Background

- Measles is a highly infectious viral disease that can cause serious complications. (1)
- Measles has been eliminated in Canada, but importation can occur, leading to secondary transmission and outbreaks. (2)
- Achieving high 2 dose vaccination coverage (95%) is deemed necessary for prevention of sustained transmission. (3) BC is signatory to national targets to achieve 95% 2 dose MMR (measles, mumps, and rubella vaccine) coverage by the 7th birthday by 2025. (4)
- In 2019, BC introduced the Vaccination Status Reporting Regulation (VSRR), which requires a parent/guardian to provide a vaccination status record of their children’s vaccination, in the instance where such a record has not been voluntarily provided. (5)
- Annual provincial immunization coverage estimates show a gradual and consistent decline over the past decade in the percentage of children at the 7th birthday who are up to date for measles, mumps, and rubella (MMR) vaccine in British Columbia (BC). (6)
- This decline appears to coincide with the change in the immunization schedule for the 2nd dose from 18 months to school entry (4-6 years) in 2012. (7) This change was made to optimize varicella vaccine protection through use of the combination MMRV vaccine, based on modeling suggesting that placement at school entry provided longer lasting protection. (8)
- Assessing the factors contributing to this decline has been complicated by changes in data sources over time and by health authority.

Objective

- To evaluate trends in measles vaccine coverage in children at the 7th birthday in BC to determine whether the MMR immunization schedule change is associated with the apparent declines.

Methods

Primary analysis

- Trends were assessed using 7th birthday childhood coverage report data from 2014-2022, which included multiple data sources that varied over time, defined below.

Methods (cont’d)

- Registry (school cohort): the number of children who turned 7 years old in the year preceding the report year with active records in the health authority’s immunization registry (PIR or PARIS) and with immunization registry records indicating they were registered in a BC school as of June 30 of the school year.
- Numerator: the number of children from the denominator who were up-to-date for measles vaccine.
- Secondary analyses
  A) As part of routine reporting, a birth cohort registry (data source #1) was produced from 2014-2021 for all HAcs except for VCH. For a secondary analysis, coverage was assessed using this source only to control for the effects of data source changes.
  B) For the birth cohort affected by the schedule change was also compared to estimates from the VSRR reports for 2019-2022 to assess changes in coverage as children progressed through school.

Results

- Measles coverage trends at the 7th birthday in British Columbia, 2014-2022
- Measles vaccine coverage declined in 2018 in all health authorities and again in 2019 for IHA, FHA, and VHA (Figure 1). Most health authorities, except NHA, had an increase in coverage from 2020-2021. IHA saw a large decline in 2017, a year earlier than other health authorities.
- From 2019 onwards the proportion of undocumented or unimmunized children remained similar to 2017 and 2018.

Conclusion

- Measles vaccination coverage by the 7th birthday has declined gradually and consistently since 2018, which was the first birth cohort affected by the change in 2nd dose schedule from 18 months of age to school entry.
- Direct comparison of historic coverage data is not possible due to changes in data sources for the numerator and denominator, but a secondary analysis using birth data from a single source (FHA) for both numerator and denominator showed that the decline in second dose receipt was still observed.
- Comparison of a cohort of children who were assessed for vaccine receipt by 7th birthday in 2018 to VSRR coverage data from 2019-2022 shows that measles coverage improved as this cohort reached lower grades (i.e., grades 4, 5, and 6). However, coverage assessed at grade 6 is still short of the 95% national target (4).
- BC could consider advancing the age of second dose to 18 months (as per other Canadian jurisdictions) or use a mixed schedule similar to the United States (9) where the second dose can be administered at either 18 months or 4-6 years. This may help in targeting younger children for completion of their MMR series prior to school entry.

References

8. Kunzlu Z, Gácsa S. Outbreak of varicella in preschool children despite one dose vaccination. Tunes Pediatr. 2018;05:00:00. doi:10.24953/tuped180518.008