



Interior Health  
*Every person matters*

# Infection Prevention & Control 2017/2018 Annual Report

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October 2, 2018

revised March 29, 2019 for typographic errors unrelated to data

## EXECUTIVE SUMMARY

The Infection Prevention and Control (IPAC) program's 2017/ 2018 (fiscal year, FY 2018) Annual Report highlights the achievements and continued challenges facing infection prevention and control practices in Interior Health (IH). This report summarizes the progress of programs, the annual infection rates, and outlines the future strategic plans for the coming years.

Highlights in program development during 2017/2018 include:

- Many region-wide and local interventions were introduced to control a significant increase in *Clostridium difficile* infection (CDI) rate in IH and in some acute care facilities.
- Methicillin-resistant *Staphylococcus aureus* (MRSA) rates at all acute care facilities across IH were below the IH MRSA benchmark.
- Surgical site infection (SSI) rates were at or below the 1.0% IH SSI benchmark at many facilities and within many categories. Higher rates were documented for Plastic and General Surgery.
  - Interventions to reduce SSI frequency were implemented across IH and at KBRH, in collaboration with the local surgical group and administration.
  - Standard SSI surveillance reporting process and report format were developed and implemented regionally in collaboration with Surgical Network.
- Hand hygiene compliance rates in many acute and residential care facilities have met or surpassed the provincial target of 80%. The overall rate for IH acute care and residential care facilities was 80%.
  - On the spot hand hygiene feedback was introduced into HH auditing process.
- Several large scale construction and renovation projects received ongoing IPAC guidance.
  - Construction permits were trialed electronically to assist in documentation of projects.
- Increased number of RI outbreaks throughout Interior Health, but with lower average resident attack rate.
  - Regional standard approach for RI and GI outbreak control was developed and implemented as part of IH Outbreak Management Response Plan.
- Ongoing educational initiatives included:
  - Emerging Pathogens Training ongoing with new trainer education and yearly refresher training.
  - Implementation of provincial IPAC education modules in iLearn.
  - Collaborated with WH&S in development of the IH Biological Exposure Control Plan.

It is anticipated that continued collaboration with stakeholders will address IPAC issues more efficiently and effectively, while ensuring the highest quality of care for patients.

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## INTRODUCTION

Infection Prevention and Control (IPAC) is a corporate program under the administrative direction of the Vice President, Medicine and Quality. The overarching goal of IPAC is to prevent infections from occurring in patients, residents, clients, visitors, volunteers, physicians, and employees. Six strategies that have been implemented to achieve this goal are summarized in this annual report.

The Infection Measurement Prevention and Control Team (IMPACT) reports to the Health Authority Medical Advisory Committee (HAMAC) and through the Senior Executive Team (SET) to the Board Quality Care Committee. An IPAC update is a standing reporting item on the Health Authority Medical Advisory Committee agenda at which the Medical Director of IPAC reports in person or by written report. The Vice President, Medicine and Quality reports to SET as required. The minutes of the IMPACT meetings are sent to the Board, and presentations on various infection control strategies and issues are made to these committees as scheduled throughout the year.

IPAC liaises across the continuum with other programs such as Communicable Disease (CD) and Workplace Health & Safety (WH&S) regarding communicable diseases and outbreak management. Other programs with whom IPAC collaborates include Support Services, Long-term Care and Community Services, Capital Planning, Medical Device Reprocessing, and Clinical Networks.

The IPAC program functions in accordance with international, national and provincial guidelines and best practices across the continuum of care. The IPAC program influences practice through direct actions by managing infection surveillance and disseminating data to appropriate stakeholders.

IPAC also develops and recommends policies, procedures and best practices including, but not limited to, routine practices, additional precautions, asepsis, equipment cleaning, disinfection and sterilization, product selection and evaluation; and construction consultation as it pertains to IPAC. Education and training of healthcare workers (HCWs), patients, and caregivers is also an important part of the IPAC program.

## MEMBERS OF TEAM AND FACILITIES

### **Vice President, Medicine/ Quality**

Dr. Michael Ertel

### **Executive Director, Quality and Patient Safety**

Dr. Glenn McRae

### **Director, IPAC**

Valerie Wood

### **Medical Director, IPAC**

Dr. Bing Wang

### **Epidemiologist, IPAC**

Dr. Julie Mori

### **Administrative Assistant, IPAC**

Rebecca Dicks

### **Co-op Student, IPAC**

Erin Flanagan, Colton Stephens, Jeanne Roux

### **Infection Control Practitioners**

Roberta Barron

Missy Blackburn

Kelly Dillon

Krystal Fergus

Nicki Gill

Wendy Herrington

Marian Kabatoff

Lynden Lehman

Sandie McKechnie

Maureen McLean Young

Lorena McLure

Kelsey McMillan

Andrea Neil

Evelyn Nicol

Coleen Reiswig

Lisa Schwartz

Karen Stoopnikoff

Joanne Tench

### **Acute Care Hospitals:**

Cariboo Memorial

East Kootenay Regional

Kelowna General

Kootenay Boundary Regional

Kootenay Lake

Penticton Regional

Royal Inland

Shuswap Lake General

Vernon Jubilee

### **Rural Acute Care Facilities (≤20 beds):**

100 Mile District

Arrow Lakes

Boundary District

Creston Valley

Dr. Helmcken Memorial

Elk Valley

Golden and District

Invermere and District

Lillooet

Nicola Valley

Princeton General

Queen Victoria

South Okanagan General

### **Long-term Care Homes:**

Bastion Place

Brookhaven Care Centre

Columbia House

Columbia View Lodge

Cottonwoods Care Centre

David Lloyd Jones Home

Deni House

Dr. Andrew Pavilion

Dr. F. W. Green Memorial Home

Fischer Place/Mill Site Lodge

Forest View Place

Gateby Care Centre

Gillis House

Hardy View Lodge

Henry M. Durand Manor

Jackson House

Kimberley Special Care Home

McKinney Place Extended Care

Minto House

Mountain View Lodge

Mt. Cartier Court Cottages

Nelson Jubilee Manor

Noric House

Orchard Haven

Overlander Residential Care

Parkview Place

Pleasant Valley Manor

Polson Special Care Unit

Ponderosa Lodge

Poplar Ridge Pavilion

Ridgewood Lodge

Slocan Community Health Centre

Sunnybank Retirement Centre

Swan Valley Lodge

Talarico Place

Three Links Manor

Trinity Care Centre

Victorian Hospital

West View Place

## GLOSSARY OF ACRONYMS AND TERMS

<b>ABHR</b>	Alcohol-based hand rub	<b>IPAC</b>	Infection Prevention and Control
<b>ALH</b>	Arrow Lakes Hospital	<b>IMIT</b>	Information Management and Technology
<b>ARO</b>	Antibiotic Resistant Organism	<b>KBRH</b>	Kootenay Boundary Regional Hospital
<b>BDH</b>	Boundary District Hospital	<b>KLH</b>	Kootenay Lake Hospital
<b>CA</b>	Community-associated	<b>LIH</b>	Lillooet Hospital
<b>CAUTI</b>	Catheter-associated urinary-tract infection	<b>LRI</b>	Lower respiratory infection
<b>CD Unit</b>	Communicable Disease Unit	<b>KGH</b>	Kelowna General Hospital
<b>CDI</b>	<i>Clostridium difficile</i> Infection	<b>MRSA</b>	Methicillin-resistant <i>Staphylococcus aureus</i>
<b>CIC</b>	Certified in Infection Control	<b>NVH</b>	Nicola Valley Hospital
<b>CLABSI</b>	Central line-associated bloodstream infection	<b>OMH</b>	100 Mile House Hospital
<b>CMH</b>	Cariboo Memorial Hospital	<b>PGH</b>	Princeton General Hospital
<b>CPO</b>	Carbapenemase-producing organism	<b>PICNet</b>	Provincial Infection Control Network of British Columbia
<b>CVH</b>	Creston Valley Hospital	<b>PPE</b>	Personal Protective Equipment
<b>DHH</b>	Dr. Helmcken Memorial Hospital	<b>PRH</b>	Penticton Regional Hospital
<b>EKRH</b>	East Kootenay Regional Hospital	<b>QVH</b>	Queen Victoria Hospital
<b>EVD</b>	Ebola Virus Disease	<b>RI</b>	Respiratory Illness
<b>EVH</b>	Elk Valley Hospital	<b>RIH</b>	Royal Inland Hospital
<b>FY</b>	Fiscal Year	<b>RN</b>	Registered Nurse
<b>GDH</b>	Golden District Hospital	<b>RSV</b>	Respiratory syncytial virus
<b>GI</b>	Gastrointestinal illness	<b>SLGH</b>	Shuswap Lake General Hospital
<b>HA</b>	Healthcare-associated	<b>SOG</b>	South Okanagan General Hospital
<b>HAI</b>	Healthcare-associated infection	<b>SSI</b>	Surgical site infection
<b>HCP</b>	Healthcare provider	<b>SSTI</b>	Skin and soft tissue infections
<b>HCW</b>	Healthcare worker	<b>TB</b>	Tuberculosis
<b>HH</b>	Hand hygiene	<b>VAP</b>	Ventilator associated pneumonia
<b>ICP</b>	Infection Control Practitioner	<b>VJH</b>	Vernon Jubilee Hospital
<b>ICU</b>	Intensive Care Unit	<b>VRE</b>	Vancomycin-resistant enterococci
<b>IDH</b>	Invermere District Hospital	<b>WH&amp;S</b>	Workplace Health & Safety
<b>IH</b>	Interior Health		
<b>i-Learn</b>	Online education platform		

## FISCAL YEAR 2018 STRATEGIC PLAN ACCOMPLISHMENTS

Five main strategies were identified for the FY 2018 with plans extending to the FY 2019 ([Appendix A](#)). These strategic initiatives support the IPAC program and were specifically aimed at addressing current and emerging issues.

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### CLOSTRIDIUM DIFFICILE INFECTION

The strategic initiative that focused on promoting zero tolerance of transmission for all CDIs in the health authority continued into FY 2018. A bundled approach in responding to increased CDIs was implemented in close collaboration with stakeholders to improve the management of CDI. The *Best Practice Checklist for Management of CDI* continued to be used by ICPs to help identify gaps in best practice for all admitted patients and residents with known or suspect CDI. Education action plans developed by ICPs target units/facilities with CDI rates over benchmark. Refer to [Actions Implemented](#) for more information on CDI in acute facilities.

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### HAND HYGIENE

The HH program saw additional efforts directed to all areas of the program including education, auditing processes, and overall awareness. Specific accomplishments that addressed the FY 2018 Strategic Plan included:

- Met the 80% HH compliance target in acute care and residential care.
- Started On the Spot Feedback pilot project in IH facilities
- Added one co-op student position, which was based in the Kootenays.
- Hand hygiene i-Learn module *IPAC Hand Hygiene for HCW* was updated.
- New HH education module developed and implemented for operating room staff.
- New HH brochure for volunteers was developed and implemented.

Refer to HH Program section [Accomplishments/Priorities Met](#), for more information.

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### COMMUNITY PROGRAMS

The IPAC Community Working Group developed the IPAC Community Clinic Practice Assessment tool. ICPs continued to deliver staff education as needed and provided consultation in community settings.

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### HAI SURVEILLANCE

Unit-level surveillance data have been integrated into routine IPAC reporting. Facility-specific, detailed SSI analysis reports have been produced and distributed to larger facilities in IH. Long-term Care HAI surveillance has been reviewed and revised to increase the ability to capture infection data.

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## EDUCATION/ACCREDITATION

- Infection control education was provided by multiple mechanisms listed below.
- ICPs provided education to HCWs and the units regarding Infection Control practice in their day to day rounds.
- On line education modules for *Point of Care Risk Assessment (PCRA)*, *Routine Practice*, *Additional Precautions* and use of *Personal Protective Equipment (PPE)* for clinical and non-clinical staff were developed by PICNet and posted on the IH i-Learn platform for staff access. Information from the PCRA module was incorporated as part of the Biological Exposure Control Plan in IH. A request was made to include these modules as part of the IH New Staff Orientation process.
- Provision for assisting students in IPAC healthcare programs and nursing programs to complete their practical experience being mentored by an IH ICP helped to prepare the IPAC program for the ongoing attrition of retiring ICPs over the few several years.
- IPAC education was provided for ICPs at monthly IPAC meetings and at face-to-face meetings.

Refer to Education section [Accomplishments/Priorities Met](#), for more information on Programs and Initiatives.

## EDUCATION

An integral part of the IPAC program is the ongoing education, training, and support by ICPs to all HCWs, volunteers, and nursing and medical students within IH.

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## ACCOMPLISHMENTS/PRIORITIES MET

HCWs were educated on various IPAC topics (Table I). Education highpoints within the IPAC program included:

- Ongoing Refresher Training for Emerging Pathogens provided.
- With the 2017 Wildfires, the IPAC Program developed checklists and educational tools for repatriation following evacuation from healthcare facilities; ICPs made site visits to repatriated facilities and to Evacuation Centres to assist with implementation of strategies to reduce the risk of disease transmission in these settings.
- Collaborated with WH&S in development of the IH Biological Exposure Control Plan.
- IPAC Manual:
  - Pet Therapy and Visitation guidelines and Toy Management guidelines updated but not posted on line as yet.
  - Tuberculosis screening tool updated and posted on IPAC website.
  - IH working group on Creutzfeldt-Jakob Disease (CJD) policies and guidelines was formed to review the recommendations aimed to prevent CJD iatrogenic transmission and contamination.



- Standard GI and RI outbreak algorithms and IPAC outbreak investigation and reporting processes were developed and implemented in the 2017-2018 winter season.
- Four issues of *Infection Reflections* released (a quarterly publication that shares information and updates on the latest IPAC issues).
- One ICP became newly certified with their Certification in Infection Control (CIC) and two ICPs successfully recertified.
- IPAC members attended one two-day education meeting in Kelowna.
- Three ICPs attended the PICNet Annual Education Conference.
- Three ICPs attended the national IPAC Canada Education Conference and provided a poster presentation on the investigation of an MRSA cluster of infections in an acute care setting.
- Four ICPs attended the IPAC BC Education day and presented on '30 Years for IPAC BC.
- ICPs provided >100 hours of education in the community (including privately owned long-term care homes, IH home and community care and clinics). Over 50 hours of education were provided during the repatriation of residents and patients displaced during the wildfires in the summer of 2017.
- Ongoing educational sessions attended by ICPs:
  - Webber Training.
  - Grand Rounds.
  - Public Health Rounds.

**Table 1: Count of Education Provided by IPAC**

Education topics	Number of HCWs educated
Hand Hygiene	1,387
CDI*	584
Routine Practices/Additional Precautions/PPE*	1,456
Outbreaks* (GI and/or RI)	1,116
Orientation	717
Miscellaneous* (including: emerging pathogens, updates to manual/guidelines, skill fairs, risk assessments, isolation, housekeeping, construction, tuberculosis, and AROs)	1,905
Hand Hygiene for Healthcare Workers, IH i-Learn course	13,495
Hand Hygiene for Healthcare Workers, IH i-Learn quiz	13,177
Hand Hygiene for Medical Staff, IH i-Learn course	197
Emerging Pathogens, IH i-Learn course	484
Emerging Pathogens Initial Training, IH i-Learn course	158
Emerging Pathogens Refresher Training, IH i-Learn course	161

\*These topics include additional HH components

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## GOING FORWARD

IPAC educational materials are evaluated and revised annually. These materials are readily available to ICPs and HCWs online (IH InsideNet) and are standardized across the health authority. PICNet is developing online learning modules for infection control precautions for rare or emerging pathogens which will be implemented at IH when completed (Fall 2018).

Going forward, ICP Working Groups will be utilized to update existing educational tools and develop new items.

## HAND HYGIENE PROGRAM

The main goals of the HH program include:

- Reducing the occurrence of HAIs by improving HH compliance
- Improving patient safety
- Meeting Provincial and Accreditation Canada requirements
- Educating HCWs, patients, and visitors about the importance of practicing optimal HH
- Supporting facilities in making the delivery of healthcare safer for everyone

The key program components include a variety of ongoing education modules, including basic orientation, promotional material, and HH auditing.

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## ACCOMPLISHMENTS/PRIORITIES MET

The IH HH compliance rate met the provincial performance target of 80% this year. Refer to [Results](#) for more information on all HH audit results. HH rates for individual long-term care homes were distributed to IH sites.

Since the HH program began hiring auditor co-op students, the program has had ten HH auditor co-op students. An additional student placement was created in the Kootenays to reduce auditing travel time and costs. The students updated the co-op student orientation package. Education and On-the-Spot Feedback tools were developed and implemented across IH.. The HH data collection application was updated to capture this.

