

SURVEILLANCE REPORT

COVID-19 Vaccination Coverage in Ontario by Neighbourhood Diversity and Material Deprivation: December 14, 2020 to August 14, 2022

Purpose

This report explores neighbourhood-level trends in health equity among Ontario residents aged five years and older who have received at least one dose of a COVID-19 vaccine and who do not live in a long-term care facility or retirement home. It combines individual vaccine coverage data with neighbourhood-level measures of diversity and material deprivation as measured by the [Ontario Marginalization Index \(ON-Marg\)](#).¹

Neighbourhood diversity is measured using the ‘ethnic concentration’ dimension of ON-Marg, which assesses the proportion of non-white and non-Indigenous residents and/or the proportion of newcomers that arrived in Canada within the past five years. The material deprivation dimension of ON-Marg is closely connected to poverty, and uses Canadian census data on income, quality of housing, educational attainment and family structure characteristics to identify neighbourhoods where people likely experience reduced access to basic material needs.

Data in this report were extracted from the Ministry of Health’s (MOH) COVaxON application as of **August 15, 2022** at approximately 7:00 a.m. The report includes COVID-19 vaccinations reported up to **August 14, 2022**. Further details on vaccine uptake can be found in the [COVID-19 Vaccine Uptake in Ontario](#) report and additional information on COVID-19 vaccine are provided on Public Health Ontario’s [web page](#).^{2,3}

Background

In Ontario, surveillance data has shown higher incidence of COVID-19 cases and deaths in neighbourhoods with higher proportions of immigrants, racialized populations, and populations with low socio-economic status, related to structural factors such as high-density housing and increased likelihood of employment in an essential business that cannot be done from home.^{4,5} Residents of these neighborhoods may additionally experience marginalization related to racism, discrimination or reduced access to resources. This report improves our understanding of how COVID-19 vaccination levels vary across neighborhood-level socio-demographic characteristics in Ontario and informs equitable prioritization of vaccination efforts.

The COVID-19 vaccination program began in Ontario on December 14, 2020.⁶ This report describes COVID-19 vaccination uptake prior to the fall 2022 booster program. As of the date of this report (August 14, 2022) all individuals in the province 6 months of age and older were eligible for a complete series of a Health Canada authorized COVID-19 vaccine and all individuals 12 years of age and older were eligible for a booster dose. Second booster doses were available for individuals 18 years of age and older as well as specific populations.^{7,8,9} Since August the vaccination program has continued to expand with additional age groups becoming eligible for booster doses (e.g. 5-11 year olds) and the authorization of COVID-19 bivalent vaccines for boosters.

Highlights

Neighbourhood diversity:

- For all quintiles, first and second booster coverage was low. Series completion coverage was highest among the most diverse neighbourhoods, whereas coverage was lowest in these areas for the first and second booster dose (Figure 1, Figure 3)
- Similar trends were observed when broken down by gender (Figure 5).
 - First and second booster dose coverage increased with age overall. Coverage trends within quintiles varied by age group. A decreasing trend was observed among the most diverse neighbourhoods for individuals 60 years of age and older (Figure 7c, Figure 7d).

Neighbourhood material deprivation:

- For all quintiles, first and second booster coverage was low. Coverage was lowest among neighbourhoods with the highest material deprivation (Figure 2, Figure 4).
 - Similar trends were observed when broken down by gender (Figure 6).
 - First and second booster dose coverage increased with age, but was lowest among neighbourhoods with the highest material deprivation for all age groups (Figure 8c, Figure 8d).

Results

Vaccination coverage by neighbourhood diversity and material deprivation

Figure 1. Vaccination coverage for eligible individuals by quintile of neighbourhood diversity and vaccination status: Ontario, December 14, 2020 to August 14, 2022

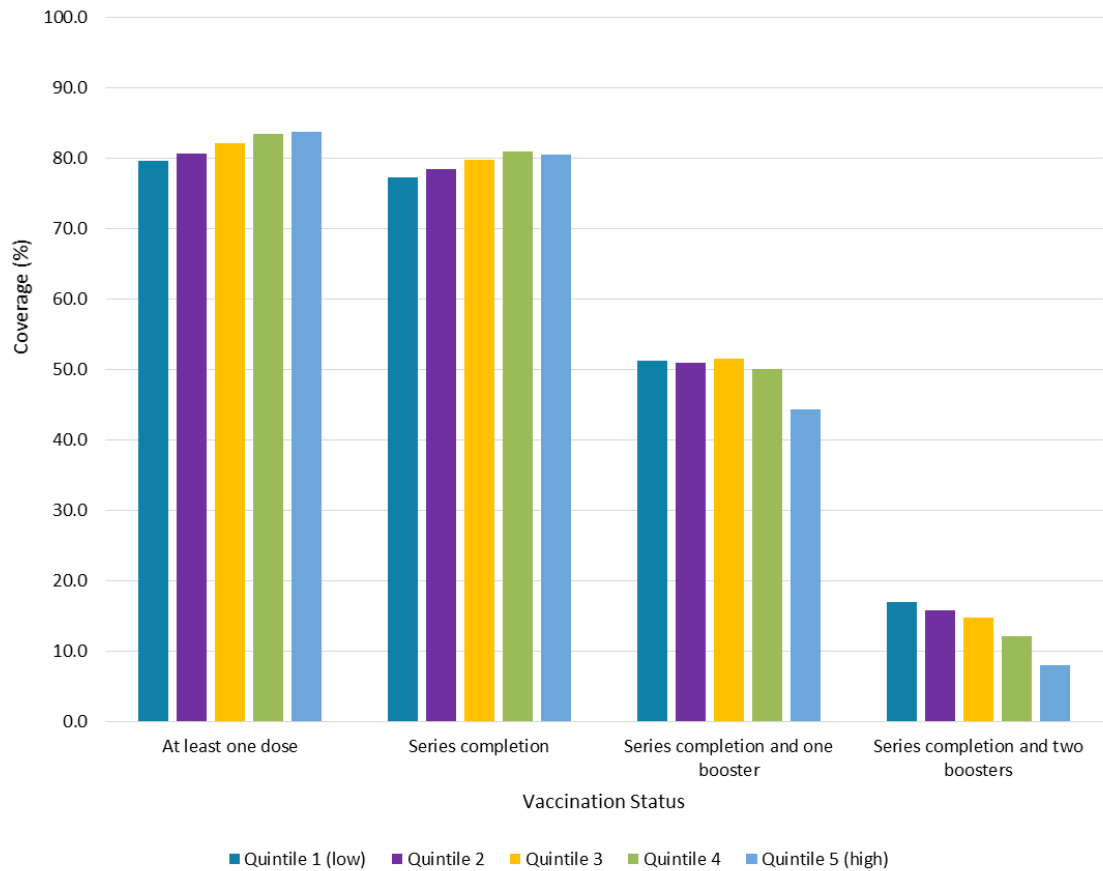


Figure 2. Vaccination coverage for eligible individuals by quintile of neighbourhood material deprivation and vaccination status: Ontario, December 14, 2020 to August 14, 2022

