



Infection Prevention and Control in VIHA ... Maintaining Momentum

2010-2011 ANNUAL REPORT

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Terminology and Abbreviations

LIST OF ABBREVIATIONS AND SPECIFIC TERMS USED IN THIS REPORT

ABBREVIATIONS

AHP	Accelerated Hydrogen Peroxide
ARO	Antibiotic Resistant Organism
BC	British Columbia
CDH	Cowichan District Hospital
CDI	<i>Clostridium difficile</i> infection
C.diff	<i>Clostridium difficile</i>
CI	Confidence Interval
CNISP	Canadian Nosocomial Infection Surveillance Program
ED	Emergency Department
ESBL	Extended Spectrum Beta Lactamase
ESS	Environmental Support Services
FMO	Facilities, Maintenance & Operations
HEICS	Hospital Emergency Incident Command Structure
IC	Infection Control
ICD	Implantable Cardiac Defibrillators
ICP	Infection Control Practitioner
ICRA	Infection Control Risk Assessment
IM/IT	Information Management/Information Technology
IPC	Infection Prevention and Control
LMAC	Local Medical Advisory Committee
MIC	Minimum Inhibitory Concentration
MRSA	Methicillin Resistant <i>Staphylococcus Aureus</i>
MSSA	Methicillin Sensitive <i>Staphylococcus Aureus</i>
NRGH	Nanaimo Regional General Hospital
OAG	Office of the Auditor General
OMS	Outbreak Management Structure

PCC	Patient Care Centre
PCC-CC	Patient Care Centre Clinical Commissioning
PCR	Polymerase Chain Reaction
PDSA	Plan-Do-Study-Act
pH1N1	Pandemic H1N1 Influenza
PMI	Performance Monitoring and Improvement
PPE	Personal Protective Equipment
QRS	Quality, Research and Safety
RCA	Resident Care Aides
RJH	Royal Jubilee Hospital
SJGH	St. Joseph's General Hospital
SPH	Saanich Peninsula Hospital
SWI	System Wide Initiative
UTI	Urinary Tract Infection
UV	Ultra Violet
VIHA	Vancouver Island Health Authority
VRE	Vancomycin Resistant <i>Enterococcus</i>
WCGH	West Coast General Hospital
WHO	World Health Organization

TERMS

Affiliate	Facility that has a contract with VIHA to provide specific services
Amalgamate	Facility that is owned and operated by VIHA
Confidence Interval	The confidence interval is a range of values within which the "true" value of the rate is expected to occur (with 95% probability). Throughout this report, the CI has been determined at 95%. The CI is generally used when there are a small number of observations or cases, and indicates the range of values in which there is confidence that the identified rate will fall 95% of the time. In reading the charts where a CI has been applied, there is more confidence/reliability in the rate the shorter the "black" line.

Residential Care

Long Term Care Facilities

System Wide
Initiative

VIHA has established 4 goals for the entire health authority to achieve. One is Infection Prevention and Control

Executive Summary

This Annual Report of the Vancouver Island Health Authority (VIHA) Infection Prevention and Control Program (IPC Program) highlights the content and scope of infection prevention and control activities undertaken within VIHA during Fiscal Year 2010-11 (April 1, 2010 to March 31, 2011).

This fiscal year, the IPC Program has been involved in a number of major projects and initiatives as well as a significant number of development activities:

- introducing the Infection Prevention and Control System Wide Initiative (SWI-IPC) at Cowichan District Hospital (CDH),
- helping to integrate infection prevention and control principles and practices into the construction and clinical commissioning of the Patient Care Centre (PCC),
- informing Information Management Information Technology (IM/IT) Infection Prevention and Control project to improve access to information to support prompt and effective case management, intervention and surveillance of infection processes and outcomes across VIHA,
- providing expert advice during outbreak situations,
- providing education to designated program/unit auditors in performing hand hygiene audits using an automated audit tool,
- providing evidence needed to trial and refine new protocols,
- building the infrastructure necessary to support prompt and effective case management and surveillance of infection processes and outcomes across VIHA, and
- completing a Self-Assessment Audit of VIHA's Hand Hygiene Program conducted by the Office of the Auditor General.

There were 45 outbreaks declared in VIHA in 2010-11. This includes both facilities owned/operated by VIHA and affiliated acute and residential care sites. An Outbreak Management Structure (OMS) toolkit, based on the principles of the Hospital Emergency Incident Command Structure (HEICS), has been used for all outbreaks declared at VIHA acute and residential sites. The use of this toolkit has:



- improved communication between departments,
- provided a venue to identify successful interventions and areas for improvement, and
- initiated the collection of costs incurred.

In addition, the data collected will assist in developing a predictive model for outbreaks and determining notional costs of outbreaks.




Education continues to be a significant role of IPC with 985 hours being provided in formal and informal sessions. Sixty-one (61%) percent of the time was focused on hand hygiene practices and audit process.

Four surveillance indicators have been highlighted:

Table 1: Surveillance Indicators

Indicator	2010-11 Rate	Trend ¹	Comments
Hand Hygiene Compliance	69% in acute 72% in residential		<ul style="list-style-type: none"> ▪ Increase from last year ▪ Below target for 2010-11 of 90% ▪ Target for 2011-12 is 90%
<i>Clostridium difficile</i> Infection (CDI)	4.8 per 10,000 patient days		<ul style="list-style-type: none"> ▪ Decrease from last year (5.6 per 10,000 pt. days) ▪ Below national/provincial rates ▪ Did not achieve target for 2010-11 of 3.7 per 10,000 pt. days ▪ Target for 2011-12 is 3.7 per 10,000 pt days with a stretch target of 2.4 per 10,000 pt. days
Antibiotic Resistant Organisms Infections – Acute Care	ESBL: 0.8 per 10,000 pt. days MRSA: 0.6 per 10,000 pt. days VRE: 0.4 per 10,000 pt. days	Unable to trend	<ul style="list-style-type: none"> ▪ Focus for 2010-11 was setting baseline for infections ▪ Target for 2011-12 is 10% decrease with a stretch target of 25%
Bacteremias – Acute Care	ESBL: 0.14 per 10,000 pt. days MRSA: 0.08 per 10,000 pt. days VRE: 0.10 per 10,000 pt. days	Unable to trend	<ul style="list-style-type: none"> ▪ Focus for 2010-11 was setting baseline for infections ▪ Target for 2011-12 is 10% decrease with a stretch target of 25%
Antibiotic Resistant Organisms Infections – Residential Care	ESBL: 0.0 per 10,000 pt. days MRSA: 0.22 per 10,000 pt. days VRE: 0.0 per 10,000 pt. days	Unable to trend	<ul style="list-style-type: none"> ▪ Focus for 2010-11 was setting baseline for infections ▪ Target for 2011-12 is maintain at 0%, or decrease by 10% decrease with a stretch target of 25%

Infections of ESBL, MRSA, and VRE in VIHA residential care facilities continue to be very low. There are no provincial or national benchmarks for infections in residential care settings.

¹ *  = improving;  = deteriorating;  = steady;

As the IPC Program moves forward into 2011-12, the focus will be on introducing the learnings from the SWI-IPC into other sites, participating in the planning of the new hospitals in North Island, implementing the hand hygiene audit into the community, and sustaining the momentum created this year.

Introduction

The IPC Program is part of the Quality, Research and Safety (QRS) Portfolio. In a shared accountability model with clinical programs, the IPC Program is responsible for:

- providing expert infection prevention and control support throughout VIHA,
- collaborating with partners to develop and implement standardized approaches to infection prevention and control issues (including outbreak management and surveillance), and
- building capability through education and issue-specific consultation to VIHA staff.

The IPC Program provides consultation to all acute care hospitals, health centres, residential care facilities and community programs owned/operated by VIHA. The Medical Health Officers, through the Communicable Disease Nurses and Environmental Health Officers, provide outbreak management support to affiliated residential care facilities.

During the 2010-11 fiscal year, the IPC Program has continued to support processes that promote shared accountability, strengthen the infrastructure for an integrated IPC program, as well as maintaining and strengthening the linkages with the programs that promote IPC practices (Public Health, Occupational Health and Safety, Laboratory [Microbiology], Pharmacy).

The shared accountability model, which was initially highlighted in the 2009-10 Annual Report, is built around the concept that staff and physicians should be aware of infection prevention and control in every aspect of clinical care and have embedded it into practice so that it becomes a routine part of the culture. The role of the IPC team then transitions from holding responsibility and ownership for all activities relating to infection prevention and control to providing expert support to their clinical colleagues.

Work to support this transition continues with a focus on:

- clarifying roles and responsibilities,
- building capacity through formal and informal education,
- making advice easily accessible on the intranet and internet, and
- working to create procedures that make it easy to do the right thing and difficult to get things wrong.

This model was used in the implementation of hand hygiene education and compliance auditing. The Infection Control Practitioners provided the education and advice to

support managers, front line leaders, and designated program/unit auditors in assuming responsibility for completing the audits and determining actions to improve program/unit rates. This work continues in VIHA acute and residential sites.

As is the case with many activities that transcend clinical areas, responsibility for infection prevention and control is an organizational wide responsibility where the 'ownership' of infection prevention and control practices rests with functional departments and front line staff. Sustained IPC improvements within VIHA will be achieved when all employees, health care providers, and contract services correctly perform IPC procedures every time.

The SWI-IPC is leading this shift in direction and approach towards infection prevention and control within VIHA. It is recognized that a change in mindset is necessary as it will drive fundamental behavioural and cultural change. This can only be achieved through the recognition and acceptance that change needs to be instigated by front line staff (based on their identification of issues and co-production of resulting solutions) and strong, consistent support from all management/leaders within VIHA.

Development Work

The IPC Program have been involved in the following major projects and initiatives this fiscal year:

- System Wide Initiative – Infection Prevention and Control (SWI-IPC),
- Patient Care Centre Clinical Commissioning (PCC-CC), and
- Information Management/Information Technology Infection Prevention and Control (IM/IT-IPC).

In addition, the IPC Program participated collaboratively with other program areas in:

- a review of reprocessing environments and processes,
- a review and recommendations for general support services contract proposals, and
- preparation for the Accreditation Canada surveyors' visit in April 2011.

System Wide Initiative – Infection Prevention and Control

The purpose of this initiative was to determine the infection prevention and control strategies required to control and reduce hospital-acquired infections.

This initiative used a range of techniques drawn from improvement methodology to challenge pervasive but unfounded ideas about infection prevention and control (such as the need to isolate all patients with Vancomycin Resistant Enterococcus) and build an evidence base to support sustainable change in processes, procedures and infrastructure to decrease healthcare associated infection across VIHA. The key to sustainability rests in an understanding that infection prevention and control must be incorporated into the culture of routine clinical care.

The approach used a 'bundle' of measures designed to reinforce each other. Targets for this year included the following:

- Early detection and management of infection from resistant organisms,
- Improved outbreak management,
- Hand hygiene,
- Appropriate usage of antimicrobial agents, and
- Improved environmental cleanliness.

A full status report for the 2010-11 fiscal year can be found in Appendix 2.

Patient Care Centre Clinical Commissioning

The IPC Program participated in all aspects of the planning, construction and clinical commissioning of the PCC at the RJH site.

During this fiscal year, a Project Manager was appointed to provide IPC input into the service delivery redesign inclusive of the following:

- Participated in the development of workflow process that support IPC practices and principles, including within the new Equipment Depot,
- Worked collaboratively with the Professional Practice Office and MultiMedia Services to develop educational materials and modules for routine practices, hand hygiene, and use of the bedpan washers/disinfectors that were included in the Learning Management System or Information Broker System,
- Identified and designated responsibilities for cleaning equipment through the development of a Clean Elements document,
- Introduced the housekeeping processes and solutions trialed through the SWI-IPC at Cowichan District Hospital and Nanaimo Regional General Hospital,
- Planned and orchestrated the cleaning of equipment in preparation for the move to the PCC,
- Planned and coordinated the “Medical Surgical move day” cleaning stations to decrease the transport of organisms from the old RJH building into the new PCC, and
- Participated in the post-move activities to provide support to front line staff in the integration of new practices into their regular daily routines.

A full status report for the 2010-11 fiscal year including the learnings from this project can be found in Appendix 3.

Information Management/Information Technology Infection Prevention and Control Project

The Information Management/Information Technology Infection Prevention and Control (IM/IT-IPC) project will improve access to information to support prompt and effective case management, intervention and surveillance of infection processes and outcomes across VIHA, and will promote and support evidence based best practice. It will also contribute to reducing the present unsustainable burden of manual data entry, enabling IPC Practitioners to spend more time on the units and building capacity through education.

These improvements will primarily be achieved by integrating IPC tools into the Cerner platform, promoting access to information for IPC decision making, and supporting early intervention where the potential for infection transmission exists. Using Cerner also supports the development of a sustainable, integrated network of health services across VIHA.

The IM/IT and SWI developments came together in the development of an automated tool for hand hygiene audits and reporting, with summary results being available to clinical units in real time. This has been included in the SWI-IPC status report found in Appendix 2.

