

Infection Prevention and Control

Annual Report 2016 - 2017



northern health
the northern way of caring

Table of Contents

Executive Summary <u>3</u>	Introduction <u>5</u>	Education <u>9</u>
Surveillance <u>11</u>	Hand Hygiene Compliance <u>11</u>	<i>Clostridium difficile</i> Infection (CDI) Incidence Rates <u>14</u>
Methicillin-resistant <i>Staphylococcus aureus</i> (MRSA) Incidence Rates <u>16</u>	Vancomycin-Resistant <i>Enterococci</i> (VRE) Incidence Rates <u>17</u>	Management of <i>Carbapenemase</i> Producing Organisms (CPO) <u>18</u>
Surgical Site Infections (SSI) Incidence Rates <u>19</u>	Outbreak Management <u>23</u>	Medical Device Reprocessing (MDR) <u>25</u>
Accreditation <u>28</u>	Antimicrobial Stewardship <u>29</u>	Appendices <u>33</u>

Executive Summary

The Northern Health Infection Prevention and Control (IPC) program's annual report highlights achievements and continued challenges facing infection prevention and control practices throughout the region. The report summarizes the progress of programs and initiatives, education, hand hygiene compliance, outbreaks, and annual infection rates within Northern Health (NH) during the fiscal year 2016 - 2017 (April 1, 2016 – March 31, 2017).

This fiscal year, the Infection Prevention & Control (IPC) program has been involved in a number of projects and initiatives both provincially with the Provincial Infection Control Network (PICNet), and regionally. The Infection Prevention team members are also involved in the BC Chapter of Infection Prevention and Control Canada (IPAC Canada), as well as individual interest groups within IPAC Canada.

Regional:

- Infection Prevention Workbook - Basic
- Celebration of the Infection Control Week at the Senior Center
- Updated Infection Prevention pamphlets, signs and posters
 - PowerPoint presentations with voiceover
- Participated in the Quality Improvement conference
- Alaris pump implementation project
- Participated in the development of Infection Prevention Plan for companies and camps
- DebMed hand hygiene monitoring system trial
- Westech hand hygiene app trial – electronic audit
- NH Emerging Infectious Disease plan

Provincial:

- Participated in the Provincial Hand Hygiene working group and sub-working groups: communication, best practice guidelines
- Participated in the development of new additional transmission precautions signage
- Involved in Hand Hygiene Provincial Communications Campaign
- Participated in the Infection Prevention and Control Canada (IPAC) education day

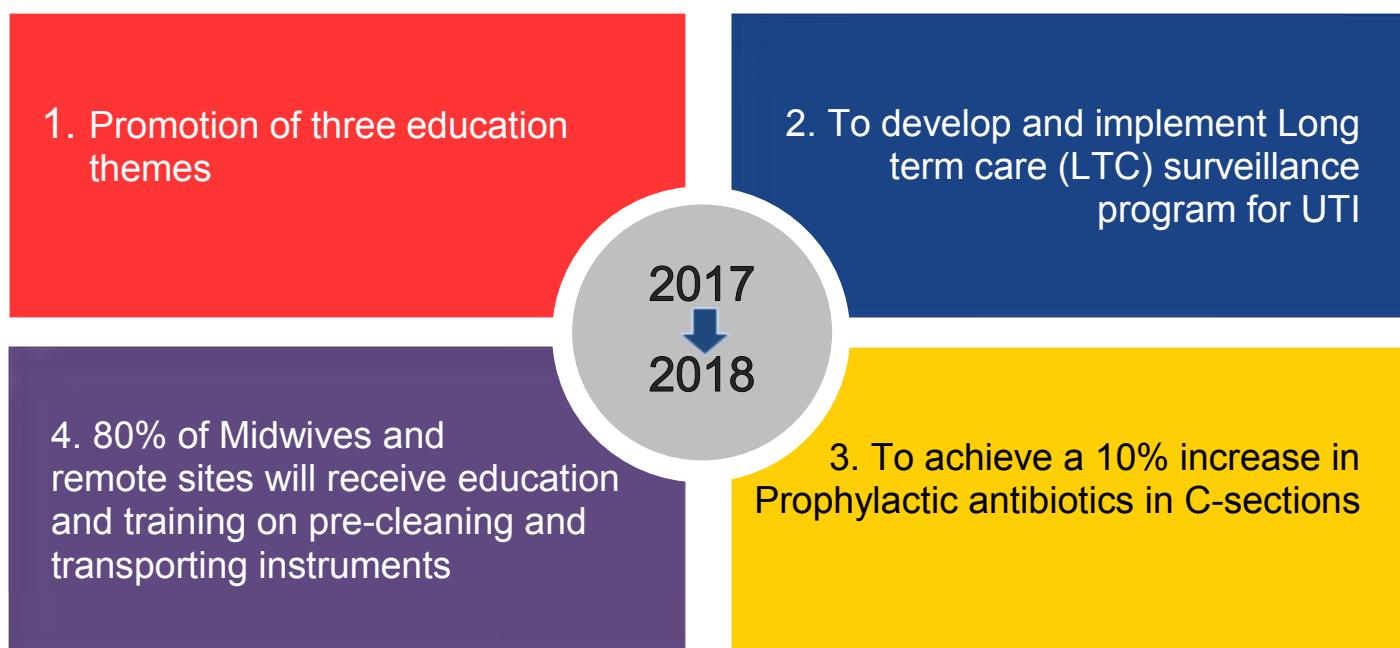
National:

- Participated in the following Infection Prevention and Control Canada (IPAC) Interest Groups: Long Term Care (LTC), Medical Device Reprocessing (MDR), Surveillance and Applied Epidemiology (SAIEG), Health Care Facility Design and Home and Community Care
- Participated in Pan Canadian Long Term Care (LTC) Case definitions group
- Participated in Canadian Nosocomial Infection Surveillance Program (CNISP)

Medical Device Reprocessing Department (MDRD):

- Participated in Ministry of Health working group and sub-working group; duodenoscope cleaning recommendations and competencies, Midwives Association instrument care, foot care instrument update, Human Papillomavirus (HPV) disinfection recommendation, Request for Proposal (RFP) language for manufacturers' instructions for use
- Revised outdated Policies and Procedures using manufacturer's instructions for use, Best Practice Guidelines and Canadian Standards Association (CSA) standards
- Initiated educational opportunity for Medical Imaging Department using power point presentation and on-line in-services for disinfection of semi-critical transducers, reaching 95% of staff responsible for this task.
- Completed Decontamination Modules for Learning Pathway for Medical Device Reprocessing (MDR). Modules to be uploaded on the NH Learning Hub.
- Attended 2nd biennial Canadian Association of Medical Device Reprocessing (CAMDR) conference in Toronto.
- Organized and chaired medical device processing monthly meeting.
- Completed audits using audit checklist for reprocessing critical and semi-critical medical devices for all acute sites and using a revised checklist for residential sites.

Based on this year's report, the key priorities for 2017 - 2018 will be:



Introduction

The Northern Health Infection Prevention and Control (IPC) program is part of the Vice President Planning, Quality, and Information Management portfolio. The program is dedicated to the prevention and reduction of healthcare associated illness in Northern British Columbia residents through a variety of strategies summarized in this annual report.

The Infection Prevention team is comprised of a Regional Manager, an Epi-technologist, eight infection prevention and control practitioners and a Medical Device Reprocessing Coordinator. The group (including a dedicated practitioner for residential care), provides on-site and consultative infection prevention and control and sterile reprocessing expertise, to thirty five acute care facilities, residential care facilities, home and community care, assisted living facilities, Diagnostic and Treatment (D&T) centres and health centres.

Northern Health is geographically divided into three Health Service Delivery Areas (HSDAs) and each of these areas is represented by a multidisciplinary IPAC Committee. Committee membership includes representatives from the following groups: physicians, public health, environmental health, workplace health and safety, plant services, nursing, residential care, lab, support services and Health Services Administrators. The committees report to the NH IPAC Council, the NH Medical Advisory Committee, and the Senior Executive Team.

The IPAC program functions in accordance with international, national, and provincial guidelines and best practices across the continuum of care. The program influences practice through the following:

- Provides infection surveillance (includes Antibiotic Resistant Organisms [ARO], and Surgical Site Infection [SSI]) and disseminates data to appropriate stakeholders;
- Develops and recommends best practices, policies, and procedures;
- Involved in infection prevention and control issues relating to all construction and renovation projects within NH to ensure that infection prevention strategies are followed during construction and renovation projects according to the Canadian Standards Association protocols
- Provides education and training to healthcare providers, patients, non-medical caregivers, and visitors;
- Provides outbreak management support to all acute care facilities, residential care facilities, assisted living facilities, diagnostic and testing centres, health centres, and community programs within Northern Health.