The new tool, *Hand Hygiene in the Operating Room*, was made available to all IH surgical facilities. The HH i-Learn module for all IH staff was updated. A pilot project to provide HH education in one Mental Health Substance Use (MHSU) site will lead to an IH HH initiative in all MHSU facilities. A new tool for providing HH education to contracted workers and volunteers in IH facilities was developed and posted on the HH website.

The IH HH Working Group met quarterly to discuss and make recommendations on various HH topics. This multidisciplinary group developed a new sign for staff and visitor bathroom doors.

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## GOING FORWARD

The new HH signs will be posted in IH staff and public bathrooms, encouraging families and visitors to wash their hands. Best practice guidelines will be updated by the Provincial Hand Hygiene Working Group and will include the HH infrastructure audits. Many IH facilities will require new infrastructure audits in 2018. The impact of On the Spot Feedback pilot project will be assessed and reported.

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## RESULTS

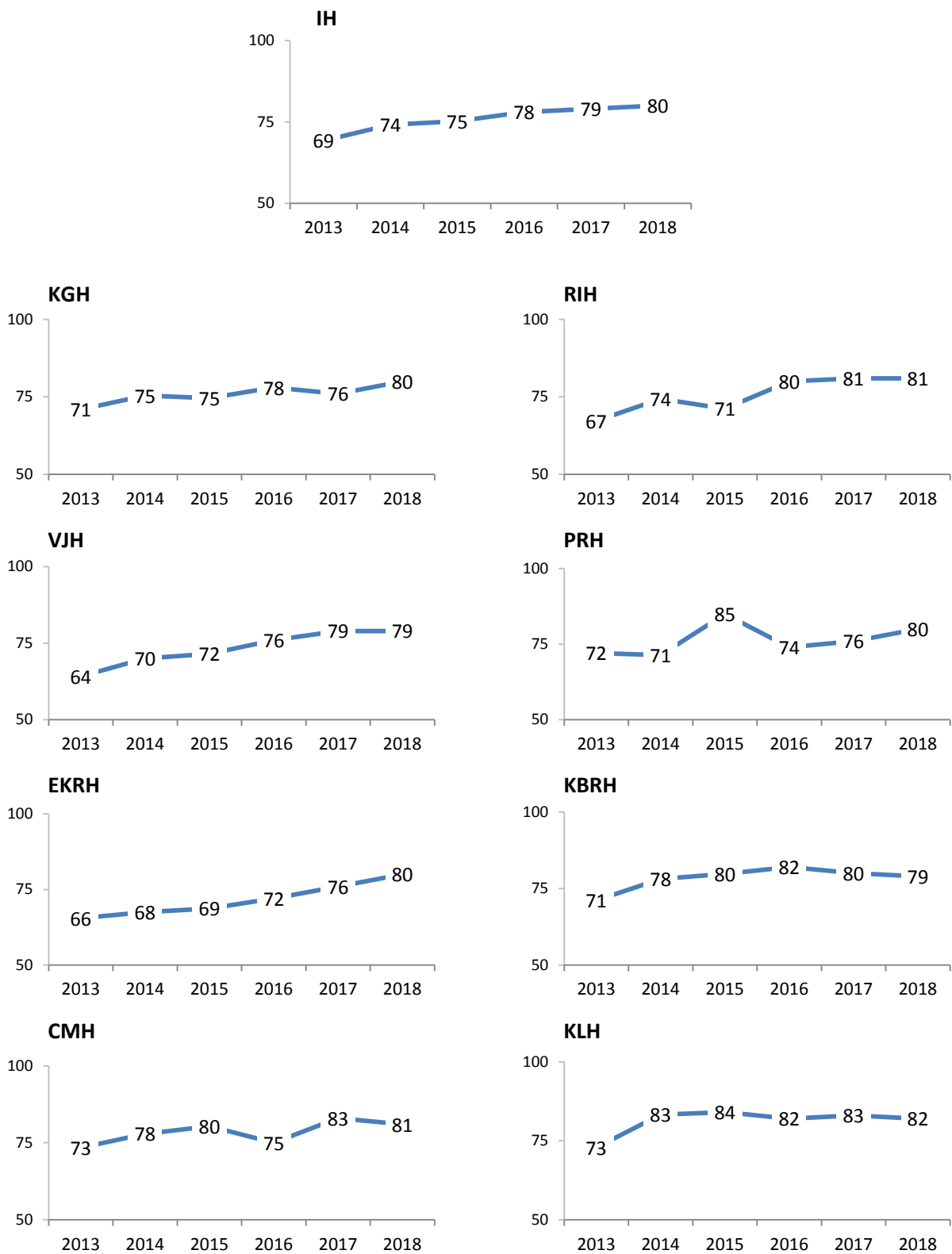
The annual HH compliance increased again this year across IH (Figure 1). The FY 2018 HH compliance for IH was 80% (95% confidence interval {CI}, 80% - 81%), this was not a statistically significant increase compared to FY 2017. While compliance increased from year to year at most facilities (Figure 1, [Appendix C](#)), the only significant increase was at KGH ( $p < 0.01$ ).

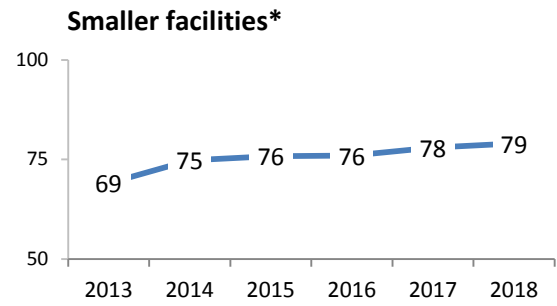
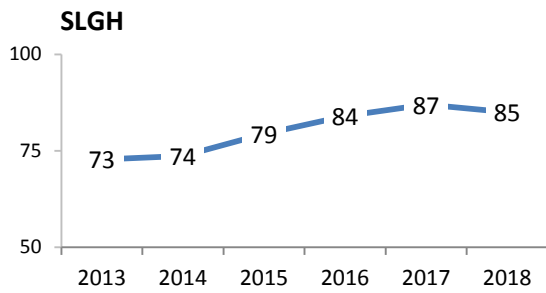
Nursing staff make up the vast majority of HH observations in acute care (77% of all observations) and their rate reached 81% this year (Figure 2). For the second year in a row, the group labeled “Other Staff”, which are largely housekeeping staff, had the highest compliance of all healthcare worker groups (Figure 2). Small decreases in compliance were observed among clinical staff and physicians. Typically there is a difference between HH compliance observed before and after contact with the patient environment, with compliance usually higher after contact. The difference widened this year which is a concerning trend that will be monitored in the future (Figure 3).

The HH compliance rate in IH long-term care homes did reach 80% this year (Figure 4), and this difference was statistically significant ( $p < 0.05$ ). There has been no significant change over the past year for any individual facility ([Appendix C](#)).

When interpreting the HH rate from different groups, it is important to know the limitation of the data due to individual differences in sample sizes (number of observations), patient care needs, and other characteristics that are unique to each group. It has been recognized that ‘being observed’ in practice, e.g. during auditing, can lead to falsely elevated compliance rates. To minimize this effect, audits are completed in twenty to thirty (20-30) minute intervals (acute care) with no greater than six (6) observations made of the same HCW within this period. In an effort to maintain consistency in audit practices, HH audits are currently only observed by ICPs and co-op students.

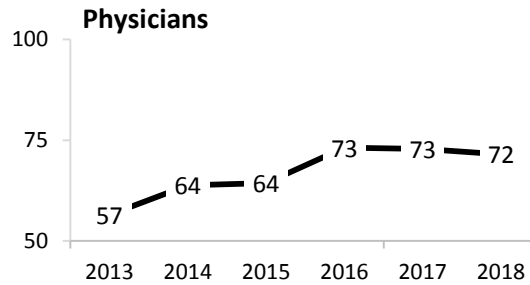
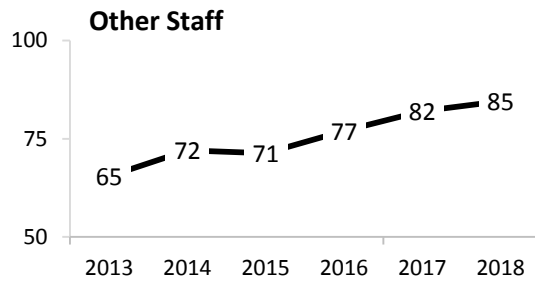
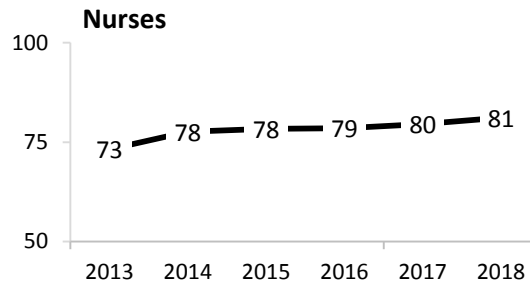
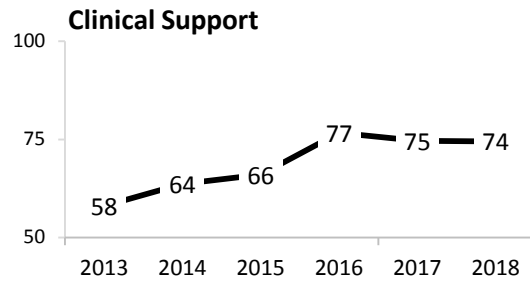
**Figure I. HH compliance rate (%) by fiscal year for IH and tertiary, service area, community, and smaller facilities.**





\* Includes 100 Mile Hospital, Arrow Lakes Hospital, Boundary District Hospital, Creston Valley Hospital, Dr. Helmcken Memorial Hospital, Elk Valley Hospital, Golden District Hospital, Invermere and District Hospital, Lillooet Hospital, Nicola Valley Hospital, Princeton General Hospital, Queen Victoria Hospital, South Okanagan General Hospital.

**Figure 2. HH compliance rates (%) by fiscal year for IH by healthcare worker group\*\***



\*\***Clinical Support Staff:** Occupational, Respiratory, or Speech Therapist, Physiotherapist, Social Work, Dietician, Porter, Psychologist, Audiologist, Pastoral Care, Radiology, Technicians (e.g. EKG, EEG), Phlebotomy; **Nursing:** Registered Nurse, Registered Psychiatric Nurse, Midwife, Licenced Practical Nurse, Care Aide, Nursing/ Midwife Student; **Other Staff:** Housekeeping, Food Services, Clerk, Volunteer, Security, Plant Maintenance; **Physicians:** Medical Doctor, Resident, Fellow, Medical Student

Figure 3. HH compliance rates (%) in all IH acute care facilities by fiscal year and by timing of observation

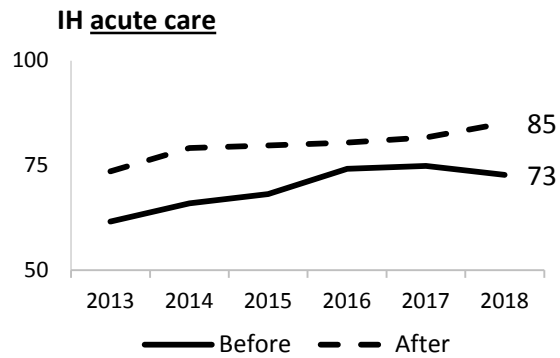
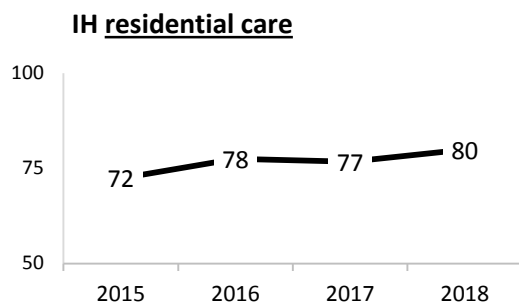


Figure 4. HH compliance rates (%) in all IH long-term care homes by fiscal year



## CONSTRUCTION

Construction and renovation projects pose potential health risks for patients, staff, visitors, and construction personnel, which may lead to HAIs. Two of the most common risks associated with construction are dust containing fungi (primarily *Aspergillus*) and contaminated water systems (*Legionella*).

IPAC is an essential component of the multidisciplinary construction/renovation team that includes but is not limited to Facilities Management, Capital Planning and Projects, Support Services, senior administrators, clinical representatives, architects, and engineers. For large projects IPAC must be included from design through to commissioning. An *IPAC Risk Assessment* is required before construction or renovation begins. To facilitate the risk assessment, Facilities Management and/or Capital Planning and Projects inform IPAC of the location and adjacencies of the affected area(s). Once satisfied that all safety measures have been considered and will be implemented for the proposed project, IPAC will issue a permit. Standardized permits have been developed by IPAC and are now being trialed.

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### ACCOMPLISHMENTS/PRIORITIES MET

IPAC provides vital education and oversight to contractors and all members of the multidisciplinary team on infection prevention practices related to construction. This includes hoarding, negative pressure, monitoring of the worksite and enhanced housekeeping during the construction/renovation period. Over 270 new construction and renovation permits were issued by ICPs across IH during FY 2018. Construction and renovation projects ranged in size, completion time, and health risks.

Some examples are:

- Ongoing construction of the new patient care tower at Penticton Regional Hospital, to be completed in 2019.
- Extensive renovations of 2<sup>nd</sup> floor Strathcona Building at Kelowna General Hospital for cardiac inpatients will be complete November/December 2018.
- Vernon Jubilee Hospital is in the planning stage of building a new MRI suite with completion slated for 2019.
- Nicola Valley Hospital Emergency Department construction/renovation project to be complete August/September 2018.

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### GOING FORWARD

Revision of the IPAC construction guidelines including electronic permits has been completed and is currently in draft form and being trialed by stakeholders.

## EMERGING PATHOGENS

The Emerging Pathogens and Pandemic Planning Committee (EPPPC) is responsible for all aspects of emergency preparedness in IH and has IPAC representation on the committee.

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### ACCOMPLISHMENTS/PRIORITIES MET

The annual *Refresher Training for Emerging Pathogens* continues using the IH i-Learn platform, which provides reminders to HCPs of the annual training requirements and allows for ongoing tracking of participants.

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### GOING FORWARD

A ‘train the trainer’ strategy is used for emerging pathogens training. The ICPs are responsible for all trainer education and then the trainers are responsible for training the Emergency Department staff (including nurses, respiratory therapists, physicians, and housekeepers).

## COMMUNICATION AND PROMOTION

IPAC publishes a quarterly *Infection Reflections* newsletter that is distributed to all staff. Promotional tools and informational resources are utilized to increase IPAC awareness among staff, patients, and visitors. The program participates in national IPAC awareness campaigns such as Infection Control Week and Stop! Clean Your Hands Day.

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### ACCOMPLISHMENTS/PRIORITIES MET

- There were 13,878 visits to the IPAC InsideNet page, 1,256 visits to the IPAC HH InsideNet page, and 1,434 visits to the IPAC Data InsideNet page.
- IPAC related articles have been published in various IH newsletters.

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### GOING FORWARD

The IPAC team will continue to work closely with the Communications and Public Engagement teams.



## SURVEILLANCE

Surveillance for HAIs is an IH-wide strategy that is carried out by IPAC and ICPs. Ongoing surveillance is important to ensure increasing trends and clusters are quickly identified and addressed. It also provides a useful indication of the effectiveness of IPAC efforts in the prevention of HAIs and control of their transmission. Finally, surveillance can support the implementation of risk-reduction strategies and monitor the effectiveness of the interventions.

A semi-automated electronic surveillance system assists ICPs to identify potential HAI cases in acute care based on predetermined case definitions. Standardized reports are available to all staff and the public. Surveillance is conducted in IH acute care and long-term care homes.

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### ACCOMPLISHMENTS/PRIORITIES MET

New to CDI and ARO surveillance this year, unit-level surveillance has allowed the program to identify individual units within acute care facilities where case numbers were increasing in frequency. While traditional facility-level surveillance of CDI and ARO is informative, it may not capture a concerning situation in one unit if other units in the facility are not experiencing the same situation. This has helped spur IPAC investigations and interventions where concerns were evident within several units in IH.

Facility-specific SSI epidemiology reports were distributed to facility perioperative medical committees. Surgeon-specific SSI line list reports were developed and implemented in collaboration with Information Management and Information Technology (IMIT). Two facility and unit-level reports were published on Insight. Long-term care HAI surveillance was revised to increase ability to capture HAIs. Frequency of data collection and length of look-back period increased.

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### GOING FORWARD

Epidemiology support will continue to build for units and facilities where HAI cases are more frequent than normal. Routine surveillance reporting will continue to evaluate and develop as needed. Review of IPAC surveillance program will be conducted to identify the needs and priorities for surveillance.