A status report for the IM/IT-IPC Project for the 2010-11 fiscal year can be found in Appendix 4.

Outbreak Management

In 2010-11 there were 45 outbreaks in VIHA's service area. This includes both facilities owned/operated by VIHA and affiliated acute and residential care sites. The IPC Program provides expert support to VIHA owned/operated sites that are experiencing outbreaks. For affiliated sites (usually privately owned, but publicly funded residential care sites), this responsibility rests with VIHA's Public Health Communicable Disease Program.

Active outbreaks are posted at:

http://www.viha.ca/mho/public_health_alerts/active_outbreak_list.htm

OUTBREAK SUMMARY:

There was an increase in the number of outbreaks this year (45) in comparison to last year (24). The largest increases were for norovirus and influenza-like illnesses. When comparing the number of outbreaks from year to year, it is important to keep in mind the changing prevalence of these viruses in the community. Moreover, an increase in the number of outbreaks declared may reflect an increased willingness of sites to mobilize outbreak management resources when an increase in incidence of a virus is noted at facility.

The overall average duration of outbreaks was about the same between fiscal years 2009-10 and 2010-11 (16.0 vs. 15.7). However, averages are subject to distortion if outliers or extreme values exist. In 2010, one CDI outbreak at an acute care facility lasted nearly 150 days and one norovirus outbreak at a residential care facility lasted nearly 50 days.

Table 2 below identifies the number, type, and duration of outbreaks, in VIHA acute and residential care facilities during fiscal year 2010-11 and 2009-10. It also provides the number of patients/residents involved and the associated attack rate.

Table 2: Outbreaks by Select Characteristics

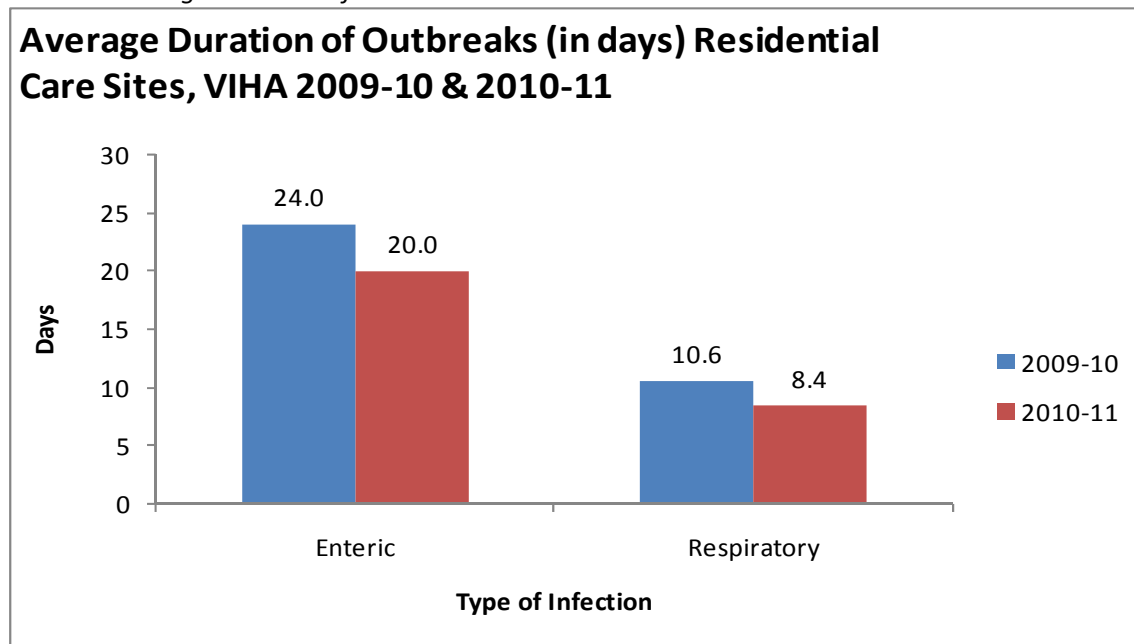
Organism	2010-11					2009-10				
	Number of Outbreaks	Average Duration (days)	Number of patients	Average number of patients	Average Attack Rate*	Number of Outbreaks	Average Duration (days)	Number of patients	Average number of patients	Average Attack Rate*
Total	45	15.7	975	22	21.6%	24	16.0	385	16	16.6%
Enteric	27	20.6	769	28	29.2%	18	18.0	324	18	18.0%
CDI	2	79.0	53	27	9.5%	2	16.5	33	17	3.1%
Norovirus	22	16.9	666	30	39.4%	12	21.3	256	21	26.1%
Noro-like/Other	3	9.0	50	17	49.4%	4	8.8	35	9	25.1%
Respiratory	17	8.6	203	12	13.7%	6	10.2	61	10	11.3%
Influenza	7	10.9	93	13	17.1%	2	8.0	16	8	7.7%
ILI	6	6.5	60	10	10.5%	3	6.0	18	6	5.3%
Rhinovirus/Other	4	7.8	50	13	13.7%	1	27.0	27	27	37.0%
Group A Strep	1	6.0	3	3	N.A.	-	-	-	-	-
Acute Care	16	18.9	182	11	12.3%	8	8.5	68	9	6.0%
Enteric	13	21.2	172	13	13.0%	7	8.6	60	9	6.0%
CDI	2	79.0	53	27	9.5%	2	16.5	33	17	3.1%
Norovirus	10	11.2	114	11	26.1%	3	5.0	15	5	23.3%
Noro-like/Other	1	6.0	5	5	31.3%	2	6.0	12	6	38.1%
Respiratory	2	10.0	7	4	7.2%	1	8.0	8	8	N.A.
Influenza	2	10.0	7	4	7.2%	-	-	-	-	-
ILI	-	-	-	-	-	1	8.0	8	8	N.A.
Rhinovirus/Other	-	-	-	-	-	-	-	-	-	-
Group A Strep	1	6.0	3	3	N.A.	-	-	-	-	-
Residential	29	14.0	793	27	25.0%	16	19.8	317	20	21.2%
Enteric	14	20.0	597	43	42.6%	11	24.0	264	24	25.8%
CDI	-	-	-	-	-	-	-	-	-	-
Norovirus	12	21.6	552	46	41.6%	9	26.8	241	27	26.3%
Noro-like/Other	2	10.5	45	23	53.5%	2	11.5	23	12	21.3%
Respiratory	15	8.4	196	13	14.2%	5	10.6	53	11	11.3%
Influenza	5	11.2	86	17	19.3%	2	8.0	16	8	7.7%
ILI	6	6.5	60	10	10.5%	2	5.0	10	5	5.3%
Rhinovirus/Other	4	7.8	50	13	13.7%	1	27.0	27	27	37.0%

*The total patient population was not provided in about one quarter of the outbreaks recorded in 2010 and 10% of all outbreaks in 2009. The attack rate presented is based on the outbreaks where the total population was provided.

There has been a perception that with a more structured Outbreak Management Structure there has been a decrease in the duration of outbreaks. A review of the data identifies the following changes:

- There was a decline in the proportion of outbreaks that lasted more than 20 days: 25% in 2009-10 to 16% in 2010-11, and
- The average duration of outbreaks declined for residential care facilities from 19.8 days in 2009-10 to 14 days in 2010-11. The declines were noted for both enteric (4 days difference) and respiratory (2 days difference) outbreaks (see Chart 1 below).

Chart 1: Average Duration of Outbreaks – Residential Care Sites



What is VIHA doing to decrease number and duration of outbreaks?

The Outbreak Management Structure (OMS) toolkit, based on the principles of the Hospital Emergency Incident Command Structure (HEICS), has been used for all outbreaks declared at VIHA acute and residential sites. The structure facilitates immediate and concurrent involvement of all areas impacted by the outbreak. Consequently, issues are identified, actions are assigned, and interventions are implemented swiftly.

Through the Outbreak Management Debrief Summary Report, programs impacted by the outbreak:

- collect costs they incurred in relation to their response activities,
- provide recommendations for improvement in future situations, and
- identify actions introduced that assisted in containing the outbreak more quickly.

VIHA is gaining experience with the collection of costs for the different types of outbreaks. The cost data being gathered will be used to determine the notional costs of outbreaks in acute and residential care. It will be based on the type of outbreak, the extent of patient and staff involvement, and the duration of the outbreak. In addition, data collection on the impact to patient/resident bed days based on blocked beds has been initiated through the Outbreak Management Debrief Summary Report.

Other actions taken to prevent or contain outbreaks include:

- Provision of staff education to reinforce the need to implement precautions based on symptoms rather than diagnosis, decreasing the time frame when exposure and transmission can occur,
- Change of cleaning solutions and frequency of cleaning,
- Dedication of equipment to the patient/resident on infection control precautions, and
- Placement of the patient in a private room, where possible.

VIHA is working on developing a predictive model for outbreaks. This involves tracking and trending the reasons why patients were placed on precautions, identifying other factors that may increase the potential for transmission, and determining the resulting impact on the occurrence of outbreaks. Interventions can then be implemented prior to a cluster of cases occurring. This in turn will prevent the increase in cases that leads to an outbreak being declared.

Education

Education is a key component of the Infection Control Practitioner's (ICP) role. Education regarding infection prevention and control principles and practices is provided to VIHA staff primarily through the following three venues: new employee orientation, new nursing hire orientation, and in-service education. Just-in-time education is also provided during ICP rounds on units and in facilities.

The main topics presented this year were:

- Management of Antibiotic Resistant Organisms,
- IPC Principles and Practices,
- Influenza,
- Accreditation Required Organizational Practices – Infection Control, and
- Hand Hygiene.

Of the total 984.62 hours of education, 61% (601 hours) was focused on hand hygiene practices and audits.

A synopsis of the education provided is listed in Appendix 5.

Surveillance

1. Hand Hygiene Compliance

Trend*	Target	Actual ²
	90%	69% in acute; 72% in residential

Hand hygiene practices are audited in VIHA acute care and long term care facilities using an audit tool adapted from the Canadian Patient Safety Institute. Health care providers were observed by trained auditors to determine whether they used proper technique when they washed their hands or used an alcohol based hand rub product. Those who completed the activity correctly, without wearing barriers such as rings and long sleeves, were considered to be compliant with VIHA guidelines. In the analysis for 2009-10 and 2010-11 (see Appendix 8), all observations reported within a facility during a day are defined as an audit.




Using the definition above, 70 audits took place in VIHA's acute care facilities during the 2009-10 fiscal year. Points to note include:

- Two audits (3%) had a compliance rate of 90% or better,
- Ten audits (13%) had a compliance rate between 65% and 89%, and
- In 84% of cases, the compliance rate was less than 65%.

The number of audits increased to 339 in fiscal year 2010-11, with the following compliance rates:

- The proportion of those with compliance rates 90% or better increased to 12%,
- The proportion of audits with compliance rates between 65% and 89% increased to 55%, and
- The proportion of audits with compliance rates less than 65% decreased to 33%.

These results show that a substantial improvement in hand hygiene compliance rates occurred between 2009-10 and 2010-11. Overall rates are encouraging as process

*  = 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

² It is important to note that aggregated hand hygiene rates are misleading, in that transmission of organisms will occur where hand hygiene is poor, therefore focus must be on the worst results from each unit or facility rather than the average.

indicators, but do not provide an indication of the variation in compliance within VIHA's facilities. It is important to focus attention on the percentage of areas with compliance rates below 65%, as transmission of organisms occurs where hand hygiene is poor.

Summary of Hand Hygiene Compliance Rates at Acute Care Facilities

- The overall number of hand hygiene observations increased from about 4,000 in 2009-10 to around 20,000 in 2010-11,
- The overall compliance rate improved from 35% to 69%,
- Improvements in hand hygiene compliance took place in nearly all of the acute care facilities, with the most notable improvements at the Cowichan District, Royal Jubilee, Saanich Peninsula and Victoria General Hospitals where the proportion of audits with compliance rates 65% or better increased significantly, and
- Very few audits were conducted at the smaller acute care facilities of Cormorant Island Health Centre and of Port Alice, Port McNeill and Tofino General Hospitals.

Given the small number of observations recorded at the rural remote sites, it is difficult to determine whether the results are representative of the true level of compliance. It is also important to note that in the small rural remote hospitals, it is difficult to obtain the required 25 observations day needed to constitute an audit. Alternative options for sites with less than 24 beds are being explored to ensure that audits can be completed with reliable results.

A chart showing the proportion of Hand Hygiene Compliance Rates from Audits at VIHA Acute Care Facilities (Fiscal years 2009-10 and 2010-11) can be found in Appendix 8.

