



Getting Started Kit

Antibiotic Resistant Organisms: MRSA

How-to Guide

Safer Healthcare Now!

We invite you to join the *Safer Healthcare Now!* Campaign (*SHN!*) to help improve the safety of the Canadian healthcare system. *SHN!* is a National campaign supporting Canadian healthcare organizations to improve patient/resident safety by using quality improvement methods to integrate evidence and best practices in patient/resident care delivery. The campaign is supported by the Institute for Healthcare Improvement (IHI) and is patterned after IHI's campaigns (*100,000 Lives Campaign* and *5 million lives campaign*). To obtain further information about MRSA and to find out how to join the *SHN!* Campaign and access more resources, contacts, and tools, visit our website <http://www.saferhealthcare.now.ca>

Patient safety interventions are organized as bundles and described in Getting Started Kits, based on those originally developed by IHI for its *100,000 Lives Campaign* (now *5 million lives campaign*). These Getting Started kits are designed to engage your teams and clinicians in a dynamic approach for quality improvement, and to provide a thorough basis for *getting started*. **Please note that although the SHN kits and the original kits developed by IHI are similar, there are also key differences in the content of the interventions and corresponding measures for some kits.** These differences are clearly noted in the body of the SHN kits themselves, and on the SHN website.

The "Getting Started" kits are based on the current state of knowledge. Consistent with the dynamic nature of this campaign, which continues to evolve, emerging evidence may influence adaptation of the kit in the future. This kit was created in February 2008. We remain open to working consultatively on updating the content as together we make healthcare safer in Canada.

Note:

The Quebec Campaign: Together, let's improve healthcare safety! works collaboratively with the SHN! Campaign. The GSKs for all interventions used in both campaigns are the same.

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This MRSA toolkit has been prepared with support from the Canadian Patient Safety Institute and contains materials, documents and experiences of National and International facilities. The insight and contributions of following members has been greatly appreciated:

Canadian Faculty

Name	Position	Facility
Elizabeth Bryce	Clinical Professor UBC and Regional Medical Director Infection Control Vancouver Coastal Acute	Vancouver General Hospital
Andrew Simor	Chief, Department of Microbiology and the Division of Infectious Diseases Co-Chair, Canadian Nosocomial Infection Surveillance Program	Sunnybrook Health Sciences Centre CNISP
Dick Zoutman	Medical Director Infection Control Services Professor and Chair, Divisions of Medical Microbiology and of Infectious Diseases Physician Director	Kingston General Hospital Queen's University & University Hospitals Kingston CHICA
Jim Hutchinson	Director of Infection Control Service Chair Canadian Committee on Antibiotic Resistance	Health Care Corp. of St. John's
Lynn Johnston	Head of the Division of Infectious Diseases	QEll Health Sciences Centre
Michael Mulvey	Chief, Antimicrobial Resistance and Nosocomial Infections	National Microbiology Laboratory, Public Health Agency of Canada
Joanne Laalo	Current President	Community and Hospital Infection Association – Canada Dundas, Ontario
Shirley Paton	A/Director, Health Care Acquired Infections Division	Public Health Agency of Canada
Nora Boyd	Board Member CHICA Chair Canadian Committee on Antibiotic Resistance	Sarnia, Ontario

Safer Healthcare Now! Campaign
How-to Guide: Reduce Methicillin-Resistant *Staphylococcus aureus*

March 2008

Michael Gardam	Director, Infection Prevention and Control Medical Director, Tuberculosis Clinic MRSA Intervention Lead – SHN!	University Health Network, Toronto
Tanis Rollefstad	Safety and Improvement Advisor Western Node	Safer Healthcare Now!, Saskatchewan
Dannie Currie	Safety and Improvement Advisor Atlantic Node	Safer Healthcare Now!, Nova Scotia
Wendy Runge	Infection Control Practitioner,	Calgary Health Region, Alberta
Virginia Flintoft	Project Manager, Central Measurement Team	University of Toronto and Safer Healthcare Now!
Marlies van Dijk	Advisor to MRSA intervention, Western Node Leader	Safer Healthcare Now!, Alberta
Phyllis Stoffman	Consultant	Vancouver



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SUMMARY

This *Safer Healthcare Now! (SHN!) Getting Started Kit: MRSA* is a step-by-step guide to assist Canadian health care organizations to implement evidence-based strategies that will control, reduce and prevent MRSA infections using Quality Improvement methodologies.

This kit is targeted to healthcare facilities across the healthcare continuum, including long term care and community hospitals. Please see examples of how the kit can be applied in these settings (Appendix B and J).

How Can We Prevent MRSA?

This *Getting Started Kit* uses five **evidence-based infection control interventions** that have proven successful in reducing MRSA transmission:

1. An aggressive **hand hygiene program** with strong leadership support to ensure that health care workers have the correct tools available to perform hand hygiene.
2. A systematic **cleaning and/or disinfection** program for the environment and patient care equipment;
3. Use of **contact precautions** for any patient infected or colonized with MRSA;
4. Use of selected **MRSA screening cultures** on admission and at other times during hospitalization, if indicated, to detect asymptomatic MRSA colonization; and
5. Surveillance of clinically important healthcare associated (HAI) **MRSA infections**.

The *Getting Started Kit* recommends that each facility perform an initial assessment of the burden of patient MRSA colonization and infection by reviewing laboratory reports of MRSA isolates and any available MRSA surveillance data. These baseline data will help guide resource allocation and the selection of appropriate interventions to maximize MRSA prevention, control and reduction.

For example, large hospitals with endemic high rates of MRSA colonization or infection may decide to initially target high risk programs such as intensive care, cardiac surgery, general medicine, and transplant. Other facilities with known low rates of MRSA colonization and infection may choose to build on the first three components in order to maintain their low rates (Appendix B and J). It is likely however that most healthcare organizations will need to implement all 5 interventions in order to positively influence MRSA colonization and infection in their organization.

None of the interventions will ultimately succeed without an organizational culture change. Usually the challenge faced by infection prevention and control programs is not the lack of knowledge about these interventions, but rather an inability to translate that knowledge into the requisite social and behavioral changes within complex healthcare organizations. Another common challenge is the lack of organizational supports such as efficient work flow patterns and an “work friendly” environment that enable HCW to easily perform the needed behaviors: HCW cannot effectively perform hand hygiene unless alcohol based hand rub (ABHR) and hand hygiene sinks are available at point of care.

Infection Prevention and Control programs cannot bring about these changes alone: both staff and leadership engagement are required for any of these interventions to be effective.

The first three interventions in this Getting Started Kit, namely hand hygiene, environmental cleaning and disinfection, and the use of contact precautions for MRSA colonized or infected patients are aimed at breaking the chain of infection

The final two interventions, namely screening for MRSA colonization and laboratory surveillance for MRSA infections, allow for the calculation of rates.

Measurement for Safer Healthcare Now! Central Measurement Team are:

Hand Hygiene Product (worksheet 1.0)

Hand Hygiene Observations (worksheet 2.0)

Reduction in Mean Time to Placement on Contact Precautions for Patients with Known or Probable MRSA at Time of Admission (worksheet 3.0)

Reduction in Mean Time from Notification by Lab of MRSA Status to Placement on Contact Precautions for Patients identified as MRSA Colonized or Infected through Routine Admission Screening Process (worksheet 4.0)

Active Screening on admission for asymptotically MRSA colonized patients per 1,000 admissions (worksheet 5.0)

Incidence of HAI MRSA Infections per 1000 *Patient Days (this could be for entire facility or your identified unit) (worksheet 6.0)

Healthcare Associated Blood Stream Infections caused by MRSA per 1000 Patient Days (worksheet 7.0)

* *Safer Healthcare Now!* will not be collecting monthly measurement for Environmental Cleaning.

INTRODUCTION

This *Safer Healthcare Now! (SHN!) Getting Started Kit: MRSA* is a step-by-step guide to assist health care organizations across the continuum of healthcare in Canada to implement evidence-based interventions that will prevent, reduce or control MRSA infections using Quality Improvement methodologies.

MRSA is currently a significant cause of infections in Canadian healthcare institutions, and therefore *SHN!* has decided to make MRSA reduction its first priority. Future interventions may include *Clostridium difficile* and vancomycin-resistant *Enterococci* (VRE).

This Getting Started Kit will provide:

1. A framework for acute and non-acute care organizations to either significantly *reduce or maintain existing low rates* of MRSA infection by reliably implementing at least three of the five interventions recommended in this guide; and
2. Tools for ongoing monitoring of both process and outcome measures to enable health care organizations to evaluate the effectiveness of the interventions.

The Problem – Hospital Associated MRSA is on the Rise

An ARO is a microorganism that has developed resistance to the action of several antimicrobial agents and that is of special clinical or epidemiological significance.¹ MRSA are strains of *S. aureus* that are resistant to all of the beta-lactam classes of antibiotics (such as penicillins, penicillinase-resistant penicillins (e.g. cloxacillin) and cephalosporins.² The rate of MRSA in Canadian hospitals increased from 0.46 to 8.04 per 1000 admissions between 1995 and 2006.³

HAIs are a major cause of excess illness and death. Infections caused by MRSA are particularly problematic. Compared to methicillin-susceptible staphylococcal infections, they are often more lethal. In the US, one of every 20 (5%) patients treated in US hospitals in 2005 for MRSA died. Many of the patients were elderly or had other risk factors. The death rate for hospitalized MRSA patients was higher than the 4% death rate for hospitalized tuberculosis patients, another potentially deadly illness.⁴

There are a number of factors identified that place people at risk for colonization and/or infection with MRSA. The risk factors include:^{5,6}

- increased age;
- admission to an ICU;
- extended stay in an acute care facility;
- previous or recurrent hospitalizations;
- invasive procedures;

1 Ontario Ministry of Health and Long-Term Care/Public Health Division/Provincial Infectious Diseases Advisory Committee Toronto, Canada March 2007 Best Practices for Infection Prevention & Control of Resistant *Staphylococcus aureus* and *Enterococci* March 2007

2 Ibid.

3 CNISP Data, 2007

4 Agency for Healthcare Research and Quality (AHRQ), Rockville, Maryland Posted 12/04/2007

5 The evolution of methicillin-resistant *Staphylococcus aureus* in Canadian hospitals: 5 years of national surveillance, CMAJ • July 10, 2001; 165 (1)© 2001 Andrew E. Simor*, Marianna Ofner-Agostini, Elizabeth Bryce†, Karen Green**, Allison McGeer**, Michael Mulvey, Shirley Paton and The Canadian Nosocomial Infection Surveillance Program, Health Canada

6 Boyce JM, Update on resistant *Staphylococcus aureus* infections, Clinical Updates in Infectious Diseases , June 2003.

- presence of invasive indwelling devices (dialysis access lines, intravascular lines, urinary catheter, endotracheal or tracheostomy tube, gastrostomy or jejunostomy feeding tube);
- recurrent antibiotic use;
- presence of a surgical wound, decubitus ulcer, or other chronic wound;
- contact with, or proximity to, a patient colonized or infected with MRSA who had draining skin lesions or wounds not covered by dressings or copious uncontrolled respiratory secretions;
- malnutrition, immunosuppression (age- and/or medication-related), chronic medical conditions (diabetes); and
- debilitated and/or bed bound and requiring extensive hands on care (burns, other traumas).

Reducing MRSA infections may also help reduce VRE and Extended Spectrum Beta-lactamase (ESBL) organisms as several of the control measures are similar.⁷ The intensive antibiotic therapy used to treat MRSA, VRE and other antibiotic-resistant pathogens starts a vicious cycle by predisposing affected patients to colonization and/or infection with yet other antibiotic resistant organisms.

We know how to control MRSA; however, it is one thing to know how to do it, and another to put the knowledge into practice in a reliable, consistent manner. Hospitals (healthcare organizations) that have been successful in the fight against MRSA are using new, innovative and creative approaches that engage the entire hospital community, from front-line workers to CEOs to surgeons to patients and their families.

Controlling MRSA is possible. In the 1970s MRSA accounted for 30% of hospital-associated *S. aureus* infections in Denmark, Finland and the Netherlands, yet today, the prevalence of hospital-associated MRSA infections in those countries is less than one percent.⁸ Controlling the spread of MRSA involves everyone: healthcare workers, senior leaders, patients, residents, clients, families. MRSA is a democratic problem – controlling its spread involves everyone in the hospital. Therefore *“the hierarchical social structure in hospitals does not work well in tackling these kinds of problems. What you need to fight the spread of germs is a cultural shift”*; Dr. Jon Lloyd, Coordinator for the SW Pennsylvania MRSA Prevention Collaborative.⁹

A word about Community Acquired MRSA (CA-MRSA)

It has been known for many years that hospital-associated strains of MRSA could transmit outside of the hospital setting and result in community infections. More recently however, community acquired MRSA strains have arisen that are distinct from hospital strains; they typically have different antibiotic resistance patterns and virulence factors. These CA-MRSA strains are known to frequently cause invasive skin and soft tissue infections such as abscesses. Many outbreaks of CA-MRSA have been reported in North American communities; in Canada, CA-MRSA is most prevalent in the Western provinces but is a growing problem throughout the country. It has been shown in some

7 Management of Multidrug-Resistant Organisms in Healthcare Settings, 2006. Healthcare Infection Control Practices Advisory Committee (HICPAC). <http://www.cdc.gov/ncidod/dhqp/pdf/ar/mdroGuideline2006.pdf>

8 Muto, C. A., Jernigan, J.A., Ostrowsky, B. E., & et al. 2003, SHEA guideline for preventing nosocomial transmission of multidrug-resistant strains for *Staphylococcus aureus* and *Enterococcus*, *Infection Control and Hospital Epidemiology*, vol. 24.

9 “Do What You Can, With What You Have, Where You Are.” Plexus Institute 2007 A Quest To Eliminate MRSA At the VA Pittsburgh Healthcare System. P. 4. A. Singh and Karen Greiner

settings to be more prevalent in certain populations such as IV drug users and the homeless

For the purposes of this Getting Started Kit, CA-MRSA and HA-MRSA are treated the same way: for either organism, there ideally should not be spread within hospitals. The increase in CA-MRSA has implications for facilities that are not planning on performing the admission screening intervention or who only screen patients with HA-MRSA risk factors: if patient is admitted with undetected CA-MRSA colonization that subsequently develops an infection, this infection will be attributed to the facility.

"We have to change the culture from one of acceptance to one of outrage."

Dr. Jerry Zuckerman, Albert Einstein Medical Center
Philadelphia, PA

This kit will provide you with some tools to help you find an approach that works for your specific setting. We will share success stories from a variety of acute care hospitals to inspire you (on the *SHN!* Communities of Practice), and offer specific case studies as examples from community hospitals and long-term care settings (Appendix B)

Key Elements of the Getting Started Kit

The key components of this *Getting Started Kit* are five evidence-based infection prevention and control interventions that have been proven successful in reducing transmission of MRSA: ^{10,11,12,13,14,15,16,17}

1. An aggressive hand hygiene program;
2. A systematic program for cleaning and decontamination of the environment and equipment;
3. Use of contact precautions for any patient that is infected or colonized with MRSA (requires health care workers to wear gloves, gowns and sometimes masks when in the room or bed space of the patient);
4. Detection of asymptomatic MRSA colonization using selected MRSA screening cultures on admission and at other times during hospitalization, if indicated; and
5. Surveillance of clinically important HAI MRSA infections (sterile site isolates) which includes regular reporting MRSA infection rates back to both healthcare workers

10 Ontario Ministry of Health and Long-Term Care/Public Health Division/Provincial Infectious Diseases Advisory Committee Toronto, Canada March 2007

Best Practices for Infection Prevention & Control of Resistant *Staphylococcus aureus* and *Enterococci* March 2007

11 Siegel JD, Rhinehart E, Jackson M, et al. Management of multidrug-resistant organisms in healthcare settings. Atlanta, GA: Centers for Disease Control and Prevention Healthcare Infection Control Practices Advisory Committee; 2006; 2006.

12 Gerber SI, Jones RC, Scott MV, et al. Management of outbreaks of methicillin resistant *Staphylococcus aureus* infection in the neonatal intensive care unit: a consensus statement. *Infect Control Hosp Epidemiol* 2006; 27: 139–145.

13 . Institute for Healthcare Improvement (IHI). Getting Started Kit: Reduce Methicillin-Resistant *Staphylococcus Aureus* (MRSA) Infection, How-To Guide.2007

14 Association for Professional in Infection Control and Epidemiology. A call to action: elimination of MRSA transmission [online resource]. <http://www.apic.org/>

15 Huang SS, Yokoe DS, Hinrichsen VL, et al. Impact of routine intensive care unit surveillance cultures and resultant barrier precautions on hospital-wide methicillin-resistant *Staphylococcus aureus* bacteremia. *Clin Infect Dis* 2006; 43:971–978. A quasi-experimental study

16 Boyce et al. (2004). Do infection control measures work for methicillin-resistant *Staphylococcus aureus*? *Infect Cont Hosp Epidemiol*; 25(5): 395-401.

17 "Eliminating Hospital-Acquired Infections" presentation slides from Jon Lloyd, MD, FACS, from VHA's Best Practice Symposium, September 18, 2006.

Routine Practices regardless of diagnosis

Ideally, all HCWs should apply “routine practices” for all patient/resident interaction to prevent the transmission of pathogenic organisms from patient to patient or to healthcare workers. These routine practices should be used for all patients **regardless of diagnosis** and tailored to the characteristics of the patients and their environment. Routine practices include: appropriate hand hygiene, routine cleaning or disinfection of equipment and patient furniture and using gloves, masks, eye wear, gowns, and private rooms when there is a risk or likelihood of being in contact with, or being sprayed, splashed or exposed to any blood, body fluid, excretion or secretion. All staff should receive regular annual education and support to comply with the principles of Routine Practices.

It is recognized that were these practices widely followed, much of the transmission of hospital-acquired organisms like MRSA would greatly diminish. Indeed, some of the SHN! MRSA interventions e.g. hand hygiene and environmental cleaning and disinfection, are in fact simply reinforcements of routine practices. This reinforcement is necessary in order to help drive the necessary culture change in healthcare organizations.

Leadership

Changing the culture at an organizational level is essential to control the spread of antibiotic-resistant organisms. Over the last years, hand hygiene campaigns have sprung up both locally and nationally; however we are not yet seeing a corresponding reduction in ARO's. It is well known in the business literature that 80% of planned interventions fail in reaching their goals, presumably because the long and complicated process of bringing about culture change was not successful.

Administrative and clinical leadership engagement is essential for any of the care components in this kit to be implemented properly i.e., while infection control staff can advise on best practices and aid with their implementation. Culture change at an organization will only occur if you involve all players in the system, not just infection control.

“If your leadership doesn't see the importance of controlling MRSA, then walk away; you will achieve nothing but frustration.”

Michael Gardam
Director, Infection Prevention and Control University Health Network,
Ontario, Canada

Tackling such a problem requires leadership support to: ¹⁸

- nurture a cultural change from the inside out;
- set the direction for the intervention;
- provide freedom and opportunities for staff to co-create solutions;
- eliminate barriers to problem solving; and

18 . Institute for Healthcare Improvement (IHI) Getting Started Kit: Reduce Methicillin-Resistant Staphylococcus Aureus (MRSA) Infection, How-To Guide.2007

- provide resources to develop and make available educational materials and approaches appropriate for all staff, volunteers, patients, and families.

Presenting a strong business case may be one of the first steps to get your senior leadership on board. Please refer to Appendix A for business case information.

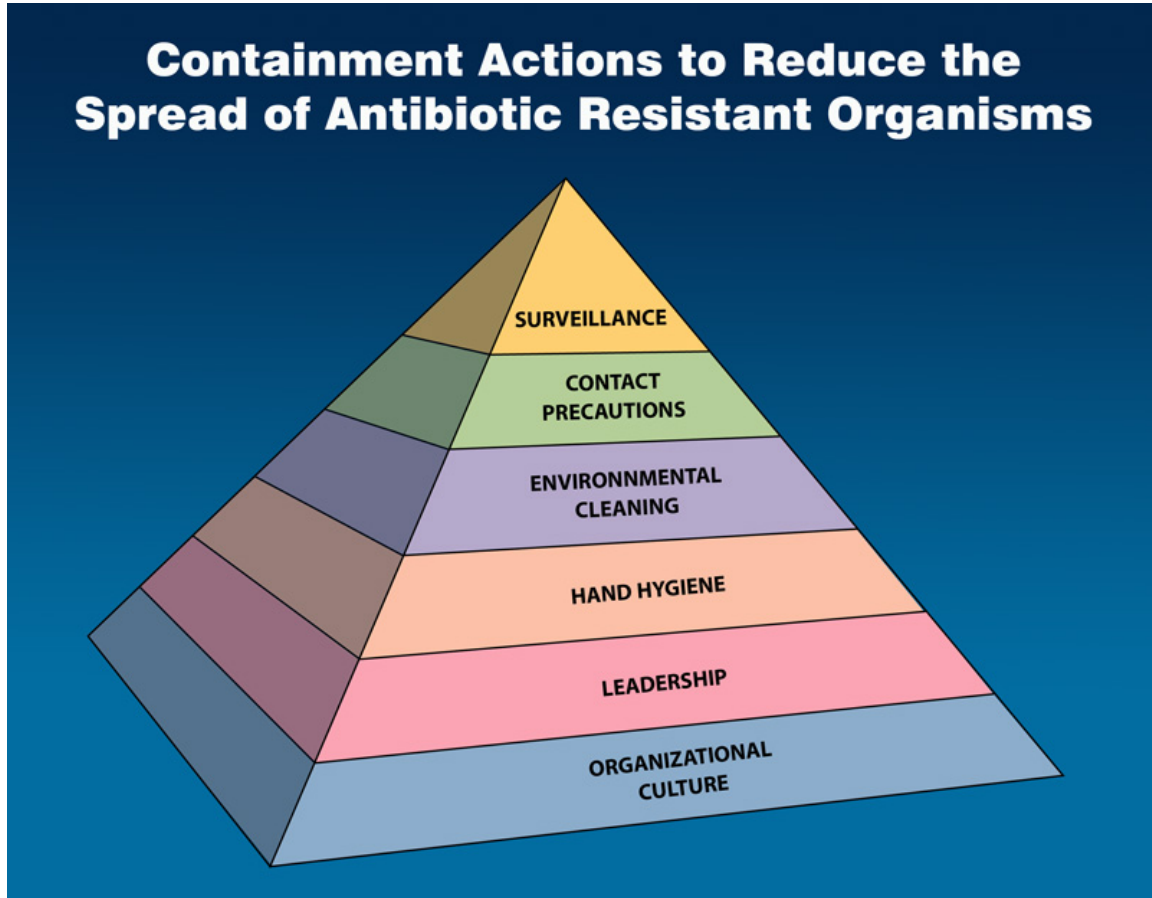


Image: Key elements to reduce or control MRSA– Safer Healthcare Now!

Needs Assessment

The guide recommends that organizations:

1. Determine the extent of their MRSA challenge. Begin with an assessment of MRSA infection incidence rates and MRSA colonization prevalence rates in their facility.
 2. Base their interventions on the results of this assessment:
 - a. Facilities with high endemic MRSA rates will likely choose to implement all five of the interventions that reduce transmission of MRSA.
 - b. Facilities seeking to maintain current low rates of MRSA may decide to focus on the first three, less resource-intensive, of the interventions.
- * It is likely however that most facilities will need to implement at least some form of all 5 interventions in order to achieve success in lower MRSA rates.

HAND HYGIENE

The First of the Five Key Interventions to Reduce MRSA Infection¹⁹

Although we have known the importance of hand hygiene for 150 years, only 30 - 40 % of healthcare providers comply with the World Health Organization (WHO) hand hygiene guidelines²⁰. This means most encounters between health care providers and patients in our hospitals carry a high risk of organism transmission.

Some facts:

- Hand hygiene is the most effective measure for interrupting the transmission of microorganisms in healthcare settings.
- Based on global research endorsed by WHO, improvements in hand hygiene could reduce infections obtained in healthcare settings by up to 50%.
- The total cost of hand hygiene promotion corresponds to less than 1% of the costs related to HAI.
- It takes less than one minute to properly clean your hands with soap and water, and less than 30 seconds to properly clean hands using alcohol rub.

