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Preventive Medicine 161 (2022) 107125

Contents lists available at ScienceDirect

Preventive Medicine

journal homepage: www.elsevier.com/locate/ypmed

Parents' perceptions on COVID-19 vaccination as the new *routine* for their children ≤ 11 years old

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ARTICLE INFO

Keywords:
COVID-19
Vaccination
Immunization
Parent
Intention
Perceptions
Children

ABSTRACT

Canadian children 5–11 years old became eligible for COVID-19 vaccination on November 19, 2021, with eligibility for younger children expected later. We aimed to descriptively assess parents' COVID-19 vaccine intentions and acceptability of future doses, including co-administration and annual vaccination for their children. We conducted a cross-sectional Canadian online survey of parents from October 14–November 12, 2021, just prior to authorization of the pediatric formulation of the BNT162b2 COVID-19 vaccine for children aged 5–11 years. We assessed parents' intention to vaccinate their children aged 5–11 years, 2–4 years, and 6–23 months; reasons for their intention; and preferences for delivery and access to vaccines. Of 1129 parents, 56% intended to vaccinate their child aged 5–11 years against COVID-19; intentions were lower for children aged 6–23 months (41.9%) and 2–4 years (45.4%). Most parents who intended to vaccinate supported co-administration with routine (61.1%) or influenza (55.4%) vaccines, administration at school (63.6%), receipt of booster doses of COVID-19 vaccine (57.8%), and annual vaccination (56.4%) for their child. Despite parents' high COVID-19 vaccination uptake for themselves (88.8%), intentions for children aged 5–11 years was low. Currently, 56.9% of Canadian children aged 5–11 years have received one dose of a COVID-19 vaccine, and only 37.1% are fully vaccinated. Given that intentions for children <5 years was lower than those 5–11 years, we can also expect low uptake in this group. Parents' preferences regarding delivery and access to COVID-19 vaccination should be considered by public health officials when planning vaccination strategies for children.

1. Introduction

The first pediatric COVID-19 vaccine product, BNT162b2 (Pfizer-BioNTech, 10 micrograms/dose), was authorized for use in children 5–11 years by Health Canada on November 19, 2021 (Government of Canada, 2021a). Although severe COVID-19 disease is rare in children and adolescents, vaccination of adolescents 12–17 years has been associated with a reduction in hospitalization for COVID-19 (Delahoy et al., 2021; Ioannidis, 2021) and risk of Multisystem Inflammatory Syndrome (MIS-C) (Olson et al., 2022; Xue and Shen, 2021; Zambrano et al., 2022) in this age group. Waning protection of COVID-19 vaccines against infection (Goldberg et al., 2021; Levin et al., 2021), and to a lesser extent against hospitalizations (Andrews et al., 2022), raise questions about the need for regular booster doses to ensure optimal protection. As we move from a pandemic to an endemic state, it is reasonable to anticipate that COVID-19 vaccination may become the new 'routine'.

Currently, few national studies focus on parents' COVID-19

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https://doi.org/10.1016/j.ypmed.2022.107125
Received 5 April 2022; Received in revised form 9 June 2022; Accepted 27 June 2022
Available online 2 July 2022
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vaccination intentions for younger children in Canada (Lackner and Wang, 2021) and their perceptions about ideal strategies to deliver COVID-19 vaccines to their children. Specifically, limited research is available on parents' intentions for COVID-19 vaccination across different age groups of children (Hamel et al., 2021; McKinnon et al., 2021; Szilagyi et al., 2021), as well as parents' perceptions on co-administration with other routine vaccines, school-based delivery, booster doses (e.g., third doses), annual vaccination, and children's self-consent for receipt of vaccination (Ioannidis, 2021; Olick et al., 2022). Addressing these gaps in knowledge will enable the implementation of evidence-informed strategies to promote COVID-19 vaccination as the new routine.

As a descriptive study, we sought to answer questions about parents' COVID-19 vaccination intentions for their children, reasons for their intentions, and preferences for future vaccine delivery. Therefore, the objective of this study was to assess a national sample of Canadian parents regarding their COVID-19 vaccination intentions and delivery preferences for their children ≤11 years old, and thereby identify factors that support inclusive and accessible vaccine services. Parents with children aged 5–11 years were our primary focus, and we also assessed for differences among parents with children aged 2–4 years and those 6–23 months, anticipating future vaccine eligibility and administration.

2. Methods

2.1. Study design and participants

We conducted a cross-sectional national online survey with respondents selected from a panel of >400,000 Canadians from a well-established national polling firm (Leger360.com [Internet], n.d.). The overall survey sample ($N = 6026$) was representative for population size in all provinces, and by sex and age, based on data from the latest Census (Statistics Canada, 2016). Respondents were adults who have access to the internet and are proficient in reading English or French. To ensure rigor and validity (Eysenbach, 2004), respondents had unique URLs and 15% of respondents were contacted by telephone for identity verification.

The unweighted survey sample used in this analysis included a subset of respondents ($N = 1129$) who identified as being a primary caregiver to one or more children aged 6 months-11 years. Of these parents, three age groups were assessed: children 6–23 months, 2–4 years, and 5–11 years. To enable parents to refer to a specific child in their responses, we asked them to answer for their youngest child within each age group. These methods are consistent with other studies (Dubé et al., 2018; Frew et al., 2016). We estimated the minimal sample size of the target parent population to be 402, based on the maximum variability possible in the outcome variable in the population (i.e., a proportion of 0.50), with a margin of error of +/− 5% and 95% confidence intervals (CI).

The 75-question online survey took an average of 22 min to complete, and was conducted from October 14–November 12, 2021, just prior to the approval of the first COVID-19 vaccine (i.e., BNT162b2) for children aged 5–11 years (Government of Canada, 2021b). The survey instrument was developed by drawing from a previous survey of Canadians' acceptance of routine childhood vaccines (Dubé et al., 2018), a previous national survey about perceptions and intentions for COVID-19 vaccination (Humble et al., 2021), previously validated questions about perceptions of vaccination (Betsch et al., 2018), areas of focus for our policy partners (including the Canadian National Advisory Committee on Immunization Secretariat [NACI]), and the expertise of our national team of immunization researchers and policy advisors. The draft questionnaire was reviewed by public health experts, pre-tested with team members, and then pilot tested with 47 members of the public and revised accordingly. This study received approval from the Health Research Ethics Board at the University of Alberta.

2.2. Measures

Our primary focus was parents' intention and perceptions regarding COVID-19 vaccination of their children aged 5–11 years, as well as future vaccination for children <5 years old. Other areas of interest included parents' perceptions about future administration strategies for COVID-19 vaccines for children (i.e., co-administration with influenza or routine vaccines, school delivery, having a third dose, annual vaccination), the relative importance of vaccine safety versus effectiveness, appropriate age of self-consent, and access to COVID-19 vaccination. Sociodemographic characteristics included: parents' province of residence, age, gender, level of education, annual household income, marital status, ethnicity, newcomer status (i.e., arrival in Canada within the last 5 years), language most often spoken at home, and number of children. Survey questions can be found in the Appendix (Table A1).

2.3. Statistical analysis

We calculated descriptive statistics (i.e., frequencies and percentages) for all variables, along with 95% CIs using the Wilson method to examine differences in parents' COVID-19 vaccine intention by their children's age. We coded responses to the single open-ended question to identify emerging themes. No data were missing due to the online survey completion requirements. We analyzed data using SPSS version 26.0 (IBM, Chicago, IL, USA).

3. Results

3.1. Characteristics of sample

Characteristics of our sample of parents with children 5–11 years old ($N = 1129$) are provided in Table 1.