Summary of Hand Hygiene Compliance Rates at Long Term Care Facilities

- Fewer audits took place in long term care compared to acute care facilities,
- The small number of audits performed at some facilities, raises questions about the representativeness and generalizability of the audit results presented. That is to say, one or two audits may not accurately reflect the true compliance rates at a facility throughout the entire fiscal year,
- During 2009-10, 18 audits were conducted, with an overall compliance rate of 31%:
 - In 16 (89%) audits, the compliance rate was less than 65%,
 - In 2, the compliance rates were between 65% and 89%.
- In 2010-11, the number of audits performed increased to 54, with an overall compliance rate of 72%:
 - 26% of the audits had compliance rates of 90% or better,

- 44% had rates between 65% and 89%.

A chart showing the proportion of Hand Hygiene Compliance Rates from Audits at VIHA Long Term Care Facilities (Fiscal years 2009 and 2010) can be found in Appendix 8.

What is VIHA doing to improve compliance rates?

A targeted focus to hand hygiene practices will continue in 2011-12. Supports to improve compliance rates are:

- approved and posted VIHA Hand Hygiene Policy outlining expectations for compliance and resulting action when non-compliance occurs,
- approved and posted VIHA Hand Hygiene Action Plan that identifies actions required to implement and sustain a fully operational Hand Hygiene Program,
- alcohol based hand rub product being available where patient care is being provided, with the exception being where the patient may consume the product,
- continued use of the automated hand hygiene audit tool,
- support to designated program/unit auditors through education, videos, guides, and additional information on the IPC website,
- mentoring front line leaders in change management strategies to improve compliance rates,
- increased involvement with physician groups to introduce and implement a hand hygiene education module for physicians, and
- facilitated access to compliance reports and enhanced the data available for front line leaders.

The hand hygiene electronic audit tool has been embedded into InfoPath and has the capacity to generate a report at time of audit. It can also be downloaded to the VIHA Performance Monitoring and Improvement data warehouse for further compilation and reporting purposes. This tool was introduced in CDH in July 2010, providing the ability for site hand hygiene auditors to complete audits on a more frequent basis. Using the implementation experience at CDH, the tool was introduced throughout the acute and residential care sites in the 2010-11 fiscal year.

Audits are scheduled based on an established frequency correlating to previous audit results (i.e. weekly if rates are below 65%, monthly once compliance is consistently established at a rate greater than 65% and less than 90%, quarterly when rates are consistently 90% and higher).

VIHA, along with the other Health Authorities, participated in an Office of the Auditor General Provincial Self-Assessment Audit on Hand Hygiene. This audit identified that

VIHA's implementation of its Hand Hygiene Strategy was in progress. VIHA's development of an electronic audit form with immediate reporting to staff and the program/unit based auditors with spot checks by ICPs were seen as Promising Practices.

How does VIHA's rate compare to other areas?


Currently, there are no provincial or national benchmarks for hand hygiene compliance. VIHA is participating in a Provincial Hand Hygiene Working Group to develop a provincial framework for a Hand Hygiene Program and to develop measurement indicators. This will inform reporting requirements which will be in place in 2011-12.

The Ontario Patient Safety Indicator Reporting indicates an average compliance rate of 77.7% for their acute and long term care sites. Based on the recent audit results, VIHA's rates have increased substantially from last year, but are lower than those achieved in Ontario. Continued work is required to improve VIHA's hand hygiene compliance rates.

What is the Annual Target VIHA seeks to reach?

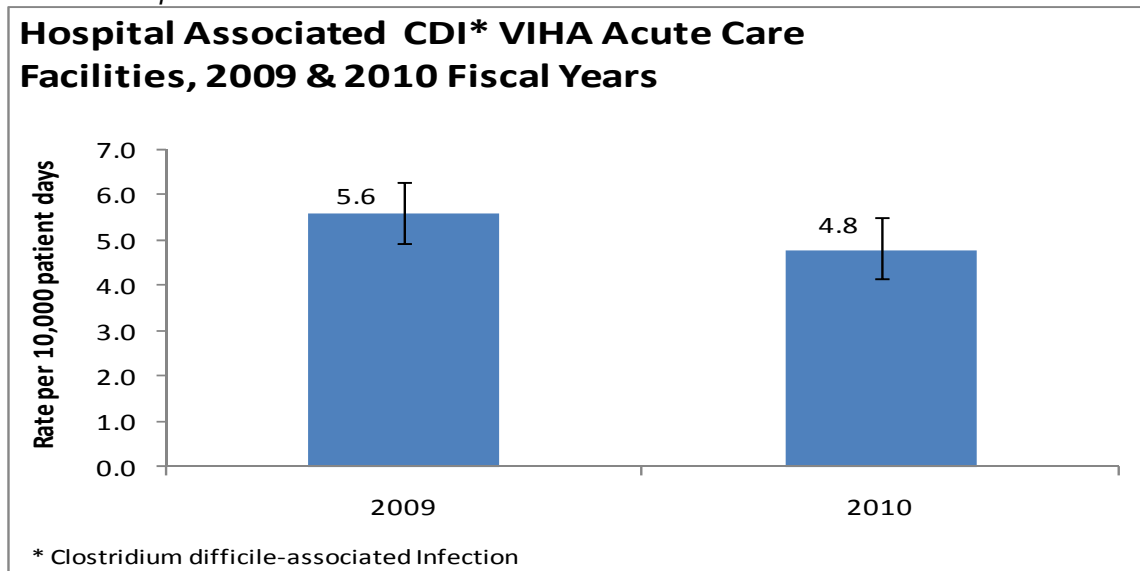
VIHA aspires to 100% compliance in non-emergency situations, and is striving to meet a 90% compliance rate over the next fiscal year (2011-12).

2. Clostridium difficile Infections Incidence Rate

Trend*	Target	Actual
	3.7 per 10,000 pt. days	4.8 per 10,000 pt. days ³




Clostridium difficile-associated infection (CDI) is the most common cause of healthcare associated infectious diarrhea in Canada. During fiscal year 2010-11, a total of 225 cases of hospital-associated CDI were identified at all VIHA acute care facilities, down from 257 cases during the 2009 fiscal year. As a result, CDI rate⁴ per 10,000 patient-days declined from 5.6 in 2009-10 to 4.8 in 2010-11 (see Chart 2).

Chart 2: Hospital Associated CDI – Acute Care Facilities



Notes: Newborns and patients in psychiatry wards are excluded from the denominator. The delta method was used to calculate the 95% confidence intervals⁵

Rates by acute care facility for the fiscal years 2009-10 and 2010-11 have been provided in Chart 3 below.

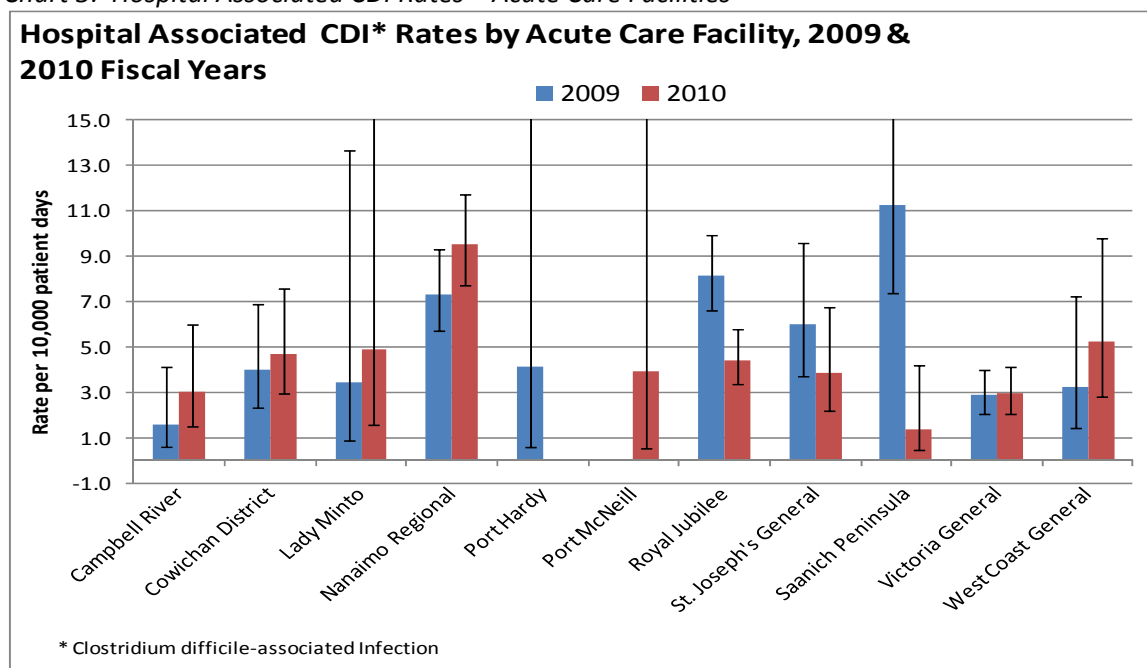
*  = improving; at least 4 consecutive data points moving towards target  = deteriorating; at least 4 consecutive data points moving away from target  = steady; fewer than 4 consecutive data points moving in either direction

³ See Appendix 6 for case definitions

⁴ The infection rates in this report are based on the patients identified as the population at risk, therefore patient days from newborn nurseries and psychiatry wards have been excluded. As a result, the rates reported here may differ from those previously provided.

⁵ See Terms for explanation of “confidence intervals”

Chart 3: Hospital Associated CDI Rates – Acute Care Facilities



Notes: Newborns and patients in psychiatry wards are excluded from the denominator. The delta method was used to calculate the 95% confidence intervals

Chart 3 illustrates:

- A variance in rates between facilities, and between years within each facility,
- Significant reductions for the Royal Jubilee (8.1 to 4.4 per 10,000 patient days) and Saanich Peninsula (11.2 to 1.3) Hospitals,
- An increased rate at Nanaimo Regional General Hospital in 2010-11 which relates to an outbreak from March 29 – August 24, 2010 and involved 49 patients (see Appendix 6), and
- Small increases at a number of other acute care facilities.

While CDI rates are not based on a sample, 95% confidence intervals were calculated to indicate that rates in smaller facilities are often based on a small number of cases (for example there were three cases of CDI at Lady Minto Hospital in 2010-11). This means that a large amount of variation may occur within any given year or one outbreak in a facility may have a large impact on the VIHA rates. For example, four additional cases at each of the following sites in 2010-11 reflected a substantial increase in rates:

- Campbell River Hospital (CRH): increase from 1.5 to 3.0, and
- West Coast General Hospital (WCGH) increase from 3.2 to 5.2.

Likewise, the increase in hospital-associated CDI rates at CDH is based on four more cases in 2010-11 compared to 2009-10. The increase at CDH, the SWI-IPC site, occurred during influenza season when there was a pressure on in-patient beds. It should also be

noted that the Antibiotic Stewardship guidelines were introduced in the Emergency Department but not onto the in-patient floors.

What is VIHA doing to decrease CDI incidence rates?

VIHA is continuing to work toward improving early recognition of symptoms indicative of CDI and early implementation of precautions. This is in addition to interventions that are instituted regularly when a positive CDI result is received, such as:

- change in frequency of cleans and type of cleaning solution,
- implementation of precautions based on symptoms, and
- placement in private rooms with dedicated equipment.

In addition, focus continues on maintaining a clear separation of clean and dirty items, decreasing the amount of equipment in hallways, labelling clean equipment, and providing education to all staff. The Outbreak Management Structure (OMS) toolkit is used for all outbreaks declared in acute and residential sites.

The ICPs review all new CDI cases to ensure appropriate precautions and interventions are in place and treatment is being considered when required. The use of precautions for patients colonized with VRE has been reviewed and revised in order to promote use of gowns and gloves in those situations of highest transmission risk. The resulting decrease in the number of patients requiring precautions assisted in improving adherence in the higher risk situations.

As noted previously, Infection Prevention and Control has been identified as one of four System Wide Initiatives. CDH was selected as the pilot site and through the initiative has developed and trialed a guideline with the Emergency Department physicians relating to usage of designated antibiotics for treatment of infections. It specifically restricts usage of those antibiotics most prone to predisposing patients to CDI. This process will be expanded throughout CDH and introduced to physicians at other sites in 2011-12.