MRSA is hardy. The bacteria is easily transmitted by skin to skin contact and by touching shared items and it can live up to six weeks on environmental surfaces.²¹ Hands of healthcare workers are the most common method for transmission of MRSA in healthcare facilities. Fortunately, it is readily removed or killed by hand washing, the use of ABHR, and standard hospital disinfectants.

Any of these items can harbour MRSA if they have been in contact with the organisms: lab coats, bed rails, IV poles, stethoscopes, pens, computer keyboards, books or journals in the hospital library, equipment shared by patients in physical therapy, and chairs in the patient and family lounge.

Hands pick up MRSA from soiled surfaces (fomites) and then deposit the organism on the next item or person they touch. Transmission can happen even while performing basic patient care activities such as taking a pulse or blood pressure, lifting a patient up in bed, or handling items in the patient's vicinity.²²

The literature sites that healthcare workers contaminated their hands or gloves by touching contaminated environmental surfaces, and both contaminated hands and gloves could result in organism transmission to patients.²³

Healthcare facilities are often understaffed and overcrowded, have poorly located hand hygiene products such as ABHR, hand hygiene sinks, soap, paper towels etc. Another common issue is that there may not be assignment & accountability on the part of

19 Canada's Hand Hygiene Campaign --The importance of hand hygiene. A guide for chief executives and boards. The Canadian Patient Safety Institute, the Community and Hospital Infection Control Association – Canada, the Canadian Council on Health Services Accreditation, the Public Health Agency of Canada.

20 Gautham Suresh, M.D., D.M., M.S., Cahill, John, M.D., "National Patient Safety Goals. How 'User Friendly' is the Hospital for Practicing Hand Hygiene?: An Ergonomic Evaluation." The Joint Commission Journal on Quality and Patient Safety 33. 3 (March 2004) : 1.

21 Pittet D, Dharan S, Touveneau S, Savan V, Perneger TVI. Bacterial contamination of the hands of hospital staff during routine patient care. Arch Intern Med. 1999;159:821-826.

22 Ibid.

23 Environmental contamination makes an important contribution to hospital infection, John M. Boyce, The Journal of Hospital Infection - Volume 65, Issue Suppl 2 June 2007 Copyright © 2007 The Hospital Infection Society.

workers in healthcare facilities to stock and replenish these supplies. Furthermore, most Canadian hospitals have a preponderance of multi-bedded rooms which help spread microorganisms between patients. Despite these challenges, we have many success stories and examples of programs that have improved hand hygiene performance (Appendix D).

In 2005, the World Health Organization (WHO) launched its *Guidelines on Hand Hygiene in Health Care (Advanced Draft)* in October 2005. Key elements include:

- staff education and motivation;
- promoting the use of an alcohol-based hand rub (ABHR) as the main method for hand hygiene;
- performance indicators; and
- strong commitment by all stakeholders including: front-line staff, managers and health care leaders to improve hand hygiene.

Canada launched its own national hand hygiene campaign in 2007, based on the WHO Guidelines. This national campaign will respond to your needs for help with capacity building, leadership development, and/or the production of tools to help promote hand hygiene. If you want to become involved or need further details, please contact the Canadian Patient Safety Institute at www.handhygiene.ca. On this website you will find the latest hand hygiene observation tool endorsed by the Hand Hygiene Campaign.

It is essential to have the correct supplies in place for healthcare workers (HCW's) to clean their hands. Refer to Appendix C for audit tools that determine whether hand hygiene products are conveniently available and fully supplied.

The tools are therefore available to support your facilities' hand hygiene campaign; however, the required culture change cannot come from a toolkit. Only through the active involvement and guidance of your senior leaders will your hand hygiene campaign be successful.

Measurement for Safer Healthcare Now!

We ask that all enrolled teams with SHN submit their data to the Central Measurement Team based at the University of Toronto (see more details on page 46). We recommend that you use the audit tool of choice and audit various HCW in your setting once a month.

HAND HYGIENE MEASUREMENT for SHN!

1. Hand Hygiene Product (worksheet 1.0)

The percentage of bed spaces or patient areas being monitored at which the Alcohol-Based Rub Dispenser is:

- 1) easily visible and accessible,
- 2) easy to activate,
- 3) two sizes of clean gloves are available and accessible at the point of care.

These numbered items represent the THREE elements of the Hand Hygiene Product Bundle. Teams need to customize their own local definition of each bundle item and consider the definitions in the technical descriptions (Appendix O).

In this measure compliance with the individual elements and overall bundle compliance will be monitored through a regular audit process.

These bundle measures should be monitored on the same units where appropriate hand hygiene technique is also being monitored.

Ten to twenty direct observations should be made randomly throughout the month on different shifts.

Goal: 95% of all patient areas will meet the three standards for Alcohol-Based Hand Hygiene Products Bundle.

2. Hand Hygiene Observations (worksheet 2.0)

The percentage of patient encounters which there was compliance by health care workers (Physician, Nurse, Other) with all components of appropriate hand hygiene according to the hand hygiene policy in place at your healthcare facility.

Ten to twenty direct observations should be made randomly throughout the month on different shifts.

Goal: Improve by 100% in one year (if at 30% - then goal would be to have 60% compliance in one year)

ENVIRONMENTAL CLEANING

The Second of the Five Key Interventions in Reducing MRSA Infection

Proper, effective surface cleaning and disinfection in healthcare facilities is one of the most important ways to prevent and control HAI. MRSA and other microorganisms can survive and even thrive on inanimate surfaces for weeks to months. Without thorough regular preventive surface cleaning and disinfection these microorganisms can be a continuous source of transmission.^{24,25}

As expected, a clean environment goes “hand-in-hand” with clean hands. We know that environmental contamination causes hand contamination. Environmental surfaces quickly become contaminated in the rooms of patients colonized or infected with MRSA.²⁶

How does this happen?

- MRSA survives well in the hospital environment,
- MRSA gets on our hands when we touch contaminated objects or surfaces; and
- These hands then deposit MRSA on the next person or object that they touch.

Items that are “high touch” by patients, families and staff are often implicated in MRSA transmission. High touch surfaces include bed rails, sinks, chairs, privacy curtains, call bells, telephones, intravenous lines and poles, blood pressure cuffs, door handles, wall panel controls, thermostats and keyboards.^{27,28} MRSA has also been isolated from other environmental surfaces including floors, work areas and tourniquets used for blood drawing.²⁹

Patients who are placed in rooms that were previously occupied by a patient who was colonized with MRSA will occasionally acquire MRSA from that room, either via the hands of personnel or by their own contact with these persisting microorganisms in their hospital room.³⁰ Quality of environmental hygiene in hospitals can make a significant impact on reducing MRSA transmission.^{33,34}

24 John M. Boyce Environmental contamination makes an important contribution to hospital infection *The Journal of Hospital Infection* - Volume 65, Issue Suppl 2 (June 2007)

25 Kramer A, Schwebke I, and Kamp G. How long do nosocomial pathogens persist on inanimate surfaces? A systematic review. *BMC Infectious Diseases*. 6:130;2006

26 Bhalla A, Pultz NJ, Gries DM, Ray AJ, Eckstein EC, Aron DC et al. Acquisition of nosocomial pathogens on hands after contact with environmental surfaces near hospitalized patients. *Infect Control Hosp Epidemiol*. 2004;25(2):164-167

27 Bures S, Fishbain JT, Uyehara CF, Parker JM, Berg BW. Computer keyboards and faucet handles as reservoirs of nosocomial pathogens in the intensive care unit. *Am J Infect Control*. 2000;28(6):465-471.

28 PIDAC, Ontario MOH & LTC, Best Practices for Infection Prevention & Control of Resistant *Staphylococcus aureus* and Enterococci March 2007, p. 30

29 Griffiths R, Fernandez R, Halcomb E. Reservoirs of MRSA in the acute hospital setting: a systematic review. *Contemp Nurse*. 2002;13(1):38-49.

30 Huang SS, Datta R, Platt R. Risk of acquiring antibiotic-resistant bacteria from prior room occupants. *Arch Intern Med*. 2006;166(18):1945-1951.

33 31 Best Practices For Infection Prevention and Control of Resistant *Staphylococcus aureus* and Enterococci in all health care settings, Ministry of Health and long term care, Ontario, Provincial Infectious Diseases Advisory Committee (PIDAC) 2007

34 Ibid. p. 18

Cleaning and Disinfection

Cleaning is defined as the physical removal of foreign material (e.g., dust, soil, organic material such as blood, secretions, excretions and microorganisms).

- Cleaning physically removes rather than kills microorganisms. It is accomplished with water, detergents and mechanical action.
- Skin antiseptics, should not be used for cleaning inanimate objects. Detergents are adequate for most surface cleaning.
- Thorough cleaning is required before any surface is decontaminated, disinfected and/or sterilized.³²
- The cleaning agent used is less important than the thoroughness of the cleaning activity.

Disinfection is the inactivation of disease-producing microorganisms.

Environmental surfaces and medical equipment/devices must be cleaned thoroughly before effective disinfection can take place.

- Low level disinfection (killing of most species of vegetative bacteria and viruses) is required for hospital/facility surfaces and equipment that touches only intact skin.
- Most health care facilities use a quaternary ammonium compound or an accelerated hydrogen peroxide product (AHP) for surface disinfection.³³

The number and types of microorganisms present on environmental surfaces are influenced by; number of people in the environment, amount of activity, amount of moisture/humidity, presence of organic material capable of supporting microbial growth and type of surface and orientation (horizontal or vertical).

You must both clean and disinfect in order to achieve the goal of preventing the spread of infection since disinfectants are not effective when used on items or areas that are soiled with organic material including microorganisms. A clean environment is everyone's business, and not just restricted to housekeeping.

Begin with an assessment of your environment. Reduce clutter, keep minimal supplies in rooms (enough for a one 8 hour shift) and remove unnecessary equipment. Look at your process for cleaning and disinfection to ensure that there is responsibility assigned for these processes.

A routine cleaning schedule is key to reducing the reservoir of organisms in the environment. Be sure that the frequency for disinfecting non-critical patient care surfaces is *at least* when items are visibly soiled and on a regular basis (such as after each patient use).³⁴

Once your schedule is established you also need to assign responsibility and accountability to both managers and staff for keeping to the schedule to ensure that all

32 Best Practices For Infection Prevention and Control of Resistant *Staphylococcus aureus* and Enterococci in all health care settings, Ministry of Health and long term care, Ontario, Provincial Infectious Diseases Advisory Committee (PIDAC) 2007

33 Ibid. p. 18

34 Disinfection and Sterilization Guidelines: What You Need to Know William A. Rutala, Ph.D., M.P.H. Presented at APIC 2007

used equipment and environmental surfaces are actually being cleaned. Please see Appendix E for a sample policy.

It is necessary to figure out ways to build a team that includes Environmental Services as a key player. The Infection Prevention and Control Department, Nursing, departmental managers and their staff, along with Environmental Services personnel make up a facility's frontline effort to reduce MRSA transmission. "There should be regular rounds that Infection Control and Environmental Services participate in together, not separately."^{35,39}

Some approaches that have proven successful are

- Assessing effectiveness of cleaning by using environmental "tracers" (Glo Germ™ or Glitter bug™) that can highlight surfaces that were skipped in the cleaning process (Appendix G);
- Using checklists to document that all areas were cleaned as per the schedule, especially those that are "high touch";
- Developing observational tools to measure if policies/checklists are being followed correctly;
- Verifying competence in cleaning and disinfection procedures using observational tools;
- Scheduling specific cleaning times for rooms of patients in isolation or on contact precautions;
- Using immediate feedback mechanisms to assess cleaning and reinforce proper technique;
- Developing educational materials that are tailored to the language and cultural needs of the staff;³⁶ and
- Including visitors and patients on the team. If motivated and given the resources (disinfectant wipes), they can help by wiping phones, computers, bed tables, TV remotes after use.

If observations are completed by those doing the work it is more successful and leads to team building and cooperation. Front line workers are much more likely to pay attention to the findings of their own co-workers, staff nurses, nurse aides, and environmental services staff. Once you have agreed on the findings, the team can get together to find ways to build on the positive findings and eliminate any identified barriers that are getting in the way to a cleaner and safer environment.

See Appendix F for examples of cleaning checklists and audit tools that you can modify for your own use.

³⁵ Team Clean, Environmental Services & Infection Prevention Unite in the Battle Against Bugs, Danielle Maheux, 09/01/2007 Infection Control Today Magazine, www.infectioncontrolday.com/

³⁶ Institute For Healthcare Improvement (IHI) Getting Started Kit: Reduce Methicillin-Resistant Staphylococcus Aureus (MRSA) Infection, How-To Guide.2007

ENVIRONMENTAL CLEANING for SHN!

Checklists and audits do not capture if the surfaces are truly clean. *Safer Healthcare Now!* will not be collecting monthly measurement for Environmental Cleaning.

Some teams across the country have used Glo Germ™ or Glitter Bug™ (Appendix G) for educational purposes are encouraged by all teams. We would encourage you to incorporate this powerful tool to evaluate cleaning.

CONTACT PRECAUTIONS

The Third of the Five Interventions In Reducing MRSA Infection

The third intervention to reducing MRSA infections is to place barriers between the MRSA reservoir (patients, environment) and the health care worker/other patients to stop MRSA transmission.

Wearing gloves and gowns as barriers during patient contact are called contact precautions. Gown and gloves prevent MRSA from coming into direct contact with HCW's hands and clothing.^{37,38} Patients who are either colonized or infected with MRSA often carry the bacteria in their anterior nares (nose), axillae, perineum and on hands or arms. Some patients also carry it in the gastrointestinal tract – especially those who have received antibiotics. In addition, wounds, pressure ulcers and other areas of broken skin or tube insertion sites can all become heavily contaminated with MRSA.

A patient's MRSA bacteria are shed into the immediate environment from these skin surface areas and the GI tract, heavily contaminating surfaces and nearby objects. Health care workers hands and clothing easily pick it up and take it to the next room or patient or object that they come in contact with.^{39,40}

Contact precautions include:

1. Wearing clean, non-sterile gloves when having contact with patients or the immediate environment of patients colonized or infected with MRSA; and *This will reduce the likelihood that HCW's will contaminate their hands with MRSA and other microorganisms.*

Wear a clean, non-sterile gown when having contact with patients or potentially contaminated areas in the patient's immediate environment.
This will protect HCW's from contaminating their clothing.

37 PIDAC, Ontario MOH & LTC, Best Practices for Infection Prevention & Control of Resistant *Staphylococcus aureus* and Enterococci March 2007, p. 30

38 Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care

Health Canada Laboratory Centre for Disease Control, Bureau of Infectious Diseases Division of Nosocomial and Occupational Infections CDDR July 1999, vol. 25s4

39 . Institute For Healthcare Improvement (IHI) Getting Started Kit: Reduce Methicillin-Resistant *Staphylococcus Aureus* (MRSA) Infection, How-To Guide.2007

40 (IHI) Boyce JM, Potter-Bynoe G, Chenevert C, King T. Environmental contamination due to methicillin-resistant *Staphylococcus aureus*: Possible infection control implications. *Infect Control Hosp Epidemiol.* 1997;18(9):622-627.

Key steps:

- Change gloves after each use and between each patient.
- Remove gloves right before leaving the patient's room and clean hands immediately because hands often become contaminated during glove removal.
- Remove gown following gloves and place gown in laundry hamper
- Clean hands immediately

Some provincial guidelines and jurisdictions require that that HCW's and all visitors put on gowns and gloves when entering either the private room or bed space of the patient, even if they are not planning to have any direct patient or environmental contact.^{41,42}

2. Placing patients who require Contact Precautions in a single-patient room whenever possible. *When caring for patients in a single room the HCW's are more likely to remove their gowns and gloves, and clean their hands before moving on to the next patient.*
 - If a private room is neither available nor practical, place the patient in a room with a patient(s) who has MRSA but with no other infection (called cohorting). Another less desirable option is to place the patient in a room with patients who are at low risk of acquiring MRSA infection.⁴³

Masks

There is little agreement on whether to include masks as part of MRSA contact precautions. Some hospitals do not require it at all, some require it for all MRSA-related isolation (reduce healthcare worker risk of nasal colonization), while other facilities require it only if the MRSA-positive patient is known to have MRSA infection of the respiratory tract.⁴⁴

When to Place a Patient on Contact Precautions

While Routine Practices are expected to be adhered to regardless of patient/resident diagnosis, it is well known that these practices are poorly adhered to. The use of contact precautions is meant to provide a second layer of defense. The decision to initiate contact precautions (made by Infection Prevention and Control Professionals (ICP's), Nurse Managers, or Physicians) should be made based on amount of environmental soiling by patient, suspected or known infectious illnesses capable of causing illness in humans, cultures and assessment of risk factors (screening). It is important to begin Contact Precautions as soon as possible. In some facilities, patients that are suspected of being colonized or infected with MRSA are placed on Contact Precautions even before culture results are available (presumptive precautions).

41 Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care
Health Canada Laboratory Centre for Disease Control, Bureau of Infectious Diseases Division of Nosocomial and Occupational Infections CCDR July 1999, vol. 25s4

42 PIDAC, Ontario MOH & LTC, Best Practices for Infection Prevention & Control of Resistant *Staphylococcus aureus* and Enterococci March 2007

43 Jemigan JA, Titus MG, Groschel DH, Getchell-White S, Farr BM. Effectiveness of contact isolation during a hospital outbreak of methicillin-resistant *Staphylococcus aureus*. *Am J Epidemiol.* 1996;143(5):496-504.

44 Siegel JD, Rhineheart E, Jackson M, Linda C; Healthcare Infection Control Practices Advisory Committee (HICPAC). Management of multi-drug-resistant organisms in healthcare settings, 2006. Available at <http://www.cdc.gov/ncidod/dhqp/pdf/ar/mdroGuideline2006.pdf>.

Studies have shown that applying contact precautions on all patients in high risk areas like a burn unit was more effective in controlling MRSA (colonized and infected) than selected application of contact precautions⁴⁵ Those considered to be at high risk include:

- Patients with a recent history of hospitalization in other countries or Canadian hospitals that have known high endemic rates of MRSA and VRE; and
- Roommates of patients newly identified as being colonized/infected with MRSA or VRE; and other exposed patients (for example: on same ward or cared for by same health care worker).⁴⁶
- Patients belonging to certain high risk groups for being colonized/infected with CA-MRSA such as the homeless and IV drug users.

Here are some strategies that have worked in other hospital teams in Canada, US and Europe to help staff to comply with contact precautions:

- Developing educational and training methods, as well as materials that are tailored to the language and cultural needs of the staff and which clearly explain the reasons for and importance of following all contact precautions;
- Ensuring that adequate (but not excess) supplies are stored at the point of care for easy access;
- Checking and replenishing supplies (gloves, gowns, masks) and ABHR regularly; consider scheduled times for checking supplies;
- Educating families about contact precautions;
- Instructing patients about precautions and hand hygiene, and encouraging them to question personnel who do not comply; and
- Being very careful that patients on precautions have the same standard of care as other patients (frequency of entering the room, monitoring vital signs, etc.) to prevent adverse events and ensure patient/family-provider communication;⁴⁷

Ease of use, convenience and availability of supplies in addition to training are the two key components that will lead to increased compliance with contact precautions.


A Canadian study concluded that compliance with infection control procedures is tied to efforts to improve availability of equipment and promote a safety culture. "Training offered to HCW's demonstrates an organizational commitment to patient and worker safety." In this study, only 5% of respondents rated their training in infection control as excellent and 30% felt they were not offered the necessary training.⁴⁸

Once colonized, patients tend to remain colonized for months to years. At least three negative cultures on separate days are generally recommended before discontinuing precautions. The patient must be off all antibiotics for 24 to 48 hours before cultures are taken.⁴⁹ Even with the three negative cultures it is quite likely that the patient may become re-colonized with the same or a new strain of MRSA in the near future.

45 Abstr Intersci Conf Antimicrob Agents Chemother Intersci Conf Antimicrob Agents Chemother. 2003 Sep 14-17; 43: abstract no. K-1744

46 Ibid.

47 Institute For Healthcare Improvement (IHI) Getting Started Kit: Reduce Methicillin-Resistant Staphylococcus Aureus (MRSA) Infection, How-To Guide.2007

48 Healthcare Quarterly, 10(1) 2007: 44-52 Determinants of Healthcare Workers' Compliance with Infection Control Procedures  Annalee Yassi, Karen Lockhart, et al.

49 Management of Multidrug-Resistant Organisms in Healthcare Settings. Healthcare Infection Control Practices Advisory Committee (HICPAC). 2006:25.

We are including some risk assessment tables for use when determining patient placement, as well as some ideas for observational tools so you can determine how well the staff (nursing, ancillary, medical) are following contact precautions (Appendix H & I).

Measurement for Safer Healthcare Now!

We ask that all enrolled teams with SHN submit their data to the Central Measurement Team based at the University of Toronto (see more details on page 46).

CONTACT PRECAUTIONS MEASURES for *SHN!*

Reduction in Mean Time to Placement on Contact Precautions for Patients with Known or Probable MRSA at Time of Admission (worksheet 3.0)

Reduce the mean time to being placed on contact precautions for patients with known or probable MRSA colonization or infection at the time of hospital arrival. The recommended industry standard is within 2 hour of hospital admission.

Goal: Decrease the mean time to placement on CP by 50% in one year

Reduction in Mean Time from Notification by Lab of MRSA Status to Placement on Contact Precautions for Patients identified as MRSA Colonized or Infected through Routine Admission Screening Process (worksheet 4.0)

Reduce the mean time from notification by the laboratory to being placed on contact precautions for patients identified as positive for MRSA colonization or infection through a process of routine admission screening process. The recommended industry standard for the period from lab notification to placement on Contact Precautions is within 2 hours.

We recommend you identify the time of lab notification from either the time stamp on the lab report or the time the lab calls the unit to notify them of the patient's probable or definite MRSA status. The time of being placed on contact precautions may be obtained from the patient record.

Goal: Decrease the mean time from Lab notification to placement on CP by 50% in one year

ACTIVE SCREENING for asymptomatic MRSA colonization on admission

The Fourth of the Five Key Interventions in Reducing MRSA Infection

The literature has shown that it is not enough to apply contact precautions to those patients that have already been identified by clinical cultures.⁵⁰

Unidentified colonized patients provide a “reservoir” of MRSA that can be transmitted to other patients. Actively identifying colonized patients allows you to find this reservoir and place these patients on contact precautions which, if performed reliably, will prevent transmission from the reservoir to the non-colonized patients.

The size of this “reservoir” of colonized patients is a major determinant of the risk of spread to other patients who have not yet been colonized. Cultures of clinical specimens (e.g., sputum, wound, urine, blood) will identify infected patients, but they fail to detect up to 85% of colonized patients. Barrier precautions have proven themselves 15 times more effective than hand washing alone in preventing MRSA transmission from colonized to uncolonized patients (presumably because compliance with hand hygiene and other components of routine practices is far less than ideal).⁵¹

You need to identify colonized patients by actively looking for them. This is called active surveillance cultures (ASCs). Without active surveillance most colonized patients remain undetected and unisolated. But with active surveillance cultures (ASCs) of the anterior nares, 80% of colonized adult patients will be identified.⁵² Culturing of other sites including the axillae, groin, wounds, intravenous catheter insertion sites, and the perirectal area will allow for a greater percentage of colonized patients to be detected.

50 Do Infection Control Precautions Work for Methicillin-Resistant *Staphylococcus aureus* (MRSA)?-The Evidence Infection Control Serviceswww.path.queensu.ca/ic Slide Presentation

51 Jernigan, J. A., Titus, M. G., Groeschel, D. H. M. & et al. 1996, Effectiveness of isolation during hospital outbreak of methicillin-resistant *Staphylococcus aureus*, American Journal of Epidemiology, p. 143.