3.2. Parents' vaccination intentions and reasons for them

Slightly more than half (56.3%) of parents in our sample intended to vaccinate their child aged 5–11 years when a COVID-19 vaccine was recommended for them (see Table 2). Twenty-three percent of parents were undecided about vaccinating their child, and 20.4% reported no intention. Parents who intended to vaccinate their child (Fig. 1) reported that their top reasons to vaccinate were to protect their child (90.8%) or family (84.9%) from COVID-19, prevent spread of COVID-19 (60.6%), and to return to normal life (46.9%). Protecting their child from COVID-19 was ranked first by most parents (77.7%), while protecting their family from COVID-19 was most often ranked second (64.7%). Fewer parents reported that recommendations by health care providers influenced their intention to vaccinate (15.3%). Parents who were undecided or did not intend to vaccinate their child against COVID-19 (Fig. 2) reported concerns about safety of the vaccine (86.4%), the speed of vaccine development (72.8%), and the fact that it was a new vaccine (65.3%) in their top three reasons for not vaccinating their child against COVID-19. Concerns with vaccine safety and newness were ranked first by 38.3% and 29.4% of parents, respectively. Most parents (58.3%) suggested that children should be 15 years and older to decide on their own (self-consent) whether to get vaccinated against COVID-19. Supplementary cross-tabulation of associations between parents' COVID-19 vaccination intentions for their child (5–11 years) and sociodemographic characteristics, parent and child COVID-19 disease, and parent vaccination status are provided in the Appendix (Table A2).

3.3. Parents delivery and access preferences

As shown in Table 2, of the parents who intended to vaccinate their child aged 5–11 years against COVID-19 or were undecided ($n = 899$), the majority stated that they would agree to have the COVID-19 vaccine co-administered with childhood routine vaccines (61.1%) or the

Table 1
Characteristics of parents of children 5–11 years old (N = 1129).

Characteristics		Total % (n)
Province of residence	British Columbia	10.5 (118)
	Alberta	11.3 (128)
	Saskatchewan	2.7 (31)
	Manitoba	3.2 (36)
	Ontario	29.0 (327)
	Quebec	37.6 (424)
	Atlantic provinces[a]	5.7 (65)
Age	15–29 years	7.4 (84)
	30–39 years	45.2 (510)
	40–49 years	39.9 (450)
	50–59 years	6.6 (74)
	≥ 60 years	1.0 (11)
Gender	Woman	59.4 (670)
	Man	40.4 (456)
	Other	0.3 (3)
Highest level of education	High school or less	11.2 (127)
	Non-university certificate or diploma (college/ apprenticeship)	34.0 (384)
	University degree/Bachelor's or more than Bachelor's	53.9 (609)
	Prefer not to answer	0.8 (9)
Annual household income	< $40,000	9.4 (106)
	$40,000-79,000	25.8 (291)
	≥ $ 80,000	57.7 (651)
	Prefer not to answer	7.2 (81)
Marital status	Not married	14.3 (161)
	Married/common-law	85.2 (962)
	Prefer not to answer	0.5 (6)
Ethnic or cultural origin	White	69.5 (785)
	Visible minority[b]	21.3 (241)
	Indigenous[c]	8.8 (99)
	Prefer not to answer	0.4 (4)
Newcomer to Canada in the past 5 years	Yes	8.6 (97)
	No	91.4 (1032)
Language spoken most often at home	English	55.1 (622)
	French	34.1 (385)
	Indigenous languages	0.2 (2)
	Minority	10.6 (120)
Number of children in household (0–17 years old)	1 child	23.9 (270)
	2 children	51.4 (580)
	3 children	18.1 (204)
	4 or more children	6.6 (75)
COVID-19 vaccination status for parents and their older children		
Have you (the parent) received any doses of a COVID-19 vaccine?	Yes	88.8 (1003)
	No	11.2 (126)
	Yes	
Has your 12–17-year-old child received any doses of a COVID-19 vaccine?[d] (*N* = 339)	No	80.5 (273) 19.5 (66)

[a] Atlantic provinces include PEI, Nova Scotia, New Brunswick, and Newfoundland and Labrador.
[b] Visible minority groups including Black, Latin/Central American, Arabic/ West Asian/North African, East Asian, South Asian, and any respondents who selected one of these groups and White.
[c] Indigenous respondents are individuals who self-identified as First Nations, Métis, or Inuk.
[d] Parents of children 5–11 years old, who also had an older child 12–17 years old.

influenza vaccine (55.4%), to have their child receive the vaccine at school (63.6%), and would accept a booster dose (57.8%) and annual administration for their child (56.4%). Yet, many parents reported that they would not accept co-administration with influenza (22.5%), or routine vaccines (16.5%), 16.5% would not accept vaccination at school, and 14.5% would not accept a booster dose or annual vaccination (16.8%) for their child. As seen in Fig. 3, fewer parents that were undecided about COVID-19 vaccination for their child supported these statements.

Most parents believed that they would not have difficulty accessing COVID-19 vaccination services for their children (82.2%), whereas 10.9% reported they would have difficulty. Making a vaccination appointment (5.6%) and vaccination locations being inaccessible (3.1%) were the most common reported barriers to access. Parents reported that providing COVID-19 vaccines for their children at school (29.6%) and at a pharmacy (28.6%) would be the easiest locations. Furthermore, many parents answered that having drop-in clinics (47.9%), allowing family members to be vaccinated at the same time (45.3%), and having clinics close to the communities they live or work in (42.6%) would make access easier. Some also highlighted the importance of paid time off from work to get vaccinated (28.5%), culturally safe vaccination settings (13.3%), and having language-specific vaccination information (12.1%).

3.4. Open-ended question: COVID-19 vaccine information and access

Many parents ($n = 522$) responded to an open-ended question, "How can health officials in Canada improve information and/or access to COVID-19 vaccines for parents deciding whether to vaccinate their children?" The top four themes included: improving the method of delivering COVID-19 information to the public (36.4%, $n = 190$) (i.e., timely messaging through schools and health care providers); expanding the type of knowledge available about COVID-19 vaccines (26.6%, $n = 139$) (i.e., reliable risks and benefits of vaccination); adjusting public policies on COVID-19 vaccination (14.6%, $n = 76$) (i.e., removing or implementing vaccine mandates); and improving access to COVID-19 vaccines (13.6%, $n = 71$) (i.e., school-based vaccine delivery). Open-ended responses are provided in the Appendix (Table A3) to illustrate differences between parents who intended to vaccinate their children against COVID-19 (60.3%, $n = 315$), and those who were undecided (20.1%, $n = 105$), or had no intention (19.5%, $n = 102$).

3.5. Differences in COVID-19 vaccine intention by children's age

As shown in Table 3, parents of children aged 8–11 years had the highest intention to vaccinate their children against COVID-19 (58.1%; 95% CI: 53.8, 62.3), followed by parents of children aged 5–7 years (54.8%; 95% CI: 50.9, 58.7) and parents of 2–4 year old children (45.4%; 95% CI: 41.6, 49.2), while parents of children aged 6–23

Table 2
Parents' COVID-19 vaccine intentions and delivery preferences for their children.