## ACUTE CARE FACILITIES

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### CLOSTRIDIUM DIFFICILE INFECTION

*C. difficile* are Gram-positive spore-forming bacteria that can cause diarrheal infections in persons in healthcare facilities, and in the community. CDI are one of the most common

HAIs among patients in Canadian hospitals<sup>1</sup>. *C. difficile* spores are resistant to common types of disinfectants and the use of sporicidal chemicals is required when cleaning the patient environment.

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## WHAT IS BEING MEASURED AND REPORTED?

CDI surveillance includes cases of new healthcare-associated CDI (HA-CDI), relapse CDI, and inpatient community-associated CDI (CA-CDI). CDI rates are the number of cases divided by the total number of inpatient days expressed as a ratio per 10,000 patient-days. CDI case definition and population under surveillance are in alignment with PICNet protocol<sup>2</sup> ([Appendix B](#)).

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## ACTIONS IMPLEMENTED

Throughout the year, ICPs and their facilities worked on many proactive interventions to reduce HA-CDI. Some were specifically developed at one facility and implemented at other facilities later. IPAC coordinated the bundled approach with site specific and multidisciplinary engagement to address site specific CDI control issues. Communication among ICPs allowed for the permeation of CDI control ideas across IH. Below is a list of initiatives developed this year in acute care facilities to control CDI.

- Removal of glove boxes within CDI patient rooms
- Development and implementation of stool documentation tool for patient charts
- Promotion of HH and appropriate use of personal protection equipment (PPE)
- Promotion of daily bathing or showering of CDI patients
- Promotion of dedicated blood pressure (BP) cuffs in units with high CDI frequency
- Mattress integrity inspection following cluster identification
- Use of ultraviolet light (UV) to audit housekeeping in rooms with high CDI frequency
- Encouraging the transfer of CDI-positive patients to units with more patient bathrooms
- Ensuring twice-daily cleaning with sporicidal of CDI-patient rooms
- Unit terminal cleaning when CDI frequency increased
- Collaboration with IH Antimicrobial Stewardship Program and clinical pharmacists completing pharmacy review of CDI cases
- Collaboration with IH Support Services on environmental cleaning products and audit process.
- Encouraging distribution of CDI education pamphlet to patients and visitors

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<sup>1</sup> Simor A, Williams V, McGeer A, Raboud J, et al. Prevalence of colonization and infection with methicillin-resistant *Staphylococcus aureus* and vancomycin-resistant *Enterococcus* and of *Clostridium difficile* infections in Canadian hospitals. *Infect Control Hosp Epidemiol* 2013;34:687-693.

<sup>2</sup> PICNet Surveillance Protocol for *Clostridium difficile* Infection (CDI) in BC Acute Care Facilities, July 2013. Provincial Infection Control Network of British Columbia

- Engaging unit managers, patient care coordinators, and site administrators in development of CDI control plans on units when necessary
- Encouraging decluttering of patient rooms and hallways to allow for thorough cleaning
- Investigation of new technology such as canine *C. difficile* detection for environmental contamination

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## GOING FORWARD

IH regional wide *C. difficile* Initiative will be implemented with the emphasis on CDI control as the IPAC priority of FY 2018-2019. In addition, the use of the CDI checklist will continue to be used to identify gaps in best practice and provide staff education. For more information see [Clostridium difficile Infection](#) in the Fiscal Year 2018 Strategic Plan section.

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## LIMITATIONS

Because CDI rates are not risk-adjusted to account for differences in risk factors for CDI, comparisons between facilities are not advised.

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## RESULTS

**Table 2: Interior Health new healthcare associated CDI status, FY 2018**

Incidence (95% confidence interval)	Five-year trend	FY 2018 benchmark	Status
5.9/10,000 patient-days (5.2/10,000 – 6.6/10,000 patient-days)	Significant U-shaped trend	3.5/10,000 patient-days	Above benchmark

### **Current Year Cases:**

Across IH there were 276 cases of new healthcare associated CDI (HA-CDI), 145 new cases of community-associated CDI, and 41 cases of relapse CDI. The proportion of community-associated CDI (CA-CDI, 31.4%) was lower than the proportion last year (35.2%). Last year's proportion in IH was similar to the proportion reported across BC in FY 2017<sup>3</sup>. The proportion of relapse cases in IH was similar to the rate in the previous year.

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<sup>3</sup> Annual Surveillance Report of Healthcare-Associated Infections in BC Health Care Facilities, Fiscal Year 2016/17. Provincial Infection Control Network of British Columbia

### **Rates and Comparison to Previous Year:**

The incidence of new HA-CDI in IH for FY 2018 was 5.9/10,000 patient-days (95% confidence interval, 5.2/10,000 patient-days – 6.6/10,000 patient-days, Figure 6, [Appendix D](#)). This was a highly significant increase compared to the previous year, when the rate was 4.3/10,000 patient-days (difference = 1.6/10,000 patient-days,  $p = 0.001$ ).

Statistically significant increases also occurred this year at EKRH, KGH, and VJH ( $p < 0.05$ , refer to [Appendix D](#) for rate differences). No individual facility had a reportable CDI rate below the IH benchmark of 3.5/10,000 patient-days.

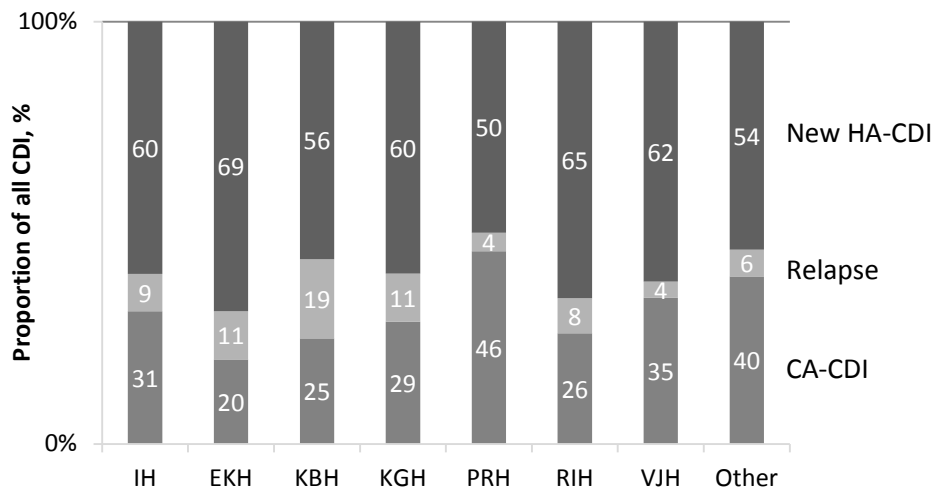
### **Long Term Trend:**

Over the past five years there was no significant linear trend in new HA-CDI rate for IH ( $p > 0.05$ ). However, due to historically decreasing CDI rates and recent increases, the CDI rates (moving average rates by period) had very strong U-shaped trends over time between FY 2014 and FY 2018 at KGH, RIH, and EKRH and for IH overall (each model  $p < 0.001$ ). The only facility with a significant downward linear trend was CMH ( $p < 0.001$ ).

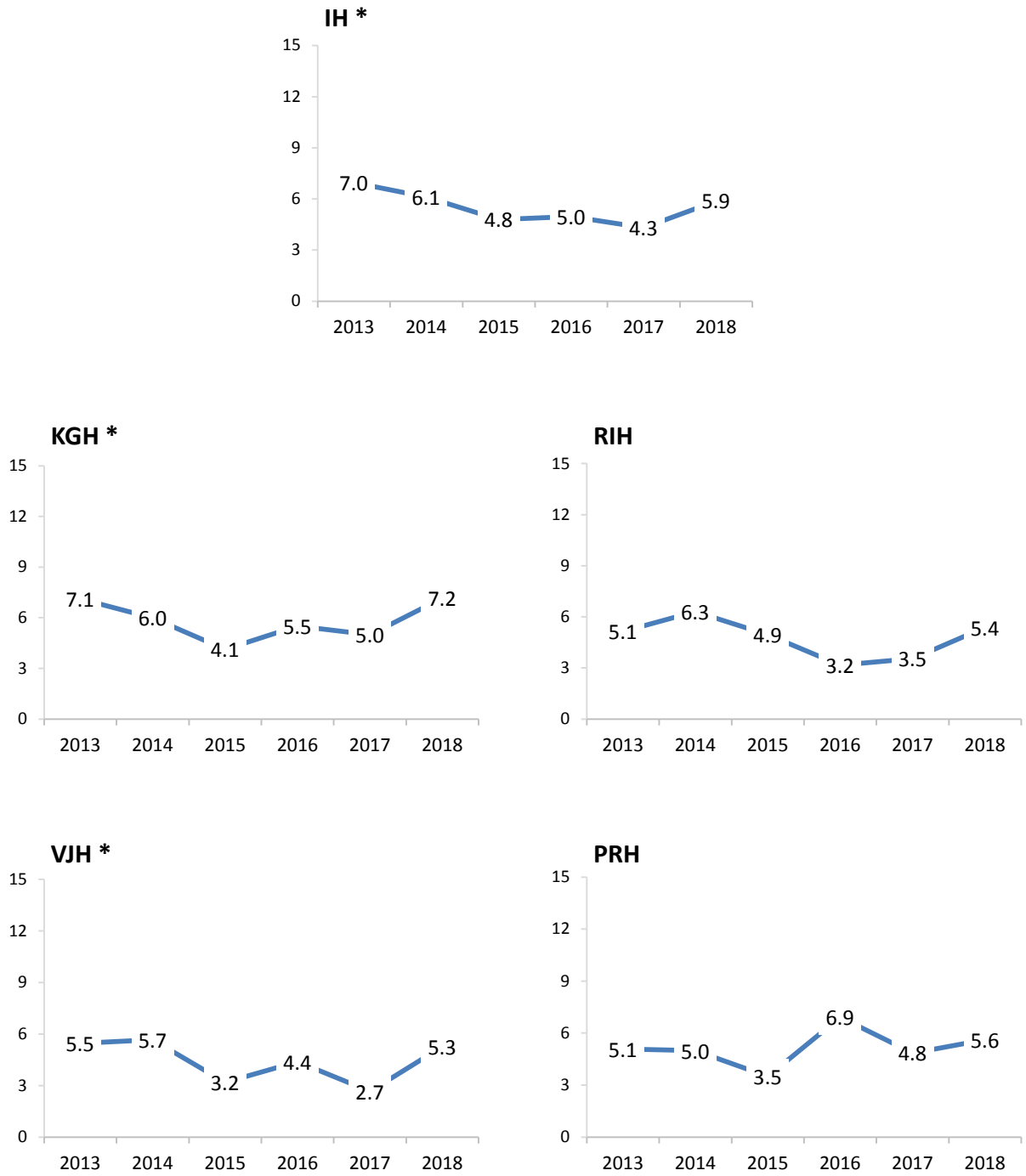
### **Unit-Level Surveillance:**

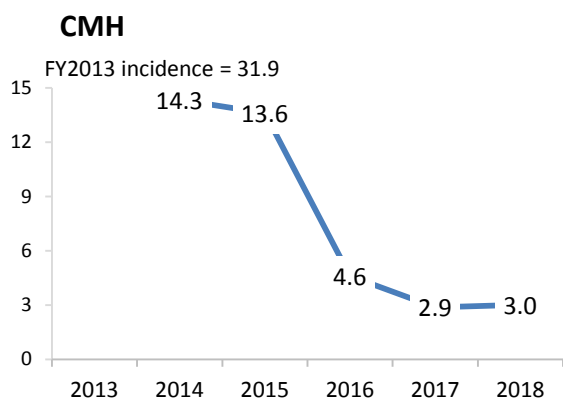
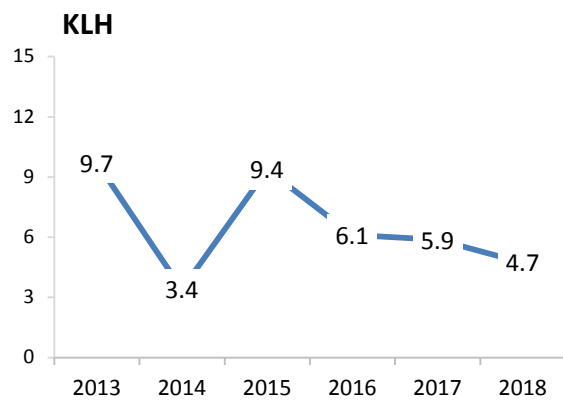
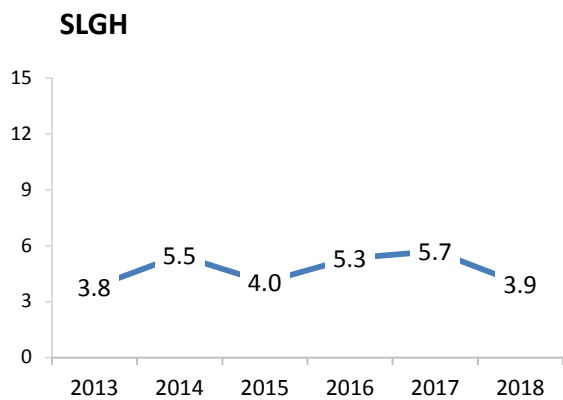
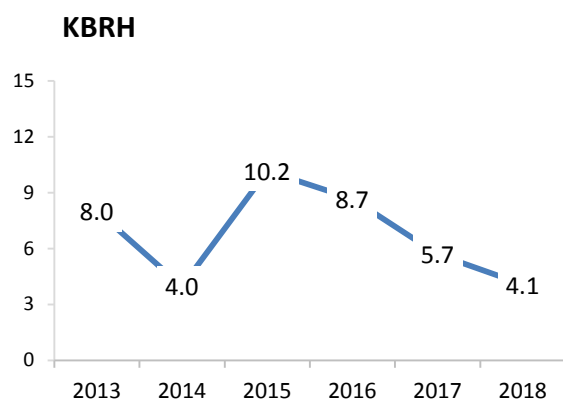
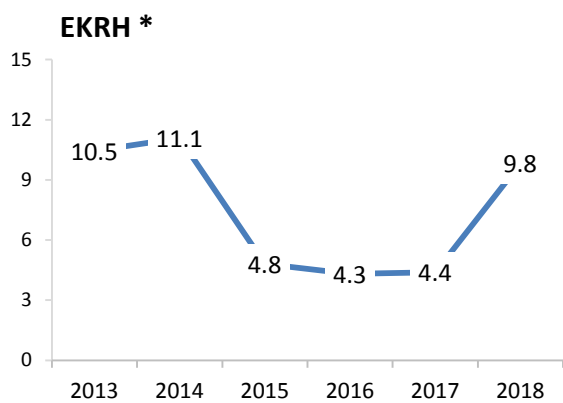
This year, the total number of new HA-CDI cases that could be attributed to a specific acute care unit through unit-level surveillance was 260. Table 3 lists the units with the highest new HA-CDI case counts ( $n = 77$  units, 90<sup>th</sup> percentile = 8.4). CDI control actions were targeted at these units during the year and these will be closely monitored through the next year. These data are for monitoring purposes only; they are not adjusted by population or by risk, so should not be used for comparison purposes.

**Figure 5. Distribution of CDI cases across classification groups (new, relapse, community) by facility with >10 cases, FY 2018**



**Figure 6. Annual rates of new HA-CDI, I/10,000 patient-days, \* indicates statistically significant difference from FY 2018**





**Table 3. Acute care units and new HA-CDI case counts in top 90th percentile of units, FY 2018**

Facility	Unit	Total new HA-CDI cases
<b>KGH</b>	Strathcona 3 East	15
<b>RIH</b>	6 South	14
<b>EKRH</b>	2 <sup>nd</sup> Floor	11
<b>KGH</b>	Royal 5B	11
<b>PRH</b>	South Pavilion 2	11
<b>VJH</b>	6 Floor	10
<b>KGH</b>	Royal 4A	9
<b>KGH</b>	Strathcona 4 East	9
<b>All</b>	All	260

### METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS*

MRSA are bacteria that are resistant to penicillin antibiotics, including methicillin and amoxicillin. MRSA have been recognized as a major medical issue for the past 20 years, as people infected with MRSA are more difficult to treat. These bacteria are spread easily in healthcare settings as they are readily transmitted by direct contact, or indirectly with items contaminated by the bacteria.

### WHAT IS BEING MEASURED AND REPORTED?

MRSA surveillance includes the number of new cases of MRSA acquired by patients, divided by the total number of inpatient days over a specified time frame, expressed as a ratio per 10,000 patient-days. The population under MRSA surveillance are inpatients admitted to IH acute care facilities<sup>4</sup> ([Appendix B](#)). MRSA cases are classified as either colonization or infection, based on presence or absence of clinical evidence of infection. Cases are identified through the MRSA inpatient screening program or through clinical specimens.