52 . Institute For Healthcare Improvement (IHI) Getting Started Kit: Reduce Methicillin-Resistant *Staphylococcus Aureus* (MRSA) Infection, How-To Guide.2007



Adapted from image presented by: Jon C. Lloyd. Second Annual Maryland Patient Safety Conference Keeping Our Patients Safe March 30, 2006. Baltimore Convention Center

Several strategies are available for you to choose from in order to identify colonized patients:⁵³

1. Passive screening detects patients with clinical cultures only. As these are clinical culture, a large percentage of these patients will actually be infected with MRSA; however some cultures, such as wound cultures, may represent colonization rather than infection; or
2. Targeted active screening for asymptomatic MRSA colonization when:
 - particular areas of the hospital are labeled as high risk and all patients being admitted to those areas are cultured for MRSA (e.g., ICU, burn unit, trauma unit),or
 - all admissions are verbally screened for risk factors and those with identified risk factors are then cultured for; or
3. Universal active screening means culturing all hospital admissions for MRSA infection/colonization. This is the most reliable method to detect patients with CA-MRSA as well as HA-MRSA

Several recent studies support using some form of active screening cultures (ASCs):

⁵³ SHEA Guideline for Preventing Nosocomial Transmission of Multidrug-Resistant Strains of *Staphylococcus aureus* and *Enterococcus* (Infect Control Hosp Epidemiol 2003;24:362-386). May 2003 Carlene A. Muto, MD, MS; John A. Jernigan, MD, MS; Belinda E. Ostrowsky, MD, MPH;

1. A long-term study in one large institution (eight ICUs) retrospectively evaluated the effect of several interventions including active screening for asymptomatic MRSA colonization on the incidence of hospital associated and overall MRSA bacteremia. The incidence of MRSA bacteremia decreased substantially (75%) among ICU patients, non-ICU patients and all patients hospital-wide after initiation of active screening for MRSA in ICU patients.⁵⁴
2. In a 700-bed hospital, screening cultures for detection of asymptomatic MRSA colonization were recommended for all patients at high risk for MRSA bacteremia intervention and contact precautions were implemented for patients with positive culture results. The mean number of MRSA bacteremia cases per month decreased from 3.6 cases before the intervention to 1.8 cases after the intervention. The study concluded that active screening cultures are important for identifying hidden reservoirs of MRSA. Contact isolation can prevent new colonization and infection and lead to a significant reduction of morbidity and healthcare costs.⁵⁵
3. In an unpublished study conducted in a Toronto hospital, 50% of MRSA cases identified in 2004 were detected through admission screening of high-risk patients.⁵⁶
4. Another success story applying universal surveillance comes from Evanston Northwestern Healthcare in Evanston, Ill. They screened 24,045 patients and found this approach to be more effective than just passive or targeted active surveillance when monitoring for MRSA. The results demonstrated that the majority of patients admitted harboring MRSA would not have been identified using either passive or targeted active surveillance. "Universal surveillance is the most thorough way to identify patients who are carriers of MRSA upon admission," said Dr. Ari Robicsek, the epidemiologist who presented this work. "But when it isn't feasible, this study suggests that risk factors can be identified by an organization to direct targeted active surveillance."⁵⁷

Most facilities in Canada use the following criteria to determine which patients need screening on admission:⁵⁸

- Patients admitted for more than 24 hours to a healthcare setting within the past 12 to 24 months;
- Residents of any long-term residential care facility;
- Patients who have previously tested positive for an ARO in the past 12 months;
- Patients who have had contact with a known positive patient;
- Patients admitted to or discharged from an intensive care unit (ICU); and

54 Huang SS, Yokoe DS, Hinrichsen VL, et al. Impact of routine intensive care unit surveillance cultures and resultant barrier precautions on hospital-wide methicillin-resistant *Staphylococcus aureus* bacteremia. *Clin Infect Dis* 2006; 43:971–978.

55 Active Surveillance for Methicillin-Resistant *Staphylococcus aureus* (MRSA) Decreases the Incidence of MRSA Bacteremia *Infect Control Hosp Epidemiol* 2006; 27:1004-1008 Pnina Shitrit, MD; Bat-Sheva Gottesman, MD; Michal Katzir, MD; Avi Kilman, MSc;

Yona Ben-Nissan, BSc; Michal Chowers, MD

56 Infection control and antimicrobial restriction practices for antimicrobial resistant organisms in Canadian tertiary care hospitals *AJIC* 2007, 566 Vol. 35 No. 9 Ofner-Agostini et al

57 . A recent presentation at the American Society for Microbiology's 46th Annual Interscience Conference on Antimicrobial Agents and Chemotherapy (ICAAC(TM)) "Prevalence of Colonization with Methicillin-Resistant *Staphylococcus aureus* (MRSA)

American Society for Microbiology's 46th Annual Interscience Conference on Antimicrobial Agents and Chemotherapy (ICAAC(TM)), 2007

58 Atlantic Health Sciences Corporation December, 2006 MRSA Task Force Report

- Patients receiving dialysis.

See Appendix M for Comprehensive Protocol for Active Screening.

Facilities that care for populations at risk for CA-MRSA may want to modify the above risk factors to include screening patients who come from these risk groups such as IV drug users and the homeless. CA-MRSA is not confined to these populations however: as the prevalence of CA-MRSA increases in a facilities' population, consideration should be given to universal admission screening.

Cost for Active Surveillance Cultures

It costs less to reduce MRSA than it costs to care for patients with MRSA infections. The costs of screening cultures and precautions measures are far less than the costs of caring for patients with MRSA infections. Both targeted and universal screening surveillance for MRSA colonization have been found to be cost-effective by reducing the rate of nosocomial MRSA infections when combined with effective implementation of contact precautions for all identified patients.⁵⁹

Several studies have demonstrated cost savings including:

1. A study conducted in a setting where MRSA was endemic estimated that screening high-risk patients on admission and placing them on precautions would prevent from between eight and 41 nosocomial MRSA infections and save the hospital from \$20,000 to \$462,000. The study found that it costs on average \$3,475 per month for a program that screens ICU patients and places those positive for MRSA on precautions, when combined with other control interventions. But it saved \$19,700 per month in excess hospital costs by reducing the number of MRSA infections.⁶⁰
2. A 2007 Canadian study found laboratory and nursing costs were \$8.34 CDN per specimen, for a total cost of \$30,632 CDN for 1 year of screening. The average cost of implementing recommended infection control measures for patients colonized with MRSA was approximately \$5235 per patient. As admission screening facilitates the early detection of patients colonized or infected with AROs, this measure and the resulting implementation of appropriate infection control precautions are a key strategy for decreasing the nosocomial spread of AROs, thereby decreasing the costs if other patients acquired infections due to these cases.⁶¹
3. In a 2001 study done at both a large tertiary-care facility and a smaller suburban hospital in Charleston, South Carolina, all patients were screened upon admission to either the ICU or general wards based on a risk assessment. Colonized patients were placed in contact isolation. They found that this approach prevented 13 nosocomial MRSA bacteremias and nine surgical site infections, for a savings of \$1,545,762 US dollars.⁶²

⁵⁹ Source: Karchmer TB, Durbin LJ, Simonton BM, Farr BM. Cost-effectiveness of active surveillance cultures and contact/droplet precautions for control of methicillin-resistant *Staphylococcus aureus*. *J Hosp Infect.* 2002;51(2):126-132.

⁶⁰ Ibid.

⁶¹ Infection control and antimicrobial restriction practices for antimicrobial resistant organisms in Canadian tertiary care hospitals AJIC 2007, 566 Vol. 35 No. 9 Ofner-Agostini et al

⁶² Effect of targeted surveillance for control of methicillin-resistant *Staphylococcus aureus* in a community hospital system. *Infect Control Hosp Epidemiology.* 2006; 27(3):233-8(ISSN: 0899-823X)West TE ;Guerry C ; Hiott M Morrow N ;WardK ;SalgadoCD Infectious Diseases Consultants & Travel Medicine, Charleston, SC 29425, USA.

Where, When and Who to Screen?

You will need to perform risk assessments in your individual facilities to determine how best to implement a screening culture program for asymptomatic MRSA colonization. Your decision will depend on your MRSA infection rates, your MRSA colonization rates as well as the availability of rapid tests and lab resources in general. You may also look at risks in your particular patient population. One method is to perform point prevalence screening on certain selected units (either high risk units or units where other MRSA patients are housed) once weekly for one month. For example, you can target units with more than two healthcare associated MRSA patient isolates within a four-week period.⁶³

Another approach is to perform universal admission MRSA screening for a limited period of time to determine your admission colonization rates. Once you have some baseline information you can decide on an appropriate approach for your facility:

Here are three possible approaches:⁶⁴

1. Active universal or targeted screening for asymptomatic MRSA colonization for either all patients or all high risk patients on admission;
2. Apply active screening for asymptomatic MRSA colonization only after other approaches (routine practices, contact precaution for infected patients identified through clinical cultures) have not worked and your MRSA infection rates are increasing; and
3. Use routine periodic screening cultures on admission and selected inpatient units. Then, if clusters of MRSA are identified, start universal screening of all admissions for asymptomatic MRSA colonization or screening all ICU patients or other high risk units depending on your situation.

Rapid Tests

A rapid test for MRSA using PCR (polymerase chain reaction) techniques is available and in use in several large tertiary care centers. Culture based screening tests take from 16 to 72 hours for results to be reported. The PCR test result is usually available in just two hours of lab time. PCR-based tests can thus improve the laboratory turnaround time; however, depending on how often the PCR tests are performed and how rapidly the results are reported, the overall turnaround time may not improve over culture based techniques as much as expected.

If however the overall turnaround time for PCR is faster than culture-based screening, using PCR can result in a substantial reduction in preemptive contact precaution days (patients placed on contact precautions pending culture results).⁶⁵

Once you have decided how you are going to look for MRSA in your facility you will want methods to measure how well you are doing in identifying MRSA; and if you are using active screening and contact precautions, it will be important to know whether these interventions are successfully reducing your MRSA infection rate.

63 Vol. 9 Special Issue | Patient Safety Papers A Multidisciplinary Approach to Reducing Outbreaks and Nosocomial MRSA in a University-Affiliated Hospital
Healthcare Quarterly, 9(Sp)2006:54-60 Maryam Salaripour, Pat McKernan, Roslyn Devlin and the Infection Prevention and Control Team

64 Interventions to prevent transmission of antimicrobial-resistant bacteria in the intensive care unit. Infectious diseases Current Opinion in Critical Care. 13(5):572-577, October 2007. Huskins, W Charles

65 Harbarth S, Masuet-Aumatell C, Schrenzel J, et al. Evaluation of rapid screening and preemptive contact isolation for detecting and controlling methicillin resistant *Staphylococcus aureus* in critical care: an interventional cohort study. Crit Care 2006; 10:R25.

Measurement for Safer Healthcare Now!

We ask that all enrolled teams with SHN submit their data to the Central Measurement Team based at the University of Toronto (see more details on page 46).

Active Screening on Admission for *SHN!*

Active Screening on admission for asymptotically MRSA colonized patients per 1,000 admissions (worksheet 5.0)

The number of patients with laboratory-confirmed MRSA colonization per 1,000 admissions. The procedure for obtaining screening isolates is established at an individual healthcare facility.

MRSA case is defined as the isolation of *Staphylococcus aureus* resistant to oxacillin (e.g. methicillin, amoxicillin, penicillin) from any body site in a screening isolate obtained from an inpatient on admission. This is a measure of potential risk for exposure to MRSA in the healthcare facility.

SURVEILLANCE for Healthcare Associated Infections

The Fifth Intervention For Reducing MRSA Infection

The goal of the previous four interventions is to decrease and ultimately to eliminate healthcare-acquired clinical MRSA infections in your patients. The only way to know if you are succeeding in reducing and/or eliminating these MRSA infections is by having an MRSA infection surveillance program.

A surveillance program for MRSA infection provides the definitions, measurements and data analysis needed to evaluate the success of the appropriate intensified interventions meant to eliminate MRSA infections in the health care setting.⁶⁶

The Canadian Council on Health Services Accreditation (CCHSA) is including either MRSA or *C. difficile* surveillance in its next accreditation requirements. Please see table below.

If your hospital already has a MRSA surveillance program in place you can use existing data as the basis for your MRSA risk assessment. If not, as part of your risk assessment you will need to determine the burden of MRSA in your facility, either by point prevalence studies, admission screening cultures and/or a review of lab data.

The results of this risk assessment will help you to decide which components you will emphasize (actions/interventions) in your MRSA control program and may also help you decide whether or not to begin implementing a surveillance program.

Your findings will tell you if your facility has patients with documented MRSA healthcare-associated infections (HAI), patients that are acquiring MRSA colonization from infected or colonized patients (transmission), and whether patients with documented MRSA colonization are being admitted. Any of these findings indicate that you have a reservoir of MRSA in your facility. After reviewing the data you may decide to establish a MRSA infection surveillance program.

On the other hand, if you *do not* have endemic MRSA you may choose to focus on hand hygiene, cleaning and disinfection in order to prevent MRSA from making inroads into your facility and /or unit, especially if in the future colonized patients are admitted. Once an infection is identified you would move to the next step and place patients identified MRSA on contact precautions.

The basic outline for setting up a surveillance program is:⁶⁷

- Select the surveillance methodology;
- Assess and define the population(s) to be studied;
- Choose the indicators (events) to monitor;
- Determine time period for observation;
- Identify surveillance criteria;
- Identify data elements to be collected;
- Determine methods for data analysis;

66 APIC Guide to the Elimination of Methicillin-Resistant *Staphylococcus aureus* (MRSA) Transmission in Hospital Settings, March 2007

67 APIC Text of Infection Control and Epidemiology, 2nd Edition; January 2005. Copyright 2005, Association for Professionals in Infection Control and Epidemiology, Inc.

- Determine methods for data collection and management;
- Identify recipients of the surveillance report; and
- Develop a written surveillance plan.

Widely distribute the results of whatever infection surveillance program you have in place or need to establish. It is hard for staff to follow precautions when they do not get to see the results that they have accomplished. Be explicit about how the interventions and hard work that is being done on the unit ties back to surveillance numbers. Involve staff so that they feel ownership of the numbers this will then inspire them to make changes.

A team can choose from a variety of surveillance SHN! elements that are most important to their local environment.

Measurement for Safer Healthcare Now!

We ask that all enrolled teams with SHN submit their data to the Central Measurement Team based at the University of Toronto (see more details on page 46).

SURVEILLANCE MEASURES for SHN!

Incidence of Healthcare-Associated Methicillin-Resistant *Staphylococcus aureus* (MRSA) Infections per 1000 *Patient Days (this could be for entire facility or your identified unit) (6.0 worksheet)

The number of patients with laboratory-confirmed MRSA healthcare-associated clinical infections (HAI) per 1,000 patient days.

MRSA case is defined as the isolation of *Staphylococcus aureus* resistant to oxacillin (e.g. methicillin, amoxicillin, penicillin) from any body site in a clinical isolate (non-screening, non-blood culture specimens) obtained from a patient who meets the definition of HAI-MRSA: a minimum of 48 hours after admission to a healthcare facility, knowledge of previous MRSA status or history of admission to a healthcare institution in last 12 months (see Technical descriptions for more details). Infection refers to invasion of bacteria into tissue with replication of the organism; it is characterized by isolation of the organism accompanied by clinical signs of illness such as fever, elevated WBC, purulence, pneumonia or inflammation.

Note: If using clinical isolates then exclude all screening culture results as well as duplicate or additional specimens from the same patient (i.e., a patient with 3 swabs from a wound that all grow MRSA would be counted once – you need one clinical isolate from each infection event)

* Monthly measure of "Patient days" for a healthcare facility may be obtained from the utilization staff, financial department or health records or where located at your facility.

Goal: Annual reduction of 50% in rate of MRSA-HAI

Healthcare Associated Blood Stream Infections caused by MRSA per 1000 Patient Days (7.0 worksheet)

This measure is data collected on patients that are admitted to a healthcare facility as inpatients. This blood stream infection (BSI) is the result of a healthcare contact acquired in a variety of ways i.e., a patient who was admitted with an BSI caused by MRSA due to an outpatient activity (renal outpatient IV therapy) or a patient recently discharged and readmitted with an BSI caused by MRSA within 48 hours of discharge. We are excluding BSI secondary to surgical site infections unless the patient is being readmitted.

MRSA Bacteremia case is defined as the isolation of *Staphylococcus aureus* resistant to oxacillin (e.g. methicillin, amoxicillin, penicillin) in blood obtained from a patient a minimum of 48 hours after admission to hospital. The patient must have a diagnosed infection which meets the hospital's definition of infection.

* Monthly measure of "Patient Days" for a selected hospital or unit (i.e., ICU) may be obtained from the utilization staff, financial department or health records or where located at your facility.

Goal: Zero Cases

There are several other national initiatives currently underway that also request surveillance measures. As you can see, all the three initiatives are in concert with one another; and the measurement for *SHN!* should not add any burden if you are already participating with either CNISP or CCHSA.

S u r v e i l l a n c e M e a s u r e s N a t i o n a l l y		
CNISP Canadian Nosocomial Infection Surveillance Program	CCHSA Canadian Council on Health Services Accreditation	SHN! Safer Healthcare Now!
H e a l t h c a r e A s s o c i a t e d M R S A :		
1. MRSA bloodstream infection	1. Health care associated clinical isolates of MRSA	1. Health care associated clinical isolates of MRSA
2. MRSA other clinical infection except bloodstream	2. MRSA any screening isolate (colonization)	2. MRSA any screening isolate (colonization)
3. MRSA screening isolates		
C o m m u n i t y A s s o c i a t e d M R S A		
4. MRSA community associated isolates		

GETTING STARTED with Implementing the MRSA Interventions in your Organization or Unit

You are very likely already using some or even most of the components in this guide in an effort to control healthcare-associated infections (HAI), including MRSA, in your facility. As the kit has summarized, the root of the problem is not due to lack of knowledge about control and prevention techniques, but rather an inability to translate that knowledge into the requisite social and behavioral changes within complex healthcare organizations.

So, what do we need to do differently in this Campaign, given what we now know?

SHN! recommends using the Model for Improvement when implementing MRSA reduction strategies in your organization. Several health organizations and systems have used a new approach called “Positive Deviance” which has shown to produce more improvement than other approaches. We have included a section on Positive Deviance below.

The following key steps for getting started in reducing MRSA include:⁶⁸

1. Secure Senior Leadership Commitment
2. Form a Team
3. Use the Model of Improvement to Accelerate Change by:
 1. Set Aims (Goals and Objectives)
 2. Establish Measures
 3. Select Changes
 4. Test Changes
4. Implement Changes
5. Spread Changes

Secure Senior Leadership Commitment

Reducing MRSA requires clear commitment and direction from the highest level of the organization. Visible senior leadership support can help to remove obstacles and allocate resources enhancing the ability of teams to implement MRSA reduction strategies.

Actively engage senior leadership by building a business case for a MRSA strategy and demonstrating the need for addressing this growing patient safety problem. Present progress to senior leadership monthly, for example by presenting data on the percentage of your staff groups that are washing their hands. Unless you have a strong commitment from the leaders in your organization you will be unable to implement these care components and reduce or control MRSA.

You need to gain focused, committed hospital leadership in order to achieve control of a complex problem such as MRSA. Leadership commitment includes these elements:

- Acknowledgment that the MRSA problem is serious, causes needless morbidity and mortality, and is associated with real costs;
- Intolerance of the status quo, and a sense that a major reduction in the rate of MRSA (colonization and/or infection) is possible;
- Encouraging and supporting front-line multidisciplinary teams to get the job done, including provision of necessary supplies, personnel, and infection control, microbiological, and environmental services resources;
- Accountability for reliable performance of basic infection control practices such as hand hygiene, once appropriate systems of care and supplies are in place. This could include being prepared to discipline staff who consistently do not follow appropriate practice;
- Engagement of clinical staff; and
- Regular review of data and prompt removal of barriers to success.

Sharing qualitative stories is important particularly for teams with small numbers and less reliable quantitative data.

Form a Team

Including the right people on a process improvement team is critical to a successful improvement effort. Teams vary in size and composition. Each organization builds teams to suit its own needs.

Infection control initiatives such as this have typically been led by infection prevention and control professionals. Although IPAC professionals have in depth knowledge of MRSA control measures, they are typically neither at the appropriate level of seniority to lead organization-wide change initiatives nor close enough to the healthcare front line to lead local unit initiatives. Using the Quality Improvement and/or Positive Deviance model will encourage you to look at a variety of possible leaders. If hand hygiene on a unit is your first focus; perhaps a nurse or physician should champion this team; as they represent a significant portion of the group you are hoping to influence.

In this intervention, we recommend that teams are unit based vs. hospital-wide based; although often the organizational infection control department can support your surveillance information gathering (negotiated at a local level). Representation of the site coordination team could include:

- Senior Administrative leadership (executive sponsor);
- Environment and maintenance services (representatives from house keeping);
- Clinical leaders representing physicians, nursing and pharmacy staff;
- Front line caregivers from key settings of care, and from all shifts;
- Representatives from other work units or committees whose responsibilities/mandates include the improvement of resident safety (e.g., Resident Safety Officer, representatives from Quality Improvement/Risk Management, Pharmacy and Therapeutics committee);
- Infection Prevention and Control;
- Clerical support;

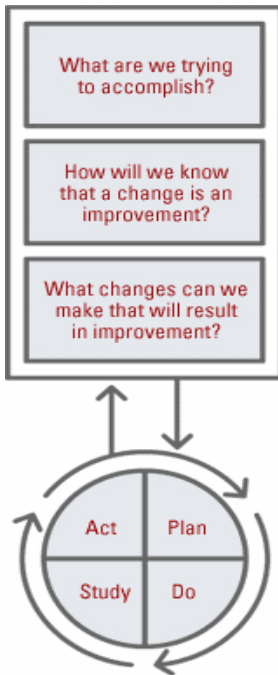
- Educator – ongoing staff training; and
- Patients.

Use the Model for Improvement to Accelerate Change

The **Model for Improvement**, developed by Associates in Process Improvement, is a simple yet effective tool not meant to replace change models that organizations may already be using, but rather to accelerate improvement. This model has been used very successfully by hundreds of healthcare organizations in many countries to improve many different healthcare processes and outcomes.

The model has two parts:

- Three fundamental questions, which can be addressed in any order.
 1. What are we trying to accomplish?
 2. How will we know that a change is an improvement?
 3. What changes can we make that will result in improvement?
- The Plan-Do-Study-Act (PDSA) cycle to test and implement changes in real work settings. The PDSA cycle guides the test of a change to determine if the change is an improvement.



Set Aims

Improvement requires setting aims. The aim should be time-specific and measurable; it should also define the specific population of patients that will be affected.

Establish Measures

Teams use quantitative measures to determine if a specific change actually leads to an improvement.

Select Changes

All improvement requires making changes, but not all changes result in improvement. Organizations therefore must identify the changes that are most likely to result in improvement.

Test Changes

The Plan-Do-Study-Act (PDSA) cycle is shorthand for testing a change in the real work setting — by planning it, trying it, observing the results, and acting on what is learned. This is the scientific method used for action-oriented learning.

Langley G; Nolan KM, Nolan TW, Norman CL, Provost LP. The Improvement Guide: A Practical Approach to Enhancing Organizational Performance.

A. Set Aims (Goals and Objectives)

Improvement requires setting aims. An organization will not improve without a clear and firm intention to do so. The aim should be time-specific and measurable; it should also define the specific population of residents that will be affected. Agreeing on the aim is crucial; so is allocating the people and resources necessary to accomplish the aim.

Setting an aim can assist teams to focus on what they are hoping to achieve when implementing MRSA reduction strategies. The aim should be time-specific, measurable and define the specific population who will be affected.

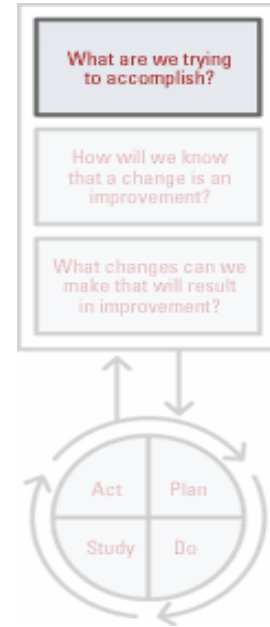
The following are examples of aims at the organizational level:

6. Improve hand hygiene of all healthcare workers on unit X from 30% to 90% by June 2008.
7. Improve compliance with all isolation precautions for MRSA patients to 100% by June 2008.

