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OIAC Ontario Immunization Advisory Committee
CCOI Comité consultatif ontarien de l'immunisation

Recommendations: COVID-19 Vaccine Booster Doses for Adolescents

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Overview

On January 28, 2021, Canada's National Advisory Committee on Immunization (NACI) released recommendations for the off-label use of booster COVID-19 vaccine doses for adolescents 12-17 years of age at high risk of severe outcomes from COVID-19 due to medical and/or social risk factors.[1] Following this release, the Ministry of Health (MOH) requested the Ontario Immunization Advisory Committee (OIAC) to review NACI's guidance and provide recommendations on the use of booster doses (i.e., an additional dose following the completion of a primary vaccine series) for this age group in Ontario.

At the time of this request, select adolescent groups had already been made eligible for a booster dose by the MOH, including healthcare workers ≥16 years of age, Indigenous adolescents ≥12 years of age, and consistent with one of the specific NACI recommendations, adolescents ≥12 years of age with medical comorbidities; as such, these adolescent groups were out of scope for OIAC recommendations.

The OIAC met on February 9, 2022 to review and discuss current Ontario epidemiology, vaccine effectiveness and safety, and equity considerations to inform adolescent COVID-19 vaccine booster dose recommendations in Ontario. This document provides a summary of the evidence, considerations, and the OIAC's recommendation.

Recommendation

All adolescents 12 to 17 years of age be made eligible for a booster dose of COVID-19 vaccine, using the Pfizer-BioNTech (30 mcg per dose) vaccine at the NACI recommended interval of at least six months (168 days) after completion of the primary COVID-19 vaccine series.

Background

On May 5, 2021, Health Canada expanded the age indication of a primary series of the Pfizer-BioNTech COVID-19 vaccine to 12 years of age and older,[2] from the previous indication of 16 years of age and older made on December 9, 2020.[3] In the context of increasing vaccine supply, Ontario expanded eligibility to all individuals ≥12 years of age on May 23, 2021.[4] As of February 13, 2022, 82.9% of adolescents 12-17 years of age in Ontario had completed a two-dose primary series of COVID-19 vaccine.[5] Despite high provincial vaccine coverage among adolescents, vaccine coverage varies across Ontario Marginalization Index dimensions quintiles.[6] For example, lower vaccine coverage has been observed among adolescents (and other age groups) residing in neighbourhoods with high material deprivation as compared to those residing in less deprived neighbourhoods.[6] As of mid-February 2022, approximately 80% of adolescents who have received two doses are at least 168 days from their last dose.[5]

Booster doses of Pfizer-BioNTech (30 mcg) COVID-19 vaccine were authorized by Health Canada on November 9, 2021 for those ≥18 years of age,[7] but have not yet been authorized for use in those 12-17 years of age. On January 28, 2022 NACI issued off-label recommendations for booster doses of COVID-19 vaccines in adolescents 12 to 17 years of age who may be at higher risk of severe outcomes from COVID-19 infection.[1] This included individuals experiencing biological and/or social risk factors that may intersect, and systemic barriers to accessing health care. NACI recommended that "a booster dose of an mRNA COVID-19 vaccine may be offered ≥ 6 months after completion of a primary COVID-19 vaccine series to adolescents 12 to 17 years of age:

a) with an underlying medical condition at high risk of severe illness due to COVID-19 (including those who are immunocompromised and who received a three-dose primary series)

b) who are residents of congregate living settings (e.g., shelters, group homes, quarters for migrant workers, correctional facilities)

c) who belong to racialized and/or marginalized communities disproportionately affected by COVID-19".[1]

In addition to the groups NACI identified based on increased risk of severity, the OIAC deliberated on making booster recommendations for all adolescents in light of the increased transmissibility of the Omicron variant, the anticipated relaxation of public health measures in the coming months, and the goals of the COVID-19 immunization program. The program goals include minimizing serious illness, preserving health system capacity, and reducing transmission to protect high risk populations.[8]

Following the release of NACI's recommendations, several provinces and territories updated their guidance on booster vaccine eligibility for adolescents, with some jurisdictions following NACI's recommendations and others expanding eligibility to all adolescents 12-17 years of age.