Parent responses		Total % (n)
Parents' intention to vaccinate their child 5–11 years old ($N = 1129$)		
Do you intend to get a COVID-19 vaccine for your child, when a vaccine is recommended for them?	Yes	56.3 (636)
	Undecided	23.3 (263)
	No	20.4 (230)
If yes, what is the main reason you would get a COVID-19 vaccine for your child? ($N = 636$)	If it is mandated for my child (e.g., required for school, recreational/social activities, or travel)	9.6 (61)
	It would be a personal choice	90.4 (575)
Parents' preference for future COVID-19 vaccine delivery for their child aged 5–11 years[a] (N = 899)		
If it was recommended, would you get a COVID-19 vaccine at the same time as the influenza vaccine for your child?	Yes	55.4 (498)
	Undecided	22.1 (199)
	No	22.5 (202)
If it was recommended, would you get a COVID-19 vaccine at the same time as routine vaccines (e.g., measles, meningococcal) for your child?	Yes	61.1 (549)
	Undecided	22.5 (202)
	No	16.5 (148)
If it is offered, would you agree to have your child receive the COVID-19 vaccine at school?	Yes	63.6 (572)
	Undecided	19.8 (178)
	No	16.6 (149)
Parents' preference for future COVID-19 vaccine delivery for their children[a] (N = 899)		
If a booster dose (e.g., third dose) of COVID-19 vaccine was recommended, would you get it for your child(ren)?	Yes	57.8 (520)
	Undecided	27.7 (249)
	No	14.5 (130)
If it was recommended, would you get a COVID-19 vaccine every year for your child(ren) (similar to the seasonal influenza vaccine)?[b]	Yes	56.4 (507)
	Undecided	26.8 (241)
	No	16.8 (151)
When thinking about vaccinating your child(ren), what vaccine would you choose?[c]	A vaccine that is more effective even if it has more side effects	29.9 (269)
	A vaccine with less side effects even if it was less effective	26.8 (241)
	Any vaccine recommended and available to my child	43.3 (389)
In your opinion, at what age should a child(ren) be able to decide on their own (self-consent) whether to get a COVID-19 vaccine?[c]	< 11 years old	5.6 (63)
	11–12 years old	16.5 (186)
	13–14 years old	15.4 (174)
	15–16 years old	25.2 (285)
	17–18 years old	23.4 (264)
	> 18 years old	9.7 (109)
	Undecided	4.3 (48)
Parents' preferences for access to COVID-19 vaccines for their children[a, c] (N = 899)		
Do you expect that you will have difficulty accessing COVID-19 vaccine services for your child (ren)?	Yes, the vaccination locations are not accessible to me	3.1 (28)
	Yes, making a vaccination appointment will not be easy	5.6 (50)
	Yes, I don't have a regular health care provider	1.1 (10)
	Yes, I'm too busy with other competing priorities in my like	1.1 (10)
	I don't know if I will have difficulty accessing vaccine services	6.2 (56)
	No	82.2 (739)
	Other, please specify	0.7 (6)
What would be the easiest location for you to get the COVID-19 vaccine for your child(ren)?	My child's school	29.6 (266)
	Pharmacy	28.6 (257)
	A temporary vaccination centre	14.6 (131)
	Doctor's office	14.6 (131)
	Public health centre	8.7 (78)
	Mobile vaccination clinic	1.9 (17)
	My child's daycare or before/after school care	1.8 (16)
	Other location	0.3 (3)
What would make getting a COVID-19 vaccine for your child(ren) easier?	No appointment required (Drop-in/walk-in clinic)	47.9 (431)
	Allow my whole family to be vaccinated at the same time	45.3 (407)
	COVID-19 vaccine services close to the community I live or work in	42.6 (383)
	Paid time off from work to get vaccinated	28.5 (256)
	Culturally safe and welcoming vaccination settings	13.3 (120)
	Vaccination information in the language I understand best	12.1 (109)
	Improve access to vaccination services for children with disabilities	7.9 (71)
	Having transportation to/from vaccination clinics	7.5 (67)
	Prefer not to answer	4.9 (44)
	Other, please specify	2.1 (19)

[a] Parents who answered "yes" or "undecided" about vaccinating their child 5–11 years old.
[b] Parents answered in general for their children aged 6 months - 11 years.
[c] Parents answered in general for their children aged 6 months - 17 years.

months had the lowest intention (41.9%; 95% CI: 37.1, 46.8). Conversely, a higher proportion of parents of younger children (i.e., 6–23 months) reported that they would get a COVID-19 vaccine at the same time as influenza or routine vaccines for their child (60.0% and 64.6%, respectively) compared to parents of older children, but the differences between the four age groups were not significant as the CIs were overlapping.

4. Discussion

This cross-sectional survey of Canadian parents was conducted two weeks before the Pfizer-BioNTech COVID-19 vaccine was approved in Canada for children aged 5–11 years (November 19, 2021) (Government of Canada, 2021c). In a sample of parents who are largely vaccinated themselves (88.8%), surprisingly only 56.3% intended to vaccinate their child aged 5–11 years against COVID-19, while a quarter remained undecided (23.3%) or had no intention (20.4%). Four months after its

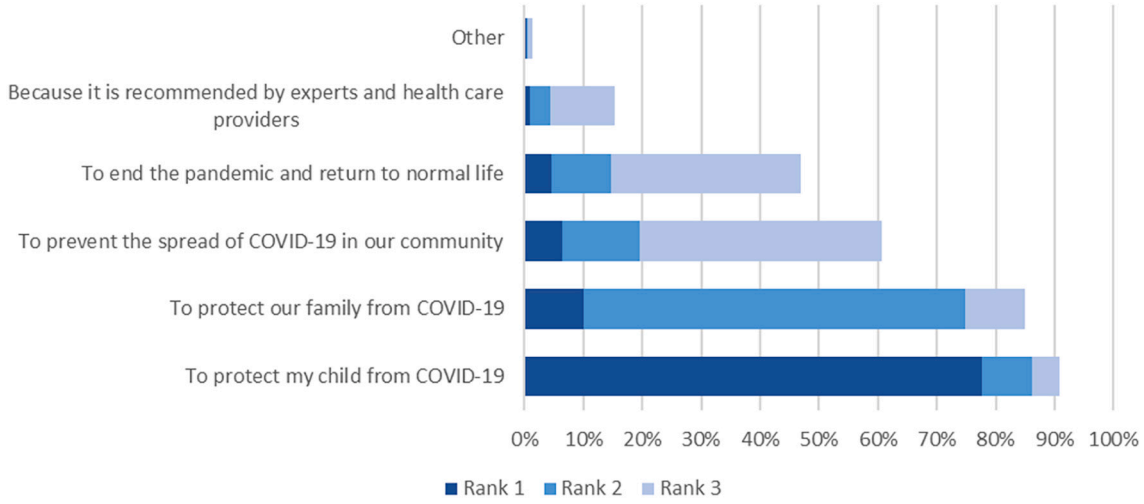

Fig. 1. Parents' reasons for vaccinating their 5–11-year-old child against COVID-19, as reported by parents who intended to vaccinate for personal reasons (Table 2; $n = 573$[a]).
Note.[a] Data were missing for two respondents.

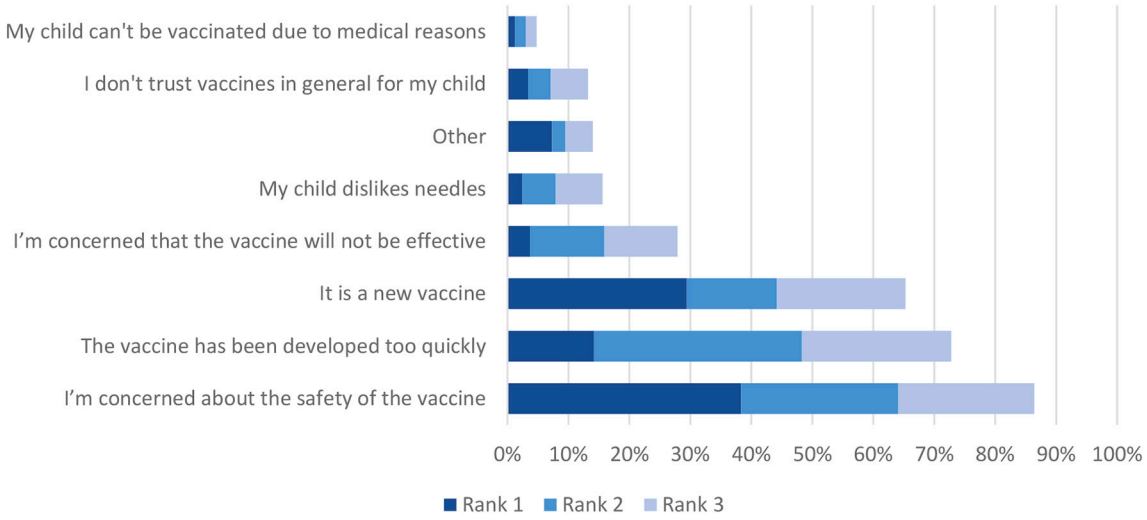

Fig. 2. Parents' reasons for reluctance to vaccinate their 5–11-year-old child against COVID-19, as reported by those who were undecided or did not intend to vaccinate ($n = 493$).

approval (as of March 13, 2022), 56.9% of children aged 5–11 years had received at least one dose of a COVID-19 vaccine and only 37.1% were fully vaccinated (Government of Canada, 2022a). In comparison, four months after the Pfizer-BioNTech vaccine was approved for use in Canadian children aged 12–17 years (September 4, 2021), 79.6% had received at least one dose (Government of Canada, 2021d) and 69.2% were fully vaccinated. The few studies that have explored parents' intentions for children <12 years report similar findings of lower vaccination intention compared to that of parents with older children (Hamel et al., 2021; McKinnon et al., 2021; Szilagyi et al., 2021).