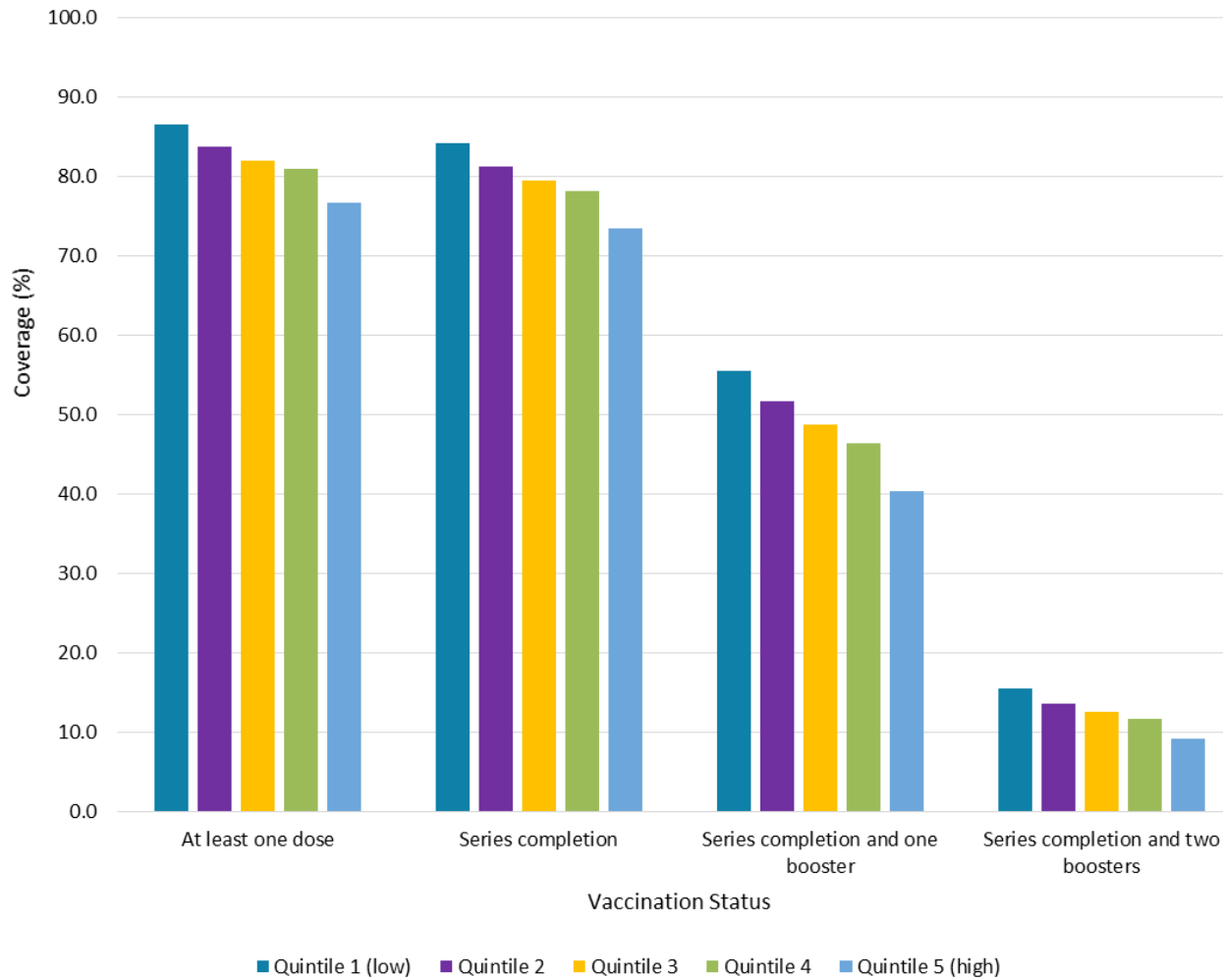


Figure 3. Cumulative vaccination coverage for eligible individuals by week of vaccination and quintile of neighbourhood diversity: Ontario, December 14, 2020 to August 14, 2022

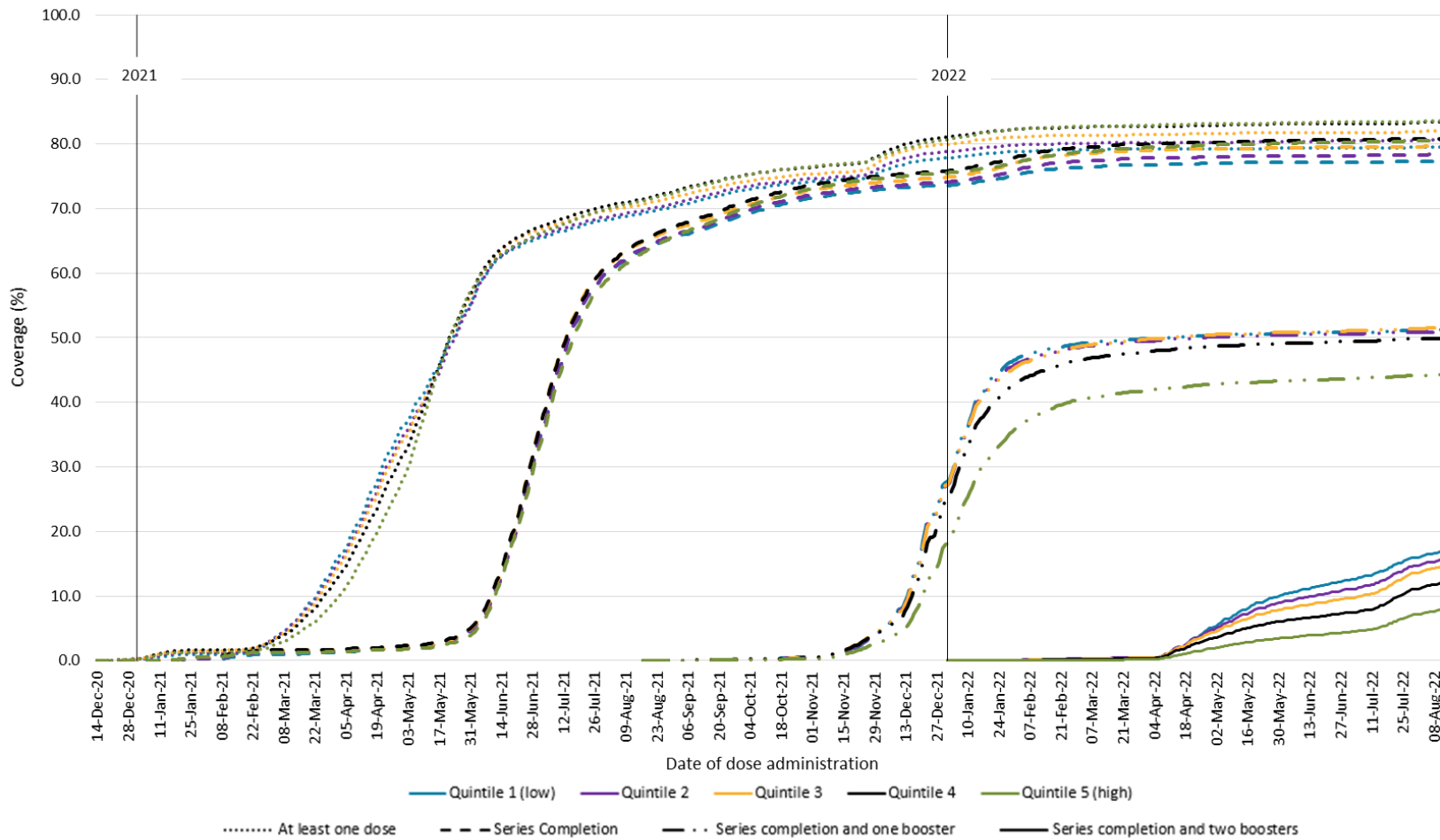


Figure 4. Cumulative vaccination coverage for eligible individuals by week of vaccination and quintile of neighbourhood material deprivation: Ontario, December 14, 2020 to August 14, 2022

