Province Wide Surveillance

AHS has 13 performance measures aligned with the AHS 2017-2020 Health Plan and Business Plan used to monitor the performance of the health system. IPC provides the data for the performance measure on hand hygiene compliance that is used as an indicator to reduce and prevent incidents of preventable harm to patients in AHS facilities. Covenant Health is not included in this measure due to differences in methodology. AHS also has several monitoring measures that are of interest to Albertans. One of these, the hospital-acquired *Clostridium difficile* infection rate is provided by IPC and includes both AHS and Covenant Health.

**Provincial surveillance program**

Surveillance for the identification of healthcare-associated infections is an essential component of AHS’ response to the hazard these infections pose to Albertans. Infections for surveillance are selected based on those that have a significant cost to the healthcare system or significant impact on patients in terms of morbidity or mortality. Surveillance for IPC purposes is distinct from the clinical need of information for patient diagnosis and treatment and so is carried out in a distinct manner.

IPC has an integrated provincial surveillance program. Protocols are used to ensure that surveillance activities are carried out in a uniform manner. IPC protocols are developed by the IPC Data Quality Working Group, approved by the Provincial Infection Prevention and Control Surveillance Committee, and confirmed by the Provincial Infection Prevention and Control Committee. Protocols are applied across AHS and Covenant Health. In 2018/19, there were nine provincial IPC surveillance protocols related to outcome measures, which are outlined in Table 3.

**Table 3: Provincial IPC surveillance protocols related to outcome measures**

<table>
<thead>
<tr>
<th>Protocol Category</th>
<th>Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibiotic-resistant organisms</td>
<td>Laboratory-confirmed carbapenemase-producing organisms</td>
</tr>
<tr>
<td></td>
<td>Laboratory-confirmed methicillin-resistant <em>Staphylococcus aureus</em> colonizations and infections</td>
</tr>
<tr>
<td></td>
<td>Laboratory-confirmed vancomycin-resistant enterococcus infections</td>
</tr>
<tr>
<td>Bloodstream infections</td>
<td>Bloodstream infections with antibiotic-resistant organisms including carbapenemase-producing organisms, extended-spectrum beta-lactamase-producing organisms, methicillin-resistant <em>Staphylococcus aureus</em>, and vancomycin-resistant enterococcus in all admitted patients and central line-associated bloodstream infections in adult and pediatric intensive care units</td>
</tr>
<tr>
<td><em>Clostridium difficile</em> infection</td>
<td>Laboratory-confirmed with clinical signs and symptoms in an acute care setting</td>
</tr>
<tr>
<td></td>
<td>Laboratory-confirmed in a continuing care setting</td>
</tr>
<tr>
<td>Surgical site infections</td>
<td>Eligible cardiovascular procedures including coronary artery bypass graft or cardiac procedures that involve valve replacement, septum repair, and reconstruction procedures</td>
</tr>
<tr>
<td></td>
<td>Eligible orthopedic procedures including total hip or total knee replacement</td>
</tr>
<tr>
<td></td>
<td>Eligible vascular procedures including abdominal aortic aneurysm and peripheral vascular bypass procedures</td>
</tr>
</tbody>
</table>
All protocols are posted on the external AHS IPC website and are updated on an annual basis. Where appropriate, these protocols align with national and international surveillance protocols, allowing comparison between Alberta’s health system performance and other jurisdictions in Canada.

A provincial online IPC surveillance platform – ProvSurv – enables the collection and reporting of surveillance data for outcome measures. Vendor-supported electronic platforms – AHS Clean Hands and AHS Medical Device Reprocessing Reviews – enable or will enable the collection and reporting of surveillance data for process measures, which are described elsewhere in this report. Education and training for staff is provided before platform access is granted to promote accuracy and validity of the data.

**Provincial IPC surveillance program action plan**

In 2018/19, the AHS IPC Provincial Surveillance Action Plan (2019), which describes the overall functioning and future plans for provincial surveillance activities on both outcome and process measures, was updated. Provincial and local IPC surveillance activities are directed towards areas requiring monitoring and potential actions to address increasing trends, including those of specific diseases, pathogens, sites of infection, or patient populations.

This plan adapted the model for data quality from the Canadian Institute for Health Information’s Information Quality Framework (2017) to categorize current provincial surveillance activities for IPC under one of three domains – data, information and action (Figure 1). These domains describe activities that allow data to be continuously, systematically collected, analyzed, and interpreted to inform planning, implementation, and evaluation of IPC improvement initiatives.

**Figure 1: IPC provincial surveillance quality framework**

![Figure 1: IPC provincial surveillance quality framework](image-url)
Data

The data domain includes activities that support the capture, entry, and verification of data. Data on outcome measures are captured and entered by IPC staff. The IPC Data Quality Working Group is responsible for identifying education needs for IPC staff related to surveillance activities on outcome measures. Education is offered through the IPC Data Quality Forum, which is hosted monthly.