While reasons for the low intention in parents of younger children are still unclear, it is likely that concerns regarding the safety and effectiveness of COVID-19 vaccines for younger children may play a role. In our study, parents who were undecided or did not intend to vaccinate their 5–11-year-old child most commonly identified concerns with the safety of COVID-19 vaccines, how quickly the vaccines were developed, the newness of the vaccines, and whether they would be effective in preventing COVID-19 transmission or disease severity in their child aged 5–11 years. Open-ended responses expanded on parents' concerns about the safety and efficacy of COVID-19 vaccines including possible long-term effects and perceived misinformation about the benefits and risks of vaccination in children. Indeed, rare cases of myocarditis and pericarditis (Dionne et al., 2021) and other side effects have been reported in a small number of vaccinated children aged 12–17 years (Husby et al., 2021; Marshall et al., 2021; Østergaard et al., 2021; Zou and Cao, 2021) and some countries have suspended administration of the mRNA-1273 COVID-19 vaccine in adolescents aged 12–18 years due to an increased risk of myocarditis in this age group (Dionne et al., 2021; Rao et al., 2021). Given the lower severity of COVID-19 disease in children (Zou and Cao, 2021; Zheng et al., 2021), it is possible that parents may perceive that the risks of COVID-19 vaccination outweigh the benefits. Thus, ongoing communication about the risk-benefit balance of COVID-19 disease and vaccination for children is critical to provide parents with accurate and timely information on the importance of vaccination in younger children. Key messaging should include the potential risks of severe acute COVID-19 and/or MIS-C (which can occur in otherwise healthy children), and insufficient protection achieved solely by vaccination of adults due to the limited ability of existing vaccines to block transmission (Delahoy et al., 2021; Ioannidis, 2021; Olson et al., 2022; Xue and Shen, 2021; Zambrano et al.,

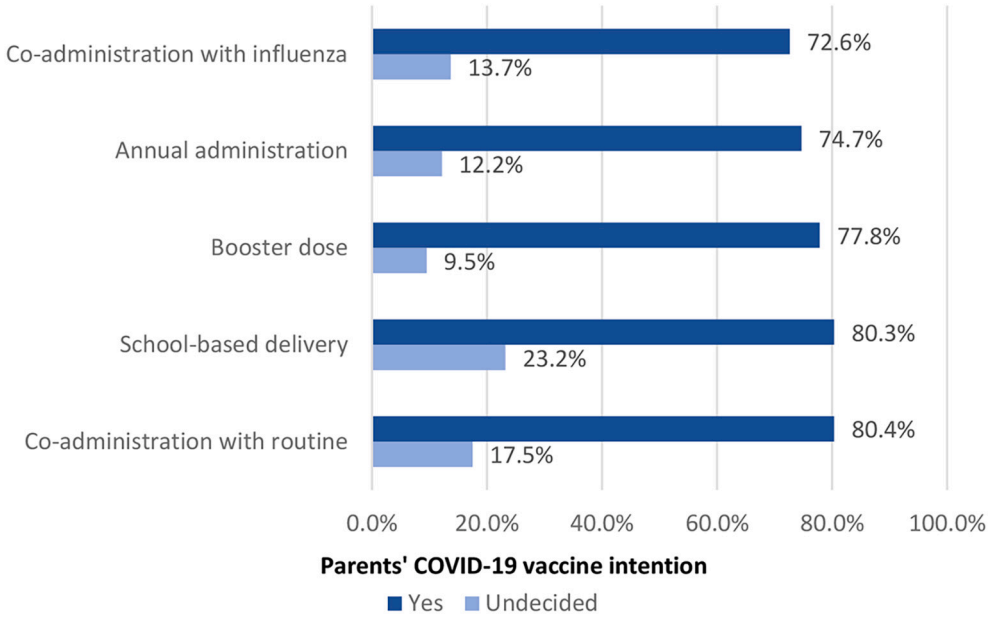

Fig. 3. Percentage of parents who supported each COVID-19 vaccine delivery strategy, grouped by their intention to vaccinate their child aged 5–11 years against COVID-19.
Note. Only parents who intended to vaccinate their child (n=636) or were undecided (n=263) were asked about their support of these COVID-19 vaccine delivery strategies.

Table 3
Parents' COVID-19 vaccination intentions for children of various age ranges.

Variable		Parents with a child 6–23 months old (N = 394) % (CI), n	Parents with a child 2–4 years old (N = 646) % (CI), n	Parents with a child 5–7 years old (N = 613) % (CI), n	Parents with a child 8–11 years old (N = 516) % (CI), n
Do you intend to get a COVID-19 vaccine for your child, when a vaccine is recommended for them?	Yes	41.9% (37.1–46.8), 165	45.4% (41.6–49.2), 168	54.8% (50.9–58.7), 336	58.1% (53.8–62.3), 300
	Undecided	29.2% (24.9–33.9), 115	28.6% (25.3–32.2), 185	23.8% (20.6–27.4), 146	22.7% (19.3–26.5), 117
	No	28.9% (24.7–33.6), 114	26.0% (22.8–29.5), 168	21.4% (18.3–24.8), 131	19.2% (16–22.8), 99
If it was recommended, would you get a COVID-19 vaccine at the same time as the influenza vaccine for your child?[a,b]	Yes	60.0% (54.2–65.6), 168	56.1% (51.6–60.5), 268	58.1% (53.6–62.4), 280	52.3% (47.5–57), 218
	Undecided	24.3% (19.6–29.6), 68	25.7% (22–29.8), 123	21.6% (18.1–25.5), 104	22.8% (19–27), 95
	No	15.7% (11.9–20.4), 44	18.2% (15–21.9), 87	20.3% (17–24.2), 98	24.9% (21–29.3), 104
If it was recommended, would you get a COVID-19 vaccine at the same time as routine vaccines (e.g., measles, meningococcal) for your child?[a,c]	Yes	64.6% (58.9–70), 181	63.8% (59.4–68), 305	63.3% (58.9–67.5), 305	58.5% (53.7–63.1), 244
	Undecided	23.6% (19–28.9), 66	24.1% (20.4–28.1), 115	21.0% (17.6–24.8), 101	24.2% (20.4–28.6), 101
	No	11.8% (8.5–16.1), 33	12.1% (9.5–15.4), 58	15.8% (12.8–19.3), 76	17.3% (13.9–21.2), 72

[a] Only asked of parents who answered "yes" or "undecided" about vaccinating their child 6–23 months old (N = 280), 2–4 years old (N = 478), 5–7 years old (N = 482), and 8–11 years old (N = 417) against COVID-19.
[b] Responses may include parents who do not intend to vaccinate their child against influenza or live in a province where influenza vaccine is not recommended for children.
[c] Responses may include parents who do not intend to give their child other routine vaccines.