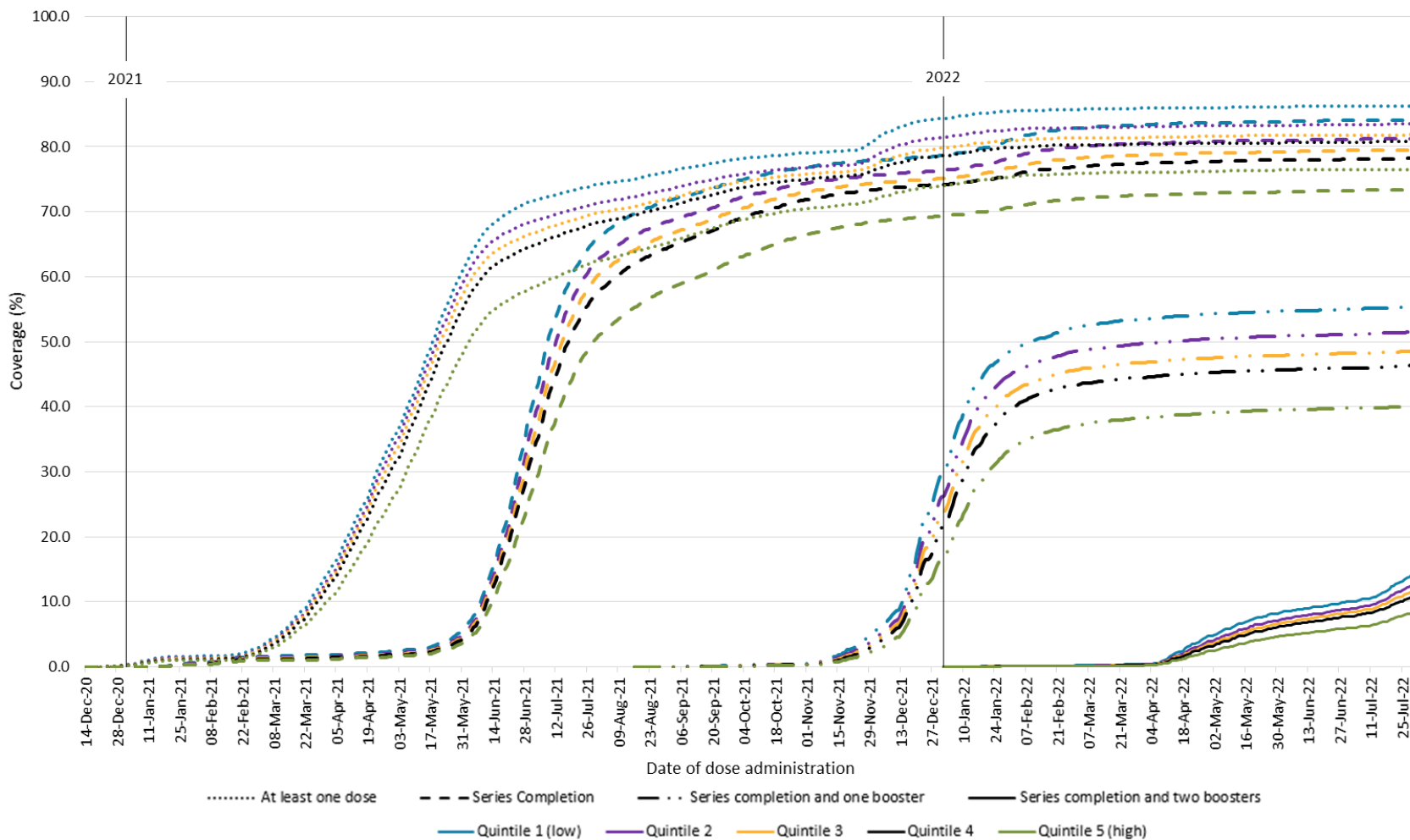


Figure 5. Vaccination coverage for eligible individuals by quintile of neighbourhood diversity, vaccination status and gender: Ontario, December 14, 2020 to August 14, 2022

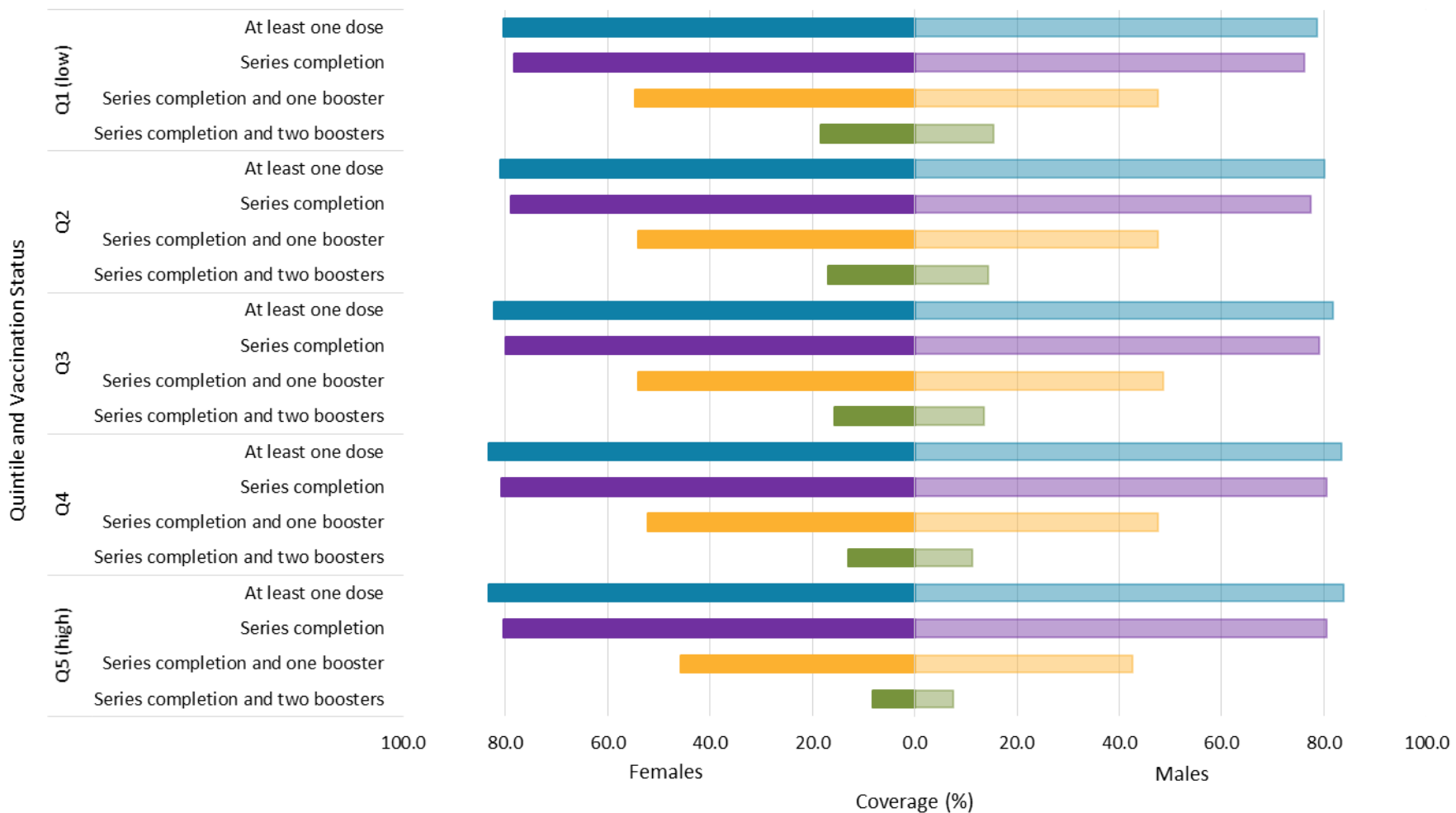


Figure 6. Vaccination coverage for eligible individuals by quintile of neighbourhood material deprivation, vaccination status and gender: Ontario, December 14, 2020 to August 14, 2022

