Influenza vaccination coverage assessment for staff of acute and long term care facilities and residents of long term care facilities British Columbia, 2021/22 and 2022/23 – Methods Report

Methods

Influenza immunization coverage rates for healthcare workers and long term care facility residents were calculated at the facility level, health service delivery area level, health authority level, and for BC. There are five regional health authorities comprised of 16 health service delivery areas, and a Provincial Health Services Authority (PHSA) which is responsible for select acute care province-wide healthcare programs and services.

Definitions

Acute care facilities were defined as non-profit institutions that are designated as a hospital by the Minister and are operated primarily for the reception and treatment of persons:

- suffering from the acute phase of illness or disability;
- convalescing from or being rehabilitated after acute illness or injury; or
- requiring extended care at a higher level than that generally provided in a private hospital.

Long term care facilities were defined as facilities with 50% or more residents aged 65 years and older that are either:

- licensed under the Hospital Act; or
- licensed under the Community Care and Assisted Living Act and provide some health care services.

Staff were defined as all persons who work or train on a full time, part time or casual basis in a facility or hospital who have direct or indirect contact with patients or residents, regardless of whether they are health care providers. This includes administrative and non-patient care staff (e.g., medical records, housekeeping and dietary) and excludes volunteers. This definition of staff is unchanged since the 2013/14 season and is based on the Ministry's Performance Agreements.

Data Sources

There were two sources of influenza vaccination coverage data: an anonymized individual healthcare worker level dataset from the electronic Workplace Health Indicator Tracking and Evaluation (WHITE) database of occupational health records including influenza vaccination status, and aggregate data entered by health authority staff into an application developed using REDCap[1] (Table 1). Data are received and analyzed annually following the influenza vaccination campaign.

Table 1: Summary of influenza immunization coverage data sources and included populations

Data Source	Data Type	Population Included
WHITE	Record level	• Staff at acute facilities • Staff at public long term care facilities
REDCap	Aggregate	• Staff at private long term care facilities • Residents at long term care facilities

WHITE data were used for staff coverage rates at all acute care facilities as well as for publicly funded (owned and operated and contracted) long term care facilities, and these have been the source of this information since the 2012/13 season. Influenza vaccination status in the WHITE data is based on self-

[1] REDCap (Research Electronic Data Capture) is a secure web application for building and managing online surveys and databases; the version used for influenza coverage reporting in BC is supported by PHSA-IT; see https://projectredcap.org/software/

reporting; staff report vaccination (date and provider) or vaccine declination. All staff self-reports at these facilities are recorded in WHITE. Data on healthcare worker job descriptions are recorded in WHITE using job codes designated by Health Sector Compensation Information Systems (HSCIS). HSCIS codes are grouped into 162 subfamilies, which have been further collapsed into 10 job categories and 1 'other' category for the purpose of these reports.

Coverage for staff at private long term care facilities and residents of all long term care facilities were obtained by aggregate reporting by health authority staff using the REDCap application. In BC, licensing of long term care facilities is conducted by regional Health Authority Community Care Facility Licensing programs. Beginning in the 2018/19 influenza season, a list of long term care facilities was provided by the Office of the Seniors Advocate and was sent to each health authority for review. Long term care facilities that closed during the previous year were removed and new facilities were added to the list of facilities in REDCap.

Analysis

Staff whose records were included in the analysis must have been employed by a health authority and have worked for a minimum of 8 hours from December 1 to January 31 during the influenza season. Staff who were not on a health authority's payroll (contracted staff, trainees, etc.) were not included in the WHITE database. Physicians and medical residents were not included in the WHITE database for most facilities.

Healthcare workers were counted in the facility and region where they work, rather than by their health authority employer. Some healthcare workers worked at multiple facilities during the influenza season. For coverage statistics at the provincial, health authority or health service delivery area level, each healthcare worker was included only in the facility where they worked the most hours. For facility level coverage statistics, healthcare workers were included in each facility where they worked for at least 8 hours during the influenza season. These are the same inclusion criteria as have been used since the 2014/15 influenza season coverage report.

Some facilities in the province contain both acute and long term care units, and the distinction between these two units is not made in the WHITE data. As a result, mixed acute/LTC facilities are included in the acute HCW analysis and excluded from the LTC HCW analysis.