2022).

Our study also provided insight on potential delivery strategies that public health decision-makers could consider to improve uptake of COVID-19 vaccination in children. Co-administration of COVID-19 vaccines with other vaccines could facilitate easier access for parents and young children by preventing parents from having to book multiple vaccination appointments. Recent guidelines from NACI have supported the administration of COVID-19 vaccines alongside other vaccines (Government of Canada, 2021e). Importantly, over half of parents who intended or were undecided about vaccinating their child aged 5–11 years were willing to accept COVID-19 vaccine co-administration with routine or influenza vaccines. Slightly more parents were willing to

accept co-administration with routine vaccines as compared to the influenza vaccine, which could be due to the fact that influenza vaccine uptake in children is typically lower than that of routine vaccines (Lackner and Wang, 2021; Li et al., 2010; Schmid et al., 2017), and our sample may have included parents who did not intend to vaccinate their child against influenza or live in a province where it is not publicly funded.

Another potential strategy is school-based delivery of COVID-19 vaccines, which has only been used by a few jurisdictions in Canada (Gouvernement du Québec, 2022; Government of Saskatchewan, 2021; BC Centre for Disease Control, 2019). Like mobile clinics, school-based delivery could improve equity in vaccination coverage by facilitating access for those who have difficulty attending booked appointments at public health clinics or pharmacies. In Canada, the traditional paradigm of school-based immunization occurs during school hours, without parents being present. However, many parents reported that access to COVID-19 vaccination could be made easier by having their entire family vaccinated at the same time or having vaccine clinics close to the places in which they live and work. Thus, expanding school-based delivery by also offering COVID-19 services for entire families after school hours could help to alleviate some of these issues.

Another option for increasing vaccination in children and youth is to allow self-consent for vaccination. The rules regarding age of consent vary by jurisdiction, with some provinces allowing self-consent for mature minors (Government of Saskatchewan, 2021; Government of Canada, 2022b). It is notable that over half of parents in our study suggested that children should be at least 15 years old to self-consent to COVID-19 vaccination. Recent research suggests that clear guidance and support is needed for older children who may self-consent to COVID-19 vaccination over parental objection (Olick et al., 2022).

Of the parents who intended or were undecided about vaccinating their child aged 5–11 years, over half would accept a booster COVID-19 dose (e.g., third dose) and annual COVID-19 vaccination, while a quarter were undecided. In exploring these findings, we found that most of those who intended to vaccinate were also supportive of co-administration of COVID-19 vaccines with other vaccines, delivery at school, third doses, and annual vaccination, compared to those who were undecided about vaccinating their child against COVID-19. Yet, it is notable that a substantial proportion of parents who intended or were undecided about vaccinating their child aged 5–11 years, remained undecided or would not accept a booster COVID-19 dose, annual vaccination, or co-administration of COVID-19 vaccines. Research has shown that trusting relationships with health care providers supports parents' confidence in vaccination when deciding whether to vaccinate children (Chanchlani et al., 2020; Gust et al., 2008). Therefore, a critical opportunity exists for frontline providers to support parents' decision-making as they navigate COVID-19 vaccine uncertainties for their children.

While most parents reported that they would not have difficulty accessing vaccine services, approximately 11% anticipated difficulty, mainly due to having to make an appointment or vaccination locations being inaccessible. Currently, COVID-19 vaccines in Canada are mainly distributed at pharmacies and public health clinics, with appointment-based booking (Eshun-Wilson et al., 2021). Although pharmacies have been noted as favourable locations for vaccination in our study and others (Strand et al., 2020; City of Calgary, 2021), booked appointments may not be accessible to all. Some Canadian jurisdictions have implemented drop-in mobile vaccination clinics (Government of New Brunswick, 2022; Chen et al., 2020), which have been shown to be cost-effective (Abdul-Mutakabbir et al., 2021) and can improve uptake for COVID-19 (Leibowitz et al., 2021; Lee and Fong, 2007) and other vaccines (City of Toronto, 2021), particularly in disadvantaged communities. However, some mobile clinics in Canada are only available for adults (Government of New Brunswick, 2022) or have few available appointments (Government of Canada, 2021f). Therefore, program expansion to parents and their children in multiple jurisdictions may help to further reduce barriers to vaccination.

Interestingly, although COVID-19 vaccination intention was higher for older children than younger children, we found that acceptance of delivery strategies such as co-administration of COVID-19 vaccines with routine or influenza vaccines, was higher among parents of younger children. This has important implications for public health as co-administration strategies may be more effective in targeting younger children, particularly those in the 6–23 month and 2–4 year age groups who are not yet eligible for COVID-19 vaccination. This finding could be explained by the fact that in Canada, young children are receiving numerous routine vaccines at public health clinics or physician offices every few months or yearly (Government of Alberta, 2022), in comparison to older children (i.e., 5–7 or 8–11 years). Therefore, an important opportunity exists for public health policymakers and practitioners to promote COVID-19 vaccination and ensure that vaccines are accessible through the usual and trusted health service providers for infants and young children.

4.1. Strengths and limitations

We collected information from a nationally representative sample of parents regarding their perceptions and intentions to vaccinate their children at a critical time before children aged 5–11 years became eligible for COVID-19 vaccination in Canada. Our study captured information on novel factors, such as parents' preferences for future delivery of COVID-19 vaccines for children (such as booster doses, annual vaccination, and co-administration), children's self-consent for receipt of vaccination, and parents' vaccination intentions for their younger children, who are not yet eligible for vaccination against COVID-19. However, our sample was selected from a pre-existing panel of individuals, so despite being representative by province, age, and sex, respondents may have characteristics and responses that are not representative of the general Canadian population. Data were self-reported, therefore some variables (e.g., parents' previous COVID-19 vaccination status) may be affected by recall bias. Lastly, this was a descriptive study that reports parents' vaccination intentions for their children, reasons for their intentions, and preferences for future delivery for the purpose of informing inclusive and accessible vaccine service for children. Therefore, we cannot infer associations between the variables of interest and parents' COVID-19 vaccination intention for their children. Further research is needed to understand parents' COVID-19 vaccination intention and maximize vaccine uptake in younger children.

5. Conclusion

Shifting from a pandemic to an endemic situation, and returning to economic and social norms, may require new COVID-19 vaccination routines for parents and their children. We found that parents' vaccination intention for their children 5–11 years old was lower than that of older children, 12–17 years. Slightly over half of parents were supportive of third doses, annual vaccination, and co-administration of COVID-19 vaccines with routine or influenza vaccines, while some parents remained undecided or would not accept these delivery methods for their children. Parents were more supportive of school delivery, as well as drop-in vaccination. Public health officials and policymakers may consider expanding access to COVID-19 vaccines through mobile or drop-in clinics, school-based vaccination, and co-administration with other vaccines. Messaging regarding the importance of COVID-19 vaccination for children should focus on protecting children and their family against severe disease.

Contributors

SEM, RH were involved in conceptualization, investigation, formal analysis, writing (original draft, review, and editing).

HS was involved in formal analysis, writing (original draft, review,

and editing).

ED, JAB, AG, MS, SBM, SW assisted with conceptualization, methodology, writing (review and editing).

SL-P provided statistical analyses, writing (review and editing).

SEM provided supervision and funding acquisition.

Funding/Support

This work was funded by the Canadian Institutes of Health Research. MS is supported via salary awards from the BC Children's Hospital Foundation, the Canadian Child Health Clinician Scientist Program and the Michael Smith Foundation for Health Research. The funding source had no involvement in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the article for publication.

Declaration of Competing Interest

No conflict	RH, HS, SM, ED, SW, SBM, AG, JAB
COI	MS has been an investigator on projects funded by GlaxoSmithKline, Merck, Moderna, Pfizer, Sanofi-Pasteur, Seqirus, Symvivo and VBI Vaccines. All funds have been paid to his institute, and he has not received any personal payments.