As teams work on different elements of the bundle, the aims should be specific to what it is they are hoping to achieve at that point.

B. Establish Measures

Measurement is a critical part of testing and implementing changes; measures tell a team whether the changes they are making actually lead to improvement. Measurement for improvement should not be confused with measurement for research. This difference is outlined in this chart:



	Measurement for Research	Measurement for Learning and Process Improvement
Purpose	To discover new knowledge	To bring new knowledge into daily practice
Tests	One large “blind” test	Many sequential, observable tests
Biases	Control for as many biases as possible	Stabilize the biases from test to test
Data	Gather as much data as possible, “just in case”	Gather “just enough” data to learn and complete another cycle
Duration	Can take long periods of time to obtain results	“Small tests of significant changes” accelerates the rate of improvement

Three Types of Measures

Use a balanced set of measures for all improvement efforts:

1. **Outcome Measures (voice of the patients):**
 How is the system performing? What is the result?

2. Process Measures (the workings of the system):

Are the parts/steps in the system performing as planned?

- Percentage of healthcare workers washing their hands.

3. Balancing Measures (looking at a system from different directions/dimensions):

Are changes designed to improve one part of the system causing new problems in other parts of the system? This measure often addresses resident/staff satisfaction and workload issues.

- Time to put patient on isolation precautions after test results received on unit.

Measuring for improvement starts with collecting baseline data to determine the seriousness of the problem to help motivate stakeholders. Then, collect data regularly to track the effectiveness of change over time.

C. Select Changes

While all changes do not lead to improvement, all improvement requires change. The ability to develop, test, and implement changes is essential for any individual, group, or organization that wants to continuously improve. There are many kinds of changes that will lead to improvement, but these specific changes are developed from a limited number of change concepts.

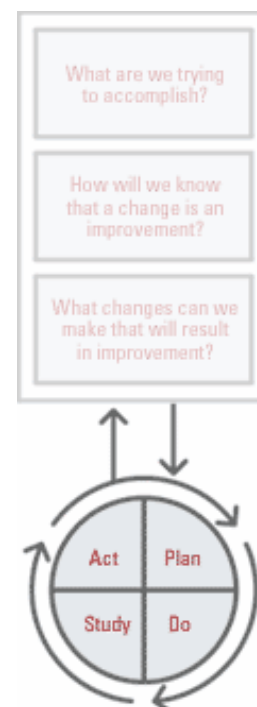
A change concept is a general notion or approach to change that has been found to be useful in developing specific ideas for changes that lead to improvement. Creatively combining these change concepts with knowledge about specific subjects can help generate ideas for tests of change. After generating ideas, run Plan-Do-Study-Act (PDSA) cycles to test a change or group of changes on a small scale to see if they result in improvement. If they do, expand the tests and gradually incorporate larger and larger samples until you are confident that the changes should be adopted more widely.

D. Test Changes

Once a team has set an aim, established its membership, and developed measures to determine whether a change leads to an improvement, the next step is to test a change in the real work setting. The Plan-Do-Study-Act (PDSA) cycle is shorthand for testing a change — by planning it, trying it, observing the results, and acting on what is learned. This is the scientific method used for action-oriented learning.

Reasons to Test Changes

- To increase your belief that the change will result in improvement.
- To decide which of several proposed changes will lead to the desired improvement.
- To evaluate how much improvement can be expected from the change.
- To decide whether the proposed change will work in the actual environment of interest.



- To decide which combinations of changes will have the desired effects on the important measures of quality.
- To evaluate costs, social impact, and side effects from a proposed change.
- To minimize resistance upon implementation.

Steps in the PDSA Cycle

Step 1: Plan

Plan the test or observation, including a plan for collecting data.

- State the objective of the test.
- Make predictions about what will happen and why.
- Develop a plan to test the change (Who? What? When? Where? What data need to be collected?).

Step 2: Do

Try out the test on a small scale.

- Carry out the test.
- Document problems and unexpected observations.
- Begin analysis of the data.

Step 3: Study

Set aside time to analyze the data and study the results.

- Complete the analysis of the data.
- Compare the data to your predictions.
- Summarize and reflect on what was learned.

Step 4: Act

Refine the change, based on what was learned from the test.

- Determine what modifications should be made.
- Prepare a plan for the next test.

Example of a Test of Change (Plan-Do-Study-Act Cycle)

Depending on the aim, teams choose promising changes and use Plan-Do-Study-Act (PDSA) cycles to test a change quickly on a small scale, see how it works, and refine the change as necessary before implementing it on a broader scale. The following example shows how a team started with a small-scale test.

Implementing Hand Hygiene Interventions

Plan:	Observation shows that the supplies at the entrance of an isolated patients room are often missing key items such as: all sizes of gloves
Do:	Ask the nursing aid on day shift to assess and stock room twice a day.
Study:	Nurse aid reports that it is easy to forget; and she only got to it once on the shift
Act:	Suggestion for PDSA #2: to “tie” this step into medication rounds. A red card with isolation precautions written on it sits on the med cart as a reminder

Implement Changes

After testing a change on a small scale, learning from each test, and refining the change through several PDSA cycles, the change is ready for implementation on a broader scale—for example, for an entire pilot population or on an entire unit. Implementation is a permanent change to the way work is done and, as such, involves building the change into the organization. It may affect documentation, written policies, hiring, training, compensation, and aspects of the organization's infrastructure that are not heavily engaged in the testing phase. Implementation also requires the use of the PDSA cycle.

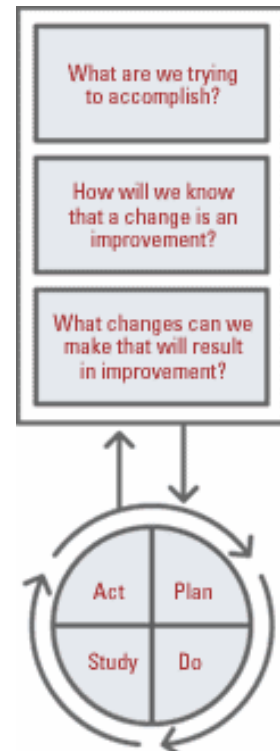
Example

Testing a change:

Three Environmental cleaning staff (one from each shift in a 24 hour period) use a new “checklist” for room cleaning to obtain feedback on ease of use, format of the form etc.

Implementing a change:

All environmental staff on the unit use the new “checklist” for room cleaning.



Spread changes

Spread is the process of taking a successful implementation process from a pilot unit or pilot population and replicating that change or package of changes in other parts of the organization or other organizations. During implementation, teams learn valuable lessons necessary for successful spread, including key infrastructure issues, optimal sequencing of tasks, and working with people to help them adopt and adapt a change.

Spread efforts will benefit from the use of the PDSA cycle. Units adopting the change need to plan how best to adapt the change to their unit and to determine if the change resulted in the predicted improvement.

As experience develops and measurement of the success of your MRSA reduction strategies process reflects sustained improvement the process can be implemented for more patients in more areas. Evaluate at each new step before adding more units to the process. Retest the pilot process on new units in order to identify any revisions that may be needed. The roll-out across an organization requires careful planning to move through each of the major implementation phases.

A key factor for closing the gap between *best* practice and *common* practice is the ability of healthcare providers and their organizations to spread innovations and new ideas. The IHI's 'A Framework of Spread: From Local Improvements to System-Wide Change' will assist teams to develop, test and implement a system for accelerating improvement by spreading change ideas within and between organizations. This paper will assist teams to "prepare for a spread; establish an aim for spread; and develop, execute, and refine a spread plan." Some issues to address in planning for spread include training and new skill development, supporting people in new behaviors that reinforce the new practices, problem solving, current culture regarding change, degree of buy-in by staff, and assignment of responsibility.

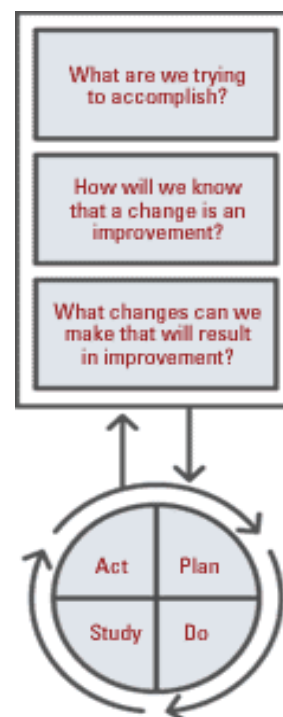
Further information on sustaining and spreading improvements can be accessed by using the following links:

<http://www.ihl.org/IHI/Results/WhitePapers/AFrameworkforSpreadWhitePaper.htm>

Example: If key change ideas such as increased access to alcohol based hand rub both on units, and painted symbols on the floor have contributed to improving hand hygiene, then spread would be sharing these successes to occur in all units in a step-wise fashion throughout the organization and assisting the units in adopting or adapting the change.

Communication

Infection Control Practitioners are skilled at collecting and reporting data on healthcare-associated infections (HAI). However, often the structures needed to give this information back to the healthcare workers in a meaningful way- front-line staff and leadership – are lacking. Unless the front-line healthcare workers feel "ownership" of the data; it will be difficult to expect change. Front-line HCWs, need to be included in the discussion on how the surveillance data is tied to the interventions they are



implementing on the unit. Teams will accelerate their improvement activity if they can see the numbers are improving. This data feedback loop is a critical component.

Successful MRSA control strategies all include creating a systematic way to give feedback to all those involved in control efforts and a way to follow-up on this feedback. Figuring out how to do this can sometimes be more challenging than the intervention. However, finding a way to effectively give information to both frontline workers and leadership is crucial to success.^{69,70}

A successful MRSA reduction program in Toronto moved from standard infection control strategies to a program of “structured communication with frontline workers, senior administration and other stakeholders of quantitative data with respect to care outcome, practice standards, the role of the environment and economic impact on a regular basis.” During the first year of the implementation of this strategy, they achieved a 60% hospital-wide drop in the incidence of HAI MRSA transmission.⁷¹

Another hospital in the US study found that “the use of statistical control charts and monthly feedback to medical staff, ward managers, and senior managers resulted in a 50% reduction in the overall MRSA rate and an associated decrease in variability within departments.”⁷¹

A report from a successful program in Pittsburgh noted: “The whole process is bathed in information. Thanks to the surveillance system, data are generated on a regular basis and given to each unit. Staff analyzes the data and act accordingly.”⁷²

Some communication examples:

- Include a review of data at weekly staff meetings;
- Provide charts showing cases of MRSA among new patients or any cases of transmission to patients in the last week. These may be displayed at nursing stations;
- Review hand hygiene, cleaning and precaution audit results jointly as a team. During the discussion focus and emphasize on what well with the audit. Then, as a group, identify places for improvement; and
- If transmission is occurring or audit results are not meeting your goals:
 - a. Brainstorm to figure out why compliance is low or how transition happened.
 - b. Encourage everyone involved to identify what is working and what is not.
 - c. Use these findings to support staff to build on what is working and also support their efforts to create innovative new practices.

The most important point is you want to develop individually tailored ideas for your unit, team and facility. Available resources, MRSA burden, patient population and many other

69 A Multidisciplinary Approach to Reducing Outbreaks and Nosocomial MRSA in a University-Affiliated Hospital Vol. 9 Special Issue | Patient Safety Papers Healthcare Quarterly,9(Sp)2006:54-60 Maryam Salaripour, Pat McKernan, Roslyn Devlin and the Infection Prevention and Control Team

70 Gandhi, T.K., E. Graydon-Baker, C.N. Huber, A.D. Whittemore and M. Gustafson. 2005. "Closing the Loop: Follow Up and Feedback in a Patient Safety Program." Joint Commission Journal on Quality and Patient Safety 31(11): 614-21.

71 Curran, E.T., J.C. Benneyan and J. Hood. 2002. "Controlling Methicillin-Resistant *Staphylococcus aureus*: A Feedback Approach Using Annotated Statistical Process Control Charts." Infection Control and Hospital Epidemiology 23(1): 13-18.

72 "Do What You Can, With What You Have, Where You Are." Plexus Institute 2007 A Quest To Eliminate MRSA At the VA Pittsburgh Healthcare System. by A. Singh and Karen Greiner

variables are all going to be different around the country and therefore your solutions must be “home grown” to work.

Examples of audits:

- hand hygiene observations;
- hand hygiene resource availability;
- appropriate use of contact precautions;
- checklists of environmental cleaning;
- use of Glo Germ™ or Glitter Bug™ to assess thoroughness of hand hygiene and environmental cleaning;
- percent of admission swabs done of those that were required; and/or
- length of time from sending MRSA cultures to the lab to receiving results and placing patients on precautions, if appropriate.

POSITIVE DEVIANCE – What is it?

Positive Deviance (PD) has been an effective tool in numerous US health systems to dramatically reduce MRSA. Positive Deviance is a successful approach to mobilizing organizations and communities for behavior and social change that has not yet been applied to solving problems in North American healthcare systems. It is based on the observation that in most communities there are certain individuals or groups (positive deviants) whose special practices or strategies enable them to find better solutions to prevalent, seemingly intractable problems than their peers who have access to the same resources. Through an iterative process called “PD process” a community identifies and disseminates those special practices. PD has been used by companies such as Hewlett Packard, Genentech, Goldman Sachs and Merck.⁷³

In the Veteran’s Affairs sites, MRSA coordinators asked questions and elicited answers from more than 400 staff that uncovered successful practices that were isolated and not widely appreciated and ideas that represented solutions just waiting to happen. Housekeepers and maintenance employees are often in a position to provide innovative practices to assist in the control of MRSA. Patients were also approached on how control the spread of this bug. “That was a gold mine” said Dr. Jon Lloyd, Coordinator for the SW Pennsylvania MRSA Prevention Collaborative, “Now, instead of patients being the defective, passive recipients of our expert care, they are part of the solution and they love it”.

Your team may want examine the PD approach given that this complex phenomena such as a rampant multiplying bacteria require a complex human response, with every member of the community engaged, observant, and poised to interact collaboratively.

PD compliments the QI methodology presented above nicely as it generates ideas for changes from across the organization to help you with this problem.

For more information on visit: www.plexusinstitute.com

73 Pascale, R.T. & Sternin, J. 2005, “Your company’s secret change agents”, Harvard Business Review

Measuring the Success of the MRSA intervention

Teams enrolled in the Campaign are expected to submit data to the Central Measurement Team (CMT) of SHN! Please see page 46 which outlines how to submit data to CMT. Teams who are committed to making improvements at the bedside, need to collect measurement on a monthly basis to guide their improvement changes. Teams who do not submit data on at least one or more measures at least once every 6 months will be deemed “inactive”. Teams can reactivate at any time by submitting data.

Ideally, all components in this kit (hand hygiene, environmental cleaning, institution of contact precautions, screening, surveillance) are areas of focus if a team is serious about reducing Hospital Associated MRSA. However, depending on your local culture, needs assessment and champions (including senior leadership) you may want to focus on one component vs. another first. You can send data into CMT for any or all the care components you choose to work on.

If over time your process measures do not reflect improvement, your team should investigate the reason why (e.g. processes which are not working, non-compliance to these processes and/or barriers exist which prevent the process from working effectively etc.). If all 5 interventions have not been implemented, serious consideration should be given to doing so.

MEASUREMENT TIPS⁷⁴

Plot data over time

Information about a system and how to improve it can be obtained by plotting data over time and then observing trends and other patterns. Tracking a few key measures over time is the single most powerful tool a team can use and will help them to see the effects of the changes they are making. Within your organization we encourage you to use Run Charts – described below, to show progress over time.

Run Charts - Track Your Measures over Time

Determining if improvement has really happened and if it is lasting, requires observation of patterns over time. **Run charts** are graphs of data over time and are one of the single most important tools in performance improvement. Using run charts has a variety of benefits:

- They help improvement teams formulate aims by depicting how well (or poorly) a process is performing;
- They help in determining when changes are truly improvements by displaying a pattern of data that you can observe as you make changes; and
- They give direction as you work on improvement and information about the value of particular changes.⁷⁵

Seek usefulness, not perfection

Remember, measurement is not the goal; improvement is the goal. In order to move forward to the next step, a team needs just enough data to know whether changes are leading to improvement.

- **Integrate measurement into the daily routine.** Useful data are often easy to obtain without relying on information systems. Don't wait two months to receive data from your hospital's information systems department. Develop a simple data collection form, and make collecting the data part of someone's job. Often, a few simple measures will yield all the information you need. For example, it is quite appropriate and helpful to feed back to a nursing unit raw number of hospital associated MRSA cases identified on that unit during the past few days without waiting for the whole month and for denominator data (i.e. patient admissions per month).
- **Use qualitative and quantitative data.** In addition to collecting quantitative data, be sure to collect qualitative data, which often are easier to access and highly informative. For example, ask staff how the MRSA reduction strategies process is going or how to improve the MRSA reduction strategies or BPMH form. Or, in order to focus your efforts on improving a resident's ability to provide a complete and accurate medication history, ask residents and their families about their experience.

⁷⁴ Adapted from Institute for Healthcare Improvement, *Tips for Effective Measures*; accessed August 9, 2006.

Link: <http://www.ihl.org/IHI/Topics/Improvement/ImprovementMethods/Measures/tipsforestablishingmeasures.htm>

⁷⁵ Adapted from SHNI: How to Guide: Rapid Response Teams May 2007.

Measurement Tips

- Goal is improvement, not the development of a measurement system
- Measurement should speed up improvement
- Develop a useful rather than a perfect process
- Key measures should clarify objectives
- Integrate measurement into daily routines
- Link measures for improvement with other initiatives in the unit/organization
- Involve stakeholders in measuring process & outcomes

Reference: Not Now, I'm Busy: Measurement For Patient Safety, G. Ross Baker, Ph.D., University of Toronto October 21, 2006

Submitting Data to SHN!

On a national level, the central question is whether Canadian healthcare facilities are able to learn and implement the changes in practice that have been shown in other settings to reduce adverse events, morbidity and mortality.

The management of data submitted to *SHN!* will be carried out by a University of Toronto based Central Measurement Team (CMT) which is funded by the Canadian Patient Safety Institute (CPSI) and led by Dr. G. Ross Baker. Data collected by the Central Measurement Team will be used to:

- Facilitate the testing of evidence-based strategies for better practice, shown in other settings to reduce morbidity and mortality; and
- Support teams by providing information on their own performance relative to the interventions for which they have enrolled through the collection, analysis and reporting of organization-level, intervention specific data.

As part of the campaign, *SHN!* Measurement Worksheets will be completed and sent in by participating teams and submitted to *SHN!* on a monthly basis in order to monitor the success of reducing MRSA across Canada. These worksheets are available using the following link:

Submitting data, which comprises the core measures, is simple and fast! For methods of data submission (fax and online) of *SHN!* Measurement Worksheets in both formats (Excel and Word) go to X for more information.

Key advantages of the Excel worksheets:

1. The Excel worksheets do most of the required calculations for you.
2. The Excel template also includes a Chart sheet that automatically generates a run chart of your progress as you enter data on the worksheets (see below for more information).

Why submit to CMT?

- Measurement will guide your improvement work and ultimately show your changes are making a difference
- You will receive quarterly reports which show your team progress compared to those across the country
- You will be classified as an "active" team in the Campaign
- This measurement will be used to evaluate the campaign and hopefully lead to ongoing support from SHN!

APPENDIX A

Business Case

MRSA is a costly public health issue. We must focus on preventing MRSA in order to control the growing burden of this disease in Canadian hospitals and in the community.⁷⁶

The costs of screening cultures and precautions measures **are far less** than the costs of caring for patients with MRSA infections.

You can make a business case for reducing methicillin-resistant S. aureus infection:

The human and financial impact of MRSA is high:

Patients harbouring MRSA required prolonged hospitalization (average 26 days of isolation per patient), special control measures, expensive treatments and extensive surveillance.

Total cost per infected MRSA patient averages \$12,216.⁷⁷

The percentage breakdown of these costs is:

- Additional hospitalization: 81%
- Barrier precautions: 13%
- Antimicrobial therapy: 4%
- Laboratory investigations: 2%.

Estimated healthcare costs of MRSA in Canada: \$82 million

The most recent epidemiological and cost data suggest that MRSA direct health care costs in Canada, including cost for management of MRSA-infected and -colonized patients and MRSA infrastructure, averaged \$82 million in 2004 and could reach \$129 million in 2010.

This financial data makes it clear that MRSA is a costly public health issue that needs to be tackled. You can use this data as a financial incentive to convince leadership to support cost-effective infection control recommendations such as screening high-risk patients and the use of appropriate barrier precautions.⁷⁸

Be innovative. The most successful programs use the resources they already have. These places have found that “The expertise to tackle MRSA is right under our noses. There are hundreds of experts here. The key is recognizing that the solutions to the problems exist among the staff and the patients.” Try to find an approach that is people driven, more sustainable and less resource intensive.⁷⁹

⁷⁶ Canadian Journal of Infectious Diseases and Medical Microbiology, Volume 18, No. 1, January/February 2007, Methicillin-resistant *Staphylococcus aureus*: A public health issue with economic consequences. M Goetghebeur

⁷⁷ The economic impact of methicillin-resistant *Staphylococcus aureus* in Canadian Hospitals, Canadian Journal of Infectious Diseases and Medical Microbiology, Volume 18, No. 1, January/February 2007, KIM Tony ; OH Paul I. ; SIMOR Andrew E.

⁷⁸ Ibid.

⁷⁹ “Do What You Can, With What You Have, Where You Are.” A Quest To Eliminate MRSA At The VA Pittsburgh Healthcare System. A. Singh and Karen Greiner Plexus Institute, 2007

APPENDIX B

Case Study Examples on how to use the MRSA Getting Started Kit for Safer Healthcare Now!

All Facilities

1. Assess the patient population

Health care organizations across Canada all have their own unique patient populations in terms of acuity, age, and diagnoses. Not all patients are at equal risk of acquiring MRSA. See Risk table for acquisition of MRSA in Appendix I. It is necessary to base your MRSA prevention program on an evaluation of both your MRSA baseline rates and the populations at risk. This risk assessment is critical so that resources can be directed to areas with the highest rates or most at risk patients.

2. Education

MRSA is a difficult topic. Myths, misunderstandings and misconceptions about MRSA abound -- and terms like "super bug" don't help. Do not assume that your nursing or medical staff have a good understanding of MRSA. All staff, families, and patients need a basic baseline understanding of MRSA – what is it, how is it spread, and why it is a concern. Your education efforts should focus on simplifying – you want to make a complex problem simple by breaking it down into parts. Once people understand how all organisms are transmitted they will also understand why they need to clean their hands and the environment, and why it is necessary to use barriers (gowns, gloves) to prevent the MRSA or other potential pathogen reservoir from coming into contact with their hands, the environment and other patients. This approach is called translating guidelines into practice.

The goal is for the staff to reach the point that following infection control policies becomes just another part of their day to day responsibilities. For example, for most people it feels unnatural to not wear a seatbelt while in a car. It took years of education and reinforcement to move Canadians from wearing a seatbelt because it was the law to wearing one simply because they always wear one

If possible try to arrange small group face-to-face educational sessions. A personal setting that offers opportunities for discussion and questions will allow staff and others to feel free to ask questions and voice their fears and concerns without feeling embarrassed or appearing uninformed. At the end of the session give them written material and on-line resources to reinforce what they have learned.

Ideas to make these sessions more fun:

- Quizzes
- Role playing
- Certificates
- Food

We are including in the Appendix D some sample educational materials for you to use – educational sheets, quizzes, provincial and national guidelines and on-line resources.

3. Getting Started Kit Application in smaller hospitals and long term care facilities

A. Community Hospitals (targeted to those institutions with minimal ICP resources and no surveillance program in place)

Hospital A is a 75-bed acute care community hospital in a semi-rural setting. Medical records show that most admissions are adult patients with a variety of acute medical diagnoses. General surgical procedures are performed by the two staff surgeons. The most frequently performed procedures are cholecystectomies, hysterectomies, and hernia repairs.