In 2018/19, a provincial review of case severity for antibiotic-resistant organisms was completed using the same methodology as a review conducted in 2015/16. The purpose of the review was to assess the accuracy and consistency of infection control professional's decisions, provide an opportunity for staff to learn more about using protocols to inform decisions, and provide an opportunity for IPC physician engagement. There was improvement in the classification of cases for both methicillin-resistant *Staphylococcus aureus* and vancomycin-resistant enterococcus between review periods resulting from increased education for staff about protocols and the zone- and site-level surveillance discussions that were instituted after the first review cycle.

Case finding processes, using secondary data sources such as *International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10)* codes, help to identify and verify cases. Case finding is done on a routine or ad hoc basis based on identified needs.

One example of routine case finding is used for carbapenemase-producing organisms. Each fiscal quarter, the Provincial Laboratory for Public Health (ProvLab) provides IPC with a list of patients with newly confirmed carbapenemase-producing organisms so that isolates meeting criteria for national surveillance through the Canadian Nosocomial Infection Surveillance Program can be identified. Using that list, IPC Surveillance and Standards reviews these patient histories in Netcare for new acute care facility admissions, and sends invitations to infection control professionals to create an electronic flagging alert so that patients are safely managed if admitted to an acute care facility.

One example of ad hoc case finding is used for bloodstream infections with methicillin-resistant *Staphylococcus aureus* or vancomycin-resistant enterococcus. In 2018/19 the completeness of patient records in ProvSurv of bloodstream infections with these organisms was assessed. The first bloodstream infection for a patient was linked to the patient's first positive laboratory blood culture with these organisms between April 1, 2016 and December 31, 2017. Results indicated that three percent of bloodstream infections had not been entered into ProvSurv. These infections were reviewed by infection control professionals and then entered to provide complete and accurate data on the incidence of bloodstream infections. A second cycle of this evaluation is scheduled for 2019/20.
Comparing infection rates using different surveillance methods

Administrative data are one method through which infections may be identified, but the accuracy of using such data is uncertain.

Clostridium difficile infections

In 2018/19, laboratory data were linked to administrative data to understand the validity of using a laboratory surveillance method only compared to the current surveillance method, which considers a patient’s symptoms in conjunction with a positive Clostridium difficile laboratory test. This study concluded that the laboratory surveillance method included more cases than the current surveillance method. Laboratory surveillance may detect colonizations rather than infections as the patient’s symptoms are not considered. Clinical symptoms and laboratory results are important in the diagnosis of infection. Thus, the hospital-acquired rate would be 26% higher using a laboratory surveillance method.

Surgical site infections

A study was designed to assess the sensitivity, specificity, and positive and negative predictive values of an administrative surveillance method based on International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) codes only compared to the current surveillance method. The study concluded that the administrative surveillance method has reasonable testing characteristics for identifying complex surgical site infections following arthroplasty and that for centres without prospective surveillance programs such as the one used in Alberta this could be helpful in identifying these infections. However, a comprehensive, prospective surveillance program is superior.

Both of these examples highlight the accuracy of the data being collected by IPC.

Information

The information domain includes activities that analyze and report on the collected data and disseminate the results to appropriate stakeholders. Timely IPC data are provided through various modalities to all AHS and Covenant Health staff and stakeholders, including Alberta Health, and are outlined in Table 4.

Work continues to increase the availability, accessibility, and usability of the data so it can inform actions at the provincial, zone, and local level. One of the ways is through automated reporting and Tableau. In 2018/19, the quarterly reports for adverse outcomes following Clostridium difficile infection and central line-associated bloodstream infections rates were automated, joining the suite of automated reports for methicillin-resistant Staphylococcus aureus and Clostridium difficile infection. In 2018/19, a new IPC workbook was created to display trends in a site’s IPC baseline. This is the expected performance for a given site in the reported time period based on the reported monthly rates for the previous fiscal year.
<table>
<thead>
<tr>
<th>Modality</th>
<th>Target Audience</th>
<th>Purpose</th>
</tr>
</thead>
</table>
| Comperio | External: N/A  
Internal: Local (i.e., site or unit) – AHS and Covenant Health frontline staff and physicians | A data extraction system in the ProvSurv platform that can be used by IPC staff and physicians to create interim reports with the aim of providing real-time information to the target audience. |
| Customized reports | External: N/A  
Internal: Zone – AHS and Covenant Health clinical leaders for acute care sites | A customized report used by the target audience to review an acute care site’s past and current performance with the aim to communicate real-time information. |
| Tableau – IPC Workbooks | External: N/A  
Internal: Provincial, zone, and local (i.e., site or unit) – AHS and Covenant Health administrative and clinical leaders, frontline staff and physicians | A data visualization software that can be used by the target audience to review user-friendly presentations of the data with the aim to communicate real-time information. |
| Tableau – Operational Best Practice Quality Dashboard | External: N/A  
Internal: Provincial and zone – AHS and Covenant Health administrative leaders | A data visualization software that can be used by the target audience to review user-friendly presentations of the data with the aim to communicate real-time information. Provides information at the program, site, and unit level in order to evaluate changes over time on individual units, in sites, or within programs. |
| Enterprise SharePoint – IPC Portal | External: Collaborative researchers and project managers  
Internal: Provincial, zone, and local (i.e., site or unit) – AHS and Covenant Health administrative and clinical leaders, frontline staff and physicians | A web-based multi-purpose platform available to those external and internal to AHS. Provides timely distribution of up-to-date information on infection prevention and control activities in Alberta Health Services and Covenant Health. |
| Quarterly reports | External: Alberta Health  
Internal: Provincial and zone – AHS and Covenant Health administrative leaders including the Provincial Infection Prevention and Control Committee, zone IPC committees, and the Provincial Infection Prevention and Control Surveillance Committee. | A report that provides validated provincial-, zone-, and site-level data that is used by the target audience to inform practice and increase patient safety. Also used for performance and monitoring measures. |
| Annual reports | External: Alberta Health  
Internal: Provincial and zone – AHS and Covenant Health administrative leaders including the Provincial Infection Prevention and Control Committee, zone IPC committees, and the Provincial Infection Prevention and Control Surveillance Committee. | A report that provides validated provincial- and zone-level data that is used by the target audience to inform practice and increase patient safety. Also used for performance and monitoring measures. Provides an opportunity to look at aspects of the data in more detail (e.g., demographics of patients, spa-typing, etc.) and reflect on successes. |
Action