Acknowledgments

This research is part of a larger project conducted by the COVImm study team, which included the named authors as well as: M Driedger; M Kiely; NE MacDonald; J Robinson; and E Rafferty. We express thanks to Applied Immunization (AImm) Research Program team members J Lee and M Anim-Larbi who provided editorial support, and to A Assi the project coordinator.

Appendix

Table A1
Cross-sectional national survey questions for Canadian parents' perceptions of COVID-19 vaccination and intention to vaccinate their children.

Variable	Question and Response options
Sample characteristics	
Gender	**What is your gender? (Select all that apply)** Woman, Man, Gender non-conforming, Transgender, Two-spirit, Not listed please specify
Highest level of education	**What is the highest level of education you have completed?** Some high school or less; High school diploma or equivalent; Registered Apprenticeship or other trades certificate or diploma; College, CEGEP or other non-university trade, certificate, or diploma; University certificate or diploma below bachelor's level; Bachelor's degree; Post graduate degree above bachelor's level; Prefer not to answer
Household income	**To the best of your knowledge, what is the total combined income before tax of everyone living in your household?** $19,999 or less; Between $20,000 and $39,999; Between $40,000 and $59,999; Between $60,000 and $79,999; Between $80,000 and $99,999; Between $100,000 and $249,000; $250,000 or more; Prefer not to answer
Marital status	**What is your current marital status?** Single, Married/Common law, Divorced/Separated, Widowed, Prefer not to answer, Not listed please specify
Parents' number and ages of children 0–17 years	**Are you the parent/primary guardian (e.g., birth parent, foster parent, stepparent, adoptive parent) who makes the health care decisions for one or more children 17 years old or younger??** Drop down answers for number and age of each child
Province	**In which province or territory do you live?** British Columbia; Alberta; Saskatchewan; Manitoba; Ontario; Quebec; New Brunswick; Nova Scotia; Prince Edward Island; Newfoundland; Northwest Territories; Yukon; Nunavut
Parents new to Canada in the past 5 years	**For respondents not born in Canada: When did you come to Canada?** Between 2016 and 2020; Between 2011 and 2015; Before 2011
Language spoken most often at home	**Which language do you speak most often at home? (drop-down list, select one)** English, French, Anishinini, Atikamekw, Dakota/Sioux, Dene, Innu, Inuktitut, Mi'kmaq, Michif, Nehiyawewin (Cree), Ojibwe, Siksiká (Blackfoot), Arabic, Cantonese, German, Gujarati, Farsi, Italian, Korean, Mandarin, Polish, Portuguese, Punjabi, Russian, Spanish, Tagalog, Tamil, Urdu, Vietnamese, Other please specify
Self-identified ethnicity	**What is your ethnic or cultural origin? (Select all that apply)** White (e.g., Caucasian, European, etc.), Black (e.g., African, Haitian, Jamaican, etc.) Latin / Central American (e.g., Mexican, Colombian, Brazilian, Cuban, etc.), Arabic/West Asian/North African (e.g., Armenian, Egyptian, Iranian, Lebanese, Moroccan, etc.), East Asian (e.g., Chinese, Filipino, Japanese, Korean, Vietnamese, etc.), South Asian (e.g., Indian, Sri Lankan, etc.), Other please specify, Prefer not to answer
Indigenous groups	**Do you self-identify as First Nations, Métis, or Inuk? [No] [Yes, please specify]** First Nations, Métis, Inuk, Other please specify, Prefer not to answer
Parents receipt of a COVID-19 vaccine	**Have you received any doses of a COVID-19 vaccine? (parents)** Yes, No
Children's receipt of a COVID-19 vaccine	**Has your 12–17-year-old child received any doses of a COVID-19 vaccine?** Yes, No
Questions for parents with a child 5–11 years	
Parents' COVID-19 vaccination intention for their child 5–11 years	**Do you intend to get a COVID-19 vaccine for your child who is 5–11 years old, when a vaccine is recommended for them?** Yes, I am undecided, No
Reasons parents intend to vaccinate their child	**What is the main reason you would get a COVID-19 vaccine for your child (5–11)?** It would be a personal choice; If it is mandated for my child (e.g., required for school, recreational/social activities, or travel)
Parents' COVID-19 vaccination influencers	**What would influence your personal choice to get your child (5–11 years) vaccinated? (Select: top influence, 2nd reason, 3rd reason)** To protect my child from COVID-19; To protect our family from COVID-19; To prevent the spread of COVID-19 in our community; To end the pandemic and return to normal life; Because it is recommended by experts and health care providers; Other please specify; Not sure
Reasons parents are undecided/no intention to vaccinate their children	**What are the main reasons you are undecided or do not intend to get a COVID-19 vaccine for your child (5–11 years)?** (select all that apply)

(*continued on next page*)

Table A1 (*continued*)

Variable	Question and Response options
	It is a new vaccine; The vaccine has been developed too quickly because of the pandemic; I'm concerned about the safety of the vaccine (it will cause my child harm); I'm concerned that the vaccine will not be effective (it won't work for my child); I don't trust vaccines in general for my child; My child dislikes needles; My child can't be vaccinated due to medical reasons (e.g., allergies, existing health condition); Other please specify
COVID-19 vaccine administration with influenza vaccine	**If it was recommended, would you get a COVID-19 vaccine at the same time as the influenza vaccine for your child (5–11 years)** Yes, I am undecided, No
COVID-19 vaccine administration with routine vaccines	**If it was recommended, would you get a COVID-19 vaccine at the same time as routine vaccines (e.g., measles, meningococcal) for your child (5–11 years)?** Yes, I am undecided, No
COVID-19 vaccine administration at school	**If it is offered, would you agree to have your child (5–11 years) receive the COVID-19 vaccine at school?** Yes, I am undecided, No
Questions for parents with a child aged 2–4 years	
Parents' COVID-19 vaccination intention for their child 2–4 years	**Do you intend to get a COVID-19 vaccine for your child who is 2–4 years old, when a vaccine is recommended for them?** Yes, I am undecided, No
COVID-19 vaccine administration with influenza vaccine	**If it was recommended, would you get a COVID-19 vaccine at the same time as the influenza vaccine for your child (2–4 years)?** Yes, I am undecided, No
COVID-19 vaccine administration with routine vaccines	**If it was recommended, would you get a COVID-19 vaccine at the same time as routine vaccines (e.g., measles, meningococcal) for your child (2–4 years)?** Yes, I am undecided, No
Questions for parents with a child aged 6–23 months	
Parents' COVID-19 vaccination intention for their child 6–23 months	**Do you intend to get a COVID-19 vaccine for your child who is 6–23 months old, when a vaccine is recommended for them?** Yes, I am undecided, No
COVID-19 vaccine administration with influenza vaccine	**If it was recommended, would you get a COVID-19 vaccine at the same time as the influenza vaccine for your child (6–23 months)?** Yes, I am undecided, No
COVID-19 vaccine administration with routine vaccines	**If it was recommended, would you get a COVID-19 vaccine at the same time as routine vaccines (e.g., measles, meningococcal) for your child (6–23 months)?** Yes, I am undecided, No
Questions for parents regarding their children of various ages	
Parents' acceptance of COVID-19 booster vaccines	**If a third dose of COVID-19 vaccine was recommended, would you get it for your children (6 months - 11 years)?** Yes, I am undecided, No
Parents' acceptance of COVID-19 annual vaccination	**If it was recommended, would you get a COVID-19 vaccine every year for your child (6 months - 11 years) (similar to the seasonal influenza vaccine)?** Yes, I am undecided, No
Acceptable age of self-consent	**In your opinion, at what age should a child be able to decide on their own (self-consent) whether to get a COVID-19 vaccine?** <11, 11, 12, 13, 14, 15, 16, 17, 18, older than 18, I am undecided
Preference of COVID-19 vaccine effectiveness versus side effects	**When thinking about vaccinating your child(ren) (6 months - 17 years), what vaccine would you choose?** A vaccine that is more effective even if it has more side effects; A vaccine with less side effects even if it was less effective; Any vaccine recommended and available to my child
Access to COVID-19 vaccines	**Do you expect that you will have difficulty accessing COVID-19 vaccine services for your child(ren) (6 months - 17 years)?** No; Yes, the vaccination locations are not accessible; Yes, making a vaccination appointment will not be easy; Yes, I don't have a regular health care provider (e.g., family doctor) for my child; Yes, I'm too busy with other competing priorities in my life; I don't know; Other please specify
Easiest location to access COVID-19 vaccines	**What would be the easiest location for you to get the COVID-19 vaccine for your child(ren) (6 months - 17 years)?** Doctor's office, Pharmacy, Public health centre, A temporary vaccination centre, My child's school, My child's daycare or before/after school care, Mobile vaccination clinic, Other please specify
Parents' perspective of easy vaccination services	**What would make getting a COVID-19 vaccine for your child(ren) (6 months - 17 years) easy for you**? No appointment required (Drop-in/walk-in clinic); COVID-19 vaccine services close to the community I live or work in; Having transportation to/from vaccination clinics; Paid time off from work to get vaccinated; Vaccination information in the language I understand best; Culturally safe and welcoming vaccination settings; Allow my whole family to be vaccinated at the same time; Improve access to vaccination services for children with disabilities; Other, please specify; Prefer not to answer; Other please specify
Barriers to accessing COVID-19 vaccines	**Everyday stress (such as competing priorities or many demands on my time) will prevent me from getting the COVID-19 vaccine.** Strongly disagree, Disagree, Neither agree nor disagree, Agree, Strongly agree
Open-ended	**How can health officials in Canada improve information and/or access to COVID-19 vaccines for parents deciding whether to vaccinate their children?** Open ended, No answer, Prefer not to answer