The hospital has not considered MRSA a problem up to now. Since they do not have a hospital acquired infection surveillance program in place or perform screening cultures on admission they also realize they do not know if they are admitting MRSA colonized patients or what the MRSA burden among inpatients actually is. In the past six months the surgeons and part time infection control practitioner (ICP) became concerned when two post op patients developed surgical wound infections that were identified as MRSA.

At this point the part time ICP looked retrospectively at lab reports and found that in the previous 12 months the lab had identified only one MRSA infection.

The ICP then met with the chief of surgery and the nurse manager to discuss this. They all agreed to use the Getting Started Kit from SHN to address and reduce MRSA transmission before it becomes a larger problem.

Using ideas in the Getting Started Kit the three decided to:

1. form a multidisciplinary working group to address the problem.
2. incorporate the first four components of the Getting Started Kit.
3. arrange a meeting with senior leadership to gain their support and needed additional financial resources.

At the meeting with leadership they presented a report showing the increase in MRSA surgical site infections over the past six months. They used the financial data in the Getting Started Kit to convince leadership that it was necessary to increase their prevention efforts using the four evidence based components. If not, the hospital will face increased costs from additional MRSA infections in the future.

They divided responsibility for implementing the four components among the group:

1. Hand hygiene: Nursing and Surgery
2. Environmental cleaning: Environmental Services
3. Contact precautions: Infection Control and Nursing
4. Active screening: Nursing, Micro lab, Infection Control

1. Hand hygiene: Nursing and Surgery

They decided that they would focus initially on the surgical unit only. They did educational sessions with all staff including surgeons to review the increase in MRSA infections. They are planning to enroll in Canada's hand hygiene campaign, do some observations of hand hygiene on the units and report back on their findings. Once they have some initial results they will decide how best to direct their hand hygiene campaign.

They had already planned to increase the number of wall mounted alcohol gel dispensers and to give pocket sized alcohol gel dispensers to all staff.

2. Environmental Cleaning: Environmental Services

Since the hospital is small and has a stable housekeeping staff it was not difficult to get Environmental Services on board. When the ICP explained to the Environmental Services staff how long MRSA lives in the environment and how easily it transfers from surfaces to hands to patients they realized just how important their jobs as cleaners are. Several ES staff members then requested to become an active part of the MRSA team.

The Environmental Services (ES) manager asked for a few volunteers. They decided to work with checklists first. They took a few sample lists from the Appendix F of the Getting Started Kit, and modified them to fit their own needs. They decided that general cleaning checklists would be more useful than discharge cleaning checklists as they have so few patients on contact precautions. The plan was to introduce the concept of checklists slowly to the staff by just using them on only one part of the unit at a time. Once they had these running well and everybody was comfortable filling them, out the group decided that they are going to try Glo-germ™ as environmental tracers to measure how well the rooms are being cleaned. For further information on this, see appendix G, use of Glo-germ™ /Glitter Bug and ultraviolet light to measure effectiveness of environmental cleaning. They chose rooms and days randomly so no one would know which rooms were being measured for a one week period. The ES manager and staff will review the results with nursing and other staff and they will ask for input from all staff to decide how to improve or maintain their cleaning standards.

Contact precautions

The hospital has only a few private or isolation rooms. They decided they would use the risk assessment table in appendix I to assist with patient placement decisions if they identified any patients as MRSA colonized or infected. The nurses and surgeons both held staff meetings to discuss reasons why staff, especially surgeons, often did not put on gowns and gloves. At the meeting they agreed to try an observation first to see how well contact precautions are actually being followed. Nurses and surgeons (with a little coaxing) volunteered to verbally screen all surgical admissions for risk factors and then swab any with identified risks. See Appendix I. The micro lab director worked with the nursing manager and staff on the units to explain how to correctly take swabs for culture. They also worked out a system to get culture results back the floor as soon as they are available.

They realized they need some baseline data on MRSA colonization and transmission on the units to guide their interventions so began a program to re-culture over a period of one month all patients:

- who remain on the unit after one week
- who have been admitted for more than 72 hours before they are discharged.

They will also track all MRSA SSI infections. They do not have a system for full SSI surveillance. Therefore they will only collect numbers of MRSA infections but not rates at this time.

At the end of six months they will look at the results of both admission surveillance screening and clinical MRSA infections. Based on these results they will evaluate the current interventions and plan next steps.

Long Term Care

Long term care facility B provides care to a range of mostly elderly clients, many of whom are wheelchair bound, and need assistance with transfers and Active Daily Living (ADL). One section of the facility houses rehabilitation patients – recovering from joint replacement surgery, strokes, hip fractures. Some patients have indwelling devices such as urinary catheters and feeding tubes. There is a small section reserved for patients with dementia.

They are aware of MRSA cases when patients are admitted from acute care who have been previously identified as MRSA colonized or infected. In the past MRSA transmission has not been a concern in the facility. However, in the last six months they documented two residents who acquired MRSA infections – one was a pneumonia case and the other was a skin and soft tissue infection at a gastrostomy tube insertion site.

The Infection Prevention and Control Program is small i.e. less than 1 FTE, and it does not have an infection surveillance program in place. The ICP would like to become more active in preventing further spread of MRSA among residents. The ICP also knows that many of them have risk factors for acquiring MRSA colonization or infection:

- decubiti, or other areas of skin breakdown due to immobility,
- indwelling devices including feeding and tracheotomy tubes
- medically fragile patients and requiring hands on care – feeding dressing bathing

The staff responsible for Infection Control and Quality Assurance and the Director of Nursing have met and all agreed to use the Getting Started Kit to manage MRSA prevention.

They decided to focus on Components One and Two: improving hand hygiene and environmental cleaning. They are enthusiastic about the project as it presents an opportunity for team building and improved cooperation among nursing, housekeeping and other support services.

Hand Hygiene.

They are going to enroll in Canada's hand hygiene campaign and use the posters, educational material and observations tools. They will use the information from this campaign to convince the facility administration to add more hand hygiene resources, - specifically alcohol based hand rubs - especially in the patient rooms and common areas – dining room, lounge, and activity areas. They recognize that hand hygiene is by far the most important of the interventions in their setting.

Cleaning and Disinfection

They had concerns about how well common areas are being cleaned. They read the information regarding use of environmental tracers and agreed it would work well in their setting.

They sat down with the environmental services manager and agreed to use Glo-germ™ as a tracer and place it on the hand rails around the walls. Guided by the process outlined in the Manitoba study in Appendix G they will use the UV light to measure how well these rails are cleaned 48 hours after they have applied the Glitter Bug (similar product to Glo-germ). Those chose hand rails -- one of their highest high touch areas -- as an effective way to make a visual impression on staff and visitors of just how easily MRSA is spread if hands are not cleaned and surfaces are not wiped down.

Nursing and Environmental Services plan to present the results jointly to housekeeping and nursing staff. They hope this process will also increase team building and joint problem solving by staff.

Contact Precautions

They do keep track of any clinically identified MRSA infections and follow their provincial guidelines regarding contact precautions. They use contact precautions for any current or newly admitted residents with known MRSA infection that present a risk for transmission to other residents (draining wounds, or excessive diarrhea, although rarely do they have a private room available). They will use the risk assessment in Appendix I to assist with decisions on resident placement.

They plan to hold educational sessions around Routine Practices with emphasis on MRSA transmission and the importance of following contact precautions. At a later date they may consider doing some observational measurements on how well contact precautions are followed.

However, they also realize that a Long Term Care Facility is a resident's home and infection control precautions must be balanced with promoting a healthy lifestyle for the resident. They cannot isolate a resident who is colonized because colonization with MRSA may last indefinitely or may periodically re-emerge, despite treatment or attempts at decolonization. They do not want to impose precautions that would interfere with social interaction and rehabilitative care and may result in isolation, depression, anger and other adverse outcomes. They discussed an education program for the residents, reminding the residents of the importance of hand hygiene, especially before meals.

Screening

They are not going to actively look for MRSA as they have limited lab resources and do not isolate residents with MRSA colonization. They do plan to swab a newly admitted resident for MRSA culture if they are identified as having a previous history of MRSA, or meet the requirements for screening in the long term care risk assessment table, Appendix J.

APPENDIX C

Audit tool to Assess Availability of Hand Hygiene Products and Equipment

Sinks; waste receptacles; alcohol-based hand rub dispensers; and gloves.	
Sinks	
Paper towels present: Does the paper towel dispenser contain paper towels at the time of assessment?	YES NO N/A
Waste Receptacles	
Is there a conveniently located available waste receptacle for paper towels	
Alcohol-Based Hand Rub Dispensers	
<i>Dispenses alcohol-based hand rub (any volume):</i> Does the dispenser provide any alcohol based hand rub on use?	YES NO N/A
<i>Dispenses adequate volume on first actuation:</i> Does the dispenser, on the first actuation, provide an adequate amount of alcohol based hand rub to cover both hands?	YES NO N/A
Glove Dispensers	
Gloves available: Are gloves of any size present in the dispensing unit?	YES NO N/A
Visible label indicating gloves' sizes: Are there clearly visible and legible labels indicating the size or sizes of the gloves available?	YES NO N/A
Small, medium, and large gloves available: Are all three sizes of gloves available?	YES NO N/A
Only two sizes available: Are the gloves available in two sizes?	YES NO N/A
Only one size available: Are the available gloves of just one size?	YES NO N/A

The Joint Commission Journal on Quality and Patient Safety

How "User Friendly" Is the Hospital for Practicing Hand Hygiene? An Ergonomic Evaluation

Gautham Suresh, M.D., D.M., M.S. John Cahill, M.D. Department Editors: Marcia M. Piotrowski, R.N., M.S., Peter Angood, M.D., Paula Griswold, M.S., Gina Pugliese, R.N., M.S., Sanjay Saint, M.D., M.P.H., Susan E. Sheridan, M.I.M., M.B.A., Kaveh G. Shojania, M.D.

Checklists for Daily Cleaning:

Adapted from: Best Practices for Infection Prevention and Control of Resistant *Staphylococcus aureus* and Enterococci in all health care settings, Ministry of Health and long term care, Ontario, Provincial Infectious Diseases Advisory Committee (PIDAC) 2007

Audit tool To Evaluate Access To Hand Hygiene Equipment

Audit tool To Evaluate Access To Hand Hygiene Equipment	
Answer each question with a “Yes,” “No,” or “Not Applicable.”	
Sinks	
Easily visible:	
Upon entry into the patient room (or the aisle of an intensive care unit or an open ward), Is the sink visible within a 180 degree field of vision?	Y N N/A
Placed at optimal height: Measure the height of the rim. Is the rim 85–110 cm above the floor?	Y N N/A
Hands-free operation: Can water be made to flow from the faucet without touching it with your hands (e.g. foot operated, elbow operated, photo-electric faucet)?	Y N N/A
Easy to set desired water temperature:	Y N N/A
Can the faucet easily be made to deliver water at a comfortable temperature?	
Easy access to soap dispenser:	Y N N/A
When standing at the sink, is the soap dispenser within hands reach without having to stretch or step to obtain soap?	
Easy access to paper towel dispenser:	Y N N/A
When standing at the sink, is the paper towel dispenser within hands reach, without having to stretch or step to obtain a paper towel?	
Sink within easy reach from patient’s bedside: Can the sink be reached from the patient’s bedside with two paces or less? Unobstructed approach from patient’s bedside:	Y N N/A
Is the path between the patient’s bedside and the sink free of obstacles such as chairs, the patient’s bed, and hospital equipment?	Y N N/A
Waste Receptacles Within easy reach:	Y N N/A
When standing at the patient’s bedside, is the waste receptacle (trash can) at a distance of one pace or less?	
Alcohol-Based Hand Rub Dispensers	
Easily visible: Upon entry into the patient room (or the aisle of an intensive care unit or an open ward) is the dispenser easily visible within a 180 degree field of vision?	Y N N/A
Placed at optimal height: Measure the height of the dispenser nozzle tip. Is it 85–110 cm above the floor?	Y N N/A
Easy to actuate: Does the dispenser provide the alcohol based hand rub liquid or foam with gentle compression of the actuator (i.e., without the use of excess force or pressure)?	Y N N/A

Redundant dispenser available: Is a second dispenser present close to the first one?	Y N N/A
Within easy reach from patient's bedside: Can the dispenser be reached from the patient's bedside with one pace or less?	Y N N/A
Unobstructed approach from patient's bedside: Is the path between the patient's bedside and the dispenser free of obstacles such as chairs, the patient's bed, and hospital equipment?	Y N N/A
Glove Dispensers:	
Easily visible: Upon entry into the patient room (or the aisle of an intensive care unit or an open ward) is the dispenser easily visible within a 180 degree field of vision?	Y N N/A
Placed at optimal height: Measure the height of the dispenser opening. Is it 85–110 cm above the floor?	Y N N/A
Redundant dispenser available: Is a second glove dispenser present close to the first one?	Y N N/A
Within easy reach at patient's bedside: Can the dispenser be reached from the patient's bedside with one pace or less?	Y N N/A
Unobstructed approach from patient's bedside: Is the path between the patient's bedside and the dispenser free of obstacles such as chairs, the patient's bed, and hospital equipment?	Y N N/A

Adapted from:

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APPENDIX D

Successful Hand Hygiene Campaigns

UNITED KINGDOM

Clean your hands www.npsa.nhs.uk/cleanyourhands

GOAL

- Improve hand hygiene compliance among health care workers.

TACTICS

- 'Near-patient' hand sanitization stations, posters, training videos.

RESULTS

- 75% of staff considered hand hygiene as a 'top priority' after 6 months.
- Significant increase in alcohol rub usage, up to 16 times a shift from 6 times a shift.
- Patient empowerment behaviors were improved by up to 71% in the hospitals reached by the campaign.

UNITED STATES

Partners in your care www.med.upenn.edu/mcguckin/handwashing/index.html

GOAL

- Put patients care in the hands of the patient.

TACTICS

- Posters, marketing tools to staff, monthly benchmarking to monitor sustained compliance.

RESULTS

- Improvement of hand hygiene compliance of 50% after 5 months.

SWITZERLAND

Hand Hygiene Campaign www.swisshandhygiene.ch

GOAL

- Promote hand hygiene to health care workers.

TACTICS

- Strong emphasis on support from hospital management, written recommendations to staff, staff training, placement of alcohol rubs at bedside stations, visual materials and observation and feedback on hand hygiene practices.

RESULTS

- 26% increase in hand washing with staff.
- 33% increase in hand washing and good hand hygiene practices specifically with physicians.

AUSTRALIA

DeBug www.debug.net.au/index.html

GOAL

- Promote good hand hygiene practices to health care professionals with message to protect themselves and patients.

TACTICS

- Posters, newsletters, t-shirts, morning teas and implemented training sessions throughout participating institutions.

RESULTS

- 20% improvement in hand hygiene compliance after first year.
- Significant reduction in MRSA (methicillin-resistant *Staphylococcus aureus*) clinical infections in hospital as well as reduction in transmission rates of MRSA.

APPENDIX E

Environmental Cleaning Sample Policy

Environment Cleaning Sample Policy: ⁸⁰

1. Cleaning is accomplished with water, detergents and mechanical action.
2. Skin antiseptics, except alcohol, should not be used for cleaning inanimate objects.
3. Detergents are adequate for most surface cleaning.
 - Using friction, clean equipment with soap and water to remove any soil, dust, blood or body fluids from the surface of the equipment. A brush may be necessary.
 - Dismantle equipment to clean in crevices when possible
 - Rinse and dry
4. Regular schedules for daily cleaning are required. Client contact areas must be cleaned between each client.
5. Responsibility for cleaning must be clearly assigned.

Reusable non-critical equipment that has been in direct contact with the patient must be cleaned with a facility-approved disinfectant before use on another patient.

- Equipment that is visibly soiled must be cleaned and then disinfected
- Use of PPE (gloves/gowns) is required when cleaning and handling soiled patient care equipment in order to prevent exposure to the health care workers' skin and mucous membranes and contamination of their clothing and the environment.

Dedicate equipment for MRSA colonized and infected patients:

- Patients who are known to have MRSA should have dedicated equipment that is used solely for them during their stay and decontaminated after they are discharged. This includes thermometers, blood pressure cuffs, pulse oximeters, IV pumps, and stethoscopes.
- If it is not possible to dedicate all equipment, then at the very least, the equipment should be disinfected with a disinfectant wipe (e.g., alcohol) before being used on the next patient.
- Bedpans must be reserved for use by a single patient and labeled appropriately.
- Mouthpieces, resuscitation bags, or other ventilation devices must be provided for single use in facility areas where the need to resuscitate is likely to occur.
- Personal care supplies, lotions, creams, soaps, are not to be shared between patients.

Environmental Control/Housekeeping

- Procedures should be established for routine care, cleaning and appropriate disinfection of patient furniture and environmental surfaces with a facility-approved disinfectant.
- All horizontal and *frequently touched surfaces* (handrails, faucets, overhead tables, doorknobs) should be cleaned with a germicidal agent daily and more often if soiled.

⁸⁰ (Hygiene And Asepsis Best Practices For Long Term Care And Community Care Including Health Care Offices, April, 2007, Ontario MOH and LTC)

How-to Guide: Reduce Methicillin-Resistant *Staphylococcus aureus*

- Toilets must be cleaned regularly –not just when visibly soiled.
- Immediately clean all spills of blood and/or body fluids with a facility-approved disinfectant according to facility approved policy.^{81 82}

81 Manitoba Guidelines for the Prevention and Control of Antibiotic Resistant Organisms (AROs) Manitoba Communicable Disease Control, January 2007 p. 12

82 . Institute For Healthcare Improvement (IHI) Getting Started Kit: Reduce Methicillin-Resistant Staphylococcus Aureus (MRSA) Infection, How-To Guide.2007

APPENDIX F

**Environmental Services Check List Audit
 Daily Cleaning Of Patient Room**

Steps

1. High Dusting Performed Yes___ No___

a. Use high duster/mop head: wipe ledges (shoulder high and above) Yes___ No___

b. Vents Yes___ No___

c. Lights Yes___ No___
Do not high dust OVER the patient

d. Dust TV: rotate and dust screen and wires Yes___ No___
Remove dust over cart trash bag gently

2. Damp Dust

Cloth (rag) and spray bottle of disinfectant – damp wipe: Yes___ No___

a. Ledges (shoulder high) Yes___ No___

b. Door handles Yes___ No___

3. Bedside Table – Disinfect Surface Yes___ No___

4. Glass Surfaces Yes___ No___

a. Wall spots Yes___ No___ N/A___

5. Bathroom (Toilet Bowl Mop) All Surfaces Yes___ No___

a. Weekly toilet chemical allow to stay Yes___ No___

b. Ledges in bathroom Yes___ No___

c. Door handles Yes___ No___

d. Sink Yes___ No___

e. Shower stall Yes___ No___

f. Finish toilet Yes___ No___

g. Damp wipe toilet seat Yes___ No___

h. Clean mirrors/chrome Yes___ No___

6. Empty Waste Basket Yes___ No___

a. Disinfect if wet Yes___ No___

b. Bags – close Yes___ No___

7. Isolation (Red Bag Waste) Empty

Yes___ No___

a. Carry to soiled utility room

Yes___ No___

b. Carry to Large Red Hazard trash

Yes___ No___

8. Needle Boxes

Yes___ No___

a. Check level of Sharps

Yes___ No___

b. Replace if ½ to ¾ full

Yes___ No___ N/A___

c. To soiled Utility Room after securely closing

Yes___ No___ N/A___

9. Floor Disinfection – Sign on Door

Yes___ No___

a. Wet mop head in disinfectant

Yes___ No___

b. Mop (farthest from door) ½ way room

Yes___ No___

c. Bathroom shower floor

Yes___ No___

d. Bathroom floor

Yes___ No___

e. Flip mop head – do remainder of room

Taken from: IHI GSK for MRSA

APPENDIX G

Ultraviolet-Visible Marker

Example and Process for using a Measuring Tool for cleaning assessment of toilets (or other surfaces) using UV-visible marker (UVM)

Equipment:

- A hand-held UV light
- UV-visible marker (UVM) Glitterbug® from Brevis Corp., USA

The UV-visible marker (UVM) used for this study was a lotion (Glitterbug® from Brevis Corp., USA) that is marketed for assessing handwashing compliance. This lotion is non-toxic and water soluble so is readily removed by cleaning with soap and water solutions.

The marker is not readily visible under regular room lighting but is visible when exposed to short-wave UV light. A hand-held UV light was used for visualization of the marker. You can purchase this at many dollar stores.

This marker was applied to the underside of the toilet seat in the patient room and was then assessed the following day to determine if the lotion had been removed or not.

Scoring:

A semi-quantitative score for residual marker was used:

3+	(100% fluorescence)	=	No cleaning
2+	(~ 75% fluorescence)	=	Poor cleaning
1+	(~25% fluorescence)	=	Adequate cleaning
0	(no fluorescence)	=	Complete cleaning

Initial testing confirmed that if no cleaning was performed then the UVM remained detectable and produced 3+ fluorescence for up to 7 days after it was inoculated.

UV-visible marker confirms that environmental persistence of *Clostridium difficile* spores in toilets of patients with *C. difficile*-associated diarrhea is associated with lack of compliance with cleaning protocol.

Source: Alfa Michelle J.123, Christine Dueck1, Nancy Olson3, Pat DeGagne2, Selena Papetti3, Alana Wald3, Evelyn Lo1, Godfrey Harding1,2 1,Dept of Medical Microbiology, University of Manitoba, 2Diagnostic Services of Manitoba, Microbiology, St. Boniface General Hospital site, and St. Boniface Research Centre3, Winnipeg, MB

APPENDIX H

Isolation Precautions and Other Equipment Audit

AUDIT FORM FOR PATIENT/RESIDENT SERVICE UNITS	YES	NO	COMMENTS
UNIT:			
Patient/Residents Services Manager:			
PHYSICAL ENVIRONMENT:			
Soiled Utility Room:			
1. Are there containers for confining soiled articles prior to pick-up? (eg yellow bag/grey bag)			
2. Is there adequate storage for contaminated supplies/equipment			
3. Are clean or sterile supplies stored in the room?			
4. Is personal protective equipment available?			
5. Does traffic move from soiled to clean?			
Clean Utility Room:			
1. Is there a clear separation of clean and soiled storage areas?			
2. Are soiled articles brought into the clean area?			
3. Are clean supplies stored above the floor?			
4. Is there a handwashing sink?			
5. Is there evidence of excessive dust or dampness?			
Medication Room			
1. Is there a dedicated handwashing sink?			
2. Is there evidence of inappropriate activities such as food preparation/storage?			
3. Are refrigerators are used for meds only (no food storage)?			
4. Are open containers of sterile solutions are dated?			
5. Are multidose vials used?			
6. Are the multidose vials wiped with alcohol before use?			
7. Is a sharps disposal container readily available?			
8. Is the sharps disposal full?			
Tub/Shower Room(s):			
1. Are the showers cleaned in between patient use?			
2. Are there used towels/diapers left in the shower after patient use?			
3. Is there a laundry hamper for used towels and shelving for supplies?			

QUESTION	YES	NO	COMMENTS
Patient/Resident Rooms:			
1. Are sharps containers accessible?			
2. Is there a urine measuring/discard container for each patient/resident?			
3. Is there appropriate storage for urine containers? (not on bedside table)			
4. Are commodes cleaned in between patient use?			
SPECIAL EQUIPMENT			
1. List any special equipment used in the area:			
2. Mechanical lifts:			
3. Vitals Machines			
4. Patient Wheelchairs			
5. BP Cuffs			
6. Oximeters			
7. Glucometers:			
8. Other:			
9. Are these being wiped down with Virox after each patient use?			
10. If there is patient-dedicated equipment, how often is it cleaned?			
INFECTION CONTROL			
1. Are HCWs knowledgeable as to appropriate use of PPE?			
2. Are gloves being worn for appropriate tasks? (e.g. when hands are likely to be exposed to blood or body substances)			
3. Are gloves changed between patient contacts?			
4. Are gloves being worn inappropriately (eg in hallways, elevators)?			
5. Are gloves changed as appropriate if they become soiled during a procedure?			
6. Are gowns available?			
7. Are gowns worn for the appropriate tasks?			
8. Are gowns being worn inappropriately (eg in the hallways, elevators)			
9. Are food trays being kept on isolation carts outside of the room?			
ROUTINE PRACTICES			
1. Are sharps containers sealed for disposal when approximately 3/4 full?			
2. Are needles being recapped after use on patients?			
3. If multidose vials are used, is a separate needle and syringe used for each re-entry?			
4. Is there food consumption in patient/resident care areas?			
5. Is biomedical waste disposed of appropriately?			
6. Are staff using PPE appropriately for non-isolated patients?			