### ACTIONS IMPLEMENTED

A number of actions continue to be carried out to address MRSA infections within IH. The *Acute Care Admission ARO Screening* tool is completed as part of the initial patient admission history and assessment. Audits of ARO screening compliance were performed three times through the year. ICPs worked with facility staff to improve practice on the units. Examples of specific actions that may have helped reduce HA-MRSA rates this year are listed below.

<sup>4</sup> PICNet Surveillance Protocol for Methicillin-Resistant *Staphylococcus aureus* (MRSA) in BC Acute Care Facilities, July 2013. Provincial Infection Control Network of British Columbia



- Reviewing bedside equipment cleaning with staff
- Reminding staff of the importance of MRSA screening inpatients and hand hygiene in the prevention of HA-MRSA
- Investigation of small clusters

---

## LIMITATIONS

Compliance with MRSA screening practice may vary across acute care settings. This variability impacts the number of colonization cases captured and the overall MRSA rate.

---

## RESULTS

**Table 4: Interior Health HA-MRSA status, FY 2018**

Incidence (95% confidence interval)	Five-year trend	FY 2018 benchmark	Status
2.5/10,000 patient-days (2.1/10,000 – 3.0/10,000 patient-days)	Significant linear decreasing trend	4.0/10,000 patient-days	Below benchmark

### **Current Year Cases:**

In total, there were 215 cases of MRSA reported in acute care in IH during FY 2018. The majority of these were healthcare-associated MRSA (60%, Figure 7), with smaller contributions from pre-existing (17%) and community-associated MRSA (22%). Of all HA-MRSA 47% were infections, which the same as the proportion as last year.

### **Rates and Comparison to Previous Year:**

Across IH, the incidence of new HA-MRSA (colonization and infection) was 2.5/10,000 patient-days (95% confidence interval, 2.1/10,000 patient-days – 3.0/10,000 patient-days). The incidence of new HA-MRSA *infection* within IH was 1.2/10,000 patient-days (95% confidence interval, 0.9/10,000 patient-days – 1.5/10,000 patient-days). There were no significant differences in HA-MRSA rates between FY 2017 and the current year in any facility or across IH ( $p > 0.05$ ).

### **Long Term Trend:**

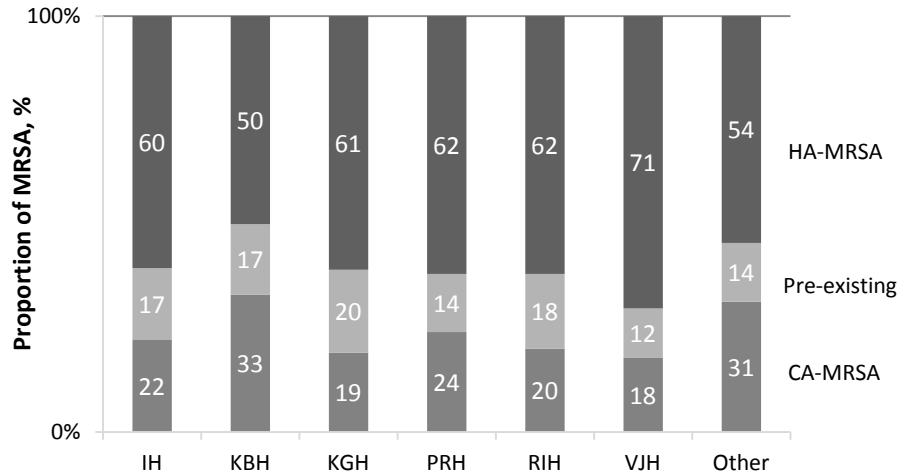
Across IH over the past five years, there was a very significant linear decreasing trend in HA-MRSA rate ( $p < 0.001$ ). Facilities with significant decreasing trends included RIH, VJH, EKRH, SLGH, KLH, and CMH ( $p < 0.01$ ). The rate at KGH increased over five years ( $p < 0.05$ ). Trends in MRSA *infection rates* have been flat at most facilities (Figure 8).

### **Unit-Level Surveillance:**

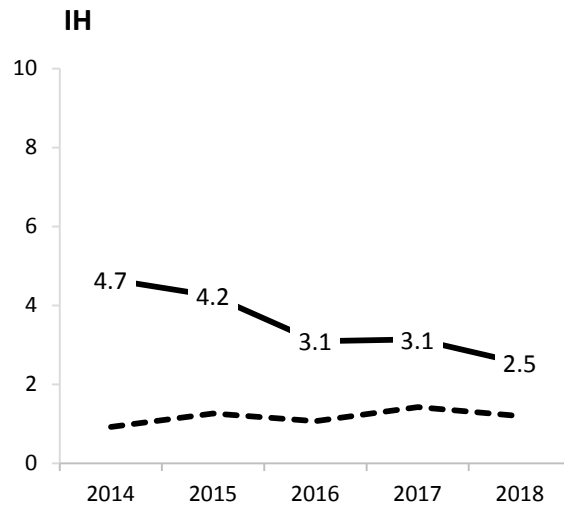
There were 124 healthcare-associated MRSA that were attributable to units and the top 90th percentile of 51 units had five or more cases in the year (Table 5). These cases include

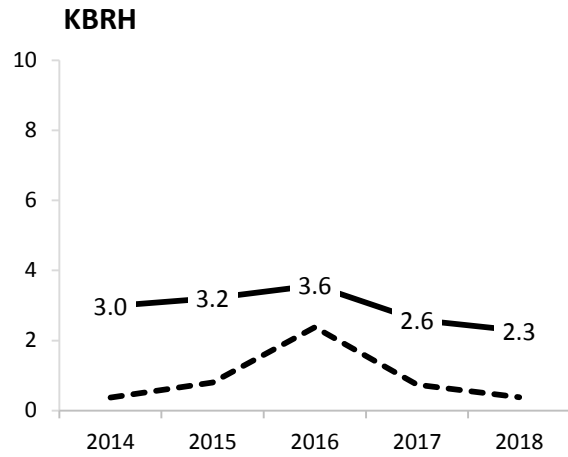
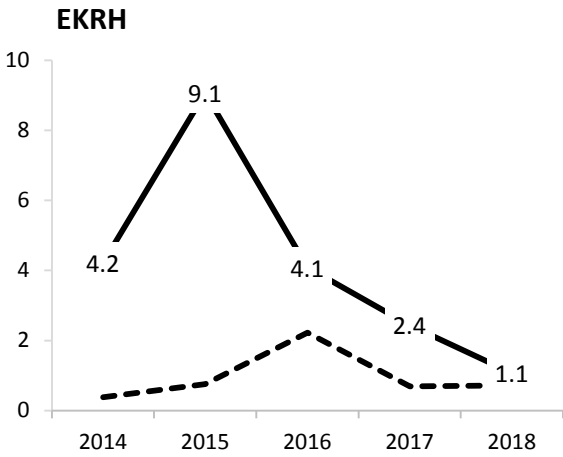
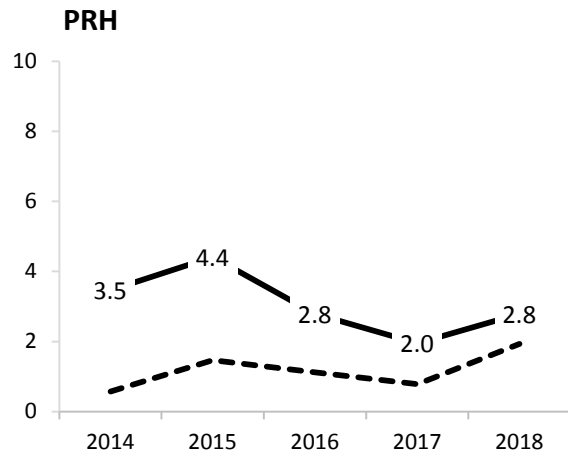
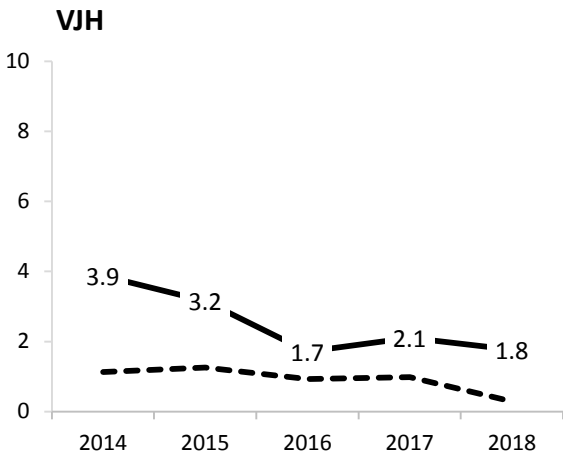
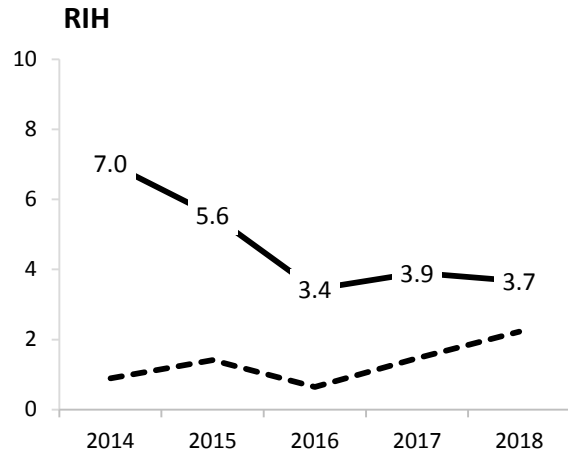
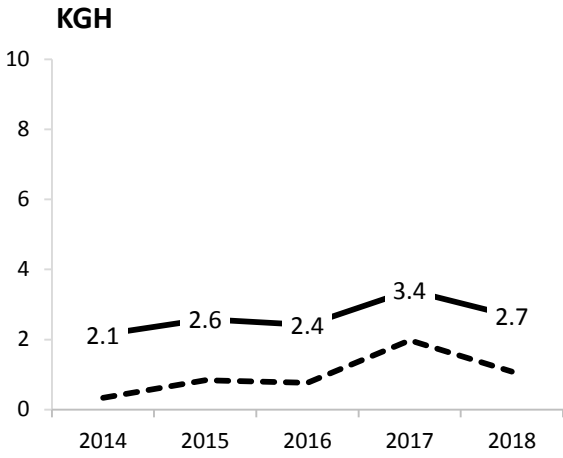
colonization and infection, current admissions and previous admissions. As these numbers are impacted by MRSA screening compliance, which varies across facilities, these numbers should not be used for comparison purposes.

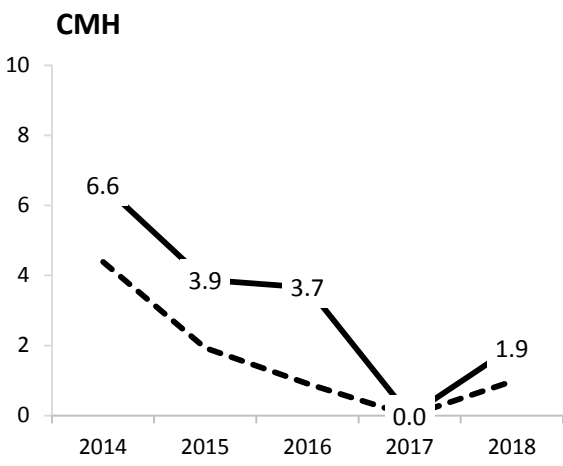
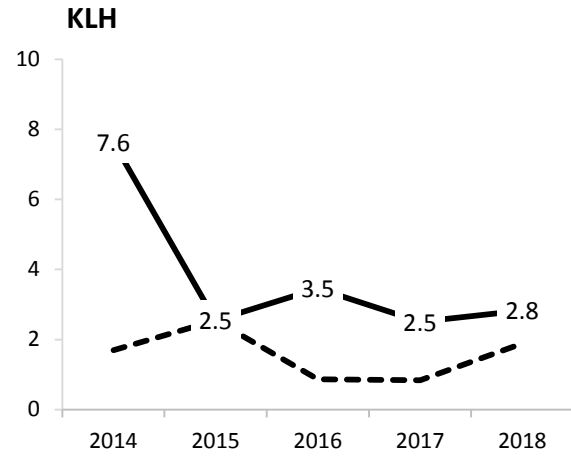
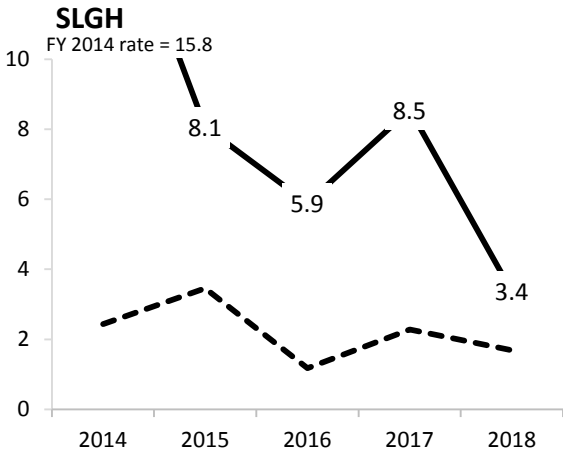
**Figure 7. Distribution of MRSA cases across classification groups (new healthcare-associated, pre-existing, community-associated) by facility with >10 cases, FY 2018**



**Figure 8. Annual rates of all HA-MRSA (solid line with values) and HA-MRSA infection (dashed line), I/10,000 patient-days**







**Table 5. Acute care units and new HA-MRSA case counts in top 90th percentile of units, FY 2018**

Facility	Unit	Total new HA-MRSA cases
RIH	6 South	9
RIH	7 North	8
KGH	Royal 4A	6
RIH	6 North	5
RIH	7 North Cardiac	5
PRH	South Pavilion 3	5
All	All	124

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## VANCOMYCIN-RESISTANT ENTEROCOCCUS

VRE are bacteria that have developed resistance to many antibiotics, especially vancomycin. Enterococci live in our intestines and on our skin, usually without causing problems; however, VRE can become a problem and cause infection, especially among those who are immunocompromised.

---

## WHAT IS BEING MEASURED AND REPORTED?

VRE surveillance in IH included only clinical cases of VRE and does not include urine cultures. The incidence rate of VRE is the number of new cases of VRE acquired by patients during their stay in hospital divided by the total number of inpatient days over a specified time frame, expressed as a ratio per 10,000 patient-days. The population under VRE surveillance are inpatients admitted to IH acute care facilities ([Appendix B](#)).

---

## ACTIONS IMPLEMENTED

There were a number of preventative actions including the use of dedicated patient equipment, the placement of patients in private rooms where feasible, and staff and patient education.

---

## RESULTS

There were 28 cases of VRE reported in IH. Of these, 26 (93%) were cases of infection, one was a case of colonization, and one was undetermined. The rate of healthcare-associated VRE for IH (HA-VRE) was 0.6/10,000 patient-days (95% CI: 0.4/10,000 patient-days – 0.8/10,000 patient-days). This rate is the same as in the previous year.

---

## CARBAPENEMASE-PRODUCING ORGANISMS

Carbapenemase-producing organisms (CPO) are bacteria with the ability to transmit multi-drug resistance to other species of bacteria and are an emerging concern due to their association with outbreaks within hospital settings. Because CPOs are resistant to all beta-lactam antibiotics, infections with these organisms are very difficult to treat. At risk persons include those who have been hospitalized or had a medical procedure in countries outside of Canada where these types of organisms are prevalent.

A notification process for BC has been implemented to ensure healthcare facilities are aware when patients with CPO are being transferred so that appropriate precautions can be taken. All suspect and/or confirmed CPO cases are placed on Contact Precautions in a private room for the duration of their stay.

---

## WHAT IS BEING MEASURED AND REPORTED?

CPO cases are identified from inpatient clinical specimens and from inpatient risk-based screening specimens. For surveillance purposes, CPO cases are classified based on their genes that encode carbapenemase production. Possible genes include NDM, KPC, OXA-48, VIM, and SME.

---

## ACTIONS IMPLEMENTED

The provincial communication plan for notification of CPO outbreaks and/or inter-facility transfers of patients with CPO was implemented.

---

## GOING FORWARD

Screening for new CPO cases will continue.

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## RESULTS

There was one CPO case (colonization) identified in IH this year.

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## SURGICAL SITE INFECTIONS

Surgical site infections (SSI) occur as a complex interaction between the microbial contamination of the surgical site, the host response, and the local environment at the site of contamination. An SSI is generally considered to be present when purulent drainage is identified at the surgical site.

---

## WHAT IS BEING MEASURED AND REPORTED?

The overall incidence rate of clean SSIs and clean-contaminated SSIs are measured for facilities that use the surgical electronic data collection system. SSI rates are the number of infected surgical operative sites over the number of surgical procedures performed, expressed as a percentage ([Appendix B](#)).