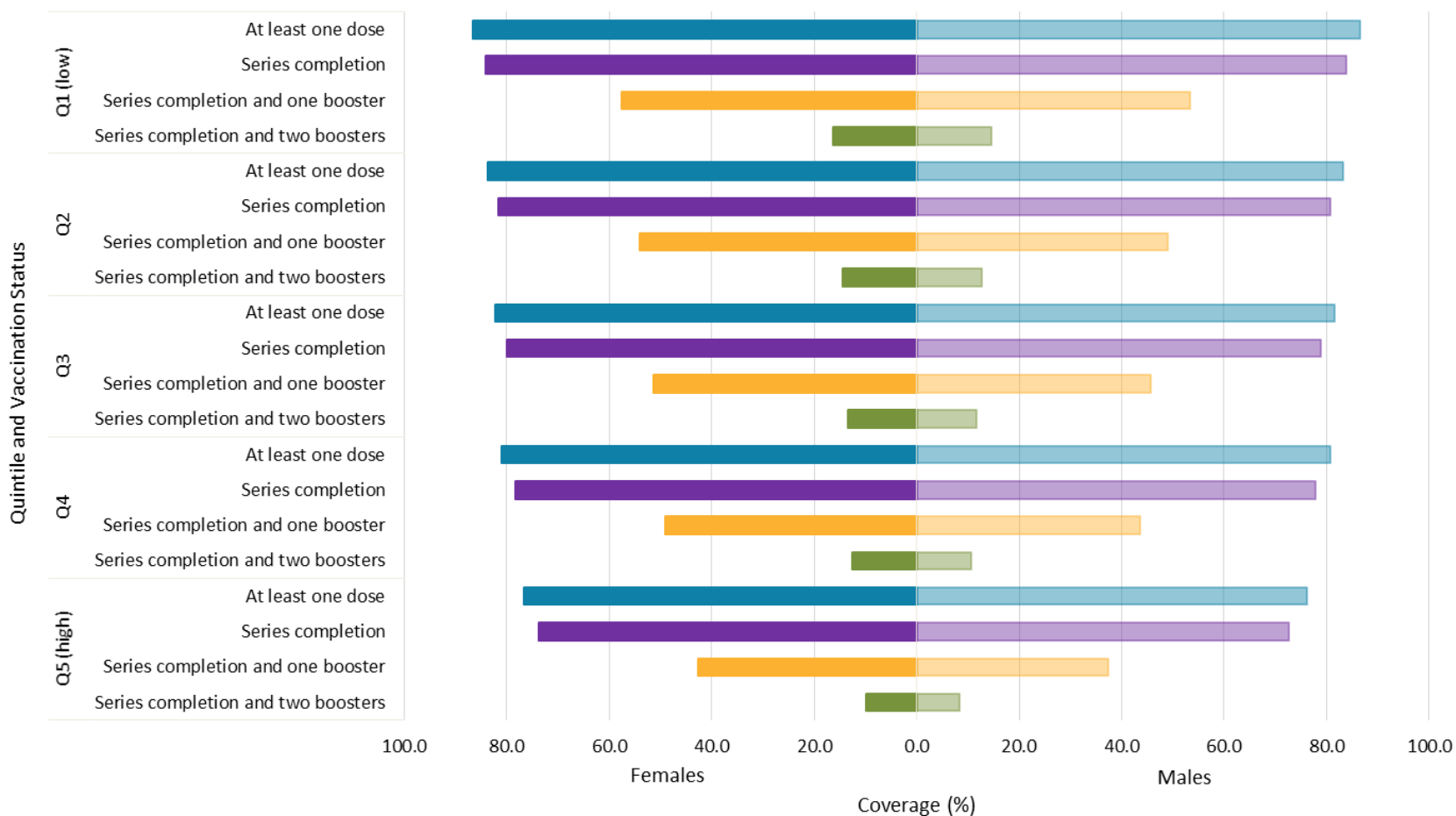
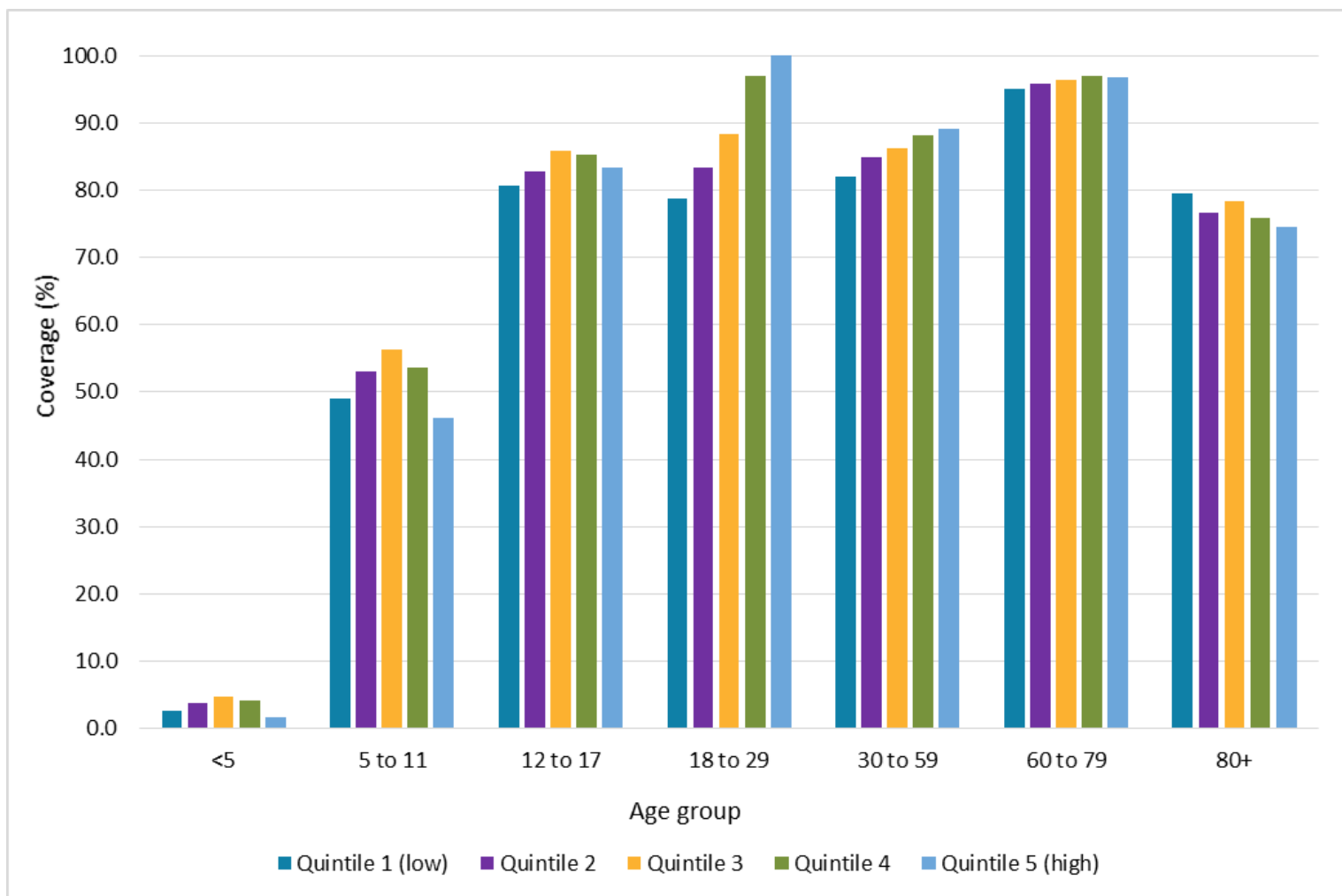


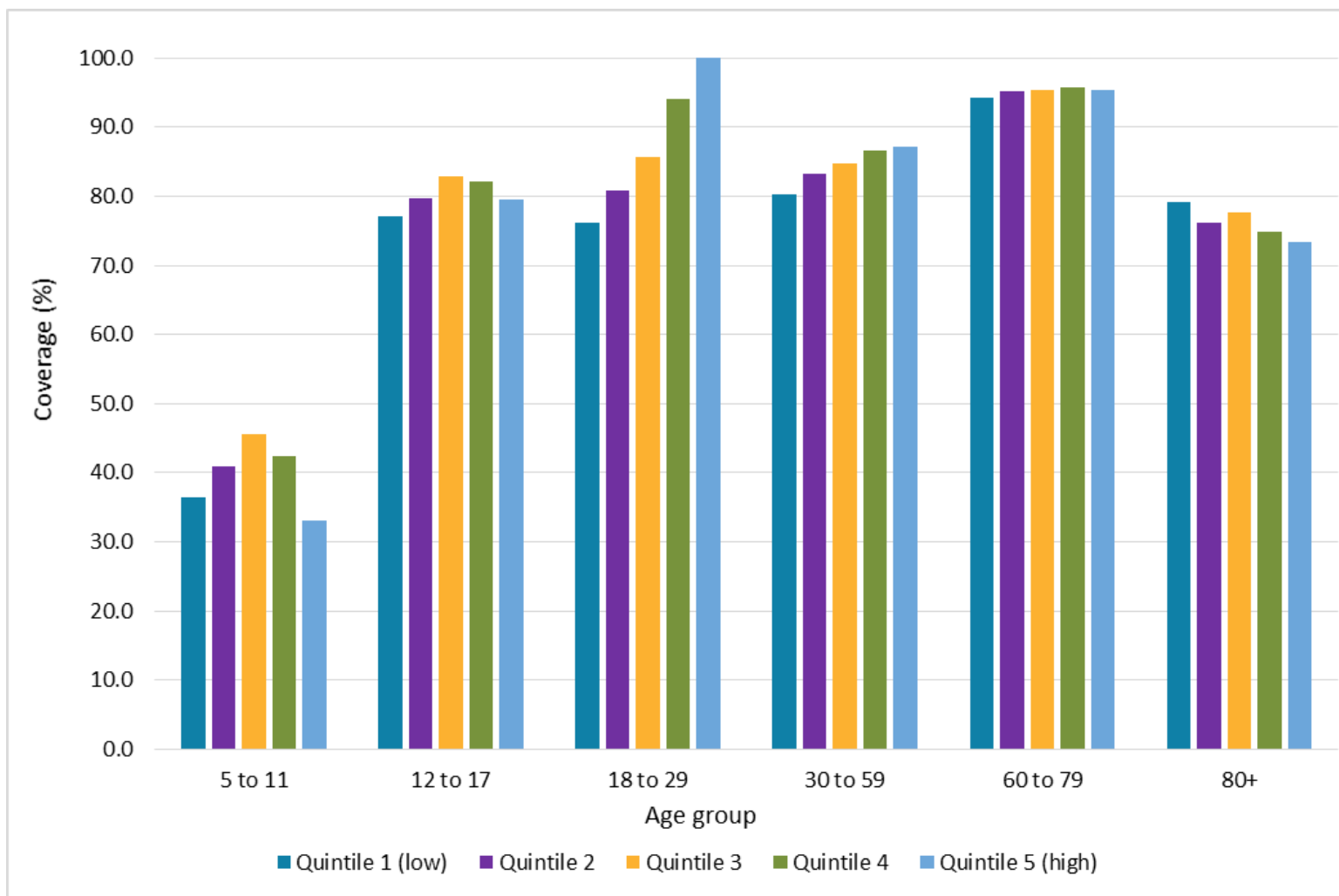
Figure 7a. Vaccination coverage for at least one dose in eligible individuals 6 months and older by quintile of neighbourhood diversity and age group: Ontario, December 14, 2020 to August 14, 2022