Infection Prevention and Control Team Members

Deanna Hembroff
IPAC Manager

Infection Prevention & Control Practitioners

Kelsey Breault

Sylvia Eaton

Roxanne Fitzsimmons

Debora Giese

Judy Klein

Beth McAskill

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Medical Device Reprocessing

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Acute Care Facilities



Bulkley Valley District Hospital – Smithers



Chetwynd Hospital & Health Centre



Dawson Creek and District Hospital



Fort Nelson Hospital



Fort St. John Hospital



GR Baker Memorial Hospital – Quesnel



Kitimat General Hospital



Lakes District Hospital – Burns Lake



Mackenzie and District Hospital



McBride Hospital



Mills Memorial Hospital – Terrace



Northern Haida Gwaii Hospital



Prince Rupert Regional Hospital



Queen Charlotte Islands Hospital



St. John Hospital – Vanderhoof



Stuart Lake Hospital-Fort St. James



University Hospital of Northern BC – Prince George



Wrinch Memorial Hospital – Hazelton

Assisted Living Facilities

- Alward Place Seniors Assisted Living – Prince George
- Gateway Lodge Assisted Living Residence – Prince George
- Heritage Manor II – Fort St John
- Laurier Manor – Prince George
- McConnell Estates – Terrace
- Nick Grosse Assisted Living Residences – Masset
- Summit Assisted Living Residences – Prince Rupert

Diagnostic and Treatment Centres, Health Centres

Atlin Hospital
Fraser Lake D&T Centre
Granisle Community Health Centre
Houston Health Centre
Hudson Hope Health Centre
Stewart Health Centre
Stikine D&T Centre – Dease Lake
Tumbler Ridge D&T Centre
Valemount D&T Centre

Home and Community Care

Residential Care Facilities

Acropolis Manor – Prince Rupert
Bulkley Lodge – Smithers
Dunrovin Park Lodge – Quesnel
Gateway Lodge Residential Care – Prince George
Jubilee Lodge – Prince George
Kitimat Mountain View Lodge
Parkside Care – Prince George
Peace Villa – Fort St. John
Rainbow Lodge – Prince George
Rotary Manor – Dawson Creek
Simon Fraser Lodge – Prince George
Stuart Nechako Manor - Vanderhoof
Terrace View Lodge - Terrace
The Pines – Burns Lake

Education

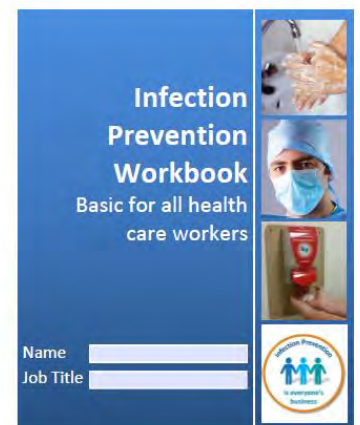
The Infection Prevention team continuously strives to provide NH staff, patients, visitors, and residents with relevant education, based on current evidence-based recommendations. Relevant and current information with regards to Infection Prevention and MDRD services is available on the OUR NH website.

In keeping with Northern Health's vision, messages are communicated using various strategies with the goal of promoting a culture in which infection prevention is integrated into all aspects of care, namely:

- Promotion of hand hygiene and environmental cleaning at the Senior centres.
- Assessment of audience learning needs, experiences and knowledge base
- We do a variety of learning approaches, PowerPoints, scenarios, hands on demonstration, online learning, mini-teaching/information sessions, quizzes and contests.
- Evaluation and surveys of learning sessions
- Development of algorithms to provide access at point of care for front line staff
- Development and accessibility through e-learning of Infection Prevention workbook - Basic
- Outbreak management in non-Northern Health facilities
- Involvement in the provincial Hand Hygiene campaign

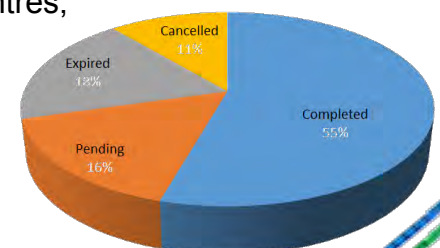
Education and/or consultation provided by NH IPC team this year included but not limited to:

- Health care workers, health care students
- New employee orientation
- Hand hygiene and auditor training
- Reprocessing of medical devices
- Construction and renovation
- Routine practices for acute, community and residential care
- Surgical site infection surveillance
- World hand hygiene day/ Infection Prevention Control Week/ Canadian patient safety week
- Blood and body fluid exposure counselling
- Influenza and employee immunization clinics
- *Clostridium difficile*, Antibiotic resistant organisms
- Outbreak Management
- Community outreach i.e. Sparks (Girl Guides), Senior Centres, summer camp, local high school, Kidney Foundation PG chapter, Junior volunteers, needle exchange



IPC Workbook Results

■ Completed ■ Pending ■ Expired ■ Cancelled



Medical Device Reprocessing Department

Education:

Sterile technicians were introduced to four Ministry of Health educational videos accessed through CanHealth, namely Infection Prevention, Decontamination, Disinfection, and Sterilization.

A Learning Pathway for Medical Device Reprocessing (MDR) is in the later part of the development stage. The pathway includes the four levels of proficiencies; fundamental, developmental, independent and proficient. Quizzes are included at the end of each module. The Learning Pathway will become part of the orientation process for sterile technicians.

Monthly meetings provide learning opportunity for attendees. Self-study material is added to the meeting agenda and encouraged.

A webinar presentation on Biofilm was attended by 70% of the Northern health sterile technicians.

In-services, webinars and power point presentations continue to be available as education opportunities either in person, via the web, or accessed from the MDR webpage.



In-services were provided as needed with the purchase of new equipment or consumables.

There are educational opportunities accessed on-line that provide credit hours for education.

These include:

- Webinars
- On-line courses
- Training videos
- Power Points
- In-services

The medical device reprocessing technician course through the College of New Caledonia in Prince George did not have enrolment in 2016, although the on-line theory course was offered through Vancouver community college.

Six sterile technicians re-certified with Canadian Standards Association (CSA). All full time Medical Device Reprocessing Technician (MDRT) are Canadian Association of Medical Device Reprocessing (CAMDR) members.

Surveillance

The IPAC program carries out surveillance on a number of quality and patient safety indicators. This section of the report presents information on a number of these indicators. Surveillance case definitions can be found in [Appendix 1](#).

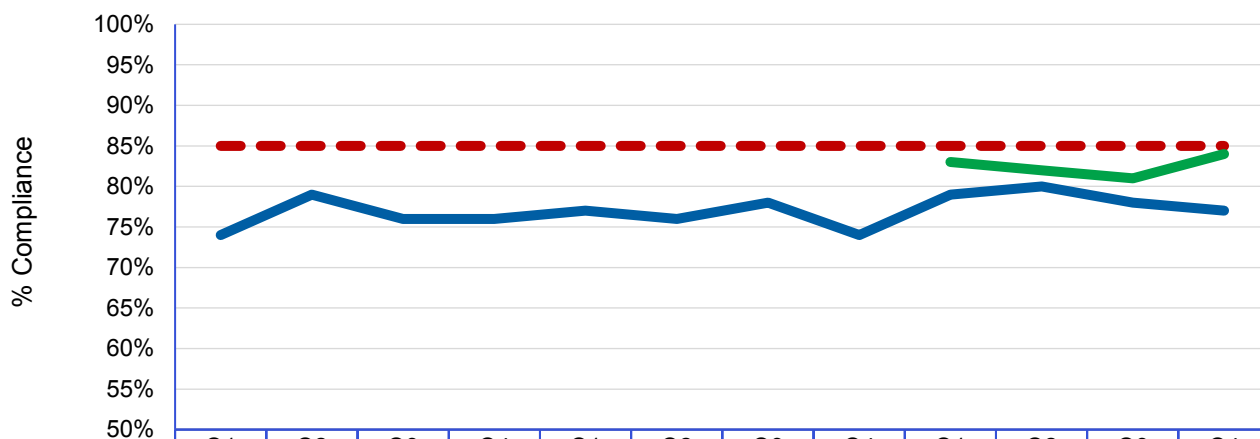
Hand Hygiene

Indicator	2016 – 2017 Rate	Trend*	Target
Hand Hygiene Compliance	Acute Care Facilities (ACF): 78% Residential Care Facilities (RCF): 83% Nursing Staff: 81% Physicians: 66% Clinical Support Services: 81% Other: 74%	➡	85%

Hand hygiene (HH) with either soap and water or alcohol based hand rub is recognized as a key component in the prevention of Healthcare-associated Infections (HAIs). HH is required both before and after contact with patients and their environment. The minimum provincial requirement is 200 observations per quarter for each facility with 25 or more beds. For facilities with fewer than 25 beds, the audit data is aggregated into NH data.

Ongoing challenges within NH are recruitment of HH auditors, and maintaining sustainability with auditing at both acute and residential care facilities.

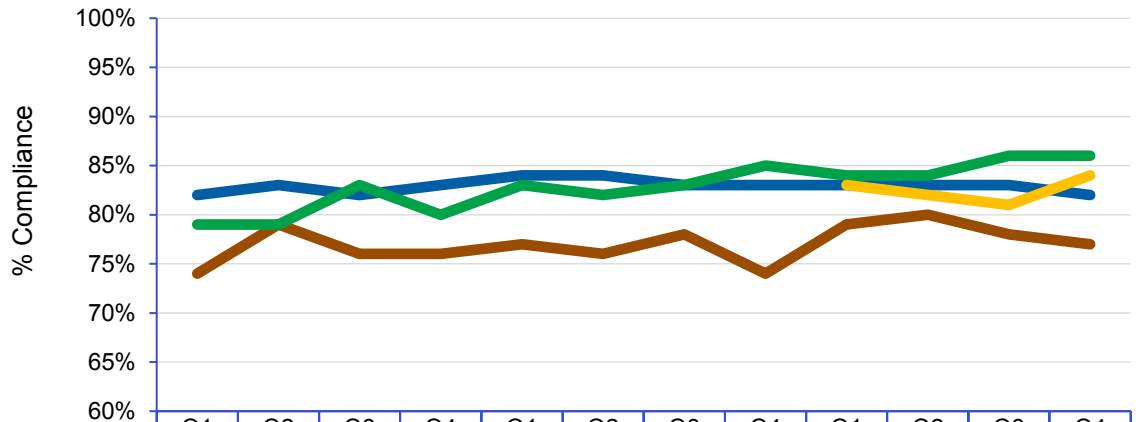
Hand Hygiene Compliance - Northern Health



	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	2014/2015 (Fiscal Year)				2015/2016 (Fiscal Year)				2016/2017 (Fiscal Year)			
Target Performance	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Percent Compliance ACF	74%	79%	76%	76%	77%	76%	78%	74%	79%	80%	78%	77%
Percent Compliance RCF									83%	82%	81%	84%
Total Opportunities ACF	2847	3393	3428	4149	2845	3171	2911	5827	3360	3581	3632	5187
Total Opportunities RCF									1191	1645	1438	1838