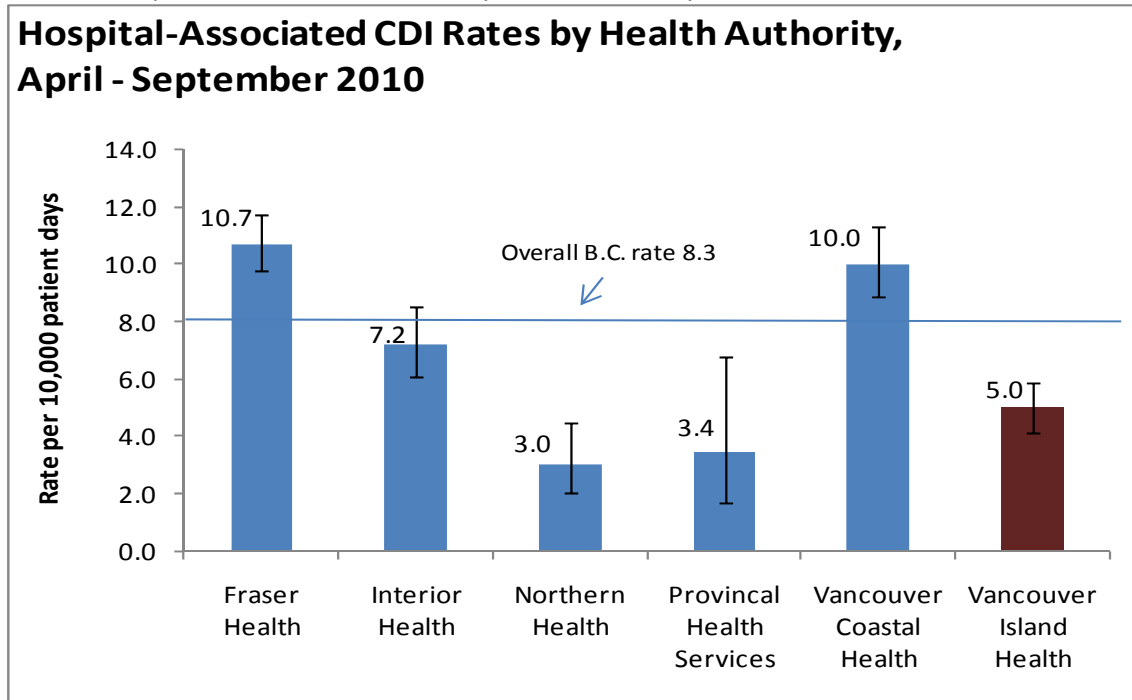
How does VIHA's rate compare to other areas?

In 2010-11 VIHA's rates were below both national and provincial rates. The Canadian Nosocomial Infection Surveillance Program's (CNISP) 2007 report on CDI (most current), identifies an incidence rate of 7.27/10,000 patient days nationally, with a 7.25 rate for the Western Region. VIHA participates in the provincial surveillance of CDI.

The chart below was published in the latest report on CDI from the Provincial Infection Control Network of British Columbia. Results for the period April 1 to September 16,

2010 are provided and show that the rates for VIHA were below the provincial rate of 8.3 and among the lowest in the province.⁶

Chart 4: Hospital Associated CDI Rates by Health Authority



Source: Provincial Infection Control Network

What is the Annual Target VIHA seeks to reach?

VIHA has set a target of 3.7 per 10,000 patient days (yellow if achieved), and a stretch target of 2.4 (green if achieved) for the 2011-12 fiscal year.

The target of 3.7 per 10,000 patient days for 2010-11, a reduction of 25%, was not met.

⁶ The report can be obtained at:

http://www.picnetbc.ca/sites/picnetbc2/files/Documents/CDI_Surveillance_Report_Q1_2_FY2010_11_Final_2011_04_29.pdf

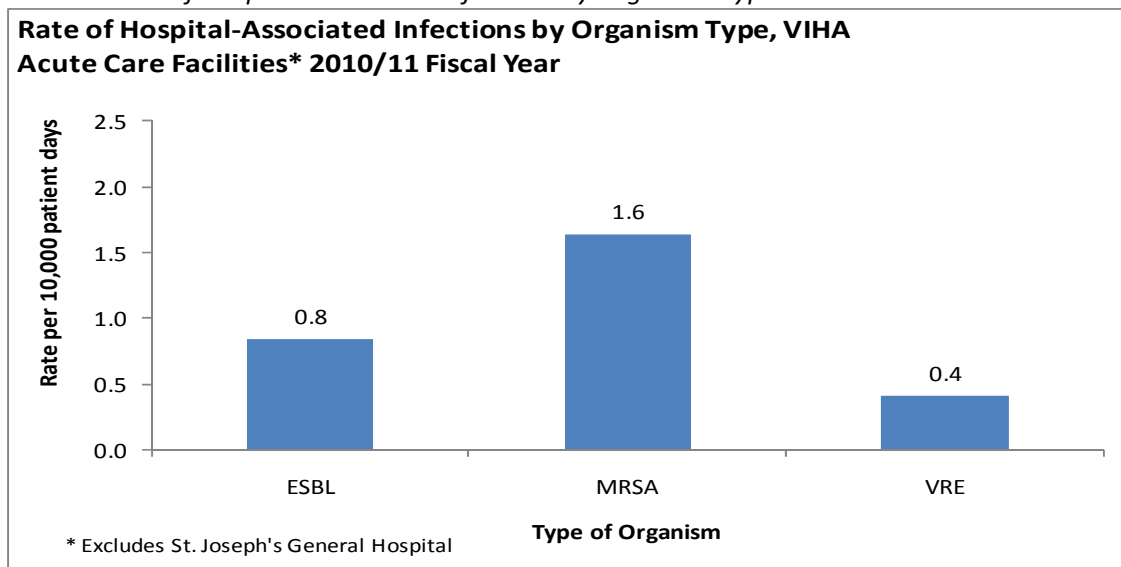
3. Infection Rates from Antibiotic Resistant Organisms

Trend*	Target	Actual
Baseline established	Not set for 2010-11	ESBL: 0.8 per 10,000 pt. days MRSA: 1.6 per 10,000 pt. days VRE: 0.4 per 10,000 pt. days

Historically, colonized and infected positive laboratory results for MRSA, VRE, and ESBL were reported. In 2010-11, the IPC Program focused its surveillance efforts on hospital acquired infections, as reduction of rates in this area would have the highest benefit to patients. Interventions aimed at decreasing the acquisition of a hospital acquired infection have the potential to improve the patient’s course of treatment, as well as decrease surgeries and treatment related to these acquired infections, decrease length of stay, and decrease pharmaceutical and supply use. The rates identified in 2010-11 will become the baseline for measurement in 2011-12.

The following chart identifies the number of new cases of hospital acquired infections due to Extended Spectrum Beta-lactamase (ESBL), Methicillin Resistant *Staphylococcus aureus* (MRSA), and Vancomycin Resistant *Enterococcus* (VRE). The rates are based on 10,000 patient days.

Chart 5: Rate of Hospital Associated Infections by Organism Type



What is VIHA doing to decrease ARO infection rates?

All patients admitted to acute care hospitals are screened for antibiotic resistant organism (ARO) risks and assessed for signs of infection. During the course of their stay

* = 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

in hospital, the patient is routinely assessed by physicians and staff for signs of infection. Anyone with signs of infection has a swab taken and is placed on precautions, with bed placement determined using a bed allocation algorithm. If the infection is lab confirmed for an ARO, a flag is entered into the electronic client record.

In addition to the measures taken above and if the organism is MRSA, decolonization treatment is considered. This entails showering with a designated soap and application of an antibiotic cream to nostrils for seven days. For 2011-12, consideration is being given to developing a decolonization protocol for patients coming in for surgery, in order to decrease the bioburden of the organism on their skin. This has the potential to decrease the possibility of the organism being introduced into the incision site during or post surgery.

The focus on hand hygiene and improved compliance rates for health care providers should also have an impact of these rates.

How does VIHA’s rate compare to other areas?

National rates are inclusive of both colonization and infections per 10,000 patient days, so does not allow comparison. There are no published provincial rates available at this time.

What is the Annual Target VIHA seeks to reach?

VIHA is aiming to lower these rates in 2011-12 and has set a target of 10% reduction (yellow if reached); and a stretch target of 25% reduction (green if achieved).

Table 3: VIHA’s Target Rates

	2010-11 Actual	2011-12 Target (10%)	2011-12 Stretch Target (25%)
ESBL	0.8	0.72	0.6
MRSA	1.6	1.44	1.2
VRE	0.4	0.36	0.3

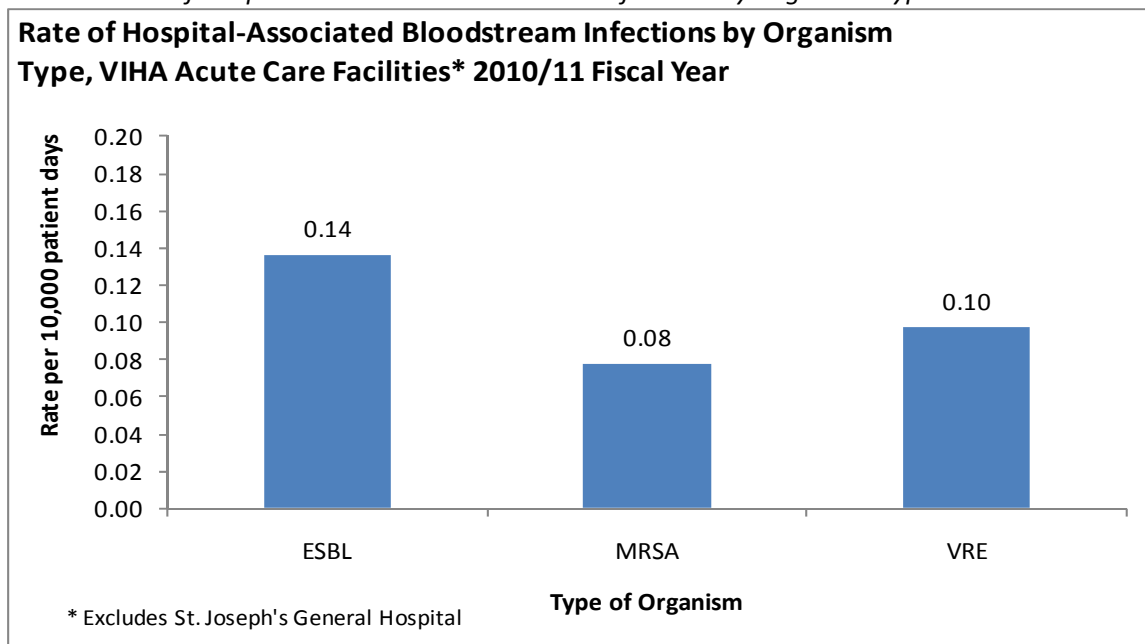
4. Bacteremias

Trend*	Target	Actual
Baseline established	Not set for 2010-11	ESBL: 0.14 per 10,000 pt. days MRSA: 0.08 per 10,000 pt. days VRE: 0.10 per 10,000 pt. days

Bacteremia designates the presence of bacteria in the blood. As the blood is normally a sterile environment, any detection of bacteria in the blood is abnormal. Bacteremias can occur as a severe complication of infections such as pneumonia or meningitis, as a result of surgery, or due to catheters including urinary or intravenous catheters. Bacteremias can have severe consequences such as sepsis, septic shock, and death.

VIHA's rates for hospital acquired bacteremias remain low (see Chart 6). Cases are found at the larger hospitals in VIHA (RJH, VGH, NRGH, CRH and WCGH).

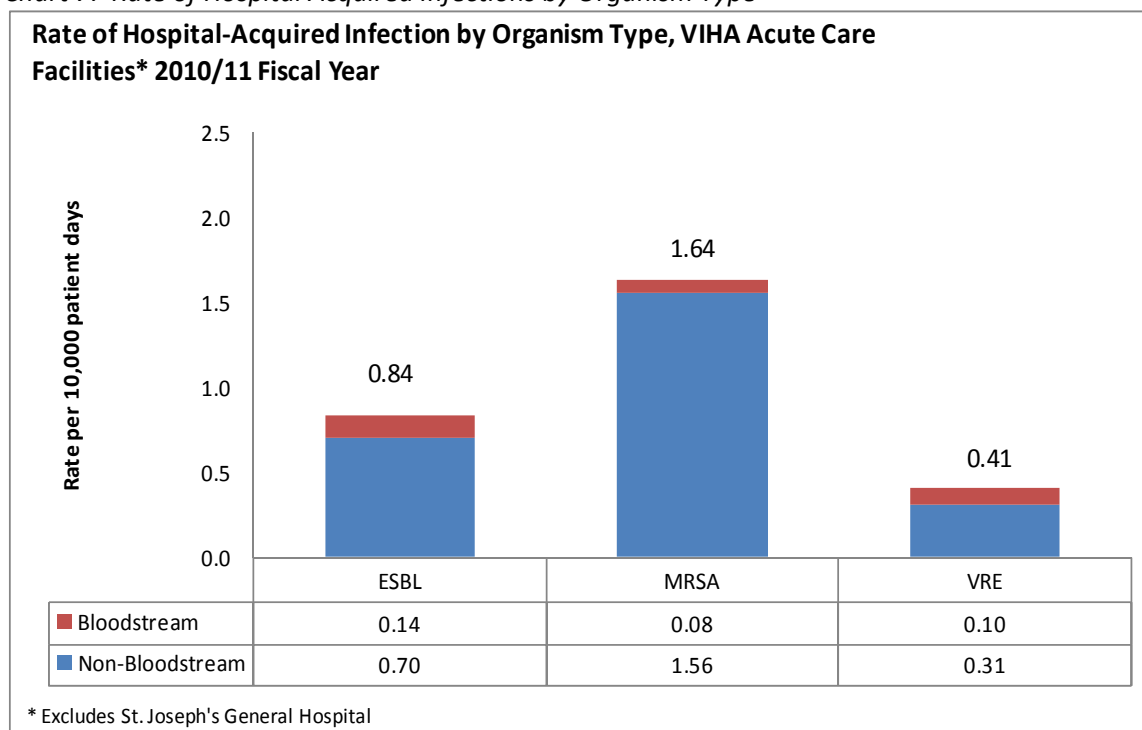
Chart 6: Rate of Hospital Associated Bloodstream Infections by Organism Type



* = 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

Bacteremias are a subset of the hospital-acquired infection rates. Chart 7 (below) compares the bacteremia rates to the infection rates.