Table A2
Cross-tabulation of associations between parents' COVID-19 vaccination intention for their child (5–11) and sociodemographic characteristics, parent and child COVID-19 disease, and parent and older child (12–17 years) vaccination status.

Characteristics	Parents intentions to vaccinate children 5–11 years old % (n)	*p*-value

(*continued on next page*)

Table A2 (*continued*)

Characteristics		Parents intentions to vaccinate children 5–11 years old % (n)			*p*-value
		Yes	Undecided	No	
		Yes	**Undecided**	**No**	
What language do you speak most often at home?	English	**60.6 (377)$^{+}$**	21.2 (132)	18.2 (113)	**<0.001**
	French	**48.3 (186)$^{-}$**	25.2 (97)	**26.5 (102)$^{+}$**	
	Indigenous & minority languages	59.8 (73)	27.9 (34)	12.3 (15)	
Ethnic or cultural origin	White	56.8 (446)	21.7 (170)	21.5 (169)	0.516
	Visible minority	54.4 (131)	27.4 (66)	18.3 (44)	
	Indigenous	57.6 (57)	26.3 (26)	16.2 (16)	
Number of children	1 child	56.7 (153)	21.9 (59)	21.5 (58)	0.692
	2 children	57.8 (335)	22.9 (133)	19.3 (112)	
	3 or more children	53.0 (148)	25.4 (71)	21.5 (60)	
Newcomer to Canada	Not a newcomer (e.g., born in Canada)	**57.5 (593)$^{+}$**	23.0 (237)	19.6 (202)	**0.030**
	Newcomer in the past 5 years (2016–2020)	**44.3 (43)$^{-}$**	26.8 (26)	28.9 (28)	
Children's age	5–7 years	54.8 (336)	23.8 (146)	21.4 (131)	0.506
	8–11 years	58.1 (300)	22.7 (117)	19.2 (99)	
Have you had COVID-19 disease?	Yes, and I think so but not confirmed	**42.9 (72)$^{-}$**	23.8 (40)	**33.3 (56)$^{+}$**	**<0.001**
	No	**59.8 (557)$^{+}$**	23.3 (217)	**16.9 (157)$^{-}$**	
	I don't know/prefer not to answer	**23.3 (7)$^{-}$**	20.0 (6)	**56.7 (17)$^{+}$**	
Have any of your children had COVID-19 disease?	Yes, and I think so but not confirmed	**46.0 (63)$^{-}$**	22.6 (31)	**31.4 (43)$^{+}$**	**<0.001**
	No	**58.6 (567)$^{+}$**	23.3 (225)	**18.1 (175)$^{-}$**	
	I don't know/prefer not to answer	**24.0 (6)$^{-}$**	28.0 (7)	**48.0 (12)$^{+}$**	
Have you received any doses of a COVID-19 vaccine?	Yes	**62.7 (629)$^{+}$**	24.0 (241)	**13.3 (133)$^{-}$**	**<0.001**
	No	**5.6 (7)$^{-}$**	17.5 (22)	**77.0 (97)$^{+}$**	
Has your child aged 12–17 years received any doses of a COVID-19 vaccine?	Yes	**70.0 (191)$^{+}$**	20.5 (56)	**9.5 (26)$^{-}$**	**<0.001**
	No	**9.1 (6)$^{-}$**	30.3 (20)	**60.6 (40)$^{+}$**	
Everyday stress (such as competing priorities or many demands on my time) will prevent me from getting the COVID-19 vaccine.	Disagree (more likely to vaccinate)	**60.3 (525)$^{+}$**	**21.4 (186)$^{-}$**	**18.4 (160)$^{-}$**	**<0.001**
	Neither agree nor disagree	**27.2 (37)$^{-}$**	**37.5 (51)$^{+}$**	**35.3 (48)$^{+}$**	
	Agree (less likely to vaccinate)	60.7 (74)	21.3 (26)	18.0 (22)	

Notes
$^{+}$Proportion is higher than what was expected by chance.
$^{-}$Proportion is lower than what was expected by chance.
P-value was calculated using chi-square analysis.

Table A3
Open-ended survey responses by parents' intentions to vaccinate their children.

Open-ended question: "How can health officials in Canada improve information and/or access to COVID-19 vaccines for parents deciding whether to vaccinate their children?"

Common themes % (n)	Examples of responses by parents' intention to vaccinate their child (5–11 years) against COVID-19 ($n = 522$)		
	Intend to vaccinate 60.3% (n = 315)	**Undecided 20.1% (n = 105)**	**No intention to vaccinate 19.5% (n = 102)**
Methods of delivering information about COVID-19 vaccination for children 36.4 (190)	**65.8 (125)** -Advertising on social networks -More commercials and info being put out -Have flyers on the walls in the health center -Using social media, like a facebook and tik tok -Through a doctor and showing detailed supporting research. Perhaps through the dial a doctor service -Information in schools. -Advertising, government website -Make the information easily accessible and	**21.1 (40)** -Distribute information in various languages -Use non-traditional media to reach opposing groups -By encouraging them -Reassure them and tell them the truth -Continue to inform people well with health professionals -Social media -Through family doctors, pediatricians, school, by email -Make trial data including any negative side	**13.2 (25)** -Explain to us how it is possible in Quebec that 100% of journalists broadcast the government's message without ever asking any interesting questions -By having family doctors talk more about the risks and the benefits of the vaccine to ensure parents are well informed -On public health sites -They should family physicians with knowledge help parents to decide -Talk about it in school

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Table A3 (*continued*)