ADDITIONAL PRECAUTIONS (MRSA/VRE/C difficile)			
1. Is appropriate signage clearly posted for isolated patients?			
2. Are HCWs observed to comply with additional precautions? (appropriate donning and doffing, not wearing PPE outside of isolation rooms)			
3. Do staff wear a procedure mask for MRSA patients?			
4. Are departments and housekeeping notified of isolation status when a patient is moved or transferred?			
5. Does housekeeping have adequate time to clean prior to admitting a patient into a room?			
DRESSING CHANGES:			
1. Was the HCW observed to clean their hands prior to gathering supplies?			
2. Was hand hygiene performed prior to performing the procedure?			
3. Was aseptic technique maintained throughout the set-up			
HANDLING AND STORAGE OF CLEAN LINEN			
1. Clean linen is physically separate from dirty linen?			
2. Are supplies of clean linen taken to client rooms and placed on client furnishings/lockers?			
3. Is there is a process to prevent handling of linen by patients?			
4. Is linen stored in an area where there is no exposure to dust, moisture or soiling?			
5. Are gloves are worn when handling dirty linen?			
6. Are staff performing hand hygiene following handling soiled linen?			
7. Are soiled linen bags are stored in a designated area away from public access?			



APPENDIX I

Contact Precautions

Risk Assessment Tables for Patient Placement Decisions taken from: Alberta Health and Wellness Provincial, Methicillin Resistant *S aureus* (MRSA) Infection Prevention and Control Guidelines

1. MRSA Colonized/ Infected Patient

DECREASING RISK OF TRANSMISSION

Table 4b: Patient Placement / Accommodation

<p>Preference 1: Assign priority to known or suspected MRSA colonization or infection.</p>	<p>Single room with a separate bathroom and sink. Give highest priority to patients who have conditions that may facilitate transmission, e.g., uncontained excretions or secretions.</p> <p>In areas with only cubicles, e.g., emergency, dialysis, etc., the patient must be isolated in a cubicle with the curtain drawn.</p>
<p>Preference 2: Consult with IPC, if possible, to assess the risk associated with other placement options (e.g., co-horting, keeping the patient with existing roommates).</p>	<p>Cohort patients with identical strains of MRSA.</p> <p>Perform risk assessment. If a multi-bed room is used, place with a patient at lower risk (Table 1 Risk factors).</p> <p>In multi-bed rooms > 3 feet spatial separation between beds is advised to reduce the opportunities for sharing of items.</p>
<p>Discontinuation of Precautions</p>	<p>Discontinue Contact Precautions after at least two consecutive negative specimens obtained one week apart.</p> <p>If patient is identified as consistently colonized with MRSA and there is no decolonization prescribed, use Contact Precautions for duration of stay while in acute care.³⁶ If in LTC, review and modify care plan to reduce transmission rates.</p>

Table 3a: Risk Factors for MRSA Transmission After Exposure to Infected or Colonized Source Patient

(Adapted from Health Canada, Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care, 1999)

	Higher Risk of Transmission	Lower Risk of Transmission
PATIENT	<ul style="list-style-type: none"> • Draining skin lesions or wounds not covered by dressings • Respiratory secretions (uncontrolled) • Patient requiring extensive hands-on care • Patient has invasive devices • Poor compliance with hygienic practices and infection control precautions, e.g., confused patient • Incontinence of stool or urine (not contained) • Exfoliating skin conditions 	<ul style="list-style-type: none"> • Skin lesions or wounds covered by dressing • Able to control respiratory secretions • Capable of self care • Good hygiene • Able to comply with infection control precautions • Continent
MICROORGANISMS	<p>MRSA characteristics that promote transmission:</p> <ul style="list-style-type: none"> • Spread by contact • Able to survive in the environment • Able to colonize invasive devices • Propensity for asymptomatic/carrier state 	
ENVIRONMENT	<ul style="list-style-type: none"> • Inadequate housekeeping • Shared patient care equipment without cleaning between patients (e.g., thermometer bases, commodes) • Crowded facilities • Shared facilities (e.g., rooms, toilets, bath, sinks) • High patient-nurse ratio 	<ul style="list-style-type: none"> • Appropriate housekeeping • Dedicated equipment • Adequate spacing between beds • Dedicated bathroom facilities • Low patient-nurse ratio
HOST PATIENT	<ul style="list-style-type: none"> • Requiring extensive hands-on care. • Have invasive procedures or devices • Non-intact skin • Exfoliating skin conditions • Debilitated, severe underlying disease • Extremes of age • Recent antibiotic therapy • Immunosuppression 	<ul style="list-style-type: none"> • Able to do self-care • No indwelling devices • Intact skin and mucous membranes

APPENDIX J

Risk Factors Determining Patient Placement in a Long Term Care Facility

Factors That Increase The Risk That A Patient May Be Colonized With MRSA On Admission To A Long Term Care Facility							
Recent transfer from a tertiary care institution	Known to be colonized or infected with a resistant pathogen	Contact with or proximity to a patient colonized or infected with MRSA who had • draining skin lesions or wounds not covered by dressings or copious uncontrolled respiratory secretions	The presence of surgical wound, decubitus ulcer, or other Chronic wound	Diagnosed With conjunctivitis Or bacteriuria.	The presence of invasive indwelling devices (intravascular lines, urinary catheter, endotracheal or tracheostomy tube, gastrostomy feeding tube)	Recent Antimicrobial therapy	Malnutrition, immunosuppression [age- and/or medication related]
Factors That Increase the Risk for the Acquisition of MRSA in a Long Term Care Resident							
Decubiti, other large open wounds, or skin lesions.	Poor compliance with hygienic practices and infection control precautions, e.g. confused patient	Crowded facilities and/or shared facilities (e.g. toilets, bath, sinks)	Received broad-spectrum antibiotics that select for the emergence of resistant strains	The presence of invasive indwelling devices (intravascular lines, urinary catheter, endotracheal or tracheostomy tube, percutaneous endoscopic gastrostomy feeding tube)	Debilitated and/or bed bound and requires extensive hands on care	Has malnutrition or immunosuppression [age- and/or medication-related]	Recent Cycle of institutionalization and hospitalization

Clinical Infectious Diseases, volume 31 (2000), pages 1414–1422 , Multiple Antibiotics, Resistant Bacteria in Long-Term-Care Facilities: An Emerging Problem in the Practice of Infectious Diseases, Robert A. Bonomo

Health Canada, Laboratory Centre for Disease Control, Bureau of Infectious Diseases, Division of Nosocomial and Occupational Infections, CCDR/INFECTION CONTROL GUIDELINES, Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care. July 1999, volume 2554
Risk Factors for Transmission and Disease after Exposure to Infected or Colonized Source Patient Higher Risk of Transmission Lower Risk of Transmission, page 19

If the admission assessment indicates that the resident is known to be infected/colonized or is considered to be at high risk for an ARO,
Then

1. Consider screening and/or diagnostic cultures to identify those newly admitted residents who are already infected/colonized with MRSA, and
2. Use the table for room placement and application of routine practices and additional precautions as required

APPENDIX M

Comprehensive Protocol for Active Screening:

The second area for your consideration is providing a more comprehensive screening protocol prior to patient's admittance. Both Provincial Infectious Diseases Advisory Committee (PIDAC) (which provides a grading system) and the National Health Service (NHS) in Great Britain are excellent examples of a robust screening tool. Below is a table comparing the criteria.

PIDAC	NHS
Those who have previously been colonized or infected with MRSA or VRE	All patients previously known to be MRSA positive
Those who have spent time in a health care facility outside of Canada in the last 12 months	
Those who have been admitted to, or who have spent more than 12 continuous hours as a client/patient/resident in, any health care facility in the past 12 months	
Those transferred between health care facilities (e.g. between hospitals or between a long-term care facility and a hospital)	Patients who have frequent contact with healthcare services and/or are resident in nursing or care homes are at a higher risk of being colonised with MRSA
Clients/patients/residents who have recently been exposed to a unit/area of a health care facility with an MRSA or VRE outbreak;	
Other high-risk client/patient/resident populations as identified by the Infection Prevention and Control Professional(s), Public Health or the Regional Infection Control Network.	Patients admitted from high-risk settings
Those receiving home health care services in the past year;	Patients who have frequent contact with healthcare services and/or are resident in nursing or care homes are at a higher risk of being colonised with MRSA
Those receiving treatment with an indwelling medical device	
Those receiving care in intensive care units, transplant units, burn units;	Critical care (including intensive care and high-dependency units) Renal medicine All elective surgical patients
Those living in a communal setting (e.g. shelter, halfway home, correctional facility)	Patients admitted from high-risk settings
Those with a history of injection drug use	Patients admitted from high-risk settings
Those who are household contacts of people with MRSA	
Those who are immuno compromised	Oncology/chemotherapy inpatients
Individuals from populations where community-associated MRSA is known to be a problem (e.g. organized sports teams).	Patients admitted from high-risk settings
	Pre-operative patients in certain surgical specialties
	All emergency admissions

APPENDIX N

Glossary of abbreviations and terms⁸³

Adapted from:

1. Best Practices for Infection Prevention & Control of Resistant *Staphylococcus aureus* and Enterococci March 2007 Ontario Ministry of Health and Long Term Care
2. Guidelines for Isolation Precautions, Preventing Transmission of Infectious Organisms in Healthcare Settings CDC 2007. Glossary P. 131

ARO Antibiotic Resistant Organism

CA-MRSA Community-associated methicillin-resistant *Staphylococcus aureus*

HIV Human Immunodeficiency Virus

ICP Infection Prevention and Control Practitioner/Professional

ICU Intensive Care Unit

MRSA Methicillin-resistant *Staphylococcus aureus*

MSSA Methicillin-sensitive *Staphylococcus aureus*

PCR polymerase chain reaction

PHAC Public Health Agency of Canada

PPE Personal Protective Equipment

VRE Vancomycin-resistant Enterococci

VRSA Vancomycin-resistant *Staphylococcus aureus*

Acute Care Hospital: A short-term hospital that has facilities, medical staff and all necessary personnel to provide diagnosis, care and treatment of a wide range of acute conditions, including injuries. It is a hospital in which a patient is treated for a brief but severe episode of illness, for conditions that are the result of disease or trauma, and during recovery from surgery by a variety of clinical personnel using technical equipment, pharmaceuticals, and medical supplies.

Alcohol-Based Handrub: An alcohol-based antiseptic with a minimum of 60 percent alcohol that is applied to all surfaces of the hands to reduce the number of microorganisms present on the hands.

Ambulatory Care Settings. Facilities that provide health care to patients who do not remain overnight (e.g., hospital-based outpatient clinics, non-hospital-based clinics and physician offices, urgent care centers, surgi-centers, free-standing dialysis centers, public health clinics, imaging centers, ambulatory behavioral health and substance abuse clinics, physical therapy and rehabilitation centers, and dental practices.

Antibiotic Resistant Organism (ARO): A microorganism that has developed resistance to the action of several antimicrobial agents and that is of special clinical or epidemiological significance.

Bacteremia: The presence of bacteria in the bloodstream.

Caregivers: All persons who are not employees of an organization, are not paid, and provide or assist in providing healthcare to a patient (e.g., family member, friend) and acquire technical training as needed based on the tasks that must be performed.

Case: An individual who is infected or colonized with an antibiotic resistant microorganism.

⁸³ Adapted from 1. Best Practices for Infection Prevention & Control of Resistant *Staphylococcus aureus* and Enterococci March 2007 Ontario Ministry of Health and Long Term Care

2. Guidelines for Isolation Precautions, Preventing Transmission of Infectious Organisms in Healthcare Settings CDC 2007. Glossary P. 131

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Client/patient/resident: Any person receiving health care within a health care setting.

Clinical Isolates (adapted from CNISP Protocol): Isolates recovered from clinical (non-screening) specimens:

Cohorting: this term applies to the practice of grouping patients infected or colonized with the same infectious agent together to confine their care to one area and prevent contact with susceptible patients (cohorting patients). During outbreaks, healthcare personnel may be assigned to a cohort of patients to further limit opportunities for transmission (cohorting staff).

Cohort Staffing: The practice of assigning specified personnel to care only for clients/patients/residents known to be colonized or infected with the same microorganism. Such personnel would not participate in the care of clients/patients/residents who are not colonized or infected with that microorganism.

Colonization: The presence and growth of a microorganism in or on a body with growth and multiplication but without tissue invasion or cellular injury. The patient will be asymptomatic.

Community-associated Methicillin-resistant *Staphylococcus aureus* (CA-MRSA): There are two different definitions of CA-MRSA: one is based on epidemiology and one is based on microbiologic types. Isolates of CA-MRSA are obtained from individuals who develop infections in the community and who have not had recent exposure to the health care system (epidemiologic definition). These are usually particular strains of MRSA (e.g. CMRSA-10) that are different from the MRSA strains found in hospitals (e.g. CMRSA-2), with a different methicillin-resistance gene (*mecIVa*, vs. *mecII*) and often with additional virulence factors (microbiologic definition). Because hospital-type MRSA strains can be transmitted in the community and community-type MRSA strains can be transmitted in hospitals, these two definitions may not always both apply to a patient with CA-MRSA.

Contact: An individual who is exposed to a person colonized or infected with an antibiotic resistant microorganism in a manner that allows transmission to occur (e.g. roommate).

Contact Precautions: A type of Additional Precautions to reduce the risk of transmitting infectious agents via contact with an infectious person. Contact Precautions are used **in addition to** Routine Practices. They are a set of practices used to prevent transmission of infectious agents that are spread by direct or indirect contact with the patient or the patient's environment. Contact Precautions also apply where the presence of excessive wound drainage, fecal incontinence, or other discharges from the body suggest an increased transmission risk. A single patient room is preferred for patients who require Contact Precautions. When a single patient room is not available, consultation with infection control is helpful to assess the various risks associated with other patient placement options (e.g., cohorting, keeping the patient with an existing roommate). In multi-patient rooms, >3 feet spatial separation of between beds is advised to reduce the opportunities for inadvertent sharing of items between the infected/colonized patient and other patients. Healthcare personnel caring for patients on Contact Precautions wear a gown and gloves for all interactions that may involve contact with the patient or potentially contaminated areas in the patient's environment. Donning of gown and gloves upon room entry, removal before exiting the patient room and performance of hand hygiene immediately upon exiting

Contamination: The presence of an infectious agent on a body surface, on clothes, gowns, gloves, bedding, toys, surgical instruments, dressings or other inanimate objects.

Decolonization: The use of topical and systemic antimicrobials to eradicate colonization of resistant bacteria.

Direct Care: Providing hands-on care, such as bathing, washing, turning client/patient/resident, changing clothes/diapers, dressing changes, care of open wounds/lesions or toileting. Feeding and pushing a wheelchair are not classified as direct care.

Endemic: The constant presence of a disease or infectious agent within a certain area.

Enterococci: Facultative anaerobic Gram-positive coccoid bacteria that live in the gastrointestinal tract of most individuals.

Enzymes: Proteins produced by living organisms. The proteins speed up biochemical reactions.

Flagging: A system using specific terminology to highlight information on a patient record, e.g. VRE Positive, MRSA Suspect.

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Hand Hygiene: A process for the removal of visible soil and removal or killing of transient microorganisms from the hands. Hand hygiene may be accomplished by washing hands with soap and running water (for removal of visible soil) or by rubbing hands with an alcohol-based hand rub (when hands are not visibly soiled). Optimal strength of alcohol-based hand rubs should be 60% to 90% alcohol.

Health Care-Associated Infection (HAI): An infection that develops in a patient or resident who is cared for in any setting where healthcare is delivered (e.g., acute care hospital, chronic care facility, ambulatory clinic, dialysis center, surgicenter, home) and is related to receiving health care (i.e., was not incubating or present at the time healthcare was provided). In ambulatory and home settings, HAI would apply to any infection that is associated with a medical or surgical intervention. Since the geographic location of infection acquisition is often uncertain, the preferred term is considered to be healthcare-associated rather than healthcare-acquired. CNISP adapted:

- length of time in hospital prior to MRSA identification (generally >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)
- other health care setting patient was admitted from (long-term care)

Health Care Facility: A set of physical infrastructure elements supporting the delivery of health-related services. A health care facility does not include a patient's home or physician offices where health care may be provided.

Health Care Setting: Any location where health care is provided, including settings where emergency care is provided, hospitals, long-term care homes, mental health facilities, outpatient clinics, community health centres and clinics, physician offices, dental offices, offices of allied health professionals and home health care.

Health Care Worker: Individual providing or supporting health care services that will bring them into contact with patients/clients/ residents.

This includes, but is not limited to: Emergency service workers, physicians, dentists, chiropractors, nurses, podiatrists, respiratory therapists and other allied health professionals, students, support services (e.g. housekeeping, dietary, maintenance, hairdressers), and volunteers

Hospital-grade Disinfectant: A disinfectant that has a drug identification number (DIN) from Health Canada indicating its approval for use in Canadian hospitals.

Immune: relating to, or having immunity to infection by a specific pathogen.

Immunocompromised patients: Those patients whose immune mechanisms are deficient because of congenital or acquired immunologic disorders (e.g., human immunodeficiency virus [HIV] infection, congenital immune deficiency syndromes), chronic diseases such as diabetes mellitus, cancer, emphysema, or cardiac failure, ICU care, malnutrition, and immunosuppressive therapy of another disease process [e.g., radiation, cytotoxic chemotherapy, anti-graft rejection medication, corticosteroids, monoclonal antibodies directed against a specific component of the immune system]). The type of infections for which an immunocompromised patient has increased susceptibility is determined by the severity of immunosuppression and the specific component(s) of the immune system that is affected. Patients with chronic graft versus host disease are considered the most vulnerable to HAIs. Immunocompromised states also make it more difficult to diagnose certain infections (e.g., tuberculosis) and are associated with more severe clinical disease states than persons with the same infection and a normal immune system.

Infection: The entry and multiplication of an infectious agent in the tissues of the host. Asymptomatic or subclinical infection is an infectious process running a course similar to that of clinical disease but below the threshold of clinical symptoms. Symptomatic or clinical infection is one resulting in clinical signs and symptoms (disease).

Infection Control and Prevention: Evidence-based practices and procedures that, when applied consistently in health care settings, can prevent or reduce the risk of transmission of microorganisms to health care workers, other clients/patients/residents and visitors.

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Infection Control and Prevention Professional/Practitioner (ICP): Trained individual responsible for a health care setting's infection prevention and control activities, such as the designated infection prevention and control expert in the facility, or individuals with specific infection prevention and control training and expertise from the Regional Infection Control Network or Public Health.

Infectious Agent: A microorganism, such as a bacterium or virus, that is capable of invading body tissues, multiplying, and causing disease.

Isolate: A pure strain of a bacterium that has been cultured in the laboratory.

Isolation: The physical separation of infected/colonized individuals from those uninfected for the period of communicability of a particular disease

Methicillin-resistant *Staphylococcus aureus* (MRSA): MRSA are strains of *S. aureus* that have an MIC to oxacillin of ≥ 4 mcg/ml. or contain the *mecA* gene coding for penicillin binding protein 2a (PBP 2a). They are resistant to all of the beta-lactam classes of antibiotics (such as penicillins, penicillinase-resistant penicillins (e.g. cloxacillin) and cephalosporins.

Methicillin-sensitive *Staphylococcus aureus* (MSSA): MSSA are strains of *S. aureus* that have an MIC to oxacillin of ≤ 2 mcg/ml. They may be treated with the beta-lactam classes of antibiotics (such as penicillinase-resistant penicillins (e.g. cloxacillin) and cephalosporins.

Minimum Inhibitory Concentration (MIC): The lowest concentration of an antibiotic that will inhibit growth of a microorganism.

MRSA case definition (adapted from CNISP): Isolation of *Staphylococcus aureus* resistant to oxacillin from any body site in a clinical isolate taken from an inpatient admitted at least 48 hours previously from the date the culture was taken.

MRSA Suspect

An individual who is exposed to an individual positive for Methicillin Resistant *Staphylococcus aureus* (MRSA) (roommate, ward contact.) and will require screening surveillance cultures

Normal Flora: The human body contains a large number of bacteria, most of them performing tasks that are useful or even essential to human survival. Those that are expected to be present, and that under normal circumstances do not cause disease, are termed "normal flora".

Nosocomial Infection: Infection acquired during the delivery of health care (also known as "health care-associated infection").

Outbreak of an ARO: The occurrence of AROs with a frequency clearly in excess of normal expectancy. The number of cases indicating presence of an ARO outbreak will vary according to the type of ARO, size and type of population exposed, previous experience or lack of exposure to the disease, and time and place of occurrence. Therefore, the status of an ARO outbreak is relative to the usual frequency of the disease in the same facility/area, among the same population.

Parasite: An organism that grows, feeds, and is sheltered on or in a different organism while contributing nothing to the survival of its host.

Pathogenic: Having the capability to cause disease; producing disease.

Patient: An individual who receives care in a hospital or surgical centre.

Personal Protective Equipment (PPE): A variety of barriers used alone or in combination to protect mucous membranes, skin, and clothing from contact with infectious agents. PPE includes gloves, masks, respirators, goggles, face shields, aprons and gowns.

Polymerase chain reaction (PCR) is a technique widely used in molecular biology. It derives its name from one of its key components, a DNA polymerase used to amplify (i.e., replicate) a piece of DNA by in vitro enzymatic replication. As PCR progresses, the DNA thus generated is itself used as template for replication. This sets in motion a chain reaction in which the DNA template is exponentially amplified. With PCR it is possible to amplify a single or few copies of a piece of DNA across several orders of magnitude, generating millions or more copies of the DNA piece. Developed in 1983 PCR is now a common and often

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indispensable technique used in medical and biological research labs for a variety of applications, including the detection and diagnosis of infectious diseases

Precautions: Interventions to reduce the risk of transmission of microorganisms (e.g. patient-to-patient, patient-to-staff, staff-to-patient, contact with the environment, contact with contaminated equipment).

Prevalence screen: Screening all clients/patients/residents in a defined area (e.g. on a specific unit) at a specific point in time to determine how many are colonized with a specific microorganism.

Public Health Agency of Canada (PHAC): A national agency focused on efforts to prevent chronic diseases and injuries and to respond to public health emergencies and infectious disease outbreaks by working closely with provinces and territories. Some of the PHAC activities were originally part of Health Canada and some publications referred to in this document originated in Health Canada but are now under the jurisdiction of PHAC.

Reservoir: Any person, animal or environmental surface in which an infectious agent survives or multiplies, posing a risk for infection.

Resident: An individual who resides in a long-term care facility/or interim care unit.

Reusable Equipment (Non-critical) Patient/resident/client care equipment that can be reused on another patient/resident/client that either touches only intact skin, but not mucous membranes or does not directly touch them. Reprocessing of these items involves cleaning and/or low level disinfection with facility approved disinfectant, e.g. commode.

Routine Practices: The system of infection prevention and control practices recommended by the Public Health Agency of Canada to be used with all clients/patients/residents during all care to prevent and control transmission of microorganisms in health care settings.

Screening: A process to identify clients/patients/residents at risk for being colonized with MRSA and/or VRE and, if risk factors are identified, obtaining appropriate specimens.

Screening/Surveillance Cultures: Cultures done in attempt to identify an ARO in an individual with risk factors for acquisition of the organism.

Sentinel Event: A colonization/infection in the occurrence of even a single case may signal the need to re-examine preventive practices.

Surgical Centre: Out of hospital surgical center that performs surgery, usually day surgery

Terminal Cleaning: Thorough cleaning of all surfaces and equipment within a room with facility approved disinfectant. This will include spot cleaning of visible soil on walls and removal of privacy curtains.