Notes:

1. Coverage estimates shown as 100% may represent estimates of 100% or more. Coverage estimates may be over 100% due to limitations in the vaccination data (numerator) or Ontario population estimates (denominator).
2. Children <6 months of age are included in denominators used to calculate coverage estimates, but are not eligible for COVID-19 vaccination.

Figure 7b. Vaccination coverage for series completion in eligible individuals 5 years and older by quintile of neighbourhood diversity and age group: Ontario, December 14, 2020 to August 14, 2022



Notes:

1. Coverage estimates shown as 100% may represent estimates of 100% or more. Coverage estimates may be over 100% due to limitations in the vaccination data (numerator) or Ontario population estimates (denominator).
2. Children <5 years old became eligible for COVID-19 vaccination at the end of July 2022, as a result counts are not shown as sufficient time has not elapsed for this group to complete their primary series.

Figure 7c. Vaccination coverage for series completion and one booster in eligible individuals 12 years and older by quintile of neighbourhood diversity and age group: Ontario, December 14, 2020 to August 14, 2022

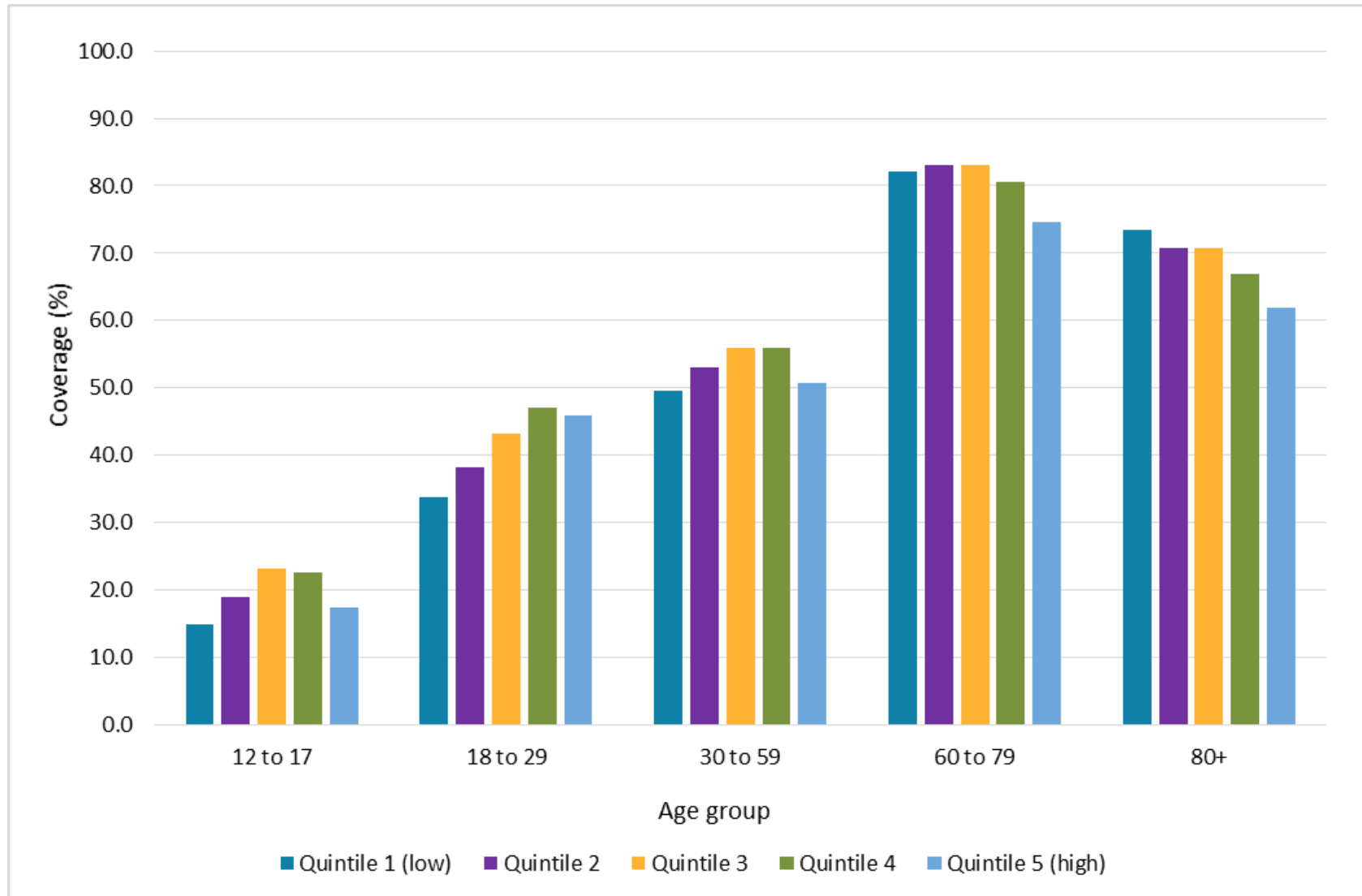


Figure 7d. Vaccination coverage for series completion and two boosters in eligible individuals 18 years and older by quintile of neighbourhood diversity and age group: Ontario, December 14, 2020 to August 14, 2022