Chart 7: Rate of Hospital Acquired Infections by Organism Type



What is VIHA doing to decrease incidence rates?

When a patient is diagnosed with a bacteremia, they are placed on precautions and treated with antibiotics.

A focus on the four moments of hand hygiene, especially before aseptic techniques and following proper procedures when inserting catheters or other tubes, should have an impact on these rates.

How does VIHA's rate compare to other areas?

There are no published national or provincial rates.

What is the Annual Target VIHA seeks to reach?

VIHA is aiming to lower these rates in 2011-12 and has set a target of 10% reduction (yellow if reached); and a stretch target of 25% reduction (green if achieved).

Table 4: VIHA's Target Rates

	2010-11 Actual	2011-12 Target (10%)	2011-12 Stretch Target (25%)
ESBL	0.14	0.13	0.11
MRSA	0.08	0.07	0.06
VRE	0.10	0.09	0.08

5. Surgical Site Infections (Targeted Surgeries)

As defined by Health Canada's standardized criteria, surgical site infections are identified by the development of an infection at the site of surgery, within a specified period of time, following the surgical procedure. The time frame following surgery varies according to the procedure.

Surveillance of surgical site infection is limited to those patients who have previously had a surgical procedure and are readmitted to the hospital with an infection. As only persons with serious infections are readmitted to hospital, only a small percentage (albeit the worst) of those infected is captured for surveillance purposes. The remainder of post-surgical patients with infections are treated in the community, at walk-in clinics and doctors' offices, or as outpatients in emergency departments, and are not identified.

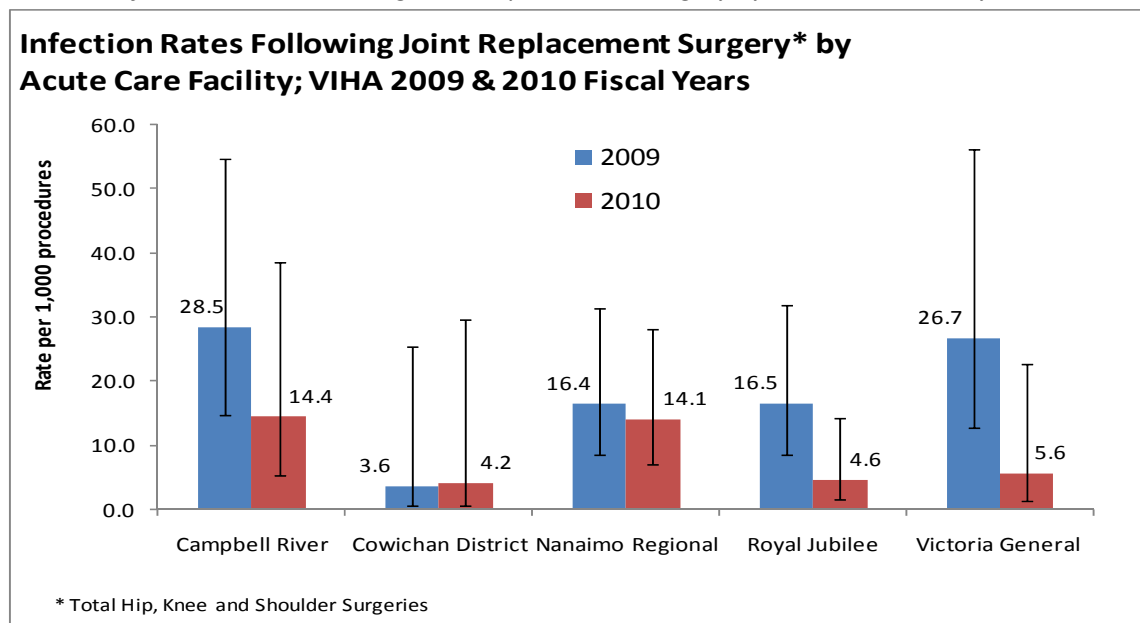
A rise in the number of captured surgical wound infections may indicate a true rise in incidence, or it may be indicative of a change in the number of procedures. It may be related to change in referral patterns or complications resulting from the prior health status of the patient, which also influences the potential for infections occurring. Measurement relies on the number of procedures as a denominator to achieve the infection rate. Normally the majority of infections are superficial (incisional), with the minority being deep or abscess/organ space. When there is a significant increase in infection rates, ICPs must take these factors into consideration to determine what actions need to be taken to reduce the rates.

The Centre for Disease Control's benchmark for SSIs in clean surgery (i.e., joint surgery) is 2.9%, and for clean-contaminated (i.e., abdominal) surgery is 3.9%. As VIHA surgical site infection rates have been below international benchmarks, the IPC Program targeted surgeries to be followed in the 2011-12 fiscal year: Joint Replacements, Open Heart, and Cardiac Device Implants. These were selected as they are classified as *clean* surgeries involving an organ space or implant, and infections can often require hospitalization and further surgeries.

Joint Replacement Surgery

The infection rate following joint replacement surgeries declined between fiscal years 2009-10 and 2010-11 from 17.9 (2%) to 8.6 infections (1%) per 1,000 procedures. The rates declined in all acute care facilities except Cowichan District Hospital where the number of infections remained the same with one infected case per year.

Chart 8: Infection Rates Following Joint Replacement Surgery by Acute Care Facility

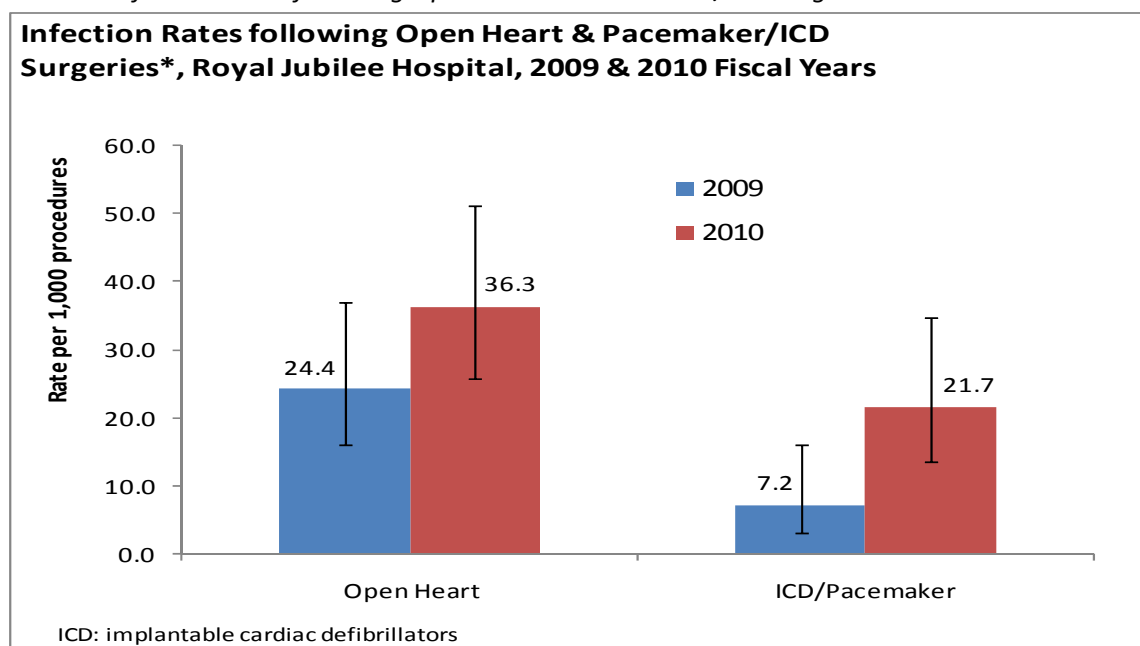


Note: 95% confidence intervals calculated using the delta method.

Open Heart Surgery and Cardiac Device Implants

The infection rates following open heart surgeries and cardiac device implants (permanent pacemakers and implantable cardiac defibrillators) conducted at the Royal Jubilee Hospital increased between the 2009-10 and 2010-11 fiscal years. The infection rate for the latter procedures tripled from 7.2 (0.7%) to 21.7 (2.2%) per 1,000 surgeries. Surveillance of infections following cardiac device implants at Nanaimo Regional General Hospital was also initiated in 2010-11. A rate of 10.2 (1%) per 1,000 procedures was recorded.

Chart 9: Infection Rates following Open Heart & Pacemaker/ICD Surgeries



Note: 95% confidence intervals calculated using the delta method.

What is VIHA doing to decrease incidence rates?

Surgical Services has implemented strategies from Safer HealthCare Now, including provision of antibiotic prophylaxis, use of clippers for hair removal in vicinity of surgical site, and maintenance of body temperature during surgery.

The IPC Program has been working with Cardiac Services in reviewing their rates to determine if previous patient medical risk factors, changed medical or nursing practices, or physical environment have contributed to this increase and to determine interventions that must be implemented.

How does VIHA's rate compare to other areas?

There are no published national or provincial rates specific to these targeted surgeries. VIHA is below the International benchmark of 2.9% for *clean* surgeries.

What is the Annual Target VIHA seeks to reach?

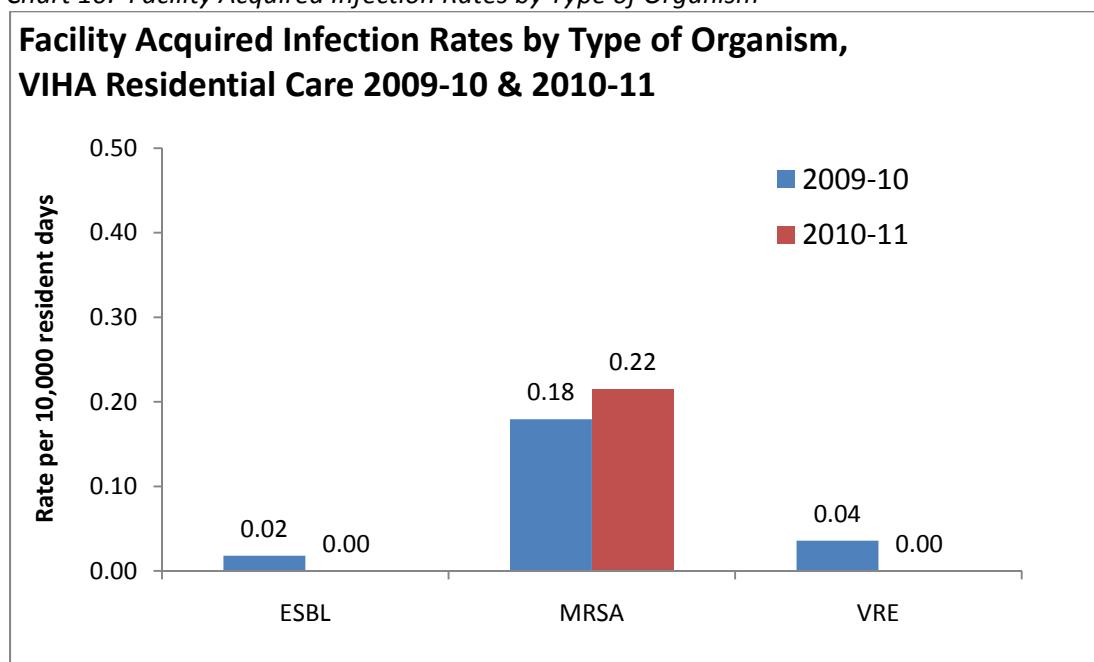
VIHA is aiming to lower these rates in 2011-12 and has set a target of 10% reduction (yellow if reached); and a stretch target of 25% reduction (green if achieved).

6. Infections in Residential Care Facilities

Trend*	Target	Actual
Baseline established	Not set for 2010-11	ESBL: 0.0 per 10,000 res. days MRSA: 0.22 per 10,000 pt. days VRE: 0.00 per 10,000 pt. days

Transmission of organisms within VIHA Residential Care Facilities remains low; often with the source cases being transfers from the acute care system. Specimens are taken for diagnostic and treatment purposes when there are clinical manifestations. Chart 10 (below) identifies the rate for new cases of infections for ESBL, MRSA, and VRE that were acquired in Residential Care Facilities.

Chart 10: Facility Acquired Infection Rates by Type of Organism



What is VIHA doing to decrease incidence rates?

Any resident positive for MRSA, VRE, or ESBL has their health record flagged. Care plans specific to the organism are placed on the chart, and education is provided as required. If a person has a flag for MRSA or VRE, efforts are made to remove the flag. Decolonization treatment is also considered for MRSA on a case by case basis.