For the analysis of influenza policy compliance, healthcare workers who did not report were classified as unvaccinated. However, a proportion of these healthcare workers may have been immunized, and, therefore, the results may underestimate vaccination coverage. Healthcare workers who reported being immunized but had a date of immunization prior to September 20, 2022 (before influenza vaccine available) or after January 31, 2023 (the cut-off period to be included in the WHITE data for these analyses) are deemed "Not reported".

Coverage rates for residents were calculated for each long term care facility. Facilities with missing data or inconsistent data (e.g., more vaccinated residents than total residents) were excluded from analysis.

Changes in coverage rates over time should be interpreted with caution as the data collection methods have changed from aggregate facility level reporting of immunization coverage to individual healthcare worker level reporting using WHITE data, and there have been other incremental methodological changes. Refer to Appendix A for a summary of methodological and policy changes which should be considered when interpreting coverage trends over time.

Appendix A

Over time, the influenza vaccination coverage analysis has changed due to different data formats, new data sources, and adjustments to inclusion and exclusion criteria of healthcare workers and long term care facilities. New policies may also impact coverage rates. Table A documents these changes and their potential impact on the reports of influenza vaccine coverage.

Table A: Summary of methodological and policy changes and impact to the interpretation of influenza vaccination coverage results, 2009/10 to present

Type of Change	Impacted influenza season(s)	Change	Impact on HCW Influenza Data
Method	2009/2010 to 2011/2012	Data may not be comparable by facility and HSDA from year to year due to ongoing changes in data collection methods, changes in facility denominators and regional differences in reporting (e.g., some facilities reported coverage for only staff on payroll, while other facilities included contracted staff, volunteers, and/or trainees).	Comparing data across time/influenza seasons unreliable. Changes in numerator and denominator within facilities when comparing influenza season.
Method	2009/2010 to 2011/2012	Staff who work in multiple facilities were counted in the denominator of every facility but in the numerator on only the facility in which they were immunized. EXCEPTION: VIHA (since 2005/06) and Fraser (since 2009/10)	This double-counting of staff members in the denominator but not the numerator artefactually lowered staff coverage rates.
Method	2009/2010 to 2011/2012	In most regions, the number of staff employed in each facility was determined using administrative databases. Obtaining the denominators from these databases artefactually lowered coverage rates because these databases include people who are not active (e.g., on long term disability or leave) or are rarely active (e.g., a casual who worked in the facility more than a year ago) in the facility.	Inclusion of staff not actively working in the denominator lowered coverage rates in facilities because such staff are less likely to receive influenza vaccine.
Method	2010/2011	The number of staff reported in the 2010/11 was just over half the number of staff reported in the previous year. The reason for this change is unknown.	Coverage rates varied on a facility specific basis for 2010/11 compared to adjacent seasons.

Type of Change	Impacted influenza season(s)	Change	Impact on HCW Influenza Data
Policy	2012/2013 to present	The BC Influenza Prevention Policy was enacted which required healthcare workers to be vaccinated against influenza or wear a mask while in patient care areas during the influenza season. Disciplinary measures were in place beginning the second year of the policy for non-compliant staff.	For acute staff, coverage increased to 74% for the 2012/13 season from the 35-46% observed in previous seasons. For LTC staff, coverage increased to 75% for the 2012/13 season from the 49-68% observed in previous seasons.
Method	2012/2013 to present	This was the first year that an individual anonymized WHITE dataset was used to calculate influenza immunization coverage statistics for acute care facilities in BC; previously all reporting was aggregate by facility. WHITE data were also used preferentially for staff in long term care facilities over aggregate reported counts. To be included in the WHITE data extract, a staff member must have been employed by a health authority and have worked at least 8 hours during the influenza season. Staff who were not on a health authority's payroll (contracted staff, trainees, etc.) were not included in the WHITE database. Physicians and medical residents were not included in the WHITE database for most facilities.	There were almost 10,000 fewer healthcare workers included in this year's report compared with previous year, which was a result of using a different data source and inclusion criteria. The acute care coverage rate using WHITE was about ten percent higher than obtained through aggregate reporting by facility. Denominators and numerators differed substantially during this influenza season compared to previous seasons.
Method	2012/2013 to 2013/2014	Health authority staff included in WHITE who worked in more than one facility were included only in the facility where they worked the most hours for facility level and regional analyses.	Results are not directly comparable to the prior season because of the change in assignment of staff by facility.
Method	2013/2014 to present	Health authority staff included in WHITE who worked in more than one facility were included in each facility where they worked for facility level analysis, but were only included in the facility where they worked the most hours for regional analysis.	Coverage rates were consistent compared to the previous influenza season, but numerator and denominator counts at each facility differed.