Evidence Summary and Considerations

The following summary provides an overview of the evidence reviewed and considerations discussed by the OIAC.

Vaccine Effectiveness

- In the pre-Omicron era, mRNA vaccines demonstrated a high degree of effectiveness against infection with SARS-CoV-2 and symptomatic COVID-19 in adolescents.[9-13] Vaccines have also been shown to be highly effective (i.e., >90%) in reducing the risk of serious outcomes in adolescents, including hospitalization and intensive care unit admission,[12,14,15] as well as multisystem inflammatory syndrome (MIS-C) due to COVID-19.[16,17]

- Vaccine effectiveness (VE) has been shown to decrease over time. When Delta was the dominant variant, VE against symptomatic infection declined as time since vaccination increased.[12,18,19] At the time of the OIAC meeting no data on VE, as estimated through studies using the test-negative design, had been published for adolescents in the Omicron era. However, VE against symptomatic Omicron infection has been demonstrated to be lower and to wane faster as compared to VE against Delta in adults.[20,21] VE against symptomatic Omicron infection has been estimated to be restored to approximately 50-75% in the first three months following a booster dose of mRNA vaccine.[20,21] Although it is not direct evidence of VE, significant waning of antibodies to both wild-type virus and the Omicron variant have been described in adolescents six months following a second dose COVID-19 mRNA vaccine.[22]

- While effectiveness against severe disease appears to be better maintained relative to symptomatic infection, VE against Omicron hospitalizations is lower than against Delta hospitalizations in adults,[20,21] and this trend may be applicable to adolescents as well. For example, in New York State, surveillance data demonstrated a decreasing protective effect of two doses of vaccine against hospitalization during a time when Omicron became the dominant circulating variant. Unadjusted VE (as estimated by comparing rates of hospitalization by vaccination status) against hospitalization in those 12-17 years of age decreased from 95% in early December 2021 to 75% in early January 2022.[23] However, if hospitalizations with an incidental positive COVID-19 test result were included in the analyses, this would likely reduce VE estimates.

- The absolute risk of COVID-19 hospitalization in adolescents 12-17 years of age is lower relative to older age groups.[5,24] Despite hospitalization being a rare outcome of COVID-19 among adolescents, Ontario surveillance data have demonstrated the impact of vaccination on adolescent hospitalizations. As of January 30, 2022, the rate of hospitalization among confirmed cases of COVID-19 in Ontario in the last 60 days was approximately four times greater in unvaccinated adolescents 12-17 years of age (0.24 per 100,000 person-days, n=21) compared to those who had completed their primary series (0.06 per 100,000 person-days, n=29).[24] Although young adults (i.e., 18-29 year-olds) are also at a low risk of hospitalization relative to older age groups, Ontario surveillance data has demonstrated that providing a booster dose further reduces the risk of hospitalization beyond the risk reduction observed following the primary series. In individuals 18-29 years of age, persons with a booster dose had the lowest hospitalization rate (0.06 per 100,000 person-days) compared to those with only a primary series (0.11 per 100,000 person-days) or those who were unvaccinated (0.44 per 100,000 person-days).[24] Similar trends of a reduced risk of hospitalization with increasing number of doses have also been observed in Alberta and the United States, including for young adult age groups.[15,25]

Vaccine Safety

- Reports of myocarditis or pericarditis following the Pfizer-BioNTech COVID-19 vaccine have been identified through post-marketing vaccine safety surveillance. This surveillance has found consistent trends in higher reporting rates in adolescents and young adults as compared to older adults, males as compared to females (across ages), and after a second dose as compared to a first dose. In Ontario, reporting rates of myocarditis or pericarditis following the Pfizer-BioNTech COVID-19 vaccine have been highest in those 12-17 years of age, although this outcome is still rare with <0.01% individuals in this age group who received a second dose experiencing myocarditis or pericarditis.[26] In addition, SARS-CoV-2 infection is known to be associated with a risk of myocarditis.