Staff: Anyone conducting activities within a health care setting that will bring him/her into contact with clients/patients/residents including: all health care providers (e.g. emergency service workers, physicians, dentists, nurses, respiratory therapists and other allied health professionals, students); support services (e.g. housekeeping); volunteers and contract workers.

Standard Precautions. A group of infection prevention practices that apply to all patients, regardless of suspected or confirmed diagnosis or presumed infection status. Standard Precautions is a combination and expansion of Universal Precautions and Body Substance Isolation and is the recommended practice by the US Centers for Disease Control and Prevention.

Standard Precautions is based on the principle that all blood, body fluids, secretions, excretions except sweat, non-intact skin, and mucous membranes may contain transmissible infectious agents. Standard Precautions includes hand hygiene, and depending on the anticipated exposure, use of gloves, gown, mask, eye protection, or face shield. Also, equipment or items in the patient environment likely to have been contaminated with infectious fluids must be handled in a manner to prevent transmission of infectious agents, (e.g. wear gloves for handling, contain heavily soiled equipment, properly clean and disinfect or sterilize reusable equipment before use on another patient).

CDC Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings 2007. Jane D. Siegel, MD; Emily Rhinehart, RN MPH CIC; Marguerite Jackson, PhD; Linda Chiarello, RN MS; the Healthcare Infection Control Practices Advisory Committee

Staphylococcus aureus: Aerobic Gram-positive coccoid bacterium commonly found on the skin and mucous membranes (especially anterior nares) of some individuals. *S. aureus* is the most common cause of health care-associated infections.

Surveillance: The systematic ongoing collection, collation and analysis of data with timely dissemination of information to those who require it in order to take action.

Susceptibility: Likelihood to be affected with a disease, infection, or condition.

Terminal Cleaning: The cleaning of a client/patient/resident room or bedspace following discharge or transfer of the client/patient/resident, in order to rid it of contaminating microorganisms that might be acquired by subsequent occupants.

Vancomycin-resistant Enterococci (VRE): VRE are strains of *Enterococcus faecium* or *Enterococcus faecalis* that usually have a minimal inhibitory concentration (MIC) to vancomycin of ≥ 32 mcg/ml. They contain the resistance genes VAN-A or VAN-B.

Vancomycin-Intermediate *Staphylococcus aureus* (VISA): VISA is a strain of MRSA that has an MIC of 8 to 16 mcg/ml.

Vancomycin-Resistant *Staphylococcus aureus* (VRSA): VRSA is a strain of MRSA with an MIC to vancomycin of ≥ 32 mcg/ml. VRSA vancomycin resistance genes are usually transferred from VRE strains.

APPENDIX O

Technical Description of the Measurement Worksheets

Implementation Stages – Definitions apply to all interventions and measures

Baseline Stage - Pre-intervention. Data collected for Baseline should be collected prior to implementing small tests of change and reflect the current process.

Early (Partial) Implementation Stage - The team has set a clear aim(s) for this MRSA intervention, identified which measures will indicate if the changes will lead to improvement, and started to implement small tests of change (PDSA) to identify and refine processes, procedures and practices which will lead to improvement and achieving the aim. When the team is close to goal they are ready to move to Full Implementation.

Full Implementation Stage - The processes, procedures and practices are finalized and have lead to significant improvement. These practices on the selected unit are being consistently applied and monitored, showing a sustained performance at or close to goal. The team has achieved their aim(s) and is ready to spread to other areas.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	
1	1.0 Percent Availability of Hand Hygiene Products - Bundle Compliance - Measurement Worksheet																															
2	Reduction of Methicillin-Resistant Staphylococcus Aureus (MRSA)																															
3	Intervention	Reduction of Methicillin-Resistant Staphylococcus Aureus (MRSA)																														
4	Definition	The percentage patient care areas being monitored at which the Alcohol-Based Rub (liquid or foam) Dispenser is (1) Easily visible, and accessible (optimal height, within easy reach of the point of interaction and additional supplies of product are readily available); (2) Easy to mechanically activate with adequate volume of product in the dispenser AND (3) two sizes of clean gloves are available and accessible at the point of care. These numbered items represent the THREE elements of the Hand Hygiene Product Bundle. In this measure compliance with the individual elements and overall bundle will be monitored through a regular audit process. These bundle measures should be monitored on the same units where appropriate Hand Hygiene technique is also being monitored. Direct observations should be made randomly throughout the month on different shifts.																														
5	Goal	95% of all patient areas will meet the three standards for Alcohol-Based Hand Hygiene Products Bundle.																														
6	Data Collection Details																															
7	Hospital Name																Team #															
8	Health Region																															
9	Patient Sample	<i>Describe the source of the patient population e.g., Intensive Care Unit, General Medicine Unit, Healthcare Facility etc.</i>																														
11																																
12																																
13																																
14	Implementation Stage																															
15	Collection Method																															
16	Calculation of Denominator																															
17	1.1	What is the total number of observations of Hand Hygiene Products within bed spaces, patient areas, or at points of care included in this monthly sample? <i>e.g. recommended 11-20 random observations of a variety of points of care.</i>																														
18	Implementation of Bundle Components																															
19	Calculation of Numerator																															
20	1.2	What is the total number of observations of Hand Hygiene Products within bed spaces, patient areas, or at points of care in # 1.1 at which ALL of the following THREE elements were in place at the time of the audit? Hand Hygiene Products Bundle Elements: <i>Alcohol-Based Rub (liquid or foam) Dispenser is</i> (1) Easily visible, and accessible (optimal height, within easy reach of the point of interaction and additional supplies of product are readily available). (2) Easy to mechanically activate with adequate volume of product in the dispenser AND GLOVES																														
21	Final Calculation																															
22	1.3	Overall compliance with the Hand Hygiene Bundle Elements. Divide # 1.2 by # 1.1. Multiply by 100.																														
23	GOAL:	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
24	Numerator for Individual Bundle Element Compliance																															
	1.4	What is the total number of observations of																														

1.0 Percent Availability of Hand Hygiene Products - Bundle Compliance - Technical Description

Intervention(s): Reduction of Methicillin-Resistant *Staphylococcus aureus* (MRSA)

Definition: The percentage patient care areas being monitored at which the Alcohol-Based Rub (liquid or foam) Dispenser is (1) Easily visible, and accessible (optimal height, or within easy reach of the point of interaction and additional supplies of product are readily available); (2) Easy to mechanically activate with adequate volume of product in the dispenser AND (3) two sizes of clean gloves are available and accessible at the point of care. These numbered items represent the THREE elements of the Hand Hygiene Product Bundle. In this measure compliance with the individual elements and overall bundle will be monitored through a regular audit process. These bundle measures should be monitored on the same units where appropriate Hand Hygiene technique is also being monitored. Direct observations should be made randomly throughout the month on different shifts.

Note: *This Hand Hygiene measure applies to Alcohol Based Rub (liquid or foam) and the availability of gloves. It is important to remember that the use of plain soap and water can physically remove a certain level of microbes, but antiseptic agents are necessary to kill microorganisms. SHN recommends that when hands are visibly dirty or contaminated with proteinaceous material or are visibly soiled with blood or other body fluids, wash hands with either a non-antimicrobial soap and water or an antimicrobial soap and water. However, if hands are not visibly soiled, use an alcohol-based hand rub for routinely decontaminating hands in all other clinical situations.*

Goal: 95% of all patient areas will meet the three standards for Alcohol-Based Hand Hygiene Products Bundle.

CALCULATION DETAILS:

Numerator Definition: The total number of observations of Hand Hygiene Products within bed spaces, patient areas, or at points of care in the monthly sample where ALL of the following THREE elements (see below) were in place at the time of the audit

Hand Hygiene Products Bundle Elements:

Alcohol-Based Rub (liquid or foam) Dispenser is:

- (1) Easily visible, and accessible (optimal height, or within easy reach of the point of interaction and additional supplies of product are readily available).
- (2) Easy to mechanically activate with adequate volume of product in the dispenser AND

GLOVES:

- (3) Two sizes of clean gloves are available and accessible at the point of care

Numerator Exclusions:

- None

Denominator Definition: The total number of observations of Hand Hygiene Products within bed spaces, patient areas, or at points of care included in this monthly sample.

Denominator Exclusions:

- None

Individual Bundle Element Compliance: The measurement worksheet is designed to allow the team to monitor performance for each of the three bundle elements listed above on an individual basis. The performance for each element will be visually displayed on the run chart titled “*Individual Compliance*”. The team will be able to readily identify which if any elements require closer monitoring, strategic revision or whether the HCWs require additional education.

Measurement Period Length: Measure monthly.

Definition of Terms:

- **Alcohol-based Hand Rub:** An alcohol-containing preparation designed for application to the hands for reducing the number of viable microorganisms on the hands. In Canada and the United States, such preparations usually contain 60%–95% ethanol or isopropanol. Dispensers for alcohol-based hand rubs do not require plumbing and can be made available adjacent to each patient’s bed and at many other locations in patient-care areas. Healthcare organizations are encouraged to install dispensers in patient rooms, treatment rooms, suites and all other appropriate locations. Healthcare facilities should work with local fire marshals to ensure that these installations are consistent with local fire codes, which may differ from the national codes. To avoid any confusion between soap and alcohol hand rubs, alcohol hand-rub dispensers should not be placed adjacent to sinks.
- **Easily Visible:** Dispensers for alcohol-based hand rubs should be placed in an area readily accessible and visible to the healthcare worker and in close proximity to the point-of-care. For example, at the door to the patient’s room, attached to the patient’s bed on the patient’s bedside table or suspended on the wall in the patient’s room. The goal for positioning the alcohol-rub is to place it strategically so that it is in the HCW’s line of sight and the HCW does not have to hunt for it.
- **Hand hygiene:** A general term that applies to either hand washing, antiseptic hand wash, antiseptic hand rub, or surgical hand antisepsis.
- **Optimal Height:** As described above for “Easily Visible” the alcohol-based hand rub should be positioned at a height where 95% of all HCW can reach the dispenser and activate the mechanism for delivering an adequate amount of product while standing.
- **Mechanically activate:** The pump mechanism is easy to start (activate) and produces an adequate supply of Alcohol-based Rub or liquid foam.
- **Within easy reach from the Point of Care:** As described above for “Easily Visible” and “Optimal Height” the alcohol-based hand rub should be positioned close to the point-of-care e.g., attached to the patient’s bed, on the patient’s bedside table or suspended on the wall in the patient’s room.

Calculate as: Number of observations of Hand Hygiene Products within bed spaces, patient areas, or at points of care in the monthly sample where ALL of the three elements were in place at the time of the audit / Number of observations x 100.

Comments: None.

COLLECTION STRATEGY:

Data Collection Approach:

- Bundle compliance should be monitored in the same patient areas as Hand Hygiene technique is also being measured.
- Baseline data may be obtained from 10 to 20 direct observations made throughout the month on different shifts and days of the week. Observations should be performed by a designated and trained individual. Ten to twenty observations at any given point would serve as adequate baseline data to start implementing any Hand Hygiene quality improvement strategies
- Continue to track the measure monthly. Using the SHN worksheet record your data and monitor your improvement on the run chart included in the measurement workbook. Annotate the run chart, with notes reflecting any interventions you made to improve.

Data Accuracy: Data accuracy is enhanced when all definitions are used without modification.

Sampling: 10 to 20 direct observations made each month on different shifts and days of the week. Observations should be performed by a designated and trained individual.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE
1	2.0 Percent Appropriate Hand Hygiene Practice by Health Care Workers - Measurement Worksheet																														
2	Reduction of Methicillin-Resistant Staphylococcus Aureus (MRSA)																														
3	Intervention	Reduction of Methicillin-Resistant Staphylococcus Aureus (MRSA)																													
4	Definition	The percentage of patient encounters in which there was compliance by health care workers (Physician, Nurse, Other) with all components of appropriate hand hygiene and glove practice according to the hand hygiene policy in place at the healthcare facility. Compliance by individual HCW category is also monitored. Direct observations may be made randomly throughout the month on different shifts. *A Patient Encounter may include but not be limited to contact with the patient, equipment and/or furniture.																													
5	Goal	Improve Hand Hygiene Practice by 100% annually for all Health Care Workers and Overall.																													
6	Data Collection Details																														
7	Hospital Name																Team #														
8	Health Region																														
9	Patient Sample	<i>Describe the source of the patient population e.g., Intensive Care Unit, General Medicine Unit, Healthcare Facility etc.</i>																													
11																															
12																															
13																															
14	Implementation Stage																														
15	Collection Method																														
16	Calculation of Denominator																														
17	2.1	What is the total number of observations of Hand Hygiene Practice BY PHYSICIANS at points of care included in this monthly sample?																													
18	2.2	What is the total number of observations of Hand Hygiene Practice BY NURSES at points of care included in this monthly sample?																													
19	2.3	What is the total number of observations of Hand Hygiene Practice BY OTHER HEALTH CARE WORKERS at points of care included in this monthly sample?																													
20	2.4	What is the total of ALL observations of Hand Hygiene Practice at points of care included in this monthly sample? (#2.1 + #2.2 + #2.3)																													
21	Numerator for BY INDIVIDUAL GROUPS OF HEALTHCARE WORKERS and OVERALL HAND HYGIENE COMPLIANCE																														
22	2.5	What is the total number of observations of Hand Hygiene Practice BY PHYSICIANS at points of care included # 2.1 that were in compliance with THE Hand Hygiene Policy for the Healthcare Facility?																													
23	2.6	What is the total number of observations of Hand Hygiene Practice BY NURSES at points of care included # 2.2 that were in compliance with THE Hand Hygiene Policy for the Healthcare Facility?																													
24	2.7	What is the total number of observations of Hand Hygiene Practice BY OTHER HEALTHCARE WORKERS at points of care included # 2.3 that were in compliance with THE Hand Hygiene Policy for the Healthcare Facility?																													
	2.8	What is the total number of observations of Hand Hygiene Practice BY ALL HEALTHCARE WORKERS at points of care included # 2.4 that were in compliance with the Hand Hygiene Policy for the Healthcare																													
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.0 Percent Appropriate Hand Hygiene Practice by Health Care Workers (HCW) - Technical Description

Intervention(s): Reduction of Methicillin-Resistant *Staphylococcus aureus* (MRSA)

Definition: The percentage of patient encounters* in which there was compliance by health care workers (Physician, Nurse, Other) with all components of appropriate hand hygiene and glove practice according to the hand hygiene policy in place at the healthcare facility. Compliance by individual HCW category is also monitored. Direct observations may be made randomly throughout the month on different shifts.

**A Patient Encounter may include but not be limited to contact with the patient, equipment and/or furniture.*

Goal: Improve Hand Hygiene Practice by 100% annually for all Health Care Workers and Overall.

CALCULATION DETAILS:

Numerator Definition: The total number of observations of Hand Hygiene Practice that were in compliance with the Hand Hygiene Policy for the Healthcare Facility by:

1. All Healthcare Workers at points of care where observations were made;
2. Individual Healthcare Worker categories as above
 - a. Physicians
 - b. Nurses
 - c. Other

Numerator Exclusions:

- None

Denominator Definition: The total number of ALL observations of Hand Hygiene Practice at points of care included in the monthly sample.

Denominator Exclusions:

- None

Compliance by Individual HCW Category: The measurement worksheet is designed to allow the team to monitor performance for each of HCW category – Physician, Nurse and Other on an individual basis. The performance for each category will be visually displayed on the run chart titled “*Individual Compliance*”. The team will be able to readily identify which if any category of HCW requires closer monitoring or whether the HCWs require additional interventions to assist in adopting best practice. Teams are encouraged to choose an observation tool they are comfortable with. Please visit the Hand Hygiene website at www.handhygiene.ca for tools.

Measurement Period Length: Measure monthly.

Definition of Terms:

How-to Guide: Reduce Methicillin-Resistant *Staphylococcus aureus*

- **Compliance:** Adhering to the hand washing policy as established and approved by the healthcare facility and should include when the HCW should wash their hands relative to patient contact and the appropriate product to use.
- **Point-of-Care:** A point-of-care is any place where healthcare is delivered to a patient. A point-of-care may include patient's room, bedside, clinic, treatment room etc.

Calculate as: Number of observations of Hand Hygiene Practice within bed spaces, patient areas, or at points of care in the monthly sample at which time ALL Healthcare Workers practiced appropriate Hand Hygiene / Number of observations x 100.

Comments: None.

COLLECTION STRATEGY:**Data Collection Approach:**

- Bundle compliance should be monitored in the same patient areas as the availability of Hand Hygiene Products is also being measured.
- The team should decide in advance the number of physician, nurse and other HCW to observe each month.
- Baseline data may be obtained from 10 to 20 direct observations made throughout the month on different shifts and days of the week. Observations should be performed by a designated and trained individual. Ten to twenty observations is enough to provide baseline data before implementing any Hand Hygiene quality improvement strategies.
- Continue to track the measure monthly. Using the SHN worksheet record your data and monitor your improvement on the run chart included in the measurement workbook. Annotate the run chart, with notes reflecting any interventions you made to improve.

Data Accuracy: Data accuracy is enhanced when all definitions are used without modification.

Sampling: 10 to 20 direct observations made each month on different shifts and days of the week. Observations should be performed by a designated and trained individual.

3.0 Reduction in Mean Time to Placement on Contact Precautions for Patients with Known or Probable MRSA at Time of Admission - Measurement Worksheet																									
Reduction of Methicillin-Resistant Staphylococcus Aureus (MRSA)																									
Intervention		Reduction of Methicillin-Resistant Staphylococcus Aureus (MRSA)																							
Definition		Reduce the mean time to being placed on contact precautions for patients with known or probable MRSA colonization or infection at the time of hospital arrival. The recommended industry standard for the time from hospital admission to placement on CP for this patient population is within 2 hours of hospital admission.																							
Goal		Decrease the mean time to placement on CP by 50% in one year																							
Data Collection Details																									
Hospital Name														Team #											
Health Region																									
Patient Sample		Describe the source of the patient population e.g. ICU, Burn Unit, General Medicine Unit, Healthcare Facility																							
		2007		2008												2009									
Calculation of Denominator		Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Implementation Stage																									
Collection Method																									
3.1 What is the total number of patients with known or probable MRSA colonization or infection at the time of hospital arrival in this month's sample?																									
Calculation of Numerator																									
3.2 What is the total number of hours required for the patients in # 3.1 to be placed placed on Contact Precautions from the time of hospital admission? (add the time (in hours with 1 decimal eg 1.5) for each patient to be placed on CP and enter the total in this box)																									
Final Calculation																									
3.3 Mean time to placement on CP. Divide # 3.2 by # 3.1.		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
GOAL:																									
		*The goal for this measure is to decrease the mean time to being placed on Contact Precautions by 50% in one year. Using your baseline rate, calculate the Goal for your patient population. For example, if the baseline mean rate for your pa is 6.6 hours, your goal rate would be $(6.6 \div 1.5) = 3.3$ hours. Enter your goal rate in each of the monthly cells in row 22 above.																							
Comments																									

3.0 Reduction in Mean Time to Placement on Contact Precautions for Patients with Known or Probable MRSA at Time of Admission - Technical Description

Intervention(s): Reduction of Methicillin-Resistant *Staphylococcus aureus* (MRSA)

Definition: The reduction of the mean elapsed time to being placed on contact precautions (CP) for patients with known or probable MRSA colonization or infection at the time of hospital arrival. The recommended industry standard for the time from hospital arrival to placement on CP for this patient population is within 2 hours of hospital arrival.

Goal: Decrease the mean time to placement on CP by 50% in one year.

CALCULATION DETAILS:

Numerator Definition: The total number of hours required for the patients presenting on admission with known or probable MRSA colonization or infection to be placed on Contact Precautions from the time of hospital arrival.

Numerator Exclusions:

- None

Denominator Definition: The total number of patients presenting with known or probable MRSA colonization or infection at the time of hospital arrival in the monthly sample.

Denominator Exclusions:

- None

Measurement Period Length: Measure monthly.

Definition of Terms:

- **Colonization vs Infection:** Colonization occurs when a patient has MRSA in or on a body site but has no clinical signs or symptoms of disease. A person colonized with MRSA may be a temporary or a longer term carrier of MRSA. Certain carriers may be shedders of MRSA [e.g., patients with dermatitis or burns).

Infection occurs when MRSA enters a body site and multiplies in tissue causing clinical manifestations of disease. This is usually evident by fever, a rise in the white blood cell count, or purulent drainage from a wound or body cavity. The distinction between colonization and infection is a clinical one. Such a distinction should be determined by the clinician, not by culture results alone.

Colonized and infected patients are the major reservoirs of MRSA. Colonization often occurs in the nares (nose), axillae (arm pits), chronic wounds, perineum or around gastrostomy and/or tracheostomy sites. Patients at risk for MRSA colonization are generally debilitated patients who may have prolonged hospitalizations, chronic wounds, or received treatment with multiple antibiotics.

- **Hospital Arrival:** Hospital arrival refers to the time of the first point-of-contact between the patient and a healthcare worker after the patient first enters the hospital. This may be the time of triage which is often electronically recorded on the Emergency

Department admission form or first documented note in patient's record. The team should agree on a standardized time.

Calculate as: The sum of the elapsed times from the time of arrival at the hospital to placement on CP for all patients in the monthly sample with known or probable MRSA colonization or infection at the time of hospital arrival / Total number of patients with known or probable MRSA colonization or infection at the time of hospital arrival.

Comments: None.

COLLECTION STRATEGY:

Data Collection Approach:

- The team should standardize the "hospital arrival" time.
- Baseline data may be obtained concurrently from a monthly sample of 10 to 20 patients.
- Continue to track the measure monthly. Using the SHN worksheet record your data and monitor your improvement on the run chart included in the measurement workbook. Annotate the run chart, with notes reflecting any interventions you made to improve.

Data Accuracy: Data accuracy is enhanced when all definitions are used without modification.

Sampling: Data may be obtained concurrently from 10 to 20 patients per month on a specific unit or the entire healthcare facility.

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI			
1	4.0 Reduction in Mean Time from Notification by Lab of MRSA Status to Placement on Contact Precautions for Patients Identified as MRSA Colonized or Infected through Routine Admission Screening Process - Measurement Worksheet																																						
2	Reduction of Antibiotic Resistant Organisms																																						
3	Intervention	Reduction of Antibiotic Resistant Organisms																																					
4	Definition	Reduce the mean time from notification by the laboratory to being placed on contact precautions for patients identified as positive for MRSA colonization or infection through a process of routine admission screening process. The recommended industry standard for the period from lab notification to placement on Contact Precautions is within 2 hours. We recommend you identify the time of lab notification from either the time stamp on the lab report or the time the lab calls the unit to notify them of the patient's probable or definite MRSA status. The time of being placed on contact precautions may be obtained from the patient record.																																					
5	Goal	Decrease the mean time from Lab notification to placement on CP by 50% in one year																																					
6	Data Collection Details																																						
7	Hospital Name																																					Team #	
8	Health Region																																						
9	Patient Sample	<i>Describe the source of the patient population. E.g. ICU, Burn unit, General Medicine unit, Healthcare facility</i>																																					
10																																							
11																																							
12																																							
13																																							
14	Calculation of Denominator																																						
15	Implementation Stage																																						
16	Collection Method																																						
17	4.1	What is the total number of patients identified on admission screening as MRSA infected at the time of admission to the unit* this month? *The "unit" may be defined by the team as any patient area or the entire healthcare facility.																																					
18	4.2	What is the total number of patients identified on admission screening as MRSA colonized at the time of admission to the unit* this month? *The "unit" may be defined by the team as any patient area or the entire healthcare facility.																																					
19	4.3	What is the total number of patients identified on admission screening as MRSA infected or colonized at the time of admission to the unit* this month? (#4.1 + #4.2)																																					
20	Calculation of Numerator																																						
21	4.4	What is the total number of hours required for the MRSA infected patients in # 4.1 to be placed on Contact Precautions from the time of receiving lab notification of positive MRSA status. (add the time [in hours with 1 decimal eg 1.5] for each patient to be placed on CP and enter the total in this box).																																					
22	4.5	What is the total number of hours required for the MRSA colonized patients in # 4.2 to be placed on Contact Precautions from the time of receiving lab notification of positive MRSA status. (add the time [in hours with 1 decimal eg 1.5] for each patient to be placed on CP and enter the total in this box).																																					
	4.6	What is the total number of hours required for the																																					
		Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec												
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

4.0 Reduction in Mean Time from Notification by Lab of MRSA Status to Placement on Contact Precautions for Patients identified as MRSA Colonized or Infected through Routine Admission Screening Process - Technical Description

Intervention(s): Reduction of Methicillin-Resistant *Staphylococcus aureus* (MRSA)

Definition: The reduction of the mean elapsed time to being placed on contact precautions (CP) for patients with known or probable MRSA colonization or infection at the time of hospital arrival. The recommended industry standard for the time from hospital admission to placement on CP for this patient population is within 2 hours of hospital admission.