---

## ACTIONS IMPLEMENTED

When increasing SSI rates are identified, assessments of processes and practices related to the surgical procedure are completed in collaboration with the facility operating room manager, staff, and surgeons. Recommendations are made and followed up by the site ICP. Specific initiatives to prevent SSIs this year included:

- Surgeon-specific SSI case reporting system was developed and rolled out throughout IH surgical groups.
- IPAC Medical Director made site visits to discuss SSI surveillance with surgeons.

- Following concerns raised by Orthopedic Surgery at KBRH, an external review of surgical environment was carried out and IPAC provided additional support to the KBRH Perioperative Medical Committee as it initiated several quality improvement practices aimed to form the SSI quality improvement program in KBRH surgical service.
- Patient wound care instructions developed by KBRH ICP and Surgical Services was rolled out as part of the surgical patient discharge information package.

---

## GOING FORWARD

Facility-specific reports of detailed SSI analysis will continue, with presentations made to Perioperative Medical Committees. The standard SSI investigation working process will be developed.

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## LIMITATIONS

Surveillance of healthcare-associated SSI does not include contaminated or dirty procedures as these have inherently higher risks of infection that are not necessarily affected by infection control interventions. The program does not have a consistent post-discharge data collection system; therefore, SSIs may be occurring but are not included in these data.

Data were collected 90 days after the end of FY 2018, so all SSI from procedures done in this year are captured in the analysis below. SSI surveillance data from 10 acute care facilities are included in the IH-wide data, but facility-specific information in figures and tables below are only provided for the largest six facilities.

---

## RESULTS

**Table 6: IH SSI status, FY 2018**

Rate (95% CI)	Five-year trend	FY 2018 benchmark	Status
Clean 1.0% (0.9% - 1.2%)	No trend	1.0%	At or above benchmark
Clean-contaminated 1.1% (0.9% - 1.2%)	No trend		

### Clean Surgery SSI:

#### Current Year:

There were 234 clean SSIs in IH, 129 (55%) of these were complex SSI (organ/space or deep incisional, Figure 10). The rate of SSI in clean surgeries was 1.0% (95% CI: 0.9% – 1.2%; Figure 11; [Appendix E](#)).

Compared to the rate of all other facilities, the risk of SSI among clean surgery was significantly higher at KBRH, even after accounting for patient’s general health assessed prior to surgery

(American Society of Anaesthesiologists score) and duration of surgery ( $p < 0.001$ ). Conversely, the rate at VJH was significantly lower than other facilities ( $p < 0.05$ ).

#### Comparison to 2017:

Within IH and in individual facilities, there was no statistically significant change in the FY 2018 clean surgery SSI rate for IH compared to the previous year (Figure 11; [Appendix E](#)).

#### Longer Term Trend:

There was a significant decreasing trend over the past five years in clean SSI rates (by fiscal quarter) at EKRH, decreasing on average at 0.043% per quarter ( $p < 0.05$ ). There was no other statistically significant trend in clean SSI rates.

### **Clean-Contaminated Surgery SSI:**

#### Current Year:

There were 145 clean-contaminated SSI cases in IH and the rate was 1.1% (95% CI: 1.1 – 1.4; Figure 10; Appendix E). Among these cases, 74 (51%) were complex SSIs.

The risk of SSI among clean-contaminated surgeries was significantly lower at VJH compared to the rest of IH, even after controlling for duration of surgery ( $p < 0.05$ ).

#### Comparison to 2017:

Similar to clean surgeries, there was no change from 2017 to 2018 in the SSI rate among clean-contaminated surgeries in IH, or in any facility (Figure 12; [Appendix E](#)).

#### Long Term Trend:

There were no significant long term trends over the past five years.

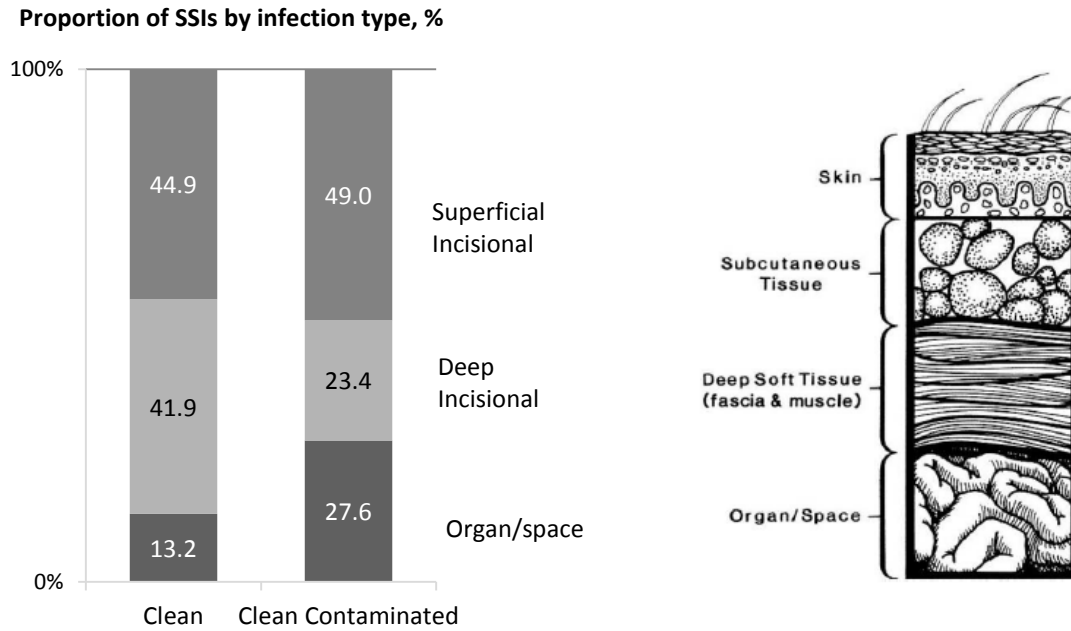
### **SSI by Procedure Category:**

As in previous years, Plastic Surgery had the highest SSI rate across IH (Figure 13). The rates at KGH and RIH were 3.0% and 2.9%, respectively. Among the 33 SSI cases in Plastic Surgery, 39% were complex SSIs. To put that into context, the proportion of complex SSIs among all SSI cases were 70% in Orthopedic Surgery, 55% in Vascular Surgery, and 50% in General Surgery. There were no significant differences in SSI rates among any procedure category between last year and the current year ( $p > 0.05$ ).

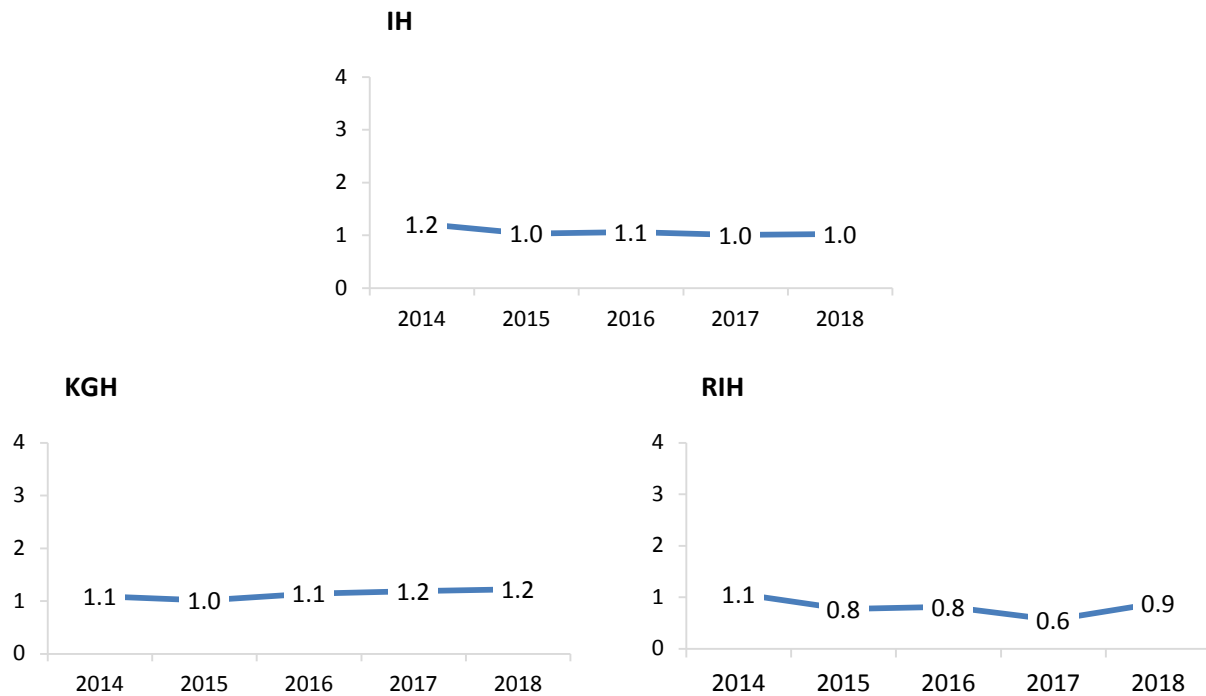
The SSI rate in Orthopedic Surgery across IH continues to be below the SSI benchmark. Orthopedic Surgery is the category of 32% of all clean or clean-contaminated procedures performed in IH and 28% of all SSI cases.

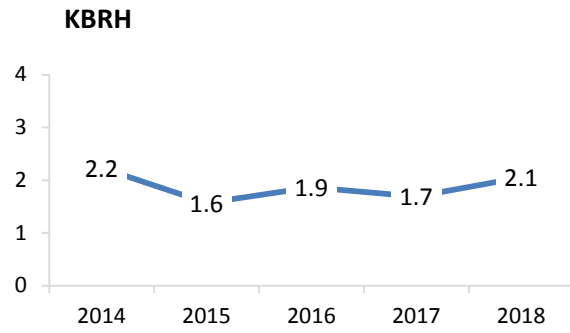
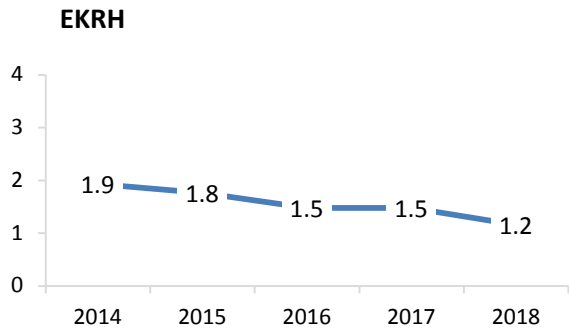
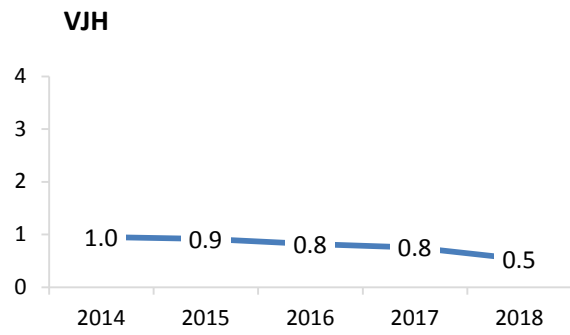
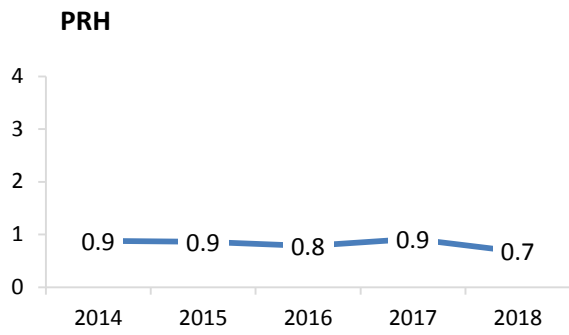


**Figure 9. Surgical site infection types, IH, FY 2018**

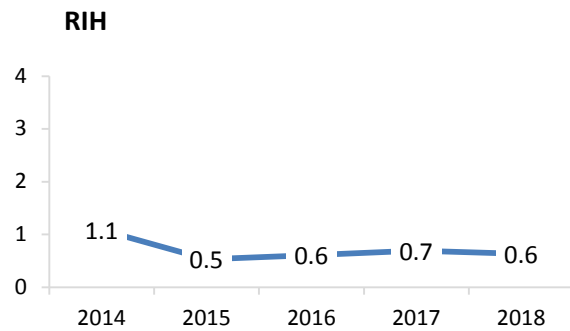
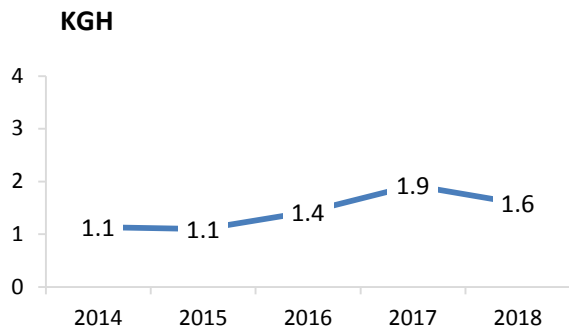
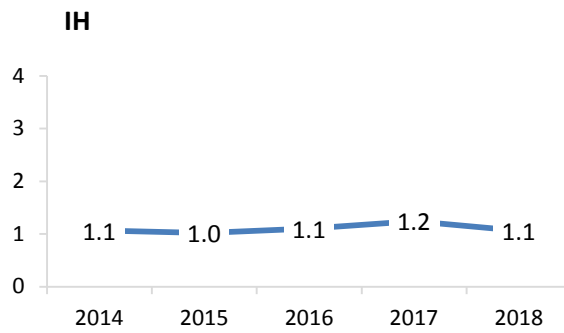


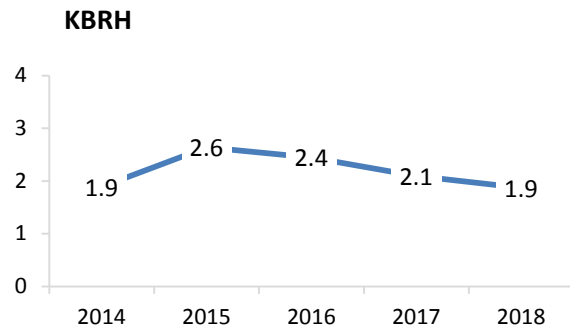
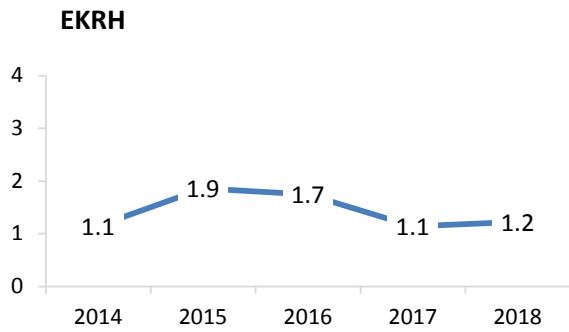
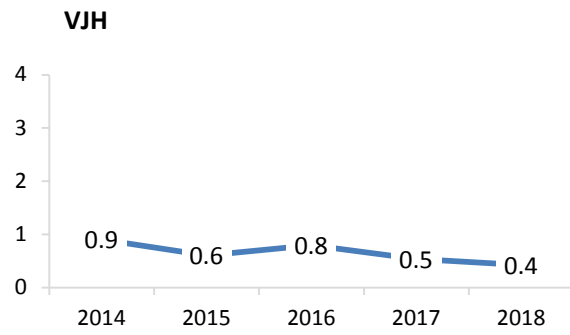
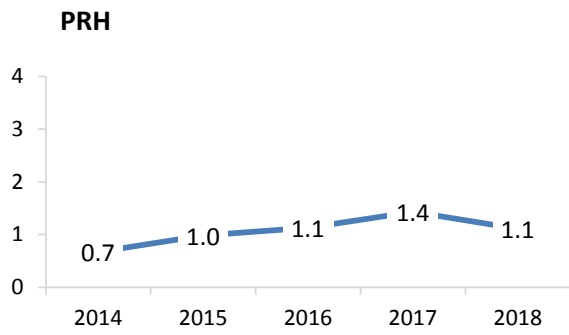
**Figure 10. Long term trends in SSI rates, %, among clean surgeries, FY 2014 through FY 2018**