- There is currently uncertainty regarding the rate of myocarditis or pericarditis following a booster dose and how it may compare to rates observed following first and second doses.[27,28] In Ontario, few events of myocarditis or pericarditis have been reported in the passive vaccine safety surveillance system following a booster dose, including in those 18-24 years of age.[29] In Israel, where a three-month interval between second and booster doses have been used, rates following a booster dose of Pfizer-BioNTech were lower than after dose two but higher than after dose one across age groups, including adolescents.[27] A longer interval between doses of the primary series has been associated with a decreased risk of myocarditis or pericarditis.[30] However, the impact of the interval between second and booster doses on the risk of myocarditis or pericarditis is unclear but might follow a similar trend to that observed for the primary series. If a longer interval is associated with a reduction in risk of myocarditis or pericarditis, this would support using a longer interval (i.e., six-month interval) between the primary series and a booster dose, and may have additional benefits such as durability of the immune response.

Equity

- Over the course of the pandemic, rates of COVID-19 cases have been higher in neighbourhoods with higher neighbourhood diversity and material deprivation.[31] The overall (i.e., all ages) rate of COVID-19 hospitalizations has also exhibited a similar trend, with the highest age-standardized rates of hospitalization observed in the most diverse and most deprived neighbourhoods. In addition to these area-level measures, the collection of race-based data in Ontario has demonstrated the risk of COVID-19 infection, hospitalization and death at the individual level has been highly inequitable and racialized.[32]

- A targeted approach to booster dose eligibility that focuses only on those adolescents identified by NACI may inadvertently exclude adolescents who experience intersecting risk factors and barriers to accessing health care. Depending on definitions for booster dose eligibility and/or approaches to program implementation, this strategy may not be comprehensive of all adolescents at increased risk of severity. Further, a targeted approach may result in stigmatization of populations identified as being eligible. A universal approach to booster eligibility may reduce this potential stigmatization and increase trust in booster doses among adolescents and their families. A universal approach also offers the opportunity to roll out tailored strategies within universal eligibility in order to reach those most at risk of severe disease. It may also allow for a focus on access, as opposed to defining eligibility, with implementation efforts focused on the higher priority groups as identified by NACI, and supported by local epidemiology and community needs.

Additional Considerations

- While the protection of booster doses against symptomatic infection and transmission may be modest and the duration of this protection is unknown, a booster dose may help with the preservation of in-person learning, and the ability to attend work and participate in recreational activities for adolescents. Further benefits may also extend beyond the individual, including to the contacts of this age group, such as young children who are not yet eligible for vaccination as well as older adults who are at increased risk of severe outcomes.

- Completion of the primary COVID-19 vaccine series should continue to be promoted and prioritized in this age group, given the important impact of two doses at reducing hospitalization as compared to the incremental benefit of a booster dose.[24] However, and as outlined by NACI, there are select groups of adolescents who may benefit in particular from a booster dose due to their increased risk of severe outcomes from COVID-19. The additional benefit from a third dose may be of increasing importance for these groups if other layers of protection are reduced as public health measures are relaxed.

- Given the large number of infections that have occurred during the Omicron wave, including among adolescents, there are considerations related to the timing of booster doses for those infected following their primary series. NACI has recommended that these individuals should wait to receive their dose until three months after symptom onset or positive test, as long as six months have also passed since completion of the primary series.[33]

- The OIAC acknowledges that many low- and middle-income countries have not had sufficient supply of COVID-19 vaccines to adequately protect individuals at highest risk of severe disease (e.g., older adults, adults with comorbidities) and that much work needs to be done to improve access to COVID-19 vaccines in less resourced jurisdictions.

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The OIAC is a multidisciplinary scientific advisory body that provides evidence-based advice to Public Health Ontario on vaccines and immunization matters including vaccine program implementation in Ontario, priority populations and clinical guidance. The focus of the OIAC's work is on publicly-funded vaccines and immunization programs in Ontario, including COVID-19 and those under consideration for new programming.

For more information about the OIAC and its members contact secretariat@oahpp.ca.

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