Type of Change	Impacted influenza season(s)	Change	Impact on HCW Influenza Data
Policy	2015/2016 to present	Health authority staff were asked to report their influenza vaccination status using an online reporting website. Staff could report receiving or declining vaccination, and if vaccinated, who administered the vaccine.	The vaccination status from the online self-reporting system was used to populate WHITE.
Method	2015/2016 to present	Policy compliance analysis was conducted to determine the number and percent of staff included in WHITE who were vaccinated, declined vaccination, or did not report. Staff who did not report using the online reporting website were considered unimmunized for the purpose of data analysis.	Vaccination status was self-reported, and ~20% of staff did not report their status and were considered unimmunized. Some of these individuals may have been vaccinated, and therefore, vaccination coverage estimates may underestimate the true coverage. Only LTC staff at publicly funded facilities are included in WHITE, and policy compliance analysis was only conducted for those individuals.
Method	2016/2017 to present	Some facilities in the province contain both acute and long term care units, and the distinction between these two units is not made in the WHITE data. Because of this, all of these mixed acute/LTC facilities are included in the acute HCW analysis and excluded from the LTC HCW analysis	Excluding these LTC facilities from the LTC HCW analysis increased the percentage of LTC facilities reporting HCW influenza vaccine receipt.
Method	2018/2019 to present	The Office of Senior's Advocate provided a list of all long term care facilities (owned and operated, contact, and private) to the BCCDC.	Health authorities review the facility list against regionally licensed facilities, and submit aggregate reports for resident coverage, and for facilities without staff data in WHITE, for staff.
Policy	2018/2019	The Influenza Prevention Policy was updated to include a requirement for LTC facilities to report influenza coverage.	94% of LTC facilities reported HCW data this season, a decline from the previous season's 95% and the 98% of facilities who reported in 2016/2017 92% of LTC facilities reported resident data this season, a decline from the previous three seasons when 95-96% of facilities reported

Type of Change	Impacted influenza season(s)	Change	Impact on HCW Influenza Data
Policy	2019/2020	The Influenza Prevention Policy was updated to suspend the disciplinary aspect that required health care employees, contractors and medical staff to get immunized or wear a mask when in patient care areas during the influenza season. Reporting of an individual employee's immunization status remained mandatory.	The proportion of acute and LTC HCWs who reported being vaccinated was the lowest since the Influenza Prevention Policy was first enacted. A higher proportion of HCWs did not report vaccination status compared to previous years. These individuals were assessed as unimmunized, the same methodology used since 2015/2016.
Method	2019/2020	Staff who reported being vaccinated in WHITE but listed a vaccination date prior to influenza vaccine availability in BC or after the last day in February were considered to have not reported their status, and therefore were analyzed as unvaccinated as per the existing methodology.	Vaccination status was changed from vaccinated to not reported for 183/70,467(<1%) HCW records in WHITE.
External factor	2020/2021	The COVID19 pandemic began in BC in early 2020 and progressed through the 2020/2021 influenza season. LTC facilities were particularly affected, which very likely impacted the facility level reporting rate.	Of those LTC facilities where HCW data were not available in WHITE (n=246), 140 (57%) reported HCW data. 58% of LTC facilities reported resident coverage data. Coverage is based only on those facilities that report. As a result, the denominator for total LTC HCW and residents was lower than previous seasons, and coverage estimates should be interpreted with a large degree of caution as coverage in reporting facilities may not be reflective of coverage in non-reporting facilities.

Type of Change	Impacted influenza season(s)	Change	Impact on HCW Influenza Data
Method	2021/2022	The cut-off for HCW self-reported influenza immunization status in WHITE was changed from February 28 to January 31.	HCW coverage has been lower in the 2021/22 and 2022/23 seasons, largely due to an increase in the proportion of individuals who did not report their influenza immunization status after the non-enforcement change in 2019/20. Most HCWs reported their status earlier in the influenza season as the historical date by which enforcement began was December 1st, so the change in date of self-reporting for the purpose of analysis likely did not have a significant impact on coverage.