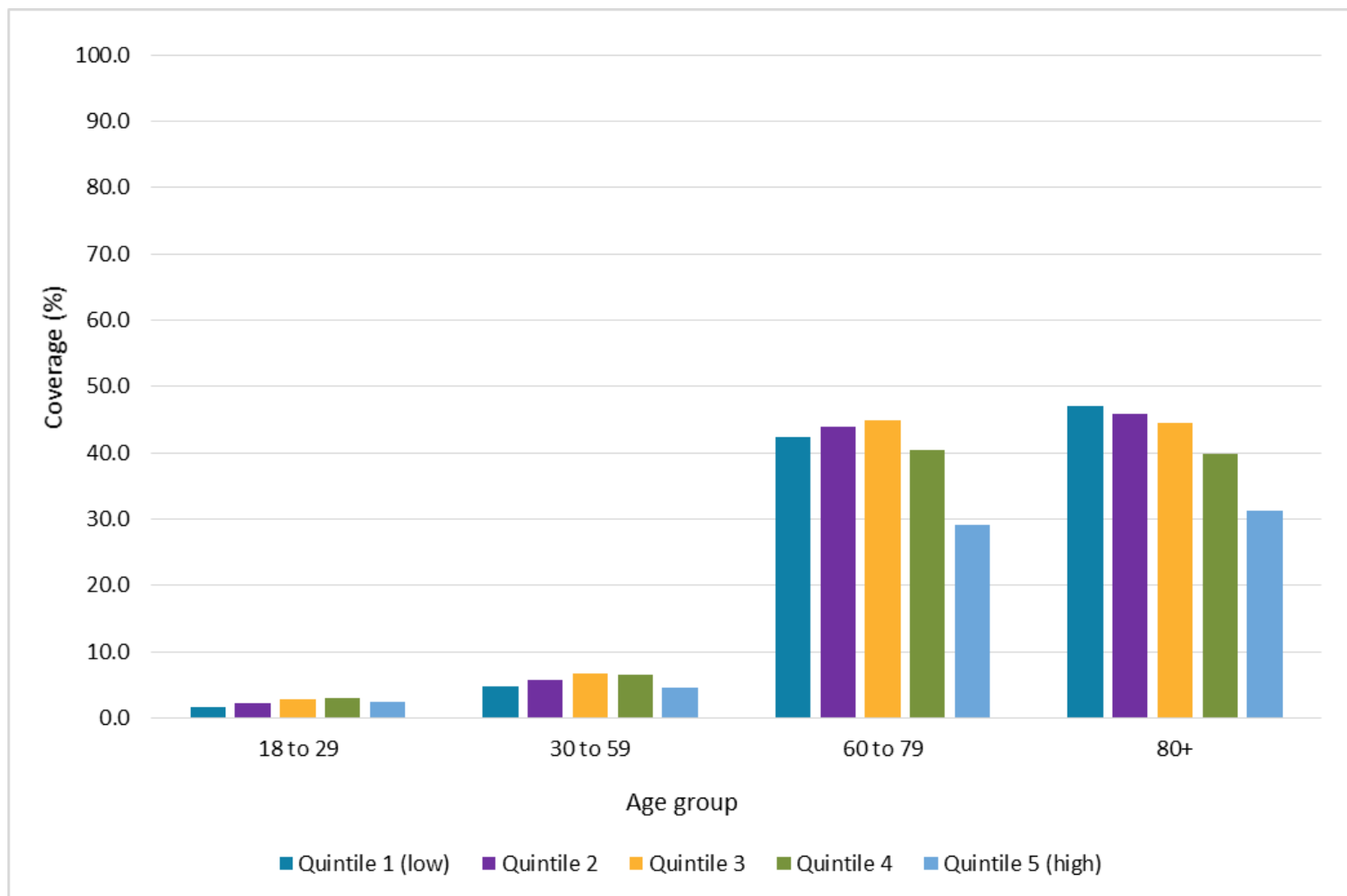
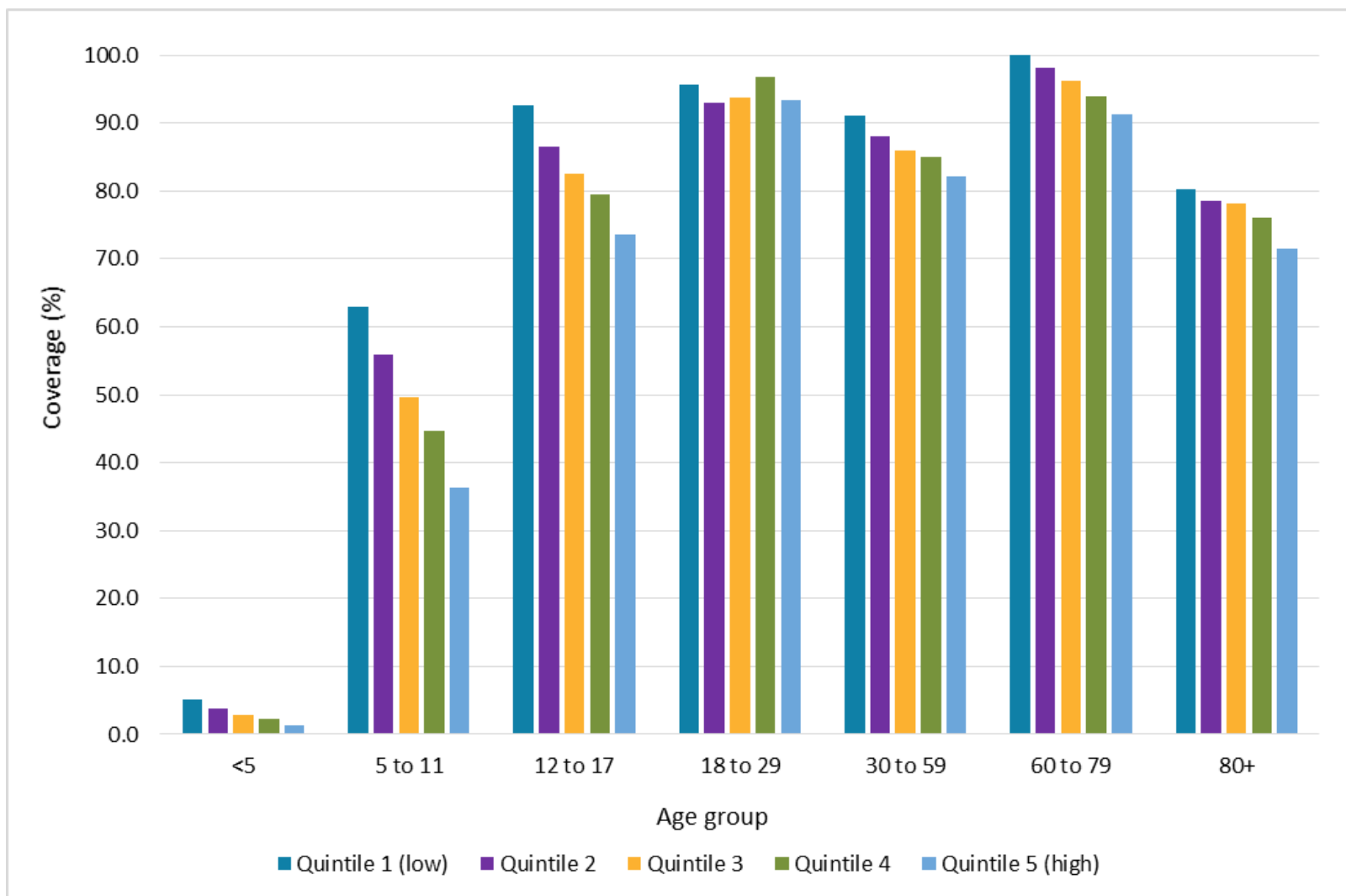


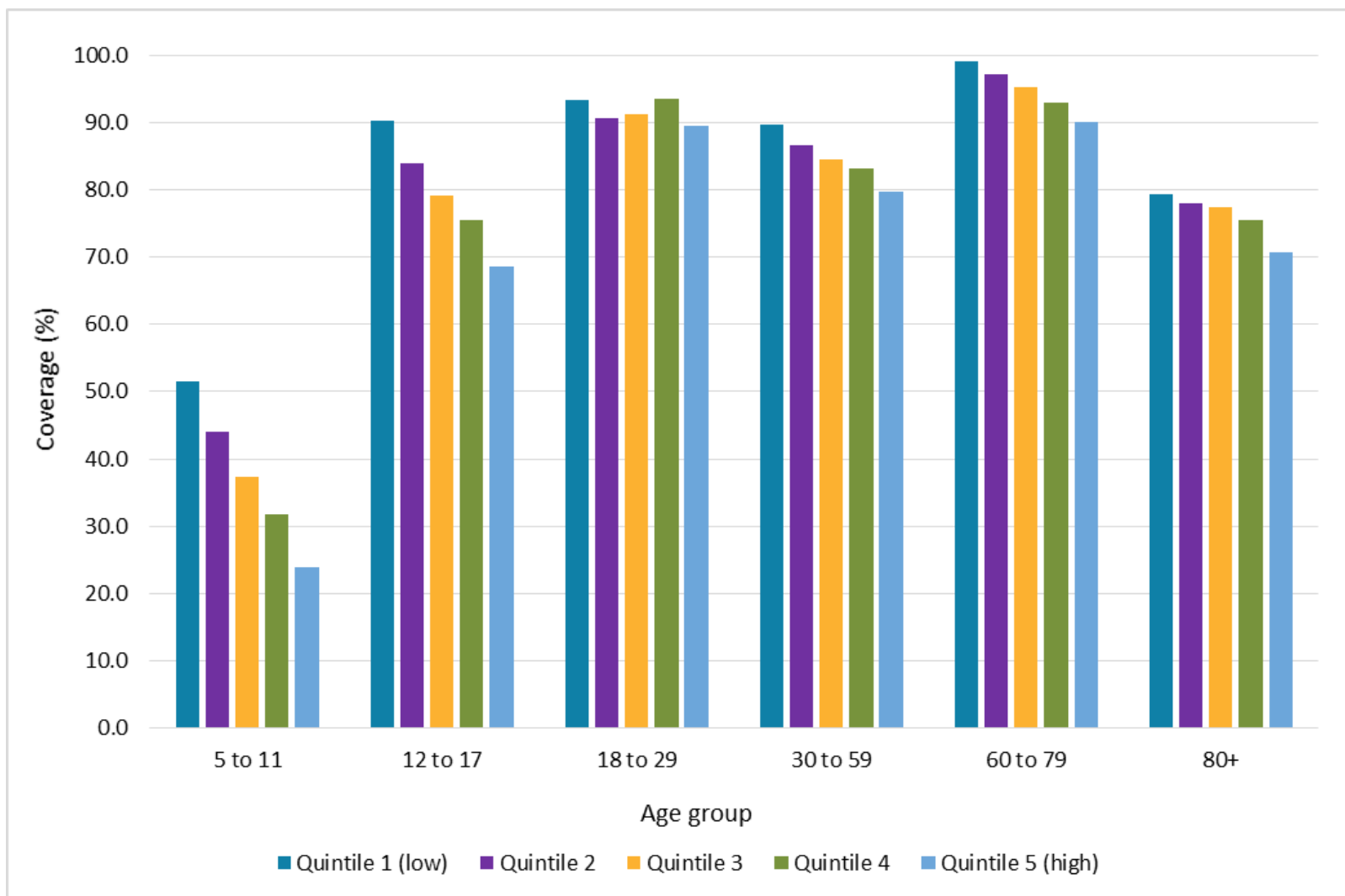
Figure 8a. Vaccination coverage for at least one dose in eligible individuals 6 months and older by quintile of neighbourhood material deprivation and age group: Ontario, December 14, 2020 to August 14, 2022