The reduction of the mean elapsed time from notification by the laboratory to being placed on contact precautions (CP) for patients identified as positive for MRSA colonization or infection through a routine admission screening process. The recommended industry standard for the period from lab notification to placement on CP is within 2 hours. We recommend you identify the time of lab notification from either the time stamp on the lab report or the time the lab calls the unit to notify them of the patient's probable or definite MRSA status. The time of being placed on CP may be obtained from the patient record.

Goal: Decrease the mean time from Lab notification to placement on CP by 50% in one year.

CALCULATION DETAILS:

Numerator Definition: The total number of hours required for the patients identified as positive for MRSA colonization or infection through routine admission screening to be placed on Contact Precautions from the time of hospital admission

Numerator Exclusions:

- None

Denominator Definition: The total number of patients identified as positive for MRSA colonization or infection through routine admission screening in the monthly sample.

Denominator Exclusions:

- None

Measurement Period Length: Measure monthly.

Definition of Terms:

- **Admission screening:** Screening performed at the time of hospital admission on all or a pre-defined target group of patients from whom specimens are recovered from nose, perianal, perineal, groin, axillary, or other sites and analyzed in the facility's microbiology laboratory for evidence of MRSA. Some healthcare facilities have a pre-printed doctor's order record directing that "Admission Screening for Antibiotic Resistant Organisms" is to be completed on all patients requiring an overnight hospital stay.
- **Colonization vs Infection:** Colonization occurs when a patient has MRSA in or on a body site but has no clinical signs or symptoms of disease. A person colonized with

MRSA may be a temporary or a longer term carrier of MRSA. Certain carriers may be shedders of MRSA [e.g., patients with dermatitis or burns).

Infection occurs when MRSA enters a body site and multiplies in tissue causing clinical manifestations of disease. This is usually evident by fever, a rise in the white blood cell count, or purulent drainage from a wound or body cavity. The distinction between colonization and infection is a clinical one. Such a distinction should be determined by the clinician, not by culture results alone.

Colonized and infected patients are the major reservoirs of MRSA. Colonization often occurs in the nares (nose), axillae (arm pits), chronic wounds, perineum or around gastrostomy and/or tracheostomy sites. Patients at risk for MRSA colonization are generally debilitated patients who may have prolonged hospitalizations, chronic wounds, or received treatment with multiple antibiotics.

- **Hospital Admission:** Hospital admission refers to the time when the patient is registered as an inpatient by the admitting department. This is often electronically recorded on the patient hospital admission form in patient's record. The team should agree on a standardized time.

Calculate as: The sum of the elapsed times from the time of admission to the hospital to placement on CP for all patients identified as positive for MRSA colonization or infection through routine admission screening in the monthly sample / Total number of patients identified as positive for MRSA colonization or infection through routine admission screening.

Comments: None.

COLLECTION STRATEGY:

Data Collection Approach:

- The team should standardize the "hospital admission" time and "lab notification" time.
- Baseline data may be obtained concurrently from a monthly sample of 10 to 20 patients.
- Continue to track the measure on a monthly basis. Using the SHN worksheet record your data and monitor your improvement on the run chart included in the measurement workbook. Annotate the run chart, with notes reflecting any interventions you made to improve.

Data Accuracy: Data accuracy is enhanced when all definitions are used without modification.

Sampling: Data may be obtained concurrently from 10 to 20 patients per month on a specific unit or the entire healthcare facility.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	
1	5.0 Active Screening on Admission for Asymptomatic MRSA Colonized Patients per 1,000 Admissions -																												
2	Reduction of Methicillin-Resistant <i>Staphylococcus Aureus</i> (MRSA)																												
3	Intervention	Reduction of Methicillin-Resistant <i>Staphylococcus Aureus</i> (MRSA)																											
4	Definition	The number of patients with laboratory-confirmed asymptomatic MRSA colonization per 1,000 admissions. The procedure for obtaining screening isolates is established at an individual healthcare facility. MRSA case is defined as the isolation of <i>Staphylococcus Aureus</i> resistant to oxacillin (e.g. methicillin, amoxicillin, penicillin) from any body site in a screening isolate (not clinical isolate) obtained from an inpatient on admission to hospital. This is a measure of the potential risk for exposure to MRSA on the unit or in the healthcare facility.																											
5	Goal	Does Not Apply - a reflection of pre-existing community state																											
6	Data Collection Details																												
7	Hospital Name											Team #																	
8	Health Region											Hospital Type																	
9	Patient Sample	Describe the source of the patient population e.g. entire healthcare facility																											
10																													
11																													
12																													
13																													
14	Calculation of Denominator																												
15	Implementation Stage																												
16	Collection Method																												
17	5.1	What is the total number of patients admitted to the healthcare facility or department or unit this month? (Monthly measure of "Admissions" for a healthcare facility may be obtained from the Admitting Department of the facility by unit or as a whole).																											
18	Calculation of Numerator																												
19	5.2	What is the total number of patients in # 5.1 identified as an asymptomatic MRSA colonization on admission according to healthcare facility policy?																											
20	Final Calculation																												
21	5.3	Colonization cases per 1000 admissions. Divide # 5.2 by # 5.5. Multiply by 1000.																											
22	GOAL*:	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
23	Comments																												

5.0 Active Screening on admission for asymptomatic MRSA colonized patients per 1,000 admissions - Technical Description

Intervention(s): Reduction of Methicillin-Resistant *Staphylococcus aureus* (MRSA)

Definition: The number of patients with laboratory-confirmed asymptomatic MRSA colonization per 1,000 admissions. The procedure for obtaining screening isolates is established at an individual healthcare facility. MRSA case is defined as the isolation of *Staphylococcus aureus* resistant to oxacillin (e.g. methicillin, amoxicillin, penicillin) from any body site in a screening isolate (not clinical isolate) obtained from an inpatient on admission to hospital. This is a measure of the potential risk for exposure to MRSA on the unit or in the healthcare facility.

Goal: Does Not Apply - a reflection of pre-existing community state.

Matches Existing Measures: None

CALCULATION DETAILS:

Numerator Definition: The total number of patients admitted to the healthcare facility, department or unit and identified through admission screening as confirmed for asymptomatic MRSA colonization on admission according to healthcare facility policy.

Numerator Exclusions:

- None

Denominator Definition: The total number of admissions to the healthcare facility, department or unit in the monthly sample.

Denominator Exclusions:

- As defined by patient sample parameters e.g., healthcare facility, department, unit.

Measurement Period Length: Measure monthly.

Definition of Terms:

- **1000 Hospital Admissions:** A measure of a multiple of admissions for a healthcare facility or unit used to standardize the results of the indicator. For this measure the multiple is 1,000 admissions. It is calculated by multiplying by 1,000 the count of patient admissions for a specific area and month which may be obtained from the Admitting Department of the facility.
- **Admission screening:** Screening performed at the time of hospital admission on all or a pre-defined target group of patients from whom specimens are recovered from nose, perianal, perineal, groin, axillary, or other sites and analyzed in the facility's microbiology laboratory for evidence of MRSA. Some healthcare facilities have a pre-printed doctor's order record directing that "Admission Screening for Antibiotic Resistant Organisms" is to be completed on all patients requiring an overnight hospital stay.
- **Colonization:** Colonization occurs when a patient has MRSA in or on a body site but has no clinical signs or symptoms of disease. A person colonized with MRSA may be a

temporary or a longer term carrier of MRSA. Certain carriers may be shedders of MRSA [e.g., patients with dermatitis or burns).

Colonized and infected patients are the major reservoirs of MRSA. Colonization often occurs in the nares (nose), axillae (arm pits), chronic wounds, perineum or around gastrostomy and/or tracheostomy sites. Patients at risk for MRSA colonization are generally debilitated patients who may have prolonged hospitalizations, chronic wounds, or received treatment with multiple antibiotics.

- **Hospital Admission:** Hospital admission refers to the time when the patient is registered as an inpatient by the admitting department. This is often electronically recorded on the patient hospital admission form in patient's record. The team should agree on a standardized time.

Calculate as: The total number of patients admitted to the healthcare facility, department or unit and identified as positive for MRSA colonization through routine admission screening in the monthly sample / Total number of patients admitted to the healthcare facility, department or unit in the monthly sample x 1000.

Comments: None.

COLLECTION STRATEGY:

Data Collection Approach:

- If your institution has been conducting surveillance on this measure prior to joining SHN!, you may use previously collected data as baseline. If your organization has not been following these measures prior to SHN!, start collecting this data prospectively. As this measure takes time to affect change, you may start testing your change ideas immediately.
- Continue to track the measure on a monthly basis. Using the SHN worksheet record your data and monitor your improvement on the run chart included in the measurement workbook. Annotate the run chart, with notes reflecting any interventions you made to improve.

Data Accuracy: Data accuracy is enhanced when all definitions are used without modification.

Sampling: Data may be obtained concurrently from 10 to 20 patients per month on a specific unit or the entire healthcare facility.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE
1	6.0 Incidence of Healthcare-Associated Methicillin-Resistant Staphylococcus Aureus (MRSA) Infections per 1000 Patient Days - Measurement Worksheet																														
2	Reduction of Methicillin-Resistant Staphylococcus Aureus (MRSA)																														
3	Intervention Reduction of Methicillin-Resistant Staphylococcus Aureus (MRSA)																														
4	Definition The number of patients with laboratory-confirmed MRSA healthcare-associated clinical infections (HAI) per 1,000 patient days. MRSA case is defined as the isolation of Staphylococcus Aureus resistant to oxacillin (e.g. methicillin, amoxicillin, penicillin) from any body site in a clinical isolate (non-screening, non-blood culture specimens) obtained from an inpatient a minimum of 48 hours after admission to hospital. The patient must have a diagnosed infection which meets the hospital's definition of infection. Infection refers to invasion of bacteria into tissue with replication of the organism; it is characterized by isolation of the organism accompanied by clinical signs of illness such as fever, elevated WBC, purulence, pneumonia or inflammation. * Monthly measure of "Patient days" for a healthcare facility or unit may be obtained from the Admitting Department of the facility. This measure reflects the number of patients who were not colonized or infected with MRSA prior to admission however, became infected with MRSA during their hospital stay.																														
5	Goal Annual reduction of 50% in rate of MRSA-HAI																														
6	Data Collection Details																														
7	Hospital Name																	Team #													
8	Health Region																	Hospital Type													
9	Patient Sample Describe the source of the patient population e.g. entire healthcare facility or per unit																														
10																															
11																															
12																															
13																															
14	Calculation of Denominator																														
15	Implementation Stage																														
16	Collection Method																														
17	6.1 What is the total number of patient days for the healthcare facility or department or unit this month? (Monthly measure of "Patient days" for a healthcare facility may be obtained from the Admitting Department of the facility).																														
18	Calculation of Numerator																														
19	6.2 What is the total number of patients in # 6.1 newly identified as a HOSPITAL-ACQUIRED MRSA INFECTION according to the criteria listed below. *Hospital-acquired MRSA Infection is defined according to the best judgement of the ICP.																														
20	Final Calculation																														
21	6.3 MRSA Healthcare Associated Infection cases per 1000 patient days. Divide # 6.2 by # 6.6. Multiply by 1000.																														
22	GOAL:																														
23	*The primary goal for this measure is to decrease the MRSA-HAI rate by 50% in one year. Using your baseline (generally, this will be your first entry in row 21 above), calculate the goal for your patient population. For example, if the baseline rate for your patient sample is 20 per 1000 patient days, your goal rate would be $20 - (20 \times 0.50) = 10$ per 1000 patient days. Enter this goal rate in every monthly cell!																														
	Comments																														

6.0 Incidence of Healthcare-Associated Methicillin-Resistant *Staphylococcus aureus* (MRSA) Infections per 1000 Patient Days - Technical Description

Intervention(s): Reduction of Methicillin-Resistant *Staphylococcus aureus* (MRSA)

Definition: The number of patients with laboratory-confirmed MRSA healthcare-associated clinical infections (HAI) per 1,000 patient days. This measure reflects the number of patients who were not colonized or infected with MRSA prior to admission however, became infected with MRSA during their hospital stay.

Goal: Annual reduction of 50% in rate of HAI - MRSA

Matches Existing Measures:

- CNISP (per 1000 admissions)
- CCHSA

CALCULATION DETAILS:

Numerator Definition: The total number of patients newly identified as having a hospital-acquired MRSA infection according to the criteria listed below. Hospital-acquired MRSA Infection is defined according to the best judgement of the ICP (or designate).

Numerator Inclusions:

Criteria for Identifying a Patient as a "Healthcare-Associated" MRSA Case

1. *Staphylococcus aureus* from any body site.
2. Isolate resistant to oxacillin

Once the patient has been identified with MRSA, they will be classified as healthcare-associated based on the "best judgment" of the practitioner. This judgment should include review of:

- a. Length of time in hospital prior to MRSA identification (generally >48 hours);
- b. Knowledge of previous MRSA status
- c. Length of stay in hospital
- d. Prior hospitalization or other healthcare facility history (previously admitted in past 12 months)
- e. Where patient admitted from (e.g., long-term care)

Denominator Definition: The total number of patient days for the healthcare facility, department or unit in the monthly sample.

Denominator Exclusions:

- MRSA colonization
- As defined by patient sample parameters e.g., healthcare facility, department, unit.

Measurement Period Length: Measure monthly.

Definition of Terms:

How-to Guide: Reduce Methicillin-Resistant *Staphylococcus aureus*

- **Infection:** Infection occurs when MRSA enters a body site and multiplies in tissue causing clinical manifestations of disease. This is usually evident by fever, a rise in the white blood cell count, or purulent drainage from a wound or body cavity. The distinction between colonization and infection is a clinical one. Such a distinction should be determined by the clinician, not by culture results alone. Colonized and infected patients are the major reservoirs of MRSA.
- **MRSA case:** The isolation of *Staphylococcus aureus* resistant to oxacillin (e.g. methicillin, amoxicillin, penicillin) from any body site in a clinical isolate (non-screening, non-blood culture specimens) obtained from a patient who meets the definition of HAI-MRSA who meets the criteria for HAI-MRSA bacteremia including: the isolate is obtained from the patient a minimum of 48 hours after admission to hospital coupled with knowledge of the patient's previous MRSA status, date of admission, length of stay in hospital, prior hospitalization or other healthcare facility history (previously admitted in past 12 months) from where patient is admitted i.e. Long-term Care. The patient must have a diagnosed infection which meets the hospital's definition of infection. Infection refers to invasion of bacteria into tissue with replication of the organism; it is characterized by isolation of the organism accompanied by clinical signs of illness such as fever, elevated WBC, purulence, pneumonia or inflammation.

Note: If using clinical isolates then exclude all screening culture results as well as duplicate or additional specimens from the same patient (i.e., a patient with 3 swabs from a wound that all grow MRSA would be counted once – you need one clinical isolate from each infection event)

- **Patient days:** A measure of a multiple of patient or bed days for a healthcare facility or unit used to standardize the results of the indicator. For this measure the multiple is 1,000 patient days. It is calculated by multiplying by 1,000 the count of patient days for a specific area and month which may be obtained from the Admitting Department of the facility.

Calculate as: The total number of patients newly identified as a hospital-acquired MRSA infection according to the criteria listed in “numerator inclusions” in the monthly sample / Total number of patient days for the healthcare facility, department or unit in the monthly sample x 1000.

Comments: None.

COLLECTION STRATEGY:

Data Collection Approach:

- If your institution has been conducting surveillance on this measure prior to joining SHN!, you may use previously collected data as baseline. If your organization has not been following these measures prior to SHN!, start collecting this data prospectively. As this measure takes time to affect change, you may start testing your change ideas immediately.
- Continue to track the measure on a monthly basis. Using the SHN worksheet record your data and monitor your improvement on the run chart included in the measurement

workbook. Annotate the run chart, with notes reflecting any interventions you made to improve.

Data Accuracy: Data accuracy is enhanced when all definitions are used without modification.

Sampling: Data may be obtained concurrently from 10 to 20 patients per month on a specific unit or the entire healthcare facility.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	
1	7.0 Healthcare Associated Blood Stream Infection caused by MRSA per 1000 *Patient Days - Measurement Worksheet																															
2	Reduction of Methicillin-Resistant Staphylococcus Aureus (MRSA)																															
3	Intervention	Reduction of Methicillin-Resistant Staphylococcus Aureus (MRSA)																														
4	Definition	<p>In the interest of the brevity of this document we will call this measure Healthcare Associated MRSA Bacteremia. This measure is data collected on patients that are admitted to a healthcare facility as inpatients. This blood stream infection (BSI) is the result of a healthcare contact acquired in a variety of ways i.e., a patient who was admitted with an BSI caused by MRSA due to an outpatient activity (renal outpatient IV therapy) or a patient recently discharged and readmitted with an BSI caused by MRSA within 48 hours of discharge. We are excluding BSI secondary to surgical site infections unless the patient is being readmitted.</p> <p>MRSA Bacteremia case is defined as the isolation of Staphylococcus aureus resistant to oxacillin (e.g. methicillin, amoxicillin, penicillin) in blood obtained from a patient a minimum of 48 hours after admission to hospital. The patient must have a diagnosed infection which meets the hospital's definition of infection. Monthly measure of "Patient Days" for a healthcare facility or selected area e.g. ICU may be obtained from the Admitting department, utilization staff, financial department or health records or where located at your facility.</p>																														
5	Goal	Zero (0) cases																														
6	Data Collection Details																															
7	Hospital Name																Team #															
8	Health Region																Hospital Type															
9	Patient Sample	Describe the source of the patient population e.g. Cardiac Care Unit, Medical ICU, Surgical ICU, CVICU, Neuro ICU etc																														
10																																
11																																
12																																
13																																
14	Calculation of Denominator																															
15	Implementation Stage																															
16	Collection Method																															
17	7.1 What is the total number of patient days for the healthcare facility or selected area (ie. Intensive Care Unit) this month? (Monthly measure of "Patient Days" for a healthcare facility or a specific area of choice may be obtained from the Admitting department, utilization staff, financial department or health records or where located at your facility).																															
18	Calculation of Numerator																															
19	7.2 What is the total number of patients in # 7.1 newly identified as a healthcare associated BACTEREMIA caused by MRSA according to the criteria listed below.																															
20	Final Calculation																															
21	7.3 Healthcare associated BACTEREMIA caused by MRSA per 1000 patient days in selected area e.g. ICU. Divide # 7.2 by # 7.1. Multiply by 1000.	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
22	GOAL*:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Comments																															

7.0 Healthcare Associated Blood Stream Infection caused by MRSA per 1000 *Patient Days - Technical Description

Intervention(s): Reduction of Methicillin-Resistant *Staphylococcus aureus* (MRSA)

Definition: In the interest of the brevity of this document we will call this measure Healthcare Associated MRSA Bacteremia. This measure is data collected on patients that are admitted to a healthcare facility as inpatients. This blood stream infection (BSI) is the result of a healthcare contact acquired in a variety of ways ie., a patient who was admitted with an BSI caused by MRSA due to an outpatient activity (renal outpatient IV therapy) or a patient recently discharged and readmitted with an BSI caused by MRSA within 48 hours of discharge. We are excluding BSI secondary to surgical site infections unless the patient is being readmitted.

MRSA Bacteremia case is defined as the isolation of *Staphylococcus aureus* resistant to oxacillin (e.g. methicillin, amoxicillin, penicillin) in blood obtained from a patient a minimum of 48 hours after admission to hospital. The patient must have a diagnosed infection which meets the hospital's definition of infection. Monthly measure of "Patient Days" for a healthcare facility or selected area e.g. ICU may be obtained from the Admitting department, utilization staff, financial department or health records or where located at your facility.

Goal: Zero (0) Cases

Matches Existing Measures:

- CNISP

CALCULATION DETAILS:

Numerator Definition: The total number of patients newly identified as having a healthcare associated bloodstream infection caused by MRSA according to the criteria listed below.

Numerator Inclusions:

Criteria for Identifying a Patient as a Healthcare-Associated MRSA Case:

1. *Staphylococcus aureus* from blood culture isolate.
2. Isolate resistant to oxacillin

Once the patient has been identified with MRSA, they will be classified as healthcare-associated based on the "best judgment" of the practitioner. This judgment should include review of:

- a. Length of time in hospital prior to MRSA identification (generally >48 hours);
- b. Knowledge of previous MRSA status
- c. Length of stay in hospital
- d. Prior hospitalization or other healthcare facility history (previously admitted in past 12 months)
- e. From where the patient was admitted (e.g., long-term care)

Denominator Definition: The total number of patient days for the healthcare facility or selected area (ie. the ICU) in the monthly sample.

Denominator Exclusions:

- MRSA colonization
- MRSA non-bloodstream infection
- As defined by patient sample parameters e.g. unit.

Measurement Period Length: Measure monthly.

Definition of Terms:

- **Bacteremia:** A blood stream infection in which the patient has a recognized pathogen cultured from one or more blood cultures and the organism cultured from the blood is not related to an infection at another site. (*National Nosocomial Infections Surveillance System, CDC, 2004*)
- **Infection:** Infection occurs when MRSA enters a body site and multiplies in tissue causing clinical manifestations of disease. This is usually evident by fever, a rise in the white blood cell count, or purulent drainage from a wound or body cavity. The distinction between colonization and infection is a clinical one. Such a distinction should be determined by the clinician, not by culture results alone. Colonized and infected patients are the major reservoirs of MRSA.
- **MRSA Bacteremia Case:** The isolation of *Staphylococcus aureus* resistant to oxacillin (e.g. methicillin, amoxicillin, penicillin) in blood (clinical isolate) obtained from a patient who meets the criteria for healthcare associated MRSA bacteremia including: the isolate is obtained from the patient a minimum of 48 hours after admission to hospital coupled with knowledge of the patient's previous MRSA status, date of admission, length of stay in hospital, prior hospitalization or other healthcare facility history (previously admitted in past 12 months) from where patient is admitted i.e. Long-term Care. The patient must have a diagnosed infection which meets the hospital's definition of infection. Infection refers to invasion of bacteria into tissue with replication of the organism; it is characterized by isolation of the organism accompanied by clinical signs of illness such as fever, elevated WBC, purulence, pneumonia or inflammation.
- **Patient days:** A measure of a multiple of patient or bed days for a specific facility or selected area e.g. ICU used to standardize the results of the indicator. For this measure the multiple is 1,000 patient days. It is calculated by multiplying by 1,000 the count of patient days for the specific area and month which may be obtained from the Admitting Department of the facility.

Calculate as: The total number of patients newly identified as having a healthcare associated bloodstream infection caused by MRSA according to the criteria listed in "numerator inclusions" in the monthly sample/ Total number of patient days for the healthcare facility, department or unit in the monthly sample x 1000.

Comments: None.

COLLECTION STRATEGY:

Data Collection Approach:

- If your institution has been conducting surveillance on this measure prior to joining SHN!, you may use previously collected data as baseline. If your organization has not been following these measures prior to SHN!, start collecting this data prospectively. As this measure takes time to affect change, you may start testing your change ideas immediately.
- Continue to track the measure on a monthly basis. Using the SHN worksheet record your data and monitor your improvement on the run chart included in the measurement workbook. Annotate the run chart, with notes reflecting any interventions you made to improve.

Data Accuracy: Data accuracy is enhanced when all definitions are used without modification.

Sampling: Data may be obtained concurrently from 10 to 20 patients per month from health care facility or a specific area (i.e. ICU).