As most of the ESBL cases relate to urinary tract infections (UTI), education specific to UTI including appropriate specimen collection and treatment of symptomatic bacteria has only been initiated at some residential sites.

* = 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

Results of admission swabs taken over the last two years, have identified very low transmission rates in residential care facilities. In 2010-11, the practice of taking swabs on all new admissions/readmissions has been discontinued. Any increased transmission within residential care will be captured through screening when the resident is admitted to acute care. Point prevalence studies will also be done to determine if the low incidence rates continue.

How does VIHA’s rate compare to other areas?

There are no provincial or national benchmarks for infections in residential care facilities (nor under other nomenclatures: nursing homes, residential facilities, long term care facilities, etc.)

What is the Annual Target VIHA seeks to reach?

VIHA is aiming for 0 transmission, and where there is room for improvement has set a target of 10% reduction (yellow if reached); and a stretch target of 25% reduction (green if achieved).

Table 5: VIHA’s Targeted Rates

	2010-11 Actual	2011-12 Target (10%)	2011-12 Stretch Target (25%)
ESBL	0.0	0.0	0.0
MRSA	0.22	0.20	0.17
VRE	0.0	0.0	0.0

Moving Forward into 2011-12

Based on this year's report, the focus for next year will be on sustaining the momentum. The key priorities continue to be:

Priority 1:

Develop an effective and efficient shared accountability service model for infection prevention and control.

Priority 2:

Improve case management, service responsiveness and surveillance through the development of an IC Module.

Priority 3:

Achieve through the shared model, a decrease in hospital-acquired *Clostridium difficile* by 25% in acute care sites.

Priority 4:

Provide consistent, high quality, expert advice.

Appendices

Appendix 1

Infection Prevention and Control Team Members

Management Team

Eileen Goudy, Executive Director, Quality Research and Safety
Dr. Martin Wale, Executive Medical Director, Quality Research and Safety
Bev Dobbyn, Director, Infection Prevention and Control
Dr. David Forrest, Associate Medical Director, Infection Prevention and Control
Dr. Pamela Kibsey, Associate Medical Director, Infection Prevention and Control
Pat Bleackley, Regional Manager, Infection Prevention and Control
Kathryn Proudfoot/Anthony Leamon, Epidemiologist

Administrative Assistants

Penny Hawley/Christina Johnston
Kathryn Blazecka,

Infection Control Practitioners

Campbell River and Surrounding Area

Susan Sinclair

Comox (St. Joseph's General Hospital – affiliate)

Toby Krell (Infection Prevention and Control Manager)

Port Alberni/Tofino

Stuart Gray

Nanaimo and Surrounding Area

Dan Costello/Margaret Litt

Christine Franic

Karen Lambert

Duncan and Surrounding Area

Joanne Baines

Victoria

Sandra Dunford

Gayle Lohr

Catherine Munford

Sandy Paton

Cynthia Proskow

Shelley Sing

Kim Zboyovsky

Infection Prevention and Control Aides

Diane Frost/Lorraine Aines (NRGH)
Faye Kinsces (NRGH)
Robin Ketch, (CDH-SWI)
Debbie McLeod/Sheila Hayes (CDH-SWI)
Dianne Morris (RJH)
Evan Wicken (RJH)

Project Leaders

Richard Cormier, Pharmacist, SWI-IPC
Kelly MacDonald, Project Manager, PCC Clinical Commissioning
Sue Munro/Elsie Widdowson, Project Manager, IM/IT-IPC
Lisa Young, Project Director, SWI-IPC

Appendix 2

Infection Prevention and Control Demonstration Initiative on Controlling and Reducing Hospital Acquired Infections

Status Report (April 1, 2010 – March 31, 2011)

1. Embedding IPC principles and practices within functional departments

Sustained IPC improvements within VIHA will only be achieved when all employees and patient care providers correctly perform IPC procedures every time. This requires second order change – a change in mindset, driving fundamental behavioral and cultural changes. Achieving this requires co-production with front line staff – their involvement in identifying problems and determining solutions - and strong, consistent support from all management/leaders within VIHA.

This component of the project will:

- deliver workable and sustainable bundles of infection prevention practices using a strategy of co-production with front line staff, beginning at the CDH site,
- develop and integrate corporate policies to support IPC principles and practices;
- shift the role of ICPs to one of expert support to the departments,
- develop educational curricula to support new employees and continuing education, and
- develop a notional costing model to enable the financial impact of changes to be estimated.

Work underway or completed:

- Work continues on changing the ICP role to provide more consultation and visibility on units. These changes are supported by the IM/IT-IPC Project,
- Work continues on developing a notional costing model to estimate the financial impact of changes, including outbreak costs, and
- The co-production methodology was used in the determination, implementation and trialing of infection prevention practices at CDH.

2. Facilitating completion of hand hygiene audits by designated Program auditors

Work completed:

- VIHA Hand Hygiene Policy has been signed off and is posted,
- Hand hygiene audit tool has been imbedded in Microsoft InfoPath and installed on tablets that are available at all VIHA acute and residential care sites. Trained program/unit auditors are auditing compliance,
- Frequency of audits has been established based on performance rates over the area's last three audits:
 - < 65% = weekly audits

- 65 – 89% = monthly audits
- $\geq 90\%$ = quarterly audits
- Temporary Project Manager and two Educators allocated by Integrated Health Services and the Professional Practice Office to provide audit education to additional auditors as well as provide support to managers and front line leaders on monitoring and taking action on audit results,
- An education e-learning tool for staff has been developed in collaboration with the Professional Practice Office and the PCC IPC Project Manager, and has been included in the Learning Management System. It is currently available to PCC staff only,
- An education e-learning tool for physicians has been purchased and revised for VIHA. Work is underway with Professional Practice Office, Medical Affairs and Medical Continuing Professional Development, to include the tool on the Learning Management System, promote its use by physicians, and recognize physician leaders in hand hygiene, and
- VIHA Hand Hygiene Action Plan has been developed, approved, and posted.

Next Steps:

- Continue to implement the VIHA Hand Hygiene Action Plan, including:
 - Provision of ongoing mentoring to program/unit auditors and unit leaders to support the hand hygiene audit process and change management activities to improve compliance rates,
 - Availability and accessibility of the physician e-learning hand hygiene module, and
 - Definition of the four moments for hand hygiene in specialty areas and areas where the patient environment is different from a “bed space” (i.e., home visits, clinic visits, group sessions, etc.).

3. Focusing surveillance (MRSA and VRE bacteremia and Clostridium difficile) across VIHA acute care sites

Surveillance efforts will be concentrated on MRSA and VRE bacteremia and *Clostridium difficile* infection (CDI) at all acute care VIHA sites, thus bringing VIHA’s focus into line with major national and international initiatives. This will be supported by:

- development of a coordinated strategy for the management of infection outbreaks within VIHA,
- introduction of Infection Prevention and Control Aides at CDH, and
- addition of an epidemiological resource to support incidence, prevalence and tracking of infections within VIHA populations with an aim to detect the source and causes of infections and associated outbreaks.

Work completed:

- Policies for management of MRSA (acute and residential) and VRE trialed at CDH and subsequently introduced at NRGH during its CDI outbreak. These policies focus the implementation of precautions to infectious situations only, eliminating the use of precautions for VRE colonization, thus decreasing precaution “fatigue”. These policies are now implemented throughout the VIHA acute and residential care sites; the IPC Program maintains responsibility for any further revisions,
- Surveillance is now focused on infections rather than colonizations.
- The IPC Aide role at CDH has been recognized as a valuable member of the CDH team, especially in assisting to improve the physical appearance of the site:
 - corridors are de-cluttered,
 - clean and soiled equipment is separated and the clean tag system is used,
 - equipment not assigned to one specific group for cleaning; is now cleaned on a regular schedule,
 - storage rooms are reconfigured within the clinical area to promote a better use of the space, and
 - cleaning and storing equipment is role modeled for other staff.
- The Outbreak Management Toolkit (based on the Hospital Emergency Incident Command Structure) has been used for all outbreaks occurring in VIHA acute and residential sites. In January, it was revised based on feedback received, and contains the following documents:
 - Purpose and Process of Outbreak Management,
 - Outbreak Management Structure Organizational Chart (Hospital or Residential),
 - Responsibilities for Key Personnel,
 - Meeting Record of Actions Template (record of decisions from each meeting),
 - Outbreak Management Debrief Summary Report Template (debrief including recommendations following conclusion of the outbreak), and
 - Communication Algorithm.
- The Outbreak Management Toolkit was submitted for recognition as Best Practice through Accreditation Canada and consideration for the Health Care Safety Award by the Canadian College of Health Leaders.

4. Supporting a demonstration site for rapid change cycles to evaluate the bundling of IPC interventions, and determining the associated costs of implementation.

CDH has been selected as the demonstration site for developing the co-production approach to bundles of infection prevention interventions, as noted above. CDH was selected as it provides all of the clinical services of larger acute care facilities, on a smaller scale. Early targets for this approach are:

- Hand hygiene,
- Changes to VRE and MRSA screening, swabbing and precautions,

- Antibiotic stewardship, and
- Housekeeping processes and service levels.

The types of possible interventions are explored with front line staff, including physicians. An evidence base is developed by using rapid Plan-Do-Study-Act (PDSA) cycles to allow staff (front line and IPC staff) to develop a better understanding of what specific changes will be most beneficial and effective. It allows the unit to implement the bundle of changes needed in a way that reflects the culture of the area, making the change more meaningful (positive deviance). Sustainability of the proposed changes will also formally be tested to detect weaknesses in implementation models and allow these gaps to be filled.

5. Specific Plan-Do-Study-Action (PDSA) Cycles:

a) Hand Hygiene and Changes to VRE and MRSA screening and precautions

Work completed in both of these areas is highlighted above.

b) Antibiotic Stewardship

To test and measure the impact of using antimicrobial guidelines at CDH.

Work Completed:

- The first PDSA cycle found there was a high usage of Cephalosporins and Quinolones both in the Emergency Department (ED) and on in-patient units. These drugs can predispose vulnerable individuals to CDI. The 2009 annual costs for these two classes of drugs were \$66,033 (Cephalosporin) and \$49,008 (Quinolones),
- Antibiotic guidelines were developed and discussed with the Antimicrobial Review Subcommittee, CDH ED physicians, CDH Medical Advisory Committee, and the Family Physicians Group in the Cowichan Valley. The guidelines were introduced into practice at the beginning of September, with a compliance rate of 80% in the first two weeks of use,
- A second audit of antibiotic usage completed in early December 2010, showed a 67% compliance rate. This decrease related predominantly to the ability to test the recommended antibiotics for Community Acquired Pneumonia (occurs seasonally). Test results recognized the need to revise the dose of Ceftriaxone, and address gastro-intolerance when macrolide was included,
- A revision to the Guidelines based on the physicians' feedback and observations has been completed and shared with the CDH ED Physicians, surgeons, and CDH Local Medical Advisory Committee (LMAC); and has been posted online for easier access, and
- This work illustrated the benefit of the co-production methodology for practice change.

Next steps:

- Initiate discussions with the LMACs of NRGH and WCGH to determine their interest in reviewing antibiotic stewardship at their sites in 2011-12.

c) Housekeeping Processes and Service Levels

Prior to the start of this intervention at CDH, it was determined that there would be benefit to trial this intervention at two sites (CDH and NRGH). The original budget for this PDSA cycle was split between the two sites, with four additional housekeeping staff for CDH and six for NRGH.

Work Completed:

- Housekeeping PDSA cycles occurred at CDH from September 13, 2010 – January 13, 2011, and October 18, 2010 – February 18, 2011 at NRGH,
- Neutral detergent was used for all routine cleaning, with change to Accelerated Hydrogen Peroxide (Virox) one-step decontamination process when a patient was on additional IPC precautions. A second clean of high touch areas using AHP occurred later in the shift if the patient was experiencing diarrhea,
- A task list was developed for the additional housekeeping staff at each site, with concentrated effort directed to high touch areas, with an increased frequency of cleaning based on the number of patients in multi-bed rooms,
- Staff were provided education and directed to focus on a thorough cleaning technique. Weekly auditing of the target areas for visual cleanliness and UV marking was instituted, with weekly meetings to discuss the audit findings, and
- Use of microfibre cloths was added as a second step in the PDSA cycle.

Initial Findings:

- Improved working relationships between units, housekeeping, and IPC,
- Audit results improved
 - CDH: Environmental cleanliness – 88%; UV Marker – 82%
 - NRGH: Environmental cleanliness – 88%; UV Marker – 71%
- The efforts of Housekeeping in collaboration with nursing staff at NRGH, contained an increased incidence of CDI cases and prevented an outbreak from needing to be declared.

Next Steps:

- The processes trialed at CDH and NRGH (use of neutral detergent and microfiber cloths) has been introduced at the PCC for routine cleaning. Education was provided to ensure that housekeeping staff were aware of the importance of the mechanical removal of soil rather than a reliance on solutions, and
- Initiated discussions on establishing a strategy to introduce these processes throughout VIHA acute and residential sites.