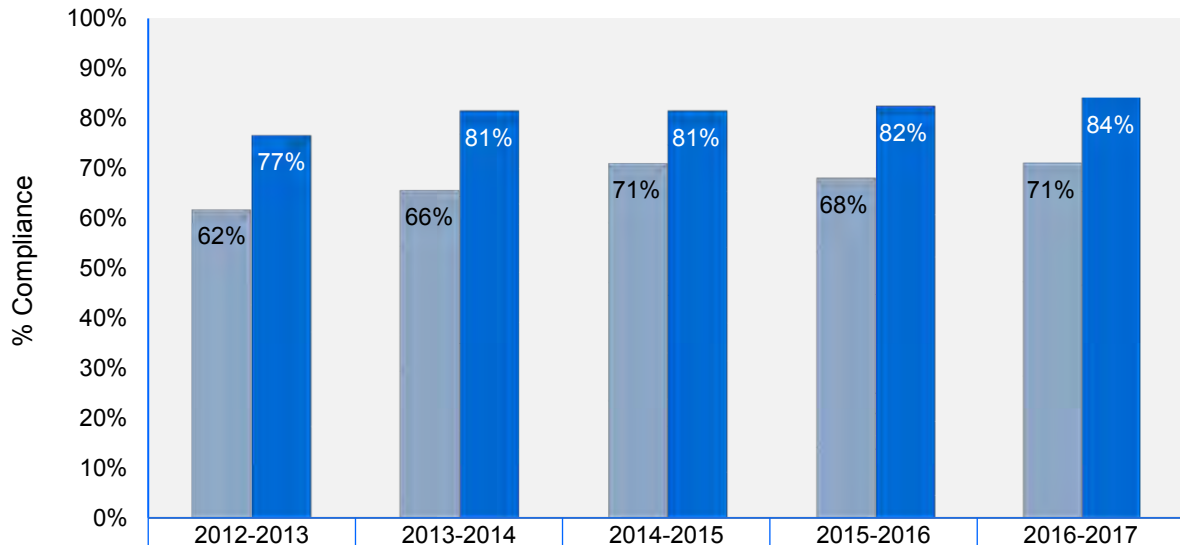
* ↑ = improving; at least 4 consecutive data points moving towards target
↓ = deteriorating; at least 4 consecutive data points moving away from target
➡ = steady; fewer than 4 consecutive data points moving in either direction PICNet BC
 Hand Cleaning Compliance 2016 – 2017

Hand Hygiene Compliance - NHA & Province of BC



	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	2014/2015				2015/2016				2016/2017			
NH Percent Compliance ACF	74%	79%	76%	76%	77%	76%	78%	74%	79%	80%	78%	77%
Province of BC Percent Compliance ACF	82%	83%	82%	83%	84%	84%	83%	83%	83%	83%	83%	82%
Province of BC Percent Compliant RCF	79%	79%	83%	80%	83%	82%	83%	85%	84%	84%	86%	86%
NH Percent Compliant RCF									83%	82%	81%	84%
NH Opportunities ACF	2847	3393	3428	4149	2845	3171	2911	5827	3360	3581	3632	5187
Province of BC Opportunities ACF	49567	52225	59151	78864	56411	53452	48393	61967	47640	47013	48961	63917
Province of BC Opportunities RCF	8778	10057	8191	12231	9775	10455	9631	12832	11688	12610	11944	13996
NH Opportunities RCF									1191	1645	1438	1902

Hand Hygiene Compliance in Northern Health Before and After Patient Contact Averages (2012-2017)



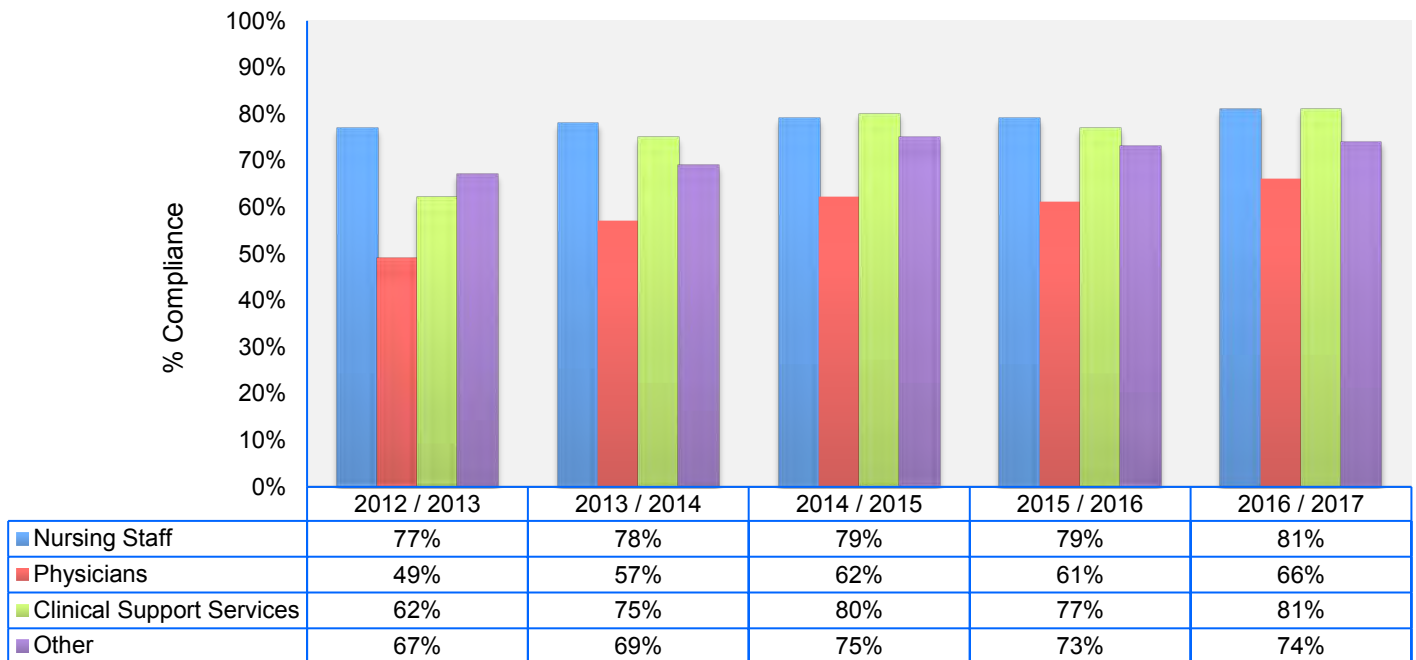
	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
Before Patient Contact	62%	66%	71%	68%	71%
After Patient Contact	77%	81%	81%	82%	84%

Overall in 2016-17 all healthcare provider groups improved their HH compliance rates.

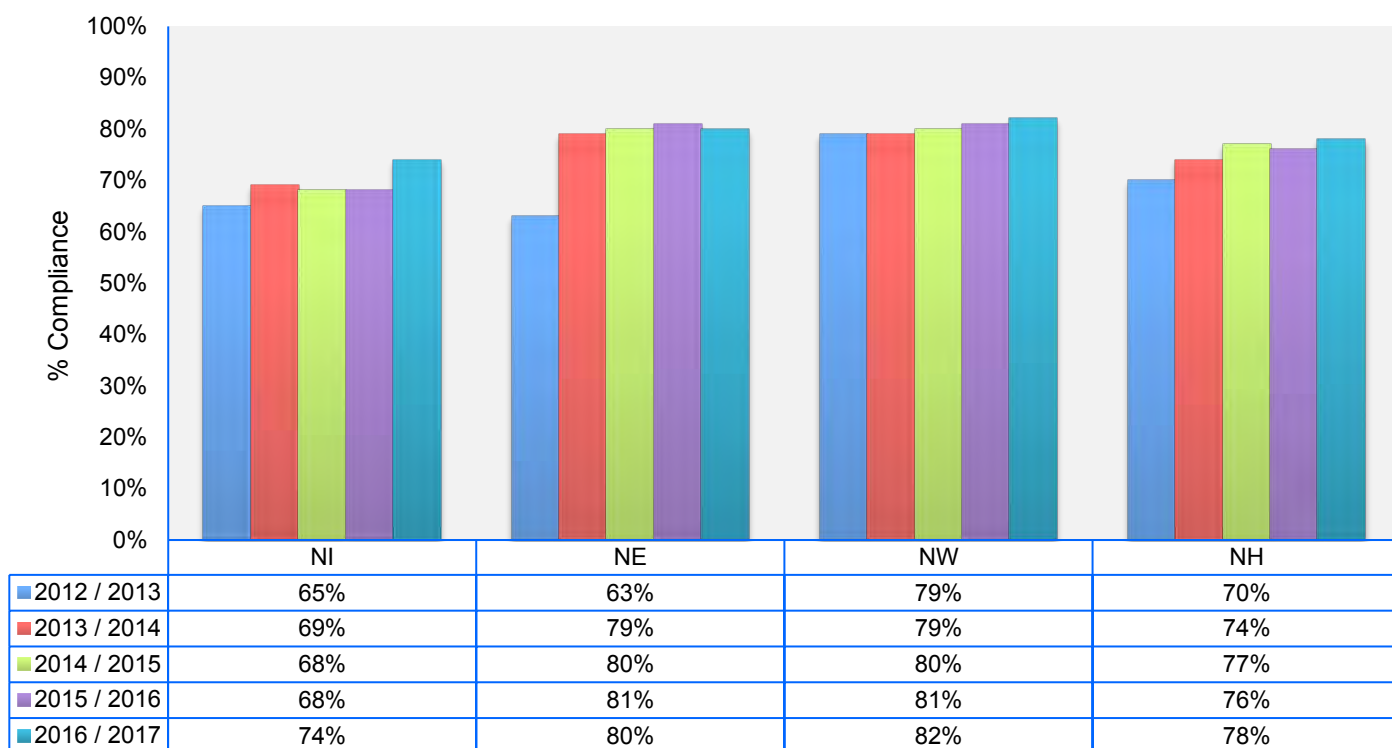
Actions taken in 2016-17 include:

- Increased communication and involvement with senior management
- Increased participation of NH facilities in the HH auditing process resulting in an increased number of HH audits
- Increased hand hygiene auditor training
- Involvement in the provincial Hand Hygiene campaign
- Process initiated for Electronic Hand hygiene monitoring system in Prince Rupert
- Participation in “Stop clean your hands day” and Canadian patient safety week
- Ongoing education for healthcare workers on how and when to perform HH, feedback provided on hand hygiene opportunities completed or missed.
- Encouragement of health care worker to assist patients to clean their hands, and provision of resources
- Participated in provincial hand hygiene communications campaign

Hand Hygiene Compliance in NorthernHealth per Healthcare Provider (2012-2017)



Hand Hygiene Compliance in Northern Health Averages 2012 - 2017



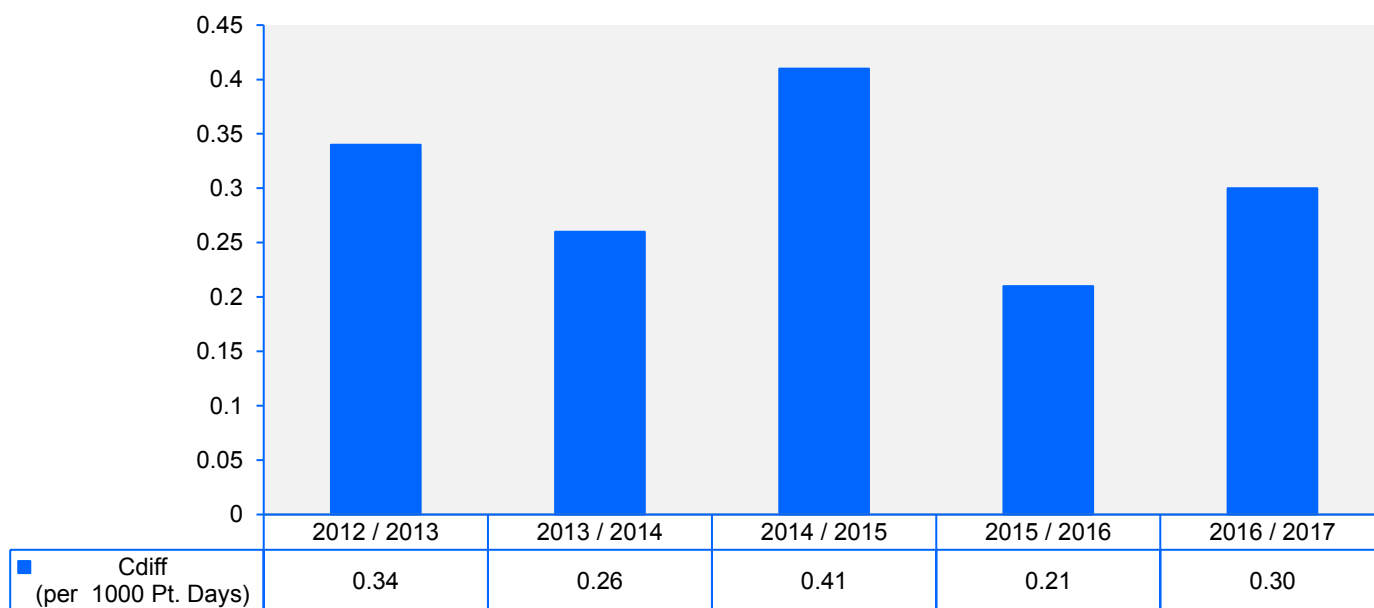
Clostridium difficile Infections (CDI)

Indicator	2016 – 2017 Rate	Trend*	Target
Healthcare-associated (nosocomial) CDI rates	0.30 per 1000 pt. days		< 0.30 per 1000 pt. days

Clostridium difficile is a spore forming bacterium that can cause infections of the gastrointestinal system. *Clostridium difficile* infection (CDI) is one of the most common infections acquired in health care settings as the physical environment plays a significant role in transmission of CDI more so than any other Healthcare-associated Infection (HAI).

* = improving; at least 4 consecutive data points moving towards target
 = deteriorating; at least 4 consecutive data points moving away from target
 = steady; fewer than 4 consecutive data points moving in either direction
 PICNet BC Hand Cleaning Compliance 2016 – 2017

Healthcare-associated *Clostridium difficile* Infection Rates (per 1000 Pt. Days)



The annual rate of Healthcare-associated *Clostridium difficile* infection (HA-CDI) is the number of new cases of CDI in NH facilities, divided by the total number of in-patient days, multiplied by 1000.

The projected 2017-18 target is a HA-CDI rate of < 0.30 cases per 1000 pt. days.

In comparison to the Antimicrobial Resistance Surveillance, Public Health Agency of Canada 2015 rate of 0.42 HA-CDI cases per 1000 pt. days, NH rates were lower at 0.30 per 1000 pt. days in 2016 - 2017.

Actions taken in 2016-17 include:

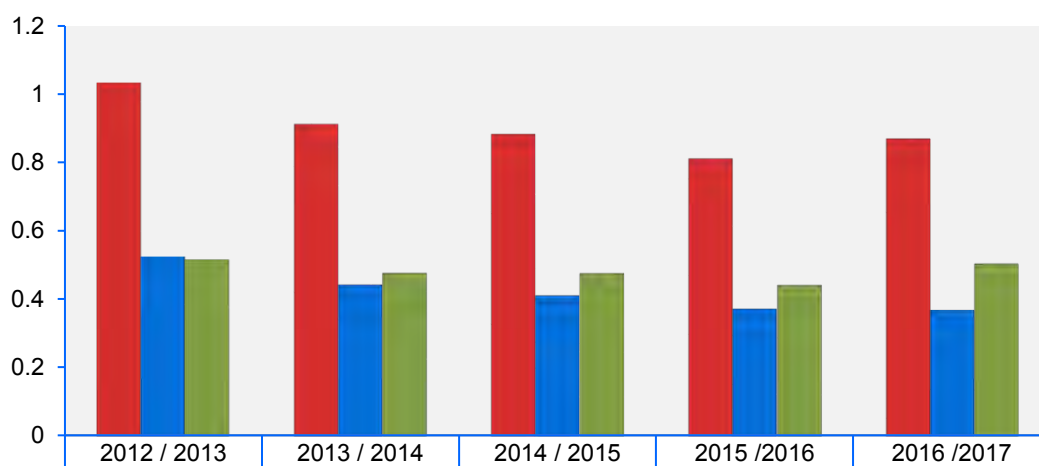
- Protocol for cleaning with sporicidal for all suspected and confirmed cases
- Development of C. Diff Associated Diarrhea (CDAD) Cleaning algorithm for Ambulatory Care areas
- Development of C. Diff Associated Diarrhea (CDAD) Cleaning algorithm for Contaminated equipment
- Facilitated increased communication between front line nursing staff and environmental services
- Increased education sessions for Health Care Workers (HCWs) regarding importance of proper protocol, signage and precautions
- Discussed with patients, families and visitors *Clostridium difficile* transmission

Methicillin-resistant *Staphylococcus aureus* (MRSA)

Indicator	2016 – 2017 Rate	Trend*	Target	Actual
Healthcare-associated (nosocomial) MRSA Infection & Colonization Rates	0.87 per 1000 pt. days	➡	< 0.70 per 1000 pt. days	Infections 0.37/1000 pt. days Colonizations 0.50/1000 pt. days

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a strain of *Staphylococcus aureus* resistant to a number of antibiotics such as methicillin, penicillin, and amoxicillin. MRSA is primarily spread by skin to skin contact or contact with items and surfaces contaminated by the bacteria. The principle mode of transmission in healthcare facilities is considered to be from one (colonized or infected) patient to another via the contaminated hands of healthcare providers. Patients at greatest risk of acquiring MRSA are the elderly, have chronic diseases and/or undergo invasive procedures.

MRSA Infection and Colonization Rates



■ Total MRSA (per 1000 Pt. Days)	1.03	0.91	0.88	0.81	0.87
■ Infections (per 1000 Pt. days)	0.52	0.44	0.41	0.37	0.37
■ Colonizations (per 1000 Pt. days)	0.51	0.47	0.47	0.44	0.50

The incidence rate of MRSA is the number of newly identified cases of MRSA (colonized and infected) acquired by patients as a result of their stay in a Northern Health acute care facility, divided by the total number of in-patient days, and multiplied by 1000.

Northern Health MRSA rates have remained steady from 0.81 in 2015-16 to 0.87 in 2016-17.

Limitations included:

- Difficulty with accommodating patients with an ARO (s) or risk factors for AROs in appropriate single rooms due to overcapacity and due to many shared wards with older hospitals design structure
- Rates of hand hygiene compliance remained steady at 78% but remain below 85% target

* ↑ = improving; at least 4 consecutive data points moving towards target
↓ = deteriorating; at least 4 consecutive data points moving away from target
➡ = steady; fewer than 4 consecutive data points moving in either direction
 PICNet BC Hand Cleaning Compliance 2016 – 2017

In comparison to the Antimicrobial Resistance Surveillance, Public Health Agency of Canada 2015 infection rate of 0.29 MRSA cases per 1000 pt. days, NH MRSA infection rates were higher at 0.37 per 1000 pt. days in 2016 -2017.