The action domain includes those activities that use information to improve patient safety, increase efficiency, increase engagement of patients and staff, and decrease healthcare costs. In 2018/19, IPC staff and physicians completed several projects that used data to improve aspects of quality of care: three of these studies are highlighted.

In response to an increased rate of hospital-acquired Clostridium difficile infection and its attributable mortality in North Zone, a project that implemented new infection management strategies and tools was conducted. In the 12 months post-implementation, there was a significant decline in the hospital-acquired Clostridium difficile infection rate and a decrease in Clostridium difficile infection attributable mortality. The infection control professionals concluded that adopting an interactive approach with best practice guidelines and clearly identified responsibilities reduced infection transmission, promoted patient safety, and improved outcomes. The infection control professionals received an award at the Successful Quality Improvement Projects Stream at Alberta Quality and Safety Summit 2018 for this work.

A different study identified the unique elements that contribute to development of Clostridium difficile infection in an adult oncology population. A retrospective, case control study was done that reviewed hospital-acquired Clostridium difficile infection cases at the Cross Cancer Institute for a three-year period. The study showed that proton pump inhibitor use and previous hospitalization were significantly higher in patients with Clostridium difficile infection than in matched controls without the infection. Recommendations from the study suggested that the risk from use of proton pump inhibitors could be reduced by identifying patients for whom these drugs could be safely discontinued. The risk factor of previous hospitalization suggested an element of environmental Clostridium difficile exposure that predisposed patients to colonization and development of infection. The results of this initiative were shared at the Infection Prevention and Control 2018 National Education Conference.

At the Foothills Medical Centre additional precautions, specifically contact precautions, were stopped for low-risk patients colonized with vancomycin-resistant enterococcus on a 45-bed unit for a one-year period as part of a study. This study was done in response to research that suggested there may be no increase in invasive infections caused by vancomycin-resistant enterococcus and that placing patients on additional precautions is not needed. As part of the study, four additional IPC practices were implemented concurrently: starting a unit-level infection control committee, increasing the number of hand hygiene observations for all staff, reducing clutter in patient rooms, and building an electronic vancomycin-resistant enterococcus risk screening tool.

Results indicate that hospital-acquired rates of various pathogens did not significantly change over the one-year study period following the removal of additional precautions for colonized patients on the unit. Reducing the number of colonized patients on isolation for vancomycin-resistant enterococcus resulted in an average of six less patients on additional precautions per day and a savings of at least $31,000 in consumable costs over the year. The average length of time a patient remained on any type of additional precautions dropped from 18 to 11 days. This study showed that removing additional precautions for low-risk patients colonized with vancomycin-resistant enterococcus could be safely implemented. The unit continues to apply this practice change with no measured increase in infections.
Local surveillance programs

Local surveillance protocols are also accommodated in the provincial surveillance platform. These surveillance initiatives are based on needs identified at the local level. For example, sites can target a specific surgical procedure such as Caesarean sections or prostate biopsy procedures.

Of the 31 AHS acute care sites in North Zone, 13 have surgical programs. Two sites perform surgical procedures that are included under provincial surveillance for surgical site infections related to orthopedic procedures. North Zone IPC selected Caesarean section deliveries, which are performed at all 13 sites, for zone-wide surgical site infections surveillance. IPC developed a protocol that includes the use of administrative data to track Caesarean section deliveries, post-operative Emergency Department visits, and readmissions to all Alberta healthcare facilities. The goal is to capture the most severe infections following Caesarean section deliveries and identify opportunities for process improvement to limit further adverse outcomes for patients. An infection control professional reviews each patient with an Emergency Department visit or readmission to determine if the patient developed a surgical site infection within 30 days, using standardized definitions. This successfully implemented program enables North Zone to determine local infection rates and, over time, establish benchmarks for individual sites and the zone. The results of this local surveillance initiative were shared at the Infection Prevention and Control 2018 National Education Conference.