Notes:

1. Coverage estimates shown as 100% may represent estimates of 100% or more. Coverage estimates may be over 100% due to limitations in the vaccination data (numerator) or Ontario population estimates (denominator).
2. Children <6 months of age are included in denominators used to calculate coverage estimates, but are not eligible for COVID-19 vaccination.

Figure 8b. Vaccination coverage for series completion in eligible individuals 5 years and older by quintile of neighbourhood material deprivation and age group: Ontario, December 14, 2020 to August 14, 2022



Notes:

1. Children <5 years old became eligible for COVID-19 vaccination at the end of July 2022, as a result counts are not shown as sufficient time has not elapsed for this group to complete their primary series

Figure 8c. Vaccination coverage for series completion and one booster in eligible individuals 12 years and older by quintile of neighbourhood material deprivation and age group: Ontario, December 14, 2020 to August 14, 2022

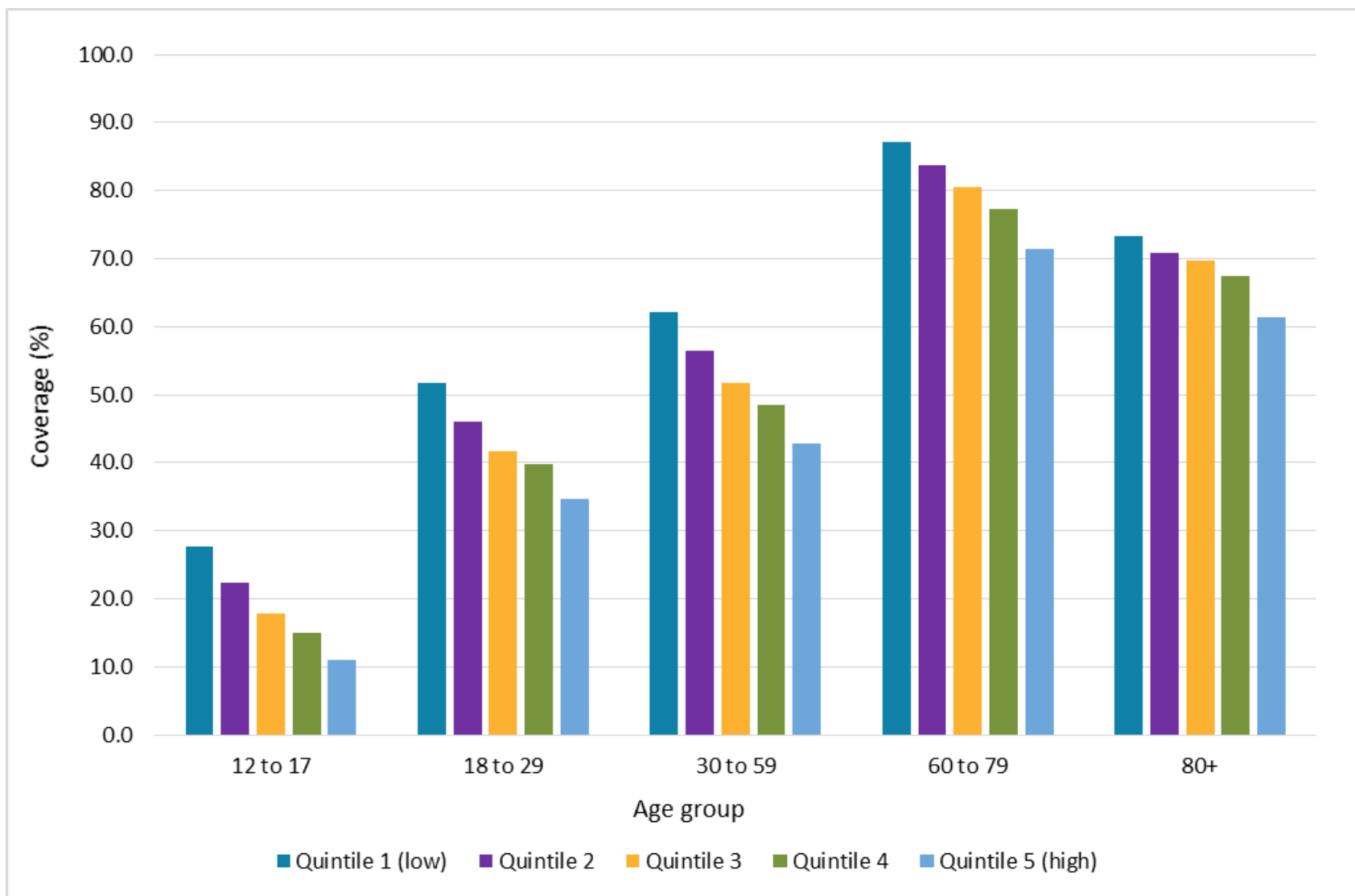
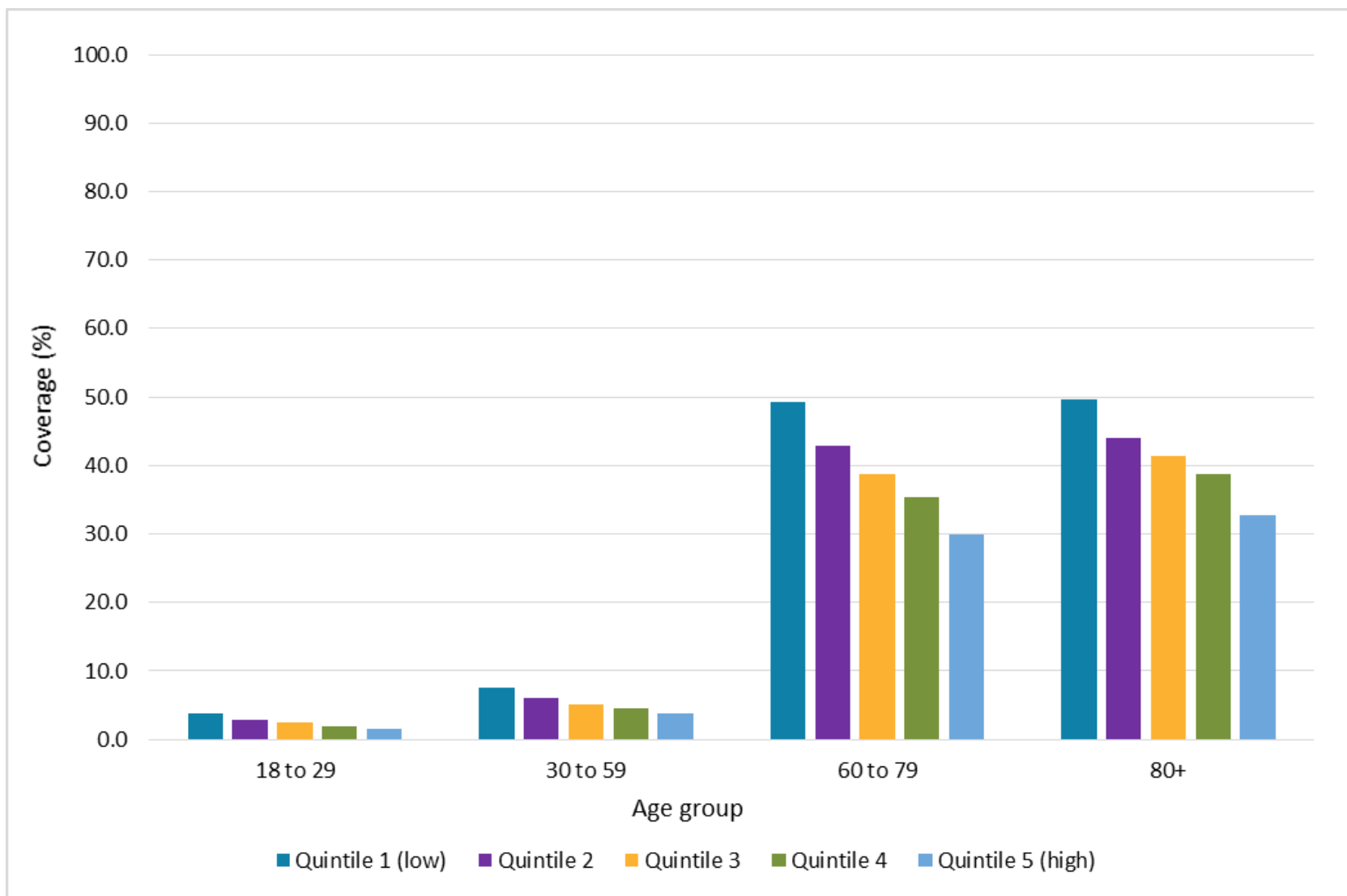