Appendix 3

Patient Care Centre – Clinical Commissioning Status Report (July 1, 2010 – April 15, 2011)

A Project Manager position was developed to plan for, coordinate, and implement a plan that encompassed the occupancy and post occupancy phases of the PCC project in order to ensure the transition was successful and sustainable. The position was filled from July 1 2010 to April 15 2011, and met these expectations for the move of all of the medical surgical units. Due to a change in move dates for acute psychiatry and geriatric psychiatry, this position participated in the preliminary discussions of the occupancy planning for these areas. The following was achieved:

1. Education

The education strategy for staff encompassed several modalities of learning and involved collaboration with the Professional Practice Office. Education was provided for all staff transitioning to the PCC prior to the date of the move as well as during the six week transition period following the acute care move in March 2011.

Education included reviews for Hand Hygiene that highlighted and supported the SWI-IPC. Additional education was provided regarding proper donning and doffing of Personal Protective Equipment (PPE) as it related to the new process in the PCC as well as management of the new washer disinfectors purchased for the PCC.

Table 6: Highlights of the education provided.

PCC Education Sessions	Attendee Types					Total Attendees	Total Hours
	Nursing	Lab	ESS	FMO	Others		
Train the Trainer: Hand Hygiene	28					28	2.0
In-service	28					28	2.0
Hand Hygiene	25				350	375	180.5
In-service	25					25	5.5
E-Learning Module					350	350	175.0
IPC Principles/Practices	22			12	304	338	81.0
In-service	22			12		34	5.0
E-Learning Module					304	304	76.0
Hand Hygiene & PPE		42	36		140	218	29.5
In-service		42	36		6	84	17.5
Café style					134	134	12.0
Infection Control Risk Assessment (ICRA) & Communication with IPC				12		12	1.0
In-service				12		12	1.0
Outbreak Management	20					20	3.5
In-service	20					20	3.5
Cleaning Terminology			33			33	2.5
In-service			33			33	2.5
Grand Total	95	42	69	24	794	1024	300.0

2. Evaluation and decision making with respect to procurement of equipment purchased for the PCC

IPC input was provided into the selection of patient beds, furniture for both acute care and mental health, finishes, fittings and sink styles, as well as washer disinfectors.

3. Development of workflow processes that highlight Infection Prevention and Control principles

A major focus was developing and established processes to ensure separate soiled and clean streams for equipment movement throughout the PCC. This also involved processes for the transport to and storage of clean maintained equipment in the equipment depot in order to promote the concept of minimal storage on the in-patient unit and timely availability of equipment when needed by nursing staff. In collaboration with stores, food, and housekeeping services, work flows and schedules were developed to prevent cross contamination from garbage and soiled linen with food delivery in the common service elevator.

Development of housekeeping standards, cleaning frequencies and cleaning solutions were established prior to PCC move. A cleaning protocol was developed that ensured the judicious use of disinfectants to ensure a clean environment was achieved, while minimizing damage to patient equipment and surfaces. This cleaning protocol drew on learnings from the SWI-IPC.

A Cleaned Elements document was created to serve as a living/working document which would identify items requiring regular cleaning. This document provides clarity on who is responsible for the task and is developed in a manner so that it can be clearly communicated and easily updated. To ensure understanding, dedicated infection control education for housekeeping staff was provided.

Engagement with the Facilities Maintenance and Operations staff prior to the acute care move ensured a strong communication infrastructure that can be sustained for the life of the PCC. Education focused on the importance of maintaining and servicing the building to minimize risk to the patients and staff. Management and processes for use of negative pressure rooms was developed in conjunction with facilities management. PCC staff received education during the initial orientation sessions for the PCC. Additional review of these processes were captured during the final phase of orientation which incorporated simulated situations.

4. Planning and assistance in the “Move Day” process for PCC

IPC participated in the development of plans to move patients from the old RJH site to the PCC, with the view to preventing or minimizing the potential of cross contamination of infectious organism between patients and in promoting clean equipment in the environment. A cleaning process was developed for equipment being moved to the PCC

prior to the “move” day; as well for the the equipment required to safely move patients on the day of the move.

The IPC aides were involved in the preparations for the move, primarily to assist with the cleaning and management of equipment that was planned for early transfer to the PCC, providing an assurance that dirty or contaminated equipment was not moved into the PCC. On the “Move Day”, they were involved in cleaning the equipment retained on the unit until all patients had been transferred, so that it was clean for transport to the new environment.

In the week leading up to the move, patient lists were reviewed daily to determine those patients on precautions and what considerations might be needed on the move day for their transport. Specific plans were developed for the one in-patient unit on Outbreak Status the day of the move.

5. Support post move day

Daily rounds of the units occurred during the 3 weeks following the move, and provided the opportunity to support staff and reinforce IPC principles and the new work flow processes developed for the PCC. The IPC Aides were also instrumental during this transitional support phase, by ensuring that the soiled utility and clean rooms were maintained as anticipated. They assisted in modeling and reinforcing the maintenance of the clean equipment flow throughout the PCC.

LEARNINGS FROM THIS PROJECT

- 1.** Successful education and learning for staff is best achieved when it is implemented close to the date of the move and incorporated throughout the transitioning period. This is evident in the ongoing support and education required for the Meiko washer disinfectors.
- 2.** The involvement of the IPC Program with the development of the housekeeping contracts will ensure that gaps in equipment/furniture cleaning are minimized.
- 3.** The development and utilization of a Mock room was a great means of obtaining input from front-line users. What was shown in the Mock room was not always reflected in the final build of the PCC, necessitating review of options to support practice and IPC principles. An example is the type of garbage bins needed for the limited space under the hand hygiene sink in the patient rooms.
- 4.** It is critical that IPC Program be involved in all stages of planning and development, construction, and clinical commissioning. Consideration should be given to the IPC Program being included as one of the signatories in the final sign off on the plans and clinical commissioning of a site.

Appendix 4

Information Management/Information Technology (IM/IT) Infection Prevention and Control Project Status Report (April 1, 2010 – March 31, 2011)

1. Automation of Hand Hygiene Audit and Reporting Processes

In late 2009, IM/IT leadership proposed utilizing a desktop application already licensed for use within VIHA to electronically capture hand hygiene audit data. This application, InfoPath, is within the Microsoft suite of applications. The utilization of this application for electronic data capture and reporting has not previously been undertaken in VIHA nor anywhere in British Columbia.

Work Completed:

- Hand hygiene audit tool imbedded in Microsoft InfoPath developed, tested, and implemented,
- Developed upload to data warehouse for additional reporting capacity, and
- Completion of development signed off by IPC Program.

2. Development and implementation of electronic solution for IPC Program

The difficulties of identifying and managing infections within VIHA has been exacerbated by the utilization of data collection and reporting tools that do not integrate information across VIHA or within the electronic health record. As identified in the IM/IT strategic plan, the Cerner clinical information system will be leveraged and additional functionality implemented to enable sound infection control principles and practices across VIHA acute and residential care. VIHA will work with Cerner as a localization partner to identify VIHA/BC/Canadian specific IPC requirements.

Work Completed:

- Two Webex presentations on the Cerner Infection Control solution to review functionality available based on existing VIHA Cerner functionality and VIHA's electronic health record stage of development,
- Current State document complete, inclusive of existing work processes and plethora of data collection tools used by each IPC Practitioner,
- IPC Program has confirmed requirements for tracking and trending risk factors to predict and prevent outbreaks, monitoring and reporting specific organisms, and identifying high risk patients requiring intervention; finalized PowerForm specifications,
- 2-day working session with Cerner build team to review functionality, information flows, proposed solutions, report availability, and customize the IC module for the VIHA/Canadian environment,
- Future state IPC work flow processes mapped out,
- VIHA IM/IT system (build domain) prepared for Cerner build team,
- Cerner team on site to do build of Websphere and Business Objects,

- High level testing roadmap developed, and
- Mock up of reports developed and reviewed; confirmation of reports required by IPC program for development by VIHA staff.

Next Steps:

- Cerner on-site visit scheduled for week of June 6th to demonstrate the work developed based on VIHA-identified requirements and obtain VIHA signoff,
- In preparation for Cerner rollout to SJGH, place ARO flag on SJGH patients once upload of demographics has occurred in VIHA's Cerner system,
- Continuation of Cerner build activities,
- Continuation of build of reports and forms by VIHA staff, and
- Finalize the test plan to be used by VIHA IM/IT and IPC.

3. *Development and introduction of IPC Screens for completion by program/unit staff*

The development and implementation of solutions that improve access to integrated clinical information and identify potential infection triggers will support surveillance, monitoring, case management, intervention and reporting requirements of infection processes and outcomes across VIHA.

Work completed:

- Four IPC screens developed and integrated into Clinical Documentation released at the PCC in March, with introduction throughout VIHA in June 2011:
 - ARO Screening Questionnaire,
 - Infection Risk Assessment,
 - Nursing Precaution Order (to capture type of precautions, and start and end dates), and
 - Lines, Tubes, Drains (to capture start and end dates).
- Revision to the ARO Screening Questionnaire to include recently identified antibiotic resistant organism, and
- Hard copy downtime forms developed.

Next steps:

- Review compliance of front line unit staff in completion of the IPC screens once implementation of Clinical Documentation has occurred throughout VIHA, and
- Finalize process for change requests to address urgent situations (pandemic), new emerging organisms (Carbepenam Resistant Gram Negative Bacillus), and trending/reporting changes.

Appendix 5

Education

Table 7: Education

Education Type	Attendee Types:					Total Attendance	Total Hours
	Physicians	Nursing	RCAs	ESSs	Mixed		
Accreditation ROPs		58	13	1	62	134	12.25
1-to-1 Training				1		1	0.25
In-service		58	13		20	91	9.00
Presentations					42	42	3.00
AROs		685	78	12	67	827	88.75
1-to-1 Training		1				1	0.50
Informal/Discussion		19			4	23	4.75
In-service		656	78	12	48	794	79.75
Presentations					15		0.50
Walk-through/Review		9				9	3.25
Hand Hygiene	6	759	128	12	356	1261	113.17
In-service	6	624	128	12	232	1002	90.67
Presentations		131			119	250	19.00
Videoconference		4			5	9	3.50
Hand Hygiene Audits		146	6	13	9	174	39.92
1-to-1 Training		23	1	2	3	29	14.42
Informal/Discussion		3				3	0.50
In-service		116	5	11	6	138	22.00
Walk-through/Review		4				4	3.00
IPC Principles/Practices		755	163	173	1277	2348	253.70
1-to-1 Training		1			1	2	5.50
Informal/Discussion		77			10	87	12.25
In-service		258	132	145	426	961	90.53
Orientation-Gen		65	31	2	553	651	17.00
Orientation-Nurs		343			10	353	29.58
Presentations				25	102	107	9.00
Walk-through/Review		11		1	175	187	89.83
IPC Updates/Events		181	16		10	207	13.58
In-service		50	16		6	72	9.50
Presentations		6				6	0.25
Videoconference		125			4	129	3.83
pH1N1/Influenza		47	34		14	95	15.25
In-service		47	34		14	95	15.25
Sub-totals	6	2631	438	211	1795	5046	536.62
Hand Hygiene Initiative					508	508	448.00
<i>Delivered by non-ICPs</i>							
Scheduled Sessions					150	150	90.00
1-to-1 Infopath Training					358	358	358.00
Grand Totals	6	2631	438	211	2303	5554	984.62

Appendix 6

***Clostridium difficile* Infection (CDI) Outbreak at Nanaimo Regional General Hospital (March 29-August 24, 2010)**

A *Clostridium difficile* outbreak was declared at Nanaimo Regional General Hospital (NRGH) on March 29, 2010 when three positive hospital acquired CDI cases were identified over a weekend and linked to one medical unit. Within the week, two additional cases were reported on another floor.