Ongoing Actions:

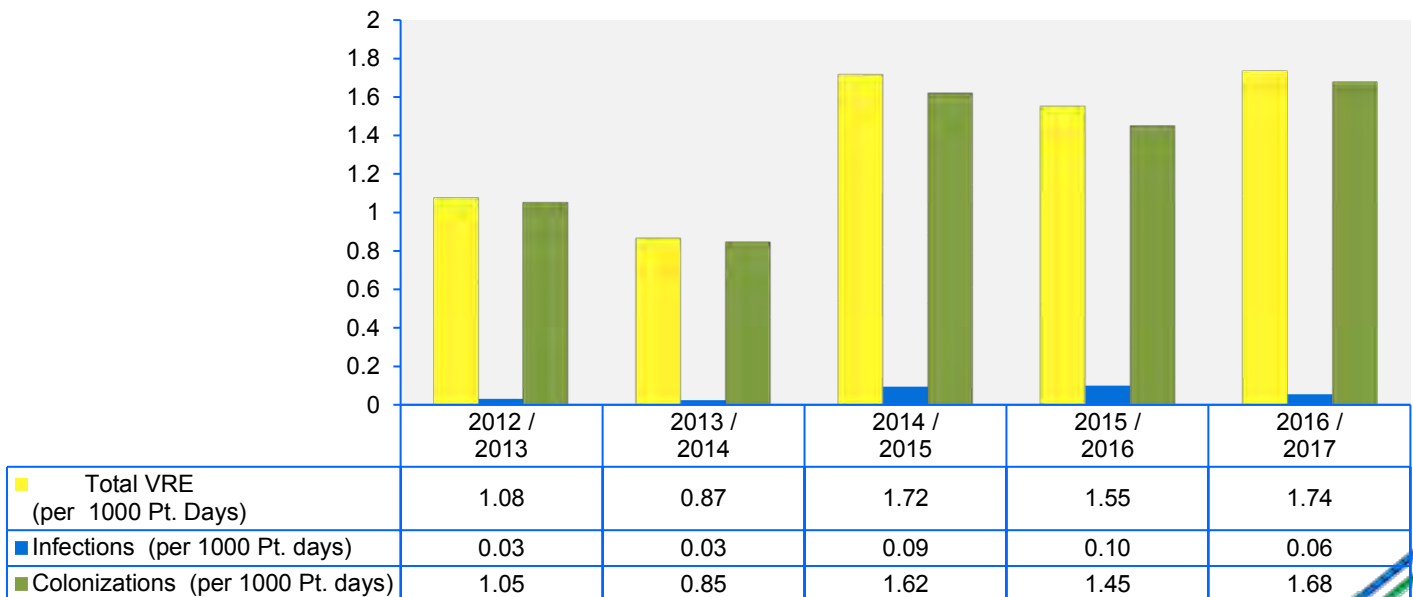
- All NH patients who test positive for an ARO have their health record flagged with that ARO alert
- Continued 30 day prevalence screening of all previously tested negative in-patients
- Infection prevention education for HCWs regarding importance of HH, environmental cleaning and appropriate cleaning of shared equipment; aseptic technic of wounds etc.
- Infection prevention education for patients, families and visitors
- Discussion with senior management around Healthcare-associated Infections (HAIs) of MRSA and VRE at operational team meetings




Vancomycin Resistant *Enterococci* (VRE)

Indicator	2016 – 2017 Rate	Trend *	Target	Actual
Healthcare-associated (nosocomial) VRE Infection & Colonization Rates	1.74 per 1000 pt. days		< 1.00 per 1000 pt. days	Infections 0.06 /1000 pt. days Colonizations 1.68 /1000 pt. days

Vancomycin-Resistant *Enterococcus* is a strain of enterococci that has developed resistance to the antibiotic Vancomycin, making infections more difficult to treat. Most patients are colonized with VRE rather than infected. VRE, like MRSA, is most often spread via contact with contaminated hands or surfaces and equipment.

VRE Nosomical Cases and Colonization Rates



*  = improving; at least 4 consecutive data points moving towards target
 = deteriorating; at least 4 consecutive data points moving away from target
 = steady; fewer than 4 consecutive data points moving in either direction
 PICNet BC Hand Cleaning Compliance 2016 – 2017

The incidence rate of Vancomycin-Resistant *Enterococci* (VRE) is the number of newly identified cases of VRE (colonized and infected) acquired by patients as a result of their stay in a Northern Health acute care facility, divided by the total number of in-patient days, and multiplied by 1000.

Northern Health VRE infection rates saw a decrease to 0.06

Northern Health VRE colonization rates saw an increase to 1.68 in 2016-2017.

The projected 2017-18 target is a decrease to < 1.00 per 1000 pt. days.

Limitations included:

- Difficulty with accommodating patients with an ARO (s) or risk factors for AROs in appropriate single rooms due to overcapacity and due to many shared wards with older hospitals design structure
- Rates of hand hygiene compliance remained steady at 78% but remain below 85% target

In comparison to the Antimicrobial Resistance Surveillance, Public Health Agency of Canada 2015 infection rate of 0.04 VRE cases per 1000 pt. days, NH VRE infection rates were slightly higher at 0.06 per 1000 pt. days in 2016 -17.

Ongoing Actions:

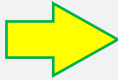
- All NH patients who test positive for an ARO have their health record flagged with that ARO alert
- Continued 30 day prevalence screening of all previously tested negative in-patients
- Infection prevention education for HCWs regarding importance of Hand Hygiene (HH), environmental cleaning and appropriate cleaning of shared equipment; aseptic technique of wounds etc.
- Infection prevention education for patients, families and visitors
- Discussion with senior management around Healthcare-associated Infections (HAIs) of MRSA and VRE at operational team meetings

Management of Carbapenemase Producing Organisms (CPO)

Carbapenemase Producing Organisms are gram negative bacteria that harbor Carbapenemase producing genes. These genes allow the organism to be resistant to the carbapenem family of antibiotics. Similar to VRE and MRSA, the most common mechanism of transmission is contact, both direct and indirect.

In 2016 - 2017, no cases of CPO were identified in NH.

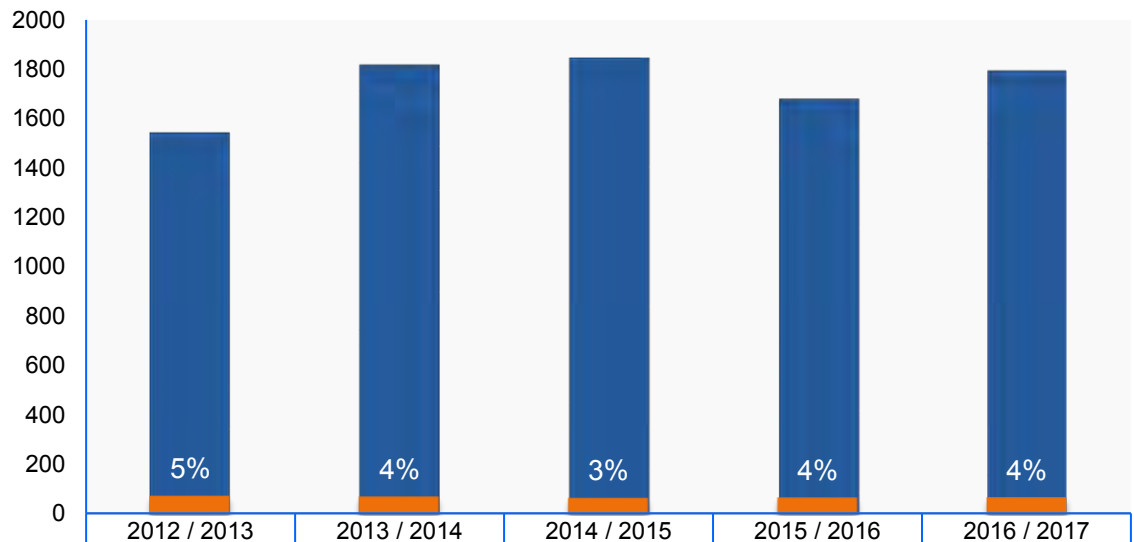
Surgical Site Infections (SSI)

Indicator	2016 – 2017 Rate	Trend *	Target
Surgical Site Infection Rates	4 per 100 procedures		< 3 per 100 procedures




Surgical Site Infections (SSI) are the most common Healthcare-associated Infections (HAIs) as found in a prevalence study done by the CDC. SSI's remain a substantial cause of morbidity, prolonged hospitalization, and death.

Surgical procedures surveyed for infection include: Caesarean section, total abdominal hysterectomy, total primary hip replacement, total primary knee replacement, and bowel resection (not including the rectum). Surveillance of antibiotic prophylaxis given within one hour of surgical cut time is also monitored.

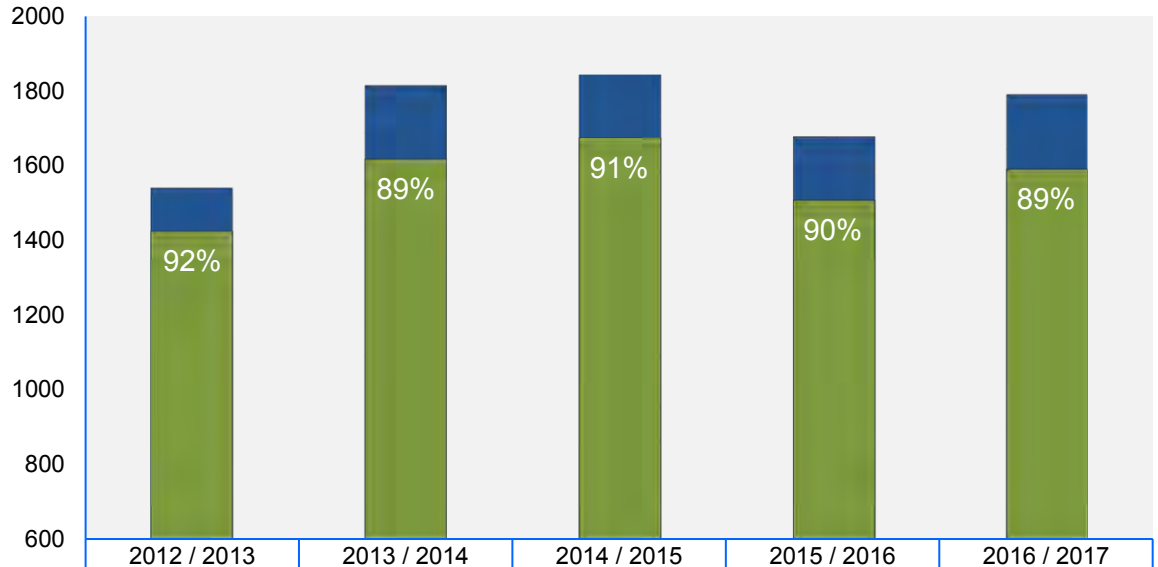
NH Overall Total Surgical Site Infection 2012 - 2017