Figure 8d. Vaccination coverage for series completion and two boosters in eligible individuals 18 years and older by quintile of neighbourhood material deprivation and age group: Ontario, December 14, 2020 to August 14, 2022



Technical Notes

Definition of Terms

Vaccination status definitions of terms can be found in the in the Technical Notes of the [COVID-19 Vaccine Uptake in Ontario](#) report.²

Data Sources

COVID-19 vaccination data were based on information successfully extracted from the Ontario Ministry of Health's COVaxON application as of **August 15, 2022 at approximately 7 a.m.**

The denominators used to derive coverage estimates for ON-Marg quintiles were extracted from the Ontario Health Insurance Plan (OHIP) Registered Person Database (RPDB) Cohort Fiscal Year 2019/20 (extracted October 2020). The OHIP RPDB includes all individuals with a valid Ontario health insurance number. Denominator data were provided by Health Analytics and Insights Branch, Capacity Planning and Analytics Division, Ministry of Health.

Statistics Canada Postal Code Conversion File Plus (PCCF +) version 7E.

The health equity (neighbourhood-level diversity and material deprivation) analyses use data from the 2016 Ontario Marginalization Index:¹

Matheson FI; van Ingen T. 2016 Ontario marginalization index [Internet]. Toronto, ON: St. Michael's Hospital; 2018 [cited 2021 Apr 29]. Joint publication with Public Health Ontario. Available from: <https://www.publichealthontario.ca/-/media/data-files/index-on-marg.xls?la=en>

Data Caveats

COVaxON is a dynamic reporting system, which allow ongoing updates to data previously entered. As a result, data extracted from COVaxON represent a snapshot at the time of extraction and may differ from previous or subsequent reports.

The data represent vaccinations reported and recorded in COVaxON. As a result, all counts may be subject to varying degrees of underreporting due to a variety of factors.

Additional caveats related to COVAX data can be found in the in the Technical Notes of the [COVID-19 Vaccine Uptake in Ontario](#) report.²

This report uses the Statistics Canada dissemination area (DA) as a measure of neighbourhood. As the smallest level of geography for which census data is made publicly available, individuals are assigned to a level of ON-Marg using DA to minimize potential misclassification of socio-demographic characteristics using area-level data. As a result, the findings from this report may not align with studies which use other levels of geography (e.g. neighbourhoods based on postal code), including those evaluating coverage in provincially designated "hot spots".

People who reside in long-term settings are not represented in Canadian census data from which ON-Marg is calculated. Therefore, individuals with reason for vaccination as residents of long-term care or retirement home settings were excluded from this report, representing 151,110 (1.3%) vaccinated individuals. Additionally 468,061 (3.9%) of vaccinated individuals had invalid or missing postal codes, or live in neighbourhoods where an ON-Marg quintile could not be derived, and were also excluded from this report.

ON-Marg is an area-based index which assigns a measure based on neighbourhood characteristics, not individual characteristics. Not all individuals in a given area will reflect the broader demographic trends of the area they live in. This means, for example, that not every individual who lives in an area of high neighbourhood material deprivation experiences material deprivation themselves. Heterogeneity of demographic characteristics can vary substantially, especially across large rural geographies.

Due to data suppression for some census indicators on First Nation reserves in Ontario, residents of reserves could not be included in ON-Marg and therefore people who have been vaccinated against COVID-19 and are living in these communities could not be assigned to a quintile of marginalization. While Indigenous individuals living off reserves are included in this analysis, Indigeneity data is not currently collected or captured in dimensions of ON-Marg.

Coverage estimates shown as 100% may represent estimates of 100% or more. Coverage estimates may be over 100% due to limitations in the vaccination data (numerator) or Ontario population estimates (denominator).

Methods

VACCINATION DATA

Methods for processing COVaxON vaccine uptake data are described in the Technical Notes of the [COVID-19 Vaccine Uptake in Ontario](#) report.²

ON-MARG

Neighbourhood diversity is defined using the ethnic concentration dimension of ON-Marg, which measures populations that may experience marginalization related to racism and discrimination. It is based on the proportion of non-white and non-Indigenous residents and/or the proportion of immigrants that arrived in Canada within the past five years.

Neighbourhood material deprivation is defined using the material deprivation dimension of ON-Marg, which is closely connected to poverty. It refers to the inability of individuals and communities to access and attain basic material needs. The indicators included in this dimension measure income, quality of housing, educational attainment and family structure characteristics.

“Neighbourhoods” are considered to be Statistic Canada dissemination areas (DA). Vaccinated individuals were probabilistically matched to a DA using Statistics Canada PCCF+ version 7E. The quintiles for the ethnic concentration and the material deprivation dimensions are ordered from quintiles 1 to 5, with quintile 1 having the lowest level of marginalization (i.e., least diverse or least material deprivation) and quintile 5 having the highest level of marginalization (i.e., most diverse or most material deprivation).

As a neighbourhood-level measure of marginalization, diversity and material deprivation describe the general characteristics of a given area and are used as a proxy for individual-level data when these data are unavailable. Therefore, trends highlighted in this report apply only to the neighbourhoods from which they arise and cannot be used to characterize individual members of a given area. In order to gain a better understanding of the complex relationship between COVID-19 vaccination and ethno-cultural characteristics at the individual level, further data collection and analysis are needed.

The demographic characteristics of the populations of the quintile of neighbourhood material deprivation are described in the appendices of the COVID-19 in Ontario – A Focus on Material Deprivation report.⁵ The demographic characteristics of the populations of the quintile of neighbourhood diversity are described in the appendices of the COVID-19 in Ontario – A Focus on Diversity report.⁴

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1. Matheson FI, van Ingen T. 2016 Ontario marginalization index [Internet]. Toronto, ON: St. Michael's Hospital; 2018 [cited 2021 Apr 29]. Joint publication with Public Health Ontario. Available from: <https://www.publichealthontario.ca/-/media/data-files/index-on-marg.xls?la=en>
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Citation

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