The Outbreak Management Structure (OMS), based on the Hospital Emergency Incident Command Structure (HEICS) was initiated and the following interventions were implemented:

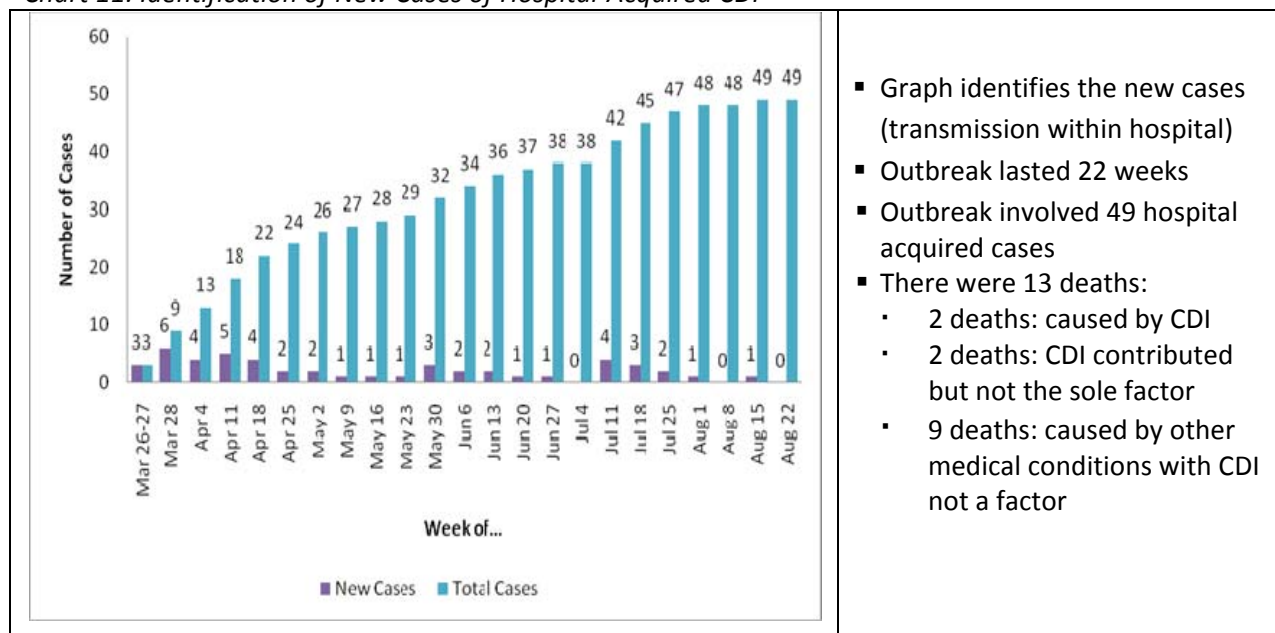
- Use of enhanced infection control precautions (contact precautions, Bristol Stool Chart, dedicated equipment),
- Accommodation in private rooms or cohorted with dedicated toileting devices,
- Change to cleaning solutions and type of clean, and
- Focus of cleaning efforts on the daily regular and discharge cleans, with the facility clean completed as resources permitted.

With transfers and movement of patients to different areas of the hospital, other units became involved. Additional housekeeping teams from Crothall and VIHA were brought in to assist with the daily and discharge cleans on the 3rd week of the outbreak. NRGH had been and was experiencing an increased number of admissions in the emergency department, which prevented a thorough clean of the department.

A review of the cases at four months into the outbreak revealed that the established case definition was not used consistently. This has likely inflated the number of true cases associated with that outbreak. A retrospective review of the cases in 2009-10 has not been done to determine if the case definition was consistently used. It is likely that because of the previous outbreaks at NRGH, staff there are hyper-vigilant in sending stool specimens, resulting in the identification of *C. diff* colonization and not true cases of infection.

This outbreak was compounded with a concurrent Norovirus outbreak from May 4-28, 2010.

Chart 11: Identification of New Cases of Hospital-Acquired CDI



- Graph identifies the new cases (transmission within hospital)
- Outbreak lasted 22 weeks
- Outbreak involved 49 hospital acquired cases
- There were 13 deaths:
 - 2 deaths: caused by CDI
 - 2 deaths: CDI contributed but not the sole factor
 - 9 deaths: caused by other medical conditions with CDI not a factor

Additional new interventions introduced during this outbreak included:

- Designation of a Coordinator to work with units to declutter space by discarding or storing unused/infrequently used equipment, support labeling equipment to designate if clean or dirty, post hand hygiene posters through the facility, and provide additional educational sessions to staff on hand hygiene and other topics:
 - Included towelettes on patients’ meal trays so hand hygiene could be completed before meals.
- Developed precaution logs that unit staff completed each morning and provided to IPC and Housekeeping,
- Reviewed case definition with all staff to ensure that only true cases were being captured, and
- Initiated IPC rounds on all new CDI cases to ensure appropriate precautions had been implemented and treatment considered. In addition, CDI care plans were placed on each affected patient’s chart.

Appendix 7

Surveillance Case Definitions

***Clostridium difficile* Infection**

CDI case:

Patient has diarrhea AND

- Laboratory confirmation is received (positive toxin or culture with evidence of toxin production), OR
- Diagnosis of typical pseudo-membranes is made on sigmoidoscopy or colonoscopy or histological/pathological diagnosis of CDI, OR
- Diagnosis of toxic megacolon is made.

A CDI case is classified as “hospital acquired” when:

- The patient’s symptoms occurred after 72 hours of admission, OR
- Symptoms cause readmission of a patient who had been hospitalized in the previous eight weeks, and patient is not a resident of a residential care facility.

Methicillin-resistant *Staphylococcus aureus* (MRSA)

MRSA case is defined as meeting ALL of the following criteria:

- Laboratory identification of MRSA,
- Includes *Staphylococcus aureus* cultured from any specimen that tests oxacillin-resistant by standard susceptibility testing methods; or by a positive result for penicillin binding protein 2a (PBP2a); or molecular testing for mecA. May also include positive results of specimens tested by other validated polymerase chain reaction (PCR) tests for MRSA,
- Patient must be admitted to an acute care facility,
- Patient is a newly identified MRSA case at the time of hospital admission or identified during hospitalization, and
- The patient exhibits signs and symptoms of infection; i.e. the MRSA is recovered through clinical investigation rather than screening.

This includes:

- MRSA cases identified for the first time during their hospital admission,
- Cases that have been previously identified at another facility outside of a VIHA facility, and
- Identified at a VIHA facility but are currently diagnosed with a different strain than the one previously recorded.

This DOES NOT include:

- MRSA cases previously identified at a VIHA facility,
- Cases identified in the emergency department who were not subsequently admitted, clinic or other outpatient cases, and

- Cases re-admitted with MRSA.

Once the patient has been identified with MRSA, they will be classified as healthcare-associated based on an assessment of the ICP using the following criteria:

- length of time in hospital prior to MRSA identification (> 48 hours),
- knowledge of previous MRSA status,
- date of admission,
- length of stay in hospital,
- prior hospitalization or other healthcare facility history (previously admitted in past 12 months), and
- where patient admitted from (e.g., long term care).

Vancomycin-resistant *Enterococci* (VRE)

VRE case is defined as meeting ALL of the following criteria:

- Laboratory identification of *Enterococcal* bacterium,
- Excluding where the organism is identified as *E. gallinarum* or *E. casseliflavus*,
- Vancomycin MIC \geq 8 ug/ml,
- Patient is admitted to the hospital,
- Is a "newly" identified VRE-infection at the time of hospital admission or identified during hospitalization, and
- The patient exhibits signs and symptoms of infection; i.e. the VRE is recovered through clinical investigation rather than screening.

This includes:

- VRE cases identified for the first time during their hospital admission,
- Cases that have been previously identified at another facility outside of a VIHA facility, and
- Identified at a VIHA facility but are currently diagnosed with a different strain than the one previously recorded.

This DOES NOT include:

- VRE infection cases previously identified at a VIHA facility,
- Cases identified in the emergency department who were not subsequently admitted, clinic or other outpatient cases, and
- Cases re-admitted with VRE infection.

Once the patient has been identified with VRE, they will be classified as healthcare-associated based on an assessment of the practitioner using the following criteria:

- length of time in hospital prior to VRE identification (> 48 hours),
- knowledge of previous VRE status,
- date of admission,
- length of stay in hospital,

- prior hospitalization or other healthcare facility history (previously admitted in past 12 months), and
- where patient admitted from (e.g., long term care).

Extended Spectrum Beta-Lactamase (ESBL)

ESBL case is defined as meeting ALL of the following criteria:

- Laboratory identification of ESBL,
- Patient is admitted to the hospital,
- Is a "newly" identified VRE-infection at the time of hospital admission or identified during hospitalization, and
- The patient exhibits signs and symptoms of infection; i.e. the ESBL is recovered through clinical investigation rather than screening.

This includes:

- ESBL cases identified for the first time during their hospital admission,
- Cases that have been previously identified at another facility outside of a VIHA facility, and
- Identified at a VIHA facility but are currently diagnosed with a different strain than the one previously recorded.

This DOES NOT include:

- ESBL infection cases previously identified at a VIHA facility,
- Cases identified in the emergency department who were not subsequently admitted, clinic or other outpatient cases, and
- Cases re-admitted with ESBL infection.

Once the patient has been identified with ESBL, they will be classified as healthcare-associated based on an assessment of the practitioner using the following criteria:

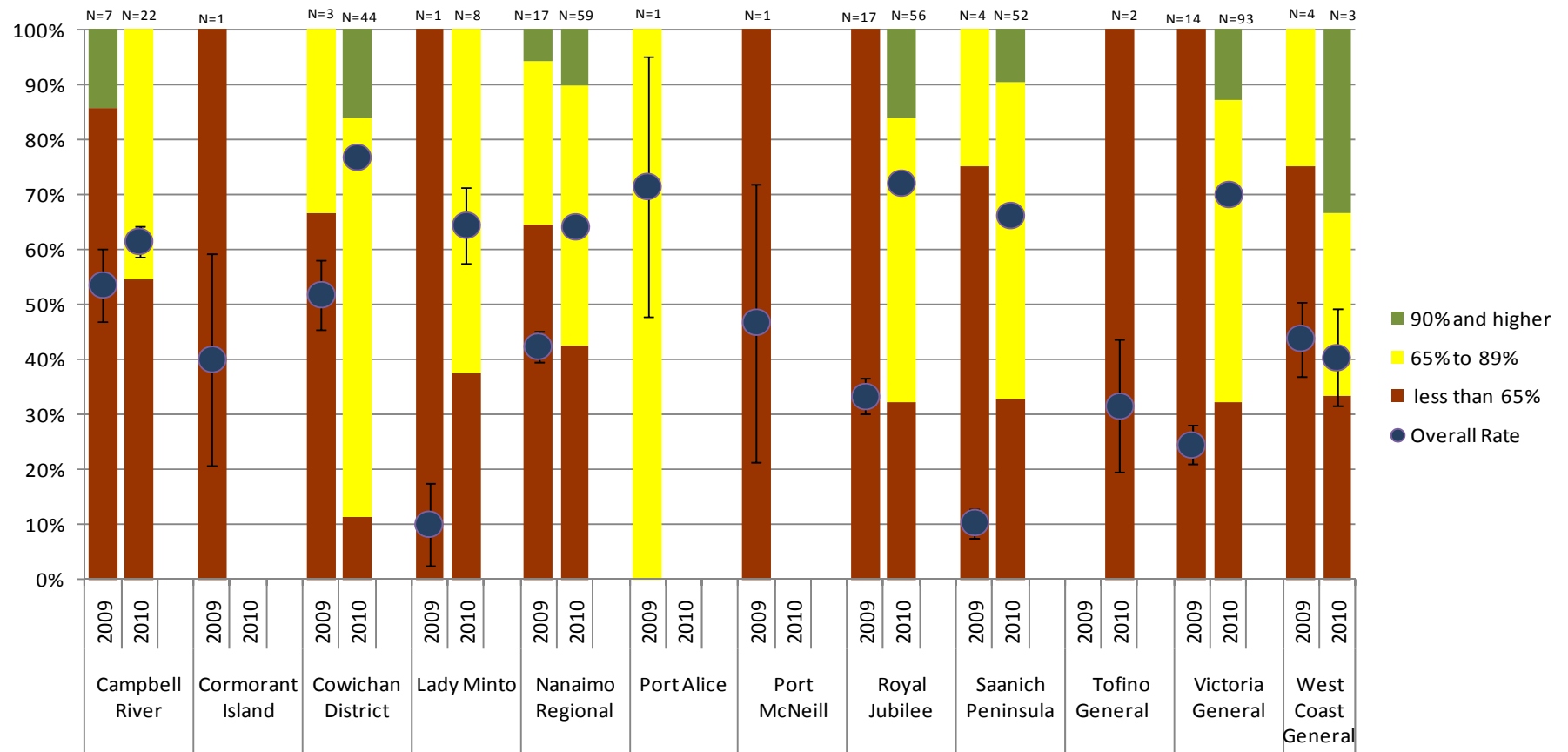
- length of time in hospital prior to ESBL identification (> 48 hours),
- knowledge of previous VRE status,
- date of admission,
- length of stay in hospital,
- prior hospitalization or other healthcare facility history (previously admitted in past 12 months), and
- where patient admitted from (e.g., long term care).

Appendix 8

Hand Hygiene Compliance Rates

Chart 12: Proportion of Hand Hygiene Compliance Rates at Acute Care Facilities

Proportion of Hand Hygiene Compliance Rates in Specified Ranges & Overall Rate from Audits at VIHA Acute Care Facilities: Fiscal Years 2009 & 2010



N = number of days hand hygiene audits were conducted

Chart 13: Proportion of Hand Hygiene Compliance Rates at Long Term Care Facilities

Proportion of Hand Hygiene Compliance Rates in Specified Ranges & Overall Rate from Audits at VIHA Long Term Care Facilities: Fiscal Years 2009 & 2010