■ NH Total # of Procedures	1541	1815	1843	1678	1791
■ NH Total # Surgery Infections	70	67	62	63	64

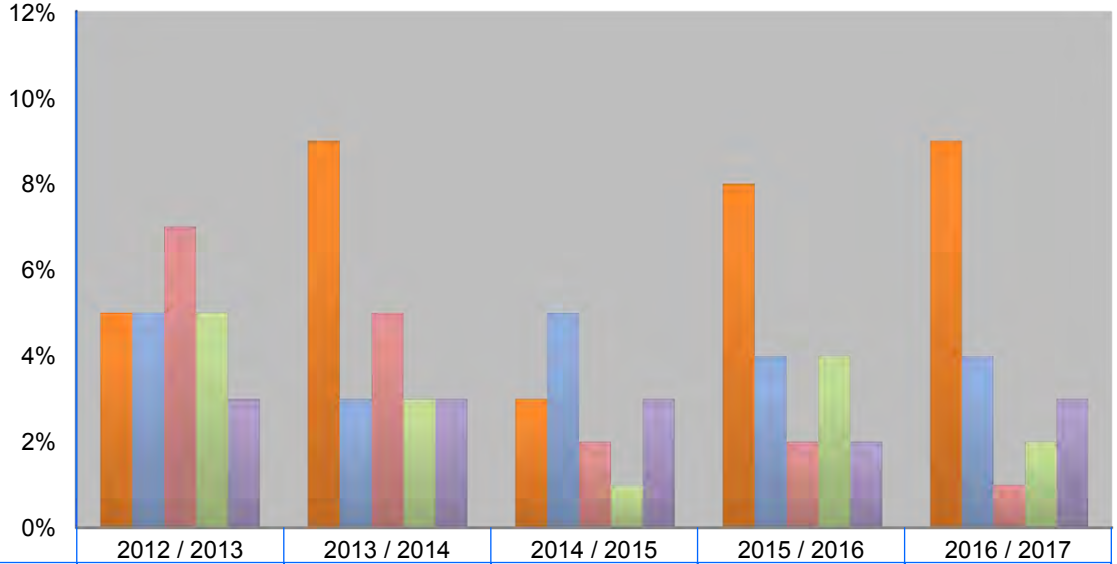
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 PICNet BC Hand Cleaning Compliance 2016 – 2017

NH Overall Total Prophylactic Antibiotic 2012 - 2017



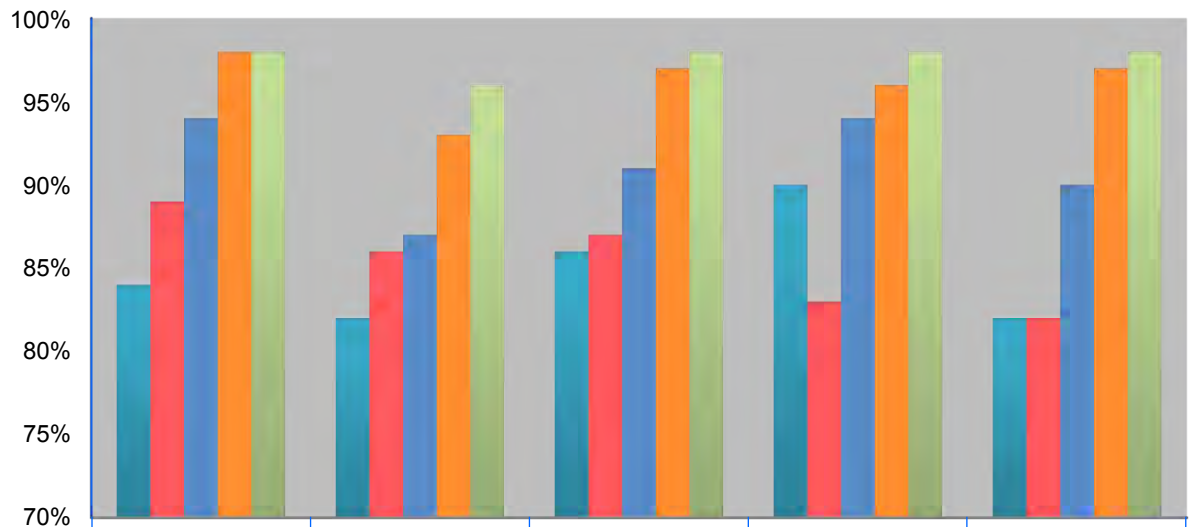
	2012 / 2013	2013 / 2014	2014 / 2015	2015 / 2016	2016 / 2017
NH Total # of Procedures	1541	1815	1843	1678	1791
NH Total Prophylactic Antibiotic	1424	1617	1672	1506	1589

Surgical Site Infection Rate (%)



	2012 / 2013	2013 / 2014	2014 / 2015	2015 / 2016	2016 / 2017
Bowel Resections Total %	5%	9%	3%	8%	9%
C-sections Total %	5%	3%	5%	4%	4%
Abdominal Hysterectomies Total %	7%	5%	2%	2%	1%
Total Hip Replacements Total %	5%	3%	1%	4%	2%
Total Knee Replacements Total %	3%	3%	3%	2%	3%

Antibiotics Given within 1 Hour of Cut Time (%)



	2012 / 2013	2013 / 2014	2014 / 2015	2015 / 2016	2016 / 2017
■ Bowel Resections	84%	82%	86%	90%	82%
■ C-sections	89%	86%	87%	83%	82%
■ Abdominal Hysterectomies	94%	87%	91%	94%	90%
■ Total Hip Replacements	98%	93%	97%	96%	97%
■ Total Knee Replacements	98%	96%	98%	98%	98%

Northern Health Surgical Site Infections (SSI) rates remain the same at 4 per 100 procedures in 2016-17. The projected 2017-18 target is a continual decrease to <3 per 100 procedures.

Rates of antibiotic prophylaxis administered within one hour of procedure cut time have remained stable for C-sections, Total Hip and Knee replacements. A decreased has been noted for Bowel resections and Abdominal Hysterectomies. Difficulty in finding prophylactic antibiotic administration information on the patient chart continues to be an ongoing challenge.

Surgical Site Infections (SSI)

Benchmark and Rate Comparison with previous years:

Procedure	Benchmark*	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017
Abdominal Hysterectomy	1.10-4.05 per 100 procedures	7 per 100 procedures	5 per 100 procedures	2 per 100 procedures	2 per 100 procedures	1 per 100 procedures
Caesarean Section	1.46-3.82 per 100 procedures	5 per 100 procedures	3 per 100 procedures	5 per 100 procedures	4 per 100 procedures	4 per 100 procedures
Bowel Resection	**3.99-9.47 per 100 procedures	5 per 100 procedures (denominator or data <100)	9 per 100 procedures	3 per 100 procedures	8 per 100 procedures	9 per 100 procedures
Total Primary Hip Replacement	0.67-2.40 per 100 procedures	5 per 100 procedures	3 per 100 procedures	1 per 100 procedures	4 per 100 procedures	2 per 100 procedures
Total Primary Knee Replacement	0.58-1.60 per 100 procedures	3 per 100 procedures	3 per 100 procedures	3 per 100 procedures	2 per 100 procedures	3 per 100 procedures

*Benchmark data from National Healthcare Safety Network (NHSN) report: Data Summary for 2006 through 2008, issued December 2009. Doi: 10.1016/j.ajic.2009.10.001

Actions Taken in 2016 - 2017:

- Patients are monitored for up to 1 year for total hip replacement (THR) and total knee replacement (TKR)
- UHNBC participates in the 10K initiative, a provincial campaign initiated by National Surgical Quality Improvement Program (NSQIP).
- Facilitate communication with surgeons regarding infections
- Clusters are investigated and discussion for quality improvements occur
- Education provided for staff regarding the rationale behind appropriate antibiotic use pre-operatively and the importance of documentation
- Education for patients and families prior to and after surgery

Outbreak Management

Responsible Organism	# of Staff Affected	# of Patients Affected	Dates / Length of Outbreak	Facility Type
GI - Norovirus	4	21	May 5 – 24, 2016	Gateway Assisted Living – Prince George
GI - unknown	8	27	June 20 – July 5, 2016	Dunrovin Park Place - Quesnel
GI, Norovirus	23	16	December 28, 2016 – January 5, 2017	University Hospital of Northern BC – Prince George
GI, Norovirus	8	8	January 13 – 21, 2017	McBride Dist. Hospital - McBride
GI, Unknown	8	10	January 10-23, 2017	Dunrovin Park Lodge - Quesnel
GI - Unknown	1	6	March 14 – 24, 2017	McConnell Estates - Terrace
Influenza A	14	25	January 9 – 20, 2017	Dunrovin Park Lodge - Quesnel
Influenza A	4	12	February 20 – March 2, 2017	Rotary Manor – Dawson Creek
Respiratory Syncytial Virus	18	26	February 21- Mar 22, 2017	Dunrovin Park Lodge - Quesnel
Influenza A	6	12	February 21 – Mar 3, 2017	Acropolis Manor – Prince Rupert
ILI - Unknown	4	4	February 24 – March 1 2017	Peace Villa – Fort St. John

Northern Health uses a multidisciplinary approach to manage outbreaks, and includes medical staff, nursing, administration and representatives from Infection Prevention and Public Health, such as Medical Health Officers, Environmental Health Officers and other critical supports from Workplace Health & Safety (WH&S), support services and external resources such as BC Ambulance.

