not intend to be vaccinated.

The results of questions assessing respondents’ knowledge, beliefs and attitudes regarding IMD and the 4CMenB vaccine are illustrated in Figure 1. Generally, the majority of respondents considered IMD to be a severe disease and were worried about their own or their child’s susceptibility to it. Most respondents also perceived 4CMenB vaccine to be safe and effective. Five percent of adolescents and 6% of parents answered “I don’t know” to the question about the vaccine’s safety. More than 90% of respondents also considered that it was their duty to receive the vaccine or to vaccinate their child to prevent the transmission of meningitis to others in their community.

Parents who were less educated (high school diploma or less) were more worried that their child could contract meningitis when compared with parents with a college or university degree (78%, 62% and 57%, respectively, P<0.0001). In addition, among adolescents, more girls than boys were worried about the risk of contracting meningitis (57% versus 29%, P=0.0002).

Because almost all parents intended to have or had their child vaccinated, it was not possible to perform multivariate analyses. However, a multivariate regression analysis was performed to identify the factors associated with adolescents’ intention not to be vaccinated. The results of this multivariate analysis are presented in Table 3. Not being aware of the vaccination campaign, believing that the 4CMenB was not safe and not believing that it was a duty to be vaccinated to prevent the spread of infection in the community were associated with the intention not to be vaccinated with the 4CMenB vaccine.

DISCUSSION

Results of the first phase of our study indicated that the majority of respondents were aware of the mass vaccination campaign against meningococcal serogroup B disease that was going on in Saguenay–Lac-St-Jean. This is not surprising given that the survey was conducted two weeks after the official announcement of the campaign, which was highly publicized in local media (13-16).

Our results illustrate a high willingness to receive the new 4CMenB in the context of a targeted mass campaign. More than nine of 10 parents indicated an intention to have their child vaccinated or had already done so. Almost three of four adolescents surveyed indicated an intention to receive the vaccine or had received it. As in other studies, our results indicate a strong association between having received all recommended vaccines and intending to receive the new vaccine (17,18).

Our results mirror findings from prelicensure trials that showed a high level of acceptability for the vaccine (17-26). Because it can
arise in an unpredictable manner, develop rapidly and lead to serious consequences, meningitis has characteristics that increase the public’s perception of risk (27). Meningitis was perceived as being a dangerous disease by the majority of parents and adolescents surveyed. The death due to serogroup B meningitis of a 16-year-old adolescent living in Saguenay–Lac-St-Jean in spring 2014, before the launch of the campaign, was covered extensively by the media and has probably contributed to the perceived risk of the disease in the public (28-30). In fact, approximately two-thirds of parents reported that they were worried about the risk for their child contracting the disease. Although adolescents between 15 and 20 years of age have high rates of IMD (31), fewer adolescents were concerned about their own risk for contracting meningitis.

Different studies have shown that new vaccines are likely to engender doubts and concerns (17,32,33). For instance, in a recent pan-Canadian survey, one-half of the parents were concerned that new vaccines are not as safe as older vaccines, and one-third believed that children today receive too many vaccines (34). The fact that the 4CMenB vaccine is new did not have an important influence on its acceptability by parents and adolescents in our study. A minority of respondents have cited the novelty of the vaccine as a reason for not intending to be vaccinated. In the particular context of an endemic situation, the perceived threat of the disease may outweigh the perceived risks associated with new vaccines (35,36).

Clinical trials showed the 4CMenB vaccine to be more reactogenic than vaccines routinely used in Quebec, which we hypothesized could have a negative impact on its acceptability (37,38). We anticipated that (real or perceived) side effects after the first dose, such as pain and fever, could compromise the acceptability of the subsequent doses and even have a negative impact on the acceptability of other routine vaccines (39-42). For instance, the results of one study on vaccination against seasonal influenza highlighted the reduced acceptability of a second dose of the vaccine on the basis of the severity of side effects perceived by parents after the first dose (39). The second phase of our study will provide additional information on this issue.

The present study had both strengths and limitations. The response rate of 72% is well above rates typically obtained with telephone surveys (43,44). Other strengths of the present study were the use of random-digit dialling methodology for data collection and the use of case-weights to adjust for disproportionate sampling and non-response bias. However, similar to most surveys, we cannot exclude the potential of socially desirable responses, which is the tendency of respondents to reply in a manner that will be viewed favourably by others. The survey was conducted only in French; however, <1% of the contacted households did not participate due to a language barrier. We used a telephone survey, which resulted in a recruitment bias toward more educated individuals and against the young and new residents of a community with no household telephone number (43). However, it is known that in Quebec most families with young children are residents of the same community for several years and most of them have a household telephone number. In 2013, 89% of Quebecers households with children reported using a landline telephone (45). Finally, because of the gap between intention and behaviour (46,47), our findings are limited by the fact that our survey was conducted at the beginning of the campaign. To conclude, the first phase of the present study has indicated high acceptance of the new 4CMenB vaccine at the beginning of the mass campaign in Saguenay–Lac-St-Jean. Intention to receive the vaccine was high, as was perceived severity and susceptability of the disease. The second phase of the study, which will be conducted in March and April 2015, after the end of the campaign, will provide additional information on the determinants of acceptance of the vaccine. It will then be possible to describe the determinants for having received one, all or none of the recommended doses of the 4CMenB vaccine. We will also be able to assess the potential impact of adverse events after the first dose (real or perceived) on the acceptability of the subsequent doses and of other scheduled vaccines.

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