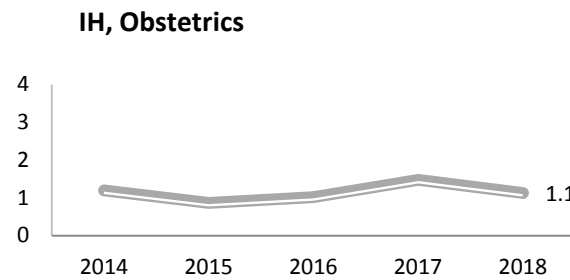
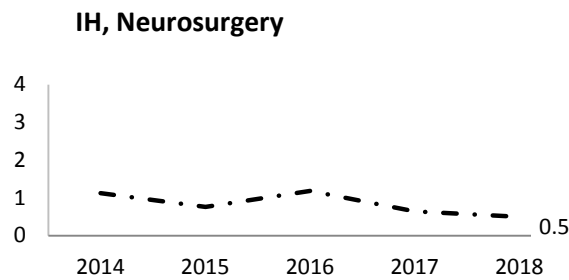
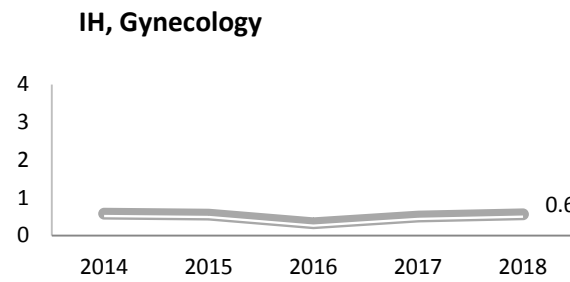
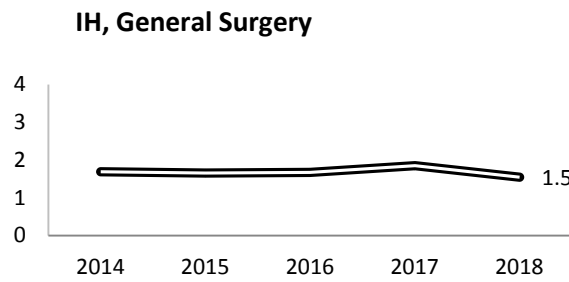


**Figure 11. Long term trends in SSI rates, %, among clean-contaminated surgeries, FY 2014 through FY 2018**

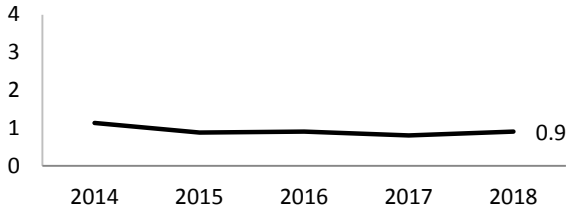




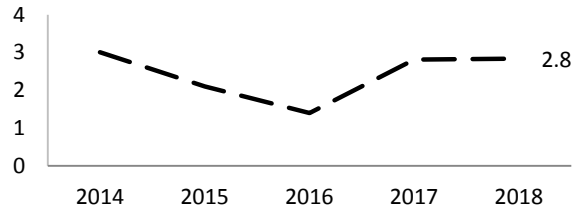
**Figure 12. Long term trends in SSI rates, %, among surgical categories, FY 2014 through FY 2018 (data shown for categories with data that are statistically reliable)**



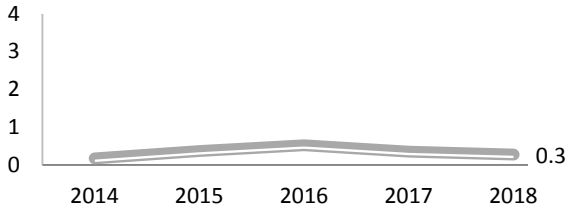
**IH, Orthopedic Surgery**



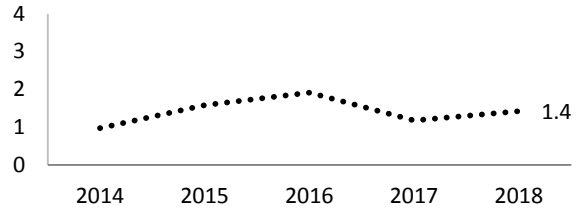
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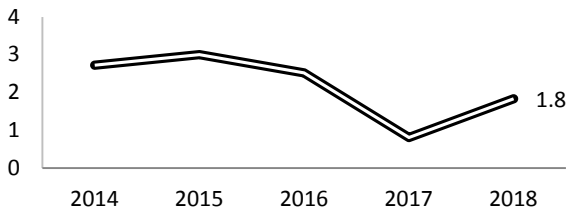
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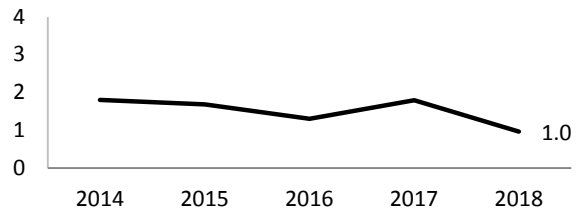
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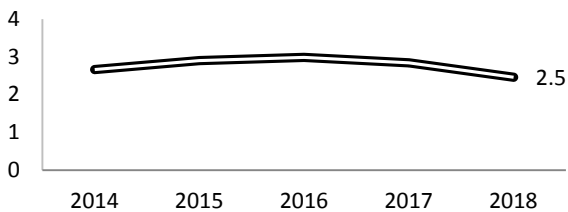
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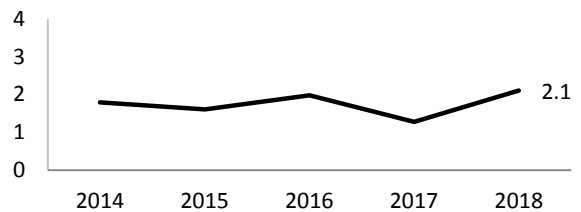
**EKRH, Orthopedic Surgery**



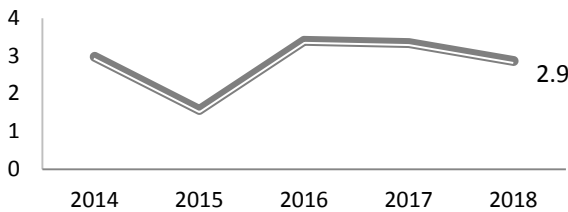
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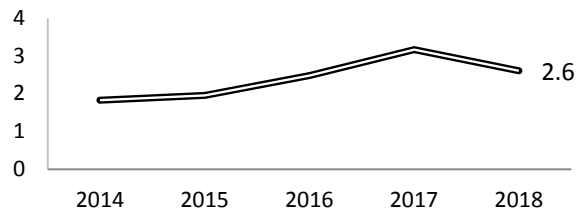
**KBRH, Orthopedic Surgery**



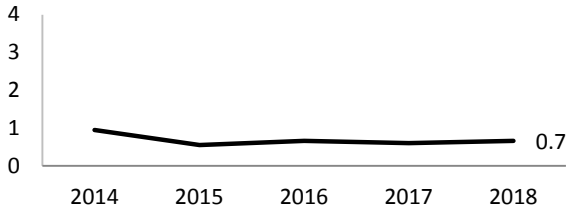
**KGH, Cardiac Surgery**



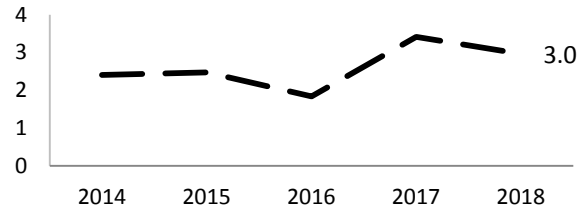
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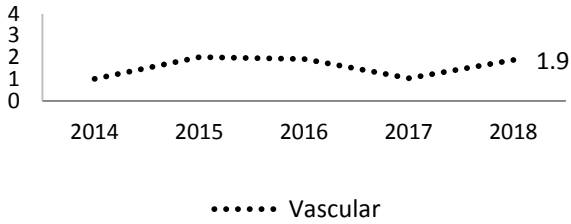
**KGH, Orthopedic Surgery**



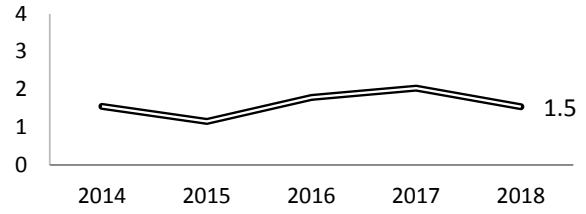
**KGH, Plastic Surgery**



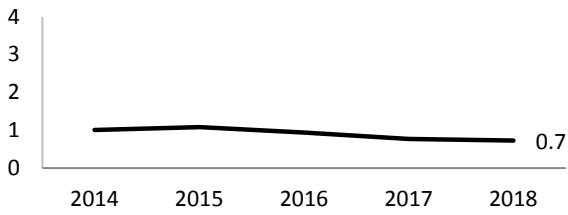
**KGH, Vascular Surgery**



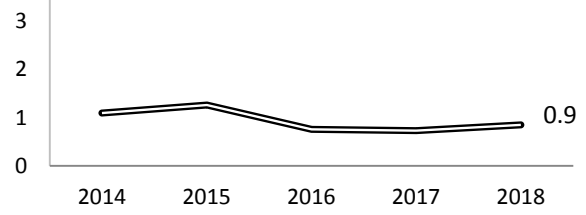
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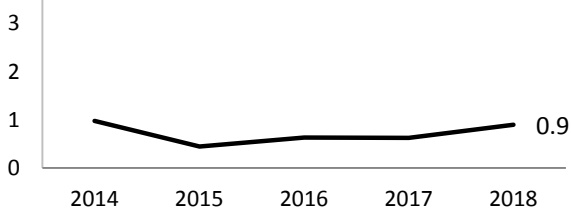
**PRH, Orthopedic Surgery**



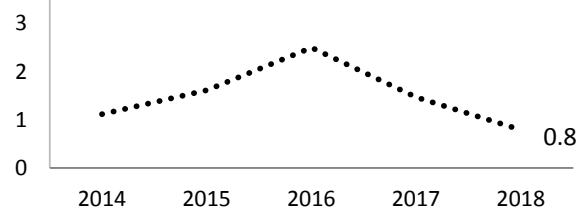
**RIH, General Surgery**



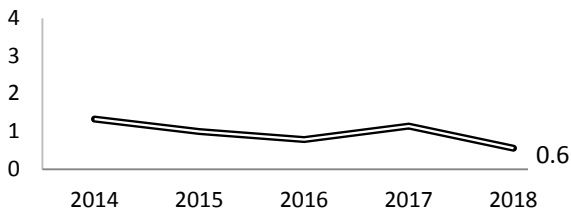
**RIH, Orthopedic Surgery**



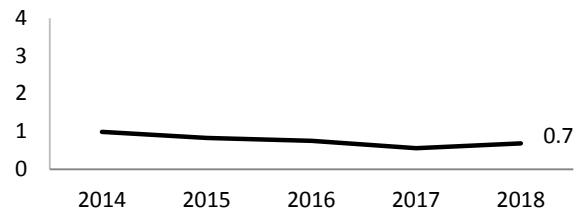
**RIH, Vascular Surgery**



**VJH, General Surgery**



**VJH, Orthopedic Surgery**



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## VENTILATOR ASSOCIATED PNEUMONIA AND CENTRAL LINE ASSOCIATED BLOODSTREAM INFECTION

Ventilator associated pneumonia (VAP) is a sub-type of healthcare associated pneumonia which is restricted to patients undergoing mechanical ventilation while in a hospital.

Central line associated blood stream infection (CLABSI) is restricted to patients who have an intravascular catheter (central line) used for infusion or hemodynamic monitoring.

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### WHAT IS BEING MEASURED AND REPORTED?

The incidence rate of VAP is the number of new cases of pneumonia acquired by ventilated patients in the intensive care unit (ICU) divided by 1,000 ventilator days ([Appendix B](#)). The incidence rate of CLABSI is the number of new cases of blood stream infection acquired by patients in the intensive care unit (ICU) with a central line divided by 1,000 central line days ([Appendix B](#)). When cases are rare, rates are not reported

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### ACTIONS IMPLEMENTED

Upon the identification of each VAP and/or CLABSI case, an investigation is done to determine potential risk factors. ICPs then make recommendations and increase education for HCPs to improve patient outcomes. The recommendations are followed up and evaluated to ensure proper implementation.

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### LIMITATIONS

Ventilator days and central line days are currently manually collected and tallied by ICU HCPs. CLABSIs may occur elsewhere in the hospital, but surveillance is limited to the ICU because there is no method of collecting accurate denominator data in other units.

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### RESULTS

There were three VAPs in IH this year. This may be clinically significant as there were no cases reported in the previous two years. Cases were not clustered in time and location, but were individually investigated, with no obvious concerns identified.

There was one CLABSI identified this year.

## LONG-TERM CARE HOMES

IPAC supports staff in IH long-term care homes through regular site visits, phone consultations, and following up laboratory-identified cases of infection as needed. In addition, regular surveillance of HAIs is carried out through prevalence surveys.

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### WHAT IS BEING MEASURED AND REPORTED?

Residential care HAI surveillance includes: CDI, lower respiratory infections (LRI), skin and soft tissue infections (SSTI), and catheter-associated urinary tract infections (CAUTI). Prevalence surveys were conducted at select facilities to provide a snapshot of the proportion of residents with LRI, SSTI, and CAUTI. Survey data collection was based on the McGeer criteria<sup>5</sup>. The criteria are based on any signs and symptoms documented in nursing charts.

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### ACTIONS IMPLEMENTED

Six rounds of surveys were conducted (May, July, September, and November 2017 and January and March 2018). Reports were distributed to Long-term Care Services leadership groups three times during the year. A review of the surveillance process was conducted and revisions were developed. Implementation of the revised process started in March 2018.

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### GOING FORWARD

As per recommendations from the review of the surveillance process, prevalence surveys will be done every month at larger facilities and less frequently at smaller facilities. The minimum frequency will be one survey every three months. The number of randomly selected residents included in each survey is 20 at larger sites and 15 elsewhere, which is smaller than in previous surveys (up to 40 residents). The look-back period for all residents will be 30 days, which is longer than in previous surveys (14 days). Resident lists will not include duplicates from one month to the next.

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### LIMITATIONS

Prevalence survey data collection did not capture all HAI cases throughout the year; however, it provided a time-efficient method to estimate the proportion of HAIs among residents at any time. Since the surveys relied on nursing chart data, any missing data may have resulted in missed cases.

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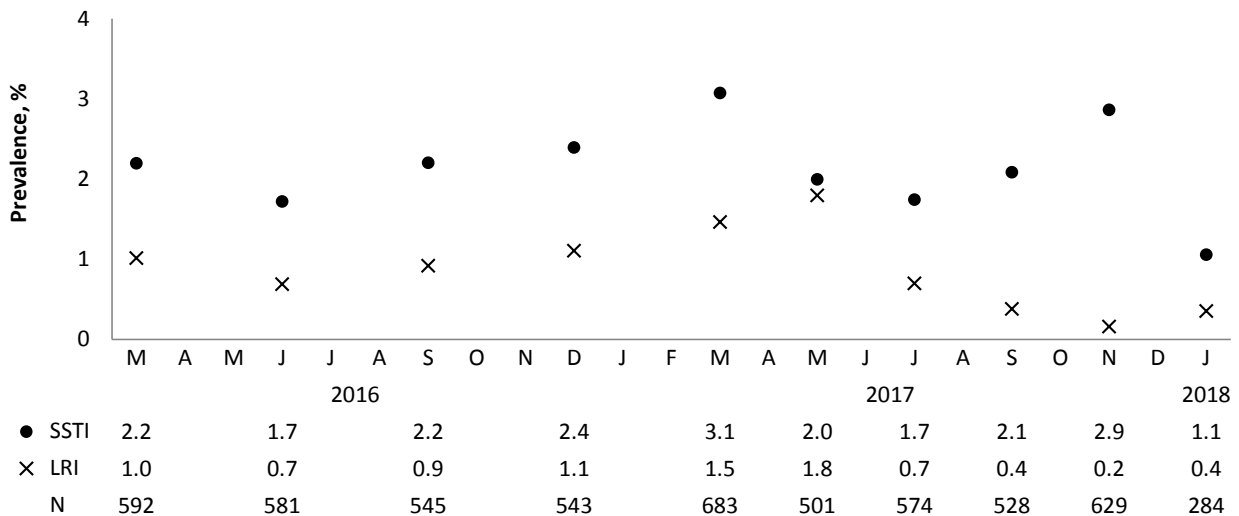
<sup>5</sup> N. Stone, M. Ashraf, J. Calder, C. Crnich, K. Crossley and others, "Surveillance definitions of infections in long-term care facilities: revisiting the McGeer criteria," *Infect Control Hosp Epidemiol*, pp. 965-977, 2012

## RESULTS

Since the start of routine long-term care home prevalence surveys in March 2016, 5,639 residents have been included in this surveillance. In total, there have been 130 SSTI, 50 LRI, 10 LRI-pneumonia, and six CAUTI captured within this surveillance. Figure 14 shows that in the surveys using the original surveillance process, there have been some fluctuations in the prevalence of SSTI and LRI, but there have not been many shifts in trend direction over time. In the past both SSTI and LRI prevalence were demonstrating increasing trends, but LRI prevalence decreased in the current year. SSTI prevalence sharply decreased between November 2017 and January 2018.