The Medical Health Officer retains primary responsibility for the investigation and management of communicable disease outbreaks within Northern Health. Members of the Outbreak Prevention and Management Team (OPMT) provide service to the affected patients and/or units and work collaboratively to ensure a timely and coordinated response to an outbreak by:

- Ensuring a coordinated response to outbreaks thereby limiting morbidity, mortality and associated costs
- Ensuring a coordinated provision of services and resources for public health or other facilities involved in outbreak management
- Ensuring a timely communication to the appropriate stakeholders regarding an outbreak
- Providing expertise and consultation to assist in the management of complex issues
- Facilitating documentation of outbreaks and ensure timely distribution of same to stakeholders
- Providing data that allows evidence-based recommendations for policy and practice that may help prevent future outbreaks
- Providing opportunities for training experience for various personnel (e.g., public health and preventive medicine or infectious disease residents, new staff in Infectious Disease, Public Health, or laboratory trainees)
- Facilitating the provision of resources (human and financial) to assist with outbreak investigation, management and control

The primary components of outbreak management include:

- Preparation to ensure efficient detection and management of outbreaks, through staff training and development of appropriate tools and processes
- Confirmation of an outbreak based on case and outbreak definition criteria
- Notification of stakeholders
- Implementation of control measures
- Ongoing communication with all stakeholders
- Staff education and support as required throughout the outbreak episode
- Overseeing timely/accurate specimen collection
- Ongoing surveillance/monitoring of outbreak cases (new versus recovery)
- Evaluating effectiveness of interventions – Infection Prevention input provided during team meetings
- Organizing post outbreak team meeting – Debriefing and identifying areas for quality improvement

Medical Device Reprocessing Department (MDRD)

The Medical Device Reprocessing departments are continuously working towards quality improvement. Two sites have changed their work flow to adhere more closely with standards. One site gave up its reprocessing practices due to lack of qualified staff, and another small site underwent renovations to have a distinctly separate decontamination area. Stakeholder involvement for equipment purchases improved with the help of BC Clinical and Support Services (BCCSS) buyers. Single use wraps and drape packs for the Operating room are now standard for Northern Health and all but one site has transitioned completely. Audit results were all above 90 percent for the acute sites.

A challenge for northern sites is recruitment of qualified staff. Another challenge included labels and manufacturer's instructions for use not being followed for detergents and disinfectants. Action taken has been the standardization of cleaners, detergents and disinfectants used in the medical device reprocessing departments and medical imaging departments. Policies had been updated to include dosage, concentration and in some cases brand name of the standardized product. This work will continue for other consumables used within the departments.

Facilities Audited	2013 Percentage	2014 Percentage	2015 Percentage	2016 Percentage
Bulkley Valley District Hospital - Smithers	97.14	93.3	97.33	99.64
Dawson Creek and District Hospital	92.68	95.5	95.90	94.88
Fraser Lake D&T Centre			95.80	
Fort Nelson General Hospital			98.01	
Fort St John Hospital	97.73	95.2	96.43	98.84
GR Baker Memorial Hospital - Quesnel	96.36	91.06	98.51	98.15
Kitimat General Hospital	97.33	96.3	99.63	96.95
Lakes District Hospital - Burns Lake			95.04	
Mackenzie and District Hospital			92.24	
Mills Memorial Hospital - Terrace	93.75	88.46	95.08	97
Prince Rupert Regional Hospital	87.04	93.2	97.19	90.91
Queen Charlotte Islands Hospital			92.41	92.41
St John Hospital - Vanderhoof	97.51	95.3	96.93	96.15
Stewart Health Centre			100	
Stikine D&T Centre - Dease Lake			100	
University Hospital of Northern BC - Prince George	92.68	97.2	98.61	96.55
Wrinch Memorial Hospital - Hazelton	96.04	96.88	99.15	99.16
Total Average Score	**94.82	**93.45	*97.48	**96.82
* For all sites				
**For sites with Operating room				

Environmental Requirements for Reprocessing Area and Storage and Use of Reprocessed Medical Devices received the lower scores in the audit. Recommendations have been well received by the sites and work is being done in both of these areas.

2016 Overall Average Compliance Scores

Practice Review Category	Average for Acute Care sites
1.0 Purchase of Medical Devices and Equipment	96.66%
2.0 Environmental Requirements	85.56%
3.0 Policies and Procedures	100%
4.0 Education & Training	91.53%
5.0 Occupational Health & Safety	98.89%
6.0 Cleaning – Reusable Devices	96.83%
7.0 Liquid Chemicals for Disinfections	90%
8.0 Disinfection – Reusable Medical Devices	95.88%
8.1 Pasteurization	N/A
9.0 Reprocessing Endoscopy	98.64%
9.1 Disinfectant	100%
9.2 Endoscope Process	100%
9.3 Drying & Storage	94.28%
9.4 Documentation of AER and HLD	99%
10.0 Sterilization – Reusable Medical Devices	95.5%
10.1 Steam Monitoring	100%
10.2 Flash Sterilization	95.24%
10.3 Flash Documentation	99.11%
10.4 Table Top Sterilizer	N/A
10.5 SS1 – Monitoring & Documentation	100.00%
10.6 D – Sterrad	100.00%
10.7 Sterrad – Monitoring & Documentation	100.00%
10.8 E – Ethylene Oxide (ETO)	N/A
10.9 ETO Monitoring & Documentation	N/A
11.0 Storage & Use of Reprocessed Medical Devices	91.56%
12.0 Quality Assurance	100%
13.0 Single Use Medical Devices	90%
14.0 Residential HCC, PH Settings	85.71%
15.0 Dental Clinics	100%
Average Across all categories	96.82%

Residential Care Facilities Audited

Residential care facilities were audited in 2016. There are no reprocessing departments within the facilities. Facilities that require instruments or basins to be reprocessed will transport them to the hospital Medical Device Reprocessing Department (MDRD) to be reprocessed. Most sites use little to no instruments or have moved to single use instruments. Single use continues to be encouraged at more remote sites. Dirty hold areas are separate from clean areas, and all but 2 sites followed this strictly.

Residential Care Facilities Audited	2016 Percentage
Acropolis Manor – Prince Rupert	100%
Bulkley Lodge - Smithers	100%
Chetwynd Hospital & Health Centre	90.91%
Dunrovin Park Lodge - Quesnel	100%
Gateway Lodge – Prince George	100%
Wrinch Memorial LTC - Hazelton	100%
Jubilee Lodge – Prince George	100%
Mountain View Lodge - Kitimat	100%
Peace Villa – Fort St John	100%
Parkside Care – Prince George	100%
Rotary Manor – Dawson Creek	100%
Stuart Nechako Lodge - Vanderhoof	100%
Terrace View Lodge	100%
The Pines – Burns Lake	92.31%

Capital Equipment:

No capital equipment to report.

Accreditation

The Accreditation Canada Decision Committee accepted the additional evidence submitted as a follow-up to our 2014 accreditation decision for Sterile Processing Departments and Infection Prevention Department in Northern Health (NH) in 2016.

All the follow-up requirements were met reflecting compliance with the evaluated criteria and demonstrating Northern Health's ongoing commitment to quality. Accreditation is an external peer review process that Northern Health uses to assess and improve the services provided to patients and clients based on standards of excellence.

Antimicrobial Stewardship

Northern Health's Antimicrobial Stewardship (AMS) Program development began in November 2014. The goal of the program is to improve patient care related to antimicrobial use in all NH facilities through collaboration with healthcare providers in order to: successfully treat infections, reduce inappropriate antimicrobial use, minimize toxicities and adverse events and limit selection of antimicrobial resistant strains.

Best Practices

There is ongoing work to develop and revise clinical tools, protocols and order sets. Items completed and actively being developed/ revised include:

- Oseltamivir for Influenza Outbreak order set (completed)
- Automatic Stop Order policy revision (completed)
- Regional Febrile Neutropenia protocol (completed)
- Antimicrobial Dosing Guidelines for Adults pocket-card 2016/17 update (completed April 2017)
- Empiric Treatment of Common Infections in Adults pocket-card 2016/17 update (completed April 2017)
- Revision/regionalization of Sexual Assault Order set (AMS contribution for antimicrobial section completed March 2017)
- Creation/Regionalization of Chronic Obstructive Pulmonary Disorder (COPD) order sets (projected completion Sept 2017)
- Pharmacist Managed Pharmacokinetic Monitoring and Dosing of Vancomycin and Aminoglycosides clinical practice standard (projected completion August 2017)
- Intravenous to oral antimicrobial conversion order set (pilot project Dawson Creek – implemented March 2017)
- Revision of Outpatient IV Antimicrobial Therapy options; re-instatement of Cefazolin + Probenacid (Probenecid available for use May 1st; order set completion projected June 2017)
- Regional Sepsis protocol revisions/updates (projected completion July 2017)
- Pharmacy Resident Research project – Gap analysis of outpatient IV antimicrobial therapy (OPAT) across NH (project completed May 2017)
- Retrospective Evaluation of Clostridium Difficile Infection Risk Factors and Management at a UHNBC (currently in data collection phase)

Future projects in active initial or planning stages include:

- Education Module and treatment algorithm development for Urinary Tract Infections (including catheter associated and asymptomatic bacteriuria)
- Education Module development for Community Acquired Pneumonia and Aspiration Pneumonia in Adults
- Surgical antimicrobial prophylaxis guidelines
- Bacteremia management clinical practice standard