Open-ended question: "How can health officials in Canada improve information and/or access to COVID-19 vaccines for parents deciding whether to vaccinate their children?"			
Common themes % (n)	**Examples of responses by parents' intention to vaccinate their child (5–11 years) against COVID-19 ($n = 522$)**		
	Intend to vaccinate 60.3% (n = 315)	**Undecided 20.1% (n = 105)**	**No intention to vaccinate 19.5% (n = 102)**
	simple to understand -Have info in English in Quebec -Have persons with turbans or people of color distributing the vaccine -More communication through traditional media offered in multiple languages (ex: television, radio, newspapers…) -Have councillors on site to discuss side effects or hesitancies with parents	effects not only available, but easy to find -Communicate simply and to the point to convey your meaning	—Be more truthful about the ingredients and the side effects -Information changes too often so it's hard to follow and believe in this information -Hold meetings that parents can come ask questions at
Types of knowledge/ information about COVID-19 vaccines for children 26.6 (139)	**59.0 (82)** -Communicate scientific information on the benefits of vaccination for children and communities -Creating public awareness on the benefits of being vaccinated against this disease -Creating awareness on the benefits of being vaccinated -Clearly explain the advantages vs. disadvantages -Information to kids at school -Highlighting long term benefits -Just show the work done to prove it's safe. Show the timeline of evidence/testing -Provide more proof of the effectiveness of the vaccine -More information on the risks to children, if any -Make sure that the information is verifiable, correct, addresses any concerns that people may have -More information addressing the positive aspects of vaccination must be disseminated -Prove that it is safe for them -Provide lots of information about the pros and cons of the vaccine	**28.1 (39)** -Speaking more about the results of clinical trials -If he needs 3 doses the vaccine is in no way effective and should not be offered -Clearly communicate the ingredients of the vaccines, the cases of complications following the administration of the vaccine -Information and reports about how vaccines will protect children's health. -Provide long term studies and side effects long term for developing children prior to giving the vaccine to children -Provide more information on the risk and the long term side effects of the vaccine -I want to know if the vaccine was safe for my child -More science and more evidence that kids under the age of 12 need to be vaccinated. We don't have enough data to support the need to vaccinate the younger population -To be 100% true and accurate that it will not harm our children in any way and to be very effective	**12.9 (18)** -Show more information on vaccine and trials -Stop hiding serious and less serious side effects leave all staff and doctors to be free to be against covid vaccines -Tell the truth about the risks. Follow through on the informed part of "informed consent" -Make children aware of the benefits of vaccination -Proof of effectiveness, and risks of getting the vaccine. Ultimately the benefits need to outweigh the risks. Are children susceptible to covid, how does it affect them compared to the elderly. -Information is vital. However since the vaccine hasn't been around long or given to kids this feels high risk to me -Let parents know about all the side effects for children
Public health policy regarding COVID-19 vaccination for children 14.6 (76)	**36.8 (28)** -Giving out more rewards - Require the vaccination passport for them [anti-vaccinators] too and prevent them from having access to public places —No choice, make it [vaccines] mandatory to go to school -Anti vaxxers should be penalized in some way make it mandatory for any service to have vaccine food, bank, store etc. -Make it mandatory to attend public school so all kids and staff are safe -They should make it [vaccines] mandatory for all children 12 and over -It [vaccines] should be mandatory.	**17.1 (13)** -Do not force the vaccination, present the statistics -Don't force mandates and test long term effects -Leave the choice to [parents] and do not try to influence their choice and promising the end of the measures if they have their children vaccinated -Require the teacher and other adults to do so [vaccinate] -It should be a choice, not obligatory or mandatory to get vaccinated just like the rest of the vaccines -Let us choose without constraining anyone and thus divide the population -I think kids can decide for themselves -It should be on a voluntary basis and should not be forced	**46.1 (35)** -Don't force or coerce. Make everything optional. Human beings' free will needs to be respected -Leave us [to] decide what we want to do with our bodies and our children's bodies -Have healthy debates on the subject to have both sides of the coin and allow you to get your head around the issue. Do not divide the population -Let parents have the final decision on whether the kid should be vaccinated or not -Do not make it an obligation without measuring the potential consequences in the years to come -Why should parents immunize their healthy children? Children are more likely to have side effects from vaccination -Vaccinating children in exchange for the promise of freedom is the abuse of power -Give us more time to weigh the options
Access to COVID-19 vaccines for children 13.6 (71)	**88.7 (63)** -Conduct vaccination clinics in schools -On night and weekend and at school -Set up vaccine clinics at schools and through family doctors -Paid time to get children vaccinated -Family vaccination schedules for flu/ covid19 -Isolated and safe places to vaccinate the little ones —As for access, it needs to be widely available- clinics/pharmacies/doctor's offices/schools etc. -Provide the service in schools during class time	**8.5 (6)** -Immunize, with parental consent, at school -Vaccination in schools and wait to be sure that there will be very few side effects for our children -Hold vaccine clinics in the school. Or have the children's doctors/health care provided administer the vaccine	**2.8 (2)** -Health officials in Canada can improve information and access to things, by letting parents have informed consent about COVID-19 and then allow them to make their own decisions accordingly for their children. -Vaccination in schools

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Table A3 (*continued*)

Open-ended question: "How can health officials in Canada improve information and/or access to COVID-19 vaccines for parents deciding whether to vaccinate their children?"			
Common themes % (n)	**Examples of responses by parents' intention to vaccinate their child (5–11 years) against COVID-19 ($n = 522$)**		
	Intend to vaccinate 60.3% (n = 315)	**Undecided 20.1% (n = 105)**	**No intention to vaccinate 19.5% (n = 102)**
Transparency about risks of COVID-19 disease and vaccination 11.3 (59)	**32.2 (19)** —Be more transparent with any side effects people have had and numbers of people who may have had problems -Explain, without hiding anything -Continue to be as transparent as possible about the process, and outcomes of vaccination for young children	**23.7 (14)** -Real transparency; clearly communicate the ingredients of the vaccines, the cases of complications following the administration of the vaccine, the real possible complications for children who contract the virus —Be transparent about the risks and consequences on the state of health of children -Make trial data including any negative side effects not only available, but easy to find —Be transparent about tests, side effects	**44.1 (26)** -Allow the various specialists who have different opinions to be able to express themselves and not to muzzle them as we are doing now -Tell the truth about the risks -Leave room for debate, stop censorship of doctors, be transparent -Do not lie -Full disclosure ALL ingredients -Allow scientific debate by scientists and make it accessible to its population -Stop censorship
Areas for further research regarding COVID-19 disease and vaccination for children 8.4 (44)	**45.5 (20)** -More in depth studies -Prove that it is safe for them -Do interviews with pediatric specialists and maybe go see countries where children have been vaccinated -More legal and validated studies proving efficacy -There needs to be over and above trials prior to giving vaccine to children under 12 -Show how it will 100% not cause infertility even by a small percentage, this is a prime worry for most minorities -More studies and more time to see how it affects the people in trials	**15.9 (7)** -Test long term effects -Long-term studies -Provide long term studies and side effects long term for developing children -We don't have enough data to support the need to vaccinate the younger population	**38.6 (17)** -Study not paid by Pfizer and longer study -Provide statistics on children's intensive care hospitalizations -Do bigger studies that are more likely to capture reactions, like myocarditis -Go back to the drawing board with the vaccine and realize first results are not always the best results.… we are talking science here…science is supposed to have peer review and a constant improvement -More research and testing -More research on side effects
Mis/disinformation about COVID-19 disease and vaccination for children 5.4 (28)	**60.7 (17)** -Counteracting misinformation on social media and in fringe media is essential for the health and wellbeing of everyone -By limiting spread of false info that uninformed newscasts [are] spreading into communities. -Counter false information -Directly address conspiracy theories about vaccine safety -Make sure that the information is verifiable, correct, addresses any concerns that people may have, and addresses misinformation that some may be influenced by	**7.2 (2)** -Fight against disinformation on social networks -Get rid of the fake news and info circling social media	**32.1 (9)** -Don't misinform people by dividing them up -Health officials has done enough of misinforming people about COVID -Do not tell lies

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