Table 7 lists the HAI rates for all IH long-term care homes in the current year. The results are stratified based on timing: prior to (May 2017 through January 2018) and after the revision (March 2018). With only one month of surveys using the revised surveillance process, it is too early to detect a difference in ability to capture HAIs; however, it appears that the revised process with longer look-back period may be able to identify more cases with a smaller sample size.

**Figure 13. Historical skin and soft tissue infection (SSTI) and lower respiratory infection (LRI) prevalence, IH long-term care homes, original surveillance process.**





**Table 7: Long-term care HAI prevalence, %, prior to (June 2017 – January 2018) and after (March 2018) surveillance process revision. Dashes indicate no survey occurred.**

	SSTI		LRI		Residents included	
	May 2017 – Jan. 2018	Mar. 2018	May 2017 – Jan. 2018	Mar. 2018	May 2017 – Jan. 2018	Mar. 2018
<b>All IH Long-term Care Homes</b>	2.0	4.6	0.6	1.0	2,616	179
<b>Brookhaven</b>	1.3	-	0.6	-	159	-
<b>Bastion Place</b>	2.6	10.0	1.3	5.0	78	20
<b>Coquihalla Gillis</b>	1.3	-	0.0	-	80	-
<b>Cottonwoods</b>	1.0	5.0	1.0	0.0	199	20
<b>Cottonwoods, short-stay</b>	5.6	-	0.0	-	54	-
<b>Columbia View</b>	1.3	-	0.0	-	78	-
<b>Dr. A. Pavilion</b>	3.8	-	0.0	-	80	-
<b>David Lloyd Jones</b>	-	0.0	-	0.0	-	15
<b>Henry Durand</b>	0.0	-	0.0	-	15	-
<b>Kimberley Special Care</b>	2.5	0.0	5.0	0.0	40	15
<b>Mount Cartier</b>	0.0	-	0.0	-	74	-
<b>McKinney Place</b>	2.5	6.7	0.0	0.0	160	15
<b>Minto House</b>	0.0	-	0.0	-	14	-
<b>Noric House</b>	12.8	0.0	0.0	0.0	39	15
<b>Nelson Jubilee</b>	0.0	-	0.0	-	78	-
<b>100 Mile Residential</b>	0.0	-	0.0	-	80	-
<b>Orchard Haven</b>	2.8	-	0.0	-	36	-
<b>Overlander</b>	1.9	-	0.8	-	120	-
<b>Overlander, high acuity</b>	0.0	-	0.0	-	40	-
<b>Polson Residential</b>	0.0	-	0.0	-	80	-
<b>Ponderosa</b>	0.0	-	0.0	-	79	-
<b>Pleasant Valley</b>	0.8	-	0.8	-	119	-
<b>Parkview Place</b>	0.0	7.1	0.0	0.0	30	14
<b>Ridgewood Lodge</b>	7.0	-	0.0	-	71	-
<b>Sunnybank</b>	-	6.7	-	0.0	-	15
<b>Swan Valley Lodge</b>	0.0	0.0	2.5	0.0	40	15
<b>Trinity Care Centre</b>	0.0	6.7	0.0	6.7	79	14
<b>Three Links</b>	0.0	-	0.0	-	80	-
<b>Talarico Place</b>	3.4	-	0.0	-	118	-
<b>Victorian Hospital</b>	0.0	6.7	0.0	0.0	14	15
<b>Westview Place</b>	3.0	5.0	1.0	0.0	199	20

## OUTBREAK SURVEILLANCE AND MANAGEMENT

Outbreaks can occur at any time during the year however, the majority usually happen during the winter season due to common circulating viruses, including influenza and norovirus. The IH IPAC program collaborates with the CD Unit in managing outbreaks in residential care facilities with the goal being to recognize, report, and react in a timely manner.

The primary components of outbreak management include:

- Confirmation of an outbreak
- Notification of stakeholders
- Implementation of control measures
- Communication with all stakeholders
- Education to HCWs

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### ACCOMPLISHMENTS/PRIORITIES MET

Working in collaboration with the CD Unit, IPAC updated the RI and GI outbreak guidelines. An education session was provided to stakeholders via the WebEx communication platform.

An Outbreak Management Response Plan was developed in collaboration with the CD Unit and IH key leadership stakeholders. It includes implementation of an Outbreak Management Team process, led by the facility leadership, for each outbreak encountered. In addition, the CD Unit provided consultation to the contracted partner sites and private long-term care sites and the IPAC program provided support to all IH owned long-term care sites in collaboration with the Medical Health Officer.

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### GOING FORWARD

IPAC will continue to work collaboratively with the CD Unit to deliver consistent education and outbreak support to facilities in the IH health service area.

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### RESULTS

#### **Acute Care RI and GI Outbreaks:**

In the current Fiscal Year, there were four GI outbreaks and two RI outbreaks in acute care settings. Norovirus was detected from three GI outbreaks and Influenza B and RSV were identified in the RI outbreaks. Two of the GI outbreaks were very quickly controlled, but two were prolonged with many cases of staff illness and patient illness occurring over nine days. One RI outbreak had only 4 cases while the other had 12. The latter was in a setting where patients are permitted to spend extended periods of time in the community.

## Long-term Care RI or GI Outbreaks:

Quantitative data for the current year were extracted from the RI and GI Facility Outbreaks report dated April 16, 2018. There were 14 GI outbreaks in IH long-term care homes and 47 RI outbreaks (Table 8). Among the GI outbreaks, norovirus was identified in five; and sapovirus was identified in three outbreaks (three neighbourhoods, same facility and time period). This year RI outbreaks were predominantly caused by Influenza B (15 of 47). Influenza A was identified in six RI outbreaks and no organism was identified in thirteen RI outbreaks.

Compared to the previous year, there were fewer GI outbreaks (Table 8). There were small increases in average duration and resident attack rates in these outbreaks and a marginally significant decrease in staff attack rates ( $p = 0.05$ ).

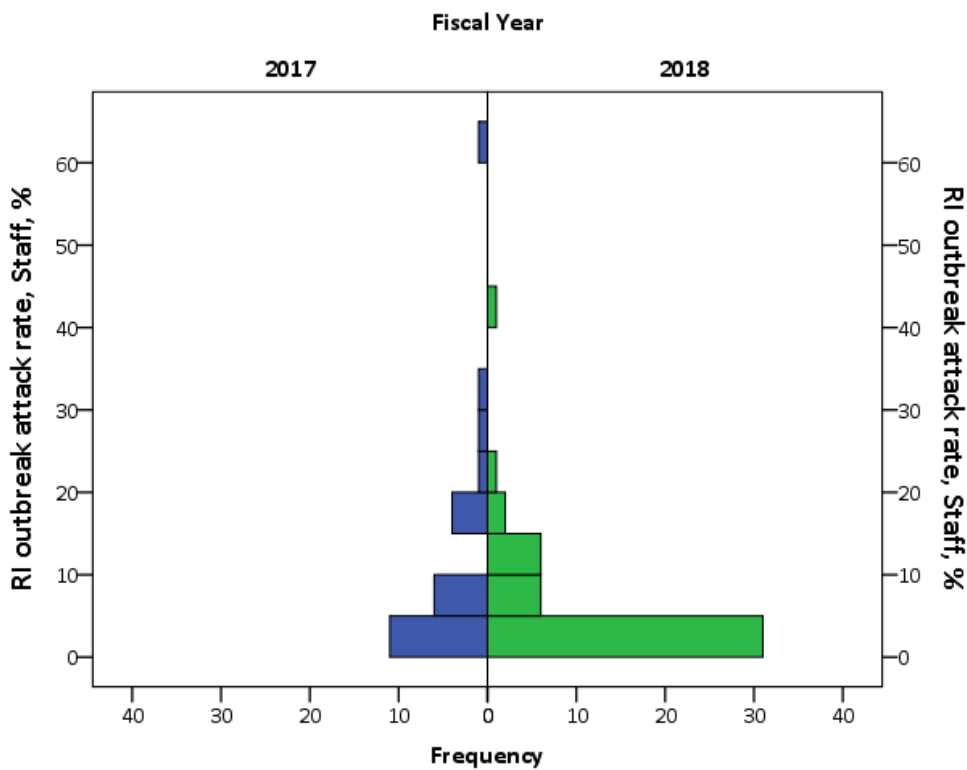
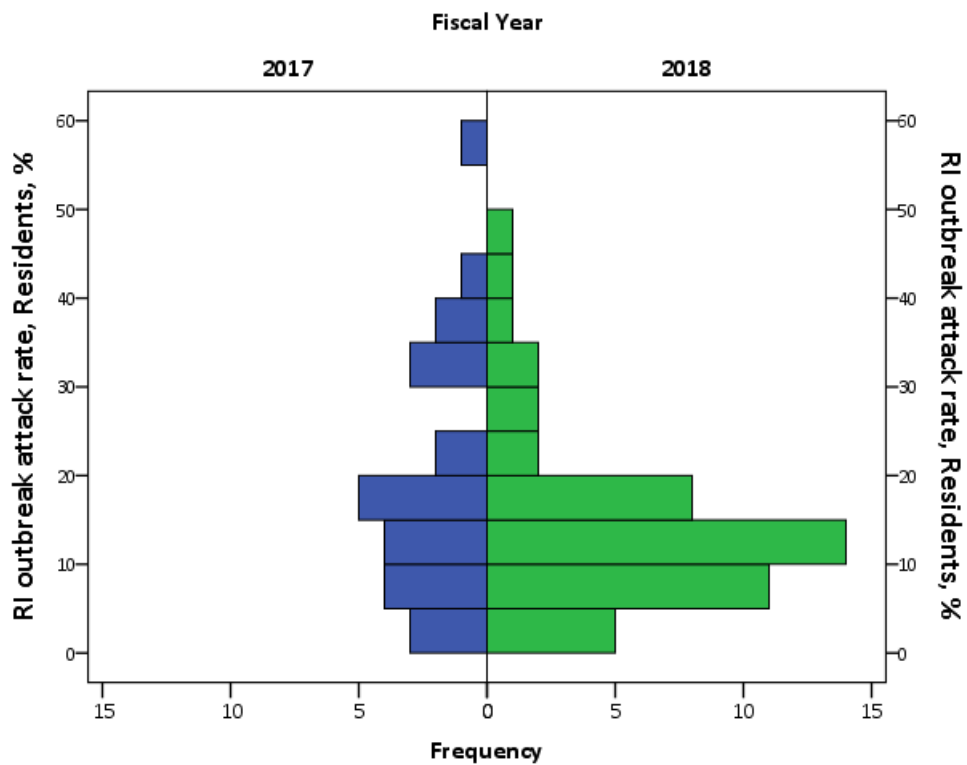
Compared to the previous year there were many more RI outbreaks. Duration of RI outbreaks were slightly lower this year compared to last. Attack rates among residents ( $p < 0.05$ ) and among staff ( $p < 0.01$ ) were significantly lower this year. This year 8.5% of RI outbreaks (4 of 47) had resident attack rates  $> 30\%$ , while in the previous year these high-impact events accounted for 28.0% of RI outbreaks (7 of 25, Figure 14). This year 36.2% (17 of 47) RI outbreaks had zero staff illness (Figure 14). Resident and staff RI attack rates were very strongly correlated (Pearson's correlation coefficient = 0.51;  $p < 0.001$ ).

**Table 8: IH long-term care outbreak descriptive summary FY 2018 and comparison to previous year**

	GI outbreaks		RI outbreaks	
	FY 2018	Change from FY 2017	FY 2018	Change from FY 2017
<b>Count</b>	<b>14</b>	- 9	<b>47</b>	+22
<b>Duration</b> average, days	<b>10.6</b>	+ 1.0	<b>13.9</b>	-1.5
<b>Resident attack rate</b> average, %	<b>20.7</b>	+ 0.7	<b>15.0</b>	-4.8 *
<b>Staff attack rate</b> average, %	<b>6.6</b>	- 8.8	<b>5.2</b>	-5.8 **

\*Student's *t*-test,  $p < 0.05$ , \*\*  $p < 0.01$

Figure 14. Histograms of FY 2017 and FY 2018 showing number of RI outbreaks by attack rates in residents (upper panel) and in staff (lower panel)



# APPENDICES

## APPENDIX A: STRATEGIC PLAN FISCAL YEAR 2018

STRATEGY	STAKEHOLDERS	PERFORMANCE MEASURES	SHORT-TERM GOALS (WITHIN 1 YEAR)
CDI	PICNet, Pharmacy, Housekeeping, Site/Unit Managers, HCPs, Antimicrobial Stewardship Committee	Ongoing surveillance	All facilities below benchmark
		Number of HCPs educated	Targeted education to units over benchmark
			Provide education based on gaps in best practice identified by the results of the CDI checklist
			Investigate facility successes for reducing CDI rates and implement on units over benchmark
		Number of times alert levels exceeded	Review facility alert levels
Zero outbreaks			
Community Programs (In Alignment with IH 5 Key Strategies)	Community Teams , P3 Residential, CD Unit, IH Clinics, Contracted Services (Housekeeping), HCPs, Clients, Mental Health, Seniors Care, Primary Health Care, Rural & Aboriginal Health	Working group(s) created	Create working group(s) and deliverables as required
		Completed needs assessment	Develop and implement a work plan based on the results of the Working Group
		Roles and responsibilities defined	Create roles and responsibilities of IPAC in the Community setting
		Implementation plan developed	Determine ICP contact for each geographical area
			Each geographical area will have a needs assessment completed by ICP(s)
Hand Hygiene	PHHWG, PICNet, Executive Medical Directors, Site/Unit Managers, HH Committee, HCPs, Educators, Maintenance, Medicine & Quality, Physicians, Patients, Residents, Clients	Quarterly observation quotas met for acute and residential	Engage acute, residential and community leadership teams to promote HH at all levels
		Number of HCPs educated	Provide annual HH education session (eg. skills fair)
		Two education modules yearly	Develop and implement education modules
		Completion of infrastructure audits every three years	Evaluate outcome of infrastructure audits and make recommendations to senior leadership
		Number of documented iLearn education sessions	Request annual completion (%) of iLearn sessions
		Quarterly HH compliance rates	Promote HH iLearn module
		Number of feedback tools completed	Consistent 80% compliance rate for all facilities
		Number of in-the-moment feedback opportunities	Completion of feedback tool for HH rates below 69% (including iLearn module)
		Quarterly reporting to PICNet, Public & HCPs	Initiating in-the-moment- feedback in the HH observation process
			Completion and submission as required.
HAI Surveillance	PICNet, Physicians, Housekeeping, Site/Unit Managers, HCPs, Patients, Residents, SET, Relevant Committees	Number of periods above benchmark	Create and implement action plans for patient care areas of concern
		Number of HCPs educated	
		Daily Surveillance	All facilities below benchmark
		Implementation of revised indicators and process	Implement revised surveillance indicators and reporting process
		Reporting of unit specific HAI rates	Develop a plan for unit specific surveillance
Education/ Accreditation	ICPs, HCPs, Quality & Patient Safety	Number of materials revised/updated	Revise/update all education materials (standardize content across IH)
		Number of new materials developed	Investigate other methods of providing IPAC education (eg. videos)
		Number of HCPs that have completed routine practice iLearn module annually	Develop and implement routine practices iLearn module
		Monthly accreditation discussion at IPAC meetings	Standing accreditation item on the monthly IPAC meeting agenda. Monthly rotating ICP presentations.
			Develop and implement action plans to address gaps in best practices
Outbreak Management (IH owned facilities)	ICPs, HCPs, Communicable Disease Unit, Quality & Patient Safety, Access and Flow, Acute and Residential Care, Support Services, Physicians, Patients, Residents.	Number of materials revised/updated	Revise/update all Outbreak Management education materials and outbreak guidelines to reflect change of ICPs as key stakeholders in IH owned facilities (standardize content with CDU)
		Decrease in the number of IH facility outbreaks	Develop New outbreak management algorithms and place on Inside Net
		Number of HCPs that have completed the Provincial iLearn modules annually	Promote Provincial Infection Control Routine/additional practices iLearn modules
		Decrease in the Duration of Outbreaks in IH Facilities.	Education to residential and acute care leaders regarding new outbreak management with ICPs for IH facilities
		Monthly Outbreak discussions at IPAC meetings	Develop strong working relationships with CDU to create a complimentary team for outbreak management
			Develop and implement action plans to address gaps in outbreak management

## CDI

Presence of diarrhea or toxic megacolon without other known etiology AND laboratory confirmation of *C. difficile* toxin A and/or B OR Diagnosis of pseudo-membranous colitis on sigmoidoscopy or colonoscopy OR Histological/pathological diagnosis of CDI with or without diarrhea

- New CDI Associated with Your Facility: Symptom onset > 72 hours after admission OR symptom onset in community or occurring ≤ 72 hours after admission AND patient admitted for at least ≥ 24 hours in past four weeks before hospitalization AND symptom onset less than four weeks after last discharge from your facility
- New CDI Associated with Another Healthcare Facility: Symptom onset in community or occurring ≤ 72 hours after admission to your facility AND patient admitted to another healthcare facility (including acute or long term care) for ≥ 24 hours in past four weeks after discharge from that facility
- Community Associated CDI Case: Symptom onset in the community or occurring within 72 hours (≤ 72 hours) after admission to acute care facility where CDI identified, provided that the case had no encounter with any healthcare facility (including acute care and long term care) in past the four weeks before onset of CDI symptoms
- Relapse CDI Case: Occurs between 2 - 8 weeks after previous CDI episode. Associated with Your Facility, with another Healthcare Facility, or Community

Notes:

- CDI rate expressed per 10,000 patient-days
- CDI case identified less than two weeks after previous episode is considered to be a continuation of previous CDI case
- Population excludes outpatients not admitted to facility, patients in extended care beds or mental health beds, inpatients under one year of age
- Reported complications of CDI occurring within 30 days include ICU admission due to CDI or complication, toxic megacolon, total or partial colectomy

## Antibiotic Resistant Organism (ARO) for MRSA, VRE

Healthcare-associated definition includes:

Not previously positive for ARO and:

1. Healthcare associated with current admission to Your Facility
  - Identified > 48 hours after patient admitted to your facility OR Newborn, if mother not known to be a case on admission or suspected to be positive
2. Healthcare associated with previous encounter to Your Facility
  - Identified ≤ 48 hours after admission and admitted to your facility at least overnight (≥24 hours) within the last 12 months

OR

- Indwelling catheters or medical device at time of admission, which was inserted by your facility

OR

- Documented weekly visits to outpatient clinic, (i.e. dialysis, oncology) in your facility in the last 12 months.