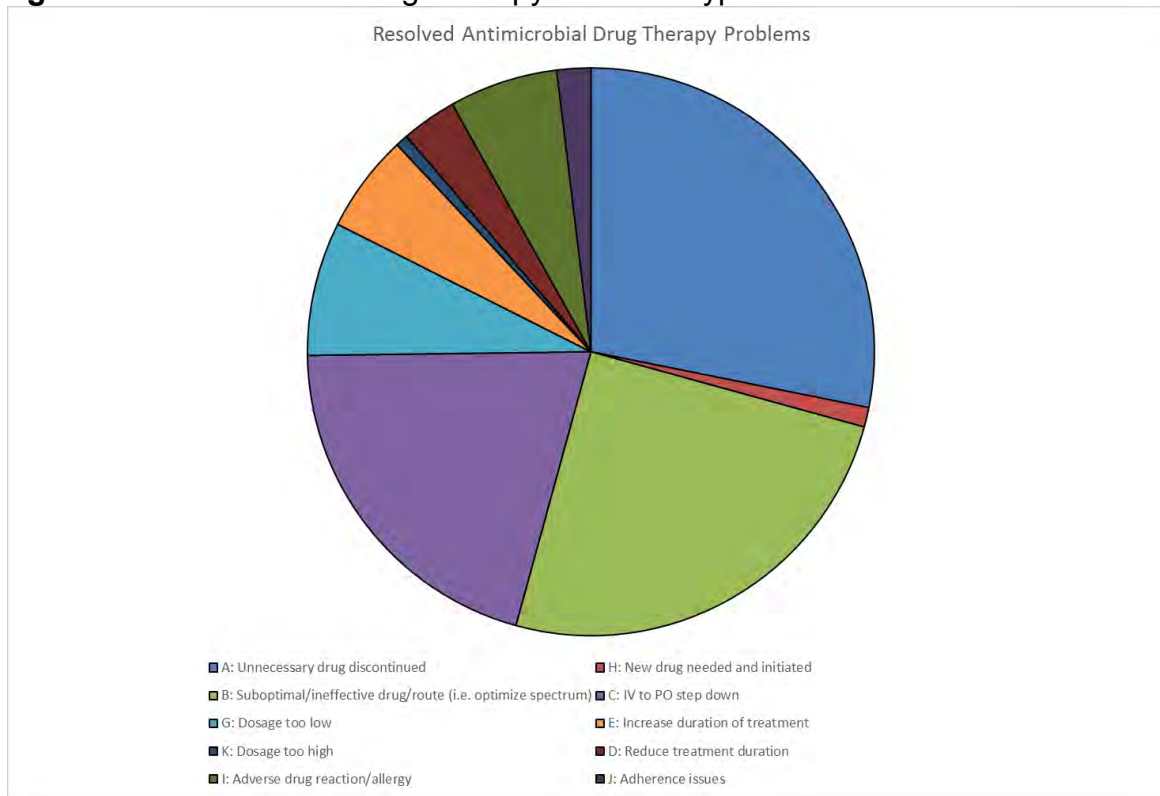
Clinical Service/Audit & Feedback

Over the course of the fiscal year variations of Prospective Audit and Feedback (A&F) of targeted antimicrobials have been occurring with mentorship from the AMS program coordinator at UHNBC, GR Baker, Mills Memorial hospital, Prince Rupert Regional Hospital, Bulkley Valley & District Hospital and Wrinch Memorial Hospital. During the fourth quarter, A&F reviews commenced at Fort St. John Hospital and the Omineca Lakes district facilities. GR Baker hospital graduated to a more independent model for identifying and resolving drug therapy problems related to antimicrobials. Patient case reviews at Fort St. John Hospital are on hold pending clinical pharmacist training; case reviews at Kitimat General Hospital are planned to commence September 5th 2017.

Over the 2016/17 fiscal year approx. 4356 patient cases were reviewed during AMS case reviews and 1662 drug therapy problems were identified and resolved with a 60% resolution rate. The term antimicrobial therapy problems resolved, refers to medication issues which a pharmacist has resolved on their own (e.g. dose optimization based on condition being treated or patient's renal function) or recommendations made to and accepted by the appropriate physician (e.g. discontinuing an unnecessary antimicrobial or changing agents based on culture results). The resolution rate (60%) has continued to increase from previous quarters; our goal is to maintain this level above 50% moving forward with a target of 80%. In the 4th quarter, issues which were unresolved because the pharmacist is unable to follow through due to workload constraints represented 56% of the unresolved drug therapy problems and 22% of all identified drug therapy problems. Unresolved issues due to patient's discharge occurring before interventions could be made equated to 25% of the unresolved drug therapy problems and only 9.5% of all identified drug therapy problems in quarter 4. We will continue to monitor the percentage of identified issues unresolved due to pharmacist workload constraints (stable at 22%) to ensure it doesn't increase as this identifies an issue with our current system and will warrant further review of resources.

There are a variety of types of antimicrobial therapy problems; Figure 1 displays various types of drug therapy problems identified. The top 3 drug therapy problems were consistent from quarter to quarter and include: A. Unnecessary Antimicrobial Discontinued, B. Suboptimal or ineffective therapy and C. Converting IV antimicrobial to an oral agent.

Figure 1 – Antimicrobial Drug Therapy Problem Types



Antimicrobial Usage

Antimicrobial utilization, measured in defined daily dose (DDD) per 100 patient-days, is calculated to track the utilization trend over time. The DDD is the assumed average adult maintenance dose per day for a drug used for its main indication. The conversion of drug utilization amount to DDD units is performed to standardize utilization of different classes of antibiotics, allowing comparisons to be made between classes. Standardization to 100 patient-days allows comparison across different health authorities and facilities. Refer to Figure 2 for an overview at the usage trends compared to last fiscal year. More detailed analysis of each HSDA and individual antimicrobials will be available in the full NH AMS Annual report.

Figure 2 – Antimicrobial Usage Summary

Targeted Antimicrobial Utilization Trends (DDD/100 patient-days) (Comparison of FY 2015/16 to FY 2016/17) (Cefotaxime, Ceftriaxone, Daptomycin, Ertapenem, Gentamicin, Imipenem-Cilastin, Meropenem, Micafungin, Piperacillin-Tazobactam, Tobramycin, Vancomycin)	
HSDA	Antimicrobial Usage
North East	↑
Northern Interior (excludes UHNBC)	↑
University Hospital of Northern BC	↑
North West	↓
Northern Health (includes UHNBC)	↑
Increase of more than 10 % compared to previous YTD	↑
Increase of less than or equal to 10 % compared to previous YTD	↑
No Change	→
Decrease compared to previous YTD	↓

Leadership

The Antimicrobial Stewardship (AMS) Subcommittee and program coordinator are pleased to report that Dr. Abu Hamour has accepted the position of Medical co-lead for the AMS program in addition to the Infection Prevention and Control Program. The co-leads are engaged in planning for future collaborations between the two programs.

Full Report

The full annual report with detailed antimicrobial usage metrics will be available on OurNH by July 21st, 2017. If you have any questions or comments regarding the NH AMS program, please contact the AMS program coordinator via email alicia.rahier@northernhealth.ca .

Appendix 1 – Surveillance Case Definitions

Clostridium *difficile* infection (CDI):

A diagnosis of CDI applies to a person with:

- Presence of diarrhea (e.g. three liquid or loose stools within a 24 hour period) or toxic megacolon without other known etiology, and laboratory confirmation of the presence of *C. difficile* toxin A and or B (positive toxin or culture with evidence of toxin production or detection of toxin genes)
- Diagnosis of typical pseudo-membranes or sigmoidoscopy or colonoscopy or
- Histological/pathological diagnosis of CDI with or without diarrhea

A CDI case is considered healthcare-associated when:

- Patient develops symptoms in hospital equal to or greater than 72 hours after admission; or
- Symptoms occur in a patient that has been hospitalized or discharged within the previous 4 weeks, and the patient is not in a residential care facility

Antibiotic Resistant Organism (ARO) Case Definition:

An ARO case is defined as meeting ALL of the following criteria:

- Laboratory identification of an ARO;
- Patient must be admitted to an acute care facility
- ARO must be newly identified from the specimen collected at the time of hospital admission or during hospitalization
- Patient must have no known history of either infection or colonization with an ARO in any BC acute care facilities

This includes:

- ARO identified for the first time during hospital admission
- ARO newly identified in the emergency dept. and then admitted to your acute care facility;

This does not include:

- ARO cases previously identified by NH or other BC acute care facilities
- ARO cases identified in the ER or outpatient clinics but are not subsequently admitted
- ARO cases re-admitted

An ARO case is considered Healthcare-associated Infection (HAI) based on the following criteria:

- Length of time in acute care facility is >48 hours prior to ARO identification
- Prior healthcare facility admission >24 hours within the previous 12 months
- Prior history of chemotherapy, dialysis, or surgery in healthcare facility within the previous 12 months
 - Indwelling catheter or other medical device (excluding Foley catheters and peripheral IV's) at time of admission which was installed at your facility

Surgical Site Infection:

Surgical procedures surveyed for infection include: caesarean sections, total abdominal hysterectomies, total primary hip and knee replacements, and bowel resections that do not involve the rectum.

Gastrointestinal (GI) illness case definition:

A case of probable GI infection is defined as any one of the following conditions that cannot be attributed to another cause (e.g., laxative use, medication side effect, diet, prior medical condition):

- Two or more episodes of diarrhea in a 24 hour period above what is considered normal for that individual
- Two or more episodes of vomiting in a 24 hour period
- One episode each of vomiting and diarrhea in a 24 hour period
- One episode of bloody diarrhea
- Positive culture for a known enteric pathogen with a symptom of GI infection (e.g., vomiting, abdominal pain, diarrhea)

Outbreak Definition

Three or more cases of probable viral GI infection, potentially related within a four day period, within a specific geographic area (e.g. unit, ward)

Influenza-like illness (ILI) case definition:

An acute onset of respiratory illness with cough and fever and with one or more of the following: headache, sore muscles/joints/, extreme fatigue/weakness or sore throat.

Outbreak Definition

Two or more cases of Influenza like Illness in clients and/or staff within a seven day period, with at least one case identified as a resident.