### 3. Healthcare associated with Another Facility

- Identified ≤ 48 hours after admission and had contact with another healthcare facility as inpatient (acute/ long term care) or as outpatient (i.e. dialysis, oncology) within the last 12 months

OR

- Any medical device at time of admission, which was inserted by another facility

Notes:

- Rates expressed per 10,000 patient-days
- Only Inpatient Healthcare Associated Cases are reported, including Newborns less than 28 days

### 4. Community associated MRSA case

- Any case without documented history of healthcare exposure including admission to acute care, long term care or rehab, weekly visits to an outpatient clinic (dialysis, oncology, i.e. use of indwelling catheter or other medical device)

## **CPO (Carbapenemase Producing Organisms)**

Patients confirmed to be positive for a CPO are reported to PICNet using their surveillance forms.

## **SSI (Clean/ Clean Contaminated)**

An infection involving the surgical site within 30 days of the procedure or within 90 days (previously 365) if an implant is in place and the infection is related to the operative procedure. Three categories of SSIs:

- Superficial Incisional Infection occurs within 30 days of procedure and involves only skin and subcutaneous tissue of incision
- Deep Incisional Infection occurs within 30 or 90 days of surgery and has implant if after the 30 days and involves deep soft tissues of incision (i.e. fascial and muscle layers)
- Organ/Space Surgical Site Infection occurs within 30 or 90 days of surgery and has implant if after the 30 days and involves any part of the body excluding the skin incision, fascia or muscle layers, that is opened or manipulated during the operative procedure

Surgeries are stratified based on the *Surgical Wound Classification*<sup>6</sup>. Clean wounds are uninfected operative wounds in which no inflammation is encountered, and the respiratory, alimentary, genital, or uninfected urinary tract is not entered. There is no break in sterile technique. Clean-contaminated wounds are those in which respiratory, alimentary, urinary, or genital tracts were involved under controlled conditions and without unusual contamination. A minor break in surgical sterile technique in an otherwise clean procedure would fit into this class.

Surveillance does not include procedures with no incision or those done in Ambulatory Care.

Primary source for definition: CDC/NHSN (National Healthcare Safety Network) guidelines, 2013.

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<sup>6</sup> Interior Health Surgical Services Practices: Operative Wound Classification Reference Guide (May 2011)

## **VAP**

Minimum time on the Ventilator  $\geq$  three calendar days

Must be  $>$  14 days since last Ventilator Associated event

Ventilator Associated Pneumonia is identified by a combination of the following Criteria:

After a period of stability or improvement for two or more days:

- Increase FIO<sub>2</sub> of  $\geq 20$  or PEEP  $\geq 3$ cm for  $\geq$  two days
- Changes in temperature OR white blood cell count AND a new antimicrobial agent started for  $\geq$  four days
- Positive laboratory cultures or other diagnostic tests (organisms excluded include: Candida, Coagulase-negative Staphylococcus species and Enterococcus species)

Notes:

- VAP rate calculation per 1000 Ventilator days
- Primary source for definition: CDC/NHSN (National Healthcare Safety Network) guidelines, 2013.
- Population: ICU Patients only

## **CLABSI**

The central line was in place for  $>$  two calendar days when all elements of a CLABSI were first present together

- Elements required for adult case include:
  - Fever  $> 38^{\circ}$  C
  - OR chills
  - OR hypotension (systolic  $< 90$ )
  - AND positive lab results that are not related to an infection at another site
  - AND common commensal is cultured from two or more blood cultures, drawn on separate occasions
  - AND criterion elements occurred within a timeframe that does not exceed a gap of one calendar day
- Elements required for patient  $<$  one year of age same except:
  - Fever  $> 38^{\circ}$  C
  - OR hypothermia  $< 36^{\circ}$  C (core)
  - OR apnea
  - OR bradycardia

Notes:

- CLABSI rate calculation per 1000 central line days
- Primary source of infection (same as VAP)
- Population ICU patients only



APPENDIX C: HAND HYGIENE COMPLIANCE BY FACILITY

<b>Acute Care Facility Hand Hygiene Compliance</b>				
<b>Facility</b>	<b>Compliance Rate, %</b>	<b>95% Confidence Interval, %</b>	<b>Observations</b>	<b>Change from FY 2017, %</b>
<b>IH</b>	80	80 - 81	29,469	1
<b>Arrow Lakes Hospital</b>	84	70 - 98	25	12
<b>Boundary Hospital</b>	78	73 - 83	261	2
<b>Cariboo Memorial Hospital</b>	81	77 - 85	439	-2
<b>Creston Valley Hospital</b>	77	72 - 82	239	-1
<b>Dr. Helmcken Memorial Hospital</b>	86	76 - 96	43	7
<b>East Kootenay Regional Hospital</b>	80	78 - 81	1,816	3
<b>Elk Valley Hospital</b>	78	73 - 83	289	6
<b>Golden and District General Hospital</b>	84	73 - 94	49	9
<b>Invermere and District Hospital</b>	84	74 - 94	51	5
<b>Kootenay Boundary Regional Hospital</b>	79	77 - 81	1,703	-1
<b>Kelowna General Hospital</b>	80	79 - 80	9,107	4 *
<b>Kootenay Lake Hospital</b>	82	79 - 84	963	-1
<b>Lillooet Hospital and Health Centre</b>	88	77 - 98	40	-3
<b>Nicola Valley Health Centre</b>	71	64 - 78	159	-6
<b>100 Mile District General Hospital</b>	75	70 - 80	296	-6
<b>Princeton General Hospital</b>	82	72 - 92	55	-7
<b>Penticton Regional Hospital</b>	80	79 - 81	3,279	4
<b>Queen Victoria Hospital</b>	90	82 - 97	58	7
<b>Royal Inland Hospital</b>	81	80 - 82	5,253	0
<b>Shuswap Lake General Hospital</b>	85	83 - 86	1,601	-2
<b>South Okanagan General Hospital</b>	83	79 - 87	371	3
<b>Vernon Jubilee Hospital</b>	79	77 - 80	3,372	-1

<b>Long-term Care Home Hand Hygiene Compliance</b>				
<b>Home</b>	<b>Compliance Rate, %</b>	<b>95% Confidence Interval, %</b>	<b>Observations</b>	<b>Change from FY 2017, %</b>
<b>IH</b>	80	79 - 81	8,542	3 *
<b>Bastion Place</b>	85	81 - 89	320	6
<b>Brookhaven</b>	80	76 - 85	352	6

<b>Columbia View Lodge</b>	79	74 - 84	271	5
<b>Cottonwoods</b>	77	74 - 80	774	5
<b>David Lloyd Jones</b>	78	73 - 83	275	7
<b>Dr. F.W. Green Home</b>	79	74 - 83	303	4
<b>Fischer Place/Mill Site Lodge</b>	77	72 - 83	230	0
<b>Gillis House</b>	71	65 - 76	268	-3
<b>Hardy View Lodge</b>	80	75 - 85	271	-2
<b>Kimberley Special Care Home</b>	79	74 - 84	267	6
<b>McKinney Place</b>	82	78 - 86	328	6
<b>Nelson Jubilee Manor</b>	84	79 - 89	197	-2
<b>Noric House</b>	79	73 - 86	146	-2
<b>Overlander RC</b>	78	75 - 81	664	1
<b>Pleasant Valley Manor</b>	82	78 - 86	330	5
<b>Polson Residential Care</b>	73	68 - 79	222	-5
<b>Ponderosa Lodge</b>	74	69 - 78	326	-12
<b>Poplar Ridge</b>	78	72 - 83	215	4
<b>Summerland Extended Care (Dr Andrew Pavilion)</b>	82	76 - 88	153	-3
<b>Sunnybank Care Home</b>	81	75 - 86	181	4
<b>Swan Valley Lodge</b>	89	85 - 93	236	8
<b>Talarico Place</b>	79	73 - 84	211	4
<b>The Gateby</b>	81	76 - 86	272	9
<b>Three Links Manor</b>	82	78 - 86	319	9
<b>Trinity Care Centre</b>	79	74 - 83	287	5
<b>Westview Extended Care</b>	80	76 - 84	369	10
<b>Smaller facilities</b>	87	85 - 90	755	4

\*Indicates a statistically significant difference,  $p < 0.05$ .

APPENDIX D: HEALTHCARE ASSOCIATED INFECTION RATES

New Healthcare-associated <i>Clostridium difficile</i> Infection						
Facility type	Facility	Count	Patient-days	Rate, I/10,000 patient-days <sup>1</sup>	95% CI <sup>1</sup>	Difference in rate from FY 2017 <sup>2</sup>
All	IH	276	469,289	5.9	5.2 – 6.6	1.6*
Tertiary hospital	KGH	99	138,173	7.2	5.8 – 8.6	2.2*
	RIH	55	102,264	5.4	4.0 – 6.8	1.8
Service area hospital	EKH	24	24,412	9.8	5.9 – 13.8	5.4*
	KBH	9	22,094	4.1	1.4 – 6.7	-1.6
	PRH	23	40,994	5.6	4.0 – 6.8	0.8
	VJH	32	60,633	5.3	3.5 – 7.1	2.6*
Community level hospital	ALH	1	1,313	NA	NA	NA
	BDH	4	4,514	8.9	0.2 – 17.5	-0.3
	CMH	3	9,952	NA	NA	NA
	CVH	3	5,458	NA	NA	NA
	DHH	0	1,437	0.0	0.0 – 0.0	0.0
	EVH	2	4,710	NA	NA	NA
	GDH	2	2,468	NA	NA	NA
	IDH	1	2,241	NA	NA	NA
	KLH	5	10,563	4.7	0.6 – 8.9	-1.1
	LIH	1	2,045	NA	NA	NA
	NVH	0	3,042	0.0	0.0 – 0.0	NA
	OMH	2	5,712	NA	NA	NA
	PGH	0	1,894	0.0	0.0 – 0.0	NA
	QVH	2	2,507	NA	NA	NA
SLH	7	17,730	4.0	1.0 – 6.9	-1.8	
SOG	1	5,133	NA	NA	NA	

<sup>1</sup> NA: Not available due to lack of insufficient data

<sup>2</sup> \* Indicates statistical significance,  $p < 0.05$ . Differences without \* are not statistically significant.

Healthcare-associated Methicillin-resistant <i>Staphylococcus aureus</i>							
Facility type	Facility	Count	Patient-days	Rate, I/10,000 patient-days <sup>1</sup>	95% CI <sup>1</sup>	Difference in rate from 2017 FY <sup>2</sup>	Infection rate <sup>3</sup> , I/10,000 patient-days
All	IH	130	510,884	2.5	2.1 – 3.0	-0.6	1.2
Tertiary hospital	KGH	42	157,299	2.7	1.9 – 3.5	-0.7	1.3
	RIH	38	103,553	3.7	2.5 – 4.8	-0.2	1.4
Service area hospital	EKH	3	27,789	NA	NA	-1.4	NA
	KBH	6	26,283	2.3	0.5 – 4.1	-0.3	1.9
	PRH	13	46,552	2.8	1.3 – 4.3	0.8	0.9
	VJH	12	67,823	1.8	0.8 – 2.8	-0.3	1.3
Community level hospital	ALH	0	1,373	0.0	0.0 – 0.0	0.0	0.0
	BDH	2	4,563	NA	NA	-0.2	NA
	CMH	2	10,293	NA	NA	1.9	NA
	CVH	0	5,470	0.0	0.0 – 0.0	-1.8	0.0
	DHH	0	1,437	0.0	0.0 – 0.0	-5.3	0.0
	EVH	1	4,810	NA	NA	-0.5	NA
	GDH	0	2,473	0.0	0.0 – 0.0	0.0	0.0
	IDH	0	2,244	0.0	0.0 – 0.0	0.0	0.0
	KLH	3	10,602	NA	NA	0.3	NA
	LIH	0	2,122	0.0	0.0 – 0.0	0.0	0.0
	NVH	0	3,042	0.0	0.0 – 0.0	0.0	0.0
	OMH	0	5,758	0.0	0.0 – 0.0	-6.8	0.0
	PGH	0	1,894	0.0	0.0 – 0.0	0.0	0.0
	QVH	1	2,547	NA	NA	3.9	0.0
SLH	6	17,824	3.4	0.7 – 6.1	-5.2	NA	
SOG	1	5,133	NA	NA	-3.1	0.0	

<sup>1</sup> NA: Not available due to lack of insufficient data

<sup>2</sup> \* Indicates statistical significance,  $p < 0.05$ . Differences without \* are not statistically significant.

<sup>3</sup> Does not include cases of colonization in the current year

Surgical Site Infection, Clean Surgeries						
Facility type	Facility	Count	Surgeries	Rate <sup>1</sup> , %	95% CI <sup>1</sup>	Difference in rate from 2016 FY <sup>2</sup>
All	IH	234	22,787	1.0	0.9 – 1.2	0.0
Tertiary hospital	KGH	98	7,989	1.2	1.0 – 1.5	0.0
	RIH	45	5,032	0.9	0.6 – 1.2	+ 0.3
Service area hospital	EKRH	18	1,559	1.2	0.6 – 1.7	- 0.2
	KBRH	42	2,048	2.1	1.4 – 2.7	+ 0.4
	PRH	14	2,071	0.7	0.3 – 1.0	- 0.3
	VJH	15	2,807	0.5	0.3 – 0.8	- 0.3
Community hospital	CMH	0	299	0.0	0.0 – 0.0	NA
	KLH	0	120	0.0	0.0 – 0.0	NA
	QVH	0	141	0.0	0.0 – 0.0	NA
	SLGH	2	721	NA	NA	NA

<sup>1</sup> NA: Not available due to lack of sufficient data

<sup>2</sup> \* indicates statistical significance,  $p < 0.05$

Surgical Site Infection, Clean-contaminated Surgeries						
Facility type	Facility	Count	Surgeries	Rate <sup>1</sup> , %	95% CI <sup>1</sup>	Difference in rate from 2016 FY <sup>2</sup>
All	IH	145	13,700	1.1	0.9 – 1.2	- 0.2
Tertiary hospital	KGH	63	3,969	1.6	1.2 – 2.0	- 0.3
	RIH	20	3,179	0.6	0.4 – 0.9	- 0.1
Service area hospital	EKRH	11	897	1.2	0.5 – 1.9	+ 0.1
	KBRH	14	748	1.9	0.9 – 2.8	- 0.2
	PRH	15	1,355	1.1	0.5 – 1.7	- 0.5
	VJH	9	2,113	0.4	0.1 – 0.7	- 0.1
Community hospital	CMH	5	872	0.6	0.1 – 1.1	- 0.4
	KLH	3	198	NA	NA	NA
	QVH	1	34	NA	NA	NA
	SLGH	4	335	1.2	0.0 – 2.4	NA

<sup>1</sup> NA: Not available due to lack of sufficient data

<sup>2</sup> \* indicates statistical significance,  $